

Proposed Marijuana Establishment

0 Greenfield Road
South Deerfield, Massachusetts

PREPARED FOR

Sunny Dayz Cannabis, LLC

PREPARED BY



One Federal Street
Bldg. 103-3N
Springfield, MA 01105
413.747.7113

August 31, 2022

Table of Contents

INTRODUCTION	1
PROJECT DESCRIPTION AND BACKGROUND	1
STUDY METHODOLOGY	3
STUDY AREA.....	3
EXISTING CONDITIONS ASSESSMENT	4
ROADWAY NETWORK.....	4
ROADWAYS	4
INTERSECTIONS.....	5
TRAFFIC VOLUMES	5
SAFETY ASSESSMENT.....	8
FUTURE CONDITIONS	9
NO-BUILD TRAFFIC VOLUMES	9
BUILD CONDITION	12
TRAFFIC OPERATIONS ANALYSIS	17
LEVEL OF SERVICE AND DELAY CRITERIA	17
INTERSECTION CAPACITY ANALYSIS.....	19
CONCLUSIONS	22

List of Tables

Table No.	Description	Page
Table 1	Crash Summary	8
Table 2	Trip Generation Summary.....	13
Table 3	Trip Distribution Summary.....	14
Table 4	Level of Service Criteria.....	18
Table 5	Signalized Intersection Capacity Analysis Summary	20
Table 6	Unsignalized Intersection Capacity Analysis Summary	21

List of Figures

Figure No.	Description	Page
Figure 1	Site Location Map	2
Figure 2	2022 Existing Conditions Traffic Volumes	7
Figure 3	2029 No-Build Conditions Traffic Volumes.....	11
Figure 4	2029 Build Conditions Traffic Volumes.....	16



1

Introduction

Vanasse Hangen Brustlin, Inc. (VHB) has been retained by Sunny Dayz Cannabis, LLC to conduct a Transportation Impact Assessment (TIA) for a proposed marijuana complex to be located at 0 Greenfield Road in South Deerfield, Massachusetts. The facility will consist of cultivation, retail, and research and development uses. VHB has evaluated existing traffic operations in the area, assessed the impacts of this redevelopment, and summarized the results in this report.

Project Description and Background

The Project site is located at 0 Greenfield Road, on the western side of the roadway in South Deerfield, Massachusetts. The site is a vacant, wooded lot. Proposed on site are three buildings for research and development, retail sales, and cultivation. The cultivation portion of the development is expected to account for 26,000 square feet of the total complex, the retail portion is expected to be the smallest building in the complex at 3,000 square feet, and the research and development building is expected to account for 5,000 square feet of the complex. The retail and research and development buildings are located at the front (eastern) portion of the site, and a security checkpoint is located on the internal site driveway connecting the front portion of the site to the cultivation building in the back. Employees must go through this security checkpoint to reach the cultivation building parking area.

A site location map is provided in Figure 1. A draft site plan of the proposed development is shown in the Appendix.



Study Location Map
Cannabis Retail, Manufacturing,
& Research
South Deerfield, MA

Figure 1



Study Methodology

This traffic study was conducted in three stages. The first stage involved an assessment of existing traffic conditions in the study area, and included an inventory of roadway geometrics and observations of traffic flow. In addition, daily and peak period traffic counts from May of 2016 were obtained from MassDOT as part of the recent MassDOT project number 606011 resurfacing the roadway and making geometric improvements. A safety review of the study area intersection was performed.

In the second stage of the study, future traffic conditions both with and without the project were estimated and analyzed. This study assessed specific travel demand forecasts for the project, and the estimated background growth unrelated to this project.

The third and final stage involved conducting traffic analyses to identify both existing and projected future roadway capacity and demand. From this information and other factors, the likely traffic impacts associated with the project can be determined. This analysis was used as the basis for determining if any resulting roadway improvements or measures would be required in support of the site-generated traffic.

Study Area

The study area includes those locations that are expected to be affected by this project. The roads and intersection included in the study area were selected based on VHB's knowledge of the traffic patterns in the area and from discussion with the Town of Deerfield. The specific study area encompasses the following intersection:

- Conway Road (Route 116) at Greenfield Road (Route 5/10) (signalized)

An inventory of the existing conditions for the study intersection is provided in the following chapter.



2

Existing Conditions Assessment

Effective evaluation of the transportation impacts associated with the proposed development project requires a thorough understanding of the existing transportation system surrounding the project study area. A complete inventory of the existing transportation system was conducted, and is presented in this section. The analysis of existing transportation conditions is based on the existing network, roadway and intersection geometry, traffic control, existing traffic volumes, traffic safety, and pedestrian facilities.

Roadway Network

The principal roadways and intersections in the study area are described below.

Roadways

The description of the roadways includes the physical characteristics, geometric conditions, adjacent land uses, and current operating conditions.

Conway Road (Route 116)

Conway Road (Route 116) runs in a primarily northwest-southeast direction through the Town of Deerfield connecting Routes 5/10 and Interstate 91 with the Town of Conway. Conway Road is classified as a rural minor arterial from the intersection with Routes 5/10 to the I-91 ramps and as a rural major collector past the I-91 ramps. This roadway is under MassDOT jurisdiction.



In the vicinity of the site, Conway Road provides one travel lane in each direction with wide shoulders. Uses along this roadway are primarily residential and agricultural.

Greenfield Road (Routes 5/10)

Greenfield Road (Route 5/10) runs in a primarily north-south direction through the Town of Deerfield connecting the I-91 ramps to the south with downtown Greenfield to the north. In the vicinity of this proposed development Greenfield Road is classified as a rural major collector under MassDOT jurisdiction. Greenfield Road has a cross section consisting of one travel lane per direction, a bike lane with buffer on either side, and a striped median between the travel lanes. A sidewalk is provided on the eastern edge of the roadway south of the intersection with Conway Road. The abutting land uses are primarily commercial and industrial.

Intersections

The description of the intersections includes the physical characteristics, geometric conditions, and current operating conditions.

Conway Road (Route 116) at Greenfield Road (Route 5/10) (signalized)

Conway Road intersects Greenfield Road from the west and the Fire Department Driveway intersects from the east to form a four-legged signalized intersection. The eastbound and westbound approaches consist of one shared left-turn/through lane, and one exclusive right-turn lane. The northeast-bound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. The southbound approach provides an exclusive left-turn lane, a through lane, and an exclusive right-turn lane. A crosswalk is provided on the Fire Department Driveway approach. The traffic control signal operates with a leading northbound/southbound left-turn phase with an eastbound right-turn overlap, a northbound/southbound through phase, and an eastbound/westbound through phase.

Traffic Volumes

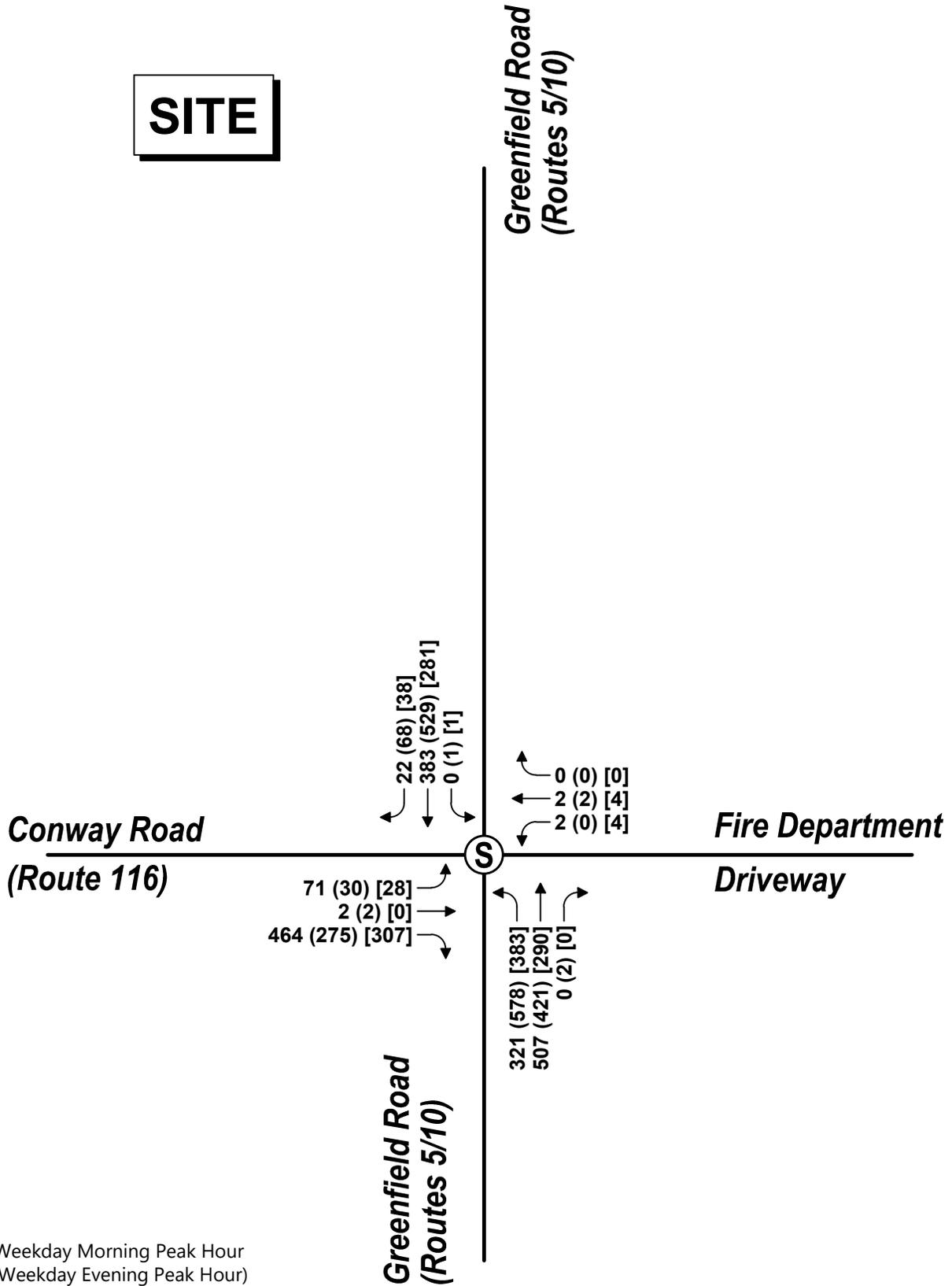
VHB obtained manual turning movement and classification (TMC) counts at the study area intersection from MassDOT as part of State Project Number 606011 during the typical weekday morning peak hours (7:00 – 9:00 AM), typical weekday evening peak hours (4:00 – 6:00 PM), and typical Saturday midday peak hours (11:00 AM – 2:00 PM). Included in these counts are passenger vehicles, heavy vehicles, buses, and pedestrians. These counts were conducted on May 19th and May 21st, 2016. Within these periods, the peak hours of the intersection generally occurred from 7:45 AM to 8:45 AM during the weekday morning, 4:30 PM to 5:30 PM during a typical weekday evening, and 11:30 AM to 12:30 PM during a typical Saturday midday.



A growth rate was applied to the May 2016 traffic volumes to forecast traffic volumes under existing conditions according to MassDOT’s April 2020 “Guidance on Traffic Count Data”. Due to the COVID-19 pandemic, traffic volumes beginning in March 2020 were greatly reduced from the preceding months. Based on a review of MassDOT count station traffic volumes in the vicinity of the site, traffic volumes have still not fully recovered from their pre-pandemic peak, and traffic volumes in 2016 were generally higher than 2021. Therefore, applying a growth rate to the 2016 traffic volumes results in a very conservative analysis of existing conditions.

The 2022 Existing conditions weekday morning, evening, and Saturday midday peak hour traffic volume networks are summarized in Figure 2.

SITE



Weekday Morning Peak Hour
 # (Weekday Evening Peak Hour)
 # [Saturday Midday Peak Hour]



Not to Scale



2022 Existing Conditions
 Peak Hour Traffic Volumes
 Sunny Dayz Cannabis
 South Deerfield, MA

Figure 2



Safety Assessment

To identify crash trends and/or roadway deficiencies in the study area, crash data for the study area intersections were obtained from MassDOT for the most recently available five-year period (2017-2021), and are summarized in Table 1. MassDOT reports vehicle crashes with damage greater than \$1,000 or personal injury occurrences, which can give a good indication of safety. As the roadway infrastructure has not changed significantly since these data were collected, this information should provide a fair representation of the current incident experience in this area.

Table 1 Crash Summary

Intersection	2017-2021 Total Crashes	Crash Rate	MassDOT Crash Rate
Route 116 at Route 5/10	23	0.53	0.89

The 2018 MassDOT average crash rates for signalized intersections for District 2 (the MassDOT district designation for South Deerfield) is 0.89. As seen in Table 2, the signalized intersection of Conway Road at Greenfield Road maintains a crash rate lower than the average state rate. The intersection is listed on the MassDOT Highway Safety Improvement Program (HSIP) top crash location list for the 2017-2019 program years. State Project Number 606011 was completed in the fall of 2021 and the changes to the signal and roadway cross-section would not be captured by the HSIP listing.



3

Future Conditions

To determine the impacts of the future site-generated traffic volumes on the roadway network, traffic conditions were projected to a seven-year planning horizon, based on Executive Office of Environmental Affairs (EOEA)/Executive Office of Transportation (EOT) guidelines for preparation of a transportation impact assessment (TIA). Future traffic projections include regional background traffic growth and planned roadway improvements. Consideration of these factors resulted in the development of the 2029 No-Build traffic volumes. Anticipated Future Site-generated traffic volumes were then added to the 2027 No-Build traffic flow networks to reflect the 2029 Build scenario with the proposed redevelopment.

No-Build Traffic Volumes

Traffic growth on area roadways is a function of the expected land development, economic activity, and changes in demographics. A frequently used procedure is to estimate traffic that could be generated by planned new major developments, potentially affecting the project study area roadways. An alternative procedure is to estimate an overall area annual percentage increase and apply that increase to study area traffic volumes. For the purpose of this assessment, the latter methodology was utilized and is detailed further below.



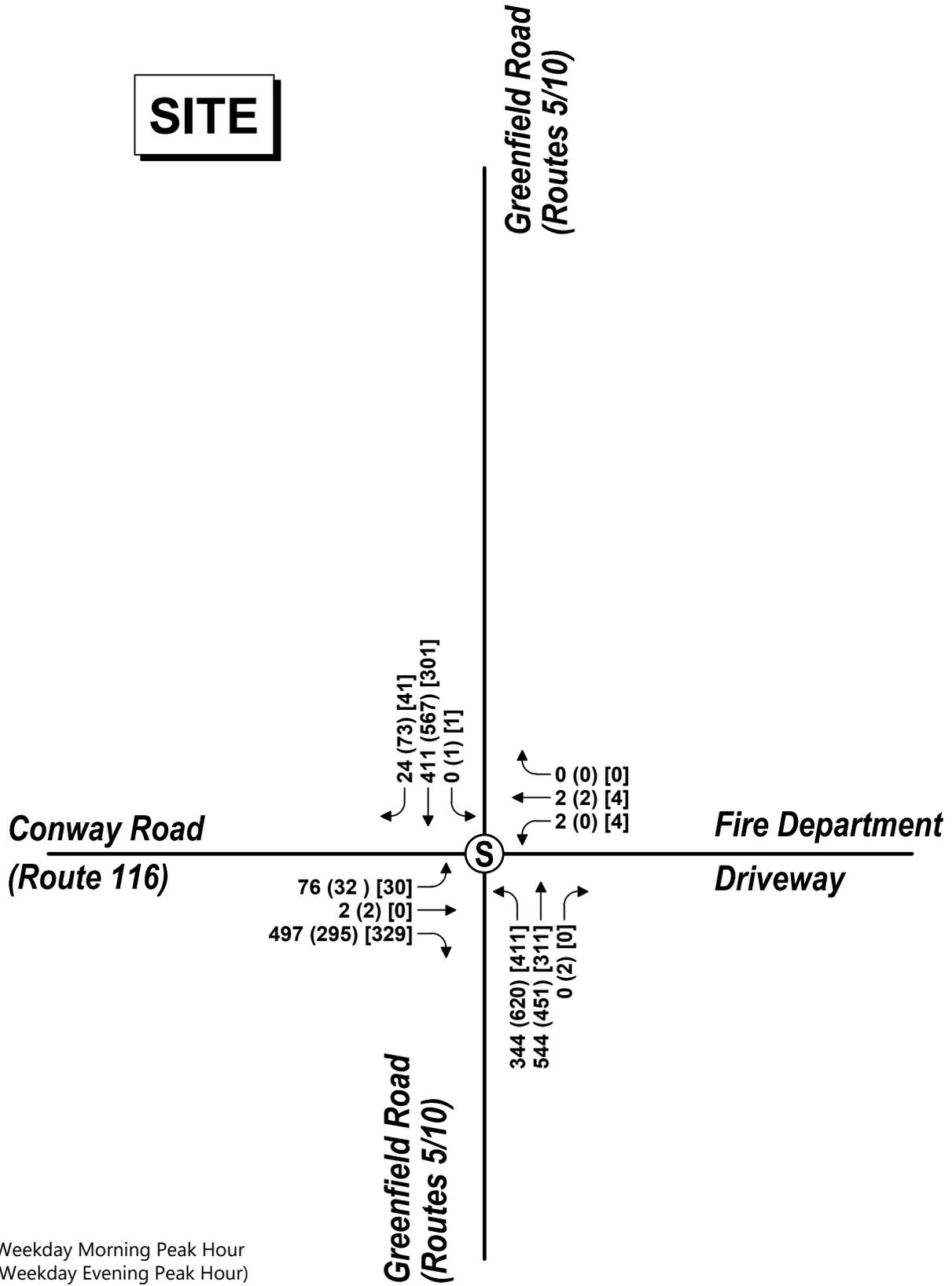
Historic Growth

Local MassDOT continuous count stations located on the Massachusetts Interstate 91 and Route 5/10 show that traffic volumes have fluctuated over the most recent ten-year period, with an average growth of approximately 0.5 to 1 percent per year. In order to account for background sources of traffic growth not related to the proposed project, a conservative 1 percent per year growth rate was applied to the traffic volumes.

2029 No-Build Traffic Volumes

The 1 percent per year annual growth rate was applied to the 2022 Existing traffic volumes over a seven year period to develop the projected 2029 No-Build (without the proposed project) weekday morning, weekday evening, and Saturday midday peak hour traffic volumes. The Veterinary Emergency and Surgical Hospital located to the north of the site is currently undergoing parking lot expansion but does not have any formal plans to expand their building or services at this time and was not included in the No-Build Conditions.

The 2029 No-Build Conditions peak hour traffic volumes can be seen in Figure 3.



Not to Scale



2029 No-Build Conditions
 Peak Hour Traffic Volumes
 Sunny Dayz Cannabis
 South Deerfield, MA

Figure 3



Build Condition

Build traffic volumes for study area roadways were determined by estimating site generated traffic volumes and distributing these volumes over the study area roadways.

Site Generated Traffic

The vehicle trips the project is expected to generate were calculated using a combination of local data compiled by VHB and national data documented in the *ITE Trip Generation* manual, 11th edition.

The traffic volumes generated by the cultivation and research and development buildings on the site were forecast using trip generation rates provided in the *ITE Trip Generation* manual, 11th edition. This widely used reference manual provides trip generation rates for various land uses based on traffic count data collected at similar sites. Land Use Code 140 (Manufacturing) was selected for the 26,000 square-foot cultivation building, and Land Use Code 760 (Research and Development) was selected for the 5,000 square-foot research and development building.

The ITE Manual contains fairly limited data for marijuana dispensaries, and the few sites surveyed were based in Colorado and Oregon in the 2010's, with Massachusetts sites being added in the latest edition. As such, VHB has compiled local traffic count data collected at four marijuana dispensaries in Massachusetts over the last two years. This local data was used to forecast the traffic generated by the retail dispensary during the weekday evening and Saturday midday peak traffic periods. Local data was unavailable for the weekday morning peak traffic period, so ITE Land Use Code 882 (Marijuana dispensary) was used to forecast the traffic generated by the retail dispensary during the morning peak. In general, the local data provides a more conservative traffic forecast for the dispensary than the ITE data. A comparison of the trip generation projections using both the ITE methodology and the local Massachusetts data for the retail marijuana component of the development are presented in the Appendix for comparison.

It should be noted that the local data used for the retail dispensary trip generation forecast was collected at a time when marijuana dispensaries were fairly sparse, and there was very little competition. Since this data was collected, the underlying conditions have changed as more new dispensaries have opened, and the trip generation for each site is trending downward due to the increased competition. Based on information provided by Revolutionary Clinics, the average number of customers per store in Massachusetts has decreased by *fifty-percent* in the past twelve months due to the increased number of stores. If this trend continues as expected the trip generation specific to the retail portion could be half of what is forecast based on the local data. However, to provide for a conservative analysis, this study was conducted without attempting to adjust these observed volumes downward.

A summary of the trip generation forecast is presented in Table 2. As shown in this table, the proposed development would be expected to generate approximately 55 (33 enter, 22 exit)



vehicle trips during the weekday morning peak hour, 146 (60 enter, 80 exit) vehicle trips during the weekday evening peak hour, and 125 (62 enter, 63 exit) during the Saturday midday peak hour.

Table 2 Trip Generation Summary

Time Period	Marijuana Dispensary Trips ¹	Cultivation ² (LUC 140)	Research and Development ³ (LUC 760)	Net New Trips
Weekday Morning Peak Hour ^b				
Enter	16	13	4	33
Exit	<u>16</u>	<u>5</u>	<u>1</u>	<u>22</u>
Total	32	18	5	55
Weekday Evening Peak Hour ^b				
Enter	59	6	1	66
Exit	<u>63</u>	<u>13</u>	<u>4</u>	<u>80</u>
Total	122	19	5	146
Saturday Midday Peak Hour ^b				
Enter	59	2	1	62
Exit	<u>60</u>	<u>3</u>	<u>0</u>	<u>63</u>
Total	119	5	1	125

a Vehicles per day

b Vehicles per hour

1 Trip generation calculated using ITE and Massachusetts Marijuana Dispensaries methodology, based on LUC 882 Marijuana Dispensary for 3,000 SF

2 Trip generation calculated using ITE methodology, based on LUC 140 Manufacturing for 26,000 SF

3 Trip generation calculated using ITE methodology, based on LUC 760 Research and Development for 5,000 SF



Trip Distribution

The anticipated distribution of the site generated traffic was determined by examining the population density of neighborhoods in South Deerfield in relation to the site location, anticipating commuter traffic patterns in the area, and ease of access to the site.

It was assumed that site-generated traffic would be allocated across the major routes in the area based on the traffic percentages that are summarized in Table 3. A figure depicting the distribution patterns can be seen in the Appendix.

Table 3 Trip Distribution Summary

Roadway	Direction [From/To]	Site Generated Trip Distribution^a
Greenfield Road	North	30%
Greenfield Road	South	50%
<u>Conway Road</u>	<u>West</u>	<u>20%</u>
Total		100%

a Based on a function of population densities, anticipated commuter traffic patterns, and ease of access to the Site



Proposed Site Access and Circulation

Access to the site is proposed via an existing MassDOT break in access line. This break in access line dates from 1992 when the access for cattle to pass was removed. The proposed site driveway will cross over the existing wetlands and split into two interior drives; one gated security access drive leading to Building C (the cultivation building) and one drive leading to Buildings D (retail dispensary) and E (the testing laboratory). The gated access drive will be further expanded at a future time to accommodate an additional phase of cultivation buildings.

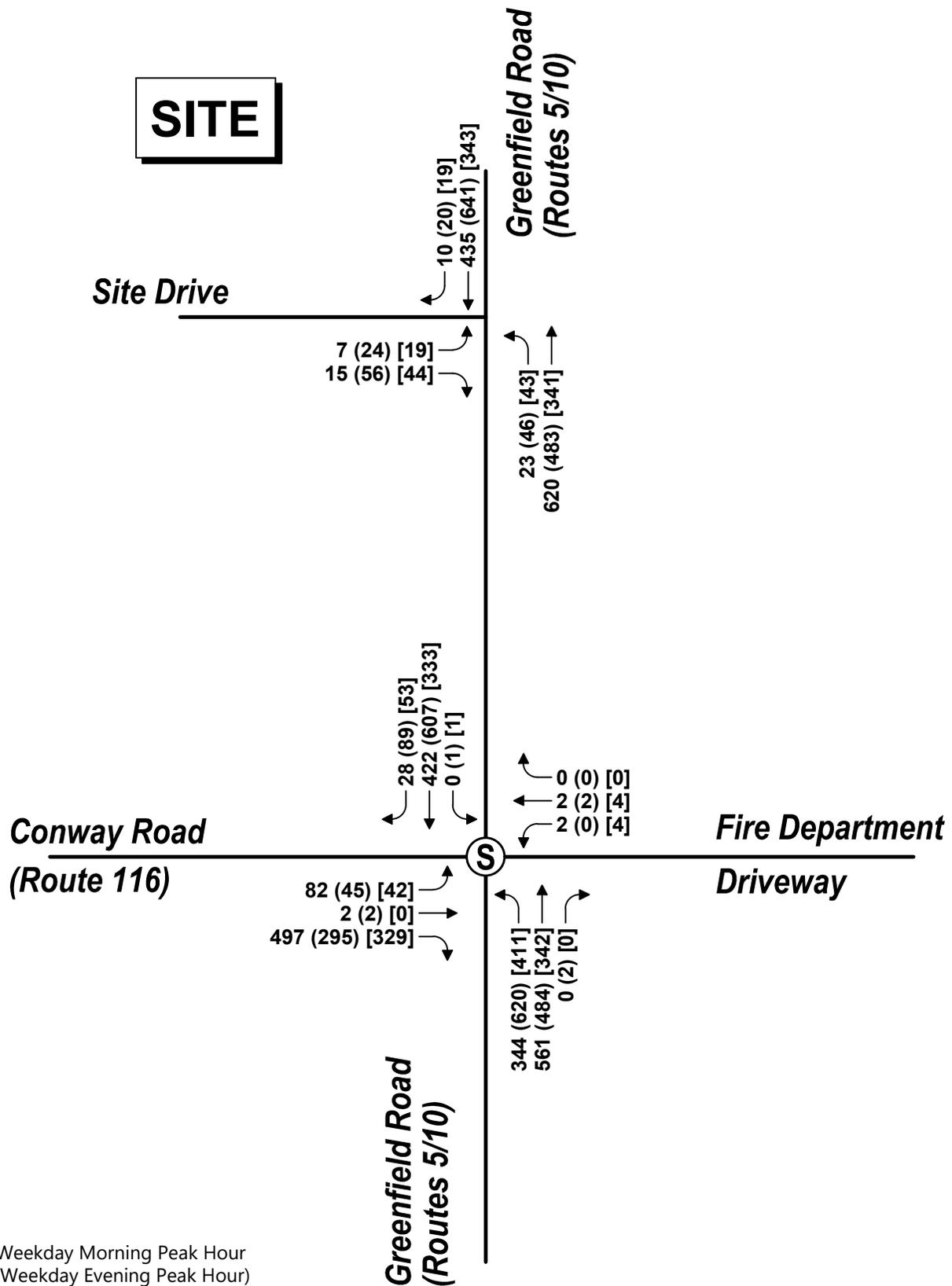
Parking on site is provided directly adjacent to the buildings. A total of 85 spaces are proposed on site for employees and patrons.

It is expected that the volume of patrons accessing the site will peak during the first days of operation, and then will slowly begin to level out as time passes. It is expected during the peak hours of the beginning days of operation, patrons will be required to stage in a line to wait for their turn to be serviced. Patrons will be expected to stage along the sidewalk adjacent to the building, without impeding vehicular traffic through the site. In addition, employees will be available during peak operating hours to assist with patron staging.

A reduced-size copy of the proposed site plan can be seen in the Appendix.

Build Conditions Traffic Volumes

The future site-generated volumes will be assigned to the roadway network according to the distribution and travel patterns previously described and combined with the 2029 No-Build traffic volumes to develop the 2029 Build peak hour network. The 2029 Build Conditions peak hour networks can be seen in Figure 4.



Weekday Morning Peak Hour
 # (Weekday Evening Peak Hour)
 # [Saturday Midday Peak Hour]



Not to Scale



2029 Build Conditions
 Peak Hour Traffic Volumes
 Sunny Dayz Cannabis
 South Deerfield, MA

Figure 4

4

Traffic Operations Analysis

Measuring existing traffic volumes and projecting future traffic volumes quantifies traffic flow within the study area. To assess the roadway and intersection capacity, analyses were conducted with respect to existing traffic volume conditions. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed on them. The following sections describe the methodology used to evaluate the study area intersections and summarize the results of the analyses.

Level of Service and Delay Criteria

The evaluation criteria used to analyze area intersections in this traffic study are based on the 2000 Highway Capacity Manual (HCM). The term 'Level of service' (LOS) is used to denote the different operating conditions that occur on a given roadway segment under various traffic volume loads. It is a qualitative measure that considers a number of factors including roadway geometry, speed, travel delay and freedom to maneuver. Level of service provides an index to the operational qualities of a roadway segment or an intersection. Level-of-service



designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions.

In addition to LOS, two other measures of effectiveness (MOEs) are typically used to quantify the traffic operations at intersections; volume-to-capacity ratio (v/c) and delay (expressed in seconds per vehicle). For example, an existing v/c ratio of 0.9 for an intersection indicates that the intersection is operating at 90 percent of its available capacity. A delay of 15 seconds for a particular vehicular movement or approach indicates that vehicles on the movement or approach will experience an average additional travel time of 15 seconds. It should be noted that v/c and delay could have a range of values for a given LOS letter designation. Comparison of intersection capacity results therefore requires that, in addition to the LOS, the other MOEs should also be considered.

The level-of-service designations, which are based on delay, are reported differently for signalized and unsignalized intersections. For signalized intersections, the analysis considers the operation of all traffic entering the intersection and the LOS designation is for overall conditions at the intersection. For unsignalized intersections, however, the analysis assumes that traffic on the mainline is not affected by traffic on the side streets. Thus, the LOS designation is for the critical movement exiting the side street, which is generally the left turn out of the side street or site driveway. Table 4 shows the level of service criteria for both signalized intersections and unsignalized intersections.

It should be noted that the analytical methodologies typically used for the analysis of unsignalized intersections use conservative analysis parameters, such as long critical gaps. Actual field observations indicate that drivers on minor streets generally accept shorter gaps in traffic than those used in the analysis procedures and therefore experience less delay than reported by the analysis software. The analysis methodologies also do not fully take into account the beneficial grouping effects caused by nearby signalized intersections. The net effect of these analysis procedures is the over-estimation of calculated delays at unsignalized intersections in the study area. Cautious judgment should therefore be exercised when interpreting the capacity analysis results at unsignalized intersections.

Table 4 Level of Service Criteria

Level of Service	Signalized Intersection	Unsignalized Intersection
A	0 to 10 seconds	0 to 10 seconds
B	10 to 20 seconds	10 to 15 seconds
C	20 to 35 seconds	15 to 25 seconds
D	35 to 55 seconds	25 to 35 seconds
E	55 to 80 seconds	35 to 50 seconds
F	Greater than 80 seconds	Greater than 50 seconds

Source: 2000 Highway Capacity Manual Exhibits 16-2 and 17-2



Intersection Capacity Analysis

Signalized Intersection Capacity Analysis

The signalized intersection of Greenfield Road (Routes 5/10) at Conway Road (Route 116) currently operates at LOS B during all peak hour conditions. Under the Future No-Build conditions, the intersection is expected to maintain a LOS B during the morning and Saturday midday peak hours and degrade to LOS C during the evening peak hour due to the projected background traffic growth unrelated to the proposed project. During the Future Build conditions the intersection is expected to continue operating at the same LOS during the peak hours, with slight increases in overall delay experienced. It should also be noted that queue lengths along all approaches are expected to increase nominally with the additional traffic traveling through the intersection. Overall, the traffic generated by the proposed development is expected to have only a nominal impact on overall traffic operating conditions.

It should be noted that during the weekday evening peak hour condition, the eastbound left-turn operates at LOS F and has a high level of delay (>120 seconds). To mitigate this, adding three seconds to the eastbound/westbound phase and removing three seconds from the northbound/southbound phase to maintain the same overall cycle length, results in the eastbound left-turn operating at similar conditions to the No-Build analysis. The overall intersection, with the above describe mitigation, continues to operate at LOS C with acceptable levels of delay.

The results of the analysis are shown in Table 5.

Unsignalized Intersection Capacity Analysis

Unsignalized intersection capacity analyses were conducted for the unsignalized intersection identified in the study area and can be seen in Table 6. The eastbound stop-controlled approach to the unsignalized study area intersection of Site Drive at Greenfield Road (Routes 5/10) is projected to operate at LOS C during the morning and evening peak hour, and a LOS B during the Saturday midday peak hour. Queue lengths are expected to equal approximately one passenger car in length or less.



Table 5 Signalized Intersection Capacity Analysis Summary

Intersection	Lane Group	2022 Existing Conditions					2029 No-Build Conditions					2029 Build Conditions					2029 Build with Optimization				
		V/C ¹	Delay ²	LOS ³	50 th 4	95 th 5	V/C	Delay	LOS	50 th	95 th	V/C	Delay	LOS	50 th	95 th	V/C	Delay	LOS	50 th	95 th
Weekday Morning Peak Hour																					
Conway Road	EB L/T	0.51	31.0	C	32	82	0.58	37.1	D	40	87	0.60	39.0	D	44	91	-	-	-	-	-
Conway Road	EB R	0.71	22.9	C	104	235	0.77	26.7	C	148	277	0.78	27.9	C	160	282	-	-	-	-	-
FD Driveway	WB L/T	0.08	27.2	C	5	8	0.09	30.2	C	5	8	0.08	30.9	C	6	8	-	-	-	-	-
FD Driveway	WB R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Greenfield Road	NB L	0.58	8.3	A	51	98	0.61	9.1	A	57	142	0.62	9.6	A	59	151	-	-	-	-	-
Greenfield Road	NB T/R	0.46	4.4	A	95	172	0.48	4.3	A	108	196	0.50	4.5	A	116	212	-	-	-	-	-
Greenfield Road	SB L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Greenfield Road	SB T	0.71	21.3	C	165	280	0.74	23.9	C	209	309	0.75	24.4	C	219	326	-	-	-	-	-
Greenfield Road	SB R	0.02	13.0	B	0	0	0.02	13.9	B	0	0	0.02	14.1	B	0	0	-	-	-	-	-
	Overall	0.71	14.8	B	-	-	0.75	16.7	B	-	-	0.76	17.3	B	-	-	-	-	-	-	-
Weekday Evening Peak Hour																					
Conway Road	EB L/T	0.56	54.2	D	24	59	0.66	71.1	E	32	62	0.88	122.6	F	47	#93	0.69	72.7	E	45	79
Conway Road	EB R	0.44	23.9	C	66	122	0.49	25.9	C	110	151	0.50	26.9	C	128	163	0.49	26.1	C	129	164
FD Driveway	WB L/T	0.05	44.1	D	2	8	0.06	49.4	D	3	8	0.04	51.3	D	3	8	0.03	50.9	D	3	8
FD Driveway	WB R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Greenfield Road	NB L	0.81	22.3	C	204	382	0.87	32.5	C	311	#539	0.92	44.9	D	368	#598	0.94	49.9	D	394	#634
Greenfield Road	NB T/R	0.31	3.5	A	54	139	0.32	3.3	A	59	152	0.35	3.7	A	66	166	0.35	4.2	A	79	187
Greenfield Road	SB L	0.00	2.4	A	0	1	0.00	2.2	A	0	1	0.00	2.4	A	0	1	0.00	2.8	A	0	1
Greenfield Road	SB T	0.74	24.5	C	333	508	0.79	29.6	C	449	562	0.85	35.9	D	501	#665	0.88	40.9	D	523	#702
Greenfield Road	SB R	0.05	14.2	B	0	2	0.06	15.9	B	0	6	0.07	17.3	B	0	16	0.07	18.7	B	0	17
	Overall	0.80	19.7	B	-	-	0.86	24.7	C	-	-	0.92	31.5	C	-	-	0.92	33.1	C	-	-
Saturday Midday Peak Hour																					
Conway Road	EB L/T	0.36	27.7	C	5	34	0.40	30.2	C	8	38	0.40	30.4	C	16	50	-	-	-	-	-
Conway Road	EB R	0.31	15.6	B	8	51	0.39	16.4	B	18	69	0.41	16.8	B	28	93	-	-	-	-	-
FD Driveway	WB L/T	0.18	25.9	C	3	12	0.19	27.8	C	4	13	0.15	28.3	C	5	14	-	-	-	-	-
FD Driveway	WB R	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Greenfield Road	NB L	0.55	5.8	A	0	94	0.58	5.9	A	0	104	0.61	6.9	A	61	111	-	-	-	-	-
Greenfield Road	NB T/R	0.29	5.0	A	0	115	0.30	4.8	A	0	125	0.33	5.3	A	47	143	-	-	-	-	-
Greenfield Road	SB L	0.00	3.7	A	0	1	0.00	3.5	A	0	1	0.00	3.8	A	0	1	-	-	-	-	-
Greenfield Road	SB T	0.46	12.7	B	44	173	0.49	13.8	B	65	195	0.54	15.8	B	129	221	-	-	-	-	-
Greenfield Road	SB R	0.03	10.2	B	0	0	0.03	10.9	B	0	0	0.04	12.0	B	0	0	-	-	-	-	-
	Overall	0.54	10.0	B	-	-	0.57	10.5	B	-	-	0.59	11.6	B	-	-	-	-	-	-	-

1 V/C – Volume-to-capacity ratio
 2 Delay – Control delay per vehicle
 3 LOS – Level-of-Service
 4 50th – 50th percentile queue length estimate, in feet
 5 95th – 95th percentile queue length estimate, in feet
 # 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles
 NB = Northbound; SB = Southbound; EB = Eastbound; WB = Westbound; L = left-turn; T = through; R = right-turn



Table 6 Unsignalized Intersection Capacity Analysis Summary

Location	Peak Period	Movement	2029 Build			
			Dem ^a	v/c ^b	Delay ^c	LOS ^d
Site Driveway at Greenfield Road	Weekday Morning	EB-LR	22	0.07	16.3	C
		NB-LT	643	0.02	0.6	A
		SB-TR	445	0.28	0.0	-
	Weekday Evening	EB-LR	80	0.31	23.4	C
		NB-LT	529	0.06	1.5	A
		SB-TR	661	0.42	0.0	-
	Saturday Midday	EB-LR	63	0.14	13.4	B
		NB-LT	384	0.04	1.3	A
		SB-TR	362	0.23	0.0	-

- a demand in vehicles per hour for unsignalized intersections; demand is calculated as the total vehicular volume from the critical side street approach
- b volume-to-capacity ratio for the critical movement
- c delay of critical approach only
- d level of service of the critical movement
- EB, WB Eastbound, westbound
- NB, SB Northbound, southbound
- N/A movement not present under specified scenario
- LR shared left/right-turn movements;
- LTR shared left/through/right-turn movements
- L left-turn movement
- LT shared left/through-movement
- R right-turn movement
- T through-movement



5

Conclusions

This study has been prepared to evaluate the traffic impacts associated with a proposed retail marijuana, cultivation, and testing facility, to be located on a vacant, wooded lot located at 0 Greenfield Road in South Deerfield, Massachusetts. Proposed on site are three buildings for research and development, retail sales, and cultivation. The cultivation portion of the development is expected to account for 26,000 square feet of the total complex, the retail portion is expected to be the smallest building in the complex at 3,000 square feet, and the research and development building is expected to account for 5,000 square feet of the complex.

The proposed development is expected to generate approximately 55 (33 enter, 22 exit) vehicle trips during the weekday morning peak hour, 146 (60 enter, 80 exit) vehicle trips during the weekday evening peak hour, and 125 (62 enter, 63 exit) during the Saturday midday peak hour.

It is expected that the volume of patrons accessing the site will peak during the first days of operation, and then will slowly begin to level out as time passes. It is expected during the peak hours of the beginning days of operation, patrons will be required to stage in a line to wait for their turn to be serviced. Patrons will be expected to stage along the sidewalk adjacent to the building, without impeding vehicular traffic through the site. In addition, employees will be available during peak operating hours to assist with patron staging.



The capacity analyses that were conducted show that the study area intersections surrounding the proposed development will experience slight increases in delay during the peak hours due to the nominal increase in traffic. It is expected that the adjacent roadway network will adequately accommodate the nominal increase in traffic due to the proposed site, especially with mitigated weekday evening peak hour timings at the signalized intersection.

It is the conclusion of this study that the additional traffic generated by the project will not have a significant negative impact on the surrounding roadway network.



Appendix

Appendix No. & Title

Attachment A – Traffic Counts

Attachment B – Conceptual Site Plan

Attachment C – Crash Data

Attachment D – Trip Generation & Distribution

Attachment E – Signal Plan

Attachment F – Capacity Analyses



Attachment A – Traffic Counts



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

File Name : 165080 A
Site Code : 13484.01
Start Date : 5/19/2016
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Greenfield Road (Route 5) From North				Fire Station Driveway From East				Greenfield Road (Route 5) From South				Conway Road (Route 116) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	5	47	0	0	1	0	1	0	0	57	59	0	65	0	9	0	244
07:15 AM	0	65	0	0	0	0	0	0	0	66	81	0	91	0	9	0	312
07:30 AM	0	96	0	0	0	0	0	0	0	93	80	0	126	0	18	0	413
07:45 AM	5	76	0	0	0	0	1	0	0	124	82	0	119	0	22	0	429
Total	10	284	0	0	1	0	2	0	0	340	302	0	401	0	58	0	1398
08:00 AM	7	91	0	0	0	0	0	0	0	113	65	0	110	1	11	0	398
08:15 AM	4	93	0	0	0	2	1	0	0	125	66	0	123	0	16	0	430
08:30 AM	5	114	0	0	0	0	0	0	0	133	100	0	101	1	20	0	474
08:45 AM	3	73	0	0	0	1	0	0	0	97	99	0	80	0	20	0	373
Total	19	371	0	0	0	3	1	0	0	468	330	0	414	2	67	0	1675
09:00 AM	5	49	0	0	0	0	0	0	0	67	65	0	74	0	14	0	274
09:15 AM	7	54	4	0	0	0	2	0	1	63	61	0	74	1	8	0	275
09:30 AM	3	56	0	0	0	1	2	0	1	64	63	0	59	0	4	0	253
09:45 AM	3	58	0	0	0	1	1	0	0	64	69	0	66	1	4	0	267
Total	18	217	4	0	0	2	5	0	2	258	258	0	273	2	30	0	1069
10:00 AM	5	67	0	0	0	0	0	0	1	55	61	0	47	0	12	0	248
10:15 AM	2	58	0	0	0	0	0	0	0	72	70	0	50	0	5	0	257
10:30 AM	4	53	1	0	1	0	0	0	1	73	54	0	42	1	14	0	244
10:45 AM	3	65	0	0	0	0	0	0	0	56	58	0	48	0	8	0	238
Total	14	243	1	0	1	0	0	0	2	256	243	0	187	1	39	0	987
11:00 AM	10	47	1	0	0	0	0	0	0	61	50	0	53	0	8	0	230
11:15 AM	4	58	0	0	1	0	0	0	1	58	66	0	40	0	6	0	234
11:30 AM	4	54	0	0	1	0	0	0	0	55	72	0	64	0	3	0	253
11:45 AM	4	80	0	0	0	0	0	0	0	57	55	0	43	0	4	0	243
Total	22	239	1	0	2	0	0	0	1	231	243	0	200	0	21	0	960
12:00 PM	7	83	1	0	0	0	0	0	0	78	60	0	42	0	6	0	277
12:15 PM	11	58	1	0	1	0	0	0	0	68	87	0	56	0	9	0	291
12:30 PM	7	91	0	0	0	0	0	0	0	70	66	0	69	0	7	0	310
12:45 PM	5	73	0	0	0	0	1	0	0	81	74	0	55	0	7	0	296
Total	30	305	2	0	1	0	1	0	0	297	287	0	222	0	29	0	1174
01:00 PM	12	67	1	0	1	0	1	0	0	91	92	0	40	0	8	0	313
01:15 PM	9	74	1	0	0	1	0	0	0	66	72	0	54	0	10	0	287
01:30 PM	5	81	0	0	0	0	0	0	0	99	78	0	53	0	5	1	322
01:45 PM	7	68	0	0	0	1	0	0	1	89	87	0	60	0	10	0	323
Total	33	290	2	0	1	2	1	0	1	345	329	0	207	0	33	1	1245
02:00 PM	17	89	0	0	0	1	0	0	0	95	109	0	57	1	9	0	378
02:15 PM	4	93	0	0	0	0	1	0	0	93	92	0	54	0	9	0	346
02:30 PM	10	101	0	0	0	0	1	0	1	99	98	0	76	0	5	0	391
02:45 PM	9	96	1	0	0	0	0	0	1	86	97	0	67	0	5	0	362
Total	40	379	1	0	0	1	2	0	2	373	396	0	254	1	28	0	1477
03:00 PM	7	98	0	0	0	0	0	0	0	125	103	0	53	0	7	0	393
03:15 PM	12	83	1	0	0	1	1	0	0	96	120	0	57	0	8	0	379
03:30 PM	7	131	0	0	0	1	0	0	0	95	129	0	53	0	7	0	423
03:45 PM	8	90	0	0	0	0	0	0	0	85	146	0	55	0	11	0	395
Total	34	402	1	0	0	2	1	0	0	401	498	0	218	0	33	0	1590
04:00 PM	9	92	2	0	1	0	3	0	2	98	117	0	63	0	8	0	395
04:15 PM	10	88	0	0	0	0	0	0	0	107	136	0	57	0	4	0	402
04:30 PM	14	106	0	0	0	1	0	0	1	98	149	0	62	0	9	0	440
04:45 PM	6	136	0	0	0	0	0	0	0	90	135	0	74	0	3	1	445
Total	39	422	2	0	1	1	3	0	3	393	537	0	256	0	24	1	1682



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

File Name : 165080 A
Site Code : 13484.01
Start Date : 5/19/2016
Page No : 2

Groups Printed- Cars - Heavy Vehicles

Start Time	Greenfield Road (Route 5) From North				Fire Station Driveway From East				Greenfield Road (Route 5) From South				Conway Road (Route 116) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
05:00 PM	26	146	0	0	0	0	0	0	0	116	134	0	49	0	7	0	478
05:15 PM	20	129	1	0	0	1	0	0	1	107	146	0	84	2	10	0	501
05:30 PM	11	100	0	0	0	1	0	0	0	95	147	0	49	0	7	0	410
05:45 PM	17	75	0	0	0	0	0	0	1	81	122	0	53	0	1	0	350
Total	74	450	1	0	0	2	0	0	2	399	549	0	235	2	25	0	1739
06:00 PM	20	68	2	0	0	2	2	0	0	48	104	0	40	0	6	0	292
06:15 PM	7	54	0	0	0	1	0	0	0	44	115	0	36	0	7	0	264
06:30 PM	8	55	0	0	0	0	0	0	0	35	89	0	47	0	6	0	240
06:45 PM	4	38	0	0	0	0	1	0	0	32	80	0	48	0	2	0	205
Total	39	215	2	0	0	3	3	0	0	159	388	0	171	0	21	0	1001
Grand Total	372	3817	17	0	7	16	19	0	13	3920	4360	0	3038	8	408	2	15997
Apprch %	8.8	90.8	0.4	0	16.7	38.1	45.2	0	0.2	47.3	52.6	0	87.9	0.2	11.8	0.1	
Total %	2.3	23.9	0.1	0	0	0.1	0.1	0	0.1	24.5	27.3	0	19	0.1	2.6	0	
Cars	330	3474	15	0	6	15	16	0	11	3584	4102	0	2903	8	374	2	14840
% Cars	88.7	91	88.2	0	85.7	93.8	84.2	0	84.6	91.4	94.1	0	95.6	100	91.7	100	92.8
Heavy Vehicles	42	343	2	0	1	1	3	0	2	336	258	0	135	0	34	0	1157
% Heavy Vehicles	11.3	9	11.8	0	14.3	6.2	15.8	0	15.4	8.6	5.9	0	4.4	0	8.3	0	7.2

Start Time	Greenfield Road (Route 5) From North					Fire Station Driveway From East					Greenfield Road (Route 5) From South					Conway Road (Route 116) From West					Int. Total
	Right	Thru	Left	U-Turn	App.Total	Right	Thru	Left	U-Turn	App.Total	Right	Thru	Left	U-Turn	App.Total	Right	Thru	Left	U-Turn	App.Total	
Peak Hour Analysis From 07:00 AM to 01:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	5	76	0	0	81	0	0	1	0	1	0	124	82	0	206	119	0	22	0	141	429
08:00 AM	7	91	0	0	98	0	0	0	0	0	0	113	65	0	178	110	1	11	0	122	398
08:15 AM	4	93	0	0	97	0	2	1	0	3	0	125	66	0	191	123	0	16	0	139	430
08:30 AM	5	114	0	0	119	0	0	0	0	0	0	133	100	0	233	101	1	20	0	122	474
Total Volume	21	374	0	0	395	0	2	2	0	4	0	495	313	0	808	453	2	69	0	524	1731
% App. Total	5.3	94.7	0	0		0	50	50	0		0	61.3	38.7	0		86.5	0.4	13.2	0		
PHF	.750	.820	.000	.000	.830	.000	.250	.500	.000	.333	.000	.930	.783	.000	.867	.921	.500	.784	.000	.929	.913
Cars	18	330	0	0	348	0	2	1	0	3	0	454	293	0	747	436	2	65	0	503	1601
% Cars	85.7	88.2	0	0	88.1	0	100	50.0	0	75.0	0	91.7	93.6	0	92.5	96.2	100	94.2	0	96.0	92.5
Heavy Vehicles	3	44	0	0	47	0	0	1	0	1	0	41	20	0	61	17	0	4	0	21	130
% Heavy Vehicles	14.3	11.8	0	0	11.9	0	0	50.0	0	25.0	0	8.3	6.4	0	7.5	3.8	0	5.8	0	4.0	7.5

Peak Hour Analysis From 01:15 PM to 06:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:30 PM

04:30 PM	14	106	0	0	120	0	1	0	0	1	1	98	149	0	248	62	0	9	0	71	440
04:45 PM	6	136	0	0	142	0	0	0	0	0	0	90	135	0	225	74	0	3	1	78	445
05:00 PM	26	146	0	0	172	0	0	0	0	0	0	116	134	0	250	49	0	7	0	56	478
05:15 PM	20	129	1	0	150	0	1	0	0	1	1	107	146	0	254	84	2	10	0	96	501
Total Volume	66	517	1	0	584	0	2	0	0	2	2	411	564	0	977	269	2	29	1	301	1864
% App. Total	11.3	88.5	0.2	0		0	100	0	0		0.2	42.1	57.7	0		89.4	0.7	9.6	0.3		
PHF	.635	.885	.250	.000	.849	.000	.500	.000	.000	.500	.500	.886	.946	.000	.962	.801	.250	.725	.250	.784	.930
Cars	64	496	1	0	561	0	2	0	0	2	2	402	545	0	949	263	2	27	1	293	1805
% Cars	97.0	95.9	100	0	96.1	0	100	0	0	100	100	97.8	96.6	0	97.1	97.8	100	93.1	100	97.3	96.8
Heavy Vehicles	2	21	0	0	23	0	0	0	0	0	0	9	19	0	28	6	0	2	0	8	59
% Heavy Vehicles	3.0	4.1	0	0	3.9	0	0	0	0	0	0	2.2	3.4	0	2.9	2.2	0	6.9	0	2.7	3.2



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

File Name : 165080 A
Site Code : 13484.01
Start Date : 5/19/2016
Page No : 1

Groups Printed- Cars

Start Time	Greenfield Road (Route 5) From North				Fire Station Driveway From East				Greenfield Road (Route 5) From South				Conway Road (Route 116) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	4	41	0	0	1	0	1	0	0	48	55	0	59	0	9	0	218
07:15 AM	0	57	0	0	0	0	0	0	0	60	69	0	86	0	9	0	281
07:30 AM	0	78	0	0	0	0	0	0	0	81	73	0	122	0	18	0	372
07:45 AM	4	65	0	0	0	0	0	0	0	115	75	0	117	0	20	0	396
Total	8	241	0	0	1	0	1	0	0	304	272	0	384	0	56	0	1267
08:00 AM	6	79	0	0	0	0	0	0	0	102	62	0	106	1	10	0	366
08:15 AM	3	84	0	0	0	2	1	0	0	112	61	0	117	0	16	0	396
08:30 AM	5	102	0	0	0	0	0	0	0	125	95	0	96	1	19	0	443
08:45 AM	3	65	0	0	0	1	0	0	0	88	95	0	79	0	20	0	351
Total	17	330	0	0	0	3	1	0	0	427	313	0	398	2	65	0	1556
09:00 AM	3	44	0	0	0	0	0	0	0	60	59	0	71	0	13	0	250
09:15 AM	4	48	4	0	0	0	2	0	1	50	55	0	69	1	6	0	240
09:30 AM	3	51	0	0	0	1	2	0	1	56	54	0	57	0	4	0	229
09:45 AM	2	52	0	0	0	1	1	0	0	56	63	0	62	1	4	0	242
Total	12	195	4	0	0	2	5	0	2	222	231	0	259	2	27	0	961
10:00 AM	5	50	0	0	0	0	0	0	1	45	58	0	45	0	12	0	216
10:15 AM	1	52	0	0	0	0	0	0	0	62	65	0	42	0	5	0	227
10:30 AM	3	45	0	0	1	0	0	0	1	58	50	0	38	1	12	0	209
10:45 AM	3	59	0	0	0	0	0	0	0	47	50	0	45	0	7	0	211
Total	12	206	0	0	1	0	0	0	2	212	223	0	170	1	36	0	863
11:00 AM	6	39	1	0	0	0	0	0	0	52	46	0	51	0	8	0	203
11:15 AM	2	51	0	0	1	0	0	0	1	51	62	0	38	0	6	0	212
11:30 AM	4	48	0	0	1	0	0	0	0	49	68	0	59	0	3	0	232
11:45 AM	3	72	0	0	0	0	0	0	0	50	48	0	41	0	4	0	218
Total	15	210	1	0	2	0	0	0	1	202	224	0	189	0	21	0	865
12:00 PM	6	74	1	0	0	0	0	0	0	62	53	0	40	0	5	0	241
12:15 PM	9	51	1	0	1	0	0	0	0	61	82	0	54	0	9	0	268
12:30 PM	6	78	0	0	0	0	0	0	0	61	61	0	65	0	6	0	277
12:45 PM	4	63	0	0	0	0	1	0	0	79	68	0	52	0	4	0	271
Total	25	266	2	0	1	0	1	0	0	263	264	0	211	0	24	0	1057
01:00 PM	10	61	1	0	1	0	1	0	0	83	80	0	38	0	8	0	283
01:15 PM	9	67	0	0	0	0	0	0	0	57	63	0	52	0	8	0	256
01:30 PM	4	74	0	0	0	0	0	0	0	93	74	0	49	0	4	1	299
01:45 PM	4	63	0	0	0	1	0	0	1	85	81	0	58	0	9	0	302
Total	27	265	1	0	1	1	1	0	1	318	298	0	197	0	29	1	1140
02:00 PM	17	85	0	0	0	1	0	0	0	90	104	0	55	1	8	0	361
02:15 PM	4	85	0	0	0	0	0	0	0	85	85	0	53	0	7	0	319
02:30 PM	9	90	0	0	0	0	1	0	0	88	92	0	73	0	4	0	357
02:45 PM	9	84	1	0	0	0	0	0	1	82	88	0	64	0	4	0	333
Total	39	344	1	0	0	1	1	0	1	345	369	0	245	1	23	0	1370
03:00 PM	6	94	0	0	0	0	0	0	0	112	94	0	49	0	5	0	360
03:15 PM	10	75	1	0	0	1	1	0	0	93	113	0	55	0	7	0	356
03:30 PM	6	122	0	0	0	1	0	0	0	92	125	0	49	0	7	0	402
03:45 PM	8	86	0	0	0	0	0	0	0	78	137	0	52	0	8	0	369
Total	30	377	1	0	0	2	1	0	0	375	469	0	205	0	27	0	1487
04:00 PM	9	89	2	0	0	0	3	0	1	88	115	0	61	0	7	0	375
04:15 PM	9	82	0	0	0	0	0	0	0	102	136	0	53	0	4	0	386
04:30 PM	12	100	0	0	0	1	0	0	1	97	144	0	61	0	8	0	424
04:45 PM	6	132	0	0	0	0	0	0	0	86	130	0	72	0	3	1	430
Total	36	403	2	0	0	1	3	0	2	373	525	0	247	0	22	1	1615



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

File Name : 165080 A
Site Code : 13484.01
Start Date : 5/19/2016
Page No : 2

Groups Printed- Cars

Start Time	Greenfield Road (Route 5) From North				Fire Station Driveway From East				Greenfield Road (Route 5) From South				Conway Road (Route 116) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
05:00 PM	26	141	0	0	0	0	0	0	0	113	130	0	49	0	7	0	466
05:15 PM	20	123	1	0	0	1	0	0	1	106	141	0	81	2	9	0	485
05:30 PM	11	96	0	0	0	1	0	0	0	92	145	0	49	0	7	0	401
05:45 PM	16	72	0	0	0	0	0	0	1	78	119	0	51	0	1	0	338
Total	73	432	1	0	0	2	0	0	2	389	535	0	230	2	24	0	1690
06:00 PM	19	66	2	0	0	2	2	0	0	47	102	0	39	0	5	0	284
06:15 PM	7	51	0	0	0	1	0	0	0	41	114	0	36	0	7	0	257
06:30 PM	6	52	0	0	0	0	0	0	0	34	87	0	46	0	6	0	231
06:45 PM	4	36	0	0	0	0	0	0	0	32	76	0	47	0	2	0	197
Total	36	205	2	0	0	3	2	0	0	154	379	0	168	0	20	0	969
Grand Total	330	3474	15	0	6	15	16	0	11	3584	4102	0	2903	8	374	2	14840
Apprch %	8.6	91	0.4	0	16.2	40.5	43.2	0	0.1	46.6	53.3	0	88.3	0.2	11.4	0.1	
Total %	2.2	23.4	0.1	0	0	0.1	0.1	0	0.1	24.2	27.6	0	19.6	0.1	2.5	0	

Start Time	Greenfield Road (Route 5) From North					Fire Station Driveway From East					Greenfield Road (Route 5) From South					Conway Road (Route 116) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 01:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	4	65	0	0	69	0	0	0	0	0	0	115	75	0	190	117	0	20	0	137	396
08:00 AM	6	79	0	0	85	0	0	0	0	0	0	102	62	0	164	106	1	10	0	117	366
08:15 AM	3	84	0	0	87	0	2	1	0	3	0	112	61	0	173	117	0	16	0	133	396
08:30 AM	5	102	0	0	107	0	0	0	0	0	0	125	95	0	220	96	1	19	0	116	443
Total Volume	18	330	0	0	348	0	2	1	0	3	0	454	293	0	747	436	2	65	0	503	1601
% App. Total	5.2	94.8	0	0		0	66.7	33.3	0		0	60.8	39.2	0		86.7	0.4	12.9	0		
PHF	.750	.809	.000	.000	.813	.000	.250	.250	.000	.250	.000	.908	.771	.000	.849	.932	.500	.813	.000	.918	.903

Peak Hour Analysis From 01:15 PM to 06:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:30 PM

04:30 PM	12	100	0	0	112	0	1	0	0	1	1	97	144	0	242	61	0	8	0	69	424
04:45 PM	6	132	0	0	138	0	0	0	0	0	0	86	130	0	216	72	0	3	1	76	430
05:00 PM	26	141	0	0	167	0	0	0	0	0	0	113	130	0	243	49	0	7	0	56	466
05:15 PM	20	123	1	0	144	0	1	0	0	1	1	106	141	0	248	81	2	9	0	92	485
Total Volume	64	496	1	0	561	0	2	0	0	2	2	402	545	0	949	263	2	27	1	293	1805
% App. Total	11.4	88.4	0.2	0		0	100	0	0		0.2	42.4	57.4	0		89.8	0.7	9.2	0.3		
PHF	.615	.879	.250	.000	.840	.000	.500	.000	.000	.500	.500	.889	.946	.000	.957	.812	.250	.750	.250	.796	.930



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

File Name : 165080 A
Site Code : 13484.01
Start Date : 5/19/2016
Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Greenfield Road (Route 5) From North				Fire Station Driveway From East				Greenfield Road (Route 5) From South				Conway Road (Route 116) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
07:00 AM	1	6	0	0	0	0	0	0	0	9	4	0	6	0	0	0	26
07:15 AM	0	8	0	0	0	0	0	0	0	6	12	0	5	0	0	0	31
07:30 AM	0	18	0	0	0	0	0	0	0	12	7	0	4	0	0	0	41
07:45 AM	1	11	0	0	0	0	1	0	0	9	7	0	2	0	2	0	33
Total	2	43	0	0	0	0	1	0	0	36	30	0	17	0	2	0	131
08:00 AM	1	12	0	0	0	0	0	0	0	11	3	0	4	0	1	0	32
08:15 AM	1	9	0	0	0	0	0	0	0	13	5	0	6	0	0	0	34
08:30 AM	0	12	0	0	0	0	0	0	0	8	5	0	5	0	1	0	31
08:45 AM	0	8	0	0	0	0	0	0	0	9	4	0	1	0	0	0	22
Total	2	41	0	0	0	0	0	0	0	41	17	0	16	0	2	0	119
09:00 AM	2	5	0	0	0	0	0	0	0	7	6	0	3	0	1	0	24
09:15 AM	3	6	0	0	0	0	0	0	0	13	6	0	5	0	2	0	35
09:30 AM	0	5	0	0	0	0	0	0	0	8	9	0	2	0	0	0	24
09:45 AM	1	6	0	0	0	0	0	0	0	8	6	0	4	0	0	0	25
Total	6	22	0	0	0	0	0	0	0	36	27	0	14	0	3	0	108
10:00 AM	0	17	0	0	0	0	0	0	0	10	3	0	2	0	0	0	32
10:15 AM	1	6	0	0	0	0	0	0	0	10	5	0	8	0	0	0	30
10:30 AM	1	8	1	0	0	0	0	0	0	15	4	0	4	0	2	0	35
10:45 AM	0	6	0	0	0	0	0	0	0	9	8	0	3	0	1	0	27
Total	2	37	1	0	0	0	0	0	0	44	20	0	17	0	3	0	124
11:00 AM	4	8	0	0	0	0	0	0	0	9	4	0	2	0	0	0	27
11:15 AM	2	7	0	0	0	0	0	0	0	7	4	0	2	0	0	0	22
11:30 AM	0	6	0	0	0	0	0	0	0	6	4	0	5	0	0	0	21
11:45 AM	1	8	0	0	0	0	0	0	0	7	7	0	2	0	0	0	25
Total	7	29	0	0	0	0	0	0	0	29	19	0	11	0	0	0	95
12:00 PM	1	9	0	0	0	0	0	0	0	16	7	0	2	0	1	0	36
12:15 PM	2	7	0	0	0	0	0	0	0	7	5	0	2	0	0	0	23
12:30 PM	1	13	0	0	0	0	0	0	0	9	5	0	4	0	1	0	33
12:45 PM	1	10	0	0	0	0	0	0	0	2	6	0	3	0	3	0	25
Total	5	39	0	0	0	0	0	0	0	34	23	0	11	0	5	0	117
01:00 PM	2	6	0	0	0	0	0	0	0	8	12	0	2	0	0	0	30
01:15 PM	0	7	1	0	0	1	0	0	0	9	9	0	2	0	2	0	31
01:30 PM	1	7	0	0	0	0	0	0	0	6	4	0	4	0	1	0	23
01:45 PM	3	5	0	0	0	0	0	0	0	4	6	0	2	0	1	0	21
Total	6	25	1	0	0	1	0	0	0	27	31	0	10	0	4	0	105
02:00 PM	0	4	0	0	0	0	0	0	0	5	5	0	2	0	1	0	17
02:15 PM	0	8	0	0	0	0	1	0	0	8	7	0	1	0	2	0	27
02:30 PM	1	11	0	0	0	0	0	0	1	11	6	0	3	0	1	0	34
02:45 PM	0	12	0	0	0	0	0	0	0	4	9	0	3	0	1	0	29
Total	1	35	0	0	0	0	1	0	1	28	27	0	9	0	5	0	107
03:00 PM	1	4	0	0	0	0	0	0	0	13	9	0	4	0	2	0	33
03:15 PM	2	8	0	0	0	0	0	0	0	3	7	0	2	0	1	0	23
03:30 PM	1	9	0	0	0	0	0	0	0	3	4	0	4	0	0	0	21
03:45 PM	0	4	0	0	0	0	0	0	0	7	9	0	3	0	3	0	26
Total	4	25	0	0	0	0	0	0	0	26	29	0	13	0	6	0	103
04:00 PM	0	3	0	0	1	0	0	0	1	10	2	0	2	0	1	0	20
04:15 PM	1	6	0	0	0	0	0	0	0	5	0	0	4	0	0	0	16
04:30 PM	2	6	0	0	0	0	0	0	0	1	5	0	1	0	1	0	16
04:45 PM	0	4	0	0	0	0	0	0	0	4	5	0	2	0	0	0	15
Total	3	19	0	0	1	0	0	0	1	20	12	0	9	0	2	0	67



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

File Name : 165080 A
Site Code : 13484.01
Start Date : 5/19/2016
Page No : 2

N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

Groups Printed- Heavy Vehicles

Start Time	Greenfield Road (Route 5) From North				Fire Station Driveway From East				Greenfield Road (Route 5) From South				Conway Road (Route 116) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
05:00 PM	0	5	0	0	0	0	0	0	0	3	4	0	0	0	0	0	12
05:15 PM	0	6	0	0	0	0	0	0	0	1	5	0	3	0	1	0	16
05:30 PM	0	4	0	0	0	0	0	0	0	3	2	0	0	0	0	0	9
05:45 PM	1	3	0	0	0	0	0	0	0	3	3	0	2	0	0	0	12
Total	1	18	0	0	0	0	0	0	0	10	14	0	5	0	1	0	49
06:00 PM	1	2	0	0	0	0	0	0	0	1	2	0	1	0	1	0	8
06:15 PM	0	3	0	0	0	0	0	0	0	3	1	0	0	0	0	0	7
06:30 PM	2	3	0	0	0	0	0	0	0	1	2	0	1	0	0	0	9
06:45 PM	0	2	0	0	0	0	1	0	0	0	4	0	1	0	0	0	8
Total	3	10	0	0	0	0	1	0	0	5	9	0	3	0	1	0	32
Grand Total	42	343	2	0	1	1	3	0	2	336	258	0	135	0	34	0	1157
Apprch %	10.9	88.6	0.5	0	20	20	60	0	0.3	56.4	43.3	0	79.9	0	20.1	0	
Total %	3.6	29.6	0.2	0	0.1	0.1	0.3	0	0.2	29	22.3	0	11.7	0	2.9	0	

Start Time	Greenfield Road (Route 5) From North					Fire Station Driveway From East					Greenfield Road (Route 5) From South					Conway Road (Route 116) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 01:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	18	0	0	18	0	0	0	0	0	0	12	7	0	19	4	0	0	0	4	41
07:45 AM	1	11	0	0	12	0	0	1	0	1	0	9	7	0	16	2	0	2	0	4	33
08:00 AM	1	12	0	0	13	0	0	0	0	0	0	11	3	0	14	4	0	1	0	5	32
08:15 AM	1	9	0	0	10	0	0	0	0	0	0	13	5	0	18	6	0	0	0	6	34
Total Volume	3	50	0	0	53	0	0	1	0	1	0	45	22	0	67	16	0	3	0	19	140
% App. Total	5.7	94.3	0	0		0	0	100	0		0	67.2	32.8	0		84.2	0	15.8	0		
PHF	.750	.694	.000	.000	.736	.000	.000	.250	.000	.250	.000	.865	.786	.000	.882	.667	.000	.375	.000	.792	.854

Peak Hour Analysis From 01:15 PM to 06:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 02:15 PM

02:15 PM	0	8	0	0	8	0	0	1	0	1	0	8	7	0	15	1	0	2	0	3	27
02:30 PM	1	11	0	0	12	0	0	0	0	0	1	11	6	0	18	3	0	1	0	4	34
02:45 PM	0	12	0	0	12	0	0	0	0	0	0	4	9	0	13	3	0	1	0	4	29
03:00 PM	1	4	0	0	5	0	0	0	0	0	0	13	9	0	22	4	0	2	0	6	33
Total Volume	2	35	0	0	37	0	0	1	0	1	1	36	31	0	68	11	0	6	0	17	123
% App. Total	5.4	94.6	0	0		0	0	100	0		1.5	52.9	45.6	0		64.7	0	35.3	0		
PHF	.500	.729	.000	.000	.771	.000	.000	.250	.000	.250	.250	.692	.861	.000	.773	.688	.000	.750	.000	.708	.904



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

File Name : 165080 A
Site Code : 13484.01
Start Date : 5/19/2016
Page No : 1

Groups Printed- Peds and Bicycles

Start Time	Greenfield Road (Route 5) From North					Fire Station Driveway From East					Greenfield Road (Route 5) From South					Conway Road (Route 116) From West					Int. Total	
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB		
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	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	1	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
08:00 AM	0	0	0	0	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	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	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	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	3
09:45 AM	0	0	0	0	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	1	0	0	0	1	0	0	1	0	0	3
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	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	1	0	0	0	0	0	0	0	0	1
11:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
11:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
11:30 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	3
12:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
12:15 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
12:45 PM	0	0	0	0	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	1	1	0	0	0	1	0	0	0	1	0	0	0	4
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
02:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	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	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	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	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
04:15 PM	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3
04:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	2	0	0	0	0	0	0	0	2	0	0	1	0	1	0	0	0	0	0	0	6



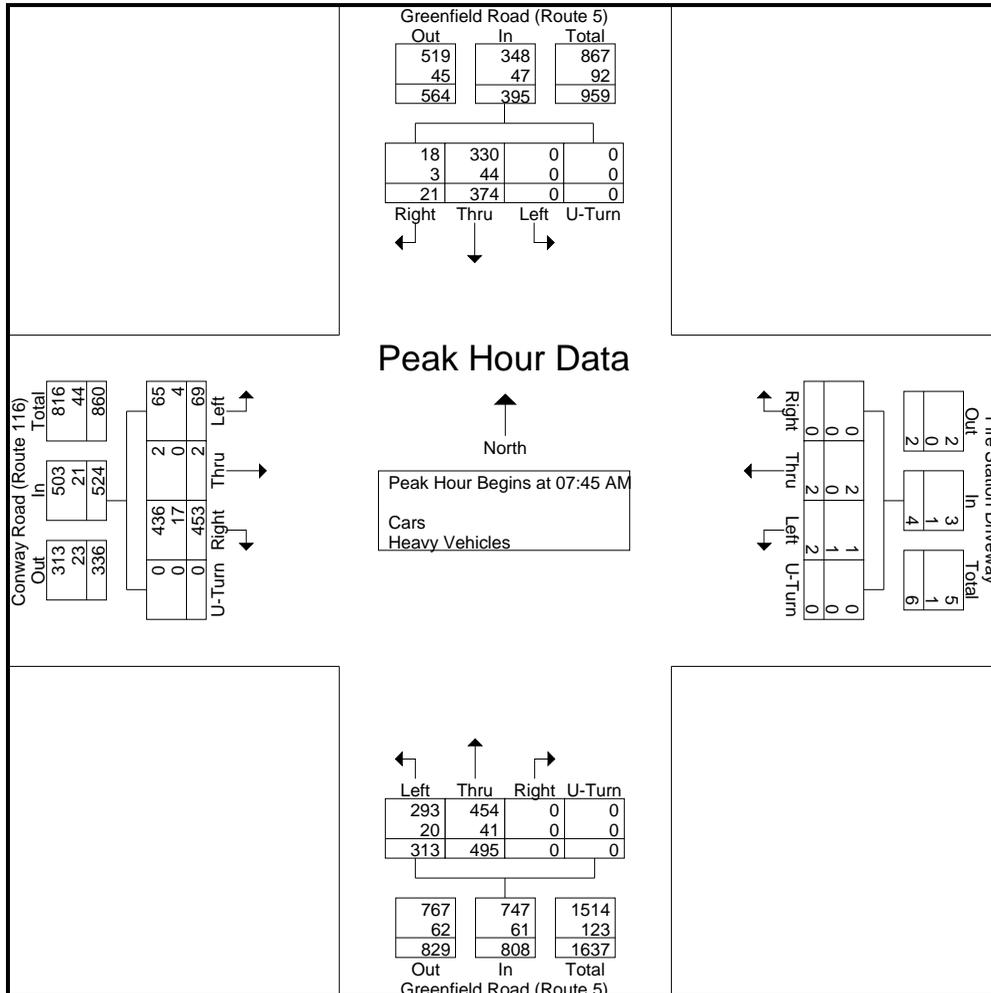
PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

File Name : 165080 A
Site Code : 13484.01
Start Date : 5/19/2016
Page No : 1

N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

Start Time	Greenfield Road (Route 5) From North					Fire Station Driveway From East					Greenfield Road (Route 5) From South					Conway Road (Route 116) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 07:00 AM to 01:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	5	76	0	0	81	0	0	1	0	1	0	124	82	0	206	119	0	22	0	141	429
08:00 AM	7	91	0	0	98	0	0	0	0	0	0	113	65	0	178	110	1	11	0	122	398
08:15 AM	4	93	0	0	97	0	2	1	0	3	0	125	66	0	191	123	0	16	0	139	430
08:30 AM	5	114	0	0	119	0	0	0	0	0	0	133	100	0	233	101	1	20	0	122	474
Total Volume	21	374	0	0	395	0	2	2	0	4	0	495	313	0	808	453	2	69	0	524	1731
% App. Total	5.3	94.7	0	0		0	50	50	0		0	61.3	38.7	0		86.5	0.4	13.2	0		
PHF	.750	.820	.000	.000	.830	.000	.250	.500	.000	.333	.000	.930	.783	.000	.867	.921	.500	.784	.000	.929	.913
Cars	18	330	0	0	348	0	2	1	0	3	0	454	293	0	747	436	2	65	0	503	1601
% Cars	85.7	88.2	0	0	88.1	0	100	50.0	0	75.0	0	91.7	93.6	0	92.5	96.2	100	94.2	0	96.0	92.5
Heavy Vehicles	3	44	0	0	47	0	0	1	0	1	0	41	20	0	61	17	0	4	0	21	130
% Heavy Vehicles	14.3	11.8	0	0	11.9	0	0	50.0	0	25.0	0	8.3	6.4	0	7.5	3.8	0	5.8	0	4.0	7.5





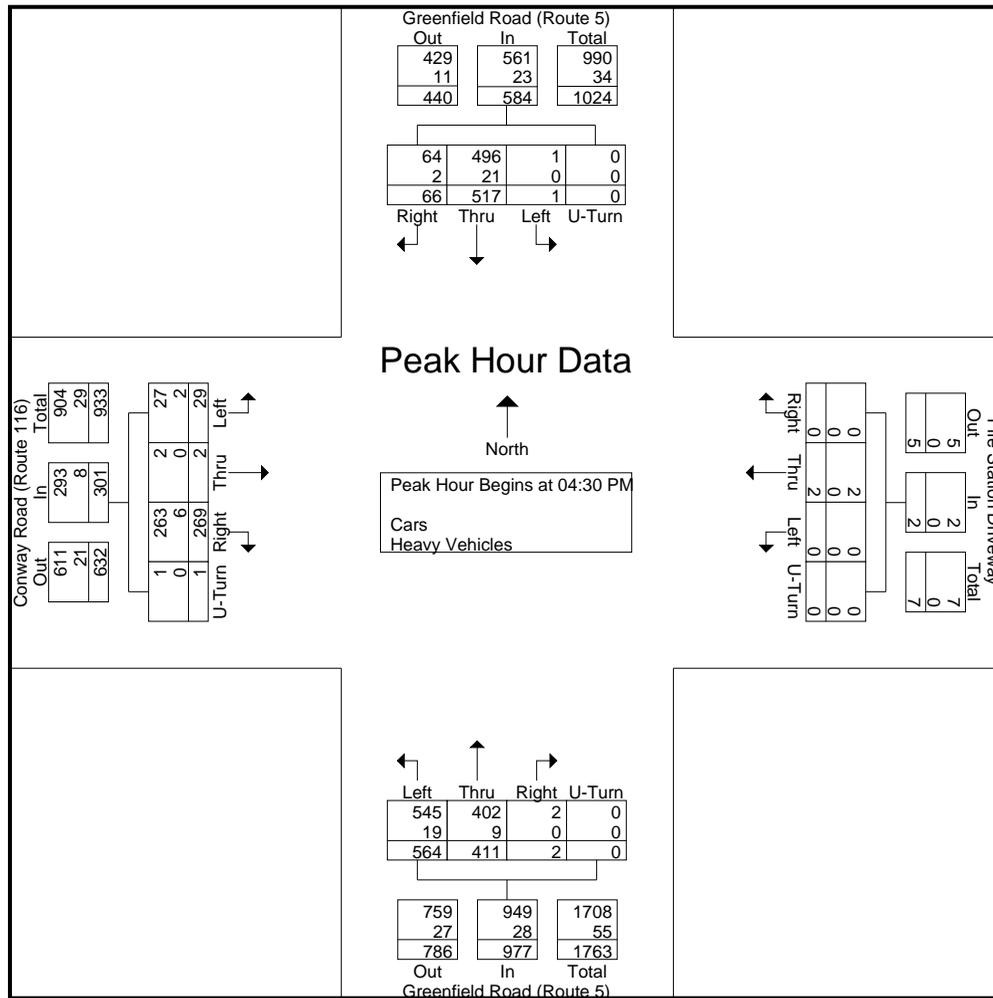
PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

File Name : 165080 A
Site Code : 13484.01
Start Date : 5/19/2016
Page No : 2

N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

Start Time	Greenfield Road (Route 5) From North					Fire Station Driveway From East					Greenfield Road (Route 5) From South					Conway Road (Route 116) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 01:15 PM to 06:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	14	106	0	0	120	0	1	0	0	1	1	98	149	0	248	62	0	9	0	71	440
04:45 PM	6	136	0	0	142	0	0	0	0	0	0	90	135	0	225	74	0	3	1	78	445
05:00 PM	26	146	0	0	172	0	0	0	0	0	0	116	134	0	250	49	0	7	0	56	478
05:15 PM	20	129	1	0	150	0	1	0	0	1	1	107	146	0	254	84	2	10	0	96	501
Total Volume	66	517	1	0	584	0	2	0	0	2	2	411	564	0	977	269	2	29	1	301	1864
% App. Total	11.3	88.5	0.2	0		0	100	0	0		0.2	42.1	57.7	0		89.4	0.7	9.6	0.3		
PHF	.635	.885	.250	.000	.849	.000	.500	.000	.000	.500	.500	.886	.946	.000	.962	.801	.250	.725	.250	.784	.930
Cars	64	496	1	0	561	0	2	0	0	2	2	402	545	0	949	263	2	27	1	293	1805
% Cars	97.0	95.9	100	0	96.1	0	100	0	0	100	100	97.8	96.6	0	97.1	97.8	100	93.1	100	97.3	96.8
Heavy Vehicles	2	21	0	0	23	0	0	0	0	0	0	9	19	0	28	6	0	2	0	8	59
% Heavy Vehicles	3.0	4.1	0	0	3.9	0	0	0	0	0	0	2.2	3.4	0	2.9	2.2	0	6.9	0	2.7	3.2





PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

File Name : 165080 AA
Site Code : 13484.01
Start Date : 5/21/2016
Page No : 1

Groups Printed- Cars - Heavy Vehicles

Start Time	Greenfield Road (Route 5) From North				Fire Station Driveway From East				Greenfield Road (Route 5) From South				Conway Road (Route 116) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
11:00 AM	15	69	1	0	0	0	1	0	0	59	70	0	64	0	12	0	291
11:15 AM	7	73	0	0	0	0	0	0	0	57	101	0	66	0	6	0	310
11:30 AM	8	56	0	0	0	0	1	0	0	58	93	0	73	0	12	0	301
11:45 AM	10	61	0	0	0	1	1	0	0	83	82	0	86	0	6	0	330
Total	40	259	1	0	0	1	3	0	0	257	346	0	289	0	36	0	1232
12:00 PM	9	82	0	0	0	3	1	0	0	78	112	0	70	0	6	0	361
12:15 PM	10	75	1	0	0	0	1	0	0	64	87	0	71	0	3	0	312
12:30 PM	3	51	0	0	0	0	1	0	0	65	88	1	60	0	11	0	280
12:45 PM	5	47	0	0	0	1	0	0	1	59	104	0	69	1	3	0	290
Total	27	255	1	0	0	4	3	0	1	266	391	1	270	1	23	0	1243
01:00 PM	9	58	2	0	1	0	0	0	1	65	98	0	66	0	10	0	310
01:15 PM	10	66	0	0	1	0	0	0	1	59	120	0	71	0	6	0	334
01:30 PM	7	63	0	0	0	2	0	0	0	50	92	0	72	0	13	0	299
01:45 PM	3	64	0	0	0	0	0	0	2	76	97	0	78	0	9	0	329
Total	29	251	2	0	2	2	0	0	4	250	407	0	287	0	38	0	1272
Grand Total	96	765	4	0	2	7	6	0	5	773	1144	1	846	1	97	0	3747
Apprch %	11.1	88.4	0.5	0	13.3	46.7	40	0	0.3	40.2	59.5	0.1	89.6	0.1	10.3	0	
Total %	2.6	20.4	0.1	0	0.1	0.2	0.2	0	0.1	20.6	30.5	0	22.6	0	2.6	0	
Cars	95	738	4	0	2	7	5	0	3	747	1114	1	835	1	95	0	3647
% Cars	99	96.5	100	0	100	100	83.3	0	60	96.6	97.4	100	98.7	100	97.9	0	97.3
Heavy Vehicles	1	27	0	0	0	0	1	0	2	26	30	0	11	0	2	0	100
% Heavy Vehicles	1	3.5	0	0	0	0	16.7	0	40	3.4	2.6	0	1.3	0	2.1	0	2.7

Start Time	Greenfield Road (Route 5) From North					Fire Station Driveway From East					Greenfield Road (Route 5) From South					Conway Road (Route 116) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
11:30 AM	8	56	0	0	64	0	0	1	0	1	0	58	93	0	151	73	0	12	0	85	301
11:45 AM	10	61	0	0	71	0	1	1	0	2	0	83	82	0	165	86	0	6	0	92	330
12:00 PM	9	82	0	0	91	0	3	1	0	4	0	78	112	0	190	70	0	6	0	76	361
12:15 PM	10	75	1	0	86	0	0	1	0	1	0	64	87	0	151	71	0	3	0	74	312
Total Volume	37	274	1	0	312	0	4	4	0	8	0	283	374	0	657	300	0	27	0	327	1304
% App. Total	11.9	87.8	0.3	0		0	50	50	0		0	43.1	56.9	0		91.7	0	8.3	0		
PHF	.925	.835	.250	.000	.857	.000	.333	1.00	.000	.500	.000	.852	.835	.000	.864	.872	.000	.563	.000	.889	.903
Cars	37	261	1	0	299	0	4	4	0	8	0	275	367	0	642	296	0	27	0	323	1272
% Cars	100	95.3	100	0	95.8	0	100	100	0	100	0	97.2	98.1	0	97.7	98.7	0	100	0	98.8	97.5
Heavy Vehicles	0	13	0	0	13	0	0	0	0	0	0	8	7	0	15	4	0	0	0	4	32
% Heavy Vehicles	0	4.7	0	0	4.2	0	0	0	0	0	0	2.8	1.9	0	2.3	1.3	0	0	0	1.2	2.5

Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 11:30 AM



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

File Name : 165080 AA
Site Code : 13484.01
Start Date : 5/21/2016
Page No : 1

N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

Groups Printed- Cars

Start Time	Greenfield Road (Route 5) From North				Fire Station Driveway From East				Greenfield Road (Route 5) From South				Conway Road (Route 116) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
11:00 AM	15	69	1	0	0	0	1	0	0	57	65	0	63	0	12	0	283
11:15 AM	7	71	0	0	0	0	0	0	0	54	95	0	66	0	6	0	299
11:30 AM	8	53	0	0	0	0	1	0	0	55	91	0	73	0	12	0	293
11:45 AM	10	58	0	0	0	1	1	0	0	80	81	0	83	0	6	0	320
Total	40	251	1	0	0	1	3	0	0	246	332	0	285	0	36	0	1195
12:00 PM	9	81	0	0	0	3	1	0	0	78	109	0	69	0	6	0	356
12:15 PM	10	69	1	0	0	0	1	0	0	62	86	0	71	0	3	0	303
12:30 PM	3	46	0	0	0	0	0	0	0	62	87	1	58	0	11	0	268
12:45 PM	5	46	0	0	0	1	0	0	1	53	100	0	69	1	3	0	279
Total	27	242	1	0	0	4	2	0	1	255	382	1	267	1	23	0	1206
01:00 PM	9	58	2	0	1	0	0	0	0	63	94	0	65	0	10	0	302
01:15 PM	10	63	0	0	1	0	0	0	0	59	119	0	71	0	6	0	329
01:30 PM	6	61	0	0	0	2	0	0	0	50	92	0	71	0	13	0	295
01:45 PM	3	63	0	0	0	0	0	0	2	74	95	0	76	0	7	0	320
Total	28	245	2	0	2	2	0	0	2	246	400	0	283	0	36	0	1246
Grand Total	95	738	4	0	2	7	5	0	3	747	1114	1	835	1	95	0	3647
Apprch %	11.4	88.2	0.5	0	14.3	50	35.7	0	0.2	40.1	59.7	0.1	89.7	0.1	10.2	0	
Total %	2.6	20.2	0.1	0	0.1	0.2	0.1	0	0.1	20.5	30.5	0	22.9	0	2.6	0	

Start Time	Greenfield Road (Route 5) From North					Fire Station Driveway From East					Greenfield Road (Route 5) From South					Conway Road (Route 116) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
11:30 AM	8	53	0	0	61	0	0	1	0	1	0	55	91	0	146	73	0	12	0	85	293
11:45 AM	10	58	0	0	68	0	1	1	0	2	0	80	81	0	161	83	0	6	0	89	320
12:00 PM	9	81	0	0	90	0	3	1	0	4	0	78	109	0	187	69	0	6	0	75	356
12:15 PM	10	69	1	0	80	0	0	1	0	1	0	62	86	0	148	71	0	3	0	74	303
Total Volume	37	261	1	0	299	0	4	4	0	8	0	275	367	0	642	296	0	27	0	323	1272
% App. Total	12.4	87.3	0.3	0		0	50	50	0		0	42.8	57.2	0		91.6	0	8.4	0		
PHF	.925	.806	.250	.000	.831	.000	.333	1.00	.000	.500	.000	.859	.842	.000	.858	.892	.000	.563	.000	.907	.893

Peak Hour for Entire Intersection Begins at 11:30 AM

Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

File Name : 165080 AA
Site Code : 13484.01
Start Date : 5/21/2016
Page No : 1

Groups Printed- Heavy Vehicles

Start Time	Greenfield Road (Route 5) From North				Fire Station Driveway From East				Greenfield Road (Route 5) From South				Conway Road (Route 116) From West				Int. Total
	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	
11:00 AM	0	0	0	0	0	0	0	0	0	2	5	0	1	0	0	0	8
11:15 AM	0	2	0	0	0	0	0	0	0	3	6	0	0	0	0	0	11
11:30 AM	0	3	0	0	0	0	0	0	0	3	2	0	0	0	0	0	8
11:45 AM	0	3	0	0	0	0	0	0	0	3	1	0	3	0	0	0	10
Total	0	8	0	0	0	0	0	0	0	11	14	0	4	0	0	0	37
12:00 PM	0	1	0	0	0	0	0	0	0	0	3	0	1	0	0	0	5
12:15 PM	0	6	0	0	0	0	0	0	0	2	1	0	0	0	0	0	9
12:30 PM	0	5	0	0	0	0	1	0	0	3	1	0	2	0	0	0	12
12:45 PM	0	1	0	0	0	0	0	0	0	6	4	0	0	0	0	0	11
Total	0	13	0	0	0	0	1	0	0	11	9	0	3	0	0	0	37
01:00 PM	0	0	0	0	0	0	0	0	1	2	4	0	1	0	0	0	8
01:15 PM	0	3	0	0	0	0	0	0	1	0	1	0	0	0	0	0	5
01:30 PM	1	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4
01:45 PM	0	1	0	0	0	0	0	0	0	2	2	0	2	0	2	0	9
Total	1	6	0	0	0	0	0	0	2	4	7	0	4	0	2	0	26
Grand Total	1	27	0	0	0	0	1	0	2	26	30	0	11	0	2	0	100
Apprch %	3.6	96.4	0	0	0	0	100	0	3.4	44.8	51.7	0	84.6	0	15.4	0	
Total %	1	27	0	0	0	0	1	0	2	26	30	0	11	0	2	0	

Start Time	Greenfield Road (Route 5) From North					Fire Station Driveway From East					Greenfield Road (Route 5) From South					Conway Road (Route 116) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
12:15 PM	0	6	0	0	6	0	0	0	0	0	0	2	1	0	3	0	0	0	0	0	9
12:30 PM	0	5	0	0	5	0	0	1	0	1	0	3	1	0	4	2	0	0	0	2	12
12:45 PM	0	1	0	0	1	0	0	0	0	0	0	6	4	0	10	0	0	0	0	0	11
01:00 PM	0	0	0	0	0	0	0	0	0	0	1	2	4	0	7	1	0	0	0	1	8
Total Volume	0	12	0	0	12	0	0	1	0	1	1	13	10	0	24	3	0	0	0	3	40
% App. Total	0	100	0	0		0	0	100	0		4.2	54.2	41.7	0		100	0	0	0		
PHF	.000	.500	.000	.000	.500	.000	.000	.250	.000	.250	.250	.542	.625	.000	.600	.375	.000	.000	.000	.375	.833

Peak Hour for Entire Intersection Begins at 12:15 PM

Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

File Name : 165080 AA
Site Code : 13484.01
Start Date : 5/21/2016
Page No : 1

Groups Printed- Peds and Bicycles

Start Time	Greenfield Road (Route 5) From North					Fire Station Driveway From East					Greenfield Road (Route 5) From South					Conway Road (Route 116) From West					Int. Total
	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	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	2	0	0	0	0	2
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	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	1	0	0	0	0	0	0	0	1
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5	0	0	0	0	6
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	100	0	0	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	0	0	16.7	0	0	83.3	0	0	0	0	

Start Time	Greenfield Road (Route 5) From North						Fire Station Driveway From East						Greenfield Road (Route 5) From South						Conway Road (Route 116) From West						Int. Total	
	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	App. Total		
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 01:00 PM																										
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.750	.000	.000	.000	.000	.000	.750	.750



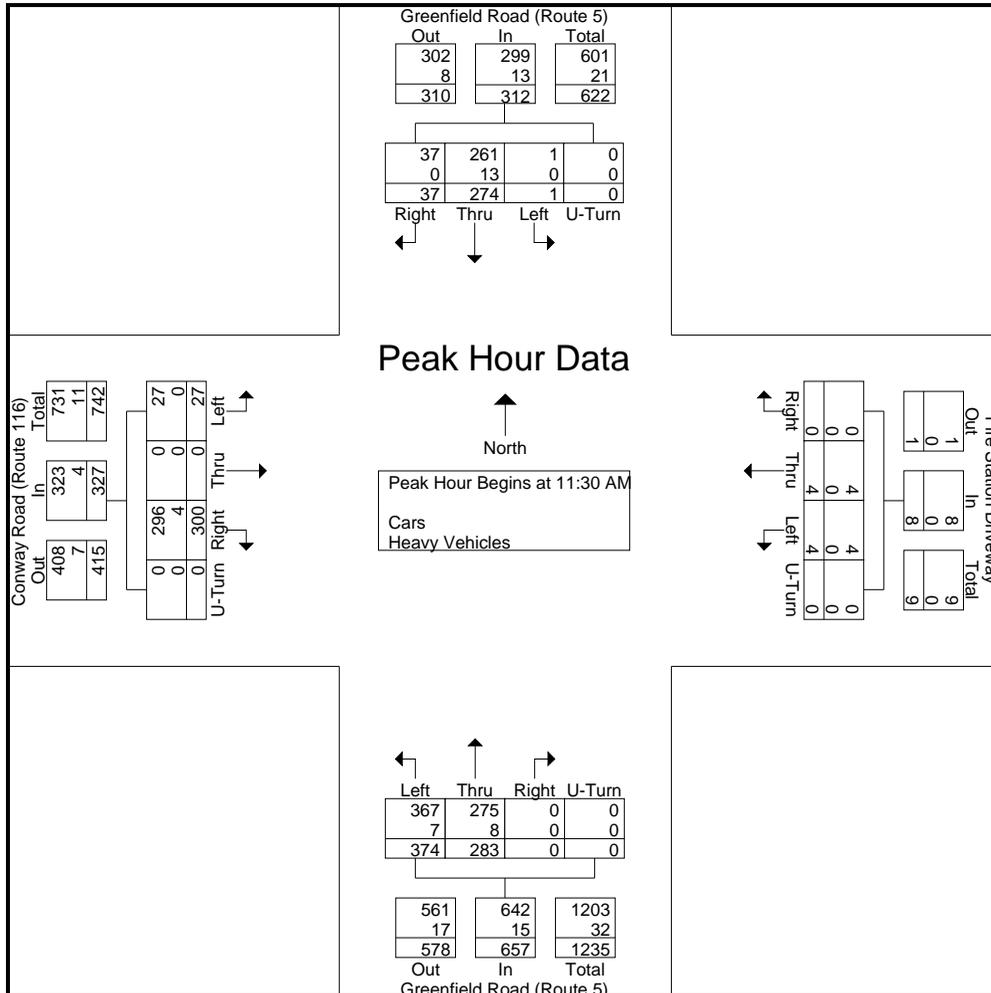
PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

File Name : 165080 AA
Site Code : 13484.01
Start Date : 5/21/2016
Page No : 1

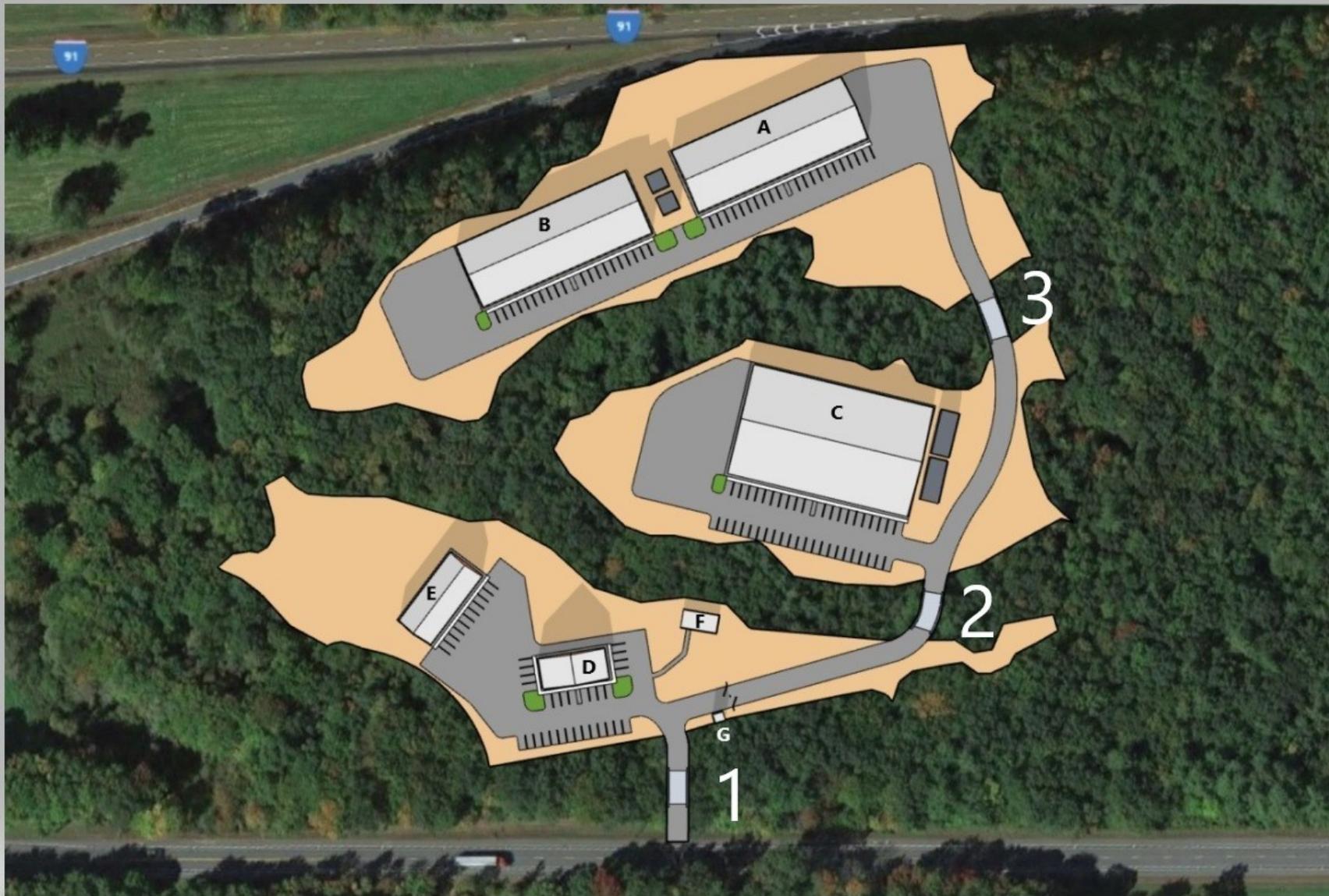
N/S: Greenfield Road (Route 5)
E/W: Fire Station/ Conway Road (Rte 116)
City, State: Deerfield, MA
Client: Greenman-Pedersen/ R. Brown

Start Time	Greenfield Road (Route 5) From North					Fire Station Driveway From East					Greenfield Road (Route 5) From South					Conway Road (Route 116) From West					Int. Total
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:30 AM																					
11:30 AM	8	56	0	0	64	0	0	1	0	1	0	58	93	0	151	73	0	12	0	85	301
11:45 AM	10	61	0	0	71	0	1	1	0	2	0	83	82	0	165	86	0	6	0	92	330
12:00 PM	9	82	0	0	91	0	3	1	0	4	0	78	112	0	190	70	0	6	0	76	361
12:15 PM	10	75	1	0	86	0	0	1	0	1	0	64	87	0	151	71	0	3	0	74	312
Total Volume	37	274	1	0	312	0	4	4	0	8	0	283	374	0	657	300	0	27	0	327	1304
% App. Total	11.9	87.8	0.3	0		0	50	50	0		0	43.1	56.9	0		91.7	0	8.3	0		
PHF	.925	.835	.250	.000	.857	.000	.333	1.00	.000	.500	.000	.852	.835	.000	.864	.872	.000	.563	.000	.889	.903
Cars	37	261	1	0	299	0	4	4	0	8	0	275	367	0	642	296	0	27	0	323	1272
% Cars	100	95.3	100	0	95.8	0	100	100	0	100	0	97.2	98.1	0	97.7	98.7	0	100	0	98.8	97.5
Heavy Vehicles	0	13	0	0	13	0	0	0	0	0	0	8	7	0	15	4	0	0	0	4	32
% Heavy Vehicles	0	4.7	0	0	4.2	0	0	0	0	0	0	2.8	1.9	0	2.3	1.3	0	0	0	1.2	2.5





Attachment B – Conceptual Site Plan



- A - 18,000 SQFT CULTIVATION BUILDING
- B - 18,000 SQFT CULTIVATION BUILDING
- C - 27,000 SQ FT CULTIVATION BUILDING
- D - 3,000 SQFT DISPENSARY
- E - 5,000 SQFT TESTING LABORATORY
- F - PAVILION
- G - GUARD SHACK



Attachment C – Crash Data

INTERSECTION CRASH RATE WORKSHEET

CITY/TOWN : South Deerfield, MA COUNT DATE : 8/1/2022

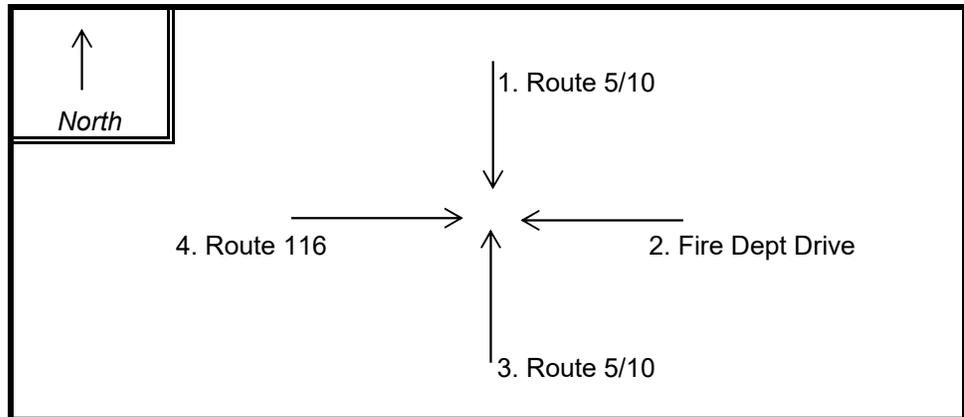
DISTRICT : 2 UNSIGNALIZED : SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Route 5/10

MINOR STREET(S) : Route 116

**INTERSECTION
 DIAGRAM**
 (Label Approaches)



PEAK HOUR VOLUMES

APPROACH :	1	2	3	4	5	Total Peak Hourly Approach Volume
DIRECTION :	SB	WB	NB	EB		
PEAK HOURLY VOLUMES (AM/PM) :	598	2	1001	307		1,908

" K " FACTOR : INTERSECTION ADT (V) = TOTAL DAILY APPROACH VOLUME :

TOTAL # OF CRASHES : # OF YEARS : AVERAGE # OF CRASHES PER YEAR (A) :

CRASH RATE CALCULATION :

0.53

RATE = $\frac{(A * 1,000,000)}{(V * 365)}$

Comments : _____

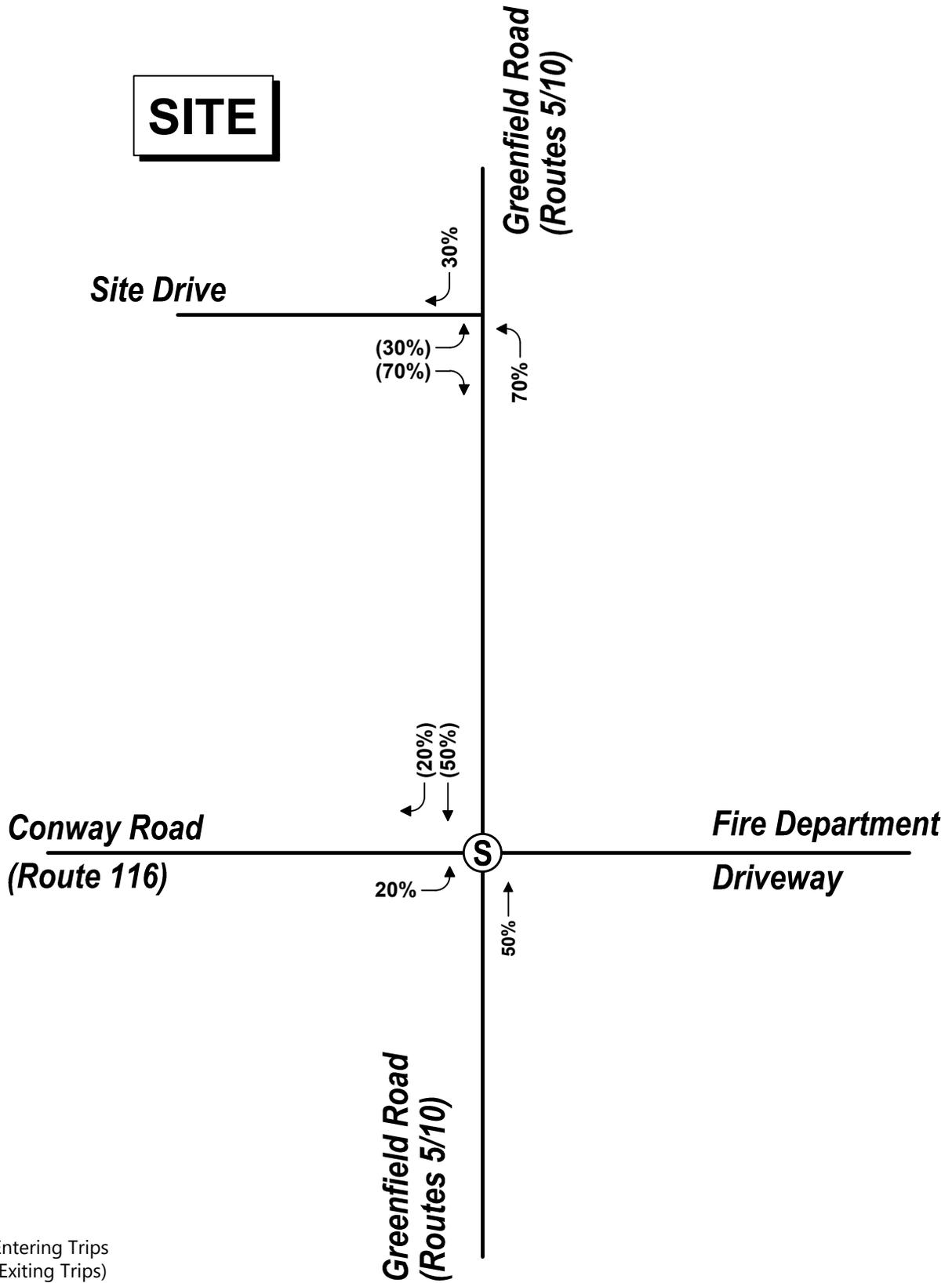
Project Title & Date: _____

2017-2021 Crash Data: Routes 5/10 at Route 116

Crash Number	City Town Name	Crash Date	Crash Severity	Crash Time	Light Conditions	Manner of Collision	Road Surface Condition	Weather Conditions
4332169	DEERFIELD	01/04/2017	Property damage only (none injured)	5:19 PM	Dark - lighted roadway	Rear-end	Dry	Cloudy
4347097	DEERFIELD	02/28/2017	Property damage only (none injured)	6:28 PM	Dark - lighted roadway	Angle	Dry	Cloudy
4347100	DEERFIELD	02/26/2017	Property damage only (none injured)	5:42 PM	Dusk	Sideswipe, opposite direction	Dry	Clear
4362269	DEERFIELD	04/26/2017	Non-fatal injury	1:34 PM	Daylight	Angle	Wet	Cloudy/Rain
4420252	DEERFIELD	08/16/2017	Property damage only (none injured)	4:48 PM	Daylight	Sideswipe, opposite direction	Dry	Clear/Unknown
4420266	DEERFIELD	08/02/2017	Property damage only (none injured)	5:48 PM	Daylight	Rear-end	Dry	Cloudy
4466945	DEERFIELD	09/28/2017	Property damage only (none injured)	7:36 AM	Daylight	Rear-end	Dry	Clear
4553165	DEERFIELD	05/25/2018	Property damage only (none injured)	2:01 PM	Daylight	Head-on	Dry	Clear
4617880	DEERFIELD	09/19/2018	Property damage only (none injured)	5:57 PM	Daylight	Rear-end	Dry	Clear/Unknown
4617889	DEERFIELD	10/02/2018	Property damage only (none injured)	5:36 PM	Daylight	Rear-end	Wet	Cloudy/Rain
4640292	DEERFIELD	12/11/2018	Property damage only (none injured)	6:08 PM	Dark - lighted roadway	Rear-end	Dry	Clear
4665901	DEERFIELD	02/01/2019	Non-fatal injury	7:45 PM	Dark - roadway not lighted	Front to Front	Dry	Clear
4705346	DEERFIELD	05/25/2019	Property damage only (none injured)	12:01 PM	Daylight	Rear-end	Dry	Clear
4705347	DEERFIELD	05/21/2019	Property damage only (none injured)	2:55 PM	Daylight	Rear-end	Dry	Clear
4757020	DEERFIELD	09/13/2019	Property damage only (none injured)	10:35 AM	Daylight	Rear-end	Dry	Clear
4800236	DEERFIELD	12/17/2019	Property damage only (none injured)	5:07 PM	Dark - roadway not lighted	Rear-end	Snow	Sleet, hail (freezing rain or drizzle)
4800241	DEERFIELD	11/25/2019	Non-fatal injury	9:37 AM	Daylight	Rear-end	Dry	Clear
4800243	DEERFIELD	01/01/2020	Property damage only (none injured)	12:41 PM	Daylight	Rear-end	Wet	Cloudy
4860794	DEERFIELD	07/17/2020	Property damage only (none injured)	10:14 AM	Daylight	Rear-end	Wet	Rain/Other
4962581	DEERFIELD	05/01/2021	Property damage only (none injured)	5:07 PM	Daylight	Sideswipe, opposite direction	Dry	Clear
4962582	DEERFIELD	05/05/2021	Non-fatal injury	6:35 PM	Daylight	Sideswipe, same direction	Wet	Cloudy/Rain
5024397	DEERFIELD	08/19/2021	Non-fatal injury	12:32 PM	Daylight	Rear-end	Wet	Rain
5024747	DEERFIELD	09/11/2021	Non-fatal injury	10:50 AM	Daylight	Angle	Dry	Clear



Attachment D – Trip Generation & Distribution



Entering Trips
(Exiting Trips)



Not to Scale



Trip Distribution

Figure

Sunny Dayz Cannabis
South Deerfield, MA

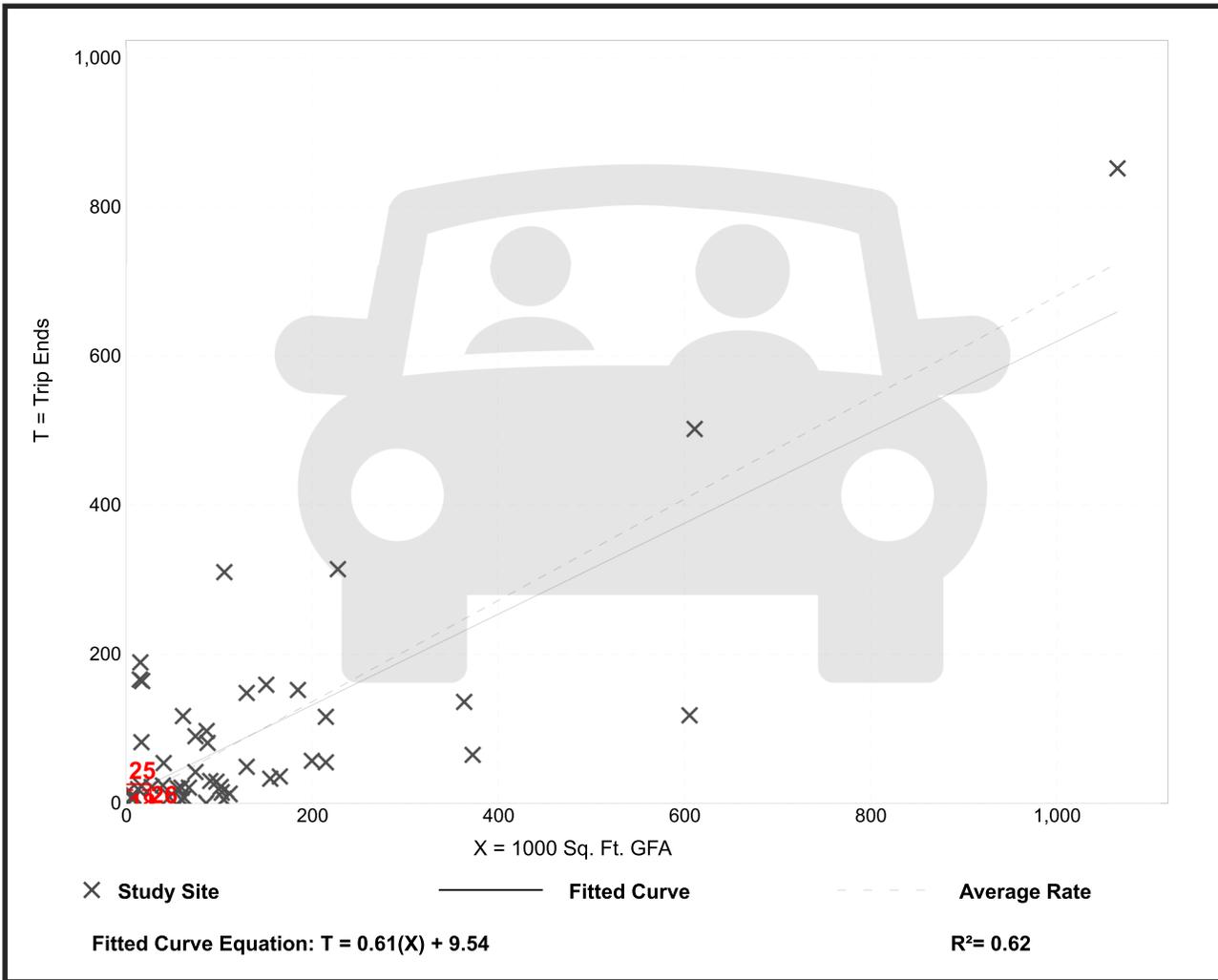
Manufacturing (140)

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: 48
 Avg. 1000 Sq. Ft. GFA: 138
 Directional Distribution: 76% entering, 24% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.68	0.01 - 11.93	1.03

Data Plot and Equation



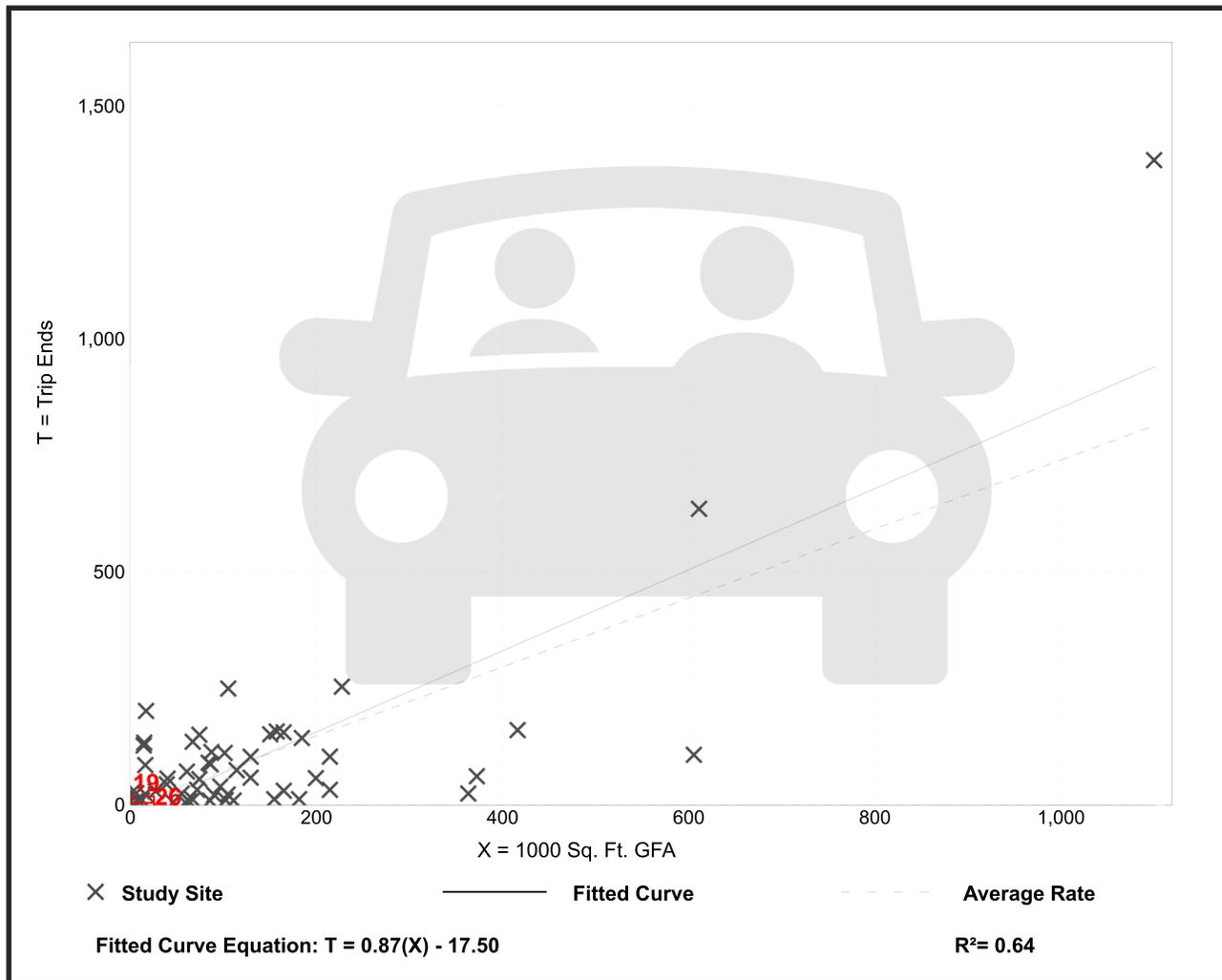
Manufacturing (140)

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: 55
 Avg. 1000 Sq. Ft. GFA: 142
 Directional Distribution: 31% entering, 69% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.74	0.07 - 11.37	0.93

Data Plot and Equation



Manufacturing (140)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday, Peak Hour of Generator

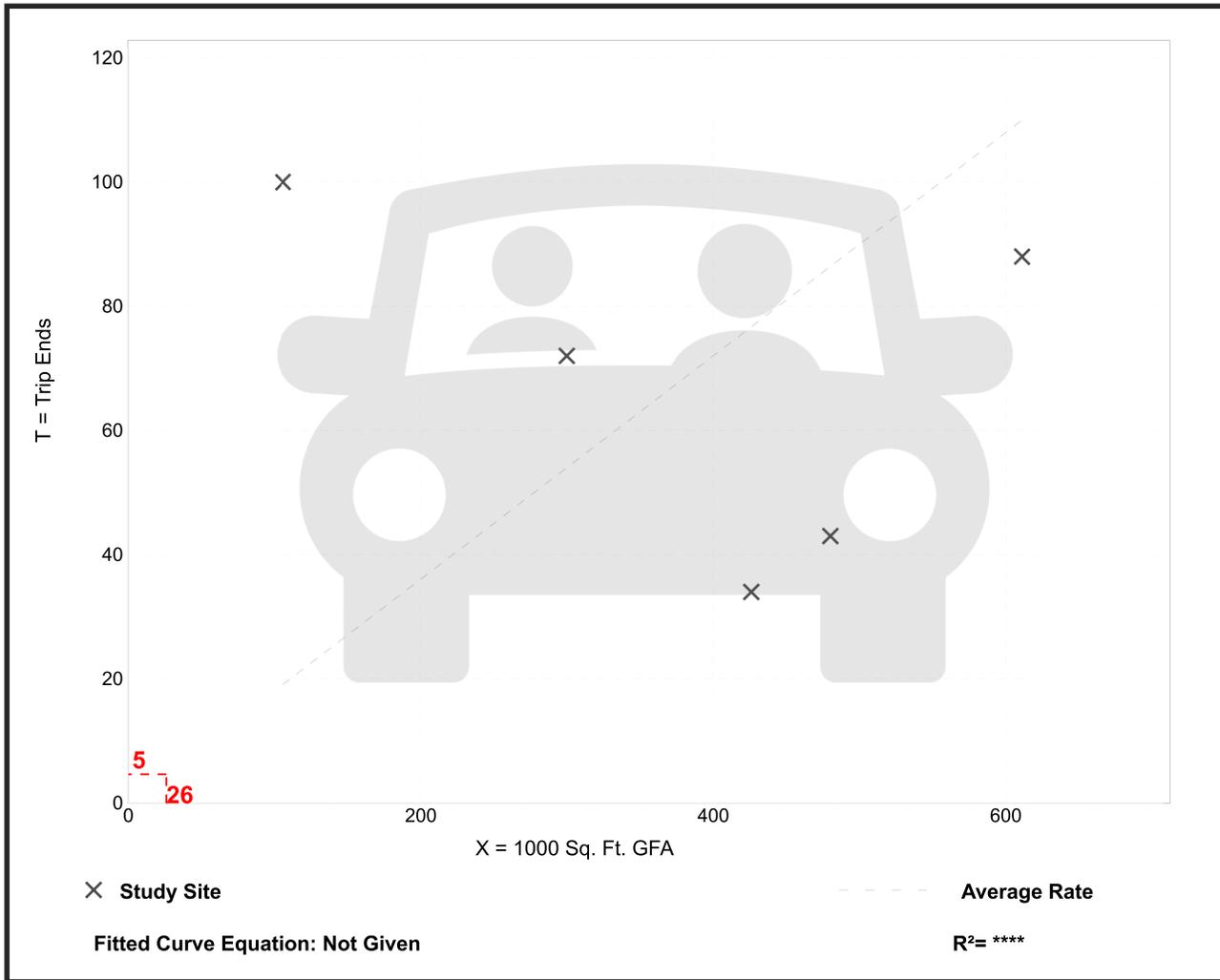
Setting/Location: General Urban/Suburban
 Number of Studies: 5
 Avg. 1000 Sq. Ft. GFA: 385
 Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.18	0.08 - 0.94	0.22

Data Plot and Equation

Caution – Small Sample Size



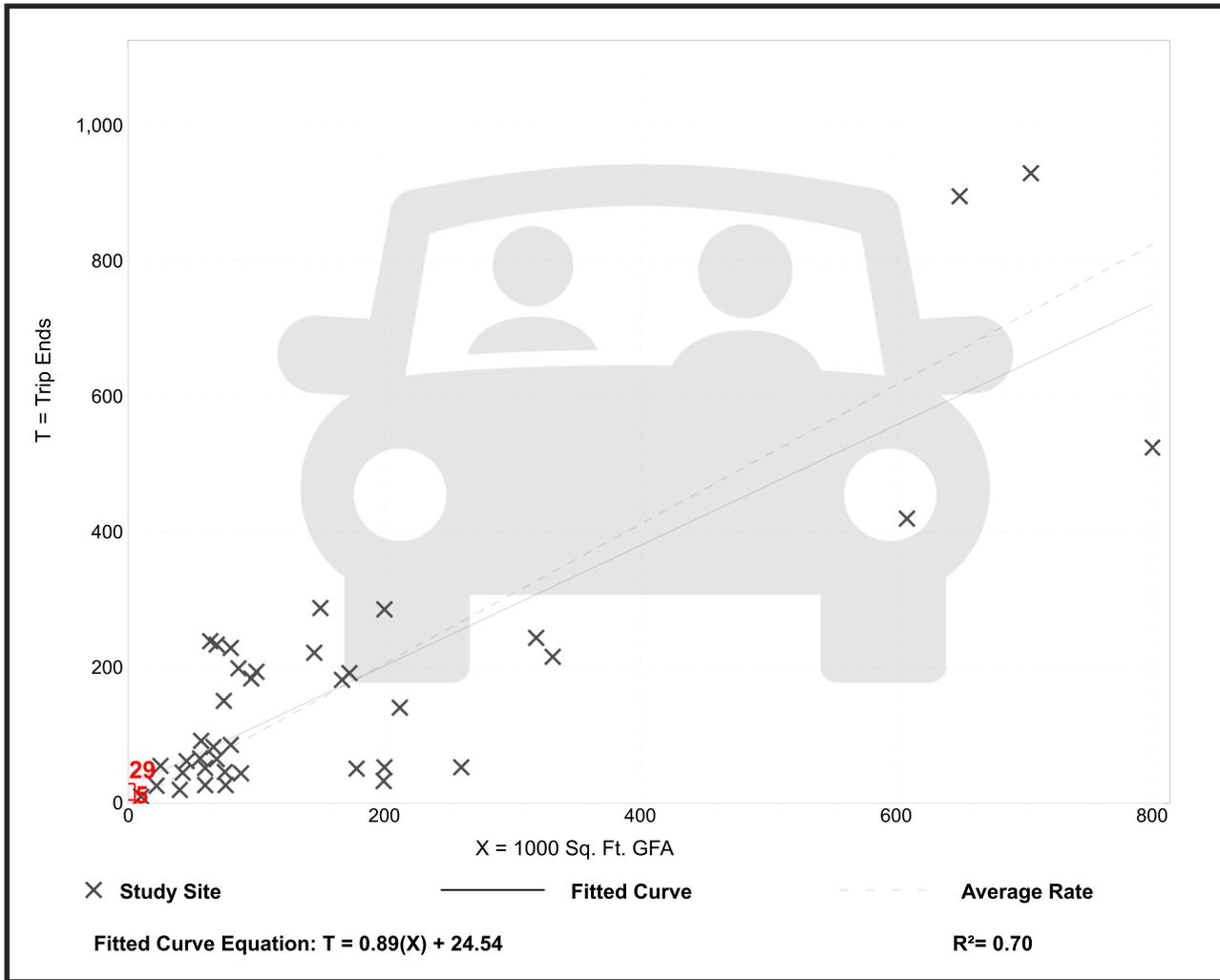
Research and Development Center (760)

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: 39
 Avg. 1000 Sq. Ft. GFA: 173
 Directional Distribution: 82% entering, 18% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.03	0.17 - 3.73	0.65

Data Plot and Equation



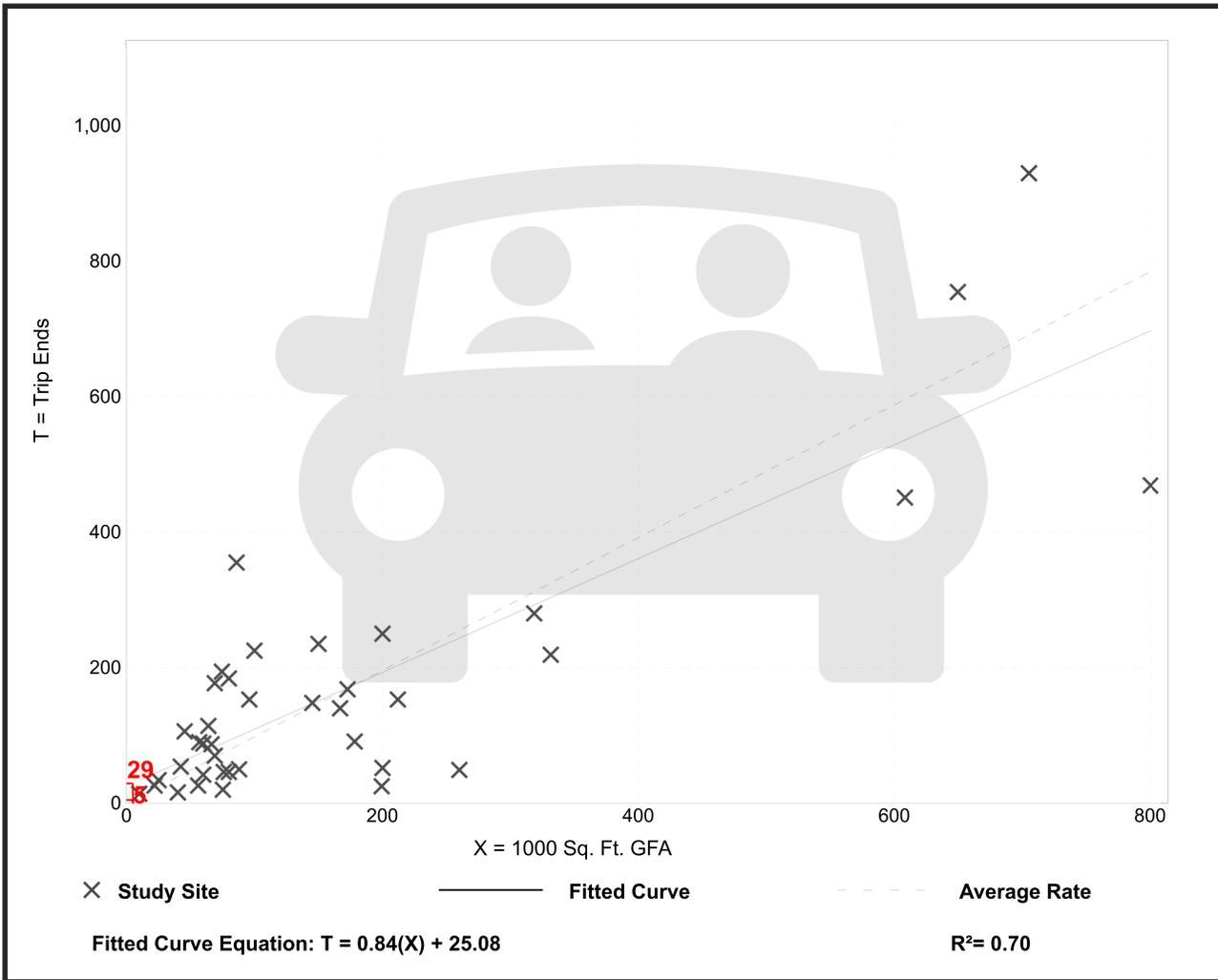
Research and Development Center (760)

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: 39
 Avg. 1000 Sq. Ft. GFA: 173
 Directional Distribution: 16% entering, 84% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.98	0.13 - 4.13	0.64

Data Plot and Equation



Research and Development Center (760)

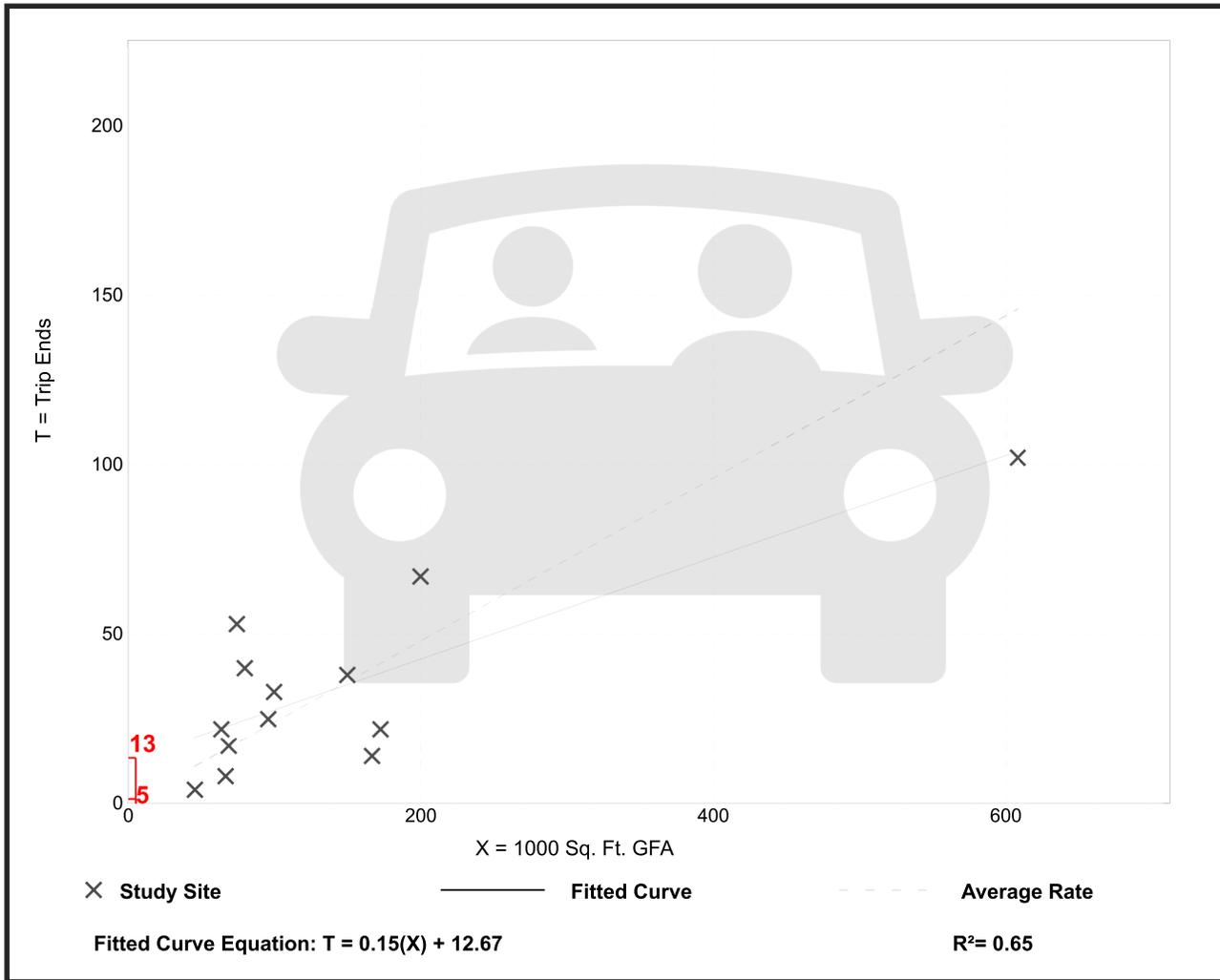
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
 Number of Studies: 13
 Avg. 1000 Sq. Ft. GFA: 146
 Directional Distribution: Not Available

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.24	0.08 - 0.71	0.14

Data Plot and Equation



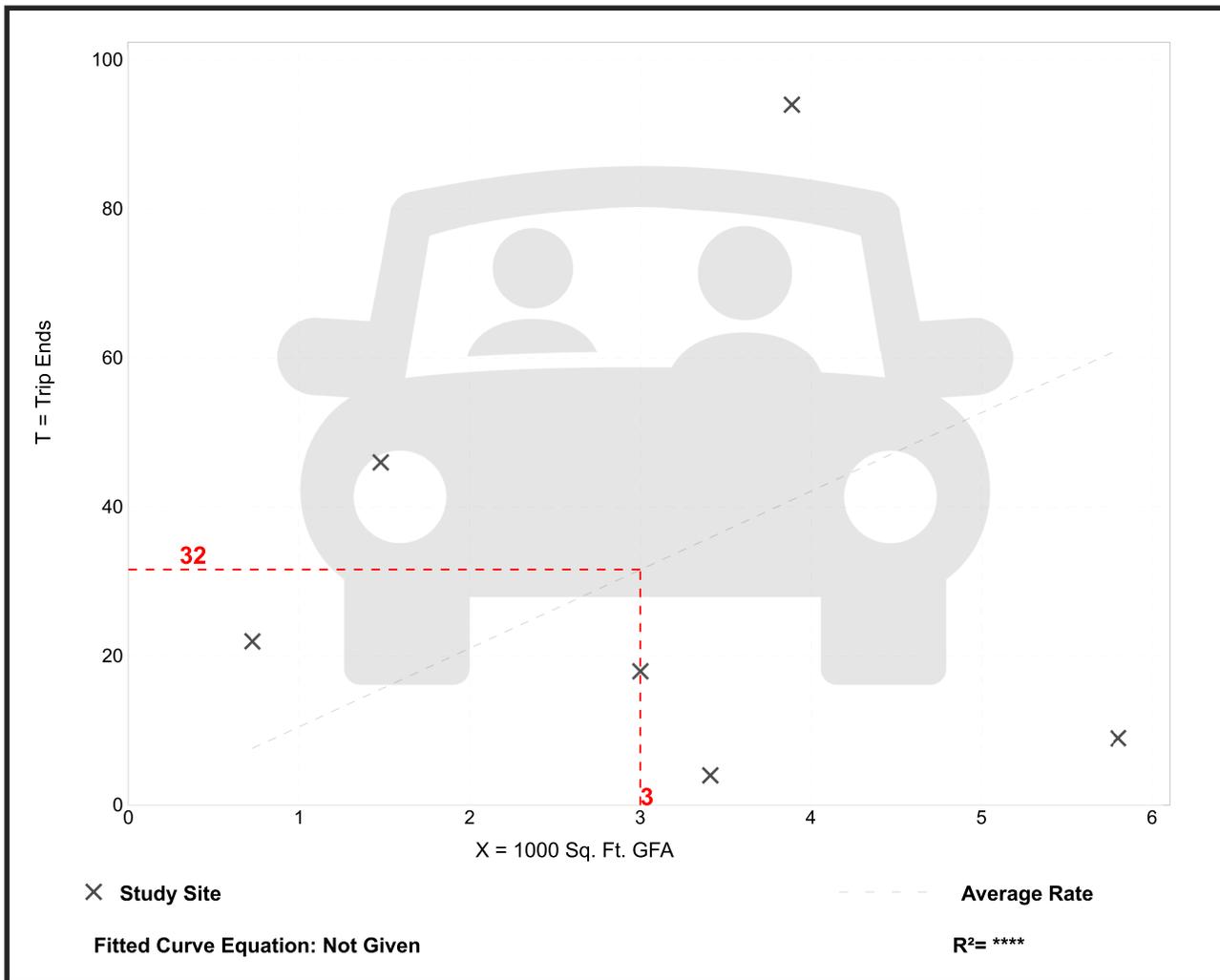
Marijuana Dispensary (882)

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: 6
 Avg. 1000 Sq. Ft. GFA: 3
 Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
10.54	1.17 - 31.08	12.69

Data Plot and Equation



MA Collected Data

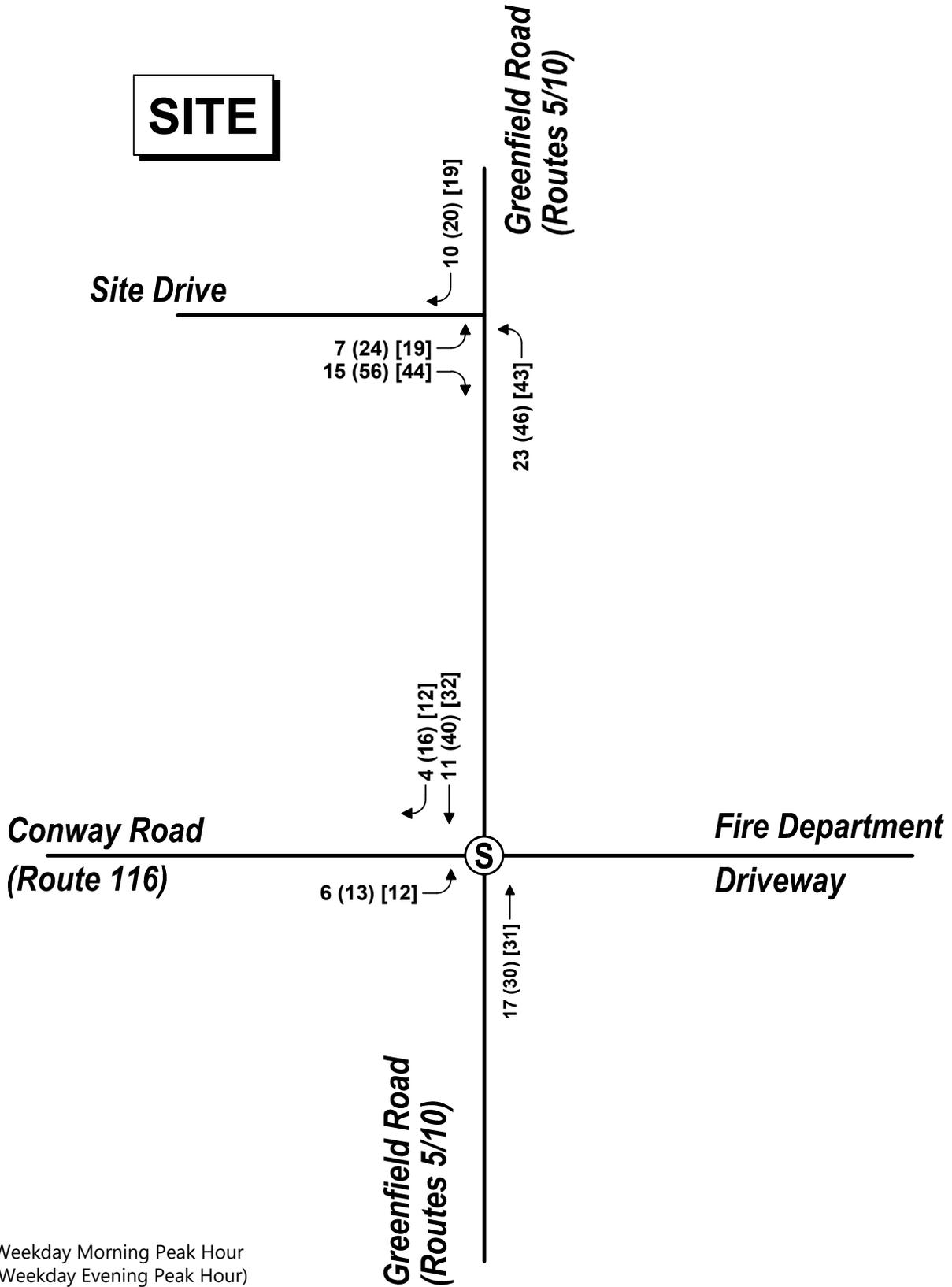
Site No.	2	3	4	5	4-site average
Weekday date:	2019	7/29/2020	8/24/2020	7/12/2019	
Saturday date:	2019	7/25/2020	10/31/2020	7/13/2019	
Size (sf):	3,705	3,700	3,000	3,100	3,376
Location:	Hudson	Millbury	Millis	Marlborough	
Weekday evening peak hour					
Enter	50	50	61	76	59
Exit	<u>56</u>	<u>53</u>	<u>60</u>	<u>82</u>	<u>63</u>
Total	106	103	121	158	122
Saturday midday peak hour					
Enter	49	52	75	60	59
Exit	<u>49</u>	<u>55</u>	<u>79</u>	<u>58</u>	<u>60</u>
Total	98	107	154	118	119

2 - Traffic counts conducted by Green International Affiliates, Inc.

3 - Traffic counts conducted by Vanasse & Associates, Inc.

4 - Traffic counts conducted by Crossmand Engineering, Inc.

5 - Traffic counts conducted by BETA Group, Inc.



Not to Scale



Site Generated Trips

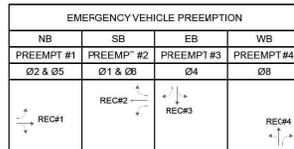
Figure

Sunny Dayz Cannabis
South Deerfield, MA



Attachment E – Signal Plan

STATE	FED AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	HSI-0035(389)K	85	145
PROJECT FILE NO.		008011	

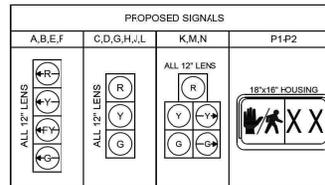


EMERGENCY VEHICLE PREEMPTION OPERATION

- EMERGENCY VEHICLE PREEMPTION SIGNAL SHALL BE OPTICALLY TRANSMITTED BY OPTICAL EMITTERS MOUNTED IN EMERGENCY VEHICLES AND RECEIVED BY OPTICAL DETECTORS (RECEIVERS) LOCATED AT THE INTERSECTION.
- PREEMPTION SIGNALS SHALL BE SERVICED ON A FIRST COME FIRST SERVED BASIS. IN CASE WHERE TWO OR MORE CALLS ARE COMING IN AT THE SAME TIME, PREEMPTION SHALL BE PRIORITIZED WITH PREEMPT #1 (GREENFIELD RD NB) FRST, THEN FOLLOW BY PREEMPT #2 (GREENFIELD RD SB), PREEMPT #3 (CONWAY ROAD) AND PREEMPT #4 (FIRE STATION).
- IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED BY OPTICAL DETECTOR REC#1 (OR REC#2, REC#3, REC#4), THE CONTROLLER SHALL HOLD OR ADVANCE TO AND HOLD IN EMERGENCY VEHICLE PREEMPTION SIGNAL #1 (OR #2, #3, #4) GREEN FOR A MINIMUM OF TEN (10) SECONDS OR UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME THE RELEVANT CLEARANCE INTERVALS AND SERVICE THE SUBSEQUENT EMERGENCY VEHICLE PREEMPTION SIGNAL IF NECESSARY. NORMAL SIGNAL OPERATION SHALL RESUME PROVIDED THAT ALL PREEMPTION SIGNALS HAVE CEASED.
- NORMAL VEHICLE CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PREEMPTION DEMAND.
- PREEMPTION STROBE SHALL BE ILLUMINATED ONLY WHEN THE PREEMPTION PHASE IS ON GREEN.
- ANY OPPOSING PHASE RUNNING FLASHING YELLOW LEFT TURN OPERATIONS SHALL DISPLAY SOLID RED LEFT ARROW DURING PREEMPTION.

DETECTION DATA									
DETECTOR NO.	NUMBER AND SIZE	SPICE PATTERN	NO. OF TURNS	Ø CALLED	Ø EXT.	MODE A=PULSE B=RES.	DELAY TIME	EXT. TIME	
1	2-6'x20'	PARALLEL	QUAD TYPE	5	5	B	-	-	
2	2-6'x20'	PARALLEL	QUAD TYPE	2	2	B	-	-	
3	1-6'x4'	-	3	2	2	A	-	2 SEC	
4	1-6'x4'	-	3	2	2	A	-	2 SEC	
5	2-6'x20'	PARALLEL	QUAD TYPE	1	1	B	-	-	
6	2-6'x20'	PARALLEL	QUAD TYPE	6	6	B	-	-	
7	2-6'x20'	PARALLEL	QUAD TYPE	6	6	B	-	-	
8	1-6'x4'	-	3	6	6	A	-	2 SEC	
9	1-6'x4'	-	3	6	6	A	-	2 SEC	
10	2-6'x20'	PARALLEL	QUAD TYPE	4	4	B	-	-	
11	2-6'x20'	PARALLEL	QUAD TYPE	4	4+5	B	8 SEC	-	
12	2-6'x20'	PARALLEL	QUAD TYPE	8	8	B	-	-	
15	2-6'x20'	PARALLEL	QUAD TYPE	8	8-1	B	8 SEC	-	
B1	4'x6'	BI-CYCLE TYPE D-2	2	2	2	B	-	-	
B2	4'x6'	BI-CYCLE TYPE D-2	6	6	6	B	-	-	
B3	8'x12'	BI-CYCLE TYPE D-2	8	8	8	B	-	-	
B4	8'x12'	BI-CYCLE TYPE D-2	4	4	4	B	-	-	

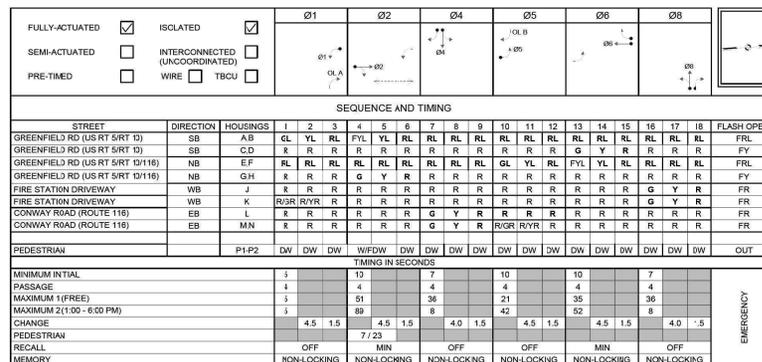
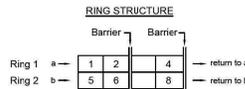
NOTE: EXTENSION AND DELAY TIME SHALL BE PROGRAMMED IN THE CONTROLLER UNIT AND NOT ON THE DETECTOR UNITS.



NOTES:

- ALL INDICATIONS SHALL BE "LED" TYPE LENS IN ACCORDANCE WITH THE SPECIAL PROVISIONS.
- ALL SIGNALS SHALL BE RIGIDLY MOUNTED AND EQUIPPED WITH CUT TUNNEL VISORS AND 5" SLID BACKPLATES.
- BACKPLATES SHALL INCLUDE 3" YELLOW RETRO-REFLECTIVE BORDER IN ACCORDANCE WITH THE SPECIAL PROVISIONS.
- ALL PEDESTRIAN DISPLAY SHALL BE "FULL" DISPLAYS. NO OUTLINE SYMBOL SHALL BE PERMITTED.
- FYLS SHALL ONLY BE DISPLAYED AT THE SAME TIME AS THE ADJACENT GREEN BALL.

TRAFFIC CONTROLLER DATA	
PARAMETER	SELECTION
PHASE ASSIGNMENTS	STD. NEMA
OVERLAPS	STD. NEMA
RINGS	DUAL
DUAL ENTRY	ON (Ø2 & Ø6)
SIMULTANEOUS GAP OUT DISABLED	YES (Ø2 & Ø6)
MINIMUM YELLOW IN SECONDS	3
MAX II BY INTERNAL CLOCK	YES
NIGHT TIME FLASH BY INTERNAL CLOCK	NOT USED

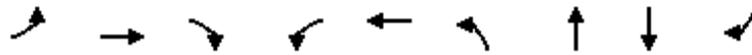




Attachment F – Capacity Analyses

Queues
4: Routes 5/10 & Route 116/FD Driveway

2022 Existing Conditions
Weekday Morning Peak Hour

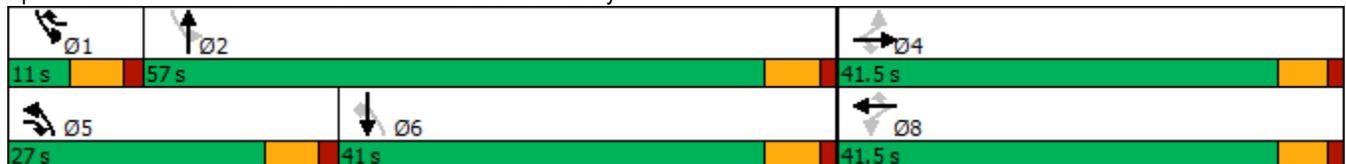


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR	Ø1
Lane Configurations		↖	↗		↖	↗	↖	↗	↗	
Traffic Volume (vph)	71	2	464	2	2	321	507	383	22	
Future Volume (vph)	71	2	464	2	2	321	507	383	22	
Lane Group Flow (vph)	0	78	499	0	12	369	583	461	27	
Turn Type	Perm	NA	pm+ov	Perm	NA	D.P+P	NA	NA	Perm	
Protected Phases		4	5		8	5	2	6		1
Permitted Phases	4		4	8		6			6	
Detector Phase	4	4	5	8	8	5	2	6	6	
Switch Phase										
Minimum Initial (s)	7.0	7.0	10.0	7.0	7.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	23.5	23.5	16.0	23.5	23.5	16.0	36.0	24.0	24.0	11.0
Total Split (s)	41.5	41.5	27.0	41.5	41.5	27.0	57.0	41.0	41.0	11.0
Total Split (%)	37.9%	37.9%	24.7%	37.9%	37.9%	24.7%	52.1%	37.4%	37.4%	10%
Yellow Time (s)	4.0	4.0	4.5	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	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	
Total Lost Time (s)		5.5	6.0		5.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead			Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	Min	None
v/c Ratio		0.38	0.66		0.06	0.58	0.44	0.72	0.04	
Control Delay		36.7	15.2		31.2	9.4	6.0	26.7	0.1	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		36.7	15.2		31.2	9.4	6.0	26.7	0.1	
Queue Length 50th (ft)		32	104		5	51	95	165	0	
Queue Length 95th (ft)		82	235		8	98	172	280	0	
Internal Link Dist (ft)		1893			53		1120	898		
Turn Bay Length (ft)			100			150			270	
Base Capacity (vph)		780	888		739	782	1405	974	889	
Starvation Cap Reductn		0	0		0	0	0	0	0	
Spillback Cap Reductn		0	0		0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	
Reduced v/c Ratio		0.10	0.56		0.02	0.47	0.41	0.47	0.03	

Intersection Summary

Cycle Length: 109.5
 Actuated Cycle Length: 67.4
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Routes 5/10 & Route 116/FD Driveway



HCM Signalized Intersection Capacity Analysis
4: Routes 5/10 & Route 116/FD Driveway

2022 Existing Conditions
Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	2	464	2	2	0	321	507	0	0	383	22
Future Volume (vph)	71	2	464	2	2	0	321	507	0	0	383	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.0		5.5		6.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00		1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1742	1553		1483		1671	1759			1696	1442
Flt Permitted		0.72	1.00		0.82		0.34	1.00			1.00	1.00
Satd. Flow (perm)		1321	1553		1251		593	1759			1696	1442
Peak-hour factor, PHF	0.93	0.93	0.93	0.33	0.33	0.33	0.87	0.87	0.87	0.83	0.83	0.83
Adj. Flow (vph)	76	2	499	6	6	0	369	583	0	0	461	27
RTOR Reduction (vph)	0	0	105	0	0	0	0	0	0	0	0	17
Lane Group Flow (vph)	0	78	394	0	12	0	369	583	0	0	461	10
Heavy Vehicles (%)	4%	4%	4%	25%	25%	25%	8%	8%	8%	12%	12%	12%
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6			2		6
Actuated Green, G (s)		7.9	24.5		7.9		42.8	48.8			26.2	26.2
Effective Green, g (s)		7.9	24.5		7.9		42.8	48.8			26.2	26.2
Actuated g/C Ratio		0.12	0.36		0.12		0.63	0.72			0.38	0.38
Clearance Time (s)		5.5	6.0		5.5		6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		153	557		144		634	1258			651	553
v/s Ratio Prot			c0.17				0.14	0.33			c0.27	
v/s Ratio Perm		0.06	0.08		0.01		0.22					0.01
v/c Ratio		0.51	0.71		0.08		0.58	0.46			0.71	0.02
Uniform Delay, d1		28.3	18.8		26.9		7.0	4.1			17.8	13.0
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		2.7	4.1		0.2		1.4	0.3			3.5	0.0
Delay (s)		31.0	22.9		27.2		8.3	4.4			21.3	13.0
Level of Service		C	C		C		A	A			C	B
Approach Delay (s)		24.0			27.2			5.9			20.8	
Approach LOS		C			C			A			C	
Intersection Summary												
HCM 2000 Control Delay			14.8				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			68.2				Sum of lost time (s)			17.5		
Intersection Capacity Utilization			69.3%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: Routes 5/10 & Route 116/FD Driveway

2022 Existing Conditions
Weekday Evening Peak Hour

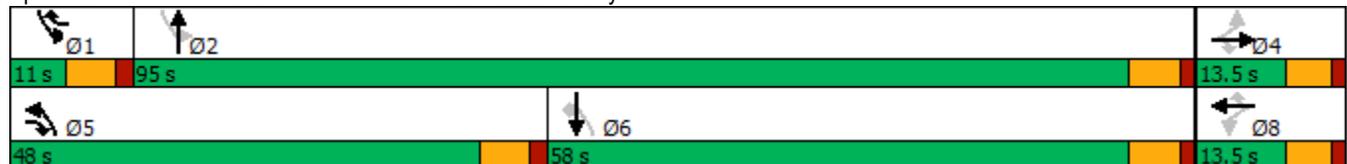


Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations		↖	↗	↖	↗	↗	↖	↖	↗
Traffic Volume (vph)	30	2	275	2	578	421	1	529	68
Future Volume (vph)	30	2	275	2	578	421	1	529	68
Lane Group Flow (vph)	0	41	353	4	602	441	1	622	80
Turn Type	Perm	NA	pm+ov	NA	D.P+P	NA	D.P+P	NA	Perm
Protected Phases		4	5	8	5	2	1	6	
Permitted Phases	4		4		6		2		6
Detector Phase	4	4	5	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	10.0	7.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	12.5	12.5	16.0	12.5	16.0	36.0	11.0	24.0	24.0
Total Split (s)	13.5	13.5	48.0	13.5	48.0	95.0	11.0	58.0	58.0
Total Split (%)	11.3%	11.3%	40.2%	11.3%	40.2%	79.5%	9.2%	48.5%	48.5%
Yellow Time (s)	4.0	4.0	4.5	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	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
Total Lost Time (s)		5.5	6.0	5.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lead		Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	Min
v/c Ratio		0.22	0.47	0.02	0.78	0.27	0.00	0.80	0.11
Control Delay		52.0	12.1	51.0	22.9	3.1	2.0	33.6	0.9
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		52.0	12.1	51.0	22.9	3.1	2.0	33.6	0.9
Queue Length 50th (ft)		24	66	2	204	54	0	333	0
Queue Length 95th (ft)		59	122	8	382	139	1	508	2
Internal Link Dist (ft)		1893		53		1120		898	
Turn Bay Length (ft)			100		150		270		270
Base Capacity (vph)		198	1048	204	1096	1661	817	1170	1041
Starvation Cap Reductn		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.21	0.34	0.02	0.55	0.27	0.00	0.53	0.08

Intersection Summary

Cycle Length: 119.5
 Actuated Cycle Length: 88
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Routes 5/10 & Route 116/FD Driveway



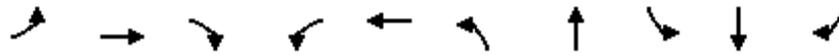
HCM Signalized Intersection Capacity Analysis
 4: Routes 5/10 & Route 116/FD Driveway

2022 Existing Conditions
 Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	2	275	0	2	0	578	421	2	1	529	68
Future Volume (vph)	30	2	275	0	2	0	578	421	2	1	529	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.96	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1763	1568		1900		1752	1843		1736	1827	1553
Flt Permitted		1.00	1.00		1.00		0.22	1.00		0.50	1.00	1.00
Satd. Flow (perm)		1845	1568		1900		409	1843		912	1827	1553
Peak-hour factor, PHF	0.78	0.78	0.78	0.50	0.50	0.50	0.96	0.96	0.96	0.85	0.85	0.85
Adj. Flow (vph)	38	3	353	0	4	0	602	439	2	1	622	80
RTOR Reduction (vph)	0	0	108	0	0	0	0	0	0	0	0	43
Lane Group Flow (vph)	0	41	245	0	4	0	602	441	0	1	622	37
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Turn Type	Perm	NA	pm+ov		NA	pm+ov	D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6			2		6
Actuated Green, G (s)		3.8	33.7		3.8		73.5	72.8		73.5	43.6	43.6
Effective Green, g (s)		3.8	33.7		3.8		73.5	72.8		73.5	43.6	43.6
Actuated g/C Ratio		0.04	0.36		0.04		0.78	0.77		0.78	0.46	0.46
Clearance Time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		73	557		76		740	1415		713	840	714
v/s Ratio Prot			0.14		0.00		c0.26	0.24		0.00	0.34	
v/s Ratio Perm		c0.02	0.02				c0.37			0.00		0.02
v/c Ratio		0.56	0.44		0.05		0.81	0.31		0.00	0.74	0.05
Uniform Delay, d1		44.7	23.3		43.8		15.4	3.4		2.4	21.0	14.2
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		9.5	0.6		0.3		6.8	0.1		0.0	3.5	0.0
Delay (s)		54.2	23.9		44.1		22.3	3.5		2.4	24.5	14.2
Level of Service		D	C		D		C	A		A	C	B
Approach Delay (s)		27.1			44.1			14.3			23.3	
Approach LOS		C			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			19.7				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			94.8				Sum of lost time (s)			17.5		
Intersection Capacity Utilization			82.9%				ICU Level of Service				E	
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: Routes 5/10 & Route 116/FD Driveway

2022 Existing Conditions
Saturday Midday Peak Hour

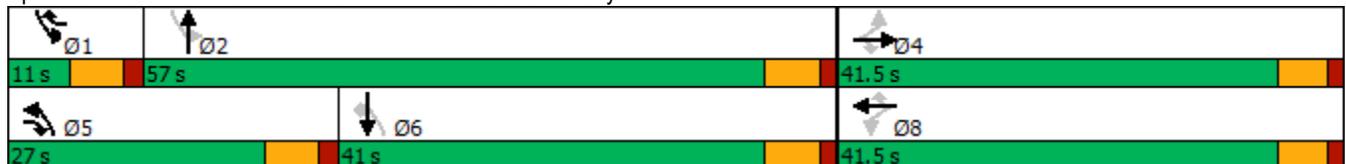


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations		↕	↗		↖	↗	↖	↖	↗	↗
Traffic Volume (vph)	28	0	307	4	4	383	290	1	281	38
Future Volume (vph)	28	0	307	4	4	383	290	1	281	38
Lane Group Flow (vph)	0	31	345	0	16	445	337	1	327	44
Turn Type	Perm	NA	pm+ov	Perm	NA	D.P+P	NA	D.P+P	NA	Perm
Protected Phases		4	5		8	5	2	1	6	
Permitted Phases	4		4	8		6		2		6
Detector Phase	4	4	5	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	10.0	7.0	7.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	23.5	23.5	16.0	23.5	23.5	16.0	36.0	11.0	24.0	24.0
Total Split (s)	41.5	41.5	27.0	41.5	41.5	27.0	57.0	11.0	41.0	41.0
Total Split (%)	37.9%	37.9%	24.7%	37.9%	37.9%	24.7%	52.1%	10.0%	37.4%	37.4%
Yellow Time (s)	4.0	4.0	4.5	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	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
Total Lost Time (s)		5.5	6.0		5.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lead			Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min	Min
v/c Ratio		0.09	0.44		0.05	0.53	0.21	0.00	0.53	0.07
Control Delay		23.1	4.4		23.1	6.1	4.5	3.0	17.9	0.2
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		23.1	4.4		23.1	6.1	4.5	3.0	17.9	0.2
Queue Length 50th (ft)		5	8		3	0	0	0	44	0
Queue Length 95th (ft)		34	51		12	94	115	1	173	0
Internal Link Dist (ft)		1893			53		1120		898	
Turn Bay Length (ft)			100			150		270		270
Base Capacity (vph)		1555	1071		1570	1142	1716	850	1496	1298
Starvation Cap Reductn		0	0		0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0
Reduced v/c Ratio		0.02	0.32		0.01	0.39	0.20	0.00	0.22	0.03

Intersection Summary

Cycle Length: 109.5
 Actuated Cycle Length: 45.7
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Routes 5/10 & Route 116/FD Driveway



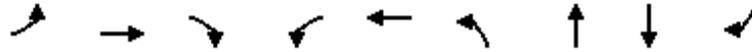
HCM Signalized Intersection Capacity Analysis
4: Routes 5/10 & Route 116/FD Driveway

2022 Existing Conditions
Saturday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	0	307	4	4	0	383	290	0	1	281	38
Future Volume (vph)	28	0	307	4	4	0	383	290	0	1	281	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1787	1599		1854		1770	1863		1736	1827	1553
Flt Permitted		1.00	1.00		1.00		0.53	1.00		0.56	1.00	1.00
Satd. Flow (perm)		1881	1599		1900		983	1863		1019	1827	1553
Peak-hour factor, PHF	0.89	0.89	0.89	0.50	0.50	0.50	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	31	0	345	8	8	0	445	337	0	1	327	44
RTOR Reduction (vph)	0	0	206	0	0	0	0	0	0	0	0	27
Lane Group Flow (vph)	0	31	139	0	16	0	445	337	0	1	327	17
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6			2		6
Actuated Green, G (s)		2.5	15.5		2.5		34.3	33.6		34.3	21.3	21.3
Effective Green, g (s)		2.5	15.5		2.5		34.3	33.6		34.3	21.3	21.3
Actuated g/C Ratio		0.05	0.29		0.05		0.63	0.62		0.63	0.39	0.39
Clearance Time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		86	456		87		809	1152		652	716	609
v/s Ratio Prot			0.07				c0.13	0.18		0.00	0.18	
v/s Ratio Perm		c0.02	0.01		0.01		c0.22			0.00		0.01
v/c Ratio		0.36	0.31		0.18		0.55	0.29		0.00	0.46	0.03
Uniform Delay, d1		25.1	15.2		24.9		4.9	4.8		3.7	12.2	10.1
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		2.6	0.4		1.0		0.8	0.1		0.0	0.5	0.0
Delay (s)		27.7	15.6		25.9		5.8	5.0		3.7	12.7	10.2
Level of Service		C	B		C		A	A		A	B	B
Approach Delay (s)		16.6			25.9			5.4			12.4	
Approach LOS		B			C			A			B	
Intersection Summary												
HCM 2000 Control Delay			10.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			54.3				Sum of lost time (s)			17.5		
Intersection Capacity Utilization			58.8%				ICU Level of Service				B	
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: Routes 5/10 & Route 116/FD Driveway

2029 No-Build Conditions
Weekday Morning Peak Hour

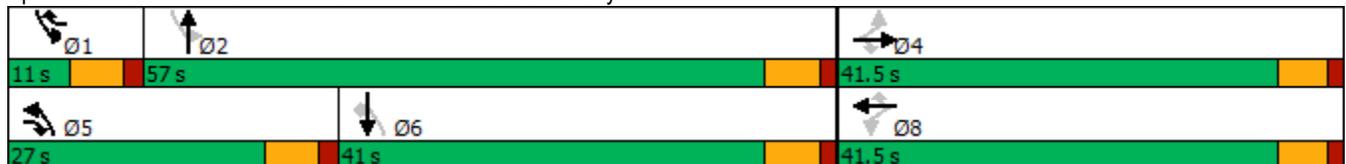


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR	Ø1
Lane Configurations		↕	↗		↕	↗	↗	↕	↗	
Traffic Volume (vph)	76	2	497	2	2	344	544	411	24	
Future Volume (vph)	76	2	497	2	2	344	544	411	24	
Lane Group Flow (vph)	0	84	534	0	12	395	625	495	29	
Turn Type	Perm	NA	pm+ov	Perm	NA	D.P+P	NA	NA	Perm	
Protected Phases		4	5		8	5	2	6		1
Permitted Phases	4		4	8		6			6	
Detector Phase	4	4	5	8	8	5	2	6	6	
Switch Phase										
Minimum Initial (s)	7.0	7.0	10.0	7.0	7.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	23.5	23.5	16.0	23.5	23.5	16.0	36.0	24.0	24.0	11.0
Total Split (s)	41.5	41.5	27.0	41.5	41.5	27.0	57.0	41.0	41.0	11.0
Total Split (%)	37.9%	37.9%	24.7%	37.9%	37.9%	24.7%	52.1%	37.4%	37.4%	10%
Yellow Time (s)	4.0	4.0	4.5	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	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	
Total Lost Time (s)		5.5	6.0		5.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead			Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	Min	None
v/c Ratio		0.44	0.71		0.07	0.61	0.46	0.74	0.04	
Control Delay		40.6	18.5		32.2	11.4	6.1	29.0	0.1	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		40.6	18.5		32.2	11.4	6.1	29.0	0.1	
Queue Length 50th (ft)		40	148		5	57	108	209	0	
Queue Length 95th (ft)		87	277		8	142	196	309	0	
Internal Link Dist (ft)		1893			53		1120	898		
Turn Bay Length (ft)			100			150			270	
Base Capacity (vph)		691	808		656	711	1362	863	804	
Starvation Cap Reductn		0	0		0	0	0	0	0	
Spillback Cap Reductn		0	0		0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	
Reduced v/c Ratio		0.12	0.66		0.02	0.56	0.46	0.57	0.04	

Intersection Summary

Cycle Length: 109.5
 Actuated Cycle Length: 74
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Routes 5/10 & Route 116/FD Driveway



HCM Signalized Intersection Capacity Analysis
4: Routes 5/10 & Route 116/FD Driveway

2029 No-Build Conditions
Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	2	497	2	2	0	344	544	0	0	411	24
Future Volume (vph)	76	2	497	2	2	0	344	544	0	0	411	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.0		5.5		6.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00		1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1742	1553		1483		1671	1759			1696	1442
Flt Permitted		0.72	1.00		0.82		0.30	1.00			1.00	1.00
Satd. Flow (perm)		1320	1553		1254		525	1759			1696	1442
Peak-hour factor, PHF	0.93	0.93	0.93	0.33	0.33	0.33	0.87	0.87	0.87	0.83	0.83	0.83
Adj. Flow (vph)	82	2	534	6	6	0	395	625	0	0	495	29
RTOR Reduction (vph)	0	0	89	0	0	0	0	0	0	0	0	18
Lane Group Flow (vph)	0	84	445	0	12	0	395	625	0	0	495	11
Heavy Vehicles (%)	4%	4%	4%	25%	25%	25%	8%	8%	8%	12%	12%	12%
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6			2		6
Actuated Green, G (s)		8.3	28.0		8.3		49.2	55.2			29.5	29.5
Effective Green, g (s)		8.3	28.0		8.3		49.2	55.2			29.5	29.5
Actuated g/C Ratio		0.11	0.37		0.11		0.66	0.74			0.39	0.39
Clearance Time (s)		5.5	6.0		5.5		6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		146	579		138		645	1294			667	567
v/s Ratio Prot			c0.20				0.16	0.36			c0.29	
v/s Ratio Perm		0.06	0.08		0.01		0.24					0.01
v/c Ratio		0.58	0.77		0.09		0.61	0.48			0.74	0.02
Uniform Delay, d1		31.7	20.7		29.9		7.4	4.1			19.5	13.9
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		5.4	6.1		0.3		1.7	0.3			4.5	0.0
Delay (s)		37.1	26.7		30.2		9.1	4.3			23.9	13.9
Level of Service		D	C		C		A	A			C	B
Approach Delay (s)		28.1			30.2			6.2			23.4	
Approach LOS		C			C			A			C	
Intersection Summary												
HCM 2000 Control Delay			16.7				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			75.0				Sum of lost time (s)			17.5		
Intersection Capacity Utilization			72.8%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: Routes 5/10 & Route 116/FD Driveway

2029 No-Build Conditions
Weekday Evening Peak Hour

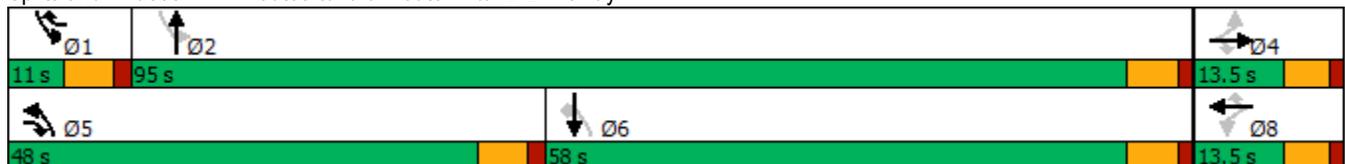


Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations		↖	↗	↖	↗	↗	↖	↖	↗
Traffic Volume (vph)	32	2	295	2	620	451	1	567	73
Future Volume (vph)	32	2	295	2	620	451	1	567	73
Lane Group Flow (vph)	0	44	378	4	646	472	1	667	86
Turn Type	Perm	NA	pm+ov	NA	D.P+P	NA	D.P+P	NA	Perm
Protected Phases		4	5	8	5	2	1	6	
Permitted Phases	4		4		6		2		6
Detector Phase	4	4	5	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	10.0	7.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	12.5	12.5	16.0	12.5	16.0	36.0	11.0	24.0	24.0
Total Split (s)	13.5	13.5	48.0	13.5	48.0	95.0	11.0	58.0	58.0
Total Split (%)	11.3%	11.3%	40.2%	11.3%	40.2%	79.5%	9.2%	48.5%	48.5%
Yellow Time (s)	4.0	4.0	4.5	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	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
Total Lost Time (s)		5.5	6.0	5.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lead		Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	Min
v/c Ratio		0.29	0.50	0.03	0.83	0.29	0.00	0.84	0.11
Control Delay		57.1	14.8	52.5	30.4	3.0	2.0	37.8	1.2
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		57.1	14.8	52.5	30.4	3.0	2.0	37.8	1.2
Queue Length 50th (ft)		32	110	3	311	59	0	449	0
Queue Length 95th (ft)		62	151	8	#539	152	1	562	6
Internal Link Dist (ft)		1893		53		1120		898	
Turn Bay Length (ft)			100		150		270		270
Base Capacity (vph)		159	911	170	943	1627	799	1064	959
Starvation Cap Reductn		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.28	0.41	0.02	0.69	0.29	0.00	0.63	0.09

Intersection Summary

Cycle Length: 119.5
 Actuated Cycle Length: 98.7
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 4: Routes 5/10 & Route 116/FD Driveway



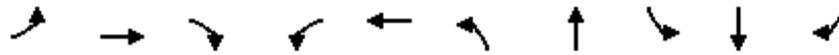
HCM Signalized Intersection Capacity Analysis
4: Routes 5/10 & Route 116/FD Driveway

2029 No-Build Conditions
Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	2	295	0	2	0	620	451	2	1	567	73
Future Volume (vph)	32	2	295	0	2	0	620	451	2	1	567	73
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.96	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1763	1568		1900		1752	1843		1736	1827	1553
Flt Permitted		0.97	1.00		1.00		0.18	1.00		0.48	1.00	1.00
Satd. Flow (perm)		1782	1568		1900		327	1843		879	1827	1553
Peak-hour factor, PHF	0.78	0.78	0.78	0.50	0.50	0.50	0.96	0.96	0.96	0.85	0.85	0.85
Adj. Flow (vph)	41	3	378	0	4	0	646	470	2	1	667	86
RTOR Reduction (vph)	0	0	91	0	0	0	0	0	0	0	0	46
Lane Group Flow (vph)	0	44	287	0	4	0	646	472	0	1	667	40
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Turn Type	Perm	NA	pm+ov		NA	pm+ov	D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6			2		6
Actuated Green, G (s)		4.0	39.7		4.0		84.3	83.5		84.3	48.6	48.6
Effective Green, g (s)		4.0	39.7		4.0		84.3	83.5		84.3	48.6	48.6
Actuated g/C Ratio		0.04	0.38		0.04		0.80	0.79		0.80	0.46	0.46
Clearance Time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		67	588		71		741	1454		706	839	713
v/s Ratio Prot			0.16		0.00		c0.29	0.26		0.00	0.37	
v/s Ratio Perm		c0.02	0.02				c0.40			0.00		0.03
v/c Ratio		0.66	0.49		0.06		0.87	0.32		0.00	0.79	0.06
Uniform Delay, d1		50.2	25.3		49.1		21.5	3.2		2.2	24.4	15.9
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		20.8	0.6		0.3		11.0	0.1		0.0	5.2	0.0
Delay (s)		71.1	25.9		49.4		32.5	3.3		2.2	29.6	15.9
Level of Service		E	C		D		C	A		A	C	B
Approach Delay (s)		30.6			49.4		20.2			28.0		
Approach LOS		C			D		C			C		
Intersection Summary												
HCM 2000 Control Delay			24.7				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			105.8				Sum of lost time (s)			17.5		
Intersection Capacity Utilization			87.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: Routes 5/10 & Route 116/FD Driveway

2029 No-Build Conditions
Saturday Midday Peak Hour

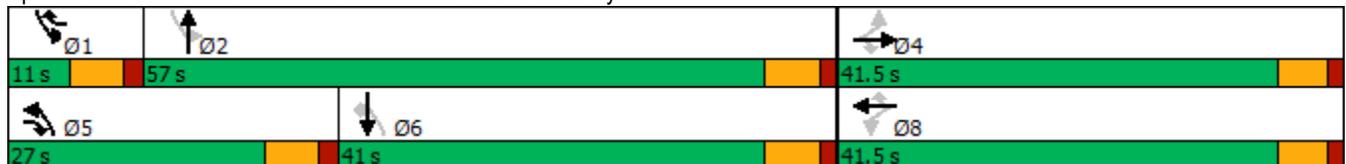


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↗	↗	↕	↗
Traffic Volume (vph)	30	0	329	4	4	411	311	1	301	41
Future Volume (vph)	30	0	329	4	4	411	311	1	301	41
Lane Group Flow (vph)	0	34	370	0	16	478	362	1	350	48
Turn Type	Perm	NA	pm+ov	Perm	NA	D.P+P	NA	D.P+P	NA	Perm
Protected Phases		4	5		8	5	2	1	6	
Permitted Phases	4		4	8		6		2		6
Detector Phase	4	4	5	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	10.0	7.0	7.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	23.5	23.5	16.0	23.5	23.5	16.0	36.0	11.0	24.0	24.0
Total Split (s)	41.5	41.5	27.0	41.5	41.5	27.0	57.0	11.0	41.0	41.0
Total Split (%)	37.9%	37.9%	24.7%	37.9%	37.9%	24.7%	52.1%	10.0%	37.4%	37.4%
Yellow Time (s)	4.0	4.0	4.5	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	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
Total Lost Time (s)		5.5	6.0		5.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lead			Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min	Min
v/c Ratio		0.11	0.47		0.05	0.56	0.23	0.00	0.56	0.08
Control Delay		25.5	5.6		25.5	6.3	4.4	3.0	19.4	0.2
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		25.5	5.6		25.5	6.3	4.4	3.0	19.4	0.2
Queue Length 50th (ft)		8	18		4	0	0	0	65	0
Queue Length 95th (ft)		38	69		13	104	125	1	195	0
Internal Link Dist (ft)		1893			53		1120		898	
Turn Bay Length (ft)			100			150		270		270
Base Capacity (vph)		1453	1003		1468	1091	1673	844	1393	1218
Starvation Cap Reductn		0	0		0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0
Reduced v/c Ratio		0.02	0.37		0.01	0.44	0.22	0.00	0.25	0.04

Intersection Summary

Cycle Length: 109.5
 Actuated Cycle Length: 49.7
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Routes 5/10 & Route 116/FD Driveway



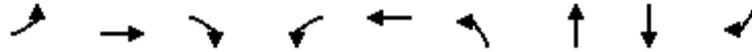
HCM Signalized Intersection Capacity Analysis
4: Routes 5/10 & Route 116/FD Driveway

2029 No-Build Conditions
Saturday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	0	329	4	4	0	411	311	0	1	301	41
Future Volume (vph)	30	0	329	4	4	0	411	311	0	1	301	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1787	1599		1854		1770	1863		1736	1827	1553
Flt Permitted		1.00	1.00		1.00		0.49	1.00		0.55	1.00	1.00
Satd. Flow (perm)		1881	1599		1900		913	1863		996	1827	1553
Peak-hour factor, PHF	0.89	0.89	0.89	0.50	0.50	0.50	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	34	0	370	8	8	0	478	362	0	1	350	48
RTOR Reduction (vph)	0	0	182	0	0	0	0	0	0	0	0	29
Lane Group Flow (vph)	0	34	188	0	16	0	478	362	0	1	350	19
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6			2		6
Actuated Green, G (s)		2.6	17.8		2.6		38.0	37.3		38.0	22.8	22.8
Effective Green, g (s)		2.6	17.8		2.6		38.0	37.3		38.0	22.8	22.8
Actuated g/C Ratio		0.04	0.31		0.04		0.65	0.64		0.65	0.39	0.39
Clearance Time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		84	489		85		821	1196		660	716	609
v/s Ratio Prot			0.10				c0.15	0.19		0.00	0.19	
v/s Ratio Perm		c0.02	0.02		0.01		c0.23			0.00		0.01
v/c Ratio		0.40	0.39		0.19		0.58	0.30		0.00	0.49	0.03
Uniform Delay, d1		27.0	15.8		26.7		4.9	4.6		3.5	13.3	10.9
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		3.2	0.5		1.1		1.1	0.1		0.0	0.5	0.0
Delay (s)		30.2	16.4		27.8		5.9	4.8		3.5	13.8	10.9
Level of Service		C	B		C		A	A		A	B	B
Approach Delay (s)		17.5			27.8			5.4			13.4	
Approach LOS		B			C			A			B	
Intersection Summary												
HCM 2000 Control Delay			10.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			58.1				Sum of lost time (s)			17.5		
Intersection Capacity Utilization			61.5%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: Routes 5/10 & Route 116/FD Driveway

2029 Build Condition
Weekday Morning Peak Hour

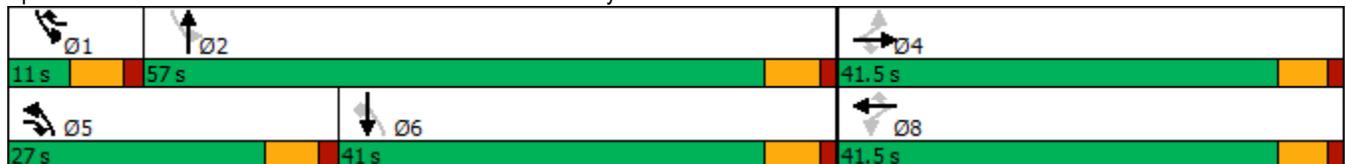


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT	SBR	Ø1
Lane Configurations		↕	↗		↕	↗	↗	↕	↗	
Traffic Volume (vph)	82	2	497	2	2	344	561	422	28	
Future Volume (vph)	82	2	497	2	2	344	561	422	28	
Lane Group Flow (vph)	0	90	534	0	12	395	645	508	34	
Turn Type	Perm	NA	pm+ov	Perm	NA	D.P+P	NA	NA	Perm	
Protected Phases		4	5		8	5	2	6		1
Permitted Phases	4		4	8		6			6	
Detector Phase	4	4	5	8	8	5	2	6	6	
Switch Phase										
Minimum Initial (s)	7.0	7.0	10.0	7.0	7.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	23.5	23.5	16.0	23.5	23.5	16.0	36.0	24.0	24.0	11.0
Total Split (s)	41.5	41.5	27.0	41.5	41.5	27.0	57.0	41.0	41.0	11.0
Total Split (%)	37.9%	37.9%	24.7%	37.9%	37.9%	24.7%	52.1%	37.4%	37.4%	10%
Yellow Time (s)	4.0	4.0	4.5	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	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	
Total Lost Time (s)		5.5	6.0		5.5	6.0	6.0	6.0	6.0	
Lead/Lag			Lead			Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	Min	None
v/c Ratio		0.47	0.72		0.07	0.61	0.47	0.75	0.05	
Control Delay		42.0	19.3		32.2	12.0	6.4	29.4	0.1	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		42.0	19.3		32.2	12.0	6.4	29.4	0.1	
Queue Length 50th (ft)		44	160		6	59	116	219	0	
Queue Length 95th (ft)		91	282		8	151	212	326	0	
Internal Link Dist (ft)		1893			53		1120	1140		
Turn Bay Length (ft)			100			150			270	
Base Capacity (vph)		661	786		631	690	1362	826	776	
Starvation Cap Reductn		0	0		0	0	0	0	0	
Spillback Cap Reductn		0	0		0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	
Reduced v/c Ratio		0.14	0.68		0.02	0.57	0.47	0.62	0.04	

Intersection Summary

Cycle Length: 109.5
 Actuated Cycle Length: 76.2
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Routes 5/10 & Route 116/FD Driveway



HCM Signalized Intersection Capacity Analysis

4: Routes 5/10 & Route 116/FD Driveway

2029 Build Condition
Weekday Morning Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	2	497	2	2	0	344	561	0	0	422	28
Future Volume (vph)	82	2	497	2	2	0	344	561	0	0	422	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.0		5.5		6.0	6.0			6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		1.00		1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1742	1553		1483		1671	1759			1696	1442
Flt Permitted		0.72	1.00		0.83		0.29	1.00			1.00	1.00
Satd. Flow (perm)		1320	1553		1260		507	1759			1696	1442
Peak-hour factor, PHF	0.93	0.93	0.93	0.33	0.33	0.33	0.87	0.87	0.87	0.83	0.83	0.83
Adj. Flow (vph)	88	2	534	6	6	0	395	645	0	0	508	34
RTOR Reduction (vph)	0	0	84	0	0	0	0	0	0	0	0	20
Lane Group Flow (vph)	0	90	450	0	12	0	395	645	0	0	508	14
Heavy Vehicles (%)	4%	4%	4%	25%	25%	25%	8%	8%	8%	12%	12%	12%
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6			2		6
Actuated Green, G (s)		8.8	28.9		8.8		51.1	57.1			31.0	31.0
Effective Green, g (s)		8.8	28.9		8.8		51.1	57.1			31.0	31.0
Actuated g/C Ratio		0.11	0.37		0.11		0.66	0.74			0.40	0.40
Clearance Time (s)		5.5	6.0		5.5		6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		150	579		143		637	1297			679	577
v/s Ratio Prot			c0.20				0.16	0.37			c0.30	
v/s Ratio Perm		0.07	0.09		0.01		0.25					0.01
v/c Ratio		0.60	0.78		0.08		0.62	0.50			0.75	0.02
Uniform Delay, d1		32.6	21.4		30.7		7.7	4.2			19.9	14.0
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		6.3	6.5		0.3		1.9	0.3			4.5	0.0
Delay (s)		39.0	27.9		30.9		9.6	4.5			24.4	14.1
Level of Service		D	C		C		A	A			C	B
Approach Delay (s)		29.5			30.9			6.4			23.7	
Approach LOS		C			C			A			C	
Intersection Summary												
HCM 2000 Control Delay			17.3				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			77.4				Sum of lost time (s)			17.5		
Intersection Capacity Utilization			73.4%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
6: Routes 5/10 & Site Drive

2029 Build Condition
Weekday Morning Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	15	23	620	435	10
Future Volume (Veh/h)	7	15	23	620	435	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	16	25	674	473	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	1220					
pX, platoon unblocked	0.89					
vC, conflicting volume	1202	478	484			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1166	478	484			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	97	98			
cM capacity (veh/h)	186	587	1079			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	24	699	484			
Volume Left	8	25	0			
Volume Right	16	0	11			
cSH	342	1079	1700			
Volume to Capacity	0.07	0.02	0.28			
Queue Length 95th (ft)	6	2	0			
Control Delay (s)	16.3	0.6	0.0			
Lane LOS	C	A				
Approach Delay (s)	16.3	0.6	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay	0.7					
Intersection Capacity Utilization	61.2%			ICU Level of Service	B	
Analysis Period (min)	15					

Queues
4: Routes 5/10 & Route 116/FD Driveway

2029 Build Conditions
Weekday Evening Peak Hour

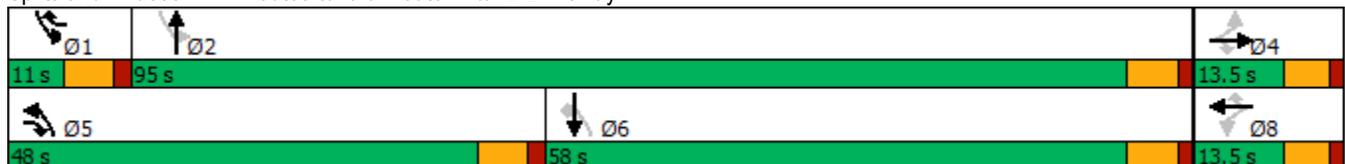


Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations		↖	↗	↖	↗	↗	↖	↖	↗
Traffic Volume (vph)	45	2	295	2	620	484	1	607	89
Future Volume (vph)	45	2	295	2	620	484	1	607	89
Lane Group Flow (vph)	0	61	378	4	646	506	1	714	105
Turn Type	Perm	NA	pm+ov	NA	D.P+P	NA	D.P+P	NA	Perm
Protected Phases		4	5	8	5	2	1	6	
Permitted Phases	4		4		6		2		6
Detector Phase	4	4	5	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	10.0	7.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	12.5	12.5	16.0	12.5	16.0	36.0	11.0	24.0	24.0
Total Split (s)	13.5	13.5	48.0	13.5	48.0	95.0	11.0	58.0	58.0
Total Split (%)	11.3%	11.3%	40.2%	11.3%	40.2%	79.5%	9.2%	48.5%	48.5%
Yellow Time (s)	4.0	4.0	4.5	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	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
Total Lost Time (s)		5.5	6.0	5.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lead		Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	Min
v/c Ratio		0.60	0.49	0.03	0.89	0.32	0.00	0.90	0.14
Control Delay		78.1	16.2	52.5	40.2	3.5	2.0	45.9	2.3
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		78.1	16.2	52.5	40.2	3.5	2.0	45.9	2.3
Queue Length 50th (ft)		47	128	3	368	66	0	501	0
Queue Length 95th (ft)		#93	163	8	#598	166	1	#665	16
Internal Link Dist (ft)		1893		53		1120		1140	
Turn Bay Length (ft)			100		150		270		270
Base Capacity (vph)		107	857	150	825	1566	748	941	864
Starvation Cap Reductn		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.57	0.44	0.03	0.78	0.32	0.00	0.76	0.12

Intersection Summary

Cycle Length: 119.5
 Actuated Cycle Length: 107.4
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 4: Routes 5/10 & Route 116/FD Driveway



HCM Signalized Intersection Capacity Analysis

4: Routes 5/10 & Route 116/FD Driveway

2029 Build Conditions
Weekday Evening Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↗	↗		↗	↕	↗
Traffic Volume (vph)	45	2	295	0	2	0	620	484	2	1	607	89
Future Volume (vph)	45	2	295	0	2	0	620	484	2	1	607	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1761	1568		1900		1752	1844		1736	1827	1553
Flt Permitted		0.73	1.00		1.00		0.13	1.00		0.46	1.00	1.00
Satd. Flow (perm)		1354	1568		1900		244	1844		839	1827	1553
Peak-hour factor, PHF	0.78	0.78	0.78	0.50	0.50	0.50	0.96	0.96	0.96	0.85	0.85	0.85
Adj. Flow (vph)	58	3	378	0	4	0	646	504	2	1	714	105
RTOR Reduction (vph)	0	0	76	0	0	0	0	0	0	0	0	57
Lane Group Flow (vph)	0	61	302	0	4	0	646	506	0	1	714	48
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Turn Type	Perm	NA	pm+ov		NA	pm+ov	D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6			2		6
Actuated Green, G (s)		5.8	44.0		5.8		90.1	89.2		90.1	51.9	51.9
Effective Green, g (s)		5.8	44.0		5.8		90.1	89.2		90.1	51.9	51.9
Actuated g/C Ratio		0.05	0.39		0.05		0.79	0.79		0.79	0.46	0.46
Clearance Time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		69	608		97		701	1450		673	836	710
v/s Ratio Prot			0.17		0.00		c0.31	0.27		0.00	0.39	
v/s Ratio Perm		c0.05	0.03				c0.42			0.00		0.03
v/c Ratio		0.88	0.50		0.04		0.92	0.35		0.00	0.85	0.07
Uniform Delay, d1		53.5	26.3		51.2		27.3	3.6		2.4	27.4	17.2
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		69.1	0.6		0.2		17.6	0.1		0.0	8.5	0.0
Delay (s)		122.6	26.9		51.3		44.9	3.7		2.4	35.9	17.3
Level of Service		F	C		D		D	A		A	D	B
Approach Delay (s)		40.2			51.3			26.8			33.4	
Approach LOS		D			D			C			C	

Intersection Summary

HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	113.4	Sum of lost time (s)	17.5
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
7: Routes 5/10 & Site Drive

2029 Build Conditions
Weekday Evening Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	56	46	483	641	20
Future Volume (Veh/h)	24	56	46	483	641	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	61	50	525	697	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	1220					
pX, platoon unblocked	0.95					
vC, conflicting volume	1333	708	719			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1324	708	719			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	86	94			
cM capacity (veh/h)	154	435	882			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	87	575	719			
Volume Left	26	50	0			
Volume Right	61	0	22			
cSH	282	882	1700			
Volume to Capacity	0.31	0.06	0.42			
Queue Length 95th (ft)	32	4	0			
Control Delay (s)	23.4	1.5	0.0			
Lane LOS	C	A				
Approach Delay (s)	23.4	1.5	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay	2.1					
Intersection Capacity Utilization	75.0%			ICU Level of Service	D	
Analysis Period (min)	15					

Queues
4: Routes 5/10 & Route 116/FD Driveway

2029 Build Conditions
Saturday Midday Peak Hour

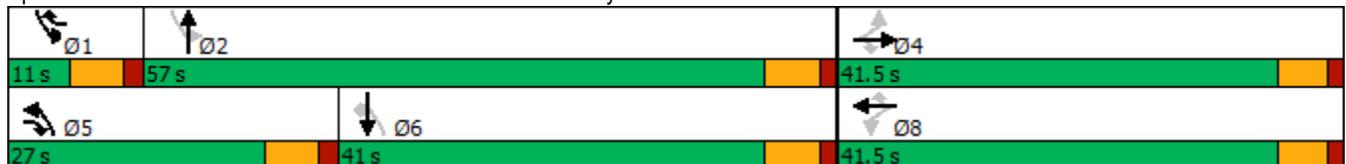


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations		↕	↗		↕	↗	↗	↗	↕	↗
Traffic Volume (vph)	42	0	329	4	4	411	342	1	333	53
Future Volume (vph)	42	0	329	4	4	411	342	1	333	53
Lane Group Flow (vph)	0	47	370	0	16	478	398	1	387	62
Turn Type	Perm	NA	pm+ov	Perm	NA	D.P+P	NA	D.P+P	NA	Perm
Protected Phases		4	5		8	5	2	1	6	
Permitted Phases	4		4	8		6		2		6
Detector Phase	4	4	5	8	8	5	2	1	6	6
Switch Phase										
Minimum Initial (s)	7.0	7.0	10.0	7.0	7.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	23.5	23.5	16.0	23.5	23.5	16.0	36.0	11.0	24.0	24.0
Total Split (s)	41.5	41.5	27.0	41.5	41.5	27.0	57.0	11.0	41.0	41.0
Total Split (%)	37.9%	37.9%	24.7%	37.9%	37.9%	24.7%	52.1%	10.0%	37.4%	37.4%
Yellow Time (s)	4.0	4.0	4.5	4.0	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	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
Total Lost Time (s)		5.5	6.0		5.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lead			Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?			Yes			Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min	Min
v/c Ratio		0.17	0.46		0.06	0.60	0.27	0.00	0.63	0.10
Control Delay		29.0	6.5		28.5	7.9	5.4	3.0	23.3	0.3
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		29.0	6.5		28.5	7.9	5.4	3.0	23.3	0.3
Queue Length 50th (ft)		16	28		5	61	47	0	129	0
Queue Length 95th (ft)		50	93		14	111	143	1	221	0
Internal Link Dist (ft)		1893			53		1120		1140	
Turn Bay Length (ft)			100			150		270		270
Base Capacity (vph)		1204	979		1094	979	1563	782	1261	1116
Starvation Cap Reductn		0	0		0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0	0	0	0	0
Reduced v/c Ratio		0.04	0.38		0.01	0.49	0.25	0.00	0.31	0.06

Intersection Summary

Cycle Length: 109.5
 Actuated Cycle Length: 56.1
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated

Splits and Phases: 4: Routes 5/10 & Route 116/FD Driveway



HCM Signalized Intersection Capacity Analysis
4: Routes 5/10 & Route 116/FD Driveway

2029 Build Conditions
Saturday Midday Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	0	329	4	4	0	411	342	0	1	333	53
Future Volume (vph)	42	0	329	4	4	0	411	342	0	1	333	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1787	1599		1854		1770	1863		1736	1827	1553
Flt Permitted		0.91	1.00		0.82		0.43	1.00		0.52	1.00	1.00
Satd. Flow (perm)		1710	1599		1553		809	1863		954	1827	1553
Peak-hour factor, PHF	0.89	0.89	0.89	0.50	0.50	0.50	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	47	0	370	8	8	0	478	398	0	1	387	62
RTOR Reduction (vph)	0	0	149	0	0	0	0	0	0	0	0	38
Lane Group Flow (vph)	0	47	221	0	16	0	478	398	0	1	387	24
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	4%	4%	4%
Turn Type	Perm	NA	pm+ov	Perm	NA	pm+ov	D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6			2		6
Actuated Green, G (s)		4.4	21.1		4.4		41.4	40.7		41.4	24.7	24.7
Effective Green, g (s)		4.4	21.1		4.4		41.4	40.7		41.4	24.7	24.7
Actuated g/C Ratio		0.07	0.33		0.07		0.65	0.64		0.65	0.39	0.39
Clearance Time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		118	533		107		782	1197		632	712	605
v/s Ratio Prot			c0.11				c0.16	0.21		0.00	0.21	
v/s Ratio Perm		0.03	0.03		0.01		c0.24			0.00		0.02
v/c Ratio		0.40	0.41		0.15		0.61	0.33		0.00	0.54	0.04
Uniform Delay, d1		28.2	16.3		27.7		5.5	5.1		3.8	14.9	12.0
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		2.2	0.5		0.6		1.4	0.2		0.0	0.9	0.0
Delay (s)		30.4	16.8		28.3		6.9	5.3		3.8	15.8	12.0
Level of Service		C	B		C		A	A		A	B	B
Approach Delay (s)		18.4			28.3		6.2				15.2	
Approach LOS		B			C		A				B	
Intersection Summary												
HCM 2000 Control Delay			11.6				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			63.3				Sum of lost time (s)			17.5		
Intersection Capacity Utilization			63.9%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
7: Routes 5/10 & Site Drive

2029 Build Conditions
Saturday Midday Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	44	43	341	343	19
Future Volume (Veh/h)	19	44	43	341	343	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	48	47	371	373	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	1220					
pX, platoon unblocked						
vC, conflicting volume	848	384	394			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	848	384	394			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	93	96			
cM capacity (veh/h)	318	664	1165			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	69	418	394			
Volume Left	21	47	0			
Volume Right	48	0	21			
cSH	499	1165	1700			
Volume to Capacity	0.14	0.04	0.23			
Queue Length 95th (ft)	12	3	0			
Control Delay (s)	13.4	1.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.4	1.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay	1.7					
Intersection Capacity Utilization	53.3%			ICU Level of Service	A	
Analysis Period (min)	15					

Queues
4: Routes 5/10 & Route 116/FD Driveway

2029 Build Conditions w/ Optimization
Weekday Evening Peak Hour

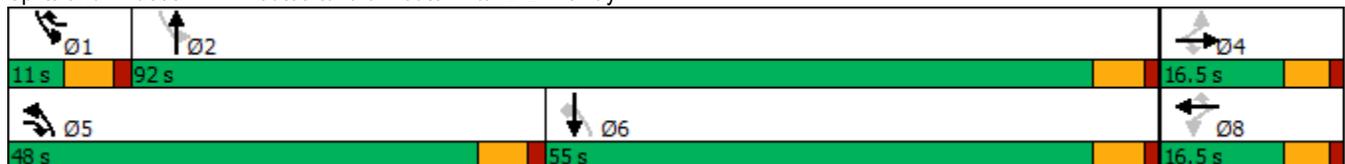


Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations		↖	↗	↖	↗	↗	↖	↖	↗
Traffic Volume (vph)	45	2	295	2	620	484	1	607	89
Future Volume (vph)	45	2	295	2	620	484	1	607	89
Lane Group Flow (vph)	0	61	378	4	646	506	1	714	105
Turn Type	Perm	NA	pm+ov	NA	D.P+P	NA	D.P+P	NA	Perm
Protected Phases		4	5	8	5	2	1	6	
Permitted Phases	4		4		6		2		6
Detector Phase	4	4	5	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	7.0	7.0	10.0	7.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	12.5	12.5	16.0	12.5	16.0	36.0	11.0	24.0	24.0
Total Split (s)	16.5	16.5	48.0	16.5	48.0	92.0	11.0	55.0	55.0
Total Split (%)	13.8%	13.8%	40.2%	13.8%	40.2%	77.0%	9.2%	46.0%	46.0%
Yellow Time (s)	4.0	4.0	4.5	4.0	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	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
Total Lost Time (s)		5.5	6.0	5.5	6.0	6.0	6.0	6.0	6.0
Lead/Lag			Lead		Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	Min
v/c Ratio		0.51	0.48	0.02	0.90	0.33	0.00	0.93	0.14
Control Delay		67.6	16.0	50.0	44.2	4.2	2.0	51.8	2.4
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		67.6	16.0	50.0	44.2	4.2	2.0	51.8	2.4
Queue Length 50th (ft)		45	129	3	394	79	0	523	0
Queue Length 95th (ft)		79	164	8	#634	187	1	#702	17
Internal Link Dist (ft)		1893		53		1120		1140	
Turn Bay Length (ft)			100		150		270		270
Base Capacity (vph)		139	840	196	774	1538	729	841	786
Starvation Cap Reductn		0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.44	0.45	0.02	0.83	0.33	0.00	0.85	0.13

Intersection Summary

Cycle Length: 119.5
 Actuated Cycle Length: 110.1
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 4: Routes 5/10 & Route 116/FD Driveway



HCM Signalized Intersection Capacity Analysis
4: Routes 5/10 & Route 116/FD Driveway

2029 Build Conditions w/ Optimization
Weekday Evening Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	2	295	0	2	0	620	484	2	1	607	89
Future Volume (vph)	45	2	295	0	2	0	620	484	2	1	607	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1761	1568		1900		1752	1844		1736	1827	1553
Flt Permitted		0.73	1.00		1.00		0.11	1.00		0.46	1.00	1.00
Satd. Flow (perm)		1354	1568		1900		209	1844		832	1827	1553
Peak-hour factor, PHF	0.78	0.78	0.78	0.50	0.50	0.50	0.96	0.96	0.96	0.85	0.85	0.85
Adj. Flow (vph)	58	3	378	0	4	0	646	504	2	1	714	105
RTOR Reduction (vph)	0	0	65	0	0	0	0	0	0	0	0	59
Lane Group Flow (vph)	0	61	313	0	4	0	646	506	0	1	714	46
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Turn Type	Perm	NA	pm+ov		NA	pm+ov	D.P+P	NA		D.P+P	NA	Perm
Protected Phases		4	5		8	1	5	2		1	6	
Permitted Phases	4		4	8		8	6			2		6
Actuated Green, G (s)		7.7	47.3		7.7		91.0	90.1		91.0	51.4	51.4
Effective Green, g (s)		7.7	47.3		7.7		91.0	90.1		91.0	51.4	51.4
Actuated g/C Ratio		0.07	0.41		0.07		0.78	0.78		0.78	0.44	0.44
Clearance Time (s)		5.5	6.0		5.5		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		89	638		125		689	1429		658	808	686
v/s Ratio Prot			0.17		0.00		c0.32	0.27		0.00	0.39	
v/s Ratio Perm		c0.05	0.03				c0.41			0.00		0.03
v/c Ratio		0.69	0.49		0.03		0.94	0.35		0.00	0.88	0.07
Uniform Delay, d1		53.1	25.5		50.8		29.6	4.0		2.8	29.7	18.6
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		19.7	0.6		0.1		20.3	0.2		0.0	11.3	0.0
Delay (s)		72.7	26.1		50.9		49.9	4.2		2.8	40.9	18.7
Level of Service		E	C		D		D	A		A	D	B
Approach Delay (s)		32.6			50.9			29.8			38.0	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			33.1				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			116.2				Sum of lost time (s)			17.5		
Intersection Capacity Utilization			90.1%				ICU Level of Service				E	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
7: Routes 5/10 & Site Drive

2029 Build Conditions w/ Optimization
Weekday Evening Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	56	46	483	641	20
Future Volume (Veh/h)	24	56	46	483	641	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	61	50	525	697	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	1220					
pX, platoon unblocked	0.94					
vC, conflicting volume	1333	708	719			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1322	708	719			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	86	94			
cM capacity (veh/h)	153	435	882			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	87	575	719			
Volume Left	26	50	0			
Volume Right	61	0	22			
cSH	280	882	1700			
Volume to Capacity	0.31	0.06	0.42			
Queue Length 95th (ft)	32	4	0			
Control Delay (s)	23.5	1.5	0.0			
Lane LOS	C	A				
Approach Delay (s)	23.5	1.5	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			75.0%	ICU Level of Service	D	
Analysis Period (min)			15			