

**TRIP GENERATION & TRAFFIC IMPACT STUDY
PROPOSED DONKIN DONUTS
35 WEST SHORE ROAD
WARWICK, RHODE ISLAND**

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INTRODUCTION

A Traffic Impact Study was performed to assess the potential impact of a proposed 3,657ft² Dunkin Donuts (DD). The proposed development will be built on a 40,776 ft² parcel (Plat Map 319, Lots 2, 4 and 502) approximately 250' to the east of the West Shore Road/Warwick Avenue/Airport Road signalized intersection. This new development will replace the existing Dunkin Donuts, approximately 3,200 SF in area, located on the adjacent lot to the west at 1582 Warwick Avenue which is on the southwest quadrant of the West Shore Road/Warwick Avenue/Airport Road signalized intersection. The existing Dunkin Donuts location on Warwick Avenue will remain vacant for future development. Since the use of the current Dunkin Donuts at 1582 Warwick Avenue is unknown at this time, this study will assume the 3,200 SF space of the existing Dunkin Donuts will be developed in the future as a High Turnover (Sit-Down) Restaurant, which is moderate traffic generator during AM and PM Peak Hours. It is recognized that future development of that space may require an updated traffic evaluation.

This traffic study is comprised of an orientation phase, a data collection phase and an analysis phase prior to preparing conclusions/recommendations. The orientation phase consists of on-site visit and becoming familiar with the scope of the project. The data collection phase consists of reviewing the existing roadway conditions, land uses and existing traffic data. The analysis portion consists of determining the capacity and level of service of the adjacent roadway network under pre-development and proposed conditions. Conclusions and recommendations are only prepared following a comprehensive review of the analysis.

EXISTING CONDITIONS

The project site at Lots 502, 2 and 4 are currently Ocean Nails Salon, Greenville Auto (permanently closed) and repair shop (by appointment only) and a vacant building, respectively. The site is located east of the signalized intersection of Warwick Avenue (Route 117 / 117A) and Airport Road / West Shore Road (Route 117) in Warwick.

A. Roadway Geometrics

West Shore Road in the vicinity of the site is a two lane east/west arterial. In the vicinity of the proposed project, West Shore Road measures approximately 59' in width consisting of a 30' travel lane and 7' shoulder westbound and a 19' travel lane and 3' shoulder eastbound. There are 6'

bituminous concrete sidewalks with curbing on both sides of the street. The posted speed limit is 35 mph.

Warwick Avenue adjacent to the site is a four lane north/south arterial approximately 52' wide with 12' travel lanes and 2' shoulders. The posted speed limit is 35 mph along the southbound approach to the signal and 30 mph along the northbound approach to the signal.

Airport Road in the vicinity of the site is a four lane east/west arterial approximately 52' wide with 12' travel lanes and 2' shoulders. The posted speed limit is 25 mph.

Warwick Avenue intersects Airport Road / West Shore Road at a signalized intersection. At the intersection approach, Warwick Avenue southbound widens to two through lanes, a left turn lane and right turn lane; Warwick Avenue northbound widens to two through lanes, a left turn only lane and a right channelized turn lane; West Shore Road westbound widens to two through lanes, a left turn only lane and a right channelized turn lane; Airport Road widens to two through lanes, a left turn lane and right turn lane.

B. Existing Traffic Volumes

Manual traffic counts were conducted on Thursday, July 29, 2021 at the following locations:

- Signalized intersection of Warwick Ave / Airport Rd / West Shore Rd from 7-9 AM and 4-6 PM
- Three driveways for the existing Dunkin Donuts at 1582 Warwick Avenue from 7-9 AM and 4-6 PM
- Two driveways for the existing Ocean Nails at 27 West Shore Road from 4-6 PM

Weekday AM Peak hour counts were not collected at Ocean Nails driveways because that business is not open during the AM Peak hours. The weekday AM and PM peak hours within the study area were determined to be 8-9 AM and 4-5 PM, respectively. There was no traffic at the Ocean Nails driveway during the PM Peak hour. The peak hour volumes on West Shore Road are as follows:

	<u>Weekday</u> <u>AM Peak</u>	<u>Weekday</u> <u>PM Peak</u>
West Shore Road	1,229	1,462
Eastbound	433	864
Westbound	796	598

PROPOSED DEVELOPMENT

A. Site Design

The proposed 3,657 ft² Dunkin Donuts restaurant and drive-thru at 35 West Shore Road will be replacing the approximately 3,200 ft² Dunkin Donuts restaurant and drive-thru at 1582 Warwick Avenue. All existing buildings on the proposed site will be removed; existing driveway openings onto West Shore Road will be closed and replaced with two proposed (2) access driveways.

B. Access / Circulation / Parking / Loading

The proposed access driveway on the east side of the site will be located approximately 49' west of the east property line and approximately 470' east of the westbound approach stop line at the Warwick Avenue signal. It will be a 24' wide full-access driveway for vehicles entering and exiting Dunkin Donuts. The northbound exit approach will be stop-controlled. The second proposed driveway will be for entering traffic only and measure 24' in width. This secondary driveway will be located 20' east of the west property line and approximately 250' east of the westbound approach stop line at the Warwick Avenue signal. The project layout allows for an emergency vehicle to circulate through the site.

ITE Parking Generation Manual (5th Ed) is the industry standard which provides parking data from traffic studies of similar land uses. From *ITE*, the average peak parking demand per 1,000 SF of gross floor area for a Coffee / Donut Shop with Drive-Thru Window is 5.22. For a proposed area of 3,657 SF, that is an equivalent average parking demand of 19 parking spaces. The proposed 38 spaces provided surpasses this standard with double the ITE average parking rate.

According to Warwick's City Ordinance, Appendix A Section 702, at least 1 loading area (measuring 60' x 14' with 15' clearance) is required per 2,000 SF of gross floor area for a commercial area where commodities are sold. One additional space is needed for every 10,000 SF thereafter. Based on the proposed area, the project meets and surpasses the requirements for loading area dimensions since it provides double the loading area required by City ordinance.

C. Sight Distance

The posted speed limit is 35 mph along West Shore Road in the vicinity of the proposed DD site; therefore, a design speed of 40 mph was utilized for evaluating sight distances. According to the

latest version of *AASHTO – Geometric Design of Highways and Streets*, a minimum stopping sight distance (SSD) of 305 feet is required. The proposed entrance-only driveway is located approximately 300' east of the Warwick Avenue signal; however, since the signal will be controlling traffic and lowering speeds, this distance is acceptable. The proposed entrance is visible more than 400' to the east. The proposed full-access driveway, where vehicles would be exiting the site, has more than a 350' sightline facing east on West Shore Road, and more than a 400' sightline facing west to the Warwick Avenue signal. Therefore, the stopping sight distances are sufficient.

D. Projected Traffic

Generally, the projected number of vehicle trips is based on trip generation rates published in the latest version of *Trip Generation* by the Institute of Transportation Engineers (ITE), a national professional organization for traffic and transportation engineers. The data provided by ITE is based on traffic studies of similar land uses and is an accepted industry standard. There was limited information available in this source regarding trip generation for land use code (LUC) 937 – Coffee Donut Shop with Drive-Thru Window; however, this was the trips generated using the ITE data:

Average Weekday: 2,700 - 3,178 trips per day (50% enter / 50% exit)

Weekday AM Peak: 325 trips per hour (51% enter / 49% exit)

Weekday PM Peak: 160 trips per hour (50% enter / 50% exit)

For a more accurate estimate than ITE data, additional trip generation data was reviewed for a similar local Dunkin Donuts located at the adjacent lot at 1582 Warwick Avenue. The traffic data for that existing location is provided below:

Weekday AM Peak Hour: 302 trips (152 enter / 150 exit) per hour

Weekday PM Peak Hour: 142 trips (72 enter / 70 exit) per hour

Using the existing 3,200 SF area of the Dunkin Donuts at 1582 Warwick Avenue, that is an equivalent existing trip generation rate of 94.4 total trips per 1,000 SF for the AM Peak hour and 44.4 total trips per 1,000 SF for the PM Peak hour.

For the future High Turnover (Sit-Down) Restaurant (LUC 932) trip generation, *ITE's Trip Generation* lists the trip rate as generating 9.94 trips per 1,000 SF for the AM Peak and 9.77 trips per 1,000 SF for the PM Peak.

Trip Generation & Traffic Impact Study
Proposed Dunkin Donuts, Warwick, RI

The total trips generated from the development of a proposed Dunkin Donuts at 35 West Shore Road in addition to the trips generated by a possible future High Turnover Restaurant at 1582 Warwick Avenue are shown in the following tables.

Weekday AM Peak Hour

Trip Generation for 3,657 SF DD at 35 W Shore Road & 3,200 SF future adjacent LUC 932

Land Use	AM Peak Ave. Rate (per 1,000 SF)	Total Area (SF)	% Enter	% Exit	Total Trips	Trips Enter	Trips Exit
937 – Coffee Donut Shop with Drive-Thru Window (using actual count rates)	94.4	3,657	50	50	346	173	173
932 – High Turnover (Sit-Down) Restaurants (using ITE rates)	9.94	~3,200	55	45	32	18	14
Subtract existing DD trips to be relocated					302	152	150
Total New Trips					76	39	37

Weekday PM Peak Hour

Trip Generation for 3,657 SF DD at 35 W Shore Road & 3,200 SF future adjacent LUC 932

Land Use	PM Peak Ave. Rate (per 1,000 SF)	Total Area (SF)	% Enter	% Exit	Total Trips	Trips Enter	Trips Exit
937 – Coffee Donut Shop with Drive-Thru Window (using actual count rates)	44.4	3,657	51	49	162	83	79
932 – High Turnover (Sit-Down) Restaurants (using ITE rates)	9.77	~3,200	62	38	31	19	12
Subtract existing DD trips to be relocated					142	72	70
Total New Trips					51	30	21

The projected added trips during the Weekday AM peak hour and during the Weekday PM peak hour were then superimposed onto the existing traffic volumes for analysis of proposed conditions with DD at 35 West Shore Road and the future restaurant at 1582 Warwick Avenue built.

E. Capacity Analysis

Capacity analyses were performed for the signalized intersection of Warwick Avenue at Airport Road / West Shore Road, at the three driveways for the future restaurant (existing DD), and at the two proposed DD site driveways at 35 West Shore Road. Analyses were performed for existing and proposed conditions using 2021 traffic counts.

The analyses result in a Level of Service being assigned to the intersection. Level of Service is defined as a qualitative measure describing operational conditions based on vehicular delay. There are six levels of service ranging from Level A to Level F with Level D being considered acceptable for peak hour conditions at signalized intersections.

1. Signalized Intersections

The levels of service at signalized intersections are determined by a procedure described in the 2010 Highway Capacity Manual and as shown in Table 1.

TABLE 1

Level of Service Criteria for Signalized Intersections

<u>Level of Service</u>	<u>Control Delay per Vehicle (SEC)</u>
A	<10.
B	10.0 to 20.0
C	20.0 to 35.0
D	35.0 to 55.0
E	55.0 to 80.0
F	>80.0

2. Unsignalized Intersections

The levels of service at unsignalized intersections are determined by a procedure described in the 2010 Highway Capacity Manual. The level of service criteria for unsignalized intersections is described in Table 2.

TABLE 2

Level of Service Criteria for Unsignalized Intersections

<u>Level of Service</u>	<u>Control Delay per Vehicle (SEC)</u>
A	<10.
B	10.0 to 15.0
C	15.0 to 25.0
D	25.0 to 35.0
E	35.0 to 50.0
F	>50.0

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The capacity analyses indicated the following levels of service:

	AM Peak <u>LOS (Secs.)</u>	PM Peak <u>LOS (Secs.)</u>
Warwick Ave @ Airport Rd / W. Shore Rd	OVERALL	OVERALL
Existing 2021 Conditions	D (41.0)	D (40.4)
Proposed 2021 DD and Restaurant	D (40.9)	D (40.5)
Restaurant Driveway 1 @ Warwick Road		
Existing 2021 Conditions (Existing DD)	C (20.5) *	B (11.7) *
Proposed 2021 DD and Restaurant	A (0.0) *	A (0.0) *
Restaurant Driveway 2 @ W. Shore Rd		
Existing 2021 Conditions (Existing DD)	B (13.6) *	A (0.0) *
Proposed 2021 DD and Restaurant	A (9.2) *	A (0.0) *
Restaurant Driveway 3 @ W. Shore Rd		
Existing 2021 Conditions (Existing DD)	C (24.5) *	C (24.6) *
Proposed 2021 DD and Restaurant	C (17.3) *	C (19.6) *
DD Site Entrance 1 @ W. Shore Rd		
Existing 2021 Conditions	NA	NA
Proposed 2021 DD and Restaurant	A (0.0) *	A (0.0) *
DD Site Drive 2 @ W. Shore Rd		
Existing 2021 Conditions	NA	NA
Proposed 2021 DD and Restaurant	D (28.1) *	C (24.9) *

NA = Not Applicable

*Along proposed site drive approach only. Warwick Ave or West Shore Rd approaches are LOS A at this location.

With the proposed DD project at 35 West Shore Road built along with potential future use of existing DD, there is no change in overall or approach LOS at the signal from existing to proposed conditions for either AM or PM Peak.

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At the future restaurant driveways at 1582 Warwick Avenue, LOS at the driveways would remain the same as existing or improve since the future use would most likely generate less traffic than that of the existing DD.

The proposed DD exit driveway would have a LOS D during the AM peak and LOS C during the PM peak which are acceptable delays for a commercial driveway along a busy mainline road.

CONCLUSION

The proposed Dunkin Donuts at 35 West Shore Road will not have a detrimental impact on adjacent roadways. This conclusion is based on the following facts:

- The proposed DD layout allows for access of an emergency vehicle through the site
- The proposed 38 spaces surpasses the ITE standard with double the average parking rate
- The two proposed 60' x 14' loading areas surpass the City's loading requirements
- The stopping sight distances at the proposed DD driveways are sufficient based on posted and design speeds on West Shore Road
- With the relocation of DD to 35 West Shore Road and the possible future development of 1582 Warwick Ave, the total new trips only amount to 76 (39 enter / 37 exit) vehicles added during the AM Peak and 51 (30 enter / 21 exit) vehicles added during the PM Peak
- With the proposed DD project at 35 West Shore Road built along with potential future use of 1582 Warwick Ave, there is no change in overall or approach LOS at the signal from existing to proposed conditions for either AM or PM Peak.
- At the future restaurant driveways at 1582 Warwick Avenue, LOS at the driveways would remain the same as existing or improve since the future use would most likely generate less traffic than that of the existing DD.
- The proposed DD exit driveway would have a LOS D during the AM peak and LOS C during the PM peak which are acceptable delays for a commercial driveway along a busy mainline road.
- With the relocation of DD to 35 West Shore Road and the possible future development of 1582 Warwick Ave, Warwick Ave and West Shore Road mainline approaches will maintain LOS A at all the proposed access driveways

APPENDIX

SIGHT DISTANCE CRITERIA

criteria and guidance applicable to specific functional classifications of highways and streets are presented in Chapters 5 through 8.

Four aspects of sight distance are discussed below: (1) the sight distances needed for stopping, which are applicable on all roads and streets; (2) the sight distances needed for the passing of overtaken vehicles, applicable only on two-lane highways; (3) the sight distances needed for decisions at complex locations; and (4) the criteria for measuring these sight distances for use in design. The design of alignment and profile to provide sight distances and to satisfy the applicable design criteria are described later in this chapter. The special conditions related to sight distances at intersections are discussed in Section 9.5.

3.2.2 Stopping Sight Distance

Sight distance is the length of the roadway ahead that is visible to the driver. The available sight distance on a roadway should be sufficiently long to enable a vehicle traveling at or near the design speed to stop before reaching a stationary object in its path.

Stopping sight distance is the sum of two distances: (1) the distance traversed by the vehicle from the instant the driver sights an object necessitating a stop to the instant the brakes are applied, and (2) the distance needed to stop the vehicle from the instant brake application begins. These are referred to as brake reaction distance and braking distance, respectively.

3.2.2.1 Brake Reaction Time

Brake reaction time is the interval from the instant that the driver recognizes the existence of an obstacle on the roadway ahead that necessitates braking until the instant that the driver actually applies the brakes. Under certain conditions, such as emergency situations denoted by flares or flashing lights, drivers accomplish these tasks almost instantly. Under most other conditions, the driver needs not only to see the object but also to recognize it as a stationary or slowly moving object against the background of the roadway and other objects, such as walls, fences, trees, poles, or bridges. Such determinations take time, and the amount of time needed varies considerably with the distance to the object, the visual acuity of the driver, the driver's reaction time, the atmospheric visibility, the type and the condition of the roadway, and the nature of the obstacle. Vehicle speed and roadway environment probably also influence reaction time. Normally, a driver traveling at or near the design speed is more alert than one traveling at a lesser speed. A driver on a street in an urban area confronted by innumerable potential conflicts with parked vehicles, driveways, and cross streets is also likely to be more alert than the same driver on a limited-access facility where such conditions should be almost nonexistent. However, a driver on an urban street faces a high mental workload in trying to monitor additional conflicts, so there is no assurance that the driver will be able to quickly detect a need for immediate action from among the many potential sources of conflict.

The study of reaction times by Johansson and Rumar (41) referred to in Section 2.2.6 was based on data from 321 drivers who expected to apply their brakes. The median reaction-time value for these drivers was 0.66 s, with 10 percent using 1.5 s or longer. These findings correlate with those of earlier studies in which alerted drivers were also evaluated. Another study (46) found 0.64 s as the average reaction time, while 5 percent of the drivers needed over 1 s. In a third study (50), the values of brake reaction time ranged from 0.4 to 1.7 s. In the Johansson and Rumar study (41), when the event that prompted application of the brakes was unexpected, drivers' response times were found to increase by approximately 1 s or more; some reaction times were greater than 1.5 s. This increase in reaction time substantiated earlier laboratory and road tests in which the conclusion was drawn that a driver who needed 0.2 to 0.3 s of reaction time under alerted conditions would need 1.5 s of reaction time under normal conditions.

Minimum brake reaction times for drivers could thus be at least 1.64 s, 0.64 s for alerted drivers plus 1 s for the unexpected event. Because the studies discussed above used simple prearranged signals, they represent the least complex of roadway conditions. Even under these simple conditions, it was found that some drivers took over 3.5 s to respond. Because actual conditions on the highway are generally more complex than those of the studies, and because there is wide variation in driver reaction times, it is evident that the criterion adopted for use should be greater than 1.64 s. The brake reaction time used in design should be long enough to include the reaction times needed by nearly all drivers under most highway conditions. Studies documented in the literature (19, 41, 46, 50) show that a 2.5-s brake reaction time for stopping sight situations encompasses the capabilities of most drivers, including those of older drivers. The recommended design criterion of 2.5 s for brake reaction time exceeds the 90th percentile of reaction time for all drivers and was used in the development of Table 3-1.

A brake reaction time of 2.5 s is considered adequate for conditions that are more complex than the simple conditions used in laboratory and road tests, but it is not adequate for the most complex conditions encountered in actual driving. The need for greater reaction time in the most complex conditions encountered on the roadway, such as those found at multiphase at-grade intersections and at ramp terminals on through roadways, can be found in Section 3.2.3, "Decision Sight Distance."

3.2.2.2 Braking Distance

The approximate braking distance of a vehicle on a level roadway traveling at the design speed of the roadway may be determined from the following:

U.S. Customary	Metric
$d_B = 1.075 \frac{V^2}{a}$ <p>where:</p> <p>d_B = braking distance, ft</p> <p>V = design speed, mph</p> <p>a = deceleration rate, ft/s²</p>	$d_B = 0.039 \frac{V^2}{a}$ <p>where:</p> <p>d_B = braking distance, m</p> <p>V = design speed, km/h</p> <p>a = deceleration rate, m/s²</p>

(3-1)

Studies documented in the literature (19) show that most drivers decelerate at a rate greater than 14.8 ft/s² [4.5 m/s²] when confronted with the need to stop for an unexpected object in the roadway. Approximately 90 percent of all drivers decelerate at rates greater than 11.2 ft/s² [3.4 m/s²]. Such decelerations are within the driver’s capability to stay within his or her lane and maintain steering control during the braking maneuver on wet surfaces. Therefore, 11.2 ft/s² [3.4 m/s²] (a comfortable deceleration for most drivers) is recommended as the deceleration threshold for determining stopping sight distance. Implicit in the choice of this deceleration threshold is the assessment that most vehicle braking systems and the tire-pavement friction levels of most roadways are capable of providing a deceleration rate of at least 11.2 ft/s² [3.4 m/s²]. The friction available on most wet pavement surfaces and the capabilities of most vehicle braking systems can provide braking friction that exceeds this deceleration rate.

Table 3-1. Stopping Sight Distance on Level Roadways

U.S. Customary					Metric				
Design Speed (mph)	Brake Reaction Distance (ft)	Braking Distance on Level (ft)	Stopping Sight Distance		Design Speed (km/h)	Brake Reaction Distance (m)	Braking Distance on Level (m)	Stopping Sight Distance	
			Calculated (ft)	Design (ft)				Calculated (m)	Design (m)
15	55.1	21.6	76.7	80	20	13.9	4.6	18.5	20
20	73.5	38.4	111.9	115	30	20.9	10.3	31.2	35
25	91.9	60.0	151.9	155	40	27.8	18.4	46.2	50
30	110.3	86.4	196.7	200	50	34.8	28.7	63.5	65
35	128.6	117.6	246.2	250	60	41.7	41.3	83.0	85
40	147.0	153.6	300.6	305	70	48.7	56.2	104.9	105
45	165.4	194.4	359.8	360	80	55.6	73.4	129.0	130
50	183.8	240.0	423.8	425	90	62.6	92.9	155.5	160
55	202.1	290.3	492.4	495	100	69.5	114.7	184.2	185
60	220.5	345.5	566.0	570	110	76.5	138.8	215.3	220
65	238.9	405.5	644.4	645	120	83.4	165.2	248.6	250
70	257.3	470.3	727.6	730	130	90.4	193.8	284.2	285
75	275.6	539.9	815.5	820	140	97.3	224.8	322.1	325
80	294.0	614.3	908.3	910					
85	313.5	693.5	1007.0	1010					

Note: Brake reaction distance predicated on a time of 2.5 s; deceleration rate of 11.2 ft/s² [3.4 m/s²] used to determine calculated sight distance.

3.2.2.3 Design Values

The stopping sight distance is the sum of the distance traversed during the brake reaction time and the distance to brake the vehicle to a stop. The computed distances for various speeds at the assumed conditions on level roadways are shown in Table 3-1 and were developed from the following equation:

U.S. Customary	Metric
$SSD = 1.47Vt + 1.075 \frac{V^2}{a}$ <p>where: SSD = stopping sight distance, ft V = design speed, mph t = brake reaction time, 2.5 s a = deceleration rate, ft/s²</p>	$SSD = 0.278Vt + 0.039 \frac{V^2}{a}$ <p>where: SSD = stopping sight distance, m V = design speed, km/h t = brake reaction time, 2.5 s a = deceleration rate, m/s²</p>

(3-2)

3.2.2.4 Effect of Grade on Stopping

When a highway is on a grade, Equation 3-1 for braking distance is modified as follows:

U.S. Customary	Metric
$d_B = \frac{V^2}{30 \left[\left(\frac{a}{32.2} \right) \pm G \right]}$ <p>where: d_B = braking distance on grade, ft V = design speed, mph a = deceleration, ft/s² G = grade, rise/run, ft/ft</p>	$d_B = \frac{V^2}{254 \left[\left(\frac{a}{9.81} \right) \pm G \right]}$ <p>where: d_B = braking distance on grade, m V = design speed, km/h a = deceleration, m/s² G = grade, rise/run, m/m</p>

(3-3)

In this equation, G is the rise in elevation divided by the distance of the run and the percent of grade divided by 100, and the other terms are as previously stated. The stopping distances needed on upgrades are shorter than on level roadways; those on downgrades are longer. The stopping sight distances for various grades shown in Table 3-2 are the values determined by using Equation 3-3 in place of the second term in Equation 3-2. These adjusted sight distance values are computed for wet-pavement conditions using the same design speeds and brake reaction times used for level roadways in Table 3-1.

Table 3-2. Stopping Sight Distance on Grades

U.S. Customary							Metric						
Design Speed (mph)	Stopping Sight Distance (ft)						Design Speed (km/h)	Stopping Sight Distance (m)					
	Downgrades			Upgrades				Downgrades			Upgrades		
	3%	6%	9%	3%	6%	9%		3%	6%	9%	3%	6%	9%
15	80	82	85	75	74	73	20	20	20	20	19	18	18
20	116	120	126	109	107	104	30	32	35	35	31	30	29
25	158	165	173	147	143	140	40	50	50	53	45	44	43
30	205	215	227	200	184	179	50	66	70	74	61	59	58
35	257	271	287	237	229	222	60	87	92	97	80	77	75
40	315	333	354	289	278	269	70	110	116	124	100	97	93
45	378	400	427	344	331	320	80	136	144	154	123	118	114
50	446	474	507	405	388	375	90	164	174	187	148	141	136
55	520	553	593	469	450	433	100	194	207	223	174	167	160
60	598	638	686	538	515	495	110	227	243	262	203	194	186
65	682	728	785	612	584	561	120	263	281	304	234	223	214
70	771	825	891	690	658	631	130	302	323	350	267	254	243
75	866	927	1003	772	736	704	140	341	367	398	302	287	274
80	965	1035	1121	859	817	782							
85	1070	1149	1246	949	902	862							

On nearly all roads and streets, the grade is traversed by traffic in both directions of travel, but the sight distance at any point on the highway generally is different in each direction, particularly on straight roads in rolling terrain. As a general rule, the sight distance available on downgrades is larger than on upgrades, more or less automatically providing the appropriate corrections for grade. This may explain why some designers do not adjust stopping sight distance because of grade. Exceptions are one-way roadways or streets, as on divided highways with independent profiles. For these separate roadways, adjustments for grade may be needed.

3.2.2.5 Variation for Trucks

The recommended stopping sight distances are based on passenger car operation and do not explicitly consider design for truck operation. Trucks as a whole, especially the larger and heavier units, need longer stopping distances for a given speed than passenger vehicles. However, there is one factor that tends to balance the additional braking lengths for trucks with those for passenger cars. The truck driver is able to see substantially farther beyond vertical sight obstructions because of the higher position of the seat in the vehicle. Separate stopping sight distances for trucks and passenger cars, therefore, are not generally used in highway design.

There is one situation in which the goal should be to provide stopping sight distances greater than the design values in Table 3-1. Where horizontal sight restrictions occur on downgrades, particularly at the ends of long downgrades where truck speeds closely approach or exceed those of passenger cars, the greater height of eye of the truck driver is of little value. Although the

TRAFFIC COUNT

Transportation Data Corporation
 Mario Perone, mperone1@verizon.net
 tel (781) 587-0086 cell (781) 439-4999

N/S: Warwick Avenue (117/117A)
 E/W: W. Shore Road/Airport Road
 City, State: Warwick, RI
 Client: Crossman/E. McChesney

File Name : 05443A
 Site Code : 05443
 Start Date : 7/29/2021
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Warwick Avenue (Route 117) From North				W. Shore Road (Route 117) From East				Warwick Avenue (Route 117A) From South				Airport Road From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
07:00 AM	48	43	20	0	40	134	6	0	9	59	105	0	36	34	13	0	547
07:15 AM	58	54	19	0	59	137	11	0	10	77	114	0	44	37	31	0	651
07:30 AM	50	58	32	0	57	141	11	0	10	98	124	0	47	37	30	1	696
07:45 AM	63	89	24	1	60	130	7	0	3	98	142	0	78	43	50	0	788
Total	219	244	95	1	216	542	35	0	32	332	485	0	205	151	124	1	2682
08:00 AM	57	75	31	0	48	175	11	0	15	97	112	4	74	52	31	0	782
08:15 AM	61	71	33	0	55	164	9	0	13	88	108	0	72	54	33	0	761
08:30 AM	78	68	50	0	49	133	13	2	14	95	140	0	77	62	37	0	818
08:45 AM	57	78	34	0	50	125	20	2	16	98	121	1	91	80	54	0	827
Total	253	292	148	0	202	597	53	4	58	378	481	5	314	248	155	0	3188
Grand Total	472	536	243	1	418	1139	88	4	90	710	966	5	519	399	279	1	5870
Apprch %	37.7	42.8	19.4	0.1	25.3	69.1	5.3	0.2	5.1	40.1	54.5	0.3	43.3	33.3	23.3	0.1	
Total %	8	9.1	4.1	0	7.1	19.4	1.5	0.1	1.5	12.1	16.5	0.1	8.8	6.8	4.8	0	

Start Time	Warwick Avenue (Route 117) From North				W. Shore Road (Route 117) From East				Warwick Avenue (Route 117A) From South				Airport Road From West				Int. Total				
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds					
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	57	75	31	0	163	48	175	11	0	234	15	97	112	4	228	74	52	31	0	157	782
08:15 AM	61	71	33	0	165	55	164	9	0	228	13	88	108	0	209	72	54	33	0	159	761
08:30 AM	78	68	50	0	196	49	133	13	2	197	14	95	140	0	249	77	62	37	0	176	818
08:45 AM	57	78	34	0	169	50	125	20	2	197	16	98	121	1	236	91	80	54	0	225	827
Total Volume	253	292	148	0	693	202	597	53	4	856	58	378	481	5	922	314	248	155	0	717	3188
% App. Total	36.5	42.1	21.4	0		23.6	69.7	6.2	0.5		6.3	41	52.2	0.5		43.8	34.6	21.6	0		
PHF	.811	.936	.740	.000	.884	.918	.853	.663	.500	.915	.906	.964	.859	.313	.926	.863	.775	.718	.000	.797	.964

Transportation Data Corporation
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N/S: Warwick Avenue (117/117A)
 E/W: W. Shore Road/Airport Road
 City, State: Warwick, RI
 Client: Crossman/E. McChesney

File Name : 05443A
 Site Code : 05443
 Start Date : 7/29/2021
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Warwick Avenue (Route 117) From North				W. Shore Road (Route 117) From East				Warwick Avenue (Route 117A) From South				Airport Road From West				Int. Total	
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds		
07:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
Apprch %	0	100	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	
Total %	0	50	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	

Start Time	Warwick Avenue (Route 117) From North				W. Shore Road (Route 117) From East				Warwick Avenue (Route 117A) From South				Airport Road From West				Int. Total	
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds		
07:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	2
% App. Total	0	100	0	0	0	100	0	0		0	0	0	0	0	0	0	0	
PHF	.000	.250	.000	.000	.250	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.500

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:00 AM

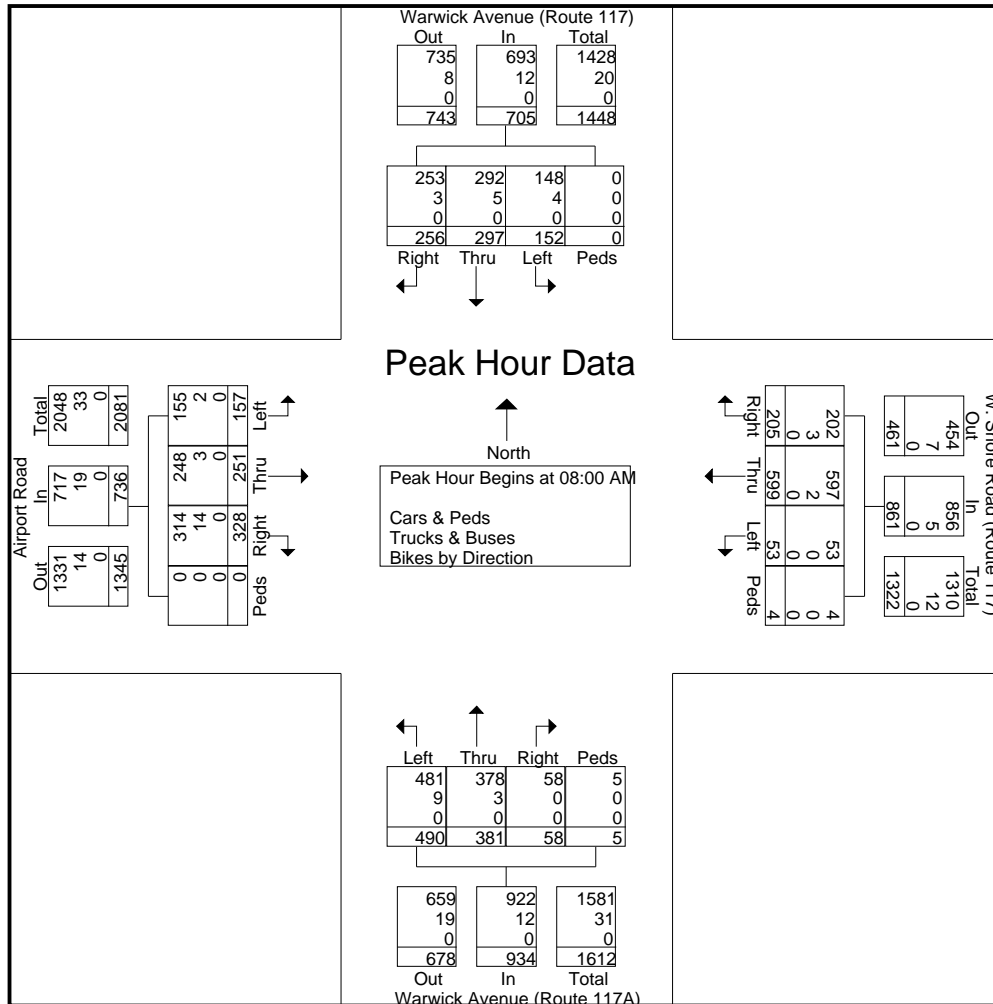
Transportation Data Corporation

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N/S: Warwick Avenue (117/117A)
E/W: W. Shore Road/Airport Road
City, State: Warwick, RI
Client: Crossman/E. McChesney

File Name : 05443A
Site Code : 05443
Start Date : 7/29/2021
Page No : 1

Start Time	Warwick Avenue (Route 117) From North					W. Shore Road (Route 117) From East					Warwick Avenue (Route 117A) From South					Airport Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	57	76	31	0	164	49	175	11	0	235	15	97	115	4	231	80	53	31	0	164	794
08:15 AM	63	72	35	0	170	55	165	9	0	229	13	89	112	0	214	73	55	34	0	162	775
08:30 AM	79	70	50	0	199	50	134	13	2	199	14	96	142	0	252	80	62	38	0	180	830
08:45 AM	57	79	36	0	172	51	125	20	2	198	16	99	121	1	237	95	81	54	0	230	837
Total Volume	256	297	152	0	705	205	599	53	4	861	58	381	490	5	934	328	251	157	0	736	3236
% App. Total	36.3	42.1	21.6	0		23.8	69.6	6.2	0.5		6.2	40.8	52.5	0.5		44.6	34.1	21.3	0		
PHF	.810	.940	.760	.000	.886	.932	.856	.663	.500	.916	.906	.962	.863	.313	.927	.863	.775	.727	.000	.800	.967
Cars & Peds	253	292	148	0	693	202	597	53	4	856	58	378	481	5	922	314	248	155	0	717	3188
% Cars & Peds	98.8	98.3	97.4	0	98.3	98.5	99.7	100	100	99.4	100	99.2	98.2	100	98.7	95.7	98.8	98.7	0	97.4	98.5
Trucks & Buses	3	5	4	0	12	3	2	0	0	5	0	3	9	0	12	14	3	2	0	19	48
% Trucks & Buses	1.2	1.7	2.6	0	1.7	1.5	0.3	0	0	0.6	0	0.8	1.8	0	1.3	4.3	1.2	1.3	0	2.6	1.5
Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bikes by Direction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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N/S: Warwick Avenue (Route 117A)
 E: Dunkin Donuts Driveway
 City, State: Warwick, RI
 Client: Crossman/E. McChesney

File Name : 05443B
 Site Code : 05443
 Start Date : 7/29/2021
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Warwick Avenue (Route 117A) From North			Dunkin Donuts Driveway From East			Warwick Avenue (Route 117A) From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
07:00 AM	0	0	0	0	0	0	11	0	0	11
07:15 AM	0	0	0	0	0	0	11	0	0	11
07:30 AM	0	0	0	0	0	0	10	0	0	10
07:45 AM	0	0	0	0	0	0	5	0	0	5
Total	0	0	0	0	0	0	37	0	0	37
08:00 AM	0	0	0	1	0	2	10	0	0	13
08:15 AM	0	0	0	0	0	0	12	0	0	12
08:30 AM	0	0	0	1	0	0	10	0	0	11
08:45 AM	0	0	0	0	1	2	6	0	0	9
Total	0	0	0	2	1	4	38	0	0	45
Grand Total	0	0	0	2	1	4	75	0	0	82
Apprch %	0	0	0	28.6	14.3	57.1	100	0	0	
Total %	0	0	0	2.4	1.2	4.9	91.5	0	0	

Start Time	Warwick Avenue (Route 117A) From North				Dunkin Donuts Driveway From East				Warwick Avenue (Route 117A) From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	0	0	0	0	1	0	2	3	10	0	0	10	13
08:15 AM	0	0	0	0	0	0	0	0	12	0	0	12	12
08:30 AM	0	0	0	0	1	0	0	1	10	0	0	10	11
08:45 AM	0	0	0	0	0	1	2	3	6	0	0	6	9
Total Volume	0	0	0	0	2	1	4	7	38	0	0	38	45
% App. Total	0	0	0		28.6	14.3	57.1		100	0	0		
PHF	.000	.000	.000	.000	.500	.250	.500	.583	.792	.000	.000	.792	.865

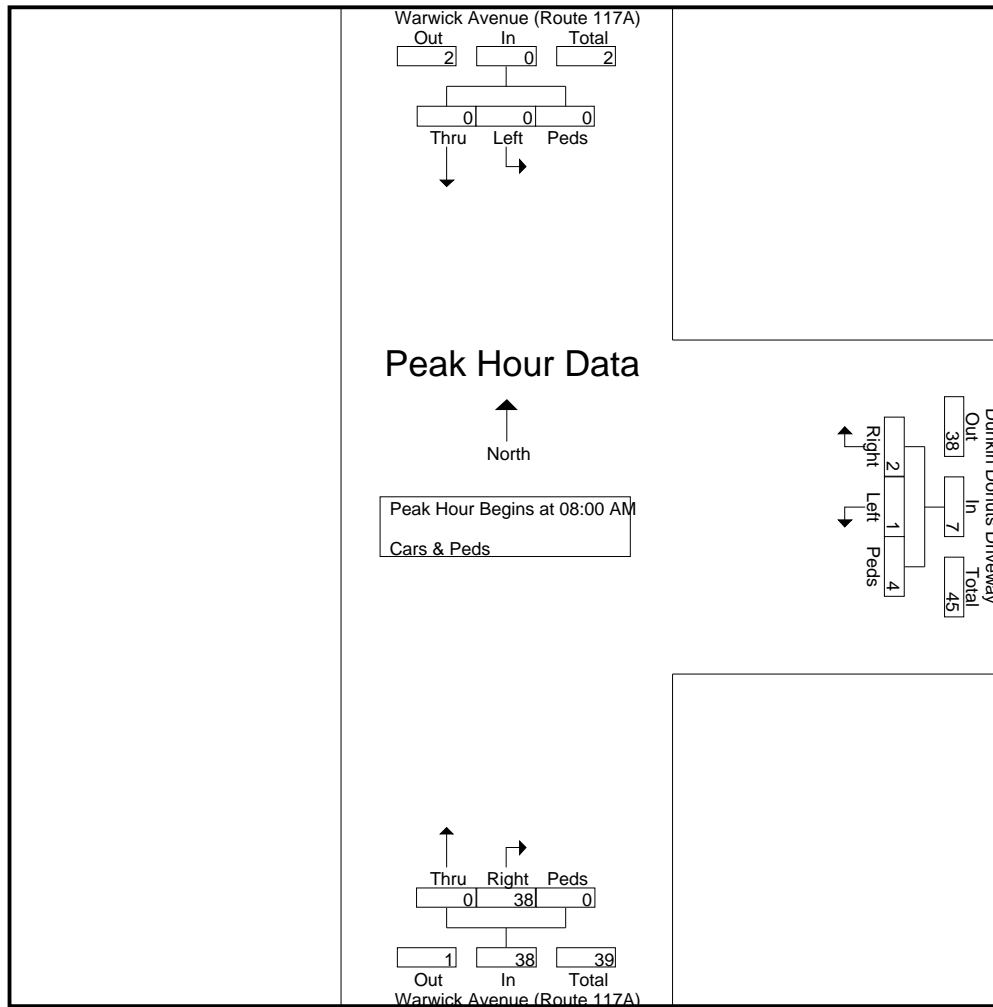
Transportation Data Corporation

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N/S: Warwick Avenue (Route 117A)
E: Dunkin Donuts Driveway
City, State: Warwick, RI
Client: Crossman/E. McChesney

File Name : 05443B
Site Code : 05443
Start Date : 7/29/2021
Page No : 1

Start Time	Warwick Avenue (Route 117A) From North				Dunkin Donuts Driveway From East				Warwick Avenue (Route 117A) From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	0	0	0	0	1	0	2	3	10	0	0	10	13
08:15 AM	0	0	0	0	0	0	0	0	12	0	0	12	12
08:30 AM	0	0	0	0	1	0	0	1	10	0	0	10	11
08:45 AM	0	0	0	0	0	1	2	3	6	0	0	6	9
Total Volume	0	0	0	0	2	1	4	7	38	0	0	38	45
% App. Total	0	0	0		28.6	14.3	57.1		100	0	0		
PHF	.000	.000	.000	.000	.500	.250	.500	.583	.792	.000	.000	.792	.865



Transportation Data Corporation
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S: Dunkin Donuts Driveways
 E/W: W. Shore Road (Route 117)
 City, State: Warwick, RI
 Client: Crossman/E. McChesney

File Name : 05443C
 Site Code : 05443
 Start Date : 7/29/2021
 Page No : 1

Groups Printed- Westerly Drive

Start Time	W. Shore Road (Route 117) From East			Dunkin Donuts Driveways From South			W. Shore Road (Route 117) From West			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
07:00 AM	0	3	0	1	0	0	18	0	0	22
07:15 AM	0	1	0	0	0	0	11	0	0	12
07:30 AM	0	1	0	0	0	0	18	0	0	19
07:45 AM	0	4	0	0	1	0	14	0	0	19
Total	0	9	0	1	1	0	61	0	0	72
08:00 AM	0	3	0	1	0	0	13	0	0	17
08:15 AM	0	2	0	0	1	0	18	0	0	21
08:30 AM	0	2	0	1	0	0	24	0	0	27
08:45 AM	0	1	0	1	1	0	15	0	0	18
Total	0	8	0	3	2	0	70	0	0	83
Grand Total	0	17	0	4	3	0	131	0	0	155
Apprch %	0	100	0	57.1	42.9	0	100	0	0	
Total %	0	11	0	2.6	1.9	0	84.5	0	0	

Start Time	W. Shore Road (Route 117) From East				Dunkin Donuts Driveways From South				W. Shore Road (Route 117) From West				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	0	4	0	4	0	1	0	1	14	0	0	14	19
08:00 AM	0	3	0	3	1	0	0	1	13	0	0	13	17
08:15 AM	0	2	0	2	0	1	0	1	18	0	0	18	21
08:30 AM	0	2	0	2	1	0	0	1	24	0	0	24	27
Total Volume	0	11	0	11	2	2	0	4	69	0	0	69	84
% App. Total	0	100	0		50	50	0		100	0	0		
PHF	.000	.688	.000	.688	.500	.500	.000	1.00	.719	.000	.000	.719	.778

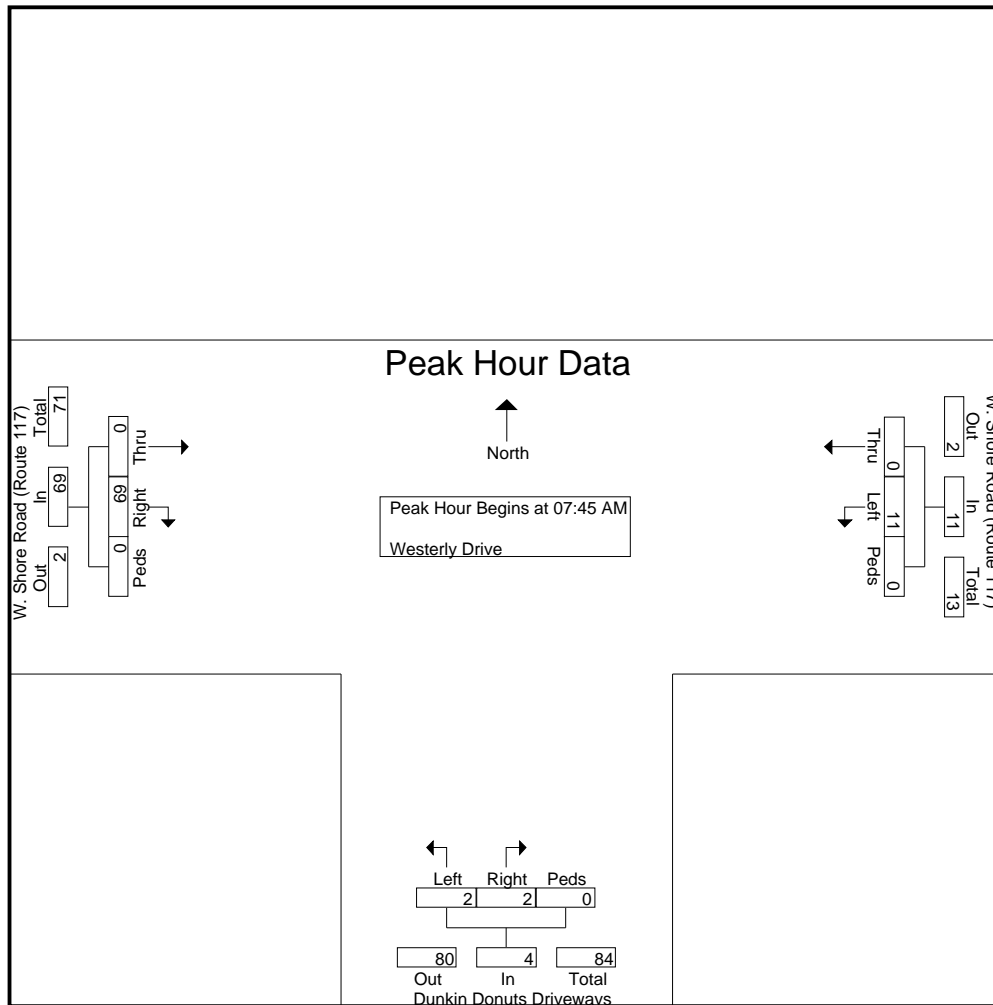
Transportation Data Corporation

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S: Dunkin Donuts Driveways
E/W: W. Shore Road (Route 117)
City, State: Warwick, RI
Client: Crossman/E. McChesney

File Name : 05443C
Site Code : 05443
Start Date : 7/29/2021
Page No : 1

Start Time	W. Shore Road (Route 117) From East				Dunkin Donuts Driveways From South				W. Shore Road (Route 117) From West				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	0	4	0	4	0	1	0	1	14	0	0	14	19
08:00 AM	0	3	0	3	1	0	0	1	13	0	0	13	17
08:15 AM	0	2	0	2	0	1	0	1	18	0	0	18	21
08:30 AM	0	2	0	2	1	0	0	1	24	0	0	24	27
Total Volume	0	11	0	11	2	2	0	4	69	0	0	69	84
% App. Total	0	100	0		50	50	0		100	0	0		
PHF	.000	.688	.000	.688	.500	.500	.000	1.00	.719	.000	.000	.719	.778



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S: Dunkin Donuts Driveways
 E/W: W. Shore Road (Route 117)
 City, State: Warwick, RI
 Client: Crossman/E. McChesney

File Name : 05443C
 Site Code : 05443
 Start Date : 7/29/2021
 Page No : 1

Groups Printed- Easterly Drive

Start Time	W. Shore Road (Route 117) From East			Dunkin Donuts Driveways From South			W. Shore Road (Route 117) From West			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
07:00 AM	0	7	0	9	29	0	0	0	0	45
07:15 AM	0	13	0	8	29	0	0	0	0	50
07:30 AM	0	12	0	8	31	0	1	0	0	52
07:45 AM	0	12	0	9	24	0	0	0	0	45
Total	0	44	0	34	113	0	1	0	0	192
08:00 AM	0	11	0	11	30	0	0	0	0	52
08:15 AM	0	3	0	12	27	0	0	0	0	42
08:30 AM	0	11	0	10	21	0	3	0	0	45
08:45 AM	0	7	0	10	21	0	1	0	0	39
Total	0	32	0	43	99	0	4	0	0	178
Grand Total	0	76	0	77	212	0	5	0	0	370
Apprch %	0	100	0	26.6	73.4	0	100	0	0	
Total %	0	20.5	0	20.8	57.3	0	1.4	0	0	

Start Time	W. Shore Road (Route 117) From East				Dunkin Donuts Driveways From South				W. Shore Road (Route 117) From West				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	0	13	0	13	8	29	0	37	0	0	0	0	50
07:30 AM	0	12	0	12	8	31	0	39	1	0	0	1	52
07:45 AM	0	12	0	12	9	24	0	33	0	0	0	0	45
08:00 AM	0	11	0	11	11	30	0	41	0	0	0	0	52
Total Volume	0	48	0	48	36	114	0	150	1	0	0	1	199
% App. Total	0	100	0		24	76	0		100	0	0		
PHF	.000	.923	.000	.923	.818	.919	.000	.915	.250	.000	.000	.250	.957

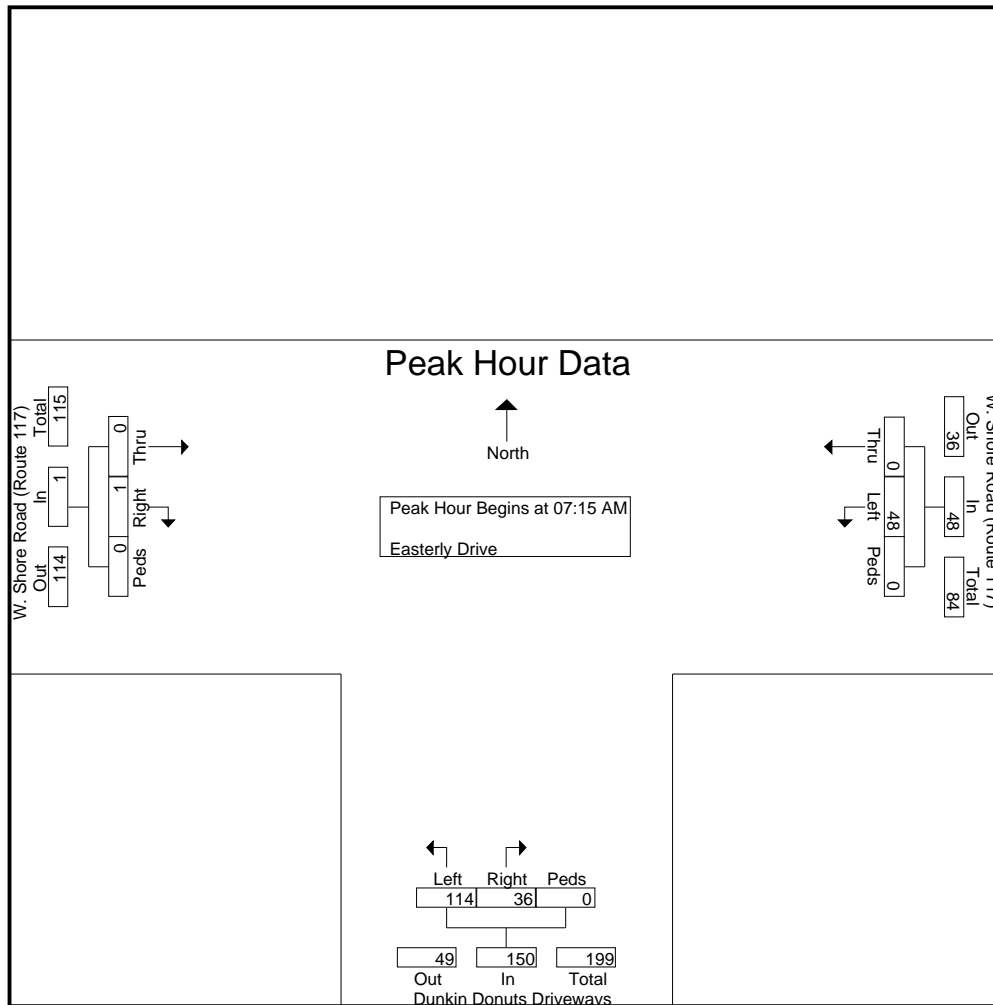
Transportation Data Corporation

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S: Dunkin Donuts Driveways
E/W: W. Shore Road (Route 117)
City, State: Warwick, RI
Client: Crossman/E. McChesney

File Name : 05443C
Site Code : 05443
Start Date : 7/29/2021
Page No : 1

Start Time	W. Shore Road (Route 117) From East				Dunkin Donuts Driveways From South				W. Shore Road (Route 117) From West				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:15 AM													
07:15 AM	0	13	0	13	8	29	0	37	0	0	0	0	50
07:30 AM	0	12	0	12	8	31	0	39	1	0	0	1	52
07:45 AM	0	12	0	12	9	24	0	33	0	0	0	0	45
08:00 AM	0	11	0	11	11	30	0	41	0	0	0	0	52
Total Volume	0	48	0	48	36	114	0	150	1	0	0	1	199
% App. Total	0	100	0		24	76	0		100	0	0		
PHF	.000	.923	.000	.923	.818	.919	.000	.915	.250	.000	.000	.250	.957



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N/S: Warwick Avenue (117/117A)
 E/W: W. Shore Road/Airport Road
 City, State: Warwick, RI
 Client: Crossman/E. McChesney

File Name : 05443AA
 Site Code : 05443
 Start Date : 7/29/2021
 Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

Start Time	Warwick Avenue (Route 117) From North				W. Shore Road (Route 117) From East				Warwick Avenue (Route 117A) From South				Airport Road From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	64	135	79	0	54	94	17	0	13	113	73	0	167	130	85	2	1026
04:15 PM	63	121	78	1	64	93	17	1	14	93	94	0	158	134	96	0	1027
04:30 PM	74	155	83	2	41	84	28	0	13	109	105	0	181	110	71	0	1056
04:45 PM	76	158	71	0	40	71	25	0	20	106	70	0	121	130	83	2	973
Total	277	569	311	3	199	342	87	1	60	421	342	0	627	504	335	4	4082
05:00 PM	69	128	79	0	36	88	23	0	14	85	89	2	136	120	72	1	942
05:15 PM	53	137	58	0	38	100	23	0	9	103	93	0	158	146	63	1	982
05:30 PM	52	138	59	0	37	78	17	0	12	113	105	1	109	97	67	1	886
05:45 PM	66	118	61	0	45	91	18	0	6	85	95	0	159	149	91	1	985
Total	240	521	257	0	156	357	81	0	41	386	382	3	562	512	293	4	3795
Grand Total	517	1090	568	3	355	699	168	1	101	807	724	3	1189	1016	628	8	7877
Apprch %	23.7	50	26.1	0.1	29	57.2	13.7	0.1	6.2	49.4	44.3	0.2	41.9	35.8	22.1	0.3	
Total %	6.6	13.8	7.2	0	4.5	8.9	2.1	0	1.3	10.2	9.2	0	15.1	12.9	8	0.1	
Cars & Peds	513	1084	564	3	352	697	168	1	100	800	722	3	1183	1010	626	8	7834
% Cars & Peds	99.2	99.4	99.3	100	99.2	99.7	100	100	99	99.1	99.7	100	99.5	99.4	99.7	100	99.5
Trucks & Buses																	
% Trucks & Buses	0.8	0.4	0.7	0	0.8	0.3	0	0	1	0.5	0.3	0	0.5	0.5	0.3	0	0.5
Bikes by Direction	0	2	0	0	0	0	0	0	0	3	0	0	0	1	0	0	6
% Bikes by Direction	0	0.2	0	0	0	0	0	0	0	0.4	0	0	0	0.1	0	0	0.1

Start Time	Warwick Avenue (Route 117) From North					W. Shore Road (Route 117) From East					Warwick Avenue (Route 117A) From South					Airport Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
04:00 PM	64	135	79	0	278	54	94	17	0	165	13	113	73	0	199	167	130	85	2	384	1026
04:15 PM	63	121	78	1	263	64	93	17	1	175	14	93	94	0	201	158	134	96	0	388	1027
04:30 PM	74	155	83	2	314	41	84	28	0	153	13	109	105	0	227	181	110	71	0	362	1056
04:45 PM	76	158	71	0	305	40	71	25	0	136	20	106	70	0	196	121	130	83	2	336	973
Total Volume	277	569	311	3	1160	199	342	87	1	629	60	421	342	0	823	627	504	335	4	1470	4082
% App. Total	23.9	49.1	26.8	0.3		31.6	54.4	13.8	0.2		7.3	51.2	41.6	0		42.7	34.3	22.8	0.3		
PHF	.911	.900	.937	.375	.924	.777	.910	.777	.250	.899	.750	.931	.814	.000	.906	.866	.940	.872	.500	.947	.966
Cars & Peds	275	566	310	3	1154	197	340	87	1	625	60	418	341	0	819	623	501	333	4	1461	4059
% Cars & Peds	99.3	99.5	99.7	100	99.5	99.0	99.4	100	100	99.4	100	99.3	99.7	0	99.5	99.4	99.4	99.4	100	99.4	99.4
Trucks & Buses	2	2	1	0	5	2	2	0	0	4	0	2	1	0	3	4	2	2	0	8	20
% Trucks & Buses	0.7	0.4	0.3	0	0.4	1.0	0.6	0	0	0.6	0	0.5	0.3	0	0.4	0.6	0.4	0.6	0	0.5	0.5
Bikes by Direction	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	3
% Bikes by Direction	0	0.2	0	0	0.1	0	0	0	0	0	0	0.2	0	0	0.1	0	0.2	0	0	0.1	0.1

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM

Transportation Data Corporation
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N/S: Warwick Avenue (117/117A)
 E/W: W. Shore Road/Airport Road
 City, State: Warwick, RI
 Client: Crossman/E. McChesney

File Name : 05443AA
 Site Code : 05443
 Start Date : 7/29/2021
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Warwick Avenue (Route 117) From North				W. Shore Road (Route 117) From East				Warwick Avenue (Route 117A) From South				Airport Road From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	62	134	79	0	53	93	17	0	13	113	73	0	166	130	85	2	1020
04:15 PM	63	121	77	1	64	92	17	1	14	92	94	0	157	132	95	0	1020
04:30 PM	74	155	83	2	41	84	28	0	13	108	104	0	179	109	71	0	1051
04:45 PM	76	156	71	0	39	71	25	0	20	105	70	0	121	130	82	2	968
Total	275	566	310	3	197	340	87	1	60	418	341	0	623	501	333	4	4059
05:00 PM	69	128	78	0	36	88	23	0	14	84	89	2	136	119	72	1	939
05:15 PM	52	136	58	0	38	100	23	0	9	103	93	0	157	146	63	1	979
05:30 PM	52	138	57	0	36	78	17	0	11	112	104	1	108	96	67	1	878
05:45 PM	65	116	61	0	45	91	18	0	6	83	95	0	159	148	91	1	979
Total	238	518	254	0	155	357	81	0	40	382	381	3	560	509	293	4	3775
Grand Total	513	1084	564	3	352	697	168	1	100	800	722	3	1183	1010	626	8	7834
Apprch %	23.7	50.1	26.1	0.1	28.9	57.2	13.8	0.1	6.2	49.2	44.4	0.2	41.8	35.7	22.1	0.3	
Total %	6.5	13.8	7.2	0	4.5	8.9	2.1	0	1.3	10.2	9.2	0	15.1	12.9	8	0.1	

Start Time	Warwick Avenue (Route 117) From North					W. Shore Road (Route 117) From East					Warwick Avenue (Route 117A) From South					Airport Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	62	134	79	0	275	53	93	17	0	163	13	113	73	0	199	166	130	85	2	383	1020
04:15 PM	63	121	77	1	262	64	92	17	1	174	14	92	94	0	200	157	132	95	0	384	1020
04:30 PM	74	155	83	2	314	41	84	28	0	153	13	108	104	0	225	179	109	71	0	359	1051
04:45 PM	76	156	71	0	303	39	71	25	0	135	20	105	70	0	195	121	130	82	2	335	968
Total Volume	275	566	310	3	1154	197	340	87	1	625	60	418	341	0	819	623	501	333	4	1461	4059
% App. Total	23.8	49	26.9	0.3		31.5	54.4	13.9	0.2		7.3	51	41.6	0		42.6	34.3	22.8	0.3		
PHF	.905	.907	.934	.375	.919	.770	.914	.777	.250	.898	.750	.925	.820	.000	.910	.870	.949	.876	.500	.951	.966

Transportation Data Corporation
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N/S: Warwick Avenue (117/117A)
 E/W: W. Shore Road/Airport Road
 City, State: Warwick, RI
 Client: Crossman/E. McChesney

File Name : 05443AA
 Site Code : 05443
 Start Date : 7/29/2021
 Page No : 1

Groups Printed- Trucks & Buses

Start Time	Warwick Avenue (Route 117) From North				W. Shore Road (Route 117) From East				Warwick Avenue (Route 117A) From South				Airport Road From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	2	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	6
04:15 PM	0	0	1	0	0	1	0	0	0	1	0	0	1	1	1	0	6
04:30 PM	0	0	0	0	0	0	0	0	0	1	1	0	2	1	0	0	5
04:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	3
Total	2	2	1	0	2	2	0	0	0	2	1	0	4	2	2	0	20
05:00 PM	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	3
05:15 PM	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
05:30 PM	0	0	2	0	1	0	0	0	1	0	1	0	1	1	0	0	7
05:45 PM	1	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	4
Total	2	2	3	0	1	0	0	0	1	2	1	0	2	3	0	0	17
Grand Total	4	4	4	0	3	2	0	0	1	4	2	0	6	5	2	0	37
Apprch %	33.3	33.3	33.3	0	60	40	0	0	14.3	57.1	28.6	0	46.2	38.5	15.4	0	
Total %	10.8	10.8	10.8	0	8.1	5.4	0	0	2.7	10.8	5.4	0	16.2	13.5	5.4	0	

Start Time	Warwick Avenue (Route 117) From North					W. Shore Road (Route 117) From East					Warwick Avenue (Route 117A) From South					Airport Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	2	1	0	0	3	1	1	0	0	2	0	0	0	0	0	1	0	0	0	1	6
04:15 PM	0	0	1	0	1	0	1	0	0	1	0	1	0	0	1	1	1	1	0	3	6
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2	1	0	0	3	5
04:45 PM	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	1	3
Total Volume	2	2	1	0	5	2	2	0	0	4	0	2	1	0	3	4	2	2	0	8	20
% App. Total	40	40	20	0		50	50	0	0		0	66.7	33.3	0		50	25	25	0		
PHF	.250	.500	.250	.000	.417	.500	.500	.000	.000	.500	.000	.500	.250	.000	.375	.500	.500	.500	.000	.667	.833

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N/S: Warwick Avenue (117/117A)
 E/W: W. Shore Road/Airport Road
 City, State: Warwick, RI
 Client: Crossman/E. McChesney

File Name : 05443AA
 Site Code : 05443
 Start Date : 7/29/2021
 Page No : 1

Groups Printed- Bikes by Direction

Start Time	Warwick Avenue (Route 117) From North				W. Shore Road (Route 117) From East				Warwick Avenue (Route 117A) From South				Airport Road From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Total	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	3
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
05:45 PM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Total	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3
Grand Total	0	2	0	0	0	0	0	0	0	3	0	0	0	1	0	0	6
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	100	0	0	
Total %	0	33.3	0	0	0	0	0	0	0	50	0	0	0	16.7	0	0	

Start Time	Warwick Avenue (Route 117) From North				W. Shore Road (Route 117) From East				Warwick Avenue (Route 117A) From South				Airport Road From West				Int. Total
	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
Total Volume	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	3
% App. Total	0	100	0	0	0	0	0	0	0	100	0	0	0	100	0	0	
PHF	.000	.250	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.000	.250	.000	.000	.375

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM

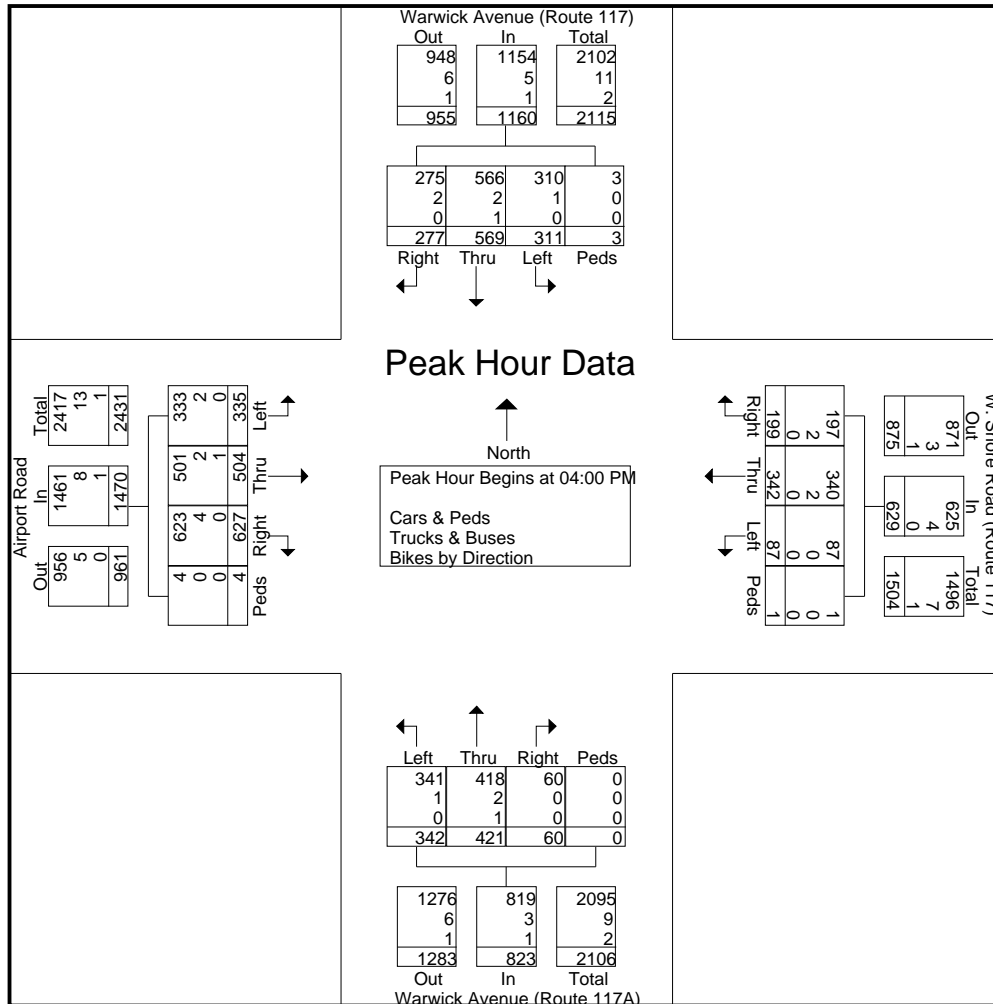
Transportation Data Corporation

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N/S: Warwick Avenue (117/117A)
E/W: W. Shore Road/Airport Road
City, State: Warwick, RI
Client: Crossman/E. McChesney

File Name : 05443AA
Site Code : 05443
Start Date : 7/29/2021
Page No : 1

Start Time	Warwick Avenue (Route 117) From North					W. Shore Road (Route 117) From East					Warwick Avenue (Route 117A) From South					Airport Road From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	64	135	79	0	278	54	94	17	0	165	13	113	73	0	199	167	130	85	2	384	1026
04:15 PM	63	121	78	1	263	64	93	17	1	175	14	93	94	0	201	158	134	96	0	388	1027
04:30 PM	74	155	83	2	314	41	84	28	0	153	13	109	105	0	227	181	110	71	0	362	1056
04:45 PM	76	158	71	0	305	40	71	25	0	136	20	106	70	0	196	121	130	83	2	336	973
Total Volume	277	569	311	3	1160	199	342	87	1	629	60	421	342	0	823	627	504	335	4	1470	4082
% App. Total	23.9	49.1	26.8	0.3		31.6	54.4	13.8	0.2		7.3	51.2	41.6	0		42.7	34.3	22.8	0.3		
PHF	.911	.900	.937	.375	.924	.777	.910	.777	.250	.899	.750	.931	.814	.000	.906	.866	.940	.872	.500	.947	.966
Cars & Peds	275	566	310	3	1154	197	340	87	1	625	60	418	341	0	819	623	501	333	4	1461	4059
% Cars & Peds	99.3	99.5	99.7	100	99.5	99.0	99.4	100	100	99.4	100	99.3	99.7	0	99.5	99.4	99.4	99.4	100	99.4	99.4
Trucks & Buses	2	2	1	0	5	2	2	0	0	4	0	2	1	0	3	4	2	2	0	8	20
% Trucks & Buses	0.7	0.4	0.3	0	0.4	1.0	0.6	0	0	0.6	0	0.5	0.3	0	0.4	0.6	0.4	0.6	0	0.5	0.5
Bikes by Direction	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	3
% Bikes by Direction	0	0.2	0	0	0.1	0	0	0	0	0	0	0.2	0	0	0.1	0	0.2	0	0	0.1	0.1



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N/S: Warwick Avenue (Route 117A)
 E: Dunkin Donuts Driveway
 City, State: Warwick, RI
 Client: Crossman/E. McChesney

File Name : 05443BB
 Site Code : 05443
 Start Date : 7/29/2021
 Page No : 1

Groups Printed- Cars & Peds

Start Time	Warwick Avenue (Route 117A) From North			Dunkin Donuts Driveway From East			Warwick Avenue (Route 117A) From South			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
04:00 PM	0	0	0	0	0	0	3	0	0	3
04:15 PM	0	0	0	0	0	0	5	0	0	5
04:30 PM	0	0	0	1	0	0	4	0	1	6
04:45 PM	0	0	0	0	0	0	10	0	0	10
Total	0	0	0	1	0	0	22	0	1	24
05:00 PM	0	0	0	0	0	0	4	0	0	4
05:15 PM	0	0	0	0	0	0	7	0	0	7
05:30 PM	0	0	0	0	0	0	5	0	0	5
05:45 PM	0	0	0	0	1	0	5	0	0	6
Total	0	0	0	0	1	0	21	0	0	22
Grand Total	0	0	0	1	1	0	43	0	1	46
Aprch %	0	0	0	50	50	0	97.7	0	2.3	
Total %	0	0	0	2.2	2.2	0	93.5	0	2.2	

Start Time	Warwick Avenue (Route 117A) From North				Dunkin Donuts Driveway From East				Warwick Avenue (Route 117A) From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	0	0	0	0	1	0	0	1	4	0	1	5	6
04:45 PM	0	0	0	0	0	0	0	0	10	0	0	10	10
05:00 PM	0	0	0	0	0	0	0	0	4	0	0	4	4
05:15 PM	0	0	0	0	0	0	0	0	7	0	0	7	7
Total Volume	0	0	0	0	1	0	0	1	25	0	1	26	27
% App. Total	0	0	0	0	100	0	0	0	96.2	0	3.8		
PHF	.000	.000	.000	.000	.250	.000	.000	.250	.625	.000	.250	.650	.675

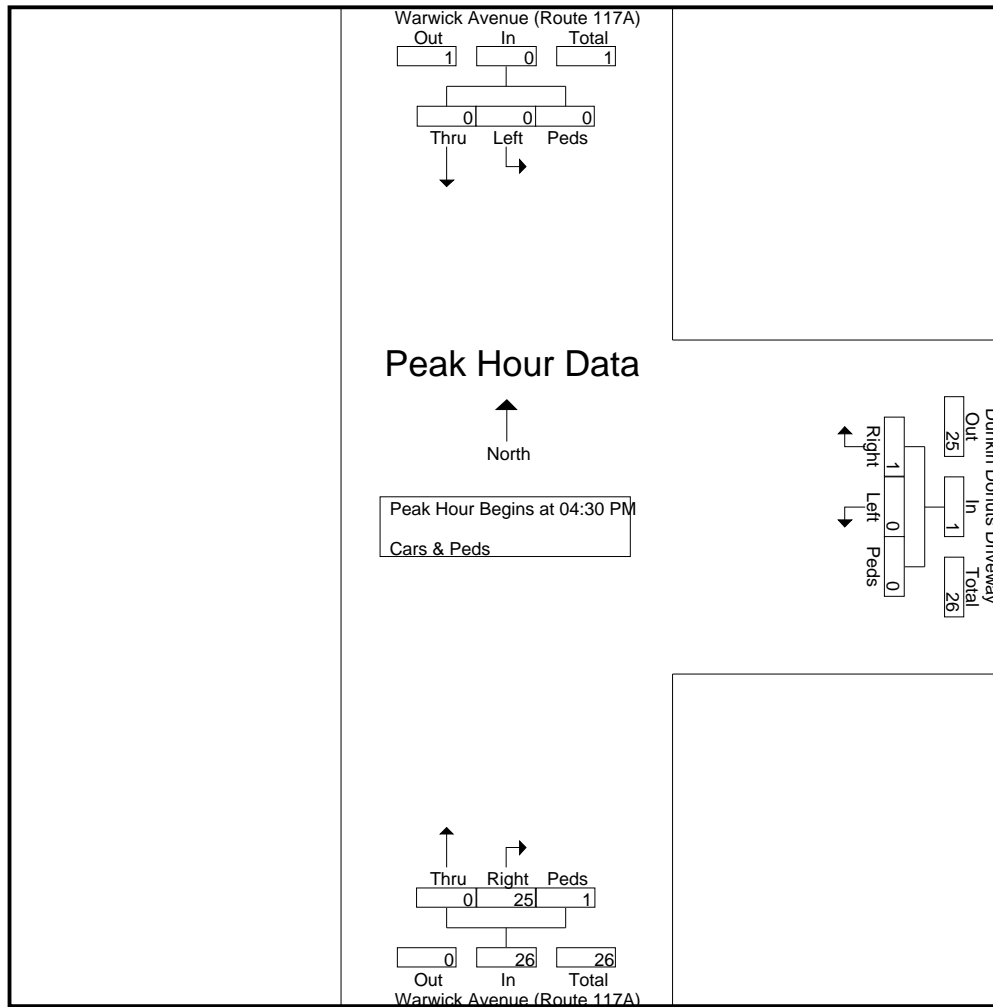
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N/S: Warwick Avenue (Route 117A)
E: Dunkin Donuts Driveway
City, State: Warwick, RI
Client: Crossman/E. McChesney

File Name : 05443BB
Site Code : 05443
Start Date : 7/29/2021
Page No : 1

Start Time	Warwick Avenue (Route 117A) From North				Dunkin Donuts Driveway From East				Warwick Avenue (Route 117A) From South				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	0	0	0	0	1	0	0	1	4	0	1	5	6
04:45 PM	0	0	0	0	0	0	0	0	10	0	0	10	10
05:00 PM	0	0	0	0	0	0	0	0	4	0	0	4	4
05:15 PM	0	0	0	0	0	0	0	0	7	0	0	7	7
Total Volume	0	0	0	0	1	0	0	1	25	0	1	26	27
% App. Total	0	0	0	0	100	0	0	0	96.2	0	3.8		
PHF	.000	.000	.000	.000	.250	.000	.000	.250	.625	.000	.250	.650	.675



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S: Dunkin Donuts Driveways
E/W: W. Shore Road (Route 117)
City, State: Warwick, RI
Client: Crossman/E. McChesney

File Name : 05443CC
Site Code : 05443
Start Date : 7/29/2021
Page No : 1

Groups Printed- Westerly Drive

Start Time	W. Shore Road (Route 117) From East			Dunkin Donuts Driveways From South			W. Shore Road (Route 117) From West			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
04:00 PM	0	0	0	0	0	0	12	0	0	12
04:15 PM	0	0	0	0	0	0	12	0	0	12
04:30 PM	0	0	0	0	0	0	7	0	0	7
04:45 PM	0	0	0	0	0	0	7	0	0	7
Total	0	0	0	0	0	0	38	0	0	38
05:00 PM	0	0	0	0	0	0	6	0	0	6
05:15 PM	0	0	0	0	0	0	5	0	0	5
05:30 PM	0	0	0	0	1	0	3	0	0	4
05:45 PM	0	1	0	0	1	0	4	0	0	6
Total	0	1	0	0	2	0	18	0	0	21
Grand Total	0	1	0	0	2	0	56	0	0	59
Apprch %	0	100	0	0	100	0	100	0	0	
Total %	0	1.7	0	0	3.4	0	94.9	0	0	

Start Time	W. Shore Road (Route 117) From East				Dunkin Donuts Driveways From South				W. Shore Road (Route 117) From West				Int. Total	
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total		
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 04:00 PM														
04:00 PM	0	0	0	0	0	0	0	0	0	12	0	0	12	12
04:15 PM	0	0	0	0	0	0	0	0	0	12	0	0	12	12
04:30 PM	0	0	0	0	0	0	0	0	0	7	0	0	7	7
04:45 PM	0	0	0	0	0	0	0	0	0	7	0	0	7	7
Total Volume	0	0	0	0	0	0	0	0	0	38	0	0	38	38
% App. Total	0	0	0		0	0	0			100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.792	.000	.000	.792	.792

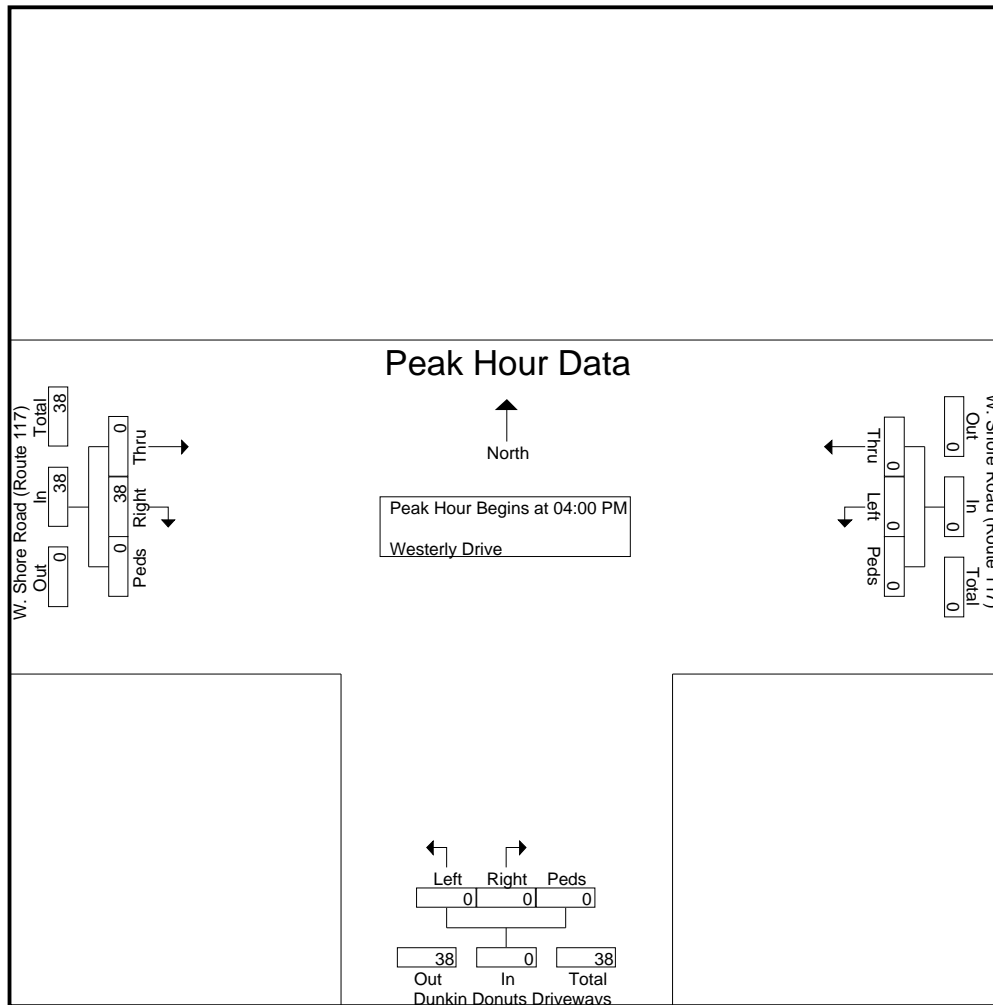
Transportation Data Corporation

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S: Dunkin Donuts Driveways
E/W: W. Shore Road (Route 117)
City, State: Warwick, RI
Client: Crossman/E. McChesney

File Name : 05443CC
Site Code : 05443
Start Date : 7/29/2021
Page No : 1

Start Time	W. Shore Road (Route 117) From East				Dunkin Donuts Driveways From South				W. Shore Road (Route 117) From West				Int. Total	
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total		
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 04:00 PM														
04:00 PM	0	0	0	0	0	0	0	0	0	12	0	0	12	12
04:15 PM	0	0	0	0	0	0	0	0	0	12	0	0	12	12
04:30 PM	0	0	0	0	0	0	0	0	0	7	0	0	7	7
04:45 PM	0	0	0	0	0	0	0	0	0	7	0	0	7	7
Total Volume	0	0	0	0	0	0	0	0	0	38	0	0	38	38
% App. Total	0	0	0	0	0	0	0	0	0	100	0	0	100	100
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.792	.000	.000	.792	.792



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 E/W: W. Shore Road (Route 117)
 City, State: Warwick, RI
 Client: Crossman/E. McChesney

File Name : 05443CC
 Site Code : 05443
 Start Date : 7/29/2021
 Page No : 1

Groups Printed- Easterly Drive

Start Time	W. Shore Road (Route 117) From East			Dunkin Donuts Driveways From South			W. Shore Road (Route 117) From West			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
04:00 PM	0	3	0	9	8	0	0	0	0	20
04:15 PM	0	2	0	7	14	0	0	0	0	23
04:30 PM	0	3	0	6	9	0	0	0	0	18
04:45 PM	0	4	0	5	11	0	0	0	0	20
Total	0	12	0	27	42	0	0	0	0	81
05:00 PM	0	2	0	4	8	0	0	0	0	14
05:15 PM	0	2	0	5	8	0	0	0	0	15
05:30 PM	0	2	0	8	7	0	1	0	0	18
05:45 PM	0	1	0	5	6	0	0	0	0	12
Total	0	7	0	22	29	0	1	0	0	59
Grand Total	0	19	0	49	71	0	1	0	0	140
Apprch %	0	100	0	40.8	59.2	0	100	0	0	
Total %	0	13.6	0	35	50.7	0	0.7	0	0	

Start Time	W. Shore Road (Route 117) From East				Dunkin Donuts Driveways From South				W. Shore Road (Route 117) From West				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
04:00 PM	0	3	0	3	9	8	0	17	0	0	0	0	20
04:15 PM	0	2	0	2	7	14	0	21	0	0	0	0	23
04:30 PM	0	3	0	3	6	9	0	15	0	0	0	0	18
04:45 PM	0	4	0	4	5	11	0	16	0	0	0	0	20
Total Volume	0	12	0	12	27	42	0	69	0	0	0	0	81
% App. Total	0	100	0		39.1	60.9	0		0	0	0		
PHF	.000	.750	.000	.750	.750	.750	.000	.821	.000	.000	.000	.000	.880

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 04:00 PM

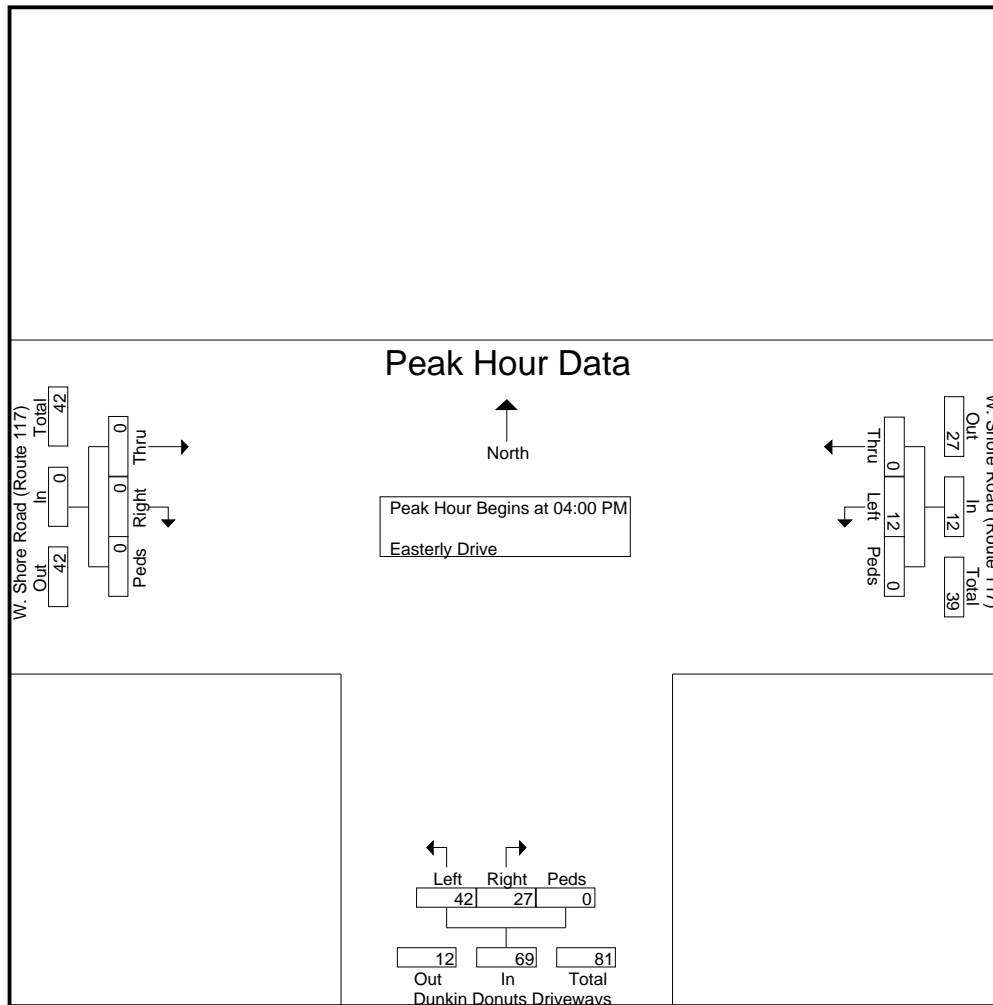
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S: Dunkin Donuts Driveways
E/W: W. Shore Road (Route 117)
City, State: Warwick, RI
Client: Crossman/E. McChesney

File Name : 05443CC
Site Code : 05443
Start Date : 7/29/2021
Page No : 1

Start Time	W. Shore Road (Route 117) From East				Dunkin Donuts Driveways From South				W. Shore Road (Route 117) From West				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	0	3	0	3	9	8	0	17	0	0	0	0	20
04:15 PM	0	2	0	2	7	14	0	21	0	0	0	0	23
04:30 PM	0	3	0	3	6	9	0	15	0	0	0	0	18
04:45 PM	0	4	0	4	5	11	0	16	0	0	0	0	20
Total Volume	0	12	0	12	27	42	0	69	0	0	0	0	81
% App. Total	0	100	0		39.1	60.9	0		0	0	0		
PHF	.000	.750	.000	.750	.750	.750	.000	.821	.000	.000	.000	.000	.880



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S: Ocean Nails Driveways
E/W: W. Shore Road (Route 117)
City, State: Warwick, RI
Client: Crossman/E. McChesney

File Name : 05443DD
Site Code : 05443
Start Date : 7/29/2021
Page No : 1

Groups Printed- Westerly Drive

Start Time	W. Shore Road (Route 117) From East			Ocean Nails Driveways From South			W. Shore Road (Route 117) From West			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	1	0	0	0	0	1
05:30 PM	0	0	0	0	1	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	2	0	0	0	0	2
Grand Total	0	0	0	0	2	0	0	0	0	2
Apprch %	0	0	0	0	100	0	0	0	0	
Total %	0	0	0	0	100	0	0	0	0	

Start Time	W. Shore Road (Route 117) From East				Ocean Nails Driveways From South				W. Shore Road (Route 117) From West				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:45 PM													
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	1
05:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	1
Total Volume	0	0	0	0	0	2	0	2	0	0	0	0	2
% App. Total	0	0	0	0	0	100	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.500

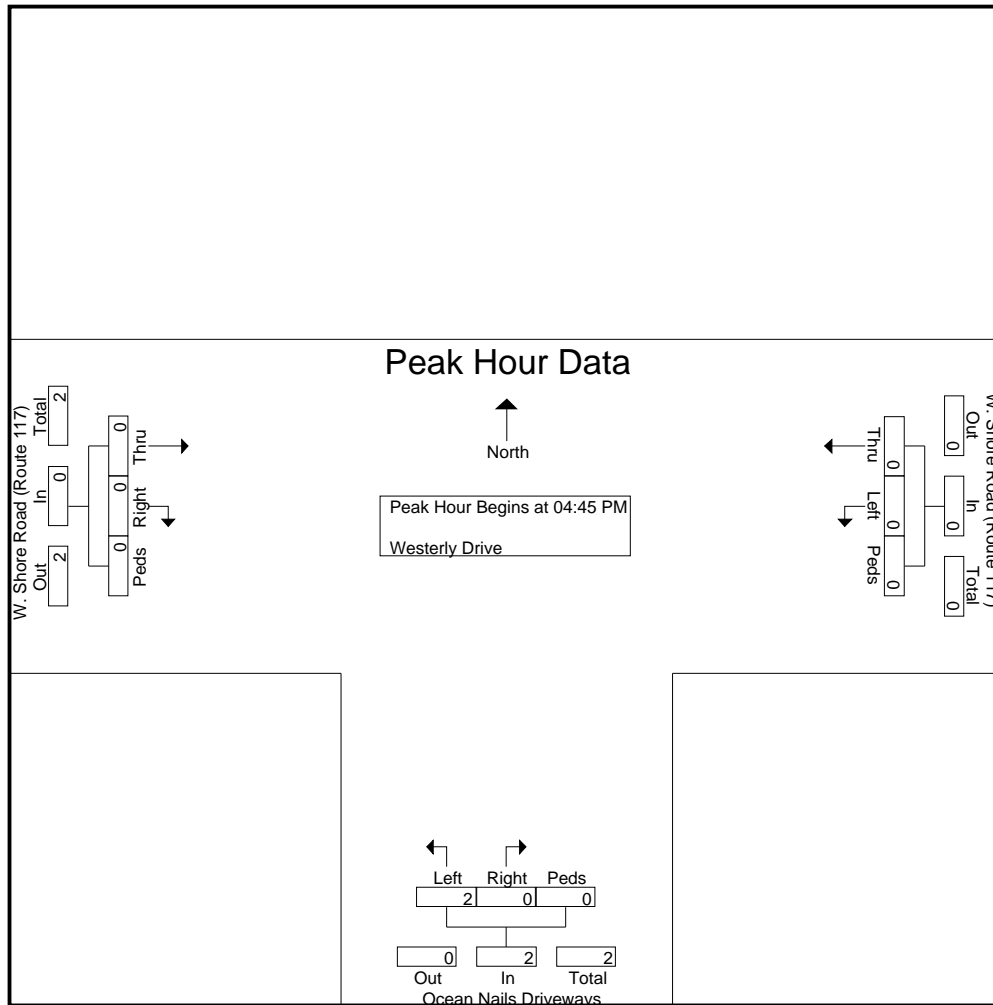
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S: Ocean Nails Driveways
E/W: W. Shore Road (Route 117)
City, State: Warwick, RI
Client: Crossman/E. McChesney

File Name : 05443DD
Site Code : 05443
Start Date : 7/29/2021
Page No : 1

Start Time	W. Shore Road (Route 117) From East				Ocean Nails Driveways From South				W. Shore Road (Route 117) From West				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:45 PM													
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	1
05:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	1
Total Volume	0	0	0	0	0	2	0	2	0	0	0	0	2
% App. Total	0	0	0	0	0	100	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.500



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 Client: Crossman/E. McChesney

File Name : 05443DD
 Site Code : 05443
 Start Date : 7/29/2021
 Page No : 1

Groups Printed- Easterly Drive

Start Time	W. Shore Road (Route 117) From East			Ocean Nails Driveways From South			W. Shore Road (Route 117) From West			Int. Total
	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	
04:00 PM	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	2	0	1	0	0	0	0	0	3
05:45 PM	0	1	0	0	0	0	0	0	0	1
Total	0	3	0	1	0	0	0	0	0	4
Grand Total	0	3	0	1	0	0	0	0	0	4
Aprch %	0	100	0	100	0	0	0	0	0	
Total %	0	75	0	25	0	0	0	0	0	

Start Time	W. Shore Road (Route 117) From East				Ocean Nails Driveways From South				W. Shore Road (Route 117) From West				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	2	0	2	1	0	0	1	0	0	0	0	3
05:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	1
Total Volume	0	3	0	3	1	0	0	1	0	0	0	0	4
% App. Total	0	100	0		100	0	0		0	0	0		
PHF	.000	.375	.000	.375	.250	.000	.000	.250	.000	.000	.000	.000	.333

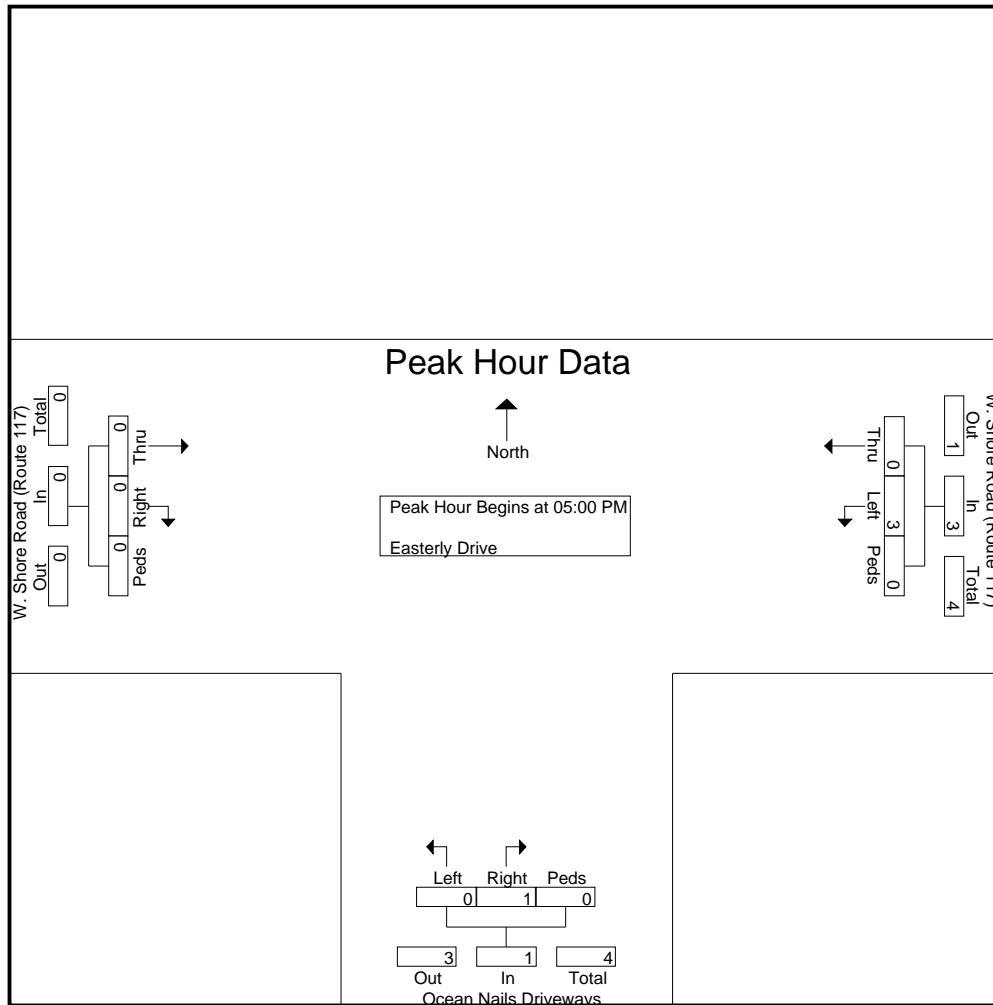
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S: Ocean Nails Driveways
E/W: W. Shore Road (Route 117)
City, State: Warwick, RI
Client: Crossman/E. McChesney

File Name : 05443DD
Site Code : 05443
Start Date : 7/29/2021
Page No : 1

Start Time	W. Shore Road (Route 117) From East				Ocean Nails Driveways From South				W. Shore Road (Route 117) From West				Int. Total
	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	2	0	2	1	0	0	1	0	0	0	0	3
05:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	1
Total Volume	0	3	0	3	1	0	0	1	0	0	0	0	4
% App. Total	0	100	0		100	0	0		0	0	0		
PHF	.000	.375	.000	.375	.250	.000	.000	.250	.000	.000	.000	.000	.333



Land Use: 937

Coffee/Donut Shop with Drive-Through Window

Description

This land use includes single-tenant coffee and donut restaurants with drive-through windows. Freshly brewed coffee and a variety of coffee-related accessories are the primary retail products sold at these sites. They may also sell other refreshment items, such as donuts, bagels, muffins, cakes, sandwiches, wraps, salads, and other hot and cold beverages. Some sites may also sell newspapers, music, CDs, and books. The coffee and donut shops contained in this land use typically hold long store hours (more than 15 hours) with an early morning opening. Also, limited indoor seating is generally provided for patrons; however, table service is not provided. Coffee/donut shop without drive-through window (Land Use 936), coffee/donut shop with drive-through window and no indoor seating (Land Use 938), bread/donut/bagel shop without drive-through window (Land Use 939), and bread/donut/bagel shop with drive-through window (Land Use 940) are related uses.

Additional Data

The sites were surveyed in the 1990s, the 2000s, and the 2010s in California, Colorado, Connecticut, Illinois, Massachusetts, Minnesota, Nevada, New Hampshire, New Jersey, New York, Ontario (CAN), Pennsylvania, Quebec (CAN), Tennessee, Vermont, Washington, and Wisconsin.

Specialized Land Use Data

One study provided data for a coffee/donut shop with a drive-through window that also sells donuts and ice cream (source 617). The trip generating characteristics of this site differed from the sites included in this land use; therefore, trip generation information for this site is presented here and was excluded from the data plots. The site had a gross floor area of 3,300 square feet. It generated 425 vehicle trips during the weekday AM peak hour of adjacent street traffic, and 236 vehicle trips during the weekday PM peak hour of adjacent street traffic.

Source Numbers

594, 599, 615, 617, 618, 621, 622, 635, 639, 712, 714, 725, 726, 728, 853, 854, 892, 903, 928, 959, 979, 982

Coffee/Donut Shop with Drive-Through Window (937)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

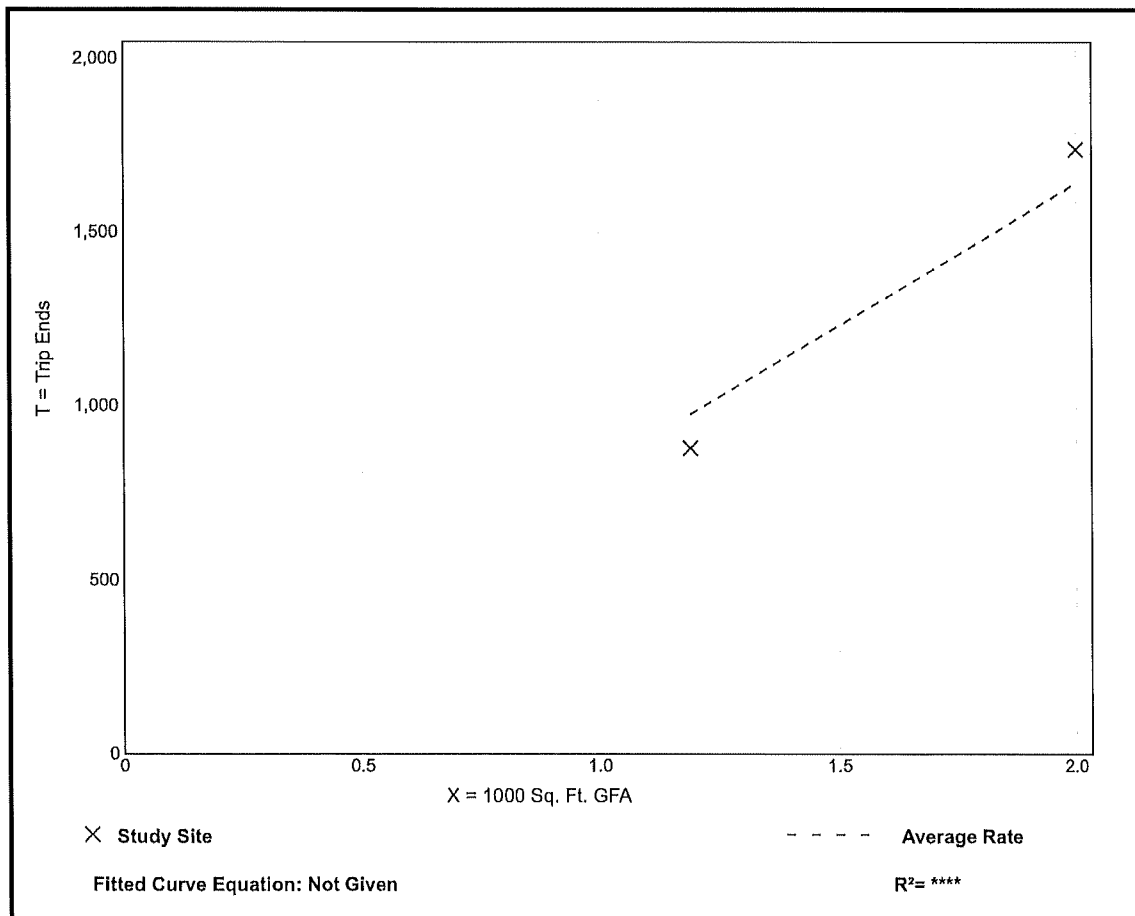
Setting/Location: General Urban/Suburban
Number of Studies: 2
1000 Sq. Ft. GFA: 2
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
820.38	738.66 - 869.00	*

Data Plot and Equation

Caution – Small Sample Size



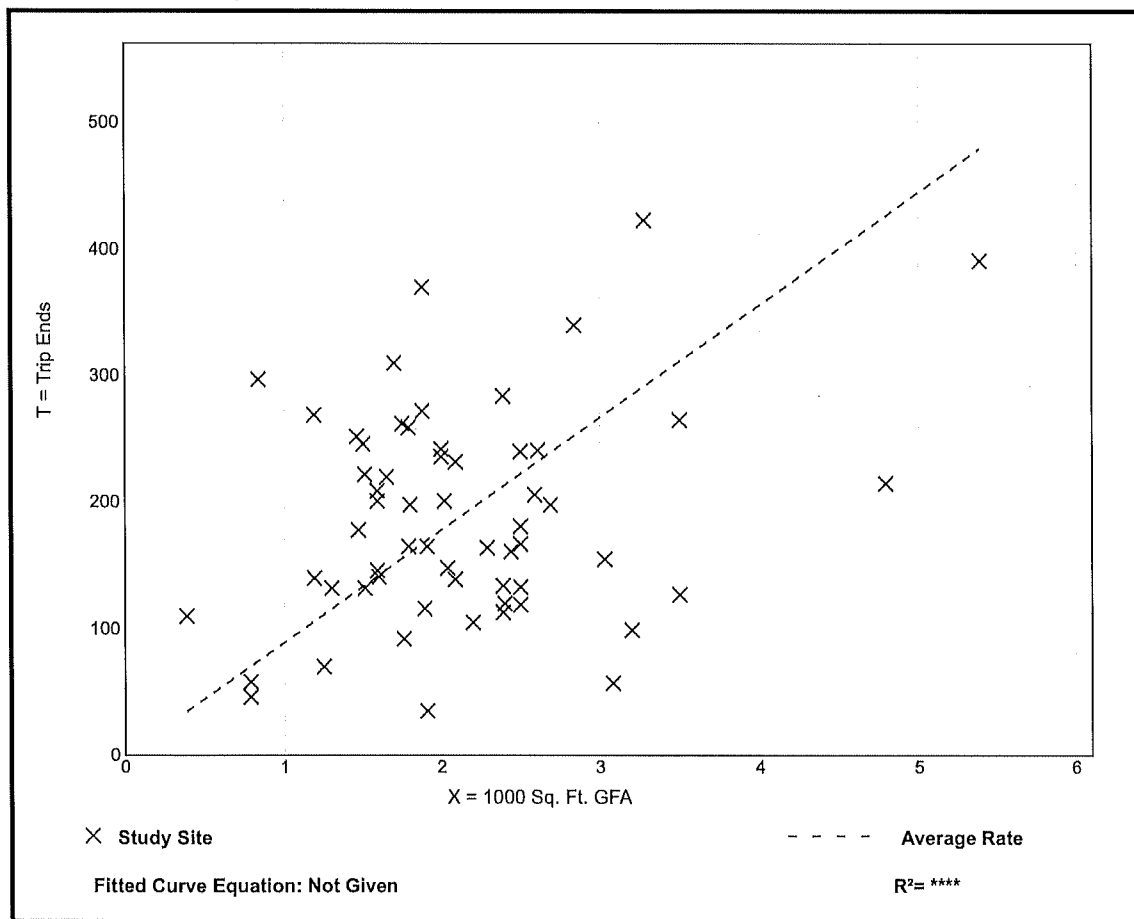
Coffee/Donut Shop with Drive-Through Window (937)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
 Number of Studies: 61
 1000 Sq. Ft. GFA: 2
 Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
88.99	18.32 - 353.57	48.19

Data Plot and Equation



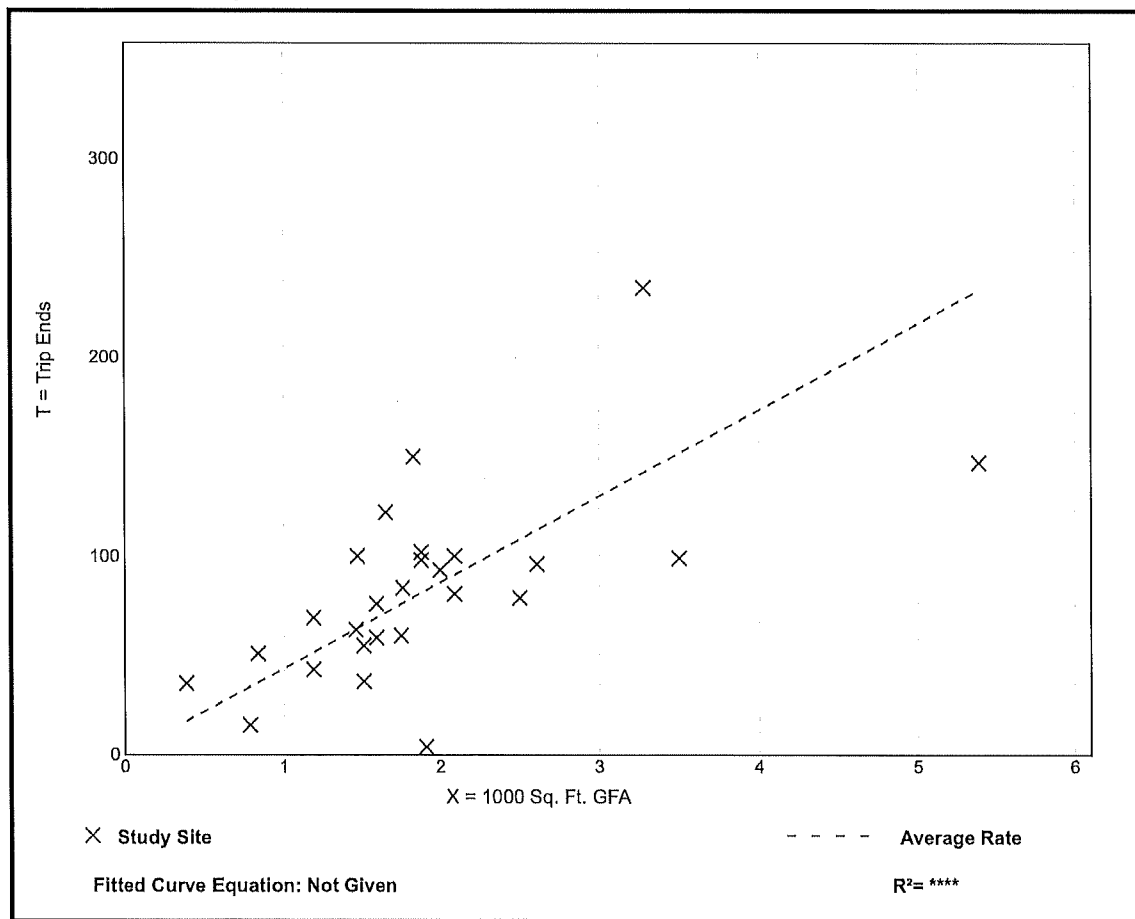
Coffee/Donut Shop with Drive-Through Window (937)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
 Number of Studies: 26
 1000 Sq. Ft. GFA: 2
 Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
43.38	2.09 - 92.31	18.88

Data Plot and Equation



Coffee/Donut Shop with Drive-Through Window (937)

Peak Period Parking Demand vs: 1000 Sq. Ft. GFA

On a: Weekday (Monday - Friday)

Setting/Location: General Urban/Suburban

Peak Period of Parking Demand: 8:00 - 10:00 a.m.

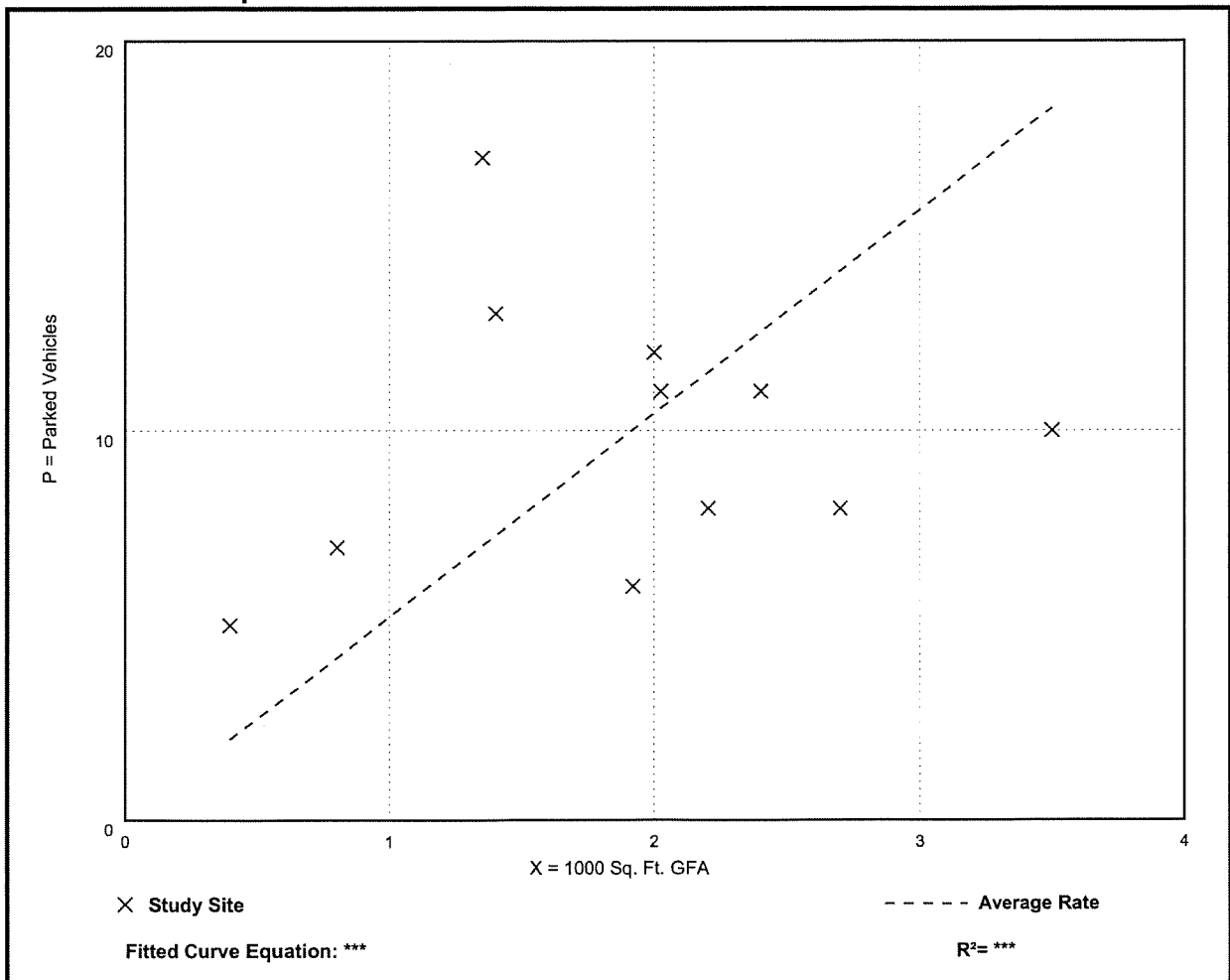
Number of Studies: 11

Avg. 1000 Sq. Ft. GFA: 1.9

Peak Period Parking Demand per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
5.22	2.86 - 12.59	3.62 / 12.52	***	3.07 (59%)

Data Plot and Equation



CAPACITY ANALYSES



HCM Signalized Intersection Capacity Analysis

2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

08/06/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↑↑	↗	↙	↑↑	↗	↙	↑↑	↗	↙	↑↑	↗
Traffic Volume (vph)	157	251	328	53	599	205	490	381	58	152	297	256
Future Volume (vph)	157	251	328	53	599	205	490	381	58	152	297	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	16	12	12	16	12	12	12
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1728	3455	1501	1745	3490	1794	1770	3574	1830	1752	3539	1599
Flt Permitted	0.25	1.00	1.00	0.56	1.00	1.00	0.25	1.00	1.00	0.51	1.00	1.00
Satd. Flow (perm)	447	3455	1501	1031	3490	1794	464	3574	1830	943	3539	1599
Peak-hour factor, PHF	0.80	0.80	0.80	0.92	0.92	0.92	0.93	0.93	0.93	0.89	0.89	0.89
Adj. Flow (vph)	196	314	410	58	651	223	527	410	62	171	334	288
RTOR Reduction (vph)	0	0	208	0	0	98	0	0	36	0	0	223
Lane Group Flow (vph)	196	314	202	58	651	125	527	410	26	171	334	65
Heavy Vehicles (%)	1%	1%	4%	0%	0%	2%	2%	1%	0%	3%	2%	1%
Turn Type	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases	5	2	2	1	6		3	8		7	4	4
Permitted Phases	2		5	6		8	8		2	4		7
Actuated Green, G (s)	64.3	53.6	64.3	50.6	45.4	36.8	54.9	36.8	53.6	29.5	16.9	29.5
Effective Green, g (s)	64.3	53.6	64.3	50.6	45.4	36.8	54.9	36.8	53.6	29.5	16.9	29.5
Actuated g/C Ratio	0.49	0.41	0.49	0.39	0.35	0.28	0.42	0.28	0.41	0.23	0.13	0.23
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	352	1422	741	429	1216	507	521	1010	753	291	459	362
v/s Ratio Prot	c0.06	0.09	0.11	0.01	0.19		c0.25	0.11		0.06	0.09	0.02
v/s Ratio Perm	c0.22		0.02	0.05		0.07	c0.17		0.01	0.08		0.02
v/c Ratio	0.56	0.22	0.27	0.14	0.54	0.25	1.01	0.41	0.03	0.59	0.73	0.18
Uniform Delay, d1	20.9	24.8	19.3	25.2	34.0	36.0	34.0	37.8	22.9	43.2	54.4	40.6
Progression 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
Incremental Delay, d2	1.1	0.4	0.1	0.1	1.7	0.1	42.3	0.1	0.1	2.0	4.8	0.1
Delay (s)	22.0	25.1	19.4	25.2	35.6	36.1	76.4	37.9	22.9	45.1	59.3	40.7
Level of Service	C	C	B	C	D	D	E	D	C	D	E	D
Approach Delay (s)		21.9			35.1			57.3			49.5	
Approach LOS		C			D			E			D	

Intersection Summary

HCM 2000 Control Delay	41.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	130.2	Sum of lost time (s)	22.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

08/06/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	251	328	53	599	205	490	381	58	152	297	256
Future Volume (vph)	157	251	328	53	599	205	490	381	58	152	297	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	16	12	12	16	12	12	12
Storage Length (ft)	130		125	100		100	475		70	250		350
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			35			30			35	
Link Distance (ft)		774			177			156			935	
Travel Time (s)		21.1			3.4			3.5			18.2	
Peak Hour Factor	0.80	0.80	0.80	0.92	0.92	0.92	0.93	0.93	0.93	0.89	0.89	0.89
Heavy Vehicles (%)	1%	1%	4%	0%	0%	2%	2%	1%	0%	3%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	314	410	58	651	223	527	410	62	171	334	288
Turn Type	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases	5	2	2	1	6		3	8		7	4	4
Permitted Phases	2		5	6		8	8		2	4		7
Detector Phase	5	2	2	1	6	8	3	8	2	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.5	39.5	39.5	10.5	39.5	40.5	10.5	40.5	39.5	10.5	40.5	40.5
Total Split (s)	30.0	58.6	58.6	12.6	41.2	41.9	40.0	41.9	58.6	38.9	40.8	40.8
Total Split (%)	19.7%	38.6%	38.6%	8.3%	27.1%	27.6%	26.3%	27.6%	38.6%	25.6%	26.8%	26.8%
Maximum Green (s)	24.5	53.1	53.1	7.1	35.7	36.4	34.5	36.4	53.1	33.4	35.3	35.3
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	Max	Max	None	Max	None	None	None	Max	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		27.0	27.0		27.0	28.0		28.0	27.0		28.0	28.0
Pedestrian Calls (#/hr)		0	0		1	0		0	0		0	0
v/c Ratio	0.56	0.22	0.44	0.13	0.55	0.37	1.00	0.40	0.08	0.58	0.72	0.49
Control Delay	26.6	26.6	3.4	20.7	38.1	16.9	73.3	39.3	1.6	35.2	64.1	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.6	26.6	3.4	20.7	38.1	16.9	73.3	39.3	1.6	35.2	64.1	5.7
Queue Length 50th (ft)	95	93	0	26	235	56	381	150	0	93	148	0
Queue Length 95th (ft)	137	121	26	55	341	133	#629	208	10	143	199	50
Internal Link Dist (ft)		694			97			76			855	
Turn Bay Length (ft)	130		125	100		100	475		70	250		350
Base Capacity (vph)	463	1436	942	448	1192	635	550	1076	817	575	978	778
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0

Lanes, Volumes, Timings

2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

08/06/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.42	0.22	0.44	0.13	0.55	0.35	0.96	0.38	0.08	0.30	0.34	0.37

Intersection Summary

Area Type: Other

Cycle Length: 152

Actuated Cycle Length: 129

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

Ø1	Ø2	Ø3	Ø4
12.6 s	58.6 s	40 s	40.8 s
Ø5	Ø6	Ø7	Ø8
30 s	41.2 s	38.9 s	41.9 s

HCM Unsignalized Intersection Capacity Analysis
 6: Exist. DD Drive 3 (Drive-thru) & West Shore Rd

08/06/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Volume (veh/h)	390	4	32	764	99	43
Future Volume (Veh/h)	390	4	32	764	99	43
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.33	0.73	0.92	0.83	0.90
Hourly flow rate (vph)	424	12	44	830	119	48
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	276					
pX, platoon unblocked				0.96	0.96	0.96
vC, conflicting volume				436	933	218
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol				325	843	97
tC, single (s)				4.1	6.8	6.9
tC, 2 stage (s)						
tF (s)				2.2	3.5	3.3
p0 queue free %				96	57	95
cM capacity (veh/h)				1181	279	901

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	283	153	321	553	167
Volume Left	0	0	44	0	119
Volume Right	0	12	0	0	48
cSH	1700	1700	1181	1700	348
Volume to Capacity	0.17	0.09	0.04	0.33	0.48
Queue Length 95th (ft)	0	0	3	0	62
Control Delay (s)	0.0	0.0	1.4	0.0	24.5
Lane LOS	A			C	
Approach Delay (s)	0.0		0.5		24.5
Approach LOS				C	

Intersection Summary					
Average Delay			3.1		
Intersection Capacity Utilization			51.1%	ICU Level of Service	A
Analysis Period (min)	15				

HCM Unsignalized Intersection Capacity Analysis

8: Warwick Ave (117A) & Exist. DD Drive 1

08/06/2021



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	1	2	927	38	0	678
Future Volume (Veh/h)	1	2	927	38	0	678
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.25	0.50	0.93	0.92	0.92	0.92
Hourly flow rate (vph)	4	4	997	41	0	737
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						156
pX, platoon unblocked	0.91					
vC, conflicting volume	1386	519			1038	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1232	519			1038	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	99			100	
cM capacity (veh/h)	157	507			665	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	8	665	373	368	368	
Volume Left	4	0	0	0	0	
Volume Right	4	0	41	0	0	
cSH	240	1700	1700	1700	1700	
Volume to Capacity	0.03	0.39	0.22	0.22	0.22	
Queue Length 95th (ft)	3	0	0	0	0	
Control Delay (s)	20.5	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	20.5	0.0			0.0	
Approach LOS	C					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			36.8%		ICU Level of Service	A
Analysis Period (min)			15			

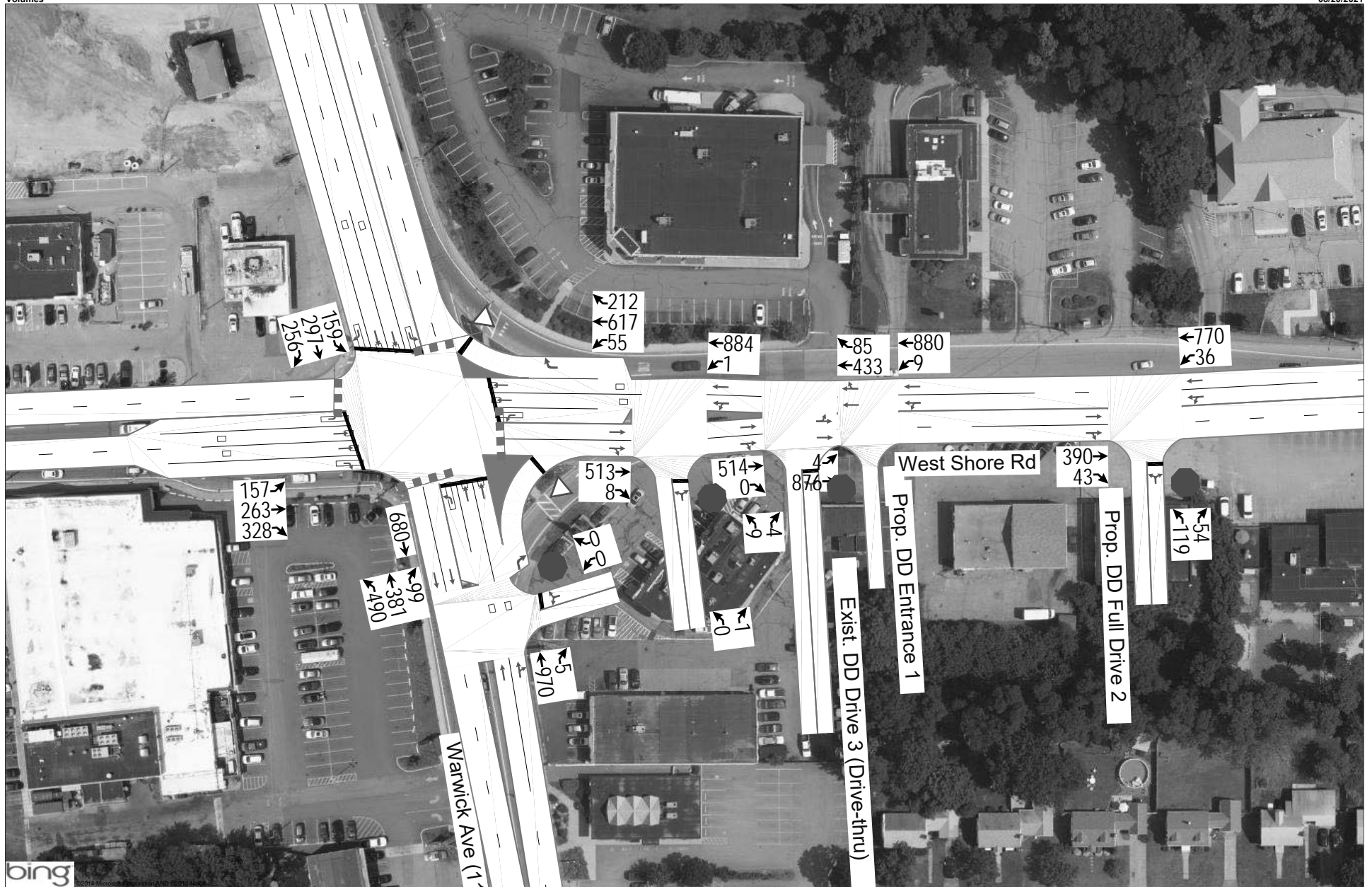
HCM Unsignalized Intersection Capacity Analysis

10: Ex. DD Drive 2 & West Shore Rd

08/06/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Volume (veh/h)	391	70	8	855	2	3
Future Volume (Veh/h)	391	70	8	855	2	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.72	0.67	0.92	0.50	0.75
Hourly flow rate (vph)	425	97	12	929	4	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	177					
pX, platoon unblocked			0.95		0.95	0.95
vC, conflicting volume			522		962	261
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			379		844	103
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	100
cM capacity (veh/h)			1112		282	881
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	283	239	322	619	8	
Volume Left	0	0	12	0	4	
Volume Right	0	97	0	0	4	
cSH	1700	1700	1112	1700	428	
Volume to Capacity	0.17	0.14	0.01	0.36	0.02	
Queue Length 95th (ft)	0	0	1	0	1	
Control Delay (s)	0.0	0.0	0.4	0.0	13.6	
Lane LOS	A			B		
Approach Delay (s)	0.0		0.1		13.6	
Approach LOS						B
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			39.3%	ICU Level of Service	A	
Analysis Period (min)	15					



HCM Signalized Intersection Capacity Analysis

2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

08/20/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↑↑	↗	↙	↑↑	↗	↙	↑↑	↗	↙	↑↑	↗
Traffic Volume (vph)	157	263	328	55	617	212	490	381	99	159	297	256
Future Volume (vph)	157	263	328	55	617	212	490	381	99	159	297	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	16	12	12	16	12	12	12
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1728	3455	1501	1745	3490	1794	1770	3574	1830	1752	3539	1599
Flt Permitted	0.23	1.00	1.00	0.55	1.00	1.00	0.25	1.00	1.00	0.51	1.00	1.00
Satd. Flow (perm)	426	3455	1501	1016	3490	1794	461	3574	1830	943	3539	1599
Peak-hour factor, PHF	0.80	0.80	0.80	0.92	0.92	0.92	0.93	0.93	0.93	0.89	0.89	0.89
Adj. Flow (vph)	196	329	410	60	671	230	527	410	106	179	334	288
RTOR Reduction (vph)	0	0	207	0	0	98	0	0	57	0	0	222
Lane Group Flow (vph)	196	329	203	60	671	132	527	410	49	179	334	66
Heavy Vehicles (%)	1%	1%	4%	0%	0%	2%	2%	1%	0%	3%	2%	1%
Turn Type	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases	5	2	2	1	6		3	8		7	4	4
Permitted Phases	2		5	6		8	8		2	4		7
Actuated Green, G (s)	64.3	53.6	64.3	50.4	45.2	36.3	54.8	36.3	53.6	29.8	16.8	29.8
Effective Green, g (s)	64.3	53.6	64.3	50.4	45.2	36.3	54.8	36.3	53.6	29.8	16.8	29.8
Actuated g/C Ratio	0.49	0.41	0.49	0.39	0.35	0.28	0.42	0.28	0.41	0.23	0.13	0.23
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	346	1423	741	422	1212	500	521	997	753	296	456	366
v/s Ratio Prot	c0.06	0.10	0.11	0.01	0.19		c0.25	0.11		0.06	0.09	0.02
v/s Ratio Perm	c0.22		0.02	0.05		0.07	c0.17		0.03	0.08		0.02
v/c Ratio	0.57	0.23	0.27	0.14	0.55	0.26	1.01	0.41	0.07	0.60	0.73	0.18
Uniform Delay, d1	21.0	24.9	19.2	25.3	34.3	36.5	34.1	38.2	23.1	43.1	54.5	40.3
Progression 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
Incremental Delay, d2	1.3	0.4	0.1	0.1	1.8	0.1	42.3	0.1	0.2	2.4	5.2	0.1
Delay (s)	22.3	25.2	19.3	25.3	36.1	36.6	76.5	38.3	23.3	45.4	59.7	40.4
Level of Service	C	C	B	C	D	D	E	D	C	D	E	D
Approach Delay (s)		22.0			35.6			56.1			49.6	
Approach LOS		C			D			E			D	

Intersection Summary

HCM 2000 Control Delay	40.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	130.1	Sum of lost time (s)	22.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

08/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	263	328	55	617	212	490	381	99	159	297	256
Future Volume (vph)	157	263	328	55	617	212	490	381	99	159	297	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	16	12	12	16	12	12	12
Storage Length (ft)	130		125	100		100	475		70	250		350
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			35			30			35	
Link Distance (ft)		774			177			156			935	
Travel Time (s)		21.1			3.4			3.5			18.2	
Peak Hour Factor	0.80	0.80	0.80	0.92	0.92	0.92	0.93	0.93	0.93	0.89	0.89	0.89
Heavy Vehicles (%)	1%	1%	4%	0%	0%	2%	2%	1%	0%	3%	2%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	329	410	60	671	230	527	410	106	179	334	288
Turn Type	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases	5	2	2	1	6		3	8		7	4	4
Permitted Phases	2		5	6		8	8		2	4		7
Detector Phase	5	2	2	1	6	8	3	8	2	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.5	39.5	39.5	10.5	39.5	40.5	10.5	40.5	39.5	10.5	40.5	40.5
Total Split (s)	30.0	58.6	58.6	12.6	41.2	41.9	40.0	41.9	58.6	38.9	40.8	40.8
Total Split (%)	19.7%	38.6%	38.6%	8.3%	27.1%	27.6%	26.3%	27.6%	38.6%	25.6%	26.8%	26.8%
Maximum Green (s)	24.5	53.1	53.1	7.1	35.7	36.4	34.5	36.4	53.1	33.4	35.3	35.3
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	Max	Max	None	Max	None	None	None	Max	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		27.0	27.0		27.0	28.0		28.0	27.0		28.0	28.0
Pedestrian Calls (#/hr)		0	0		1	0		0	0		0	0
v/c Ratio	0.57	0.23	0.44	0.14	0.57	0.38	1.00	0.41	0.13	0.60	0.72	0.49
Control Delay	27.0	26.8	3.4	20.8	38.7	17.8	73.6	39.7	6.7	35.7	64.1	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	26.8	3.4	20.8	38.7	17.8	73.6	39.7	6.7	35.7	64.1	5.6
Queue Length 50th (ft)	95	98	0	27	244	62	382	151	5	98	148	0
Queue Length 95th (ft)	137	127	26	57	355	140	#630	210	44	149	199	50
Internal Link Dist (ft)		694			97			76			855	
Turn Bay Length (ft)	130		125	100		100	475		70	250		350
Base Capacity (vph)	457	1436	942	442	1187	631	549	1067	817	575	978	782
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0

Lanes, Volumes, Timings

2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

08/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.43	0.23	0.44	0.14	0.57	0.36	0.96	0.38	0.13	0.31	0.34	0.37

Intersection Summary

Area Type: Other

Cycle Length: 152

Actuated Cycle Length: 129

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

Ø1	Ø2	Ø3	Ø4
12.6 s	58.6 s	40 s	40.8 s
Ø5	Ø6	Ø7	Ø8
30 s	41.2 s	38.9 s	41.9 s

HCM Unsignalized Intersection Capacity Analysis

6: Exist. DD Drive 3 (Drive-thru) & West Shore Rd










08/20/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	
Traffic Volume (veh/h)	514	0	4	876	9	4
Future Volume (Veh/h)	514	0	4	876	9	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.33	0.73	0.92	0.83	0.90
Hourly flow rate (vph)	559	0	5	952	11	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	276					
pX, platoon unblocked			0.95		0.95	0.95
vC, conflicting volume			559		1045	280
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			421		935	126
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		96	100
cM capacity (veh/h)			1074		249	853
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	373	186	322	635	15	
Volume Left	0	0	5	0	11	
Volume Right	0	0	0	0	4	
cSH	1700	1700	1074	1700	307	
Volume to Capacity	0.22	0.11	0.00	0.37	0.05	
Queue Length 95th (ft)	0	0	0	0	4	
Control Delay (s)	0.0	0.0	0.2	0.0	17.3	
Lane LOS			A	C		
Approach Delay (s)	0.0		0.1		17.3	
Approach LOS					C	
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			37.0%	ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 8: Warwick Ave (117A) & Exist. DD Drive 1

08/20/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	970	5	0	680
Future Volume (Veh/h)	0	0	970	5	0	680
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.25	0.50	0.93	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	1043	5	0	739
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						156
pX, platoon unblocked	0.91					
vC, conflicting volume	1415	524			1048	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1264	524			1048	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	150	503			660	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	0	695	353	370	370	
Volume Left	0	0	0	0	0	
Volume Right	0	0	5	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.00	0.41	0.21	0.22	0.22	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			30.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

10: Ex. DD Drive 2 & West Shore Rd

08/20/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	
Traffic Volume (veh/h)	513	8	1	884	0	1
Future Volume (Veh/h)	513	8	1	884	0	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.72	0.67	0.92	0.50	0.75
Hourly flow rate (vph)	558	11	1	961	0	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	177					
pX, platoon unblocked			0.94		0.94	0.94
vC, conflicting volume			569		1046	284
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			423		928	121
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1069		251	856
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	372	197	321	641	1	
Volume Left	0	0	1	0	0	
Volume Right	0	11	0	0	1	
cSH	1700	1700	1069	1700	856	
Volume to Capacity	0.22	0.12	0.00	0.38	0.00	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	9.2	
Lane LOS			A		A	
Approach Delay (s)	0.0		0.0		9.2	
Approach LOS					A	
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			35.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Prop. DD Entrance 1 & West Shore Rd

08/20/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		
Traffic Volume (veh/h)	433	85	9	880	0	0
Future Volume (Veh/h)	433	85	9	880	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	471	92	10	957	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	326					
pX, platoon unblocked			0.95		0.95	0.95
vC, conflicting volume			563		1016	282
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			429		907	132
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	100
cM capacity (veh/h)			1068		259	846
Direction, Lane #	EB 1	EB 2	WB 1	WB 2		
Volume Total	314	249	329	638		
Volume Left	0	0	10	0		
Volume Right	0	92	0	0		
cSH	1700	1700	1068	1700		
Volume to Capacity	0.18	0.15	0.01	0.38		
Queue Length 95th (ft)	0	0	1	0		
Control Delay (s)	0.0	0.0	0.3	0.0		
Lane LOS	A					
Approach Delay (s)	0.0		0.1			
Approach LOS						
Intersection Summary						
Average Delay	0.1					
Intersection Capacity Utilization	34.0%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

14: Prop. DD Full Drive 2 & West Shore Rd

08/20/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Volume (veh/h)	390	43	36	770	119	54
Future Volume (Veh/h)	390	43	36	770	119	54
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	424	47	39	837	129	59
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	531					
pX, platoon unblocked			0.97		0.97	0.97
vC, conflicting volume			471		944	236
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			401		887	159
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		52	93
cM capacity (veh/h)			1123		266	835
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	283	188	318	558	188	
Volume Left	0	0	39	0	129	
Volume Right	0	47	0	0	59	
cSH	1700	1700	1123	1700	339	
Volume to Capacity	0.17	0.11	0.03	0.33	0.55	
Queue Length 95th (ft)	0	0	3	0	80	
Control Delay (s)	0.0	0.0	1.3	0.0	28.1	
Lane LOS			A		D	
Approach Delay (s)	0.0		0.5		28.1	
Approach LOS					D	
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization			54.4%		ICU Level of Service	A
Analysis Period (min)			15			



HCM Signalized Intersection Capacity Analysis

2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

08/06/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↑↑	↗	↘	↑↑	↗
Traffic Volume (vph)	335	504	627	87	342	199	342	421	60	311	569	277
Future Volume (vph)	335	504	627	87	342	199	342	421	60	311	569	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	16	12	12	16	12	12	12
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1728	3490	1546	1745	3455	1812	1805	3574	1830	1805	3610	1599
Flt Permitted	0.38	1.00	1.00	0.45	1.00	1.00	0.13	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	695	3490	1546	835	3455	1812	251	3574	1830	687	3610	1599
Peak-hour factor, PHF	0.95	0.95	0.95	0.90	0.90	0.90	0.91	0.91	0.91	0.92	0.92	0.92
Adj. Flow (vph)	353	531	660	97	380	221	376	463	66	338	618	301
RTOR Reduction (vph)	0	0	284	0	0	132	0	0	40	0	0	189
Lane Group Flow (vph)	353	531	376	97	380	89	376	463	26	338	618	112
Heavy Vehicles (%)	1%	0%	1%	0%	1%	1%	0%	1%	0%	0%	0%	1%
Turn Type	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases	5	2	2	1	6		3	8		7	4	4
Permitted Phases	2		5	6		8	8		2	4		7
Actuated Green, G (s)	65.8	53.5	65.8	45.9	39.1	32.2	58.3	32.2	53.5	51.1	28.6	51.1
Effective Green, g (s)	65.8	53.5	65.8	45.9	39.1	32.2	58.3	32.2	53.5	51.1	28.6	51.1
Actuated g/C Ratio	0.48	0.39	0.48	0.34	0.29	0.24	0.43	0.24	0.39	0.37	0.21	0.37
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	493	1362	742	324	986	425	402	840	714	439	753	596
v/s Ratio Prot	c0.11	0.15	0.20	0.01	0.11		c0.18	0.13		0.13	0.17	0.04
v/s Ratio Perm	c0.23		0.05	0.09		0.05	c0.22		0.01	0.16		0.03
v/c Ratio	0.72	0.39	0.51	0.30	0.39	0.21	0.94	0.55	0.04	0.77	0.82	0.19
Uniform Delay, d1	24.1	30.0	24.5	32.1	39.3	42.2	39.4	46.0	25.8	33.4	51.8	29.0
Progression 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
Incremental Delay, d2	4.1	0.8	0.2	0.2	1.1	0.1	28.6	0.4	0.1	7.2	6.8	0.1
Delay (s)	28.2	30.9	24.7	32.3	40.4	42.3	68.0	46.5	25.9	40.6	58.6	29.0
Level of Service	C	C	C	C	D	D	E	D	C	D	E	C
Approach Delay (s)		27.6			39.9			53.9			46.7	
Approach LOS		C			D			D			D	

Intersection Summary

HCM 2000 Control Delay	40.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	137.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

08/06/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↑↑	↗	↘	↑↑	↗
Traffic Volume (vph)	335	504	627	87	342	199	342	421	60	311	569	277
Future Volume (vph)	335	504	627	87	342	199	342	421	60	311	569	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	16	12	12	16	12	12	12
Storage Length (ft)	130		125	100		100	475		70	250		350
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			35			30				35
Link Distance (ft)		774			177			156				935
Travel Time (s)		21.1			3.4			3.5				18.2
Peak Hour Factor	0.95	0.95	0.95	0.90	0.90	0.90	0.91	0.91	0.91	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	1%	1%	0%	1%	0%	0%	0%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	353	531	660	97	380	221	376	463	66	338	618	301
Turn Type	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases	5	2	2	1	6		3	8		7	4	4
Permitted Phases	2		5	6		8	8		2	4		7
Detector Phase	5	2	2	1	6	8	3	8	2	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.5	39.5	39.5	10.5	39.5	40.5	10.5	40.5	39.5	10.5	40.5	40.5
Total Split (s)	30.0	58.6	58.6	12.6	41.2	41.9	40.0	41.9	58.6	38.9	40.8	40.8
Total Split (%)	19.7%	38.6%	38.6%	8.3%	27.1%	27.6%	26.3%	27.6%	38.6%	25.6%	26.8%	26.8%
Maximum Green (s)	24.5	53.1	53.1	7.1	35.7	36.4	34.5	36.4	53.1	33.4	35.3	35.3
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	Max	Max	None	Max	None	None	None	Max	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		27.0	27.0		27.0	28.0		28.0	27.0		28.0	28.0
Pedestrian Calls (#/hr)		0	0		1	0		0	0		0	0
v/c Ratio	0.72	0.39	0.64	0.30	0.39	0.40	0.94	0.55	0.09	0.77	0.82	0.38
Control Delay	35.0	32.9	8.4	27.8	43.8	13.5	70.0	49.0	2.2	39.1	62.2	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	32.9	8.4	27.8	43.8	13.5	70.0	49.0	2.2	39.1	62.2	3.6
Queue Length 50th (ft)	206	182	57	48	151	35	275	192	0	204	280	0
Queue Length 95th (ft)	342	268	217	97	225	110	#414	264	14	283	373	50
Internal Link Dist (ft)		694			97			76			855	
Turn Bay Length (ft)	130		125	100		100	475		70	250		350
Base Capacity (vph)	520	1362	1026	329	985	624	503	987	773	566	936	850
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0

Lanes, Volumes, Timings

2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

08/06/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.68	0.39	0.64	0.29	0.39	0.35	0.75	0.47	0.09	0.60	0.66	0.35

Intersection Summary

Area Type: Other

Cycle Length: 152

Actuated Cycle Length: 137.2

Natural Cycle: 115

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

Ø1	Ø2	Ø3	Ø4
12.6 s	58.6 s	40 s	40.8 s
Ø5	Ø6	Ø7	Ø8
30 s	41.2 s	38.9 s	41.9 s

HCM Unsignalized Intersection Capacity Analysis

6: Exist. DD Drive 3 (Drive-thru) & West Shore Rd

08/06/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	
Traffic Volume (veh/h)	837	0	12	586	42	27
Future Volume (Veh/h)	837	0	12	586	42	27
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.33	0.75	0.90	0.75	0.75
Hourly flow rate (vph)	910	0	16	651	56	36
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	276					
pX, platoon unblocked			0.90		0.90	0.90
vC, conflicting volume			910		1268	455
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			665		1065	157
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		71	95
cM capacity (veh/h)			836		194	776
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	607	303	233	434	92	
Volume Left	0	0	16	0	56	
Volume Right	0	0	0	0	36	
cSH	1700	1700	836	1700	275	
Volume to Capacity	0.36	0.18	0.02	0.26	0.33	
Queue Length 95th (ft)	0	0	1	0	36	
Control Delay (s)	0.0	0.0	0.8	0.0	24.6	
Lane LOS			A		C	
Approach Delay (s)	0.0		0.3		24.6	
Approach LOS					C	
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			35.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Warwick Ave (117A) & Exist. DD Drive 1

08/06/2021



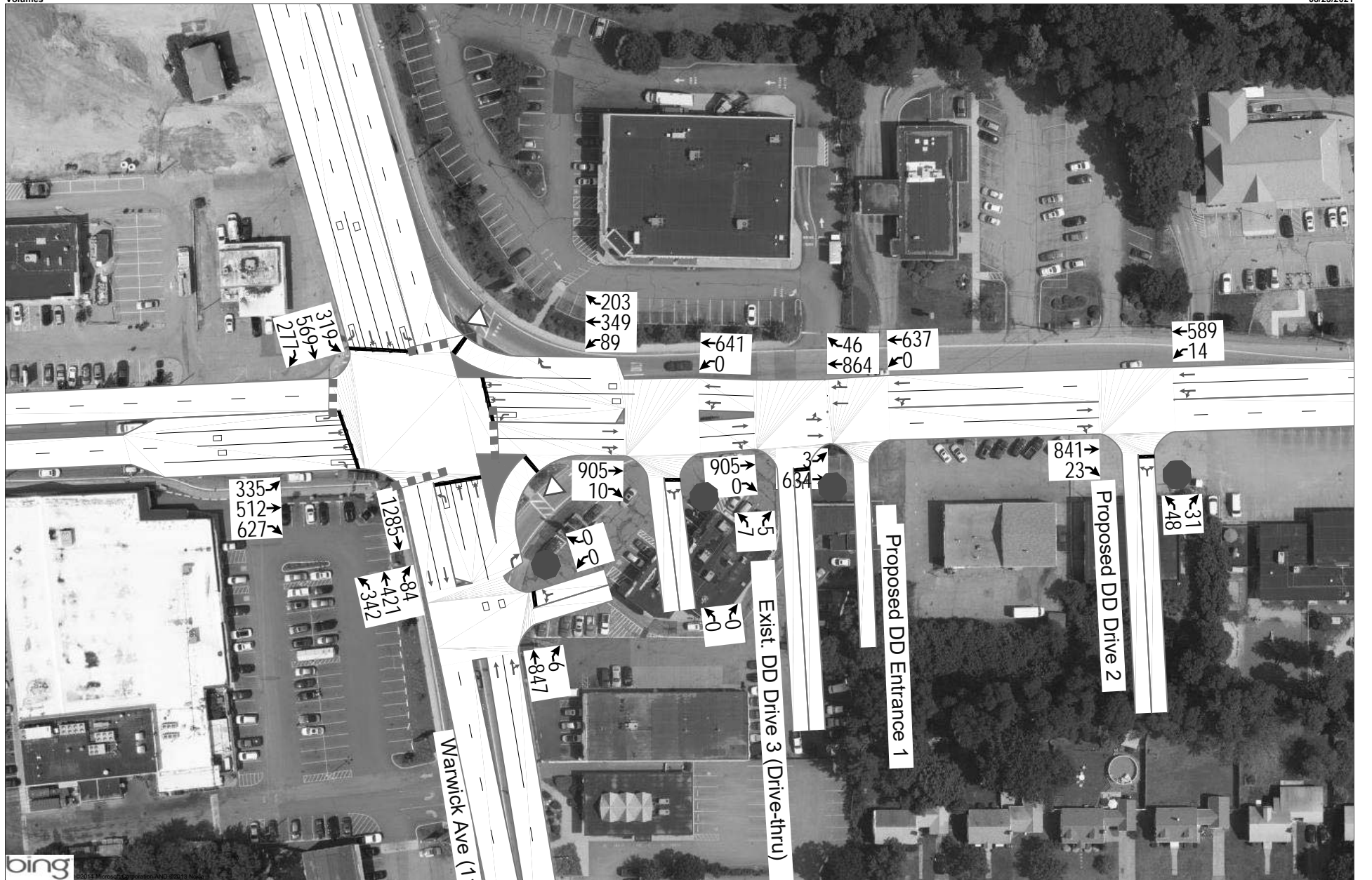
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↑↑			↑↑
Traffic Volume (veh/h)	0	1	822	22	0	1283
Future Volume (Veh/h)	0	1	822	22	0	1283
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.25	0.91	0.55	0.92	0.92
Hourly flow rate (vph)	0	4	903	40	0	1395
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						156
pX, platoon unblocked	0.84					
vC, conflicting volume	1620	472			943	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1352	472			943	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			100	
cM capacity (veh/h)	120	544			723	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	4	602	341	698	698	
Volume Left	0	0	0	0	0	
Volume Right	4	0	40	0	0	
cSH	544	1700	1700	1700	1700	
Volume to Capacity	0.01	0.35	0.20	0.41	0.41	
Queue Length 95th (ft)	1	0	0	0	0	
Control Delay (s)	11.7	0.0	0.0	0.0	0.0	
Lane LOS	B					
Approach Delay (s)	11.7	0.0			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			45.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 10: Ex. DD Drive 2 & West Shore Rd

08/06/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	
Traffic Volume (veh/h)	837	38	0	628	0	0
Future Volume (Veh/h)	837	38	0	628	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.79	0.67	0.90	0.50	0.75
Hourly flow rate (vph)	910	48	0	698	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	177					
pX, platoon unblocked			0.89		0.89	0.89
vC, conflicting volume			958		1283	479
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			711		1076	175
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			801		191	748
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	607	351	233	465	0	
Volume Left	0	0	0	0	0	
Volume Right	0	48	0	0	0	
cSH	1700	1700	801	1700	1700	
Volume to Capacity	0.36	0.21	0.00	0.27	0.02	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		0.0	
Approach LOS					A	
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			27.7%	ICU Level of Service	A	
Analysis Period (min)			15			



HCM Signalized Intersection Capacity Analysis

2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

08/23/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↑↑	↗	↙	↑↑	↗	↙	↑↑	↗	↙	↑↑	↗
Traffic Volume (vph)	335	512	627	89	349	203	342	421	84	319	569	277
Future Volume (vph)	335	512	627	89	349	203	342	421	84	319	569	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	16	12	12	16	12	12	12
Total Lost time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1728	3490	1546	1745	3455	1812	1805	3574	1830	1805	3610	1599
Flt Permitted	0.38	1.00	1.00	0.45	1.00	1.00	0.13	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	683	3490	1546	829	3455	1812	255	3574	1830	668	3610	1599
Peak-hour factor, PHF	0.95	0.95	0.95	0.90	0.90	0.90	0.91	0.91	0.91	0.92	0.92	0.92
Adj. Flow (vph)	353	539	660	99	388	226	376	463	92	347	618	301
RTOR Reduction (vph)	0	0	284	0	0	133	0	0	56	0	0	187
Lane Group Flow (vph)	353	539	376	99	388	93	376	463	36	347	618	114
Heavy Vehicles (%)	1%	0%	1%	0%	1%	1%	0%	1%	0%	0%	0%	1%
Turn Type	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases	5	2	2	1	6		3	8		7	4	4
Permitted Phases	2		5	6		8	8		2	4		7
Actuated Green, G (s)	65.8	53.5	65.8	45.9	39.1	31.7	57.9	31.7	53.5	51.7	28.6	51.7
Effective Green, g (s)	65.8	53.5	65.8	45.9	39.1	31.7	57.9	31.7	53.5	51.7	28.6	51.7
Actuated g/C Ratio	0.48	0.39	0.48	0.33	0.29	0.23	0.42	0.23	0.39	0.38	0.21	0.38
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	489	1361	741	322	985	418	403	826	714	443	753	602
v/s Ratio Prot	c0.11	0.15	0.20	0.02	0.11		c0.18	c0.13		0.13	0.17	0.04
v/s Ratio Perm	c0.23		0.05	0.09		0.05	c0.22		0.02	0.16		0.03
v/c Ratio	0.72	0.40	0.51	0.31	0.39	0.22	0.93	0.56	0.05	0.78	0.82	0.19
Uniform Delay, d1	24.2	30.1	24.5	32.2	39.5	42.7	39.3	46.5	26.0	33.3	51.8	28.6
Progression 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
Incremental Delay, d2	4.4	0.9	0.2	0.2	1.2	0.1	28.1	0.5	0.1	8.1	6.8	0.1
Delay (s)	28.6	31.0	24.7	32.4	40.6	42.8	67.5	47.1	26.1	41.4	58.6	28.7
Level of Service	C	C	C	C	D	D	E	D	C	D	E	C
Approach Delay (s)		27.8			40.2			53.2			46.8	
Approach LOS		C			D			D			D	

Intersection Summary

HCM 2000 Control Delay	40.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	137.1	Sum of lost time (s)	22.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

08/23/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	335	512	627	89	349	203	342	421	84	319	569	277
Future Volume (vph)	335	512	627	89	349	203	342	421	84	319	569	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	16	12	12	16	12	12	12
Storage Length (ft)	130		125	100		100	475		70	250		350
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		25			35			30				35
Link Distance (ft)		774			177			156				935
Travel Time (s)		21.1			3.4			3.5				18.2
Peak Hour Factor	0.95	0.95	0.95	0.90	0.90	0.90	0.91	0.91	0.91	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	1%	1%	0%	1%	0%	0%	0%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	353	539	660	99	388	226	376	463	92	347	618	301
Turn Type	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom	pm+pt	NA	custom
Protected Phases	5	2	2	1	6		3	8		7	4	4
Permitted Phases	2		5	6		8	8		2	4		7
Detector Phase	5	2	2	1	6	8	3	8	2	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	10.5	39.5	39.5	10.5	39.5	40.5	10.5	40.5	39.5	10.5	40.5	40.5
Total Split (s)	30.0	58.6	58.6	12.6	41.2	41.9	40.0	41.9	58.6	38.9	40.8	40.8
Total Split (%)	19.7%	38.6%	38.6%	8.3%	27.1%	27.6%	26.3%	27.6%	38.6%	25.6%	26.8%	26.8%
Maximum Green (s)	24.5	53.1	53.1	7.1	35.7	36.4	34.5	36.4	53.1	33.4	35.3	35.3
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	None	Max	Max	None	Max	None	None	None	Max	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		27.0	27.0		27.0	28.0		28.0	27.0		28.0	28.0
Pedestrian Calls (#/hr)		0	0		1	0		0	0		0	0
v/c Ratio	0.72	0.40	0.64	0.31	0.39	0.41	0.94	0.56	0.12	0.79	0.82	0.38
Control Delay	35.4	33.1	8.4	28.0	44.0	14.2	69.5	49.7	5.7	40.0	62.4	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	33.1	8.4	28.0	44.0	14.2	69.5	49.7	5.7	40.0	62.4	3.6
Queue Length 50th (ft)	207	185	57	49	154	38	275	193	0	211	281	0
Queue Length 95th (ft)	342	272	217	99	230	115	#414	266	37	291	373	50
Internal Link Dist (ft)		694			97			76			855	
Turn Bay Length (ft)	130		125	100		100	475		70	250		350
Base Capacity (vph)	516	1361	1026	327	985	622	503	980	772	562	935	856
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0

Lanes, Volumes, Timings

2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

08/23/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Reduced v/c Ratio	0.68	0.40	0.64	0.30	0.39	0.36	0.75	0.47	0.12	0.62	0.66	0.35

Intersection Summary

Area Type: Other

Cycle Length: 152

Actuated Cycle Length: 137.3

Natural Cycle: 115

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Warwick Ave (117A)/Warwick Ave (117) & Airport Rd/West Shore Rd

Ø1	Ø2	Ø3	Ø4
12.6 s	58.6 s	40 s	40.8 s
Ø5	Ø6	Ø7	Ø8
30 s	41.2 s	38.9 s	41.9 s

HCM Unsignalized Intersection Capacity Analysis

6: Exist. DD Drive 3 (Drive-thru) & West Shore Rd












08/23/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Volume (veh/h)	905	0	3	634	7	5
Future Volume (Veh/h)	905	0	3	634	7	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.33	0.75	0.90	0.75	0.75
Hourly flow rate (vph)	984	0	4	704	9	7
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	276					
pX, platoon unblocked			0.89		0.89	0.89
vC, conflicting volume			984		1344	492
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			739		1142	187
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		95	99
cM capacity (veh/h)			782		175	740
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	656	328	239	469	16	
Volume Left	0	0	4	0	9	
Volume Right	0	0	0	0	7	
cSH	1700	1700	782	1700	262	
Volume to Capacity	0.39	0.19	0.01	0.28	0.06	
Queue Length 95th (ft)	0	0	0	0	5	
Control Delay (s)	0.0	0.0	0.2	0.0	19.6	
Lane LOS			A		C	
Approach Delay (s)	0.0		0.1		19.6	
Approach LOS					C	
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			35.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 8: Warwick Ave (117A) & Exist. DD Drive 1

08/23/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	0	0	847	6	0	1285
Future Volume (Veh/h)	0	0	847	6	0	1285
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.25	0.91	0.55	0.92	0.92
Hourly flow rate (vph)	0	0	931	11	0	1397
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						156
pX, platoon unblocked	0.84					
vC, conflicting volume	1635	471			942	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1369	471			942	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	117	545			724	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	0	621	321	698	698	
Volume Left	0	0	0	0	0	
Volume Right	0	0	11	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.00	0.37	0.19	0.41	0.41	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS	A					
Approach Delay (s)	0.0	0.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			38.9%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

10: Ex. DD Drive 2 & West Shore Rd

08/23/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑↑	
Traffic Volume (veh/h)	905	10	0	641	0	0
Future Volume (Veh/h)	905	10	0	641	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.79	0.67	0.90	0.50	0.75
Hourly flow rate (vph)	984	13	0	712	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	177					
pX, platoon unblocked			0.89		0.89	0.89
vC, conflicting volume			997		1346	498
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			750		1143	190
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			773		172	730
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	656	341	237	475	0	
Volume Left	0	0	0	0	0	
Volume Right	0	13	0	0	0	
cSH	1700	1700	773	1700	1700	
Volume to Capacity	0.39	0.20	0.00	0.28	0.00	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS						A
Approach Delay (s)	0.0		0.0		0.0	
Approach LOS						A
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			28.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Proposed DD Entrance 1 & West Shore Rd

08/23/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		
Traffic Volume (veh/h)	864	46	0	637	0	0
Future Volume (Veh/h)	864	46	0	637	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	939	50	0	692	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	327					
pX, platoon unblocked			0.89		0.89	0.89
vC, conflicting volume			989		1310	494
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			745		1105	191
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			766		183	730
Direction, Lane #	EB 1	EB 2	WB 1	WB 2		
Volume Total	626	363	231	461		
Volume Left	0	0	0	0		
Volume Right	0	50	0	0		
cSH	1700	1700	766	1700		
Volume to Capacity	0.37	0.21	0.00	0.27		
Queue Length 95th (ft)	0	0	0	0		
Control Delay (s)	0.0	0.0	0.0	0.0		
Lane LOS						
Approach Delay (s)	0.0		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			28.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

14: Proposed DD Drive 2 & West Shore Rd

08/23/2021



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	
Traffic Volume (veh/h)	841	23	14	589	48	31
Future Volume (Veh/h)	841	23	14	589	48	31
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	914	25	15	640	52	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	532					
pX, platoon unblocked			0.90		0.90	0.90
vC, conflicting volume			939		1276	470
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			705		1081	182
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		72	95
cM capacity (veh/h)			798		187	745
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	609	330	228	427	86	
Volume Left	0	0	15	0	52	
Volume Right	0	25	0	0	34	
cSH	1700	1700	798	1700	266	
Volume to Capacity	0.36	0.19	0.02	0.25	0.32	
Queue Length 95th (ft)	0	0	1	0	34	
Control Delay (s)	0.0	0.0	0.8	0.0	24.9	
Lane LOS			A		C	
Approach Delay (s)	0.0		0.3		24.9	
Approach LOS					C	
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			37.5%		ICU Level of Service	A
Analysis Period (min)			15			