


# MEMORANDUM

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**FROM:** Mr. Jeffery S. Dirk, P.E., PTOE, FITE   
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*Professional Engineer in CT, MA, ME, NH, RI and VA*

**DATE:** March 3, 2021

**RE:** 8854

**SUBJECT:** Transportation Impact Assessment  
Proposed Marijuana Cultivation Facility and Dispensary – 12 Latti Farm Road  
Millbury, Massachusetts

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Vanasse & Associates, Inc. (VAI) has conducted a Transportation Impact Assessment (TIA) in order to determine the potential impacts on the transportation infrastructure associated with the proposed renovation and expansion of the existing commercial building located at 12 Latti Farm Road in Millbury, Massachusetts, to accommodate a marijuana cultivation facility and dispensary (hereafter referred to as the “Project”). This study evaluates the following specific areas as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; and identifies and analyzes existing traffic conditions and future traffic conditions, both with and without the Project along Latti Farm Road and at the intersection of Southwest Cutoff (Route 20) at Latti Farm Road, which is located within the City of Worcester. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the Institute of Transportation Engineers (ITE)<sup>1</sup> and empirical data obtained from an operating recreational marijuana dispensary located in Central Massachusetts, the Project is expected to generate approximately 1,008 vehicle trips on an average weekday and 1,176 vehicle trips on a Saturday (both two-way volumes over the operational day of the Project), with 64 vehicle trips expected during the weekday morning peak-hour of the roadway, 71 vehicle trips expected during the weekday morning peak-hour of the marijuana dispensary, 124 vehicle trips expected during the weekday evening peak-hour and 152 vehicle trips expected during the Saturday midday peak-hour;
2. In comparison to the trips associated with the former manufacturing use, the Project is expected to generate approximately 562 additional vehicle trips on an average weekday and 594 additional vehicle trips on a Saturday, with 8 additional vehicle trips expected during the weekday morning peak-hour of the roadway, 46 additional vehicle trips expected during the weekday morning

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<sup>1</sup>*Trip Generation*, 10<sup>th</sup> Edition; Institute of Transportation Engineers; Washington, DC; 2017.



peak-hour of the marijuana dispensary, 63 additional vehicle trips expected during the weekday evening peak-hour and 67 additional vehicle trips expected during the Saturday midday peak-hour;

3. The Project will not have a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build conditions), with all movements at the study area intersection shown to operate at a level-of-service (LOS) C or better under all analysis conditions, where an LOS of “D” or better is defined as “acceptable” traffic operations;
4. No apparent safety deficiencies were noted with respect to the motor vehicle crash history in the vicinity of the Project site; and
5. Lines of sight at the Project site driveway intersection with Latti Farm Road were found to exceed the recommended minimum distance for the intersection to operate in a safe manner.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with the implementation of the recommendations defined herein.

The following details our assessment of the Project.

## **PROJECT DESCRIPTION**

The Project will entail the renovation and expansion of the existing commercial building located at 12 Latti Farm Road in Millbury, Massachusetts, to accommodate a 2,150± square foot (sf) marijuana dispensary and a 96,174± sf marijuana cultivation facility. The Project site encompasses approximately 8.4± acres of land that is bounded by Latti Farm Road and a commercial property to the north; Interstate 90 (I-90) (Massachusetts Turnpike) to the south (no access); and commercial properties and areas of open and wooded space to the east and west. The Project site currently contains an 90,600± sf commercial building that will be renovated to accommodate the Project. Access to the Project site will continue to be provided by way of the existing driveway that intersects the south side of Latti Farm Road.



Imagery ©2021 Google

Off-street parking will be provided for a minimum of 88 vehicles, which meets the requirements of Section 33.2, *Schedule of Requirements*, of the Town of Millbury Zoning Bylaw.<sup>2</sup>

## **STUDY METHODOLOGY**

This study was prepared in consultation with the Massachusetts Department of Transportation (MassDOT), the Town of Millbury and the City of Worcester; was performed in accordance with MassDOT's *Transportation Impact Assessment (TIA) Guidelines* and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such reports; and was conducted in three distinct stages.

The first stage involved an assessment of existing conditions in the study area and included an inventory of roadway geometrics; pedestrian and bicycle facilities; on-street parking; public transportation services; observations of traffic flow; and collection of pedestrian, bicycle, and vehicle counts.

In the second stage of the study, future traffic conditions were projected and analyzed. Specific travel demand forecasts for the Project were assessed along with future traffic demands due to expected traffic growth independent of the Project. A seven-year time horizon was selected for analyses consistent with MassDOT guidelines. The analysis conducted in stage two identifies existing or projected future capacity, safety, and access issues, as these areas relate to the transportation infrastructure.

The third stage of the study presents and evaluates measures to address deficiencies in the transportation infrastructure, if any, identified in stage two of the study.

## **EXISTING CONDITIONS**

A comprehensive field inventory of existing conditions within the study area was conducted in January and February 2021. This inventory included the collection of traffic volume data and vehicle travel speed measurements, as well as a review of existing pedestrian and bicycle accommodations, public transportation services, and motor vehicle crash data. The following summarizes existing conditions within the study area.

### **Roadway**

#### ***Latti Farm Road***

Latti Farm Road is a two-lane local access roadway that is under Town jurisdiction and traverses the study area in a general north-south direction for a distance of approximately 2,800-feet south of Route 20 and traverses a circular loop to the north of the Project site. In the vicinity of the Project site, Latti Farm Road provides two 15 to 16-foot wide travel lanes separated by a double-yellow centerline with no marked shoulders provided. The posted speed limit along Latti Farm Road within the study area is 30 miles per hour (mph). Prevailing travel speeds measured in January 2021 were found to be 25 mph.<sup>3</sup> Illumination is

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<sup>2</sup>The Zoning Bylaw requires 1 space per 1¼ employees per shift are required for an industrial use, with 1 space per 200 sf required for a retail use.

<sup>3</sup>The prevailing travel speed is also known as the 85<sup>th</sup> percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below during the observation period.



provided by way of street lights mounted on steel poles. Land use in the vicinity of the Project site consists of commercial properties and areas of open and wooded space.

### **Existing Traffic Volumes**

In order to determine existing traffic-volume demands and flow patterns within the study area, automatic traffic recorder (ATR) counts, manual turning movement counts (TMCs) and vehicle classification counts were completed in January 2021. The ATR counts were conducted on Latti Farm Road in the vicinity of the Project site on January 21<sup>st</sup> through January 23<sup>rd</sup>, 2021 (Thursday through Saturday, inclusive) in order to record weekday traffic conditions over an extended period, with TMCs conducted during the weekday morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak periods on January 21, 2021 (Thursday), and during the Saturday midday (11:00 AM to 2:00 PM) peak period on January 23, 2021 (Saturday). These time periods were selected for analysis purposes as they are representative of the peak traffic-volume hours for both the Project and the adjacent roadway network.

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, traffic volume data from MassDOT Continuous Count Station No. 3178 located on Route 20 in Auburn was reviewed. Based on a review of this data, it was determined that traffic volumes for the month of January are approximately 5.3 percent below average-month conditions. As such, the January traffic volumes were adjusted upward by 5.3 percent in order to be representative of average-month conditions.

In order to account for the impact on traffic volumes and trip patterns resulting from the “safer-at-home” order and the phased “Reopening Massachusetts” plan that was issued by the Governor on May 18, 2020, in response to the COVID-19 pandemic, traffic volume data collected at MassDOT Continuous Count Station No. 3178 in January 2021 was compared to January 2018 traffic volumes that were collected at the same location. The 2018 traffic volumes were expanded to 2021 by applying a background traffic growth rate of 1.5 percent per year in order to allow for a comparison of the data. Based on this pre and post COVID-19 traffic volume comparison, the traffic volume data that was collected as a part of this assessment was adjusted upward by an additional 23.3 percent in order to account for the reduced traffic volumes resulting from the phased “Reopening Massachusetts” plan.

Based on a review of the adjusted (as defined above) traffic count data, Latti Farm Road in the vicinity of the Project site accommodates approximately 2,580 vehicles per day on an average weekday and 1,020 vehicles per day on a Saturday (both two-way, 24-hour volumes), with approximately 252 vph during the weekday morning peak-hour (7:30 – 8:30 AM), 118 vph during the weekday evening peak-hour (4:00 – 5:00 PM) and 111 vph during the Saturday midday peak-hour (12:00 – 1:00 PM). The 2021 Existing weekday morning, weekday evening and Saturday midday peak hour traffic volumes are graphically depicted on Figure 1.

### **Pedestrian and Bicycle Facilities**

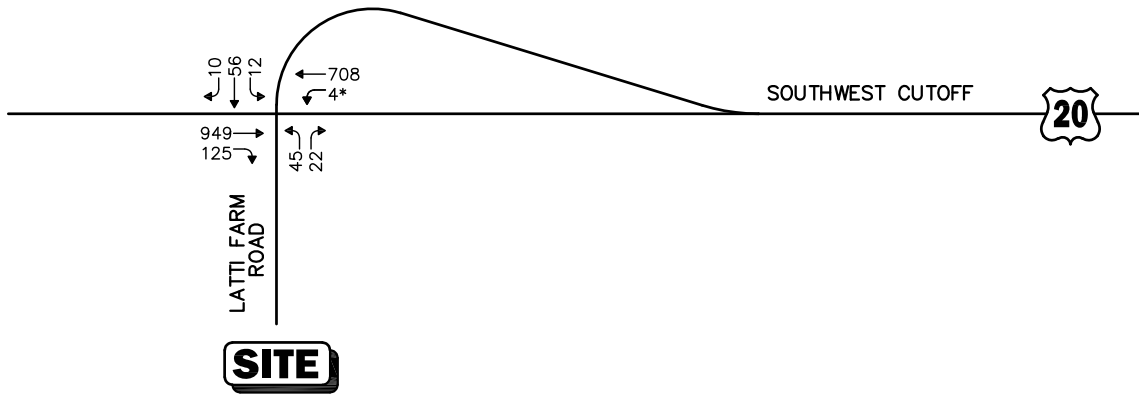
Sidewalks and formal bicycle facilities are not currently provided along Latti Farm Road; however, Latti Farm Road provides sufficient width to accommodate bicycle travel in a shared traveled-way configuration (i.e., bicyclists and motor vehicles sharing the traveled-way).<sup>4</sup> That being said, Route 20 does not provide sufficient width on a continuous basis to accommodate bicycle travel in a shared traveled-way condition and, as such, bicycle access is not afforded to Latti Farm Road.

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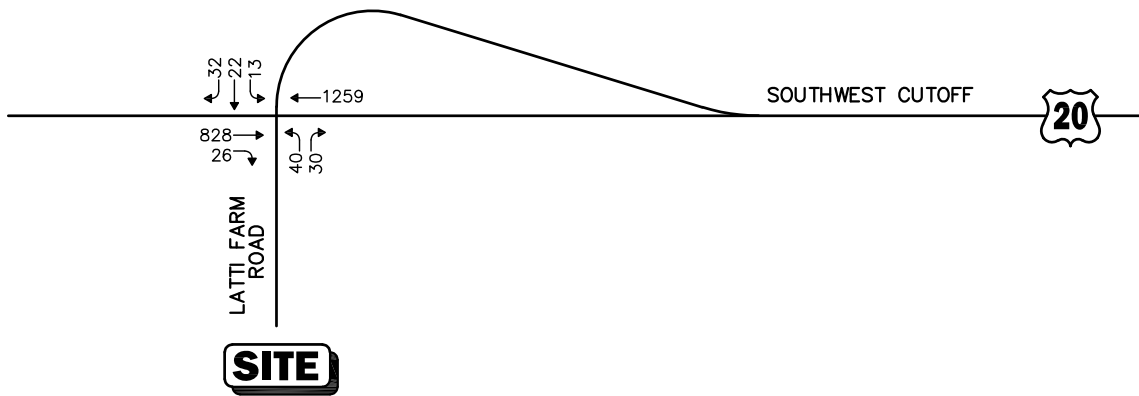
<sup>4</sup>A minimum combined travel lane and paved shoulder width of 14-feet is required to support bicycle travel in a shared traveled-way condition.



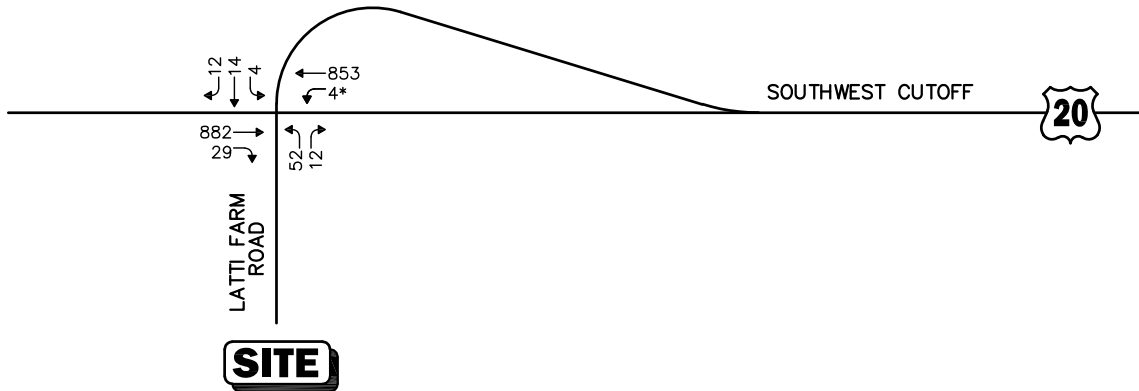
WEEKDAY MORNING PEAK HOUR (7:30-8:30 AM)



WEEKDAY EVENING PEAK HOUR (4:00-5:00 PM)



SATURDAY MIDDAY PEAK HOUR (12:00-1:00 PM)



 \*Illegal movement.  
Not To Scale



Figure 1

2021 Existing Peak Hour Traffic Volumes

## **Public Transportation Services**

Regularly scheduled public transportation services are not provided within the study area. The Worcester Regional Transit Authority (WRTA) provides complementary paratransit services (Dial-a-Ride) for eligible persons who reside in Millbury and cannot use fixed-route transit all or some of the time due to a physical, cognitive or mental disability in compliance with the Americans with Disabilities Act (ADA).

## **Motor Vehicle Crash Data**

Motor vehicle crash information for the study area intersection was provided by the MassDOT Highway Division Safety Management/Traffic Operations Unit for the most recent five-year period available (2014 through 2018, inclusive) in order to examine motor vehicle crash trends occurring within the study area. The data is summarized by intersection, type, severity, roadway and weather conditions, and day of occurrence, and presented in Table 1.

As can be seen in Table 1, The Route 20/Latti Farm Road intersection was found to have experienced a total of 14 reported motor vehicle crashes over the five-year review period, or an average of 2.8 crashes per year, the majority of which occurred on a weekday; under clear weather conditions; during daylight; and were classified as rear-end type collisions that resulted in personal injury. The intersection was found to have a motor vehicle crash rate that was below the MassDOT Statewide and District 3 average crash rates for an signalized intersection. In addition, a review of the MassDOT statewide High Crash Location List indicated that there were no locations along Latti Farm Road or within the study area that were included on MassDOT's Highway Safety Improvement Program (HSIP) listing as a high crash location.

***Based on a review of the MassDOT motor vehicle crash data, no discernible safety deficiencies were apparent in the vicinity of the Project site.***



**Table 1**  
**MOTOR VEHICLE CRASH DATA SUMMARY<sup>a</sup>**

	Rte. 20/ Latti Farm Rd.
Traffic Control Type: <sup>b</sup>	TS
<i>Year:</i>	
2014	3
2015	5
2016	3
2017	1
<u>2018</u>	<u>2</u>
Total	14
Average Rate <sup>c</sup>	2.80
MassDOT Crash Rate: <sup>d</sup>	0.57/0.61
Significant? <sup>e</sup>	No
<i>Type:</i>	
Angle	4
Rear-End	6
Head-On	1
Sideswipe	3
Fixed Object	0
Pedestrian/Bicycle	0
<u>Unknown/Other</u>	<u>0</u>
Total	14
<i>Conditions:</i>	
Clear	10
Cloudy	2
Rain	1
<u>Snow/Ice</u>	<u>1</u>
Total	14
<i>Lighting:</i>	
Daylight	12
Dawn/Dusk	0
Dark (Road Lit)	2
<u>Dark (Road Unlit)</u>	<u>0</u>
Total	14
<i>Day of Week:</i>	
Monday through Friday	12
Saturday	1
<u>Sunday</u>	<u>1</u>
Total	14
<i>Severity:</i>	
Property Damage Only	3
Personal Injury	6
Fatality	0
<u>Not Reported</u>	<u>5</u>
Total	14

<sup>a</sup>Source: MassDOT Safety Management/Traffic Operations Unit records, 2014 through 2018.

<sup>b</sup>Traffic Control Type: TS = traffic signal.

<sup>c</sup>Crash rate per million vehicles entering the intersection.

<sup>d</sup>Statewide/District crash rate.

<sup>e</sup>The intersection crash rate is significant if it is found to exceed the MassDOT crash rate for the MassDOT Highway Division District in which the Project is located (District 3).



## **FUTURE CONDITIONS**

Traffic volumes in the study area were projected to the year 2028, which reflects a seven-year planning horizon consistent with MassDOT guidelines. Independent of the Project, traffic volumes on the roadway network in the year 2028 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon the 2028 No-Build traffic volumes reflect 2028 Build traffic volume conditions with the Project.

### **Future Traffic Growth**

Future traffic growth is a function of the expected land development in the immediate area and the surrounding region. Several methods can be used to estimate this growth. A procedure frequently employed estimates an annual percentage increase in traffic growth and applies that percentage to all traffic volumes under study. The drawback to such a procedure is that some turning volumes may actually grow at either a higher or a lower rate at particular intersections.

An alternative procedure identifies the location and type of planned development, estimates the traffic to be generated, and assigns it to the area roadway network. This procedure produces a more realistic estimate of growth for local traffic; however, potential population growth and development external to the study area would not be accounted for in the resulting traffic projections.

To provide a conservative analysis framework, both procedures were used, the salient components of which are described below.

### **Specific Development by Others**

The City of Worcester Planning & Regulatory Services Division was consulted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes at the study intersection. Based on this consultation, the following projects were identified for inclusion in this assessment:

- ***Proposed Self-Storage Facility, 210 Southwest Cutoff, Worcester, Massachusetts.*** This project entails the construction of a 177,000± sf self-storage facility to be located at 210 Southwest Cutoff and east of the Project site.
- ***Proposed Marijuana Dispensary, 141 Southwest Cutoff, Worcester, Massachusetts.*** This project entails the construction of a 4,000± sf recreational marijuana dispensary to be located at 141 Southwest Cutoff and east of the Project site.

Traffic volumes associated with the aforementioned specific development projects by others were obtained using trip-generation information available from the ITE<sup>5</sup> for the appropriate land use, and were assigned onto the study area roadway network based on existing traffic patterns where no other information was available. No other developments were identified at this time that are expected to result in an increase in traffic within the study area beyond the general background traffic growth rate.

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<sup>5</sup>Ibid 1.





## **General Background Traffic Growth**

Traffic-volume data compiled by MassDOT from permanent count stations located in the area were reviewed in order to determine general traffic growth trends in the area. This data indicates that traffic volumes have fluctuated between decreases of 0.8 percent and increases of 2.8 percent, with the average growth rate found to be approximately 1.4 percent. In order to provide a prudent planning condition for the Project, a slightly higher 1.5 percent per year compounded annual background traffic growth rate was used in order to account for future traffic growth and presently unforeseen development within the study area.

## **Roadway Improvement Projects**

The City of Worcester and MassDOT were contacted in order to determine if there were any planned future roadway improvement projects expected to be complete by 2028 within the study area. Based on these discussions, no roadway improvement projects aside from routine maintenance activities were identified to be planned within the study area at this time.

## **No-Build Traffic Volumes**

The 2028 No-Build condition peak-hour traffic-volumes were developed by applying the 1.5 percent per year compounded annual background traffic growth rate to the 2021 Existing peak-hour traffic volumes. The resulting 2028 No-Build weekday morning, weekday evening and Saturday midday peak-hour traffic volumes are shown on Figure 2.

## **Project-Generated Traffic**

Design year (2028 Build) traffic volumes for the study area roadways were determined by estimating Project-generated traffic volumes and assigning those volumes on the study roadways. The following section describes the methodology used to develop the anticipated traffic characteristics of the Project. As proposed, the Project will entail the renovation and expansion of the existing commercial building located within the Project site to accommodate a 2,150± sf marijuana dispensary and a 96,174± sf marijuana cultivation facility.

In order to develop the traffic characteristics of the marijuana dispensary component of the Project, trip rates that were derived from traffic counts obtained from a similar operating recreational marijuana dispensary located in Millbury, Massachusetts, were used.<sup>6</sup> The data from the Millbury dispensary consisted of manual turning movement counts that were conducted at the dispensary driveway on Saturday, July 25, 2020, from 11:00 AM to 2:00 PM, and on Wednesday, July 29, 2020, from 7:00 AM to 7:00 PM. This data was used to establish trip rates (trips per 1,000 sf) for the weekday and Saturday peak hours of both the adjacent roadway and the dispensary (generator), which were then applied to the Project.

Based on the obtained data, the weekday evening and Saturday midday peak hours occur coincidental with the adjacent roadway peak-hour for the respective time periods; however, the weekday morning peak-hour of the dispensary occurs after the peak-hour of the roadway given that the dispensary does not open until 10:00 AM. The average weekday daily and Saturday data for the dispensary were obtained using ITE Land Use Code (LUC) 882, *Marijuana Dispensary*.<sup>7</sup>

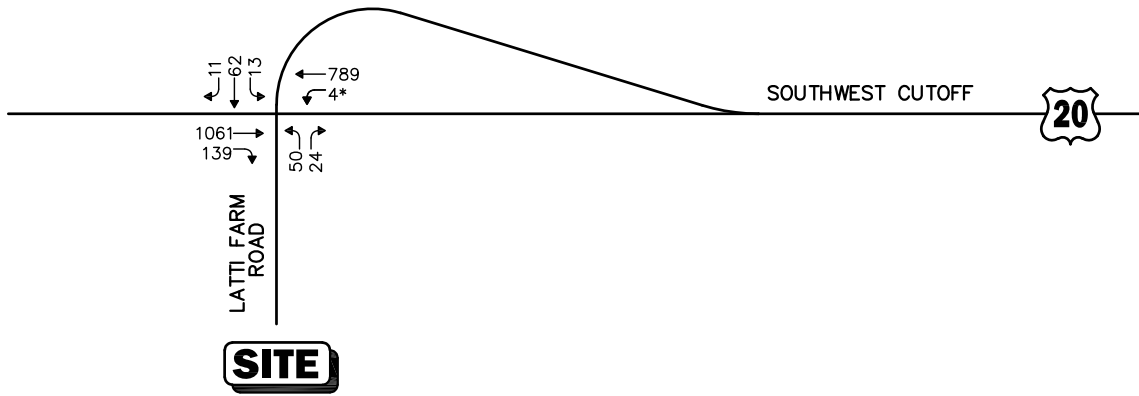
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<sup>6</sup>Natures Remedy, 266 North Main Street, Millbury, Massachusetts.

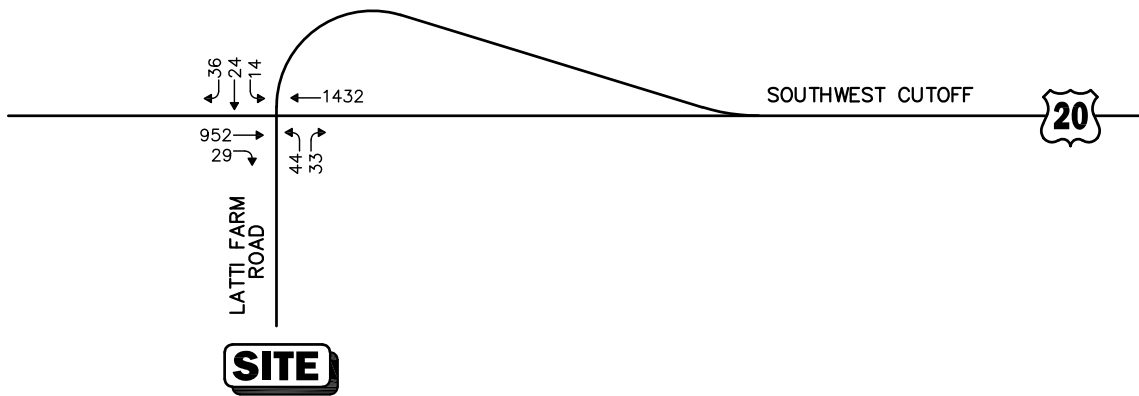
<sup>7</sup>Ibid 1.



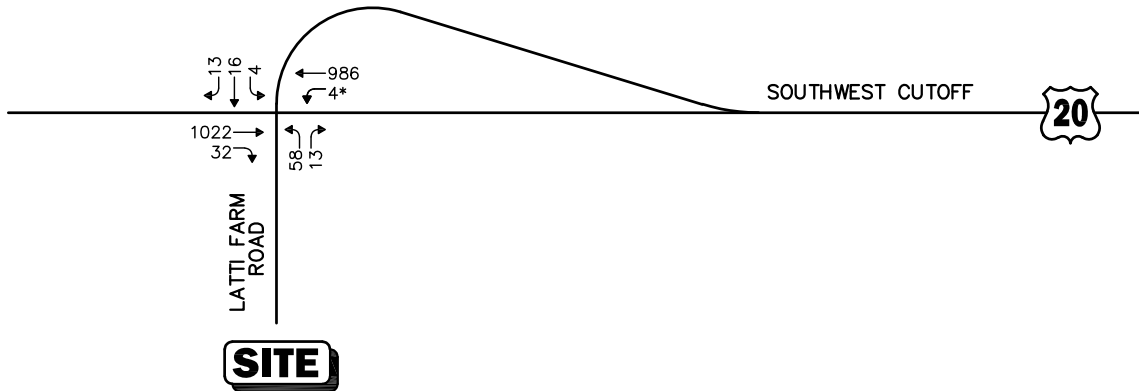
WEEKDAY MORNING PEAK HOUR (7:30-8:30 AM)



WEEKDAY EVENING PEAK HOUR (4:00-5:00 PM)



SATURDAY MIDDAY PEAK HOUR (12:00-1:00 PM)



 \*Illegal movement.  
Not To Scale



Figure 2

2028 No-Build  
Peak Hour Traffic Volumes

In order to develop the traffic characteristics of the marijuana cultivation facility component of the Project, trip-generation statistics published by the ITE for a similar land use as that proposed was used. ITE LUC 140, *Manufacturing*, was used to develop the traffic characteristics for the cultivation facility.

Table 2 summarizes the anticipated traffic characteristics of the Project using the above methodology.

**Table 2**  
**TRIP-GENERATION SUMMARY<sup>a</sup>**

Time Period/Direction	Vehicle Trips		(C=A+B) <b>Total</b>
	(A) Proposed Marijuana Dispensary (2,150 sf) <sup>a</sup>	(B) Proposed Cultivation Facility (96,174 sf) <sup>b</sup>	
<i>Average Weekday Daily:</i>			
Entering	272	232	<b>504</b>
<u>Exiting</u>	<u>272</u>	<u>232</u>	<u><b>504</b></u>
Total	544	464	<b>1,008</b>
<i>Weekday Morning Peak Hour of Roadway:</i>			
Entering	4	46	<b>50</b>
<u>Exiting</u>	<u>0</u>	<u>14</u>	<u><b>14</b></u>
Total	4	60	<b>64</b>
<i>Weekday Morning Peak Hour of Generator:</i>			
Entering	23	13	<b>36</b>
<u>Exiting</u>	<u>22</u>	<u>13</u>	<u><b>35</b></u>
Total	45	26	<b>71</b>
<i>Weekday Evening Peak Hour:</i>			
Entering	29	20	<b>49</b>
<u>Exiting</u>	<u>31</u>	<u>44</u>	<u><b>75</b></u>
Total	60	64	<b>124</b>
<i>Saturday:</i>			
Entering	279	309	<b>588</b>
<u>Exiting</u>	<u>279</u>	<u>309</u>	<u><b>588</b></u>
Total	558	618	<b>1,176</b>
<i>Saturday Midday Peak Hour:</i>			
Entering	30	45	<b>75</b>
<u>Exiting</u>	<u>32</u>	<u>45</u>	<u><b>77</b></u>
Total	62	90	<b>152</b>

<sup>a</sup>Based on ITE LUC 882, *Marijuana Dispensary*, during the average weekday and average Saturday Time Periods; and empirical data obtained from a similar site in Millbury, MA for the weekday morning, evening and Saturday midday peak hours.

<sup>b</sup>Based on ITE LUC 140, *Manufacturing*.



## Project-Generated Traffic Volume Summary

As can be seen in Table 2, the Project is predicted to generate approximately 1,088 vehicle trips on an average weekday and 1,176 vehicle trips on a Saturday (both two-way volumes over the operational day of the Project), with 64 vehicle trips (50 vehicles entering and 14 exiting) expected during the weekday morning peak-hour of the adjacent roadway, 71 vehicle trips (36 vehicles entering and 35 exiting) expected during the weekday morning peak-hour of the marijuana dispensary, 124 vehicle trips (49 vehicles entering and 75 exiting) expected during the weekday evening peak-hour and 152 vehicle trips (75 vehicles entering and 77 exiting) expected during the Saturday midday peak-hour.

As shown in Table 2, traffic volumes during the weekday morning peak-hour of the adjacent roadway and during the weekday morning peak-hour of the marijuana dispensary are similar since the morning peak of the cultivation facility does not occur coincidental with the morning peak of the dispensary. In addition, a review of traffic volume data collected along Latti Farm Road as a part of this assessment indicates that traffic volumes during the weekday morning peak-hour of the dispensary are approximately 60 percent lower than those during the weekday morning peak-hour of the adjacent roadway. As such, the higher overall traffic volumes during the weekday morning peak-hour of the adjacent roadway was used for analysis purposes.

As mentioned previously, the Project site is currently occupied by a 90,600± sf commercial building that was formerly operated as a manufacturing facility. Table 3 compares the traffic volumes of the Project to those of this former use.

**Table 3**  
**TRAFFIC VOLUME COMPARISON**

Time Period/Direction	Vehicle Trips		
	(A) Proposed Marijuana Dispensary and Cultivation Facility <sup>a</sup>	(B) Former Manufacturing Space <sup>b</sup>	(A-B) Difference
<i>Average Weekday Daily:</i>	1,008	446	+562
<i>Weekday Morning Peak Hour of Roadway:</i>	64	56	+8
<i>Weekday Morning Peak Hour of Generator:</i>	71	25	+46
<i>Weekday Evening Peak Hour:</i>	124	61	+63
<i>Saturday:</i>	1,176	582	+594
<i>Saturday Midday Peak Hour:</i>	152	85	+67

<sup>a</sup>See Table 2

<sup>b</sup>Based on ITE LUC 140, *Manufacturing*; 90,600 sf.



As can be seen in Table 3, in comparison to the former use that operated at the Project site, the Project is expected to generate approximately 562 additional vehicle trips on an average weekday and 594 additional vehicle trips on a Saturday (both two-way volumes over the operational day of the Project), with 8 additional vehicle trips expected during the weekday morning peak-hour of the roadway, 46 additional vehicle trips expected during the weekday morning peak-hour of the marijuana dispensary, 63 additional vehicle trips expected during the weekday evening peak-hour and 67 additional vehicle trips expected during the Saturday midday peak-hour.

### **Trip Distribution and Assignment**

The directional distribution of generated trips to and from the Project site was determined based on a review of existing traffic patterns within the study area and then refined based on a review of the regional roadway network. The general trip distribution for the Project is graphically depicted on Figure 3, with the additional traffic that is expected to be generated by the Project assigned on the study area roadway network as shown on Figure 4.

### **Build Traffic Volumes**

The 2028 Build condition traffic volumes consist of the 2028 No-Build traffic volumes with the addition of the traffic expected to be generated by the Project. The 2028 Build weekday morning, evening, and Saturday midday peak-hour traffic volumes are graphically depicted on Figure 5.

## **TRAFFIC OPERATIONS ANALYSIS**

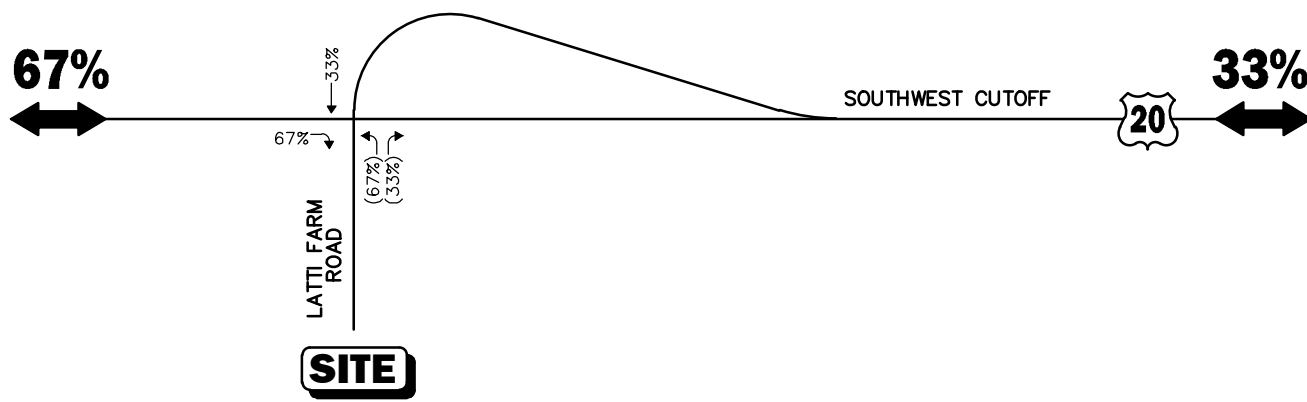
In order to assess the potential impact of the Project on the roadway network, a detailed traffic operations analysis (motorist delays, vehicle queuing, and level-of-service) was performed at the intersection of Route 20 at Latti Farm Road. Operating conditions at the Project site driveway intersection with Latti Farm Road are expected to be unconstrained given the relatively low volume of conflicting traffic along Latti Farm Road. Capacity analyses provide an indication of how well transportation facilities serve the traffic demands placed upon them, with vehicle queue analyses providing a secondary measure of the operational characteristics of an intersection or section of roadway under study.

In brief, six levels of service are defined for each type of facility. They are given letter designations ranging from A to F, with LOS “A” representing the best operating conditions and LOS “F” representing congested or constrained operations. An LOS of “E” is representative of a transportation facility that is operating at its design capacity with an LOS of “D” generally defined as the limit of “acceptable” traffic operations. Since the level-of-service of a traffic facility is a function of the flows placed upon it, such a facility may operate at a wide range of levels of service depending on the time of day, day of week, or period of the year. The Synchro® intersection capacity analysis software, which is based on the analysis methodologies and procedures presented in the 2000 *Highway Capacity Manual* (HCM)<sup>8</sup> for signalized intersections, was used to complete the level-of-service and vehicle queue analyses.

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<sup>8</sup>*Highway Capacity Manual*, Transportation Research Board; Washington, DC; 2000.





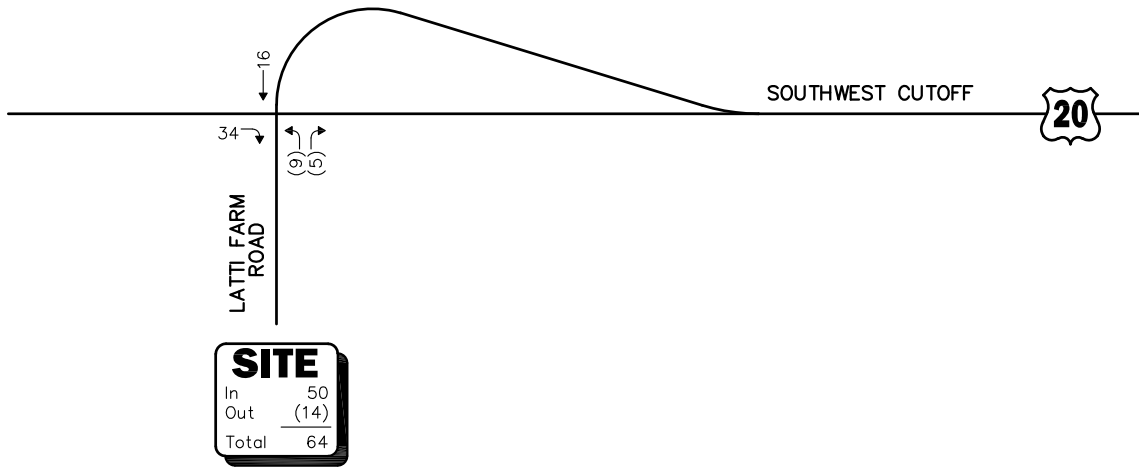
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**Figure 3**  
Trip Distribution Map

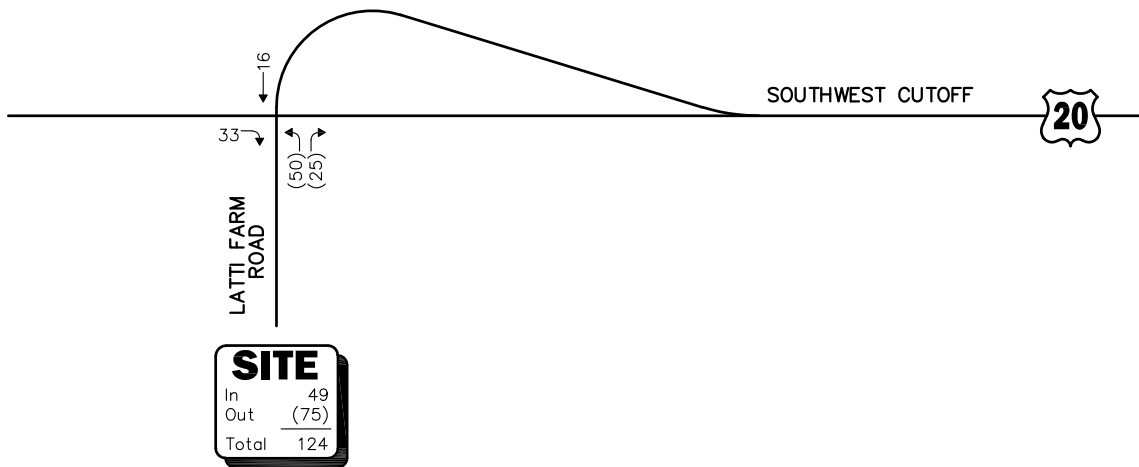


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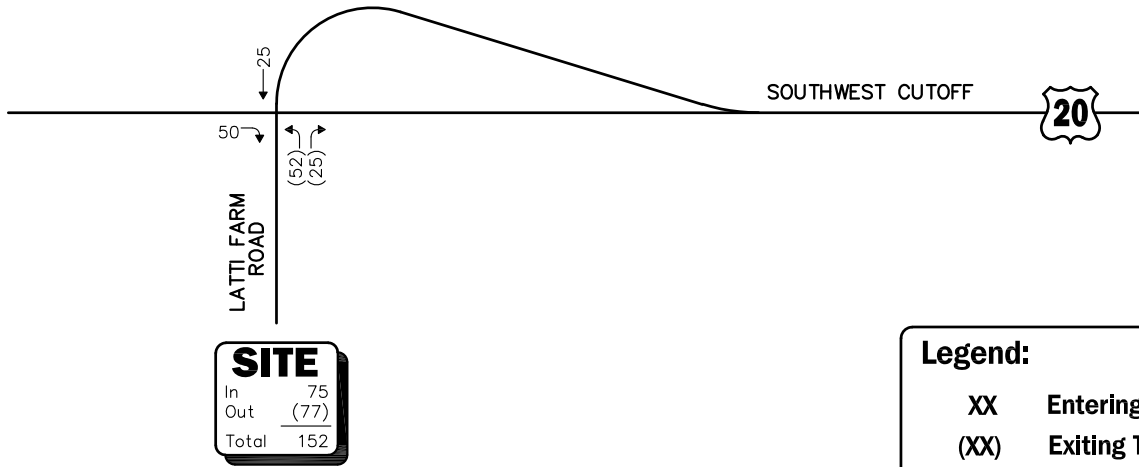
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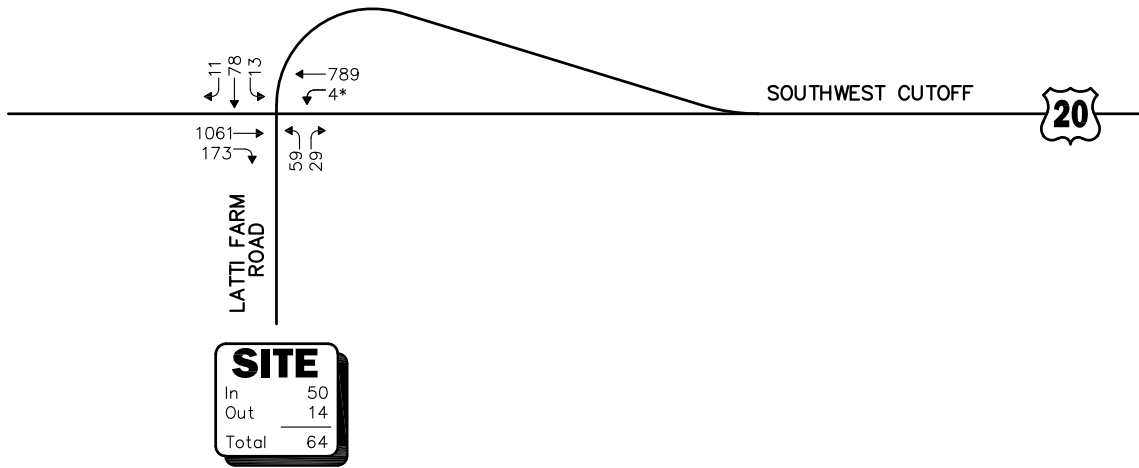
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Figure 4

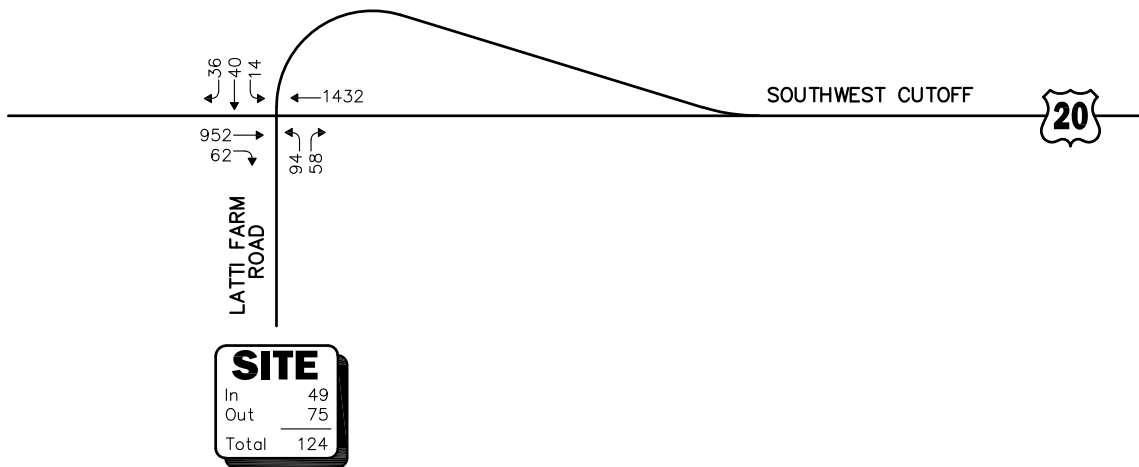


Project-Generated Peak Hour Traffic Volumes

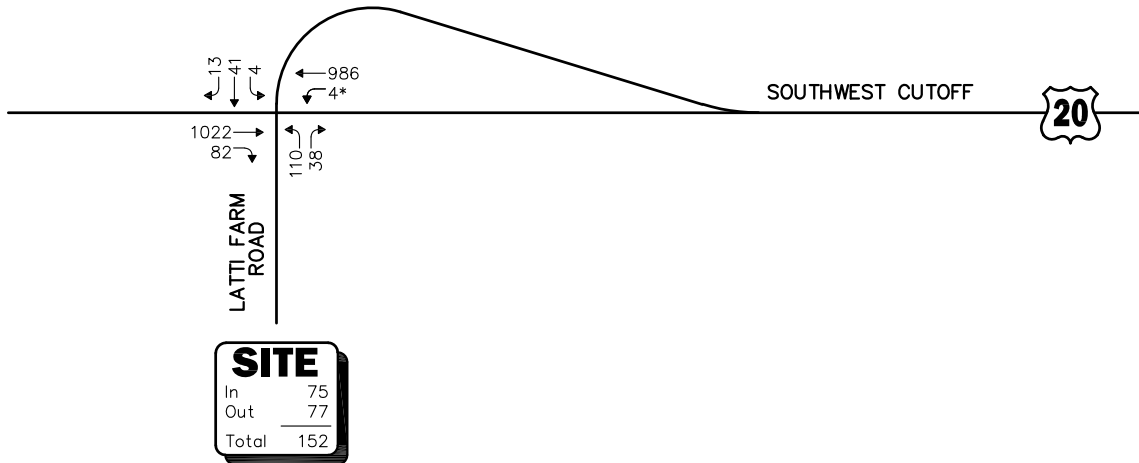
**WEEKDAY MORNING PEAK HOUR (7:30-8:30 AM)**



**WEEKDAY EVENING PEAK HOUR (4:00-5:00 PM)**



**SATURDAY MIDDAY PEAK HOUR (12:00-1:00 PM)**



 \*Illegal movement.  
Not To Scale

**Figure 5**



**Table 4**  
**SIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY**

Signalized Intersection/Peak-hour/Movement	2021 Existing				2028 No-Build				2028 Build			
	V/C <sup>a</sup>	Delay <sup>b</sup>	LOS <sup>c</sup>	Queue <sup>d</sup> 50 <sup>th</sup> /95 <sup>th</sup>	V/C	Delay	LOS	Queue 50 <sup>th</sup> /95 <sup>th</sup>	V/C	Delay	LOS	Queue 50 <sup>th</sup> /95 <sup>th</sup>
<b>Route 20 at Latti Farm Road</b>												
<i>Weekday Morning:</i>												
Route 20 EB TH	0.51	4.4	A	3/6	0.59	6.4	A	4/8	0.59	7.2	A	5/10
Route 20 EB RT	0.10	3.0	A	0/1	0.11	4.0	A	0/1	0.13	4.6	A	0/1
Route 20 WB LT <sup>e</sup> /TH	0.36	3.7	A	2/4	0.42	5.2	A	3/5	0.42	5.8	A	3/6
Latti Farm Road NB LT/RT	0.45	18.6	B	1/2	0.42	20.1	C	2/2	0.52	22.5	C	2/3
Route 20 Jughandle SB LT/TH/RT	0.30	17.5	B	1/3	0.27	18.8	B	1/3	0.29	20.2	C	2/4
<b>Overall</b>	--	<b>5.6</b>	<b>A</b>	--	--	<b>7.2</b>	<b>A</b>	--	--	<b>8.3</b>	<b>A</b>	--
<i>Weekday Evening:</i>												
Route 20 EB TH	0.39	3.3	A	2/4	0.42	3.3	A	3/6	0.47	6.7	A	5/9
Route 20 EB RT	0.02	2.4	A	0/1	0.02	2.2	A	0/1	0.05	4.7	A	0/1
Route 20 WB TH	0.58	4.2	A	4/8	0.63	4.5	A	5/11	0.69	9.2	A	9/17
Latti Farm Road NB LT/RT	0.36	20.3	C	1/2	0.44	25.6	C	1/3	0.65	32.2	C	4/6
Route 20 Jughandle SB LT/TH/RT	0.20	19.3	B	1/2	0.25	24.0	C	1/3	0.21	24.9	C	2/4
<b>Overall</b>	--	<b>5.1</b>	<b>A</b>	--	--	<b>5.5</b>	<b>A</b>	--	--	<b>10.5</b>	<b>B</b>	--
<i>Saturday Midday:</i>												
Route 20 EB TH	0.43	3.2	A	2/4	0.50	4.0	A	3/5	0.53	6.4	A	4/7
Route 20 EB RT	0.02	2.2	A	0/1	0.02	2.7	A	0/1	0.06	4.4	A	0/1
Route 20 WB LT <sup>e</sup> /TH	0.42	3.2	A	2/3	0.49	4.0	A	2/4	0.52	6.3	A	3/7
Latti Farm Road NB LT/RT	0.27	13.6	B	1/2	0.29	14.9	B	1/2	0.44	16.7	B	2/4
Route 20 Jughandle SB LT/TH/RT	0.17	13.2	B	0/1	0.14	14.0	B	1/1	0.21	15.1	B	1/2
<b>Overall</b>	--	<b>3.9</b>	<b>A</b>	--	--	<b>4.7</b>	<b>A</b>	--	--	<b>7.4</b>	<b>A</b>	--

<sup>a</sup>Volume-to-capacity ratio.

<sup>b</sup>Control (signal) delay per vehicle in seconds.

<sup>c</sup>Level-of-Service.

<sup>d</sup>Queue length in vehicles.

<sup>e</sup>Illegal left-turn maneuvers observed during the weekday morning and Saturday midday peak periods.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.



## Analysis Results

The results of the intersection capacity and vehicle queue analyses are summarized in Table 4, with the detailed analysis results provided as an Attachment. As can be seen in Table 4, with the addition of Project-related traffic, overall intersection operations were shown to remain at a LOS A during the weekday morning peak hour, to degrade slightly from LOS A to a LOS B during the weekday evening peak hour as a result of an increase in average motorist delay of 5.0 seconds, and to remain at LOS A during the Saturday midday peak hour. Vehicle queues at the intersection were shown to increase by up to six (6) vehicles with the addition of Project-related traffic.

## SIGHT DISTANCE ASSESSMENT

Sight distance measurements were performed at the Project site driveway intersection with Latti Farm Road in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)<sup>9</sup> requirements. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance required by a vehicle traveling at the design speed of a roadway, on wet pavement, to stop prior to striking an object in its travel path. ISD or corner sight distance (CSD) is the sight distance required by a driver entering or crossing an intersecting roadway to perceive an on-coming vehicle and safely complete a turning or crossing maneuver with on-coming traffic. In accordance with AASHTO standards, if the measured ISD is at least equal to the required SSD value for the appropriate design speed, the intersection can operate in a safe manner. Table 5 presents the measured SSD and ISD at the subject intersection.

**Table 5**  
**SIGHT DISTANCE MEASUREMENTS<sup>a</sup>**

Intersection/Sight Distance Measurement	Feet		
	Required Minimum (SSD)	Desirable (ISD) <sup>b</sup>	Measured
<b><i>Latti Farm Road at the Project Site Driveway</i></b>			
<i>Stopping Sight Distance:</i>			
Latti Farm Road approaching from the east	200	--	252
Latti Farm Road approaching from the west	200	--	269
<i>Intersection Sight Distance:</i>			
Looking to the east from the Project Site Driveway	200	335	281
Looking to the west from the Project Site Driveway	200	290	292

<sup>a</sup>Recommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*, 7<sup>th</sup> Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018; and based on a 30 mph approach speed on Latti Farm Road.

<sup>b</sup>Values shown are the intersection sight distance for a vehicle turning right or left exiting a roadway under STOP control such that motorists approaching the intersection on the major street should not need to adjust their travel speed to less than 70 percent of their initial approach speed.

<sup>9</sup>*A Policy on Geometric Design of Highway and Streets*, 7<sup>th</sup> Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018.



As can be seen in Table 5, the available lines of sight to and from the Project site driveway intersection with Latti Farm Road were found to exceed the recommended minimum sight distance to function in a safe manner (SSD) based on a 30 mph approach speed along Latti Farm Road, which is 5 mph above the prevailing travel speed measured at the Project site (25 mph) and is consistent with the posted speed limit (30 mph).

## **SUMMARY**

VAI has completed a detailed assessment of the potential impacts on the transportation infrastructure associated with the proposed renovation and expansion of the existing commercial building located at 12 Latti Farm Road in Millbury, Massachusetts, to accommodate a marijuana cultivation facility and dispensary. The following specific areas have been evaluated as they relate to the Project: i) access requirements; ii) potential off-site improvements; and iii) safety considerations; under existing and future conditions, both with and without the Project. Based on this assessment, we have concluded the following with respect to the Project:

1. Using trip-generation statistics published by the ITE<sup>10</sup> and empirical data obtained from an operating recreational marijuana dispensary located in Central Massachusetts, the Project is expected to generate approximately 1,008 vehicle trips on an average weekday and 1,176 vehicle trips on a Saturday (both two-way volumes over the operational day of the Project), with 64 vehicle trips expected during the weekday morning peak-hour of the roadway, 71 vehicle trips expected during the weekday morning peak-hour of the marijuana dispensary, 124 vehicle trips expected during the weekday evening peak-hour and 152 vehicle trips expected during the Saturday midday peak-hour;
2. In comparison to the trips associated with the former manufacturing use, the Project is expected to generate approximately 562 additional vehicle trips on an average weekday and 594 additional vehicle trips on a Saturday, with 8 additional vehicle trips expected during the weekday morning peak-hour of the roadway, 46 additional vehicle trips expected during the weekday morning peak-hour of the marijuana dispensary, 63 additional vehicle trips expected during the weekday evening peak-hour and 67 additional vehicle trips expected during the Saturday midday peak-hour;
3. The Project will not have a significant impact (increase) on motorist delays or vehicle queuing over anticipated future conditions without the Project (No-Build conditions), with all movements at the study area intersection shown to operate at LOS C or better under all analysis conditions, where an LOS of “D” or better is defined as “acceptable” traffic operations;
4. No apparent safety deficiencies were noted with respect to the motor vehicle crash history in the vicinity of the Project site; and
5. Lines of sight at the Project site driveway intersection with Latti Farm Road were found to exceed the recommended minimum distance for the intersection to operate in a safe manner.

In consideration of the above, we have concluded that the Project can be accommodated within the confines of the existing transportation infrastructure in a safe and efficient manner with the implementation of the recommendations that follow.

---

<sup>10</sup>Ibid 1.



## **RECOMMENDATIONS**

A detailed transportation improvement program has been developed that is designed to provide safe and efficient access to the Project site and address any deficiencies identified as a part of this assessment. The following improvements have been recommended as a part of this evaluation and, where applicable, will be completed in conjunction with the Project subject to receipt of all necessary rights, permits, and approvals.

### **Project Access**

Access to the Project site will continue to be provided by way of the existing driveway that intersects the south side of Latti Farm Road. The following recommendations are offered with respect to the design and operation of the Project site access and internal circulation, many of which are reflected on the Site Plans:

- The Project site driveway should continue to be a minimum of 24-feet in width and accommodate two-way travel and the turning and maneuvering requirements of the largest anticipated responding emergency vehicle.
- Where perpendicular parking is proposed, the drive aisle behind the parking should be a minimum of 23-feet in order to facilitate parking maneuvers.
- Vehicles exiting the Project site should be placed under stop control.
- All signs and pavement markings to be installed within the Project site should conform to the applicable standards of the *Manual on Uniform Traffic Control Devices (MUTCD)*.<sup>11</sup>
- Signs and landscaping to be installed as a part of the Project within the intersection sight triangle areas of the Project site driveway should be designed and maintained so as not to restrict lines of sight.
- Snow windrows within sight triangle areas of the Project site driveway should be promptly removed where such accumulations would impede sight lines.
- A traffic and parking management plan should be developed for the marijuana dispensary in consultation with the Millbury Police Department to accommodate the increased customer demand that may occur during the initial opening period. The goal of the traffic and parking management plan will be to manage customer demands so as not to exceed the available parking within the project site with consideration of employee parking requirements. After the initial opening period, operations should be reviewed with the Police Chief on a periodic basis to determine if there is a need to continue the elements of the traffic and parking management plan.

With the implementation of the above recommendations, safe and efficient access can be provided to the Project site and the Project can be accommodated within the confines of the existing transportation infrastructure.

cc: File

---

<sup>11</sup>*Manual on Uniform Traffic Control Devices (MUTCD)*; Federal Highway Administration; Washington, D.C.; 2009.



## ATTACHMENTS

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PROJECT SITE PLAN  
AUTOMATIC TRAFFIC RECORDER COUNT DATA  
MANUAL TURNING MOVEMENT COUNT DATA  
SEASONAL ADJUSTMENT DATA  
COVID-19 ADJUSTMENT DATA  
VEHICLE TRAVEL SPEED DATA  
MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION  
MAPPING  
GENERAL BACKGROUND TRAFFIC GROWTH  
BACKGROUND DEVELOPMENT TRAFFIC-VOLUME NETWORKS  
TRIP-GENERATION CALCULATIONS  
CAPACITY ANALYSIS WORKSHEETS





PROJECT SITE PLAN

---







ZONING INFORMATION TABLE – MILLBURY, MA  
**#12 LATI FARM ROAD**

OWNER: 12 LATI FARM ROAD, LLC  
 PO BOX 646  
 100 CENTRAL STREET  
 WORCESTER, MA 01613-0646

APPLICANT: GREENCARE THERAPEUTICS, INC.  
 70 FARGO STREET, SUITE 906  
 BOSTON, MA 02210  
 ATTN: ATTORNEY-MAYER, ANTONELLIS,  
 JACHOWICZ & HARANAS, LLP  
 PHONE: 508-473-2203

ASSESSOR'S MAP ID: MAP 14 PARCEL 27 DEED: BK 43,312 PG 162

ZONING: I-II (INDUSTRIAL 2)  
 EXISTING USE: LIGHT MANUFACTURING  
 PROPOSED USE: MARIJUANA CULTIVATOR (SPECIAL PERMIT REQUIRED)

EXISTING ZONING REQUIREMENTS	REQUIRED	EXISTING	PROPOSED
LOT SIZE (MIN.)	80,000 S.F.	366,235±S.F. (8.4 AC)	366,235±S.F. (8.4 AC)
FRONTAGE	200 FT.	200.00 FT.	200.00 FT.
FRONT SETBACK	30 FT.	161.6 FT.	161.6 FT.
SIDE SETBACK	20 FT.	131.5 FT.	131.5 FT.
REAR SETBACK	20 FT.	47.5 FT.	47.5 FT.
MAX. BLDG. HEIGHT	55 FT.	SEE ARCHITECTS PLAN	SEE ARCHITECTS PLAN
MAX. BLDG. COVERAGE	35%	90,608 ±S.F. (24.7%)	90,608 ±S.F. (24.7%)

**2019 PARKING CALCULATION**

INDUSTRIAL: 1 SPACE / 1 1/4 EMPLOYEES PER SHIFT  
 TWO SHIFTS @ 25 EMPLOYEES = 50 PERSONS

Marked Handicap Accessible Spaces  
 (76=100 Spaces) 1 Van Accessible Parking Space

REQUIRED	PROVIDED
40 Spaces	88 Spaces
Total Spaces = 40 Spaces	88 Spaces
4 HC Spaces	4 HC Spaces

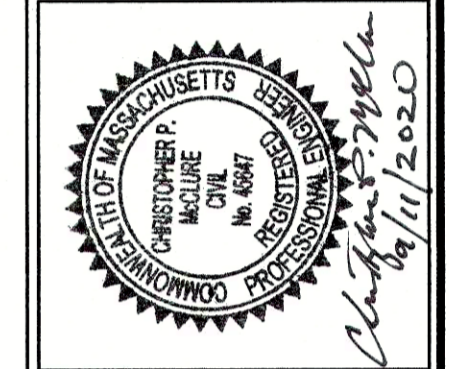
MILLBURY PLANNING BOARD  
 SITE PLAN APPROVAL

**LEGEND**

- BIT BITUMINOUS
- BM BENCH MARK
- BOS BOTTOM OF SLOPE
- CB CATCH BASIN
- CBCI CATCH BASIN CURB INLET
- CC CONCRETE CURB
- CCB CAPE COD BERM
- CLF CHAIN LINK FENCE
- CONC CONCRETE
- D DECID
- DECID DECIDUOUS
- DMH DRAIN MANHOLE
- DYCL DOUBLE YELLOW CENTER LINE
- E EAST
- ELEV ELEVATION
- EM ELECTRIC METER
- EPLP ESCUTCHEON PIN IN LEAD PLUG
- FF ELEV FINISH FLOOR ELEVATION
- GG GAS GATE
- HDWL HEADWALL
- HH HAND HOLE
- HR HAND RAIL
- HYD HYDRANT
- I INVERT ELEVATION
- LP LIGHT POLE
- LSA LANDSCAPED AREA
- MB MAIL BOX
- MTA MASSACHUSETTS TURNPIKE AUTHORITY
- N NORTH
- N/F NOW OR FORMERLY
- PIV POST INDICATOR VALVE (FIRE)
- R RIM ELEVATION
- RC REINFORCED CONCRETE PIPE
- S SOUTH
- SGC SLOPED GRANITE CURB
- SMH SANITARY SEWER MANHOLE
- SN SIGN
- TOS TOP OF SLOPE
- TPU, TPW BORINGS
- TRANS TRANSFORMER
- TYP TYPICAL
- W WEST
- W/ WITH
- WG WATER GATE
- B-7 WETLAND FLAG WITH NUMBER (TYP)
- 550- EXISTING CONTOUR (TYP)
- 550.50 EXISTING SPOT GRADE (TYP)

REV	DATE	DESCRIPTION	MADE BY	DATE
1	8/15/19	REVIEW COMMENTS 8/12/19	MM	DTF
2	5/7/20	90% ARCHITECT PLAN REV.	MM	CPM
3	6/15/20	CONSTRUCTION CHANGE #1	MM	CPM

CHRISTOPHER P. McCLURE, P.E.  
 PROFESSIONAL ENGINEER  
 MA LIC. NO. 46647  
 CT LIC. NO. 26941

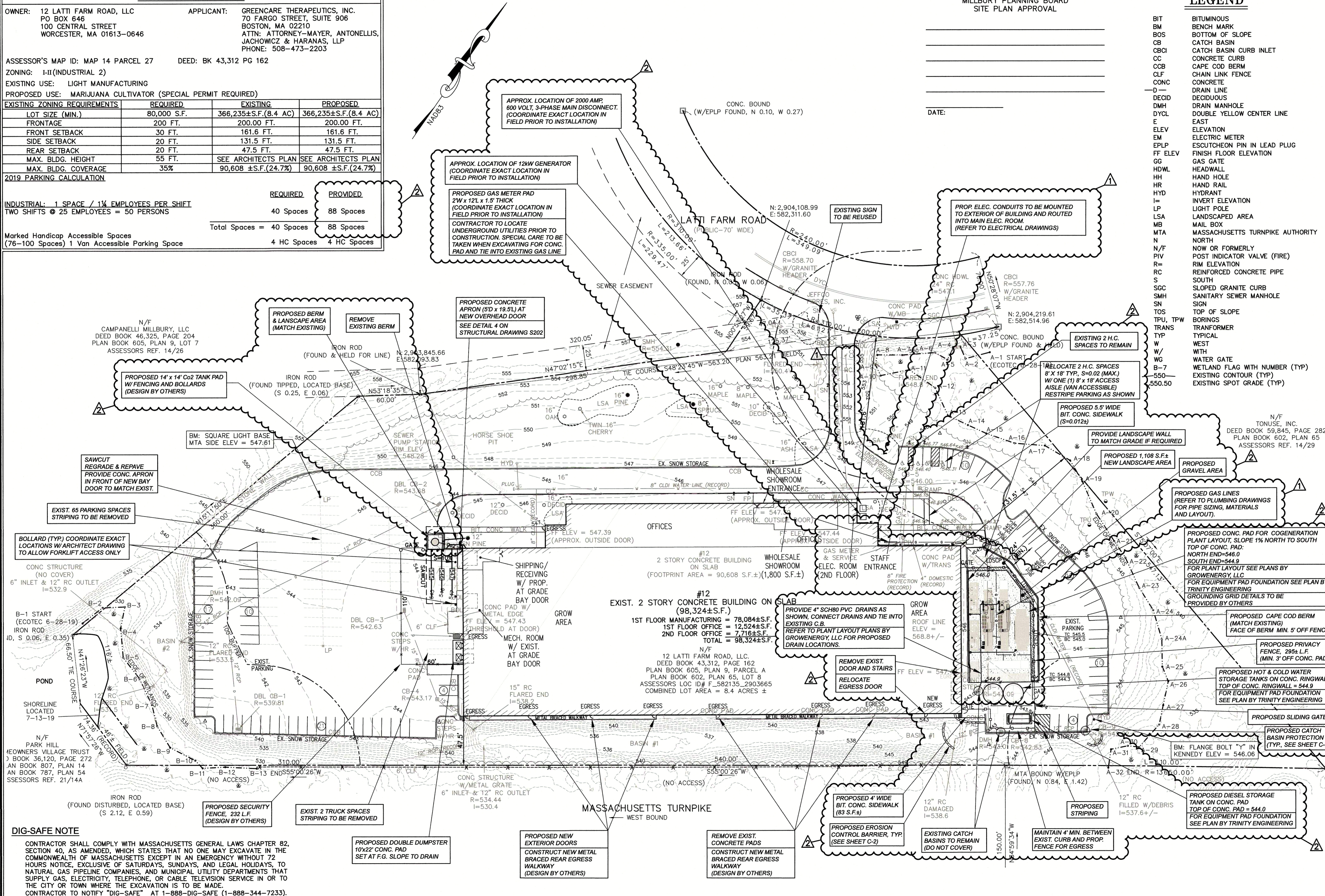


**McCLURE ENGINEERING, INC.**  
 119 Worcester Road  
 Charlton, MA 01507  
 Tel: (508) 248-2005  
 Fax: (508) 248-4887  
 Email: chris@mcclureengineers.com

**SPECIAL PERMIT SITE PLAN**  
 #12 LATI FARM ROAD  
 MILLBURY, MA 01527  
 PREPARED FOR  
 COGROW MASSACHUSETTS, LLC  
 232 MOITT ST., APT. 3  
 NEW YORK, NY 10012

DRAWN BY: MM  
 DATE: 7/18/2019  
 CHK BY: CPM  
 SCALE: 1" = 40'  
 PROJ. NO. 186-1963-K

**SPECIAL PERMIT SITE PLAN**  
**C-1**



**DIG-SAFE NOTE**  
 CONTRACTOR SHALL COMPLY WITH MASSACHUSETTS GENERAL LAWS CHAPTER 82, SECTION 40, AS AMENDED, WHICH STATES THAT NO ONE MAY EXCAVATE IN THE COMMONWEALTH OF MASSACHUSETTS EXCEPT IN AN EMERGENCY WITHOUT 72 HOURS NOTICE, EXCLUSIVE OF SATURDAYS, SUNDAYS, AND LEGAL HOLIDAYS, TO NATURAL GAS PIPELINE COMPANIES, AND MUNICIPAL UTILITY DEPARTMENTS THAT SUPPLY GAS, ELECTRICITY, TELEPHONE, OR CABLE TELEVISION SERVICE IN OR TO THE CITY OR TOWN WHERE THE EXCAVATION IS TO BE MADE.  
 CONTRACTOR TO NOTIFY "DIG-SAFE" AT 1-888-DIG-SAFE (1-888-344-7233).

AUTOMATIC TRAFFIC RECORDER COUNT DATA





**Accurate Counts**  
978-664-2565

Location : Latti Farm Road  
Location : South of Route 20  
City/State: Worcester, MA

8854VL01

Start Time	1/21/2021 Thu	SB		Hour Totals		NB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		1	15			2	18				
12:15		2	16			2	17				
12:30		0	10			0	24				
12:45		2	23	5	64	1	22	5	81	10	145
01:00		2	15			3	14				
01:15		1	20			4	17				
01:30		3	12			8	24				
01:45		0	21	6	68	0	20	15	75	21	143
02:00		0	14			5	21				
02:15		4	21			1	24				
02:30		0	19			2	29				
02:45		3	20	7	74	0	24	8	98	15	172
03:00		4	19			1	37				
03:15		7	9			5	30				
03:30		3	16			4	23				
03:45		5	11	19	55	4	25	14	115	33	170
04:00		5	17			2	29				
04:15		3	13			4	14				
04:30		6	6			4	29				
04:45		4	8	18	44	8	13	18	85	36	129
05:00		8	9			6	22				
05:15		10	13			8	9				
05:30		7	9			7	13				
05:45		4	5	29	36	2	9	23	53	52	89
06:00		3	10			7	26				
06:15		6	3			6	23				
06:30		7	3			1	9				
06:45		27	5	43	21	5	17	19	75	62	96
07:00		20	5			2	9				
07:15		6	2			5	14				
07:30		16	8			4	9				
07:45		26	4	68	19	4	9	15	41	83	60
08:00		29	4			6	6				
08:15		34	2			11	5				
08:30		26	1			15	8				
08:45		53	0	142	7	5	2	37	21	179	28
09:00		40	2			7	8				
09:15		26	5			28	2				
09:30		24	5			15	5				
09:45		21	4	111	16	15	3	65	18	176	34
10:00		13	3			12	5				
10:15		14	2			13	6				
10:30		13	2			13	3				
10:45		19	0	59	7	7	1	45	15	104	22
11:00		13	0			14	1				
11:15		6	1			20	3				
11:30		9	2			21	4				
11:45		17	1	45	4	15	1	70	9	115	13
Total		552	415			334	686			886	1101
Percent		57.1%	42.9%			32.7%	67.3%			44.6%	55.4%

**Accurate Counts**  
978-664-2565

Location : Latti Farm Road  
Location : South of Route 20  
City/State: Worcester, MA

8854VL01

Start Time	1/22/2021 Fri	SB		Hour Totals		NB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		3	8			2	18				
12:15		3	24			5	24				
12:30		0	12			0	29				
12:45		1	25	7	69	4	29	11	100	18	169
01:00		2	12			0	24				
01:15		3	17			1	13				
01:30		1	18			10	9				
01:45		3	20	9	67	4	18	15	64	24	131
02:00		1	15			2	19				
02:15		1	15			2	16				
02:30		0	18			0	19				
02:45		2	23	4	71	0	28	4	82	8	153
03:00		5	21			0	51				
03:15		2	12			2	24				
03:30		8	20			3	30				
03:45		3	13	18	66	2	23	7	128	25	194
04:00		6	18			5	24				
04:15		6	11			4	19				
04:30		5	7			6	30				
04:45		2	10	19	46	4	15	19	88	38	134
05:00		4	4			6	13				
05:15		8	5			4	13				
05:30		6	4			3	8				
05:45		5	9	23	22	3	13	16	47	39	69
06:00		6	6			4	27				
06:15		9	6			6	16				
06:30		8	3			5	20				
06:45		22	6	45	21	4	10	19	73	64	94
07:00		21	8			4	11				
07:15		13	6			7	15				
07:30		16	2			7	5				
07:45		25	6	75	22	6	6	24	37	99	59
08:00		33	1			6	2				
08:15		24	2			11	1				
08:30		35	3			3	11				
08:45		42	5	134	11	7	3	27	17	161	28
09:00		36	3			8	7				
09:15		35	4			17	6				
09:30		21	3			20	2				
09:45		24	0	116	10	16	4	61	19	177	29
10:00		11	2			11	2				
10:15		14	4			13	1				
10:30		8	1			11	3				
10:45		17	0	50	7	17	3	52	9	102	16
11:00		5	1			13	4				
11:15		21	0			13	0				
11:30		12	0			14	0				
11:45		5	2	43	3	19	3	59	7	102	10
Total		543	415			314	671			857	1086
Percent		56.7%	43.3%			31.9%	68.1%			44.1%	55.9%

**Accurate Counts**  
978-664-2565

Location : Latti Farm Road  
Location : South of Route 20  
City/State: Worcester, MA

8854VL01

Start Time	1/23/2021 Sat	SB		Hour Totals		NB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		2	9			2	8				
12:15		1	7			2	11				
12:30		1	9			1	8				
12:45		1	11	5	36	3	12	8	39	13	75
01:00		2	8			1	16				
01:15		1	8			11	7				
01:30		2	8			5	14				
01:45		0	11	5	35	1	10	18	47	23	82
02:00		1	9			1	9				
02:15		2	6			3	11				
02:30		0	5			1	9				
02:45		2	8	5	28	2	18	7	47	12	75
03:00		1	9			1	6				
03:15		4	5			1	11				
03:30		5	3			2	7				
03:45		1	6	11	23	1	9	5	33	16	56
04:00		3	3			2	8				
04:15		4	4			3	4				
04:30		0	5			3	3				
04:45		0	4	7	16	0	9	8	24	15	40
05:00		4	4			1	8				
05:15		3	5			4	3				
05:30		2	1			4	6				
05:45		3	3	12	13	5	1	14	18	26	31
06:00		2	2			3	3				
06:15		4	0			3	4				
06:30		4	1			3	2				
06:45		1	0	11	3	2	6	11	15	22	18
07:00		3	0			2	6				
07:15		2	1			2	0				
07:30		4	0			1	1				
07:45		4	0	13	1	5	0	10	7	23	8
08:00		8	0			1	0				
08:15		9	0			3	0				
08:30		8	0			2	0				
08:45		16	0	41	0	5	0	11	0	52	0
09:00		17	0			5	0				
09:15		5	1			5	0				
09:30		7	2			6	2				
09:45		9	1	38	4	4	1	20	3	58	7
10:00		7	2			9	2				
10:15		4	0			7	1				
10:30		14	0			9	0				
10:45		7	0	32	2	11	0	36	3	68	5
11:00		8	0			7	0				
11:15		5	0			9	0				
11:30		6	0			11	0				
11:45		8	0	27	0	5	0	32	0	59	0
Total		207	161			180	236			387	397
Percent		56.3%	43.8%			43.3%	56.7%			49.4%	50.6%
Grand Total		1302	991			828	1593			2130	2584
Percent		56.8%	43.2%			34.2%	65.8%			45.2%	54.8%
ADT		ADT 1,571		AADT 1,571							

**Accurate Counts**  
978-664-2565

Location : Latti Farm Road  
Location : South of Route 20  
City/State: Worcester, MA

8854VL01

Start Time	1/18/2021		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	*	*	*	*	*	*	5	5	7	11	5	8	*	*	6	8
01:00	*	*	*	*	*	*	6	15	9	15	5	18	*	*	7	16
02:00	*	*	*	*	*	*	7	8	4	4	5	7	*	*	5	6
03:00	*	*	*	*	*	*	19	14	18	7	11	5	*	*	16	9
04:00	*	*	*	*	*	*	18	18	19	19	7	8	*	*	15	15
05:00	*	*	*	*	*	*	29	23	23	16	12	14	*	*	21	18
06:00	*	*	*	*	*	*	43	19	45	19	11	11	*	*	33	16
07:00	*	*	*	*	*	*	68	15	75	24	13	10	*	*	52	16
08:00	*	*	*	*	*	*	142	37	134	27	41	11	*	*	106	25
09:00	*	*	*	*	*	*	111	65	116	61	38	20	*	*	88	49
10:00	*	*	*	*	*	*	59	45	50	52	32	36	*	*	47	44
11:00	*	*	*	*	*	*	45	70	43	59	27	32	*	*	38	54
12:00 PM	*	*	*	*	*	*	64	81	69	100	36	39	*	*	56	73
01:00	*	*	*	*	*	*	68	75	67	64	35	47	*	*	57	62
02:00	*	*	*	*	*	*	74	98	71	82	28	47	*	*	58	76
03:00	*	*	*	*	*	*	55	115	66	128	23	33	*	*	48	92
04:00	*	*	*	*	*	*	44	85	46	88	16	24	*	*	35	66
05:00	*	*	*	*	*	*	36	53	22	47	13	18	*	*	24	39
06:00	*	*	*	*	*	*	21	75	21	73	3	15	*	*	15	54
07:00	*	*	*	*	*	*	19	41	22	37	1	7	*	*	14	28
08:00	*	*	*	*	*	*	7	21	11	17	0	0	*	*	6	13
09:00	*	*	*	*	*	*	16	18	10	19	4	3	*	*	10	13
10:00	*	*	*	*	*	*	7	15	7	9	2	3	*	*	5	9
11:00	*	*	*	*	*	*	4	9	3	7	0	0	*	*	2	5
Lane Day	0	0	0	0	0	0	967	1020	958	985	368	416	0	0	764	806
AM Peak	-	-	-	-	-	-	08:00	11:00	08:00	09:00	08:00	10:00	-	-	08:00	11:00
Vol.	-	-	-	-	-	-	142	70	134	61	41	36	-	-	106	54
PM Peak	-	-	-	-	-	-	14:00	15:00	14:00	15:00	12:00	13:00	-	-	14:00	15:00
Vol.	-	-	-	-	-	-	74	115	71	128	36	47	-	-	58	92

Comb. Total	0	0	0	1987	1943	784	0	1570
ADT	ADT 1,571	AADT 1,571						

MANUAL TURNING MOVEMENT COUNT DATA

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**Accurate Counts**  
978-664-2565

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy

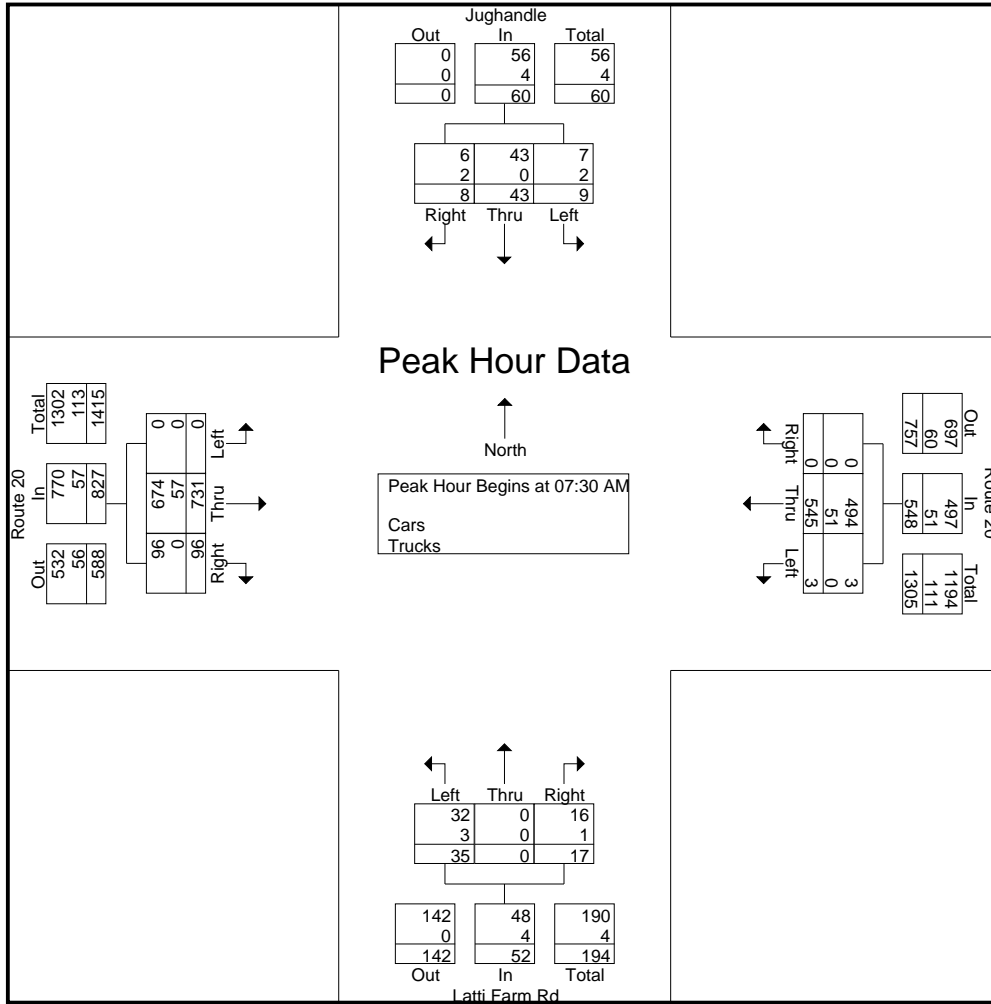
File Name : 88540001  
Site Code : 88540001  
Start Date : 1/21/2021  
Page No : 1

Groups Printed- Cars - Trucks

Start Time	Jughandle From North			Route 20 From East			Latti Farm Rd From South			Route 20 From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	9	0	0	94	0	6	0	1	0	189	19	318
07:15 AM	0	11	0	0	98	0	6	0	5	0	191	24	335
07:30 AM	1	8	3	1	141	0	9	0	6	0	209	19	397
07:45 AM	3	15	2	0	144	0	3	0	2	0	212	34	415
<b>Total</b>	<b>4</b>	<b>43</b>	<b>5</b>	<b>1</b>	<b>477</b>	<b>0</b>	<b>24</b>	<b>0</b>	<b>14</b>	<b>0</b>	<b>801</b>	<b>96</b>	<b>1465</b>
08:00 AM	1	12	0	2	125	0	3	0	2	0	147	25	317
08:15 AM	4	8	3	0	135	0	20	0	7	0	163	18	358
08:30 AM	3	4	2	1	132	0	12	0	8	0	193	19	374
08:45 AM	1	5	2	0	121	0	11	0	5	0	154	16	315
<b>Total</b>	<b>9</b>	<b>29</b>	<b>7</b>	<b>3</b>	<b>513</b>	<b>0</b>	<b>46</b>	<b>0</b>	<b>22</b>	<b>0</b>	<b>657</b>	<b>78</b>	<b>1364</b>
<b>Grand Total</b>	<b>13</b>	<b>72</b>	<b>12</b>	<b>4</b>	<b>990</b>	<b>0</b>	<b>70</b>	<b>0</b>	<b>36</b>	<b>0</b>	<b>1458</b>	<b>174</b>	<b>2829</b>
Apprch %	13.4	74.2	12.4	0.4	99.6	0	66	0	34	0	89.3	10.7	
Total %	0.5	2.5	0.4	0.1	35	0	2.5	0	1.3	0	51.5	6.2	
Cars	11	70	9	4	895	0	65	0	34	0	1339	172	2599
% Cars	84.6	97.2	75	100	90.4	0	92.9	0	94.4	0	91.8	98.9	91.9
Trucks	2	2	3	0	95	0	5	0	2	0	119	2	230
% Trucks	15.4	2.8	25	0	9.6	0	7.1	0	5.6	0	8.2	1.1	8.1

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	1	8	3	12	1	141	0	142	9	0	6	15	0	209	19	228	397
07:45 AM	3	15	2	20	0	144	0	144	3	0	2	5	0	212	34	246	415
08:00 AM	1	12	0	13	2	125	0	127	3	0	2	5	0	147	25	172	317
08:15 AM	4	8	3	15	0	135	0	135	20	0	7	27	0	163	18	181	358
<b>Total Volume</b>	<b>9</b>	<b>43</b>	<b>8</b>	<b>60</b>	<b>3</b>	<b>545</b>	<b>0</b>	<b>548</b>	<b>35</b>	<b>0</b>	<b>17</b>	<b>52</b>	<b>0</b>	<b>731</b>	<b>96</b>	<b>827</b>	<b>1487</b>
% App. Total	15	71.7	13.3		0.5	99.5	0		67.3	0	32.7		0	88.4	11.6		
PHF	.563	.717	.667	.750	.375	.946	.000	.951	.438	.000	.607	.481	.000	.862	.706	.840	.896
Cars	7	43	6	56	3	494	0	497	32	0	16	48	0	674	96	770	1371
% Cars	77.8	100	75.0	93.3	100	90.6	0	90.7	91.4	0	94.1	92.3	0	92.2	100	93.1	92.2
Trucks	2	0	2	4	0	51	0	51	3	0	1	4	0	57	0	57	116
% Trucks	22.2	0	25.0	6.7	0	9.4	0	9.3	8.6	0	5.9	7.7	0	7.8	0	6.9	7.8

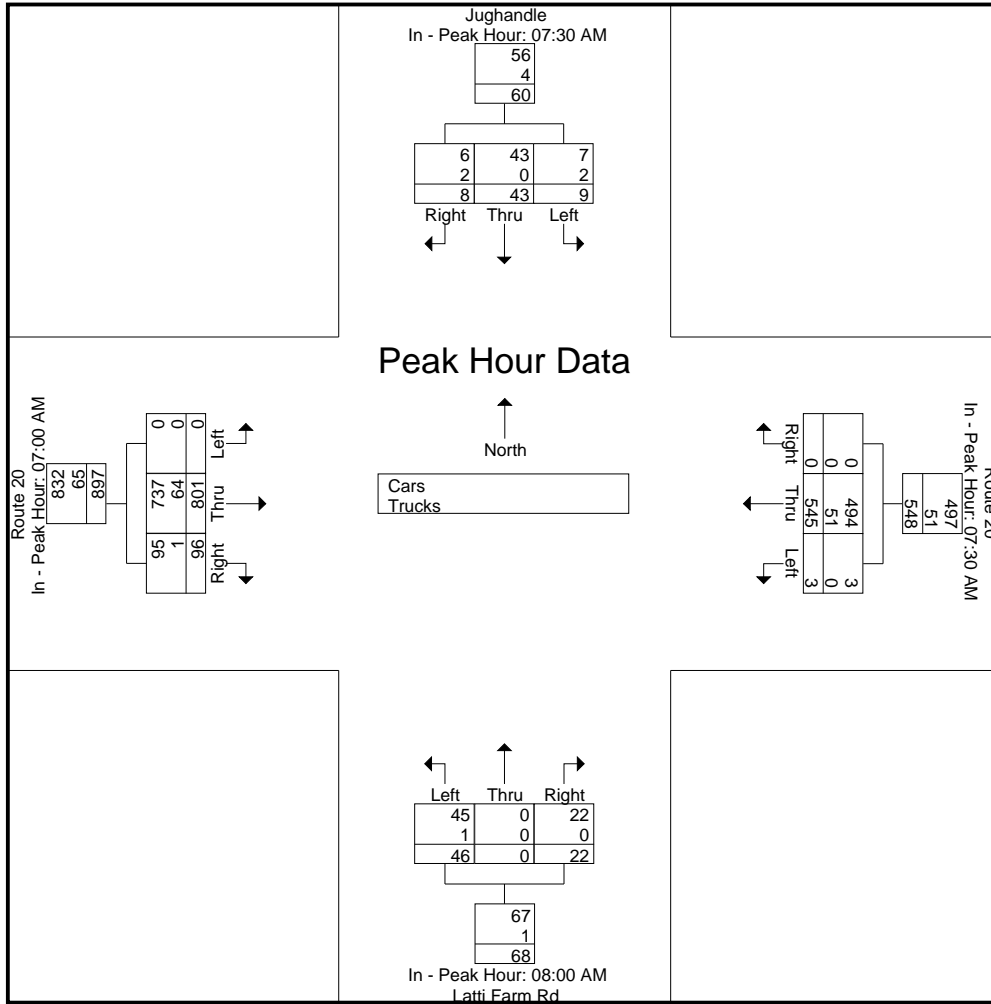
N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				08:00 AM				07:00 AM			
+0 mins.	1	8	3	12	1	141	0	142	3	0	2	5	0	189	19	208
+15 mins.	3	15	2	20	0	144	0	144	20	0	7	27	0	191	24	215
+30 mins.	1	12	0	13	2	125	0	127	12	0	8	20	0	209	19	228
+45 mins.	4	8	3	15	0	135	0	135	11	0	5	16	0	212	34	246
Total Volume	9	43	8	60	3	545	0	548	46	0	22	68	0	801	96	897
% App. Total	15	71.7	13.3		0.5	99.5	0		67.6	0	32.4		0	89.3	10.7	
PHF	.563	.717	.667	.750	.375	.946	.000	.951	.575	.000	.688	.630	.000	.945	.706	.912
Cars	7	43	6	56	3	494	0	497	45	0	22	67	0	737	95	832
% Cars	77.8	100	75	93.3	100	90.6	0	90.7	97.8	0	100	98.5	0	92	99	92.8
Trucks	2	0	2	4	0	51	0	51	1	0	0	1	0	64	1	65
% Trucks	22.2	0	25	6.7	0	9.4	0	9.3	2.2	0	0	1.5	0	8	1	7.2

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy



**Accurate Counts**  
978-664-2565

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy

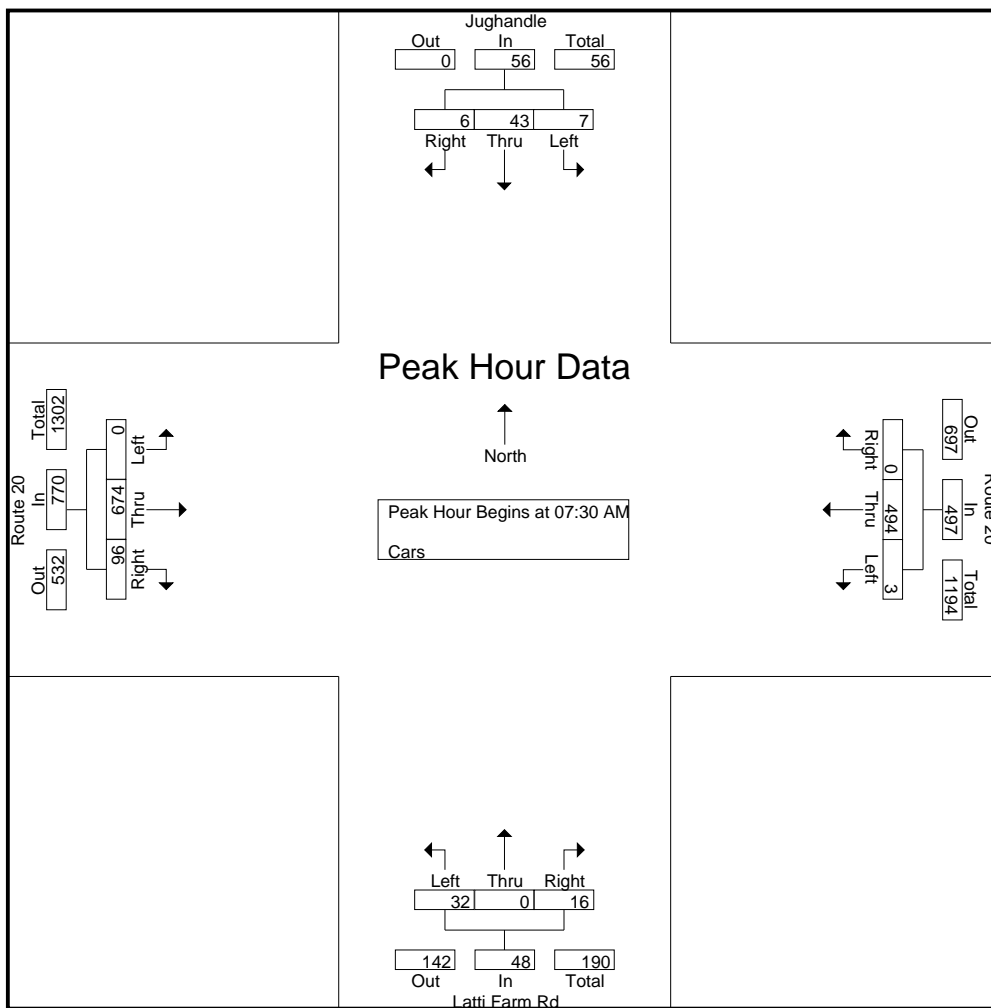
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Site Code : 88540001  
Start Date : 1/21/2021  
Page No : 4

Groups Printed- Cars

Start Time	Jughandle From North			Route 20 From East			Latti Farm Rd From South			Route 20 From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	8	0	0	82	0	5	0	0	0	176	19	290
07:15 AM	0	11	0	0	88	0	6	0	5	0	175	23	308
07:30 AM	0	8	1	1	130	0	8	0	5	0	188	19	360
07:45 AM	2	15	2	0	131	0	1	0	2	0	198	34	385
Total	2	42	3	1	431	0	20	0	12	0	737	95	1343
08:00 AM	1	12	0	2	110	0	3	0	2	0	140	25	295
08:15 AM	4	8	3	0	123	0	20	0	7	0	148	18	331
08:30 AM	3	4	2	1	120	0	11	0	8	0	176	18	343
08:45 AM	1	4	1	0	111	0	11	0	5	0	138	16	287
Total	9	28	6	3	464	0	45	0	22	0	602	77	1256
Grand Total	11	70	9	4	895	0	65	0	34	0	1339	172	2599
Apprch %	12.2	77.8	10	0.4	99.6	0	65.7	0	34.3	0	88.6	11.4	
Total %	0.4	2.7	0.3	0.2	34.4	0	2.5	0	1.3	0	51.5	6.6	

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	8	1	9	1	130	0	131	8	0	5	13	0	188	19	207	360
07:45 AM	2	15	2	19	0	131	0	131	1	0	2	3	0	198	34	232	385
08:00 AM	1	12	0	13	2	110	0	112	3	0	2	5	0	140	25	165	295
08:15 AM	4	8	3	15	0	123	0	123	20	0	7	27	0	148	18	166	331
Total Volume	7	43	6	56	3	494	0	497	32	0	16	48	0	674	96	770	1371
% App. Total	12.5	76.8	10.7		0.6	99.4	0		66.7	0	33.3		0	87.5	12.5		
PHF	.438	.717	.500	.737	.375	.943	.000	.948	.400	.000	.571	.444	.000	.851	.706	.830	.890

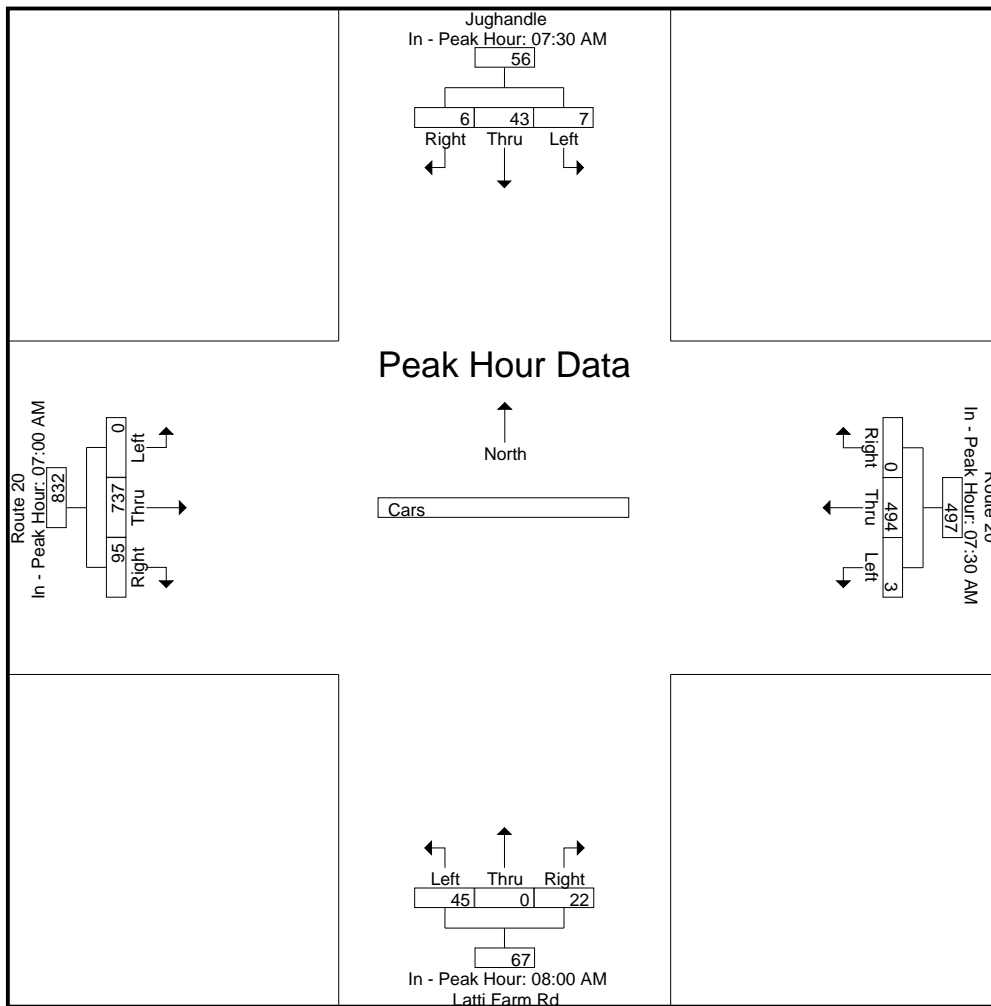
N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				08:00 AM				07:00 AM			
+0 mins.	0	8	1	9	1	130	0	<b>131</b>	3	0	2	5	0	176	19	195
+15 mins.	2	<b>15</b>	2	<b>19</b>	0	<b>131</b>	0	131	<b>20</b>	0	7	<b>27</b>	0	175	23	198
+30 mins.	1	12	0	13	<b>2</b>	110	0	112	11	0	<b>8</b>	19	0	188	19	207
+45 mins.	<b>4</b>	8	<b>3</b>	15	0	123	0	123	11	0	5	16	0	<b>198</b>	<b>34</b>	<b>232</b>
Total Volume	7	43	6	56	3	494	0	497	45	0	22	67	0	737	95	832
% App. Total	12.5	76.8	10.7		0.6	99.4	0		67.2	0	32.8		0	88.6	11.4	
PHF	.438	.717	.500	.737	.375	.943	.000	.948	.563	.000	.688	.620	.000	.931	.699	.897

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy



**Accurate Counts**  
978-664-2565

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy

File Name : 88540001  
Site Code : 88540001  
Start Date : 1/21/2021  
Page No : 7

Groups Printed- Trucks

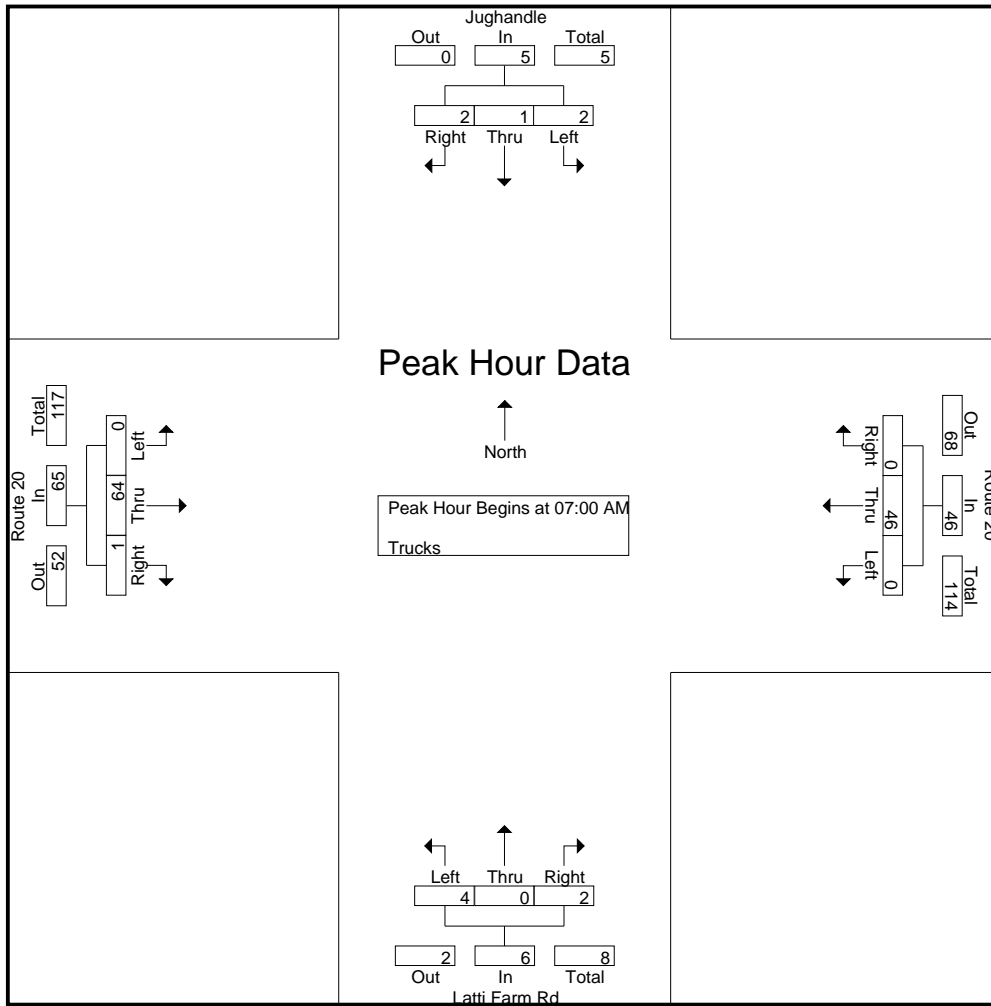
Start Time	Jughandle From North			Route 20 From East			Latti Farm Rd From South			Route 20 From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
07:00 AM	0	1	0	0	12	0	1	0	1	0	13	0	28
07:15 AM	0	0	0	0	10	0	0	0	0	0	16	1	27
07:30 AM	1	0	2	0	11	0	1	0	1	0	21	0	37
07:45 AM	1	0	0	0	13	0	2	0	0	0	14	0	30
Total	2	1	2	0	46	0	4	0	2	0	64	1	122
08:00 AM	0	0	0	0	15	0	0	0	0	0	7	0	22
08:15 AM	0	0	0	0	12	0	0	0	0	0	15	0	27
08:30 AM	0	0	0	0	12	0	1	0	0	0	17	1	31
08:45 AM	0	1	1	0	10	0	0	0	0	0	16	0	28
Total	0	1	1	0	49	0	1	0	0	0	55	1	108
Grand Total	2	2	3	0	95	0	5	0	2	0	119	2	230
Apprch %	28.6	28.6	42.9	0	100	0	71.4	0	28.6	0	98.3	1.7	
Total %	0.9	0.9	1.3	0	41.3	0	2.2	0	0.9	0	51.7	0.9	

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	1	0	1	0	12	0	12	1	0	1	2	0	13	0	13	28
07:15 AM	0	0	0	0	0	10	0	10	0	0	0	0	0	16	1	17	27
07:30 AM	1	0	2	3	0	11	0	11	1	0	1	2	0	21	0	21	37
07:45 AM	1	0	0	1	0	13	0	13	2	0	0	2	0	14	0	14	30
Total Volume	2	1	2	5	0	46	0	46	4	0	2	6	0	64	1	65	122
% App. Total	40	20	40		0	100	0		66.7	0	33.3		0	98.5	1.5		
PHF	.500	.250	.250	.417	.000	.885	.000	.885	.500	.000	.500	.750	.000	.762	.250	.774	.824



N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy

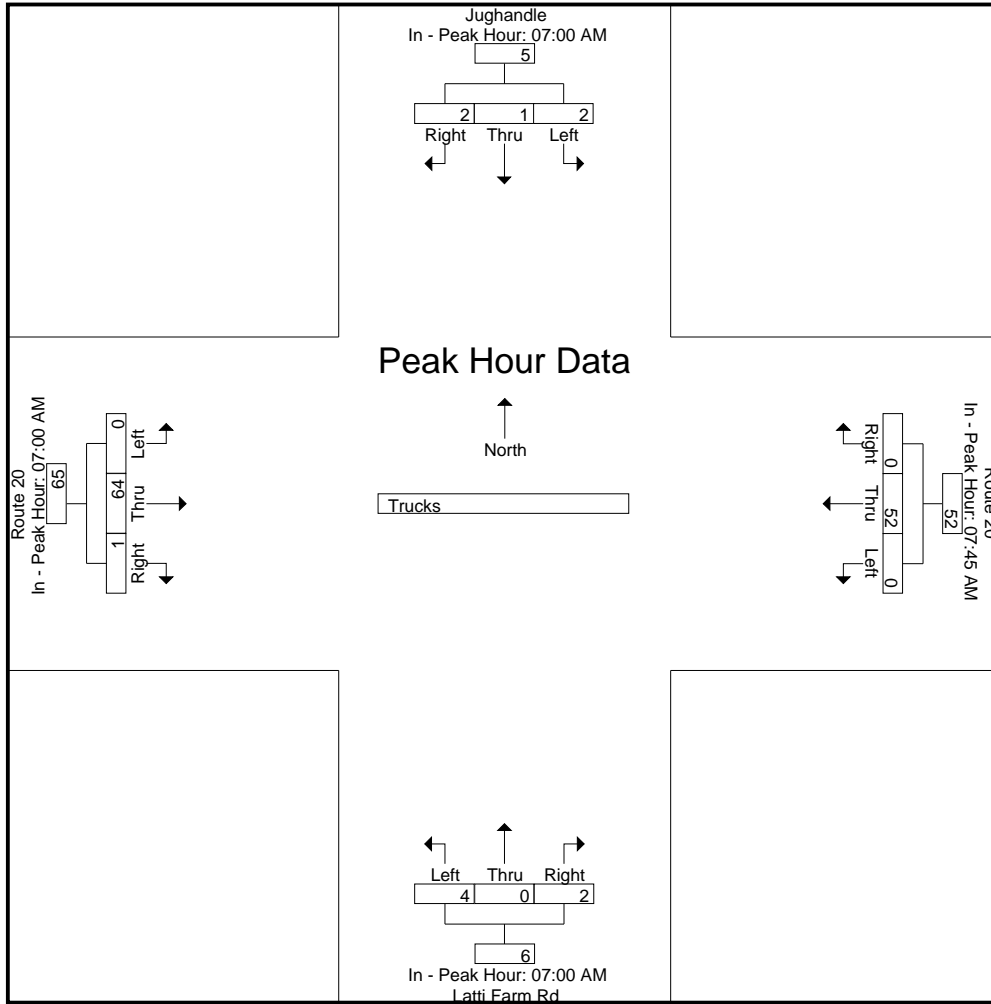
File Name : 88540001  
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Start Date : 1/21/2021  
Page No : 8



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:00 AM				07:45 AM				07:00 AM				07:00 AM			
+0 mins.	0	1	0	1	0	13	0	13	1	0	1	2	0	13	0	13
+15 mins.	0	0	0	0	0	15	0	15	0	0	0	0	0	16	1	17
+30 mins.	1	0	2	3	0	12	0	12	1	0	1	2	0	21	0	21
+45 mins.	1	0	0	1	0	12	0	12	2	0	0	2	0	14	0	14
Total Volume	2	1	2	5	0	52	0	52	4	0	2	6	0	64	1	65
% App. Total	40	20	40		0	100	0		66.7	0	33.3		0	98.5	1.5	
PHF	.500	.250	.250	.417	.000	.867	.000	.867	.500	.000	.500	.750	.000	.762	.250	.774

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy



**Accurate Counts**  
978-664-2565

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy

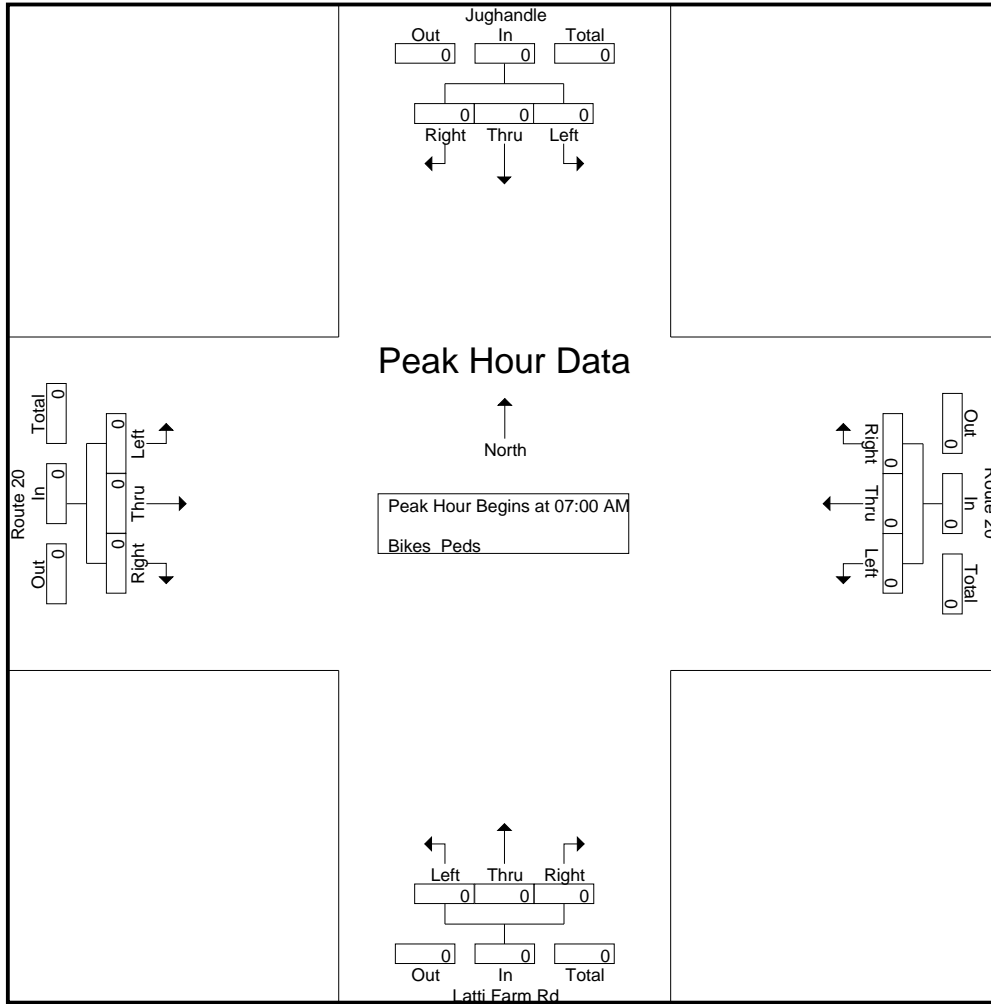
File Name : 88540001  
Site Code : 88540001  
Start Date : 1/21/2021  
Page No : 10

Groups Printed- Bikes Peds

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
07:00 AM	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
07:30 AM	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	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	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
08:30 AM	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
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	0	0	

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 07:00 AM																		
07:00 AM	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
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0			
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

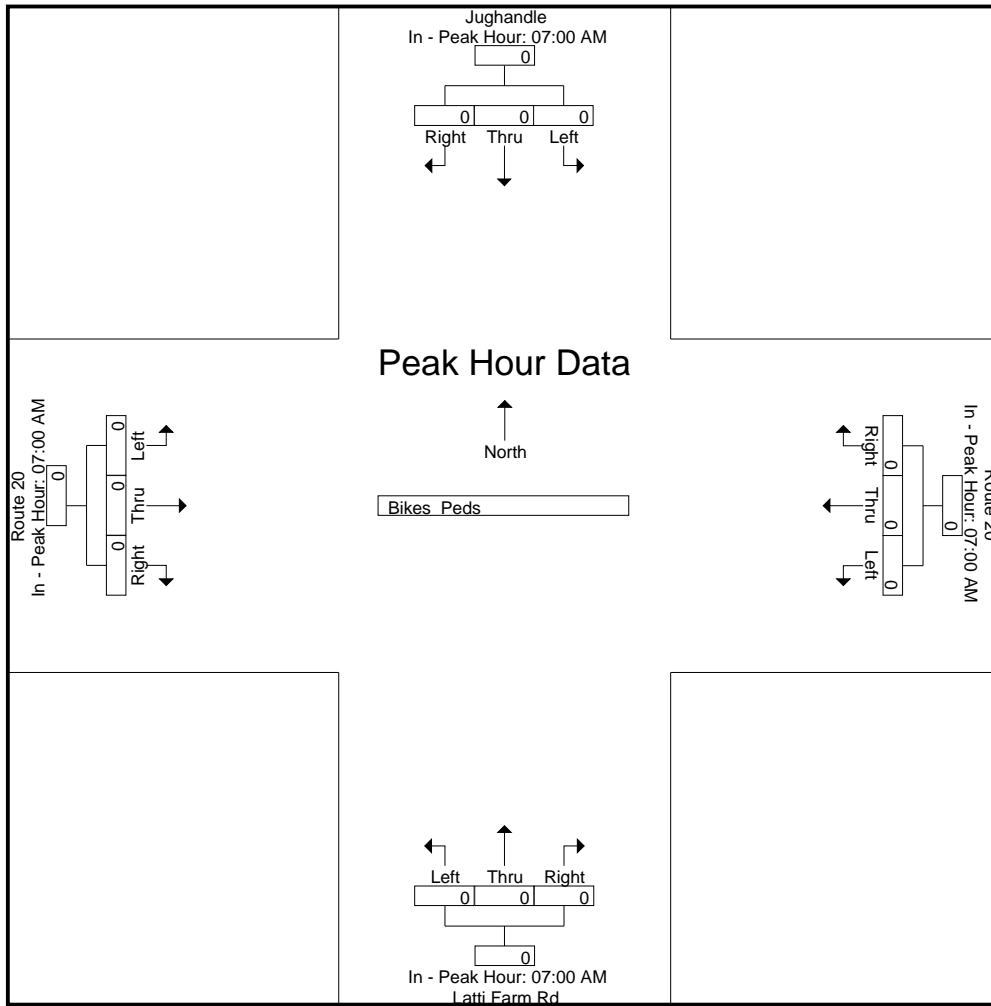
N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy



**Accurate Counts**  
978-664-2565

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy

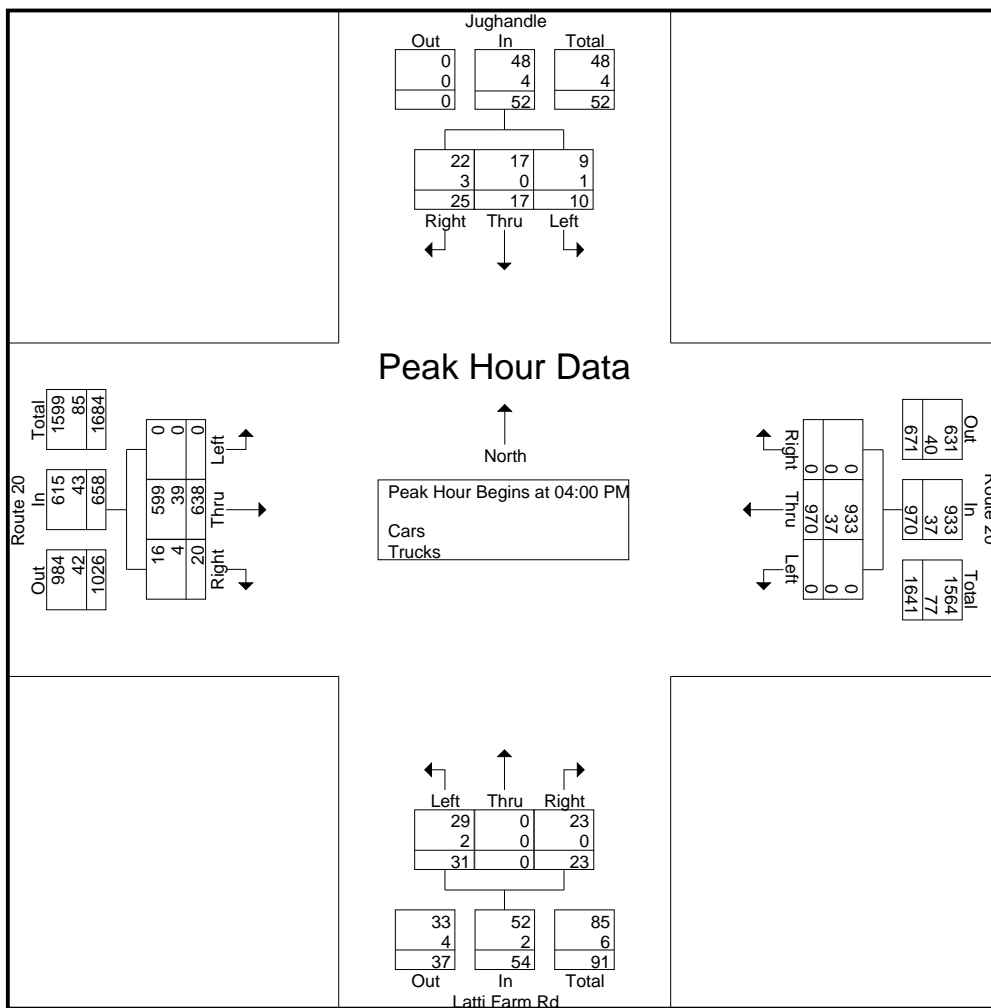
File Name : 88540001  
Site Code : 88540001  
Start Date : 1/21/2021  
Page No : 1

Groups Printed- Cars - Trucks

Start Time	Jughandle From North			Route 20 From East			Latti Farm Rd From South			Route 20 From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	2	3	11	0	270	0	15	0	6	0	176	6	489
04:15 PM	3	7	5	0	248	0	5	0	6	0	134	8	416
04:30 PM	1	4	5	0	237	0	7	0	6	0	168	4	432
04:45 PM	4	3	4	0	215	0	4	0	5	0	160	2	397
<b>Total</b>	<b>10</b>	<b>17</b>	<b>25</b>	<b>0</b>	<b>970</b>	<b>0</b>	<b>31</b>	<b>0</b>	<b>23</b>	<b>0</b>	<b>638</b>	<b>20</b>	<b>1734</b>
05:00 PM	5	3	5	0	262	0	16	0	10	0	156	5	462
05:15 PM	0	2	2	0	244	0	16	0	7	0	141	0	412
05:30 PM	0	0	2	0	210	0	7	0	4	0	124	4	351
05:45 PM	0	0	2	0	160	0	12	0	5	0	118	5	302
<b>Total</b>	<b>5</b>	<b>5</b>	<b>11</b>	<b>0</b>	<b>876</b>	<b>0</b>	<b>51</b>	<b>0</b>	<b>26</b>	<b>0</b>	<b>539</b>	<b>14</b>	<b>1527</b>
<b>Grand Total</b>	<b>15</b>	<b>22</b>	<b>36</b>	<b>0</b>	<b>1846</b>	<b>0</b>	<b>82</b>	<b>0</b>	<b>49</b>	<b>0</b>	<b>1177</b>	<b>34</b>	<b>3261</b>
Apprch %	20.5	30.1	49.3	0	100	0	62.6	0	37.4	0	97.2	2.8	
Total %	0.5	0.7	1.1	0	56.6	0	2.5	0	1.5	0	36.1	1	
Cars	14	21	33	0	1794	0	77	0	47	0	1111	27	3124
% Cars	93.3	95.5	91.7	0	97.2	0	93.9	0	95.9	0	94.4	79.4	95.8
Trucks	1	1	3	0	52	0	5	0	2	0	66	7	137
% Trucks	6.7	4.5	8.3	0	2.8	0	6.1	0	4.1	0	5.6	20.6	4.2

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	2	3	11	16	0	270	0	270	15	0	6	21	0	176	6	182	489
04:15 PM	3	7	5	15	0	248	0	248	5	0	6	11	0	134	8	142	416
04:30 PM	1	4	5	10	0	237	0	237	7	0	6	13	0	168	4	172	432
04:45 PM	4	3	4	11	0	215	0	215	4	0	5	9	0	160	2	162	397
<b>Total Volume</b>	<b>10</b>	<b>17</b>	<b>25</b>	<b>52</b>	<b>0</b>	<b>970</b>	<b>0</b>	<b>970</b>	<b>31</b>	<b>0</b>	<b>23</b>	<b>54</b>	<b>0</b>	<b>638</b>	<b>20</b>	<b>658</b>	<b>1734</b>
% App. Total	19.2	32.7	48.1		0	100	0		57.4	0	42.6		0	97	3		
PHF	.625	.607	.568	.813	.000	.898	.000	.898	.517	.000	.958	.643	.000	.906	.625	.904	.887
Cars	9	17	22	48	0	933	0	933	29	0	23	52	0	599	16	615	1648
% Cars	90.0	100	88.0	92.3	0	96.2	0	96.2	93.5	0	100	96.3	0	93.9	80.0	93.5	95.0
Trucks	1	0	3	4	0	37	0	37	2	0	0	2	0	39	4	43	86
% Trucks	10.0	0	12.0	7.7	0	3.8	0	3.8	6.5	0	0	3.7	0	6.1	20.0	6.5	5.0

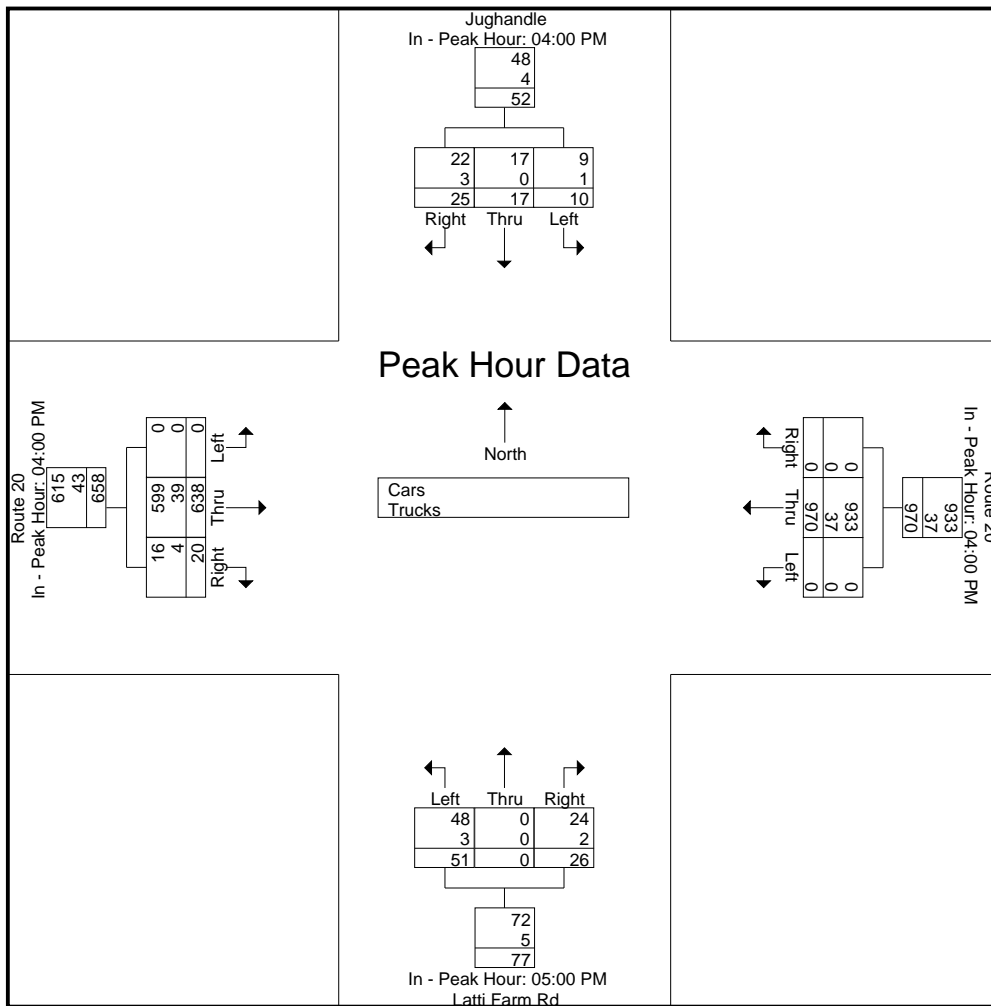
N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy



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

	04:00 PM				04:00 PM				05:00 PM				04:00 PM			
+0 mins.	2	3	11	16	0	270	0	270	16	0	10	26	0	176	6	182
+15 mins.	3	7	5	15	0	248	0	248	16	0	7	23	0	134	8	142
+30 mins.	1	4	5	10	0	237	0	237	7	0	4	11	0	168	4	172
+45 mins.	4	3	4	11	0	215	0	215	12	0	5	17	0	160	2	162
Total Volume	10	17	25	52	0	970	0	970	51	0	26	77	0	638	20	658
% App. Total	19.2	32.7	48.1		0	100	0		66.2	0	33.8		0	97	3	
PHF	.625	.607	.568	.813	.000	.898	.000	.898	.797	.000	.650	.740	.000	.906	.625	.904
Cars	9	17	22	48	0	933	0	933	48	0	24	72	0	599	16	615
% Cars	90	100	88	92.3	0	96.2	0	96.2	94.1	0	92.3	93.5	0	93.9	80	93.5
Trucks	1	0	3	4	0	37	0	37	3	0	2	5	0	39	4	43
% Trucks	10	0	12	7.7	0	3.8	0	3.8	5.9	0	7.7	6.5	0	6.1	20	6.5

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy





**Accurate Counts**  
978-664-2565

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy

File Name : 88540001  
Site Code : 88540001  
Start Date : 1/21/2021  
Page No : 4

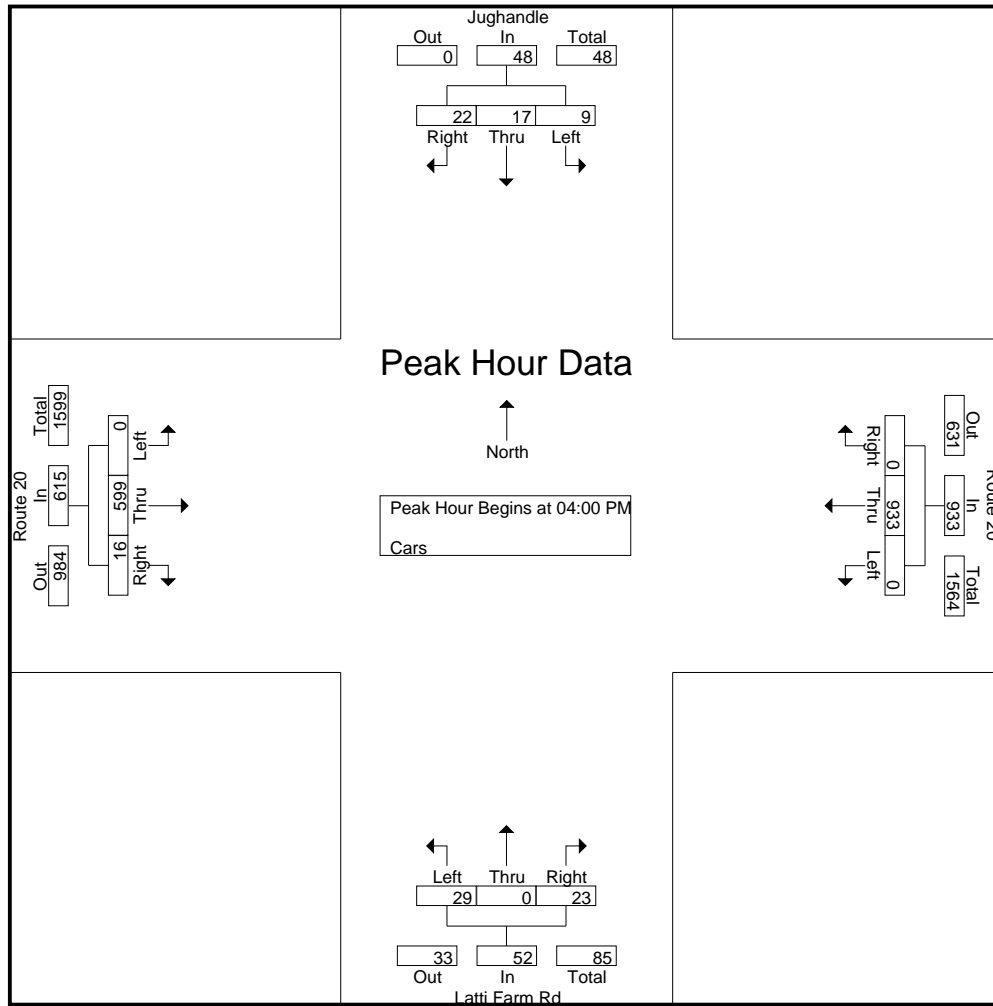
Groups Printed- Cars

Start Time	Jughandle From North			Route 20 From East			Latti Farm Rd From South			Route 20 From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	2	3	9	0	262	0	14	0	6	0	156	5	457
04:15 PM	3	7	4	0	242	0	4	0	6	0	128	6	400
04:30 PM	1	4	5	0	222	0	7	0	6	0	160	3	408
04:45 PM	3	3	4	0	207	0	4	0	5	0	155	2	383
Total	9	17	22	0	933	0	29	0	23	0	599	16	1648
05:00 PM	5	2	5	0	257	0	14	0	9	0	151	5	448
05:15 PM	0	2	2	0	242	0	16	0	6	0	130	0	398
05:30 PM	0	0	2	0	208	0	7	0	4	0	116	2	339
05:45 PM	0	0	2	0	154	0	11	0	5	0	115	4	291
Total	5	4	11	0	861	0	48	0	24	0	512	11	1476
Grand Total	14	21	33	0	1794	0	77	0	47	0	1111	27	3124
Apprch %	20.6	30.9	48.5	0	100	0	62.1	0	37.9	0	97.6	2.4	
Total %	0.4	0.7	1.1	0	57.4	0	2.5	0	1.5	0	35.6	0.9	

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	2	3	9	14	0	262	0	262	14	0	6	20	0	156	5	161	457
04:15 PM	3	7	4	14	0	242	0	242	4	0	6	10	0	128	6	134	400
04:30 PM	1	4	5	10	0	222	0	222	7	0	6	13	0	160	3	163	408
04:45 PM	3	3	4	10	0	207	0	207	4	0	5	9	0	155	2	157	383
Total Volume	9	17	22	48	0	933	0	933	29	0	23	52	0	599	16	615	1648
% App. Total	18.8	35.4	45.8		0	100	0		55.8	0	44.2		0	97.4	2.6		
PHF	.750	.607	.611	.857	.000	.890	.000	.890	.518	.000	.958	.650	.000	.936	.667	.943	.902

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy

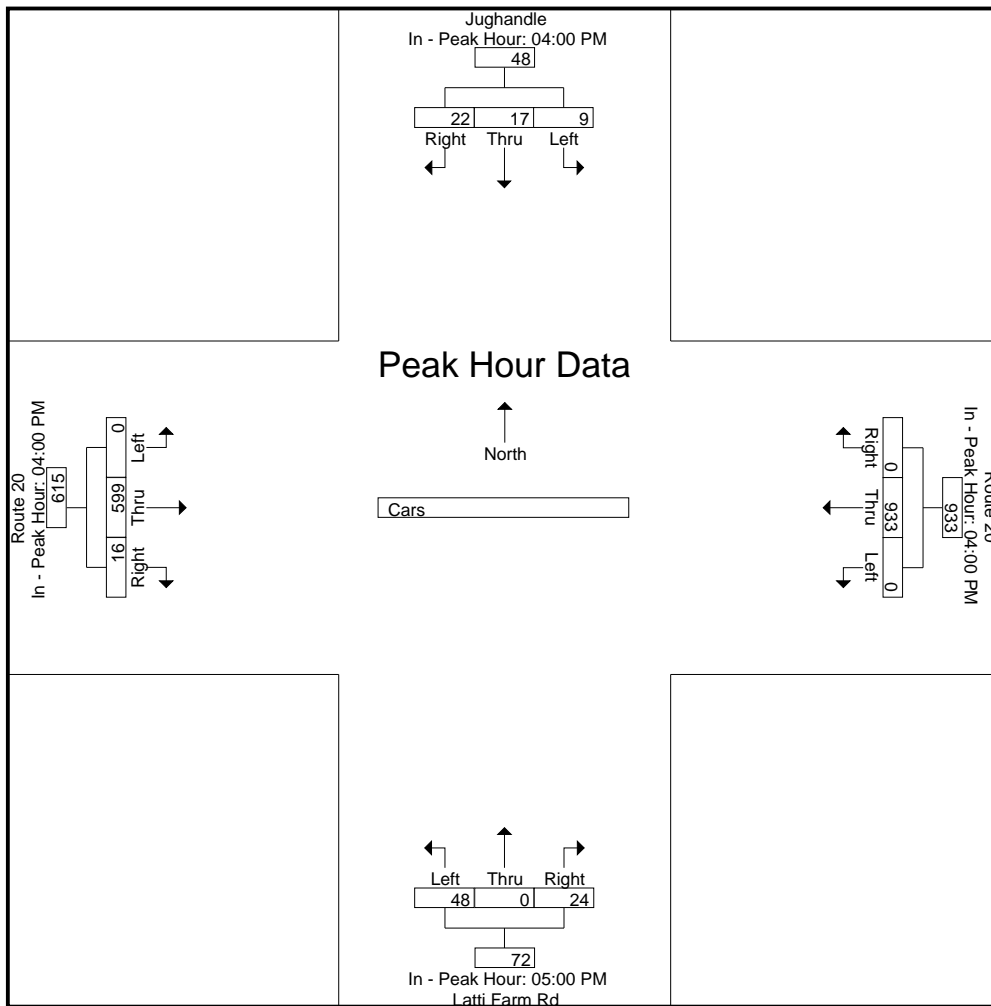
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Site Code : 88540001  
Start Date : 1/21/2021  
Page No : 5



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

	04:00 PM				04:00 PM				05:00 PM				04:00 PM			
+0 mins.	2	3	9	14	0	262	0	262	14	0	9	23	0	156	5	161
+15 mins.	3	7	4	14	0	242	0	242	16	0	6	22	0	128	6	134
+30 mins.	1	4	5	10	0	222	0	222	7	0	4	11	0	160	3	163
+45 mins.	3	3	4	10	0	207	0	207	11	0	5	16	0	155	2	157
Total Volume	9	17	22	48	0	933	0	933	48	0	24	72	0	599	16	615
% App. Total	18.8	35.4	45.8		0	100	0		66.7	0	33.3		0	97.4	2.6	
PHF	.750	.607	.611	.857	.000	.890	.000	.890	.750	.000	.667	.783	.000	.936	.667	.943

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy



**Accurate Counts**  
978-664-2565

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy

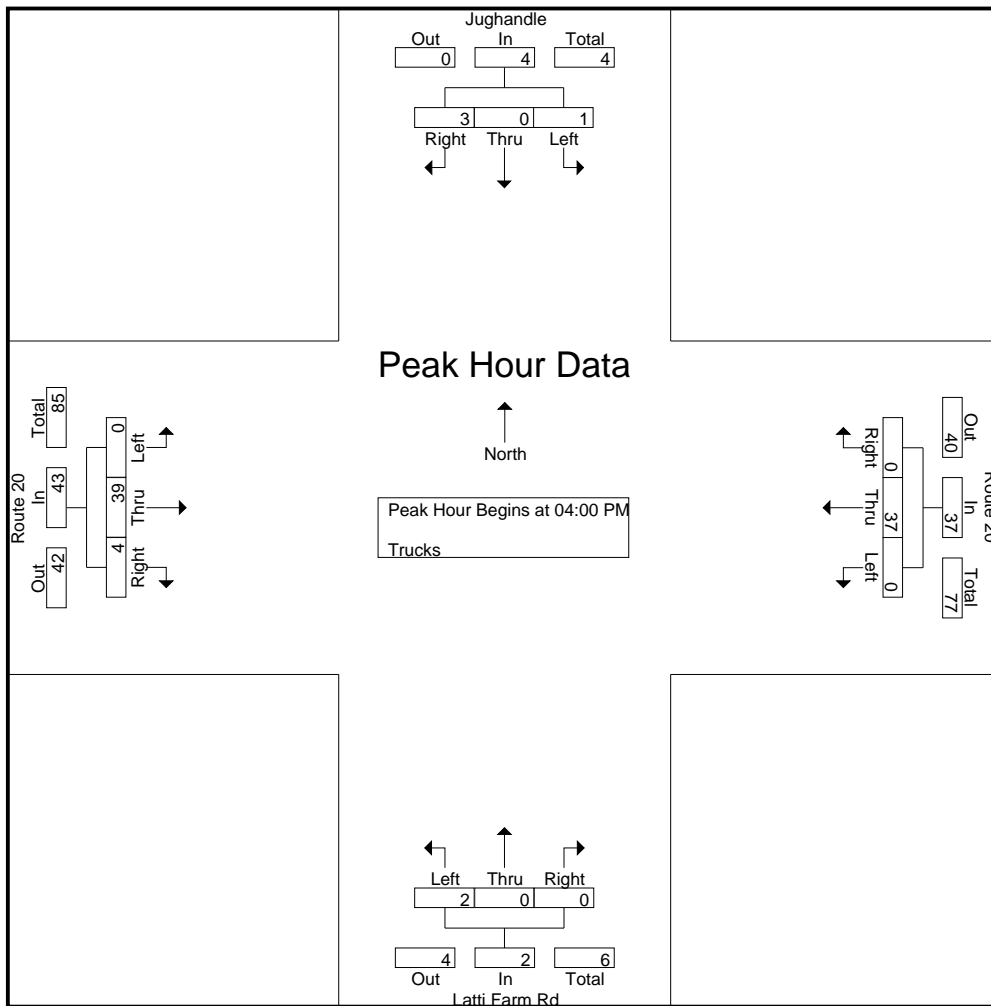
File Name : 88540001  
Site Code : 88540001  
Start Date : 1/21/2021  
Page No : 7

Groups Printed- Trucks

Start Time	Jughandle From North			Route 20 From East			Latti Farm Rd From South			Route 20 From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
04:00 PM	0	0	2	0	8	0	1	0	0	0	20	1	32
04:15 PM	0	0	1	0	6	0	1	0	0	0	6	2	16
04:30 PM	0	0	0	0	15	0	0	0	0	0	8	1	24
04:45 PM	1	0	0	0	8	0	0	0	0	0	5	0	14
<b>Total</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>37</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>39</b>	<b>4</b>	<b>86</b>
05:00 PM	0	1	0	0	5	0	2	0	1	0	5	0	14
05:15 PM	0	0	0	0	2	0	0	0	1	0	11	0	14
05:30 PM	0	0	0	0	2	0	0	0	0	0	8	2	12
05:45 PM	0	0	0	0	6	0	1	0	0	0	3	1	11
<b>Total</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>27</b>	<b>3</b>	<b>51</b>
<b>Grand Total</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>0</b>	<b>52</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>66</b>	<b>7</b>	<b>137</b>
Apprch %	20	20	60	0	100	0	71.4	0	28.6	0	90.4	9.6	
Total %	0.7	0.7	2.2	0	38	0	3.6	0	1.5	0	48.2	5.1	

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	2	2	0	8	0	8	1	0	0	1	0	20	1	21	32
04:15 PM	0	0	1	1	0	6	0	6	1	0	0	1	0	6	2	8	16
04:30 PM	0	0	0	0	0	15	0	15	0	0	0	0	0	8	1	9	24
04:45 PM	1	0	0	1	0	8	0	8	0	0	0	0	0	5	0	5	14
<b>Total Volume</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>4</b>	<b>0</b>	<b>37</b>	<b>0</b>	<b>37</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>39</b>	<b>4</b>	<b>43</b>	<b>86</b>
<b>% App. Total</b>	<b>25</b>	<b>0</b>	<b>75</b>		<b>0</b>	<b>100</b>	<b>0</b>		<b>100</b>	<b>0</b>	<b>0</b>		<b>0</b>	<b>90.7</b>	<b>9.3</b>		
PHF	.250	.000	.375	.500	.000	.617	.000	.617	.500	.000	.000	.500	.000	.488	.500	.512	.672

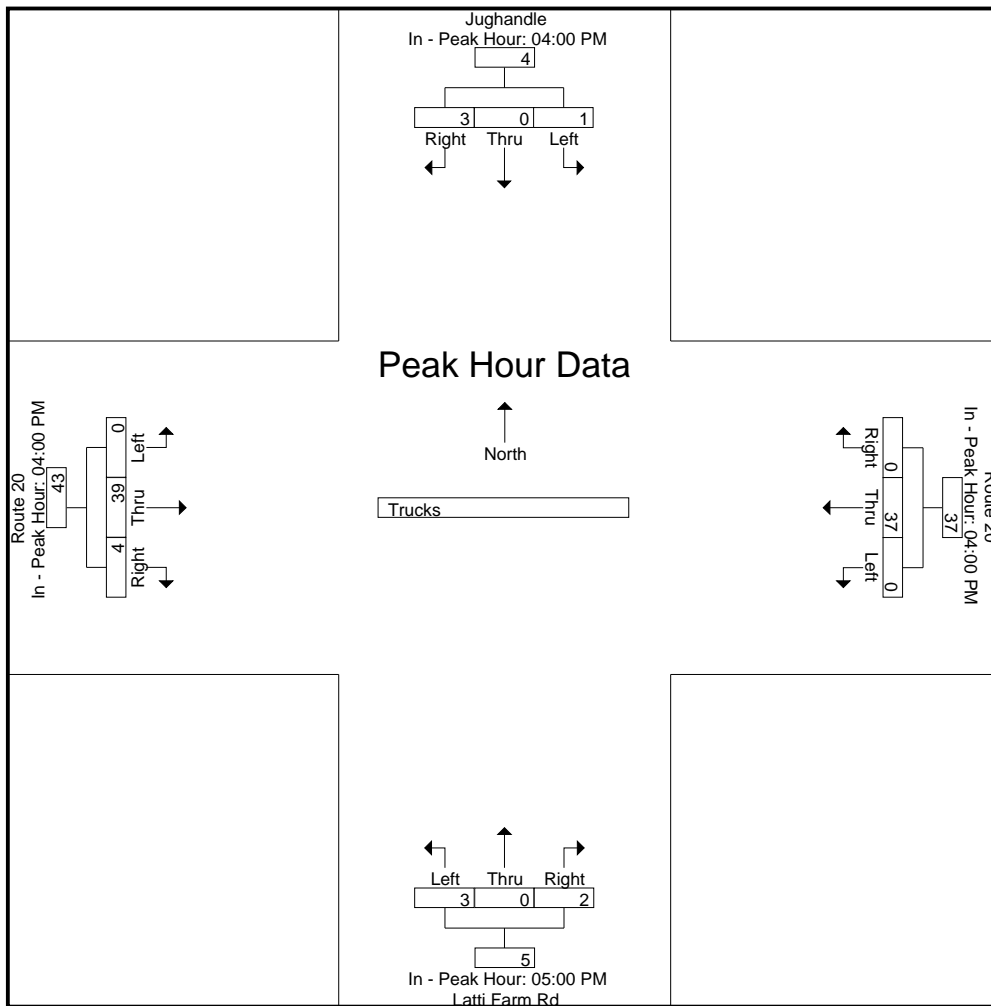
N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy



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

	04:00 PM				04:00 PM				05:00 PM				04:00 PM			
+0 mins.	0	0	2	2	0	8	0	8	2	0	1	3	0	20	1	21
+15 mins.	0	0	1	1	0	6	0	6	0	0	1	1	0	6	2	8
+30 mins.	0	0	0	0	0	15	0	15	0	0	0	0	0	8	1	9
+45 mins.	1	0	0	1	0	8	0	8	1	0	0	1	0	5	0	5
Total Volume	1	0	3	4	0	37	0	37	3	0	2	5	0	39	4	43
% App. Total	25	0	75		0	100	0		60	0	40		0	90.7	9.3	
PHF	.250	.000	.375	.500	.000	.617	.000	.617	.375	.000	.500	.417	.000	.488	.500	.512

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy



**Accurate Counts**  
978-664-2565

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy

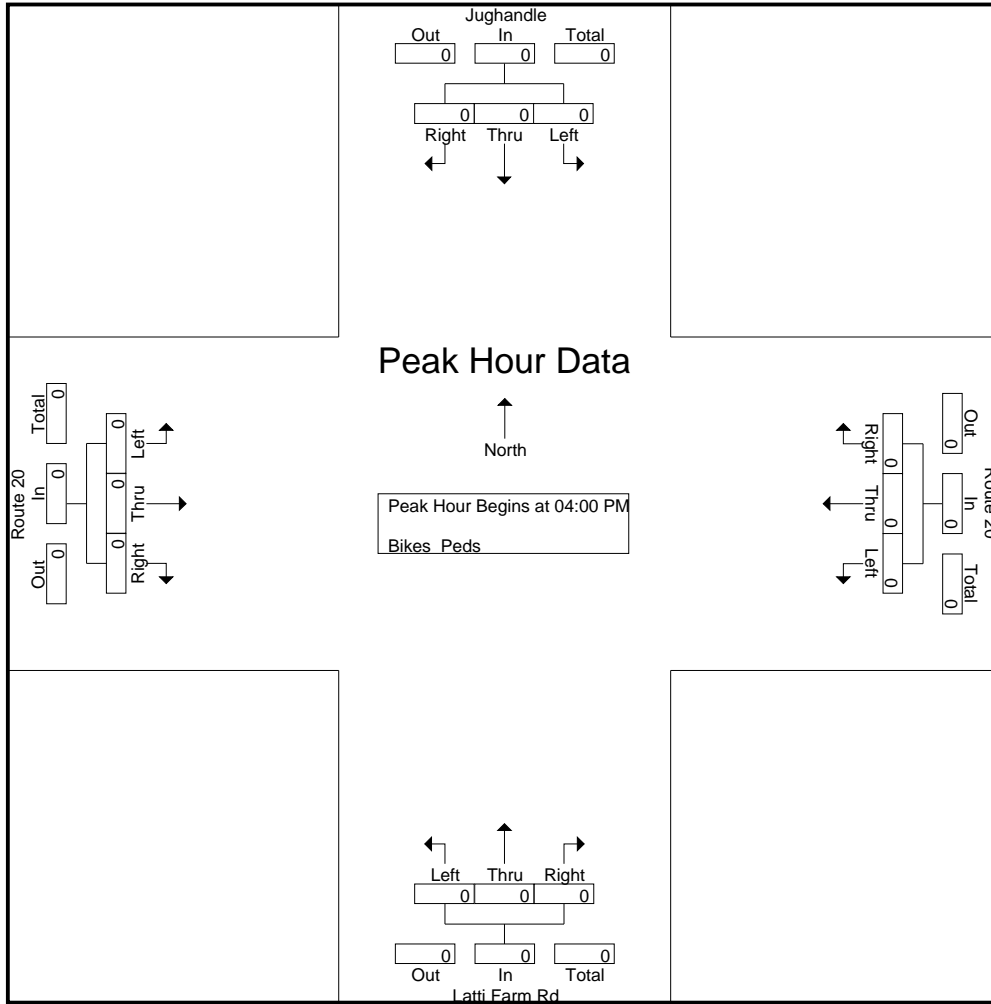
File Name : 88540001  
Site Code : 88540001  
Start Date : 1/21/2021  
Page No : 10

Groups Printed- Bikes Peds

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	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
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	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
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	0	0	

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total		
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 04:00 PM																		
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0			
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy

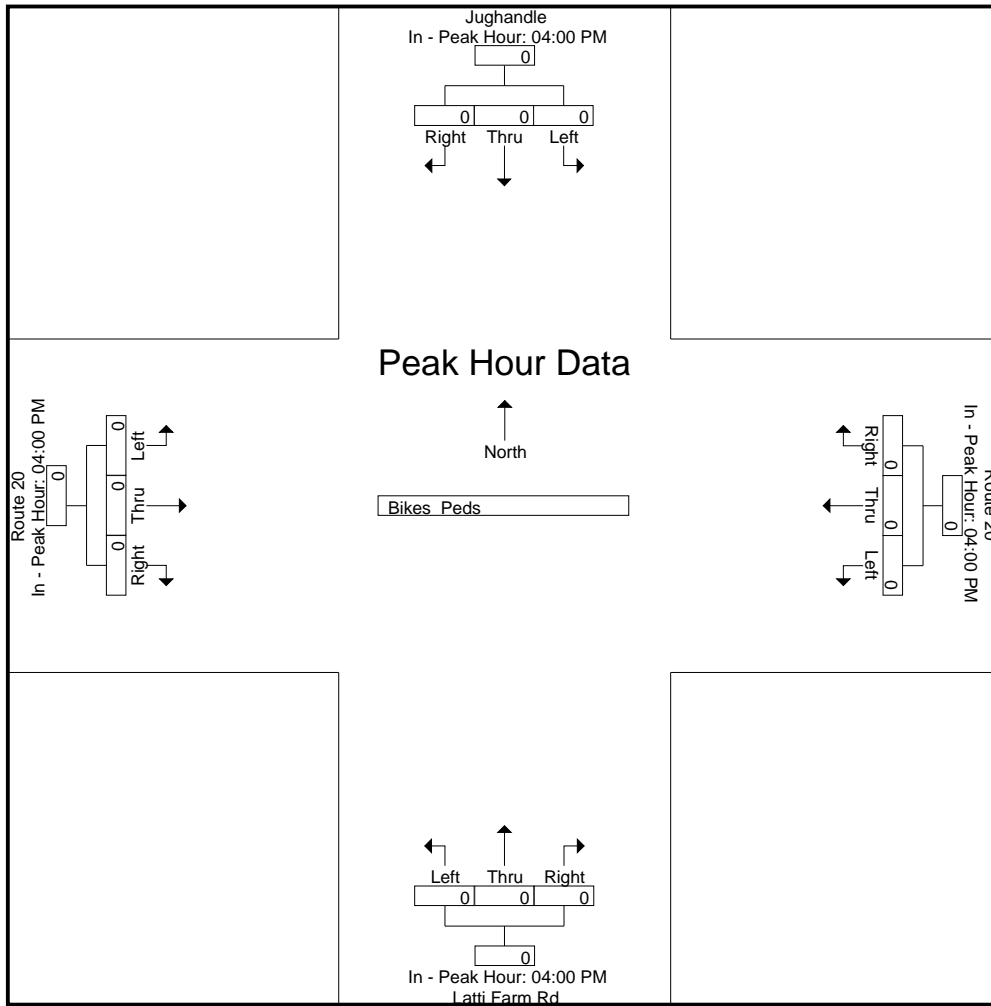


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:00 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000



N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Cloudy



**Accurate Counts**  
978-664-2565

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Clear

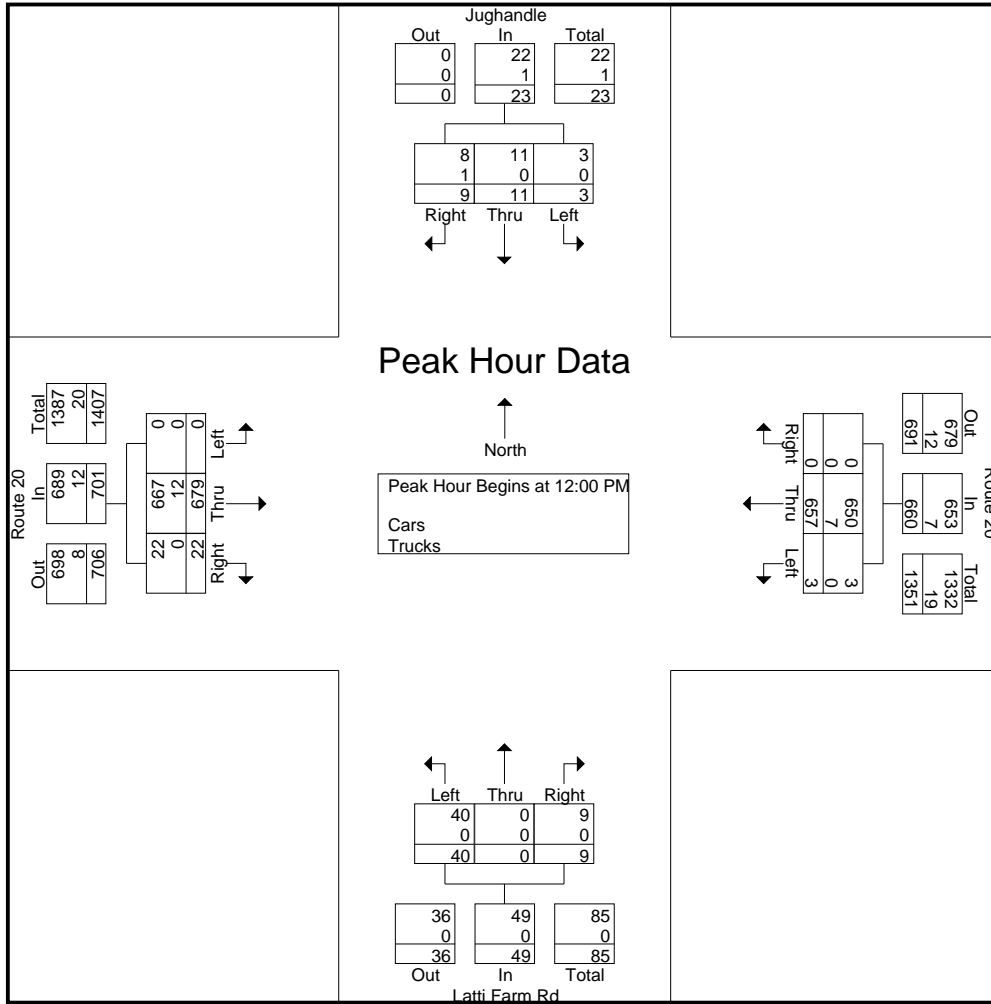
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Site Code : 88540001  
Start Date : 1/23/2021  
Page No : 1

Groups Printed- Cars - Trucks

Start Time	Jughandle From North			Route 20 From East			Latti Farm Rd From South			Route 20 From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
11:00 AM	1	3	1	0	146	0	5	0	3	0	146	6	311
11:15 AM	0	2	1	0	167	0	6	0	4	0	146	5	331
11:30 AM	1	4	3	0	182	0	6	0	2	0	146	5	349
11:45 AM	0	5	1	0	162	0	8	0	4	0	151	6	337
<b>Total</b>	<b>2</b>	<b>14</b>	<b>6</b>	<b>0</b>	<b>657</b>	<b>0</b>	<b>25</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>589</b>	<b>22</b>	<b>1328</b>
12:00 PM	2	2	7	0	159	0	15	0	1	0	178	6	370
12:15 PM	0	3	0	1	175	0	8	0	1	0	164	5	357
12:30 PM	0	3	2	0	163	0	7	0	7	0	152	5	339
12:45 PM	1	3	0	2	160	0	10	0	0	0	185	6	367
<b>Total</b>	<b>3</b>	<b>11</b>	<b>9</b>	<b>3</b>	<b>657</b>	<b>0</b>	<b>40</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>679</b>	<b>22</b>	<b>1433</b>
01:00 PM	0	2	0	0	185	0	5	0	4	0	144	7	347
01:15 PM	0	0	1	0	182	0	7	0	4	0	144	4	342
01:30 PM	1	3	0	0	190	0	6	0	4	0	160	2	366
01:45 PM	1	1	0	0	185	0	8	0	8	0	148	7	358
<b>Total</b>	<b>2</b>	<b>6</b>	<b>1</b>	<b>0</b>	<b>742</b>	<b>0</b>	<b>26</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>596</b>	<b>20</b>	<b>1413</b>
<b>Grand Total</b>	<b>7</b>	<b>31</b>	<b>16</b>	<b>3</b>	<b>2056</b>	<b>0</b>	<b>91</b>	<b>0</b>	<b>42</b>	<b>0</b>	<b>1864</b>	<b>64</b>	<b>4174</b>
Apprch %	13	57.4	29.6	0.1	99.9	0	68.4	0	31.6	0	96.7	3.3	
Total %	0.2	0.7	0.4	0.1	49.3	0	2.2	0	1	0	44.7	1.5	
Cars	7	31	14	3	2009	0	91	0	42	0	1831	63	4091
% Cars	100	100	87.5	100	97.7	0	100	0	100	0	98.2	98.4	98
Trucks	0	0	2	0	47	0	0	0	0	0	33	1	83
% Trucks	0	0	12.5	0	2.3	0	0	0	0	0	1.8	1.6	2

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	2	2	7	11	0	159	0	159	15	0	1	16	0	178	6	184	370
12:15 PM	0	3	0	3	1	175	0	176	8	0	1	9	0	164	5	169	357
12:30 PM	0	3	2	5	0	163	0	163	7	0	7	14	0	152	5	157	339
12:45 PM	1	3	0	4	2	160	0	162	10	0	0	10	0	185	6	191	367
<b>Total Volume</b>	<b>3</b>	<b>11</b>	<b>9</b>	<b>23</b>	<b>3</b>	<b>657</b>	<b>0</b>	<b>660</b>	<b>40</b>	<b>0</b>	<b>9</b>	<b>49</b>	<b>0</b>	<b>679</b>	<b>22</b>	<b>701</b>	<b>1433</b>
% App. Total	13	47.8	39.1		0.5	99.5	0		81.6	0	18.4		0	96.9	3.1		
PHF	.375	.917	.321	.523	.375	.939	.000	.938	.667	.000	.321	.766	.000	.918	.917	.918	.968
Cars	3	11	8	22	3	650	0	653	40	0	9	49	0	667	22	689	1413
% Cars	100	100	88.9	95.7	100	98.9	0	98.9	100	0	100	100	0	98.2	100	98.3	98.6
Trucks	0	0	1	1	0	7	0	7	0	0	0	0	0	12	0	12	20
% Trucks	0	0	11.1	4.3	0	1.1	0	1.1	0	0	0	0	0	1.8	0	1.7	1.4

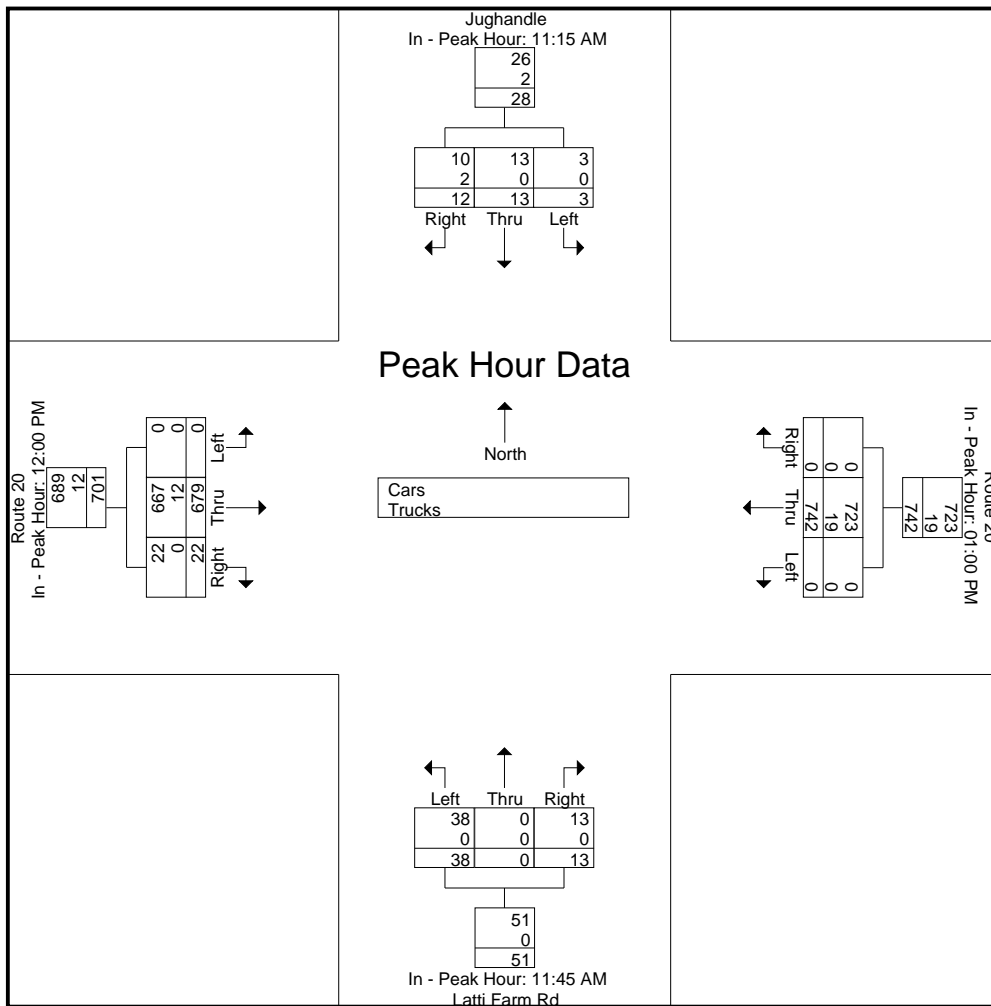
N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	11:15 AM				01:00 PM				11:45 AM				12:00 PM			
+0 mins.	0	2	1	3	0	185	0	185	8	0	4	12	0	178	6	184
+15 mins.	1	4	3	8	0	182	0	182	15	0	1	16	0	164	5	169
+30 mins.	0	5	1	6	0	190	0	190	8	0	1	9	0	152	5	157
+45 mins.	2	2	7	11	0	185	0	185	7	0	7	14	0	185	6	191
Total Volume	3	13	12	28	0	742	0	742	38	0	13	51	0	679	22	701
% App. Total	10.7	46.4	42.9		0	100	0	100	74.5	0	25.5		0	96.9	3.1	
PHF	.375	.650	.429	.636	.000	.976	.000	.976	.633	.000	.464	.797	.000	.918	.917	.918
Cars	3	13	10	26	0	723	0	723	38	0	13	51	0	667	22	689
% Cars	100	100	83.3	92.9	0	97.4	0	97.4	100	0	100	100	0	98.2	100	98.3
Trucks	0	0	2	2	0	19	0	19	0	0	0	0	0	12	0	12
% Trucks	0	0	16.7	7.1	0	2.6	0	2.6	0	0	0	0	0	1.8	0	1.7

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Clear



**Accurate Counts**  
978-664-2565

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Clear

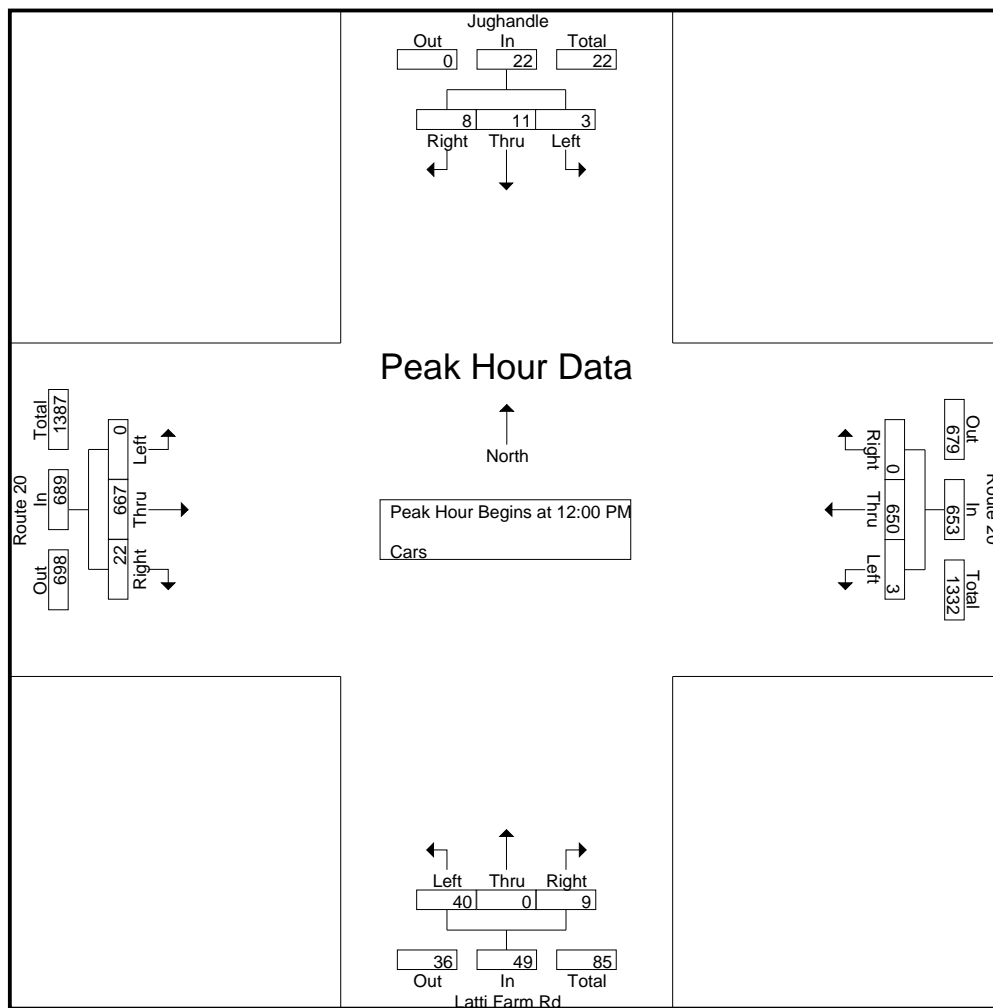
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Site Code : 88540001  
Start Date : 1/23/2021  
Page No : 4

Groups Printed- Cars

Start Time	Jughandle From North			Route 20 From East			Latti Farm Rd From South			Route 20 From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
11:00 AM	1	3	1	0	142	0	5	0	3	0	142	6	303
11:15 AM	0	2	0	0	160	0	6	0	4	0	143	5	320
11:30 AM	1	4	3	0	178	0	6	0	2	0	144	5	343
11:45 AM	0	5	1	0	156	0	8	0	4	0	150	6	330
<b>Total</b>	<b>2</b>	<b>14</b>	<b>5</b>	<b>0</b>	<b>636</b>	<b>0</b>	<b>25</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>579</b>	<b>22</b>	<b>1296</b>
12:00 PM	2	2	6	0	159	0	15	0	1	0	177	6	368
12:15 PM	0	3	0	1	174	0	8	0	1	0	159	5	351
12:30 PM	0	3	2	0	161	0	7	0	7	0	148	5	333
12:45 PM	1	3	0	2	156	0	10	0	0	0	183	6	361
<b>Total</b>	<b>3</b>	<b>11</b>	<b>8</b>	<b>3</b>	<b>650</b>	<b>0</b>	<b>40</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>667</b>	<b>22</b>	<b>1413</b>
01:00 PM	0	2	0	0	181	0	5	0	4	0	140	7	339
01:15 PM	0	0	1	0	176	0	7	0	4	0	142	4	334
01:30 PM	1	3	0	0	184	0	6	0	4	0	157	2	357
01:45 PM	1	1	0	0	182	0	8	0	8	0	146	6	352
<b>Total</b>	<b>2</b>	<b>6</b>	<b>1</b>	<b>0</b>	<b>723</b>	<b>0</b>	<b>26</b>	<b>0</b>	<b>20</b>	<b>0</b>	<b>585</b>	<b>19</b>	<b>1382</b>
<b>Grand Total</b>	<b>7</b>	<b>31</b>	<b>14</b>	<b>3</b>	<b>2009</b>	<b>0</b>	<b>91</b>	<b>0</b>	<b>42</b>	<b>0</b>	<b>1831</b>	<b>63</b>	<b>4091</b>
Apprch %	13.5	59.6	26.9	0.1	99.9	0	68.4	0	31.6	0	96.7	3.3	
Total %	0.2	0.8	0.3	0.1	49.1	0	2.2	0	1	0	44.8	1.5	

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:00 PM																	
12:00 PM	2	2	6	10	0	159	0	159	15	0	1	16	0	177	6	183	368
12:15 PM	0	3	0	3	1	174	0	175	8	0	1	9	0	159	5	164	351
12:30 PM	0	3	2	5	0	161	0	161	7	0	7	14	0	148	5	153	333
12:45 PM	1	3	0	4	2	156	0	158	10	0	0	10	0	183	6	189	361
<b>Total Volume</b>	<b>3</b>	<b>11</b>	<b>8</b>	<b>22</b>	<b>3</b>	<b>650</b>	<b>0</b>	<b>653</b>	<b>40</b>	<b>0</b>	<b>9</b>	<b>49</b>	<b>0</b>	<b>667</b>	<b>22</b>	<b>689</b>	<b>1413</b>
<b>% App. Total</b>	<b>13.6</b>	<b>50</b>	<b>36.4</b>		<b>0.5</b>	<b>99.5</b>	<b>0</b>		<b>81.6</b>	<b>0</b>	<b>18.4</b>		<b>0</b>	<b>96.8</b>	<b>3.2</b>		
PHF	.375	.917	.333	.550	.375	.934	.000	.933	.667	.000	.321	.766	.000	.911	.917	.911	.960

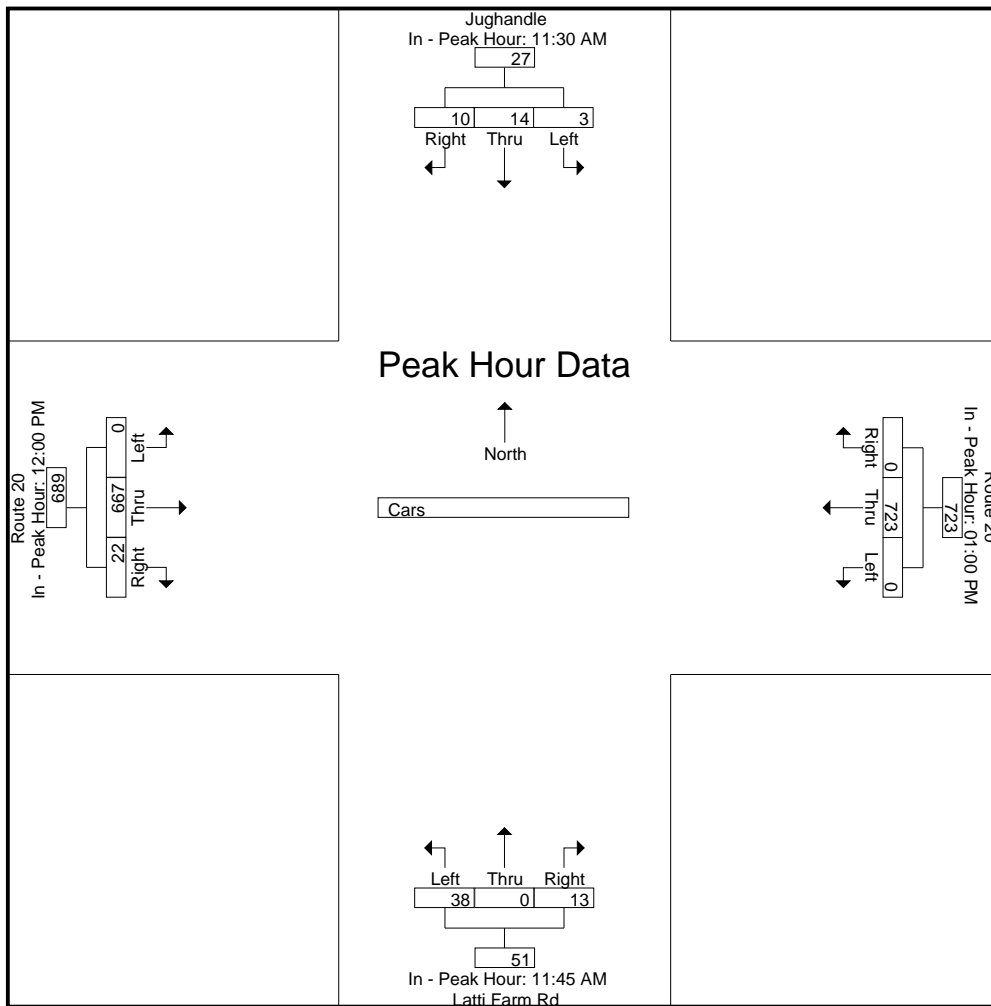
N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	11:30 AM				01:00 PM				11:45 AM				12:00 PM			
+0 mins.	1	4	3	8	0	181	0	181	8	0	4	12	0	177	6	183
+15 mins.	0	5	1	6	0	176	0	176	15	0	1	16	0	159	5	164
+30 mins.	2	2	6	10	0	184	0	184	8	0	1	9	0	148	5	153
+45 mins.	0	3	0	3	0	182	0	182	7	0	7	14	0	183	6	189
Total Volume	3	14	10	27	0	723	0	723	38	0	13	51	0	667	22	689
% App. Total	11.1	51.9	37		0	100	0		74.5	0	25.5		0	96.8	3.2	
PHF	.375	.700	.417	.675	.000	.982	.000	.982	.633	.000	.464	.797	.000	.911	.917	.911

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Clear



**Accurate Counts**  
978-664-2565

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Clear

File Name : 885400S1  
Site Code : 88540001  
Start Date : 1/23/2021  
Page No : 7

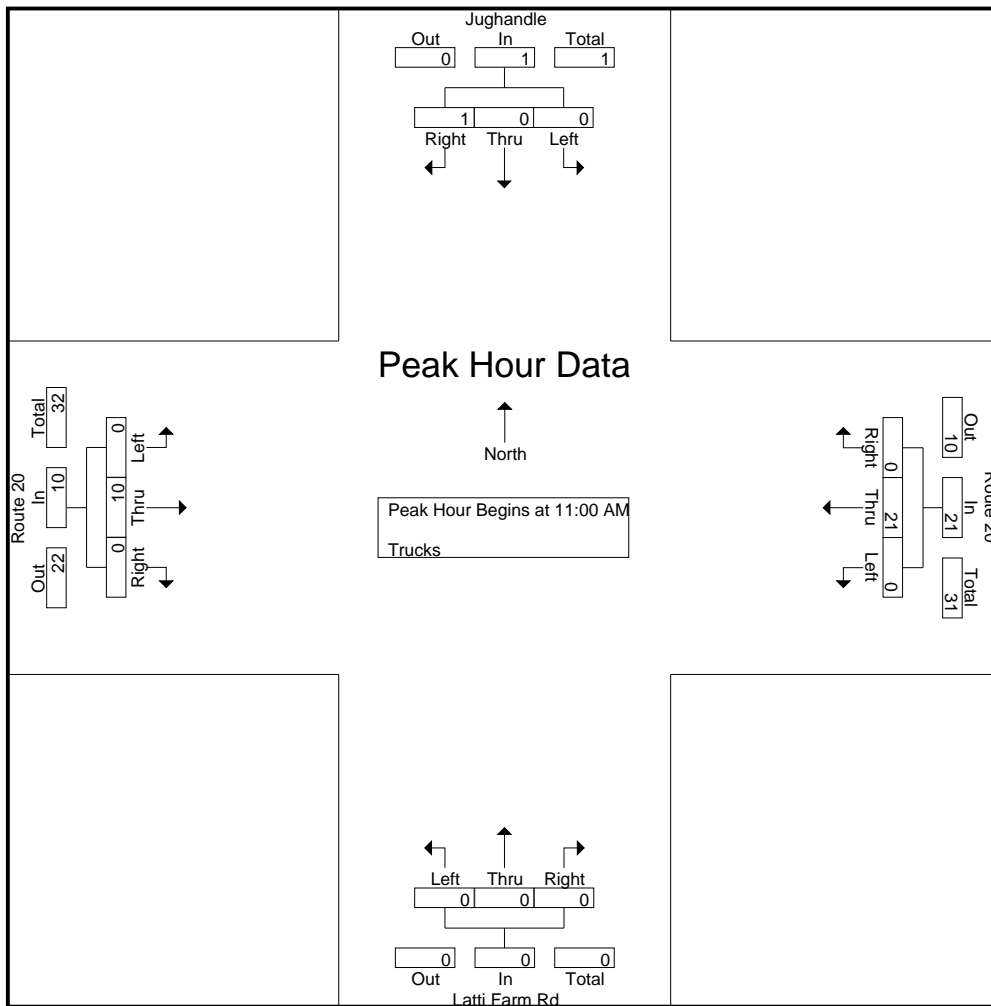
Groups Printed- Trucks

Start Time	Jughandle From North			Route 20 From East			Latti Farm Rd From South			Route 20 From West			Int. Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
11:00 AM	0	0	0	0	4	0	0	0	0	0	4	0	8
11:15 AM	0	0	1	0	7	0	0	0	0	0	3	0	11
11:30 AM	0	0	0	0	4	0	0	0	0	0	2	0	6
11:45 AM	0	0	0	0	6	0	0	0	0	0	1	0	7
<b>Total</b>	0	0	1	0	21	0	0	0	0	0	10	0	32
12:00 PM	0	0	1	0	0	0	0	0	0	0	1	0	2
12:15 PM	0	0	0	0	1	0	0	0	0	0	5	0	6
12:30 PM	0	0	0	0	2	0	0	0	0	0	4	0	6
12:45 PM	0	0	0	0	4	0	0	0	0	0	2	0	6
<b>Total</b>	0	0	1	0	7	0	0	0	0	0	12	0	20
01:00 PM	0	0	0	0	4	0	0	0	0	0	4	0	8
01:15 PM	0	0	0	0	6	0	0	0	0	0	2	0	8
01:30 PM	0	0	0	0	6	0	0	0	0	0	3	0	9
01:45 PM	0	0	0	0	3	0	0	0	0	0	2	1	6
<b>Total</b>	0	0	0	0	19	0	0	0	0	0	11	1	31
<b>Grand Total</b>	0	0	2	0	47	0	0	0	0	0	33	1	83
Apprch %	0	0	100	0	100	0	0	0	0	0	97.1	2.9	
Total %	0	0	2.4	0	56.6	0	0	0	0	0	39.8	1.2	

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:00 AM																	
11:00 AM	0	0	0	0	0	4	0	4	0	0	0	0	0	4	0	4	8
11:15 AM	0	0	1	1	0	7	0	7	0	0	0	0	0	3	0	3	11
11:30 AM	0	0	0	0	0	4	0	4	0	0	0	0	0	2	0	2	6
11:45 AM	0	0	0	0	0	6	0	6	0	0	0	0	0	1	0	1	7
<b>Total Volume</b>	0	0	1	1	0	21	0	21	0	0	0	0	0	10	0	10	32
<b>% App. Total</b>	0	0	100		0	100	0		0	0	0		0	100	0		
<b>PHF</b>	.000	.000	.250	.250	.000	.750	.000	.750	.000	.000	.000	.000	.000	.625	.000	.625	.727



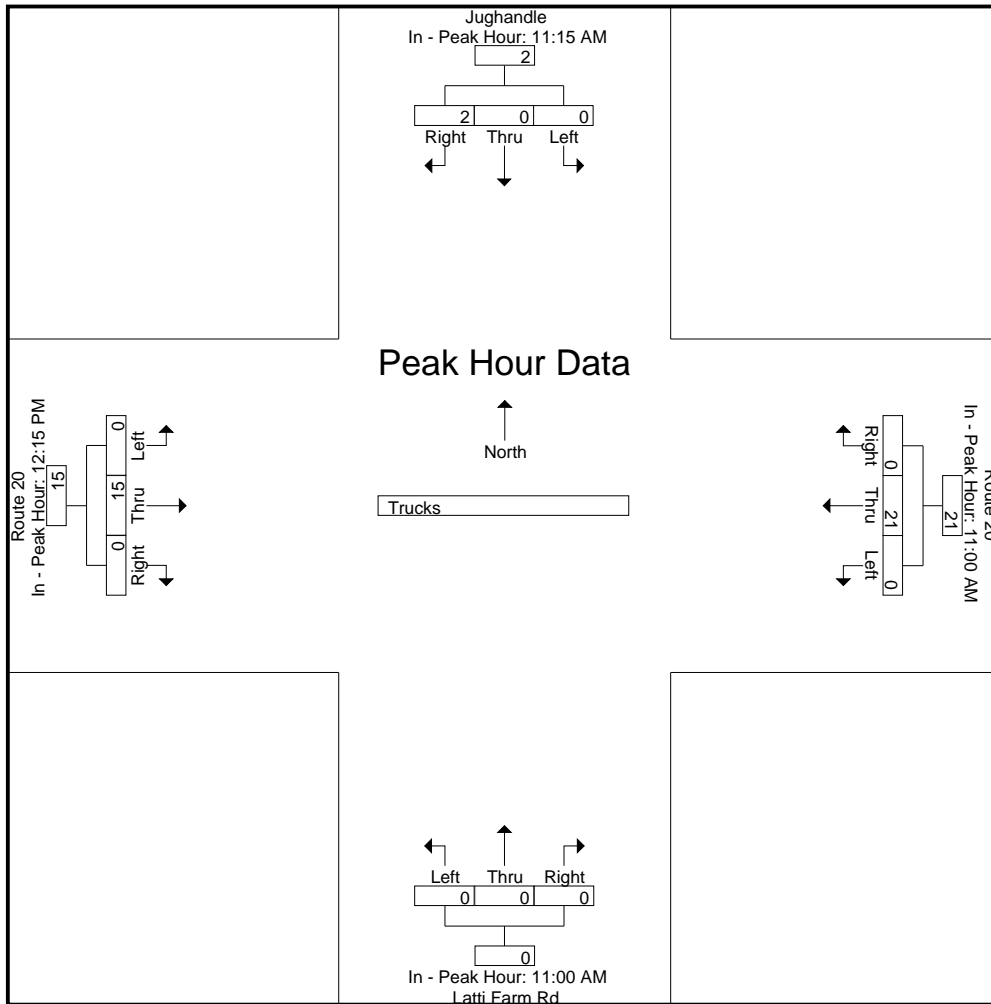
N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	11:15 AM				11:00 AM				11:00 AM				12:15 PM			
+0 mins.	0	0	1	1	0	4	0	4	0	0	0	0	0	5	0	5
+15 mins.	0	0	0	0	0	7	0	7	0	0	0	0	0	4	0	4
+30 mins.	0	0	0	0	0	4	0	4	0	0	0	0	0	2	0	2
+45 mins.	0	0	1	1	0	6	0	6	0	0	0	0	0	4	0	4
Total Volume	0	0	2	2	0	21	0	21	0	0	0	0	0	15	0	15
% App. Total	0	0	100	100	0	100	0	100	0	0	0	0	0	100	0	100
PHF	.000	.000	.500	.500	.000	.750	.000	.750	.000	.000	.000	.000	.000	.750	.000	.750

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Clear



**Accurate Counts**  
978-664-2565

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Clear

File Name : 885400S1  
Site Code : 88540001  
Start Date : 1/23/2021  
Page No : 10

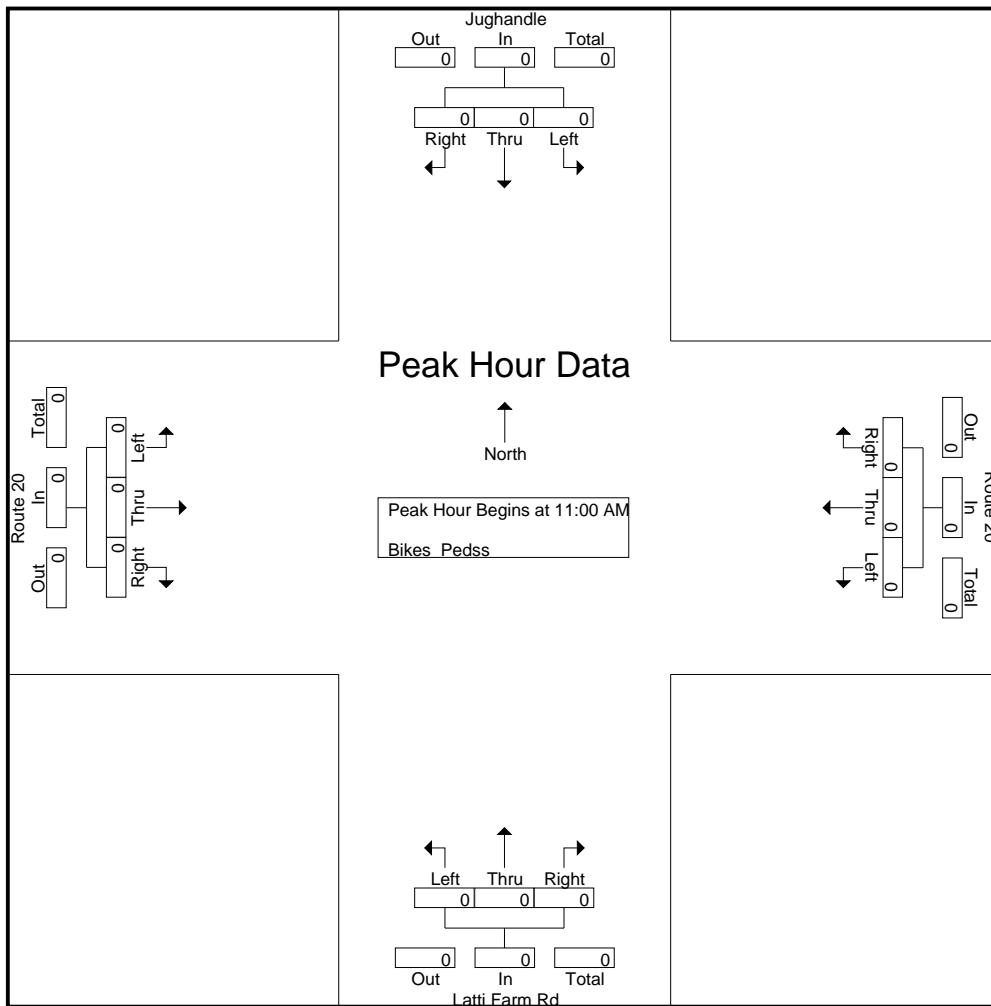
Groups Printed- Bikes Pedss

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Exclu. Total	Inclu. Total	Int. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds			
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	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
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	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	0	0	0	0	0	0	0
12:30 PM	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
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	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
01:30 PM	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	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0		0	0	0		0	0	0		0	0	0				
Total %																	0	0	

Start Time	Jughandle From North				Route 20 From East				Latti Farm Rd From South				Route 20 From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	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
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1  
Peak Hour for Entire Intersection Begins at 11:00 AM

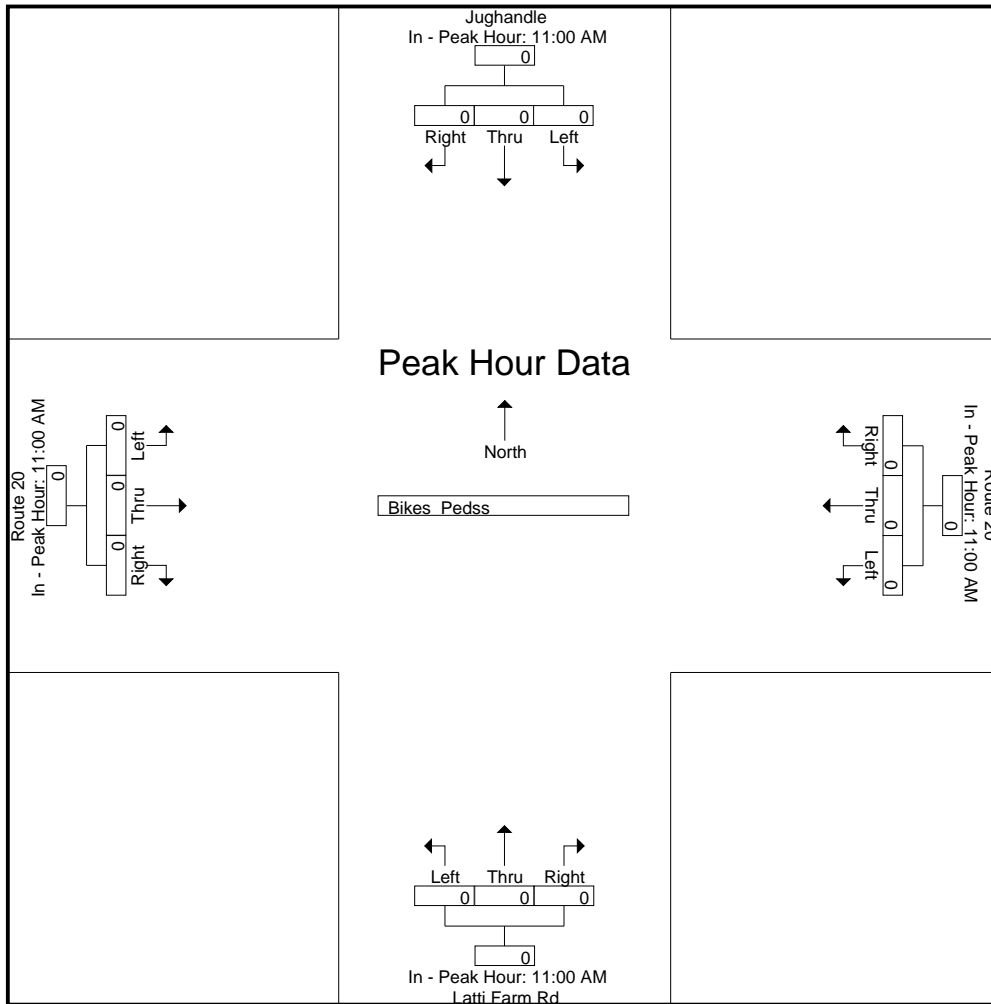
N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Clear



Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1  
Peak Hour for Each Approach Begins at:

	11:00 AM				11:00 AM				11:00 AM				11:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

N/S Street : Jughandle / Latti Farm Road  
E/W Street : Route 20  
City/State : Worcester, MA  
Weather : Clear



SEASONAL ADJUSTMENT DATA

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# Massachusetts Highway Department

## AET07: Monthly Hourly Volume for January 2019

**Location ID:** AET07  
**County:** Middlesex  
**Function Class:** 1  
**Location:** MASSACHUSETTS TURNPIKE

**Seasonal Factor Group:** U1-Boston  
**Daily Factor Group:**  
**Axle Factor Group:** U1-Boston  
**Growth Factor Group:**

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status	
1	641	842	733	540	449	506	703	891	1452	2288	3798	5490	6459	6783	6932	6970	6284	5414	4592	3792	2994	2155	1572	994	73274	Accepted	
2	705	488	468	564	1239	3703	4921	5746	5469	4754	4542	4363	4929	4908	5720	6857	6719	6315	4368	3184	2247	1920	1529	1285	86943	Accepted	
3	795	566	540	669	1341	3545	4637	5444	5545	4721	4322	4292	4425	4694	5665	6342	6747	6422	4645	3188	2404	1964	1787	1045	85745	Accepted	
4	728	539	564	695	1273	3422	4513	5344	5191	4668	4576	4705	4974	5398	6358	7029	7356	7050	5316	3695	2931	2326	1894	1490	92035	Accepted	
5	867	594	528	496	700	1159	1720	2233	3156	3926	4858	5298	5397	5411	5572	5557	5117	4580	3944	3065	2543	2000	1886	1289	71896	Accepted	
6	771	524	414	341	370	615	1069	1394	2021	3178	4270	5332	5530	5609	5832	5977	6226	5313	4561	3603	2954	2190	1549	1012	70655	Accepted	
7	664	483	454	575	1232	3698	5002	5798	5425	4607	4280	4236	4455	4546	5306	6267	6489	6215	4392	2910	2160	1754	1583	1031	83562	Accepted	
8	633	506	524	620	1211	3309	4384	5285	5277	4684	4051	3917	4137	4343	5145	6134	6328	6045	4069	2861	2244	1823	1571	932	80033	Accepted	
9	693	492	474	595	1222	3549	4862	5775	5628	4910	4336	4233	4531	4844	5701	6647	6895	6362	4457	3028	2418	2043	1750	1029	86474	Accepted	
10	690	489	530	641	1262	3716	4916	5910	5769	5036	4414	4394	4656	4929	5877	6849	7209	5440	5220	3508	2695	2187	1853	1172	89362	Accepted	
11	756	604	544	640	1174	3229	4465	5150	5548	4537	4532	5032	5167	5687	6825	7412	7469	7204	5582	4248	3037	2466	2034	1394	94736	Accepted	
12	910	620	500	520	663	1196	1720	2639	3593	4470	5171	5774	5744	5741	5741	5675	5704	4983	4300	3157	2732	2276	1888	1405	77122	Accepted	
13	877	530	411	348	340	537	933	1472	2681	3881	5003	5812	6003	5514	5237	5442	6098	6216	5594	4165	3276	2254	1616	1028	75268	Accepted	
14	682	492	434	554	1242	3716	5145	6091	5752	4725	4396	4457	4385	4579	5473	6103	5971	6501	4517	2961	2204	1794	1444	1187	84805	Accepted	
15	642	526	504	642	1266	3617	5048	5741	5697	5105	4223	4251	4273	4553	5545	6372	6473	6055	4796	2989	2370	1958	1392	926	84964	Accepted	
16	652	480	503	607	1185	3590	4995	5834	5632	4820	4335	4410	4469	4872	5758	6685	7202	6543	4487	3500	2522	1982	1424	1181	87668	Accepted	
17	751	548	509	675	1288	3536	4999	5864	5890	5091	4480	4576	4738	5204	6206	7150	7370	7019	5151	3851	2905	2427	2026	1193	93447	Accepted	
18	830	609	587	664	1147	3124	4216	5406	5243	4499	4573	4856	5236	5826	6900	7749	8116	7331	5765	4215	3204	2598	2276	1512	96482	Accepted	
19	955	673	534	536	647	1224	1762	2664	3779	5106	5838	6347	6359	6299	6552	6575	6051	5022	3622	2416	1681	1261	1056	749	77708	Accepted	
20																											
21	527	349	348	377	704	1725	2399	3103	3348	3869	4462	5401	5687	5641	6516	8029	7195	5569	4264	3902	2993	2464	1642	1128	81642	Accepted	
22	726	616	542	691	1138	3407	4705	5888	5830	4876	4451	4371	4380	4591	5036	6284	6685	6195	4555	3283	2441	1913	1498	1024	85126	Accepted	
23	759	568	593	647	1190	3430	4868	5725	5715	4690	4171	4218	4248	4527	5543	6568	6649	6337	4468	3272	2392	1929	1617	1070	85194	Accepted	
24	654	556	534	589	1134	3205	4754	5320	4380	5171	3924	4264	4369	4593	5533	6313	6361	6217	4931	3606	2683	2297	1638	1219	84245	Accepted	
25	781	628	585	661	1159	3130	4425	5567	5430	4796	4943	5195	5436	6061	7152	7571	7580	7121	6251	4647	3339	2681	2029	1482	98650	Accepted	
26	994	588	543	527	635	1152	1825	3033	3966	4832	5745	6206	6155	6035	6070	6223	6141	5487	4496	3433	2939	2426	1989	1520	82960	Accepted	
27	1128	579	456	321	326	519	984	1729	2531	3667	5090	5973	6242	6612	6811	6923	6669	5976	5111	4171	3365	2420	1710	970	80283	Accepted	
28	727	495	433	518	1276	3686	5261	5996	5718	4789	4432	4290	4208	4469	5455	6555	6636	6429	4301	2916	2246	1782	1638	958	85214	Accepted	
29	644	517	502	594	1251	3544	4978	5967	5711	4821	4143	4038	4224	4555	5274	6024	6587	6018	4128	2592	2042	1419	1118	902	81593	Accepted	
30	530	376	597	592	939	2450	3468	4939	4773	4669	4093	3924	4117	4510	5274	6090	6669	5915	2604	3130	2161	1883	1709	1022	76434	Accepted	
31	668	530	462	604	1089	3076	4582	5373	4380	3966	3765	4239	5214	4676	5764	6307	6346	6761	4789	3363	2738	2209	1834	1168	83903	Accepted	

**Jan. Average 83,914**

**2019 AADT 100,142**

**Seasonal Adjustment 1.193**





COVID-19 ADJUSTMENT DATA

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## **2017 Average Count Data – ATR: S17-050-348-10**

December ADT: 2,183

December Seasonal Adjustment: 1.109

Growth Rate: 1.5%/Year

$$2,183 \times 1.109 \times (1.015^4) = 2,570$$

## **2021 Average Count Data – ATR: 8854VL01**

January ADT: 1,987

January Seasonal Adjustment: 1.193

$$1,987 \times 1.193 = 2,370$$

## **COVID Adjustment**

$$\frac{2,570}{2,370} = 1.084$$

# Massachusetts Highway Department

## AET07: Monthly Hourly Volume for December 2019

**Location ID:** AET07  
**County:** Middlesex  
**Function Class:** 1  
**Location:** MASSACHUSETTS TURNPIKE  
**Seasonal Factor Group:** U1-Boston  
**Daily Factor Group:**  
**Axle Factor Group:** U1-Boston  
**Growth Factor Group:**

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1	2049	1266	845	715	850	1183	2092	3498	5708	8174	9320	8392	7829	8118	7571	6817	4567	2567	2190	2271	1402	923	1229	1340	90916	Accepted
2	883	525	460	493	740	1636	2014	2860	2939	3119	3198	3156	3319	3416	3704	3745	3786	3438	2220	1823	1412	1122	913	641	51562	Accepted
3	612	440	377	447	626	1596	2259	3217	2689	2877	3123	3561	3538	3750	4449	4678	4802	4578	3197	2294	2001	1718	1698	1088	59615	Accepted
4	770	594	616	689	1335	3808	5348	5942	5417	5609	4642	4960	4548	4950	5821	7047	6180	6659	5319	3780	2860	2206	1892	1254	92246	Accepted
5	790	617	570	698	1364	3870	5255	5879	5382	5650	4920	4455	4987	5461	6482	6961	7165	7173	5297	4292	3054	2592	2162	1418	96494	Accepted
6	879	642	649	741	1285	3550	4854	5930	5783	5092	5256	5528	6025	6657	7440	7370	7371	5471	6307	4160	3237	2625	2280	1762	100894	Accepted
7	1228	736	596	592	799	1445	2240	3339	4252	5052	5830	6612	6387	6254	6512	6502	6344	6408	5219	3559	2973	2859	2706	1758	90202	Accepted
8	1062	666	516	434	430	699	1023	1516	2495	3904	5276	6550	6779	6536	6793	6969	6720	5646	4642	4115	4039	3559	2248	1463	84080	Accepted
9	948	560	499	594	1282	3739	5213	5795	5161	5348	5041	4665	4656	5183	5835	6363	6255	6103	4698	3084	2416	1953	1791	1137	88319	Accepted
10	772	587	563	701	1286	3865	5288	6232	5553	5376	4653	4733	4803	5134	5864	6677	6473	6033	5112	3638	2811	2257	1768	1244	91423	Accepted
11	768	608	448	596	1044	2628	4284	5094	4968	4813	4552	4425	4521	4919	5792	6173	6584	6411	4748	3245	2672	2171	1739	1129	84332	Accepted
12	824	599	571	764	1324	3832	5295	6091	5621	5333	4881	5199	5141	5847	6932	7217	7407	6917	5966	4257	2997	2403	1974	1644	99036	Accepted
13	1123	724	670	767	1327	3470	4751	5681	5673	5678	5510	5886	6235	7234	8032	8125	7833	7218	5932	4668	3575	2985	2279	1862	107238	Accepted
14	1254	769	620	561	667	1178	1762	2737	3653	4789	5777	6706	6450	6404	6629	6175	6055	5484	4422	3432	2917	2485	2293	1912	85131	Accepted
15	1084	666	567	425	448	666	1026	1667	2535	4012	5259	6403	6885	6692	6489	6509	6572	5894	5218	4192	3830	2836	1988	1154	83017	Accepted
16	755	581	501	668	1382	4110	5518	6222	5834	5344	5115	5126	5221	5638	6512	7209	7235	6699	5061	3844	3019	2517	1845	1298	97254	Accepted
17	871	656	610	646	1215	2799	3355	3930	3457	2904	2909	2984	3093	2995	4297	4178	5018	4366	3018	2355	1813	1537	1416	1051	61473	Accepted
18	667	606	616	680	1148	3529	5086	6003	5647	5842	5785	6185	6044	6329	6750	7478	7534	6914	5566	4570	3099	2600	1924	1373	101975	Accepted
19	871	714	627	753	1332	3707	5167	6164	5357	6169	5965	5877	5950	6505	7294	7659	7450	7052	5610	4831	3566	2845	2102	1675	105242	Accepted
20	982	728	704	809	1321	3458	4573	5769	5792	5498	5888	6216	6812	7163	7760	7765	7762	7438	7074	5511	4044	3095	2620	1934	110716	Accepted
21	1324	885	739	696	953	1518	2225	3333	4624	6119	7716	8454	8162	7822	7769	7624	6496	5321	4512	3771	3728	3586	3118	1890	102385	Accepted
22	1144	729	579	454	489	859	1235	1929	3004	4576	6361	7450	7460	7143	7472	6659	6448	5766	5018	3931	3202	2974	2041	1363	88286	Accepted
23	882	625	595	641	1244	3371	4207	5144	5231	5564	5332	6477	7157	7039	7480	7294	7327	6942	5850	4690	3667	2878	2347	1588	103572	Accepted
24	1024	714	626	674	1086	2512	2972	3497	3932	4704	6067	6695	7103	7585	7474	7117	5942	4588	3560	2958	2870	2985	2597	1618	90900	Accepted
25	807	529	338	261	271	389	730	1122	1893	2992	4708	6424	7016	6431	5129	4562	4443	4570	4892	4838	4334	3235	2096	1123	73133	Accepted
26	708	424	358	529	1042	2579	3239	4079	4694	5721	7392	8218	8084	7908	8024	7929	7707	6582	4923	4013	3340	2632	1925	1401	103451	Accepted
27	907	656	558	688	1223	2746	3558	4013	4796	5725	7119	7925	7962	8280	8494	8670	8231	6939	5491	4462	3576	2928	2132	1469	108548	Accepted
28	918	688	560	640	783	1191	1785	2463	3569	5293	7079	8251	7790	8220	7765	7621	7106	6420	5556	4397	3525	2926	2460	1633	98639	Accepted
29	1040	589	479	452	535	769	1119	1759	2957	4969	6870	7930	8158	7582	7490	7143	7451	7162	6214	5002	3765	2550	2009	1212	95206	Accepted
30	809	617	477	591	1019	2610	3232	3787	3891	3996	4502	3587	4622	5423	6211	6019	5187	4502	2419	2724	2062	2136	1562	1115	73100	Accepted
31	716	686	514	625	1072	2360	2901	3505	3848	3875	4409	5393	6135	6203	7126	7534	6351	5035	3850	2787	1923	1436	1179	695	80158	Accepted

**Jan. Average 90,276**

**2019 AADT 100,142**

**Seasonal Adjustment 1.109**

# Massachusetts Highway Department

## AET07: Monthly Hourly Volume for January 2021

**Location ID:** AET07  
**County:** Middlesex  
**Funcational Class:** 1  
**Location:** MASSACHUSETTS TURNPIKE  
**Seasonal Factor Group:** U1-Boston  
**Daily Factor Group:**  
**Axle Factor Group:** U1-Boston  
**Growth Factor Group:**

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	TOTAL	QC Status
1	428	391	331	252	241	366	570	781	1179	1734	2444	3101	3605	3798	3962	3821	3429	3004	2369	1937	1319	1068	737	585	41452	Accepted
2	439	287	277	307	369	651	1041	1452	1920	2540	3491	4390	4738	5040	5209	5032	4784	4129	3365	2662	2104	1612	1154	771	57764	Accepted
3	531	388	316	297	345	497	863	1134	1600	2303	3242	4055	4517	4870	4859	4765	4114	3271	2564	1917	1620	1290	951	688	50997	Accepted
4	506	382	402	468	911	2310	3544	3826	3559	3067	3183	3250	3378	3610	4178	4956	4435	4127	2822	2079	1535	1186	1045	797	59556	Accepted
5	606	460	458	552	1049	2551	3844	4179	3908	3455	3375	3251	3646	3683	4270	4919	4599	3977	2773	1932	1508	1209	969	781	61954	Accepted
6	543	484	454	559	973	2501	3783	4174	3933	3478	3348	3547	3610	3847	4581	5009	4695	4273	2986	2054	1552	1265	981	772	63402	Accepted
7	562	478	437	615	1010	2462	3813	4321	3984	3522	3512	3601	3793	3807	4604	5051	4877	4452	3151	2208	1680	1313	1073	767	65093	Accepted
8	544	487	476	592	996	2371	3637	4043	3867	3586	3644	3724	3982	4320	4815	5430	5237	4687	3742	2470	1842	1540	1210	868	68110	Accepted
9	574	430	385	393	564	958	1468	1931	2519	3218	4001	4288	4413	4441	4277	4336	4065	3511	2858	2212	1720	1444	1155	619	55780	Accepted
10	497	298	248	243	295	485	785	986	1394	2167	2922	3563	4007	4027	4216	4227	4162	3774	3040	2445	1885	1479	1008	647	48800	Accepted
11	503	373	375	534	902	2570	3969	4449	4078	3653	3361	3563	3565	3629	4267	4870	4586	4056	2738	1932	1448	1233	963	765	62382	Accepted
12	565	425	443	579	935	2514	3956	4319	4023	3554	3312	3365	3600	3810	4271	4903	4551	4143	2839	1931	1545	1211	1004	753	62551	Accepted
13	516	414	429	602	1007	2545	3913	4350	3984	3493	3408	3549	3735	3775	4457	5175	4941	4309	2859	2096	1565	1371	1011	782	64286	Accepted
14	561	453	448	610	993	2473	3924	4339	3979	3591	3463	3517	3814	4029	4455	5235	5048	4432	3213	2362	1753	1329	1100	812	65933	Accepted
15	565	421	452	630	962	2487	3656	4127	3986	3737	3810	3986	4546	4831	5495	6164	5982	5302	4137	2931	2182	1688	1305	861	74243	Accepted
16	600	446	360	396	519	866	1259	1712	2139	2971	3662	4248	4645	4592	4620	4415	3870	3376	2793	2055	1735	1373	1058	709	54419	Accepted
17	451	314	261	245	275	475	810	1132	1644	2578	3722	4268	4665	4739	4679	4590	4342	3808	3140	2480	1886	1437	1185	742	53868	Accepted
18	490	318	355	435	813	2152	3075	3349	3329	3668	4063	4724	4780	5026	5565	5917	5317	4693	3260	2549	1947	1386	1078	838	69127	Accepted
19	538	449	430	597	967	2513	4097	4448	4157	3576	3419	3465	3732	3739	4453	4971	4538	4166	2854	1961	1524	1222	967	752	63535	Accepted
20	557	432	396	575	953	2373	3957	4275	3940	3579	3403	3462	3605	3834	4456	4981	4640	4130	2896	2003	1544	1267	1004	756	63018	Accepted
21	569	451	412	581	979	2468	3924	4357	4117	3732	3578	3580	3741	4284	4699	5269	4830	4300	3199	2257	1637	1361	1072	788	66185	Accepted
22	580	451	476	555	968	2375	3742	4194	3952	3911	3865	4112	4398	4798	5506	6060	5753	5175	4012	2651	1960	1601	1228	852	73175	Accepted
23	544	469	372	396	485	957	1483	2027	2641	3471	4417	4841	4878	4977	4846	4605	4416	3827	3232	2422	1868	1564	1163	743	60644	Accepted
24	450	373	288	247	252	432	762	1042	1477	2329	3303	4165	4491	4890	4882	4658	4061	3541	3058	2522	2050	1480	1116	677	52546	Accepted
25	463	355	360	489	967	2590	4020	4421	4207	3913	3807	3765	3875	4040	4566	5167	4798	4356	3007	2299	1601	1216	944	790	66016	Accepted
26	534	429	432	564	958	2530	4030	4330	4286	3710	3528	3675	3688	3980	4539	5007	4430	3341	2079	1497	1477	1088	882	673	61687	Accepted
27	455	378	358	530	788	2121	3368	3960	3686	3399	3373	3468	3598	3814	4412	4755	4449	3995	2845	2056	1596	1232	1040	741	60417	Accepted
28	530	423	405	581	970	2385	3956	4480	4108	3940	3588	3667	3855	4067	4564	5275	5097	4434	3308	2317	1748	1419	1076	767	66960	Accepted
29	570	443	412	546	999	2223	3427	4112	3917	3826	3755	4098	4144	4650	5369	5788	5564	5016	3891	2761	2031	1579	1215	847	71183	Accepted
30	619	440	404	430	489	892	1393	1854	2548	3407	4075	4708	4823	4705	4639	4399	4098	3582	3110	2411	1745	1379	1115	858	58123	Accepted
31	551	364	283	244	274	483	799	1018	1523	2239	3070	4002	4355	4701	4789	4823	4663	4142	3465	2622	2232	1577	1032	742	53993	Accepted

**Jan. Average 61,200**



VEHICLE TRAVEL SPEED DATA

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**Accurate Counts**  
978-664-2565

Location : Latti Farm Road  
Location : South of Route 20  
City/State: Worcester, MA

8854SP01

**NB**

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
01/21/21	0	0	0	0	0	0	2	2	0	1	0	0	0	0	5
01:00	0	0	0	0	2	4	1	3	2	1	2	0	0	0	15
02:00	0	0	0	1	0	1	1	2	0	2	0	1	0	0	8
03:00	1	0	0	0	0	3	4	1	3	2	0	0	0	0	14
04:00	3	0	0	1	1	2	3	4	4	0	0	0	0	0	18
05:00	2	0	0	0	2	3	5	8	2	0	1	0	0	0	23
06:00	1	0	0	0	0	1	4	6	7	0	0	0	0	0	19
07:00	0	0	0	0	2	1	5	4	3	0	0	0	0	0	15
08:00	0	0	0	0	0	4	10	11	8	3	1	0	0	0	37
09:00	2	0	3	3	10	11	14	12	8	1	1	0	0	0	65
10:00	1	0	0	4	8	7	7	6	4	5	1	2	0	0	45
11:00	4	0	0	2	9	14	10	17	8	6	0	0	0	0	70
12 PM	2	0	0	1	2	14	16	23	13	7	3	0	0	0	81
13:00	1	0	1	4	8	9	17	19	7	5	4	0	0	0	75
14:00	2	0	1	5	8	15	20	20	14	11	2	0	0	0	98
15:00	13	0	4	3	7	16	22	24	17	8	1	0	0	0	115
16:00	0	0	0	1	8	17	18	17	17	4	2	1	0	0	85
17:00	1	0	0	2	7	10	9	14	7	2	1	0	0	0	53
18:00	1	0	3	3	12	18	12	11	13	2	0	0	0	0	75
19:00	0	0	0	1	9	8	7	8	4	4	0	0	0	0	41
20:00	0	0	0	0	1	3	5	4	6	1	1	0	0	0	21
21:00	0	0	0	0	1	3	5	3	0	5	1	0	0	0	18
22:00	0	0	0	2	4	1	3	2	2	1	0	0	0	0	15
23:00	0	0	0	0	0	0	2	3	3	1	0	0	0	0	9
Total	34	0	12	33	101	165	202	224	152	72	21	4	0	0	1020

Daily

15th Percentile : 14 MPH  
50th Percentile : 20 MPH  
85th Percentile : 25 MPH  
95th Percentile : 28 MPH

Mean Speed(Average) : 20 MPH  
10 MPH Pace Speed : 16-25 MPH  
Number in Pace : 642  
Percent in Pace : 62.9%  
Number of Vehicles > 20 MPH : 540  
Percent of Vehicles > 20 MPH : 53.0%

**Accurate Counts**  
978-664-2565

Location : Latti Farm Road  
Location : South of Route 20  
City/State: Worcester, MA

8854SP01

**NB**

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
01/22/21	0	0	0	1	1	2	1	2	0	1	3	0	0	0	11
01:00	0	0	2	2	0	2	4	1	1	3	0	0	0	0	15
02:00	0	0	0	0	0	1	0	2	0	1	0	0	0	0	4
03:00	0	0	0	0	0	0	3	2	2	0	0	0	0	0	7
04:00	0	0	0	0	1	2	6	5	3	2	0	0	0	0	19
05:00	0	0	0	0	0	0	2	10	1	3	0	0	0	0	16
06:00	0	0	0	1	0	2	6	7	2	1	0	0	0	0	19
07:00	0	0	0	0	2	4	5	9	3	1	0	0	0	0	24
08:00	2	0	0	0	2	3	6	7	6	1	0	0	0	0	27
09:00	6	0	1	1	2	7	12	17	14	1	0	0	0	0	61
10:00	2	0	1	1	3	7	10	10	10	5	1	2	0	0	52
11:00	3	0	0	2	5	14	10	11	13	1	0	0	0	0	59
12 PM	5	0	1	2	12	16	19	15	17	9	2	2	0	0	100
13:00	1	0	0	4	11	11	14	9	10	3	1	0	0	0	64
14:00	4	0	0	1	13	11	20	13	12	8	0	0	0	0	82
15:00	10	0	2	8	13	28	21	24	14	5	2	1	0	0	128
16:00	1	0	0	2	7	13	20	24	11	9	1	0	0	0	88
17:00	0	0	0	1	5	11	6	7	14	3	0	0	0	0	47
18:00	3	0	0	2	12	18	11	11	12	4	0	0	0	0	73
19:00	0	0	0	2	3	6	7	9	5	3	2	0	0	0	37
20:00	0	0	0	1	1	2	2	3	2	5	1	0	0	0	17
21:00	0	0	0	0	2	2	3	1	6	2	3	0	0	0	19
22:00	0	0	0	0	3	2	0	1	3	0	0	0	0	0	9
23:00	0	0	0	0	1	0	2	2	1	0	0	1	0	0	7
Total	37	0	7	31	99	164	190	202	162	71	16	6	0	0	985

Daily

15th Percentile : 14 MPH  
50th Percentile : 20 MPH  
85th Percentile : 25 MPH  
95th Percentile : 28 MPH

Mean Speed(Average) : 20 MPH  
10 MPH Pace Speed : 16-25 MPH  
Number in Pace : 610  
Percent in Pace : 61.9%  
Number of Vehicles > 20 MPH : 520  
Percent of Vehicles > 20 MPH : 52.8%

Location : Latti Farm Road  
Location : South of Route 20  
City/State: Worcester, MA

8854SP01

NB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
01/23/21	0	0	0	0	0	2	0	1	1	3	1	0	0	0	8
01:00	2	0	3	2	1	1	3	2	3	1	0	0	0	0	18
02:00	0	0	0	0	0	1	2	0	4	0	0	0	0	0	7
03:00	0	0	0	0	0	0	2	2	0	1	0	0	0	0	5
04:00	0	0	0	1	0	1	3	0	2	1	0	0	0	0	8
05:00	0	0	0	0	1	0	3	5	4	1	0	0	0	0	14
06:00	0	0	0	0	0	1	4	3	2	1	0	0	0	0	11
07:00	0	0	1	0	1	1	2	3	0	2	0	0	0	0	10
08:00	0	0	0	0	0	0	5	3	3	0	0	0	0	0	11
09:00	0	0	0	1	1	3	3	5	5	1	0	1	0	0	20
10:00	0	0	1	2	7	5	0	4	10	6	1	0	0	0	36
11:00	1	0	0	1	7	5	7	5	5	0	1	0	0	0	32
12 PM	0	0	0	4	4	5	10	5	5	6	0	0	0	0	39
13:00	0	0	0	5	12	9	7	4	7	2	1	0	0	0	47
14:00	2	0	0	3	18	6	8	2	6	0	2	0	0	0	47
15:00	0	0	0	1	4	7	9	7	4	0	1	0	0	0	33
16:00	0	0	0	1	3	8	7	2	0	1	1	1	0	0	24
17:00	0	0	0	0	5	4	5	0	4	0	0	0	0	0	18
18:00	0	0	0	0	1	4	4	0	4	1	1	0	0	0	15
19:00	0	0	0	1	2	2	1	0	1	0	0	0	0	0	7
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	0	1	1	1	0	0	0	0	0	0	3
22:00	0	0	0	0	0	2	1	0	0	0	0	0	0	0	3
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	5	0	5	22	67	68	87	54	70	27	9	2	0	0	416

Daily  
 15th Percentile : 13 MPH  
 50th Percentile : 19 MPH  
 85th Percentile : 25 MPH  
 95th Percentile : 28 MPH  
 Mean Speed(Average) : 20 MPH  
 10 MPH Pace Speed : 13-22 MPH  
 Number in Pace : 240  
 Percent in Pace : 57.7%  
 Number of Vehicles > 20 MPH : 191  
 Percent of Vehicles > 20 MPH : 45.9%

Grand Total	76	0	24	86	267	397	479	480	384	170	46	12	0	0	2421
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Overall  
 15th Percentile : 13 MPH  
 50th Percentile : 20 MPH  
 85th Percentile : 25 MPH  
 95th Percentile : 28 MPH  
 Mean Speed(Average) : 20 MPH  
 10 MPH Pace Speed : 16-25 MPH  
 Number in Pace : 1484  
 Percent in Pace : 61.3%  
 Number of Vehicles > 20 MPH : 1252  
 Percent of Vehicles > 20 MPH : 51.7%

**Accurate Counts**  
978-664-2565

Location : Latti Farm Road  
Location : South of Route 20  
City/State: Worcester, MA

8854SP01

**SB**

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
01/21/21	0	0	0	0	1	1	0	2	1	0	0	0	0	0	5
01:00	2	0	0	0	2	1	0	0	1	0	0	0	0	0	6
02:00	0	0	0	0	0	1	0	4	2	0	0	0	0	0	7
03:00	1	0	0	0	0	1	4	4	5	4	0	0	0	0	19
04:00	1	0	0	0	0	2	1	8	2	4	0	0	0	0	18
05:00	0	0	0	0	0	2	4	4	12	7	0	0	0	0	29
06:00	0	0	0	0	1	3	7	10	15	5	1	1	0	0	43
07:00	0	0	0	0	1	6	10	32	9	6	4	0	0	0	68
08:00	0	0	0	0	5	17	26	55	26	12	1	0	0	0	142
09:00	3	0	2	7	5	27	17	37	11	2	0	0	0	0	111
10:00	2	0	0	3	10	12	20	10	1	1	0	0	0	0	59
11:00	0	0	0	1	5	10	15	6	5	2	1	0	0	0	45
12 PM	0	0	1	0	3	8	15	17	13	6	0	1	0	0	64
13:00	2	0	0	0	5	16	19	12	6	5	2	1	0	0	68
14:00	0	0	1	0	4	17	21	19	9	0	3	0	0	0	74
15:00	3	0	0	2	5	16	14	11	3	1	0	0	0	0	55
16:00	0	1	0	2	5	9	7	10	8	2	0	0	0	0	44
17:00	1	0	0	4	3	8	8	5	4	3	0	0	0	0	36
18:00	2	0	0	1	4	3	3	7	1	0	0	0	0	0	21
19:00	0	0	0	1	0	3	6	4	5	0	0	0	0	0	19
20:00	0	0	0	0	0	2	0	5	0	0	0	0	0	0	7
21:00	0	0	0	0	1	1	5	6	3	0	0	0	0	0	16
22:00	0	0	0	0	1	0	2	2	2	0	0	0	0	0	7
23:00	0	0	0	0	0	1	1	2	0	0	0	0	0	0	4
<b>Total</b>	<b>17</b>	<b>1</b>	<b>4</b>	<b>21</b>	<b>61</b>	<b>167</b>	<b>205</b>	<b>272</b>	<b>144</b>	<b>60</b>	<b>12</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>967</b>

Daily

15th Percentile : 15 MPH  
50th Percentile : 21 MPH  
85th Percentile : 25 MPH  
95th Percentile : 28 MPH

Mean Speed(Average) : 21 MPH  
10 MPH Pace Speed : 16-25 MPH  
Number in Pace : 692  
Percent in Pace : 71.6%  
Number of Vehicles > 20 MPH : 559  
Percent of Vehicles > 20 MPH : 57.8%

**Accurate Counts**  
978-664-2565

Location : Latti Farm Road  
Location : South of Route 20  
City/State: Worcester, MA

8854SP01

**SB**

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
01/22/21	0	0	0	0	2	0	2	2	0	0	1	0	0	0	7
01:00	0	0	0	0	1	1	2	3	2	0	0	0	0	0	9
02:00	0	0	0	0	1	0	1	2	0	0	0	0	0	0	4
03:00	0	0	0	0	2	0	4	6	2	4	0	0	0	0	18
04:00	0	0	0	0	1	2	0	5	9	2	0	0	0	0	19
05:00	0	0	0	0	0	0	3	11	2	7	0	0	0	0	23
06:00	0	0	0	0	2	4	6	11	14	7	1	0	0	0	45
07:00	0	0	0	0	1	7	10	30	20	4	2	1	0	0	75
08:00	2	1	0	0	4	14	23	35	43	11	1	0	0	0	134
09:00	4	0	1	0	5	29	23	41	11	1	1	0	0	0	116
10:00	2	0	0	1	5	4	8	10	17	1	2	0	0	0	50
11:00	2	1	1	0	6	10	13	3	5	1	0	0	1	0	43
12 PM	2	0	1	0	4	8	18	21	11	4	0	0	0	0	69
13:00	3	0	0	3	4	16	16	15	6	3	0	1	0	0	67
14:00	3	0	0	5	5	14	17	15	9	3	0	0	0	0	71
15:00	4	0	0	1	5	15	9	14	12	5	0	0	0	1	66
16:00	1	0	0	3	2	13	9	8	9	1	0	0	0	0	46
17:00	2	0	0	0	5	4	4	6	1	0	0	0	0	0	22
18:00	2	0	0	0	1	8	3	4	3	0	0	0	0	0	21
19:00	0	0	0	0	0	6	5	5	3	3	0	0	0	0	22
20:00	0	0	0	0	1	3	1	2	2	1	1	0	0	0	11
21:00	0	0	0	0	0	0	1	4	4	1	0	0	0	0	10
22:00	0	0	0	0	0	2	2	2	1	0	0	0	0	0	7
23:00	0	0	0	1	0	0	0	2	0	0	0	0	0	0	3
<b>Total</b>	<b>27</b>	<b>2</b>	<b>3</b>	<b>14</b>	<b>57</b>	<b>160</b>	<b>180</b>	<b>257</b>	<b>186</b>	<b>59</b>	<b>9</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>958</b>

Daily

15th Percentile : 15 MPH  
50th Percentile : 21 MPH  
85th Percentile : 25 MPH  
95th Percentile : 28 MPH

Mean Speed(Average) : 21 MPH  
10 MPH Pace Speed : 18-27 MPH  
Number in Pace : 676  
Percent in Pace : 70.6%  
Number of Vehicles > 20 MPH : 575  
Percent of Vehicles > 20 MPH : 60.0%

Location : Latti Farm Road  
Location : South of Route 20  
City/State: Worcester, MA

8854SP01

SB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
01/23/21	0	0	0	0	0	1	0	1	1	1	1	0	0	0	5
01:00	1	0	0	1	0	2	0	1	0	0	0	0	0	0	5
02:00	0	0	0	0	0	1	1	2	1	0	0	0	0	0	5
03:00	0	0	0	0	0	0	3	2	3	2	1	0	0	0	11
04:00	0	0	0	0	1	0	1	3	2	0	0	0	0	0	7
05:00	0	0	0	0	0	0	0	5	7	0	0	0	0	0	12
06:00	0	0	0	0	0	0	1	3	6	1	0	0	0	0	11
07:00	0	0	0	0	0	0	1	7	3	2	0	0	0	0	13
08:00	0	0	0	1	4	7	10	9	9	1	0	0	0	0	41
09:00	0	0	0	1	2	12	9	8	6	0	0	0	0	0	38
10:00	0	0	0	2	9	4	7	3	5	2	0	0	0	0	32
11:00	1	0	0	1	3	6	8	4	3	1	0	0	0	0	27
12 PM	1	0	0	0	9	14	3	5	3	1	0	0	0	0	36
13:00	0	0	0	0	8	13	7	2	4	0	0	1	0	0	35
14:00	2	0	0	1	8	5	9	2	0	1	0	0	0	0	28
15:00	0	0	0	0	5	11	3	3	0	0	1	0	0	0	23
16:00	0	0	0	0	2	10	1	2	0	1	0	0	0	0	16
17:00	0	0	0	2	4	2	1	2	1	0	1	0	0	0	13
18:00	0	0	0	0	0	1	1	1	0	0	0	0	0	0	3
19:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	1	1	0	1	1	0	0	0	0	0	4
22:00	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	5	0	0	9	56	91	67	66	56	13	4	1	0	0	368

Daily  
 15th Percentile : 14 MPH  
 50th Percentile : 19 MPH  
 85th Percentile : 25 MPH  
 95th Percentile : 26 MPH  
 Mean Speed(Average) : 20 MPH  
 10 MPH Pace Speed : 15-24 MPH  
 Number in Pace : 243  
 Percent in Pace : 66.0%  
 Number of Vehicles > 20 MPH : 162  
 Percent of Vehicles > 20 MPH : 44.1%

Grand Total	49	3	7	44	174	418	452	595	386	132	25	6	1	1	2293
-------------	----	---	---	----	-----	-----	-----	-----	-----	-----	----	---	---	---	------

Overall  
 15th Percentile : 15 MPH  
 50th Percentile : 20 MPH  
 85th Percentile : 25 MPH  
 95th Percentile : 28 MPH  
 Mean Speed(Average) : 21 MPH  
 10 MPH Pace Speed : 16-25 MPH  
 Number in Pace : 1594  
 Percent in Pace : 69.5%  
 Number of Vehicles > 20 MPH : 1297  
 Percent of Vehicles > 20 MPH : 56.5%

**Accurate Counts**  
978-664-2565

Location : Latti Farm Road  
Location : South of Route 20  
City/State: Worcester, MA

8854SP01

**SB, NB**

Start Time	1	4	7	10	13	16	19	22	25	28	31	34	37	40	Total
	3	6	9	12	15	18	21	24	27	30	33	36	39	999	
01/21/21	0	0	0	0	1	1	2	4	1	1	0	0	0	0	10
01:00	2	0	0	0	4	5	1	3	3	1	2	0	0	0	21
02:00	0	0	0	1	0	2	1	6	2	2	0	1	0	0	15
03:00	2	0	0	0	0	4	8	5	8	6	0	0	0	0	33
04:00	4	0	0	1	1	4	4	12	6	4	0	0	0	0	36
05:00	2	0	0	0	2	5	9	12	14	7	1	0	0	0	52
06:00	1	0	0	0	1	4	11	16	22	5	1	1	0	0	62
07:00	0	0	0	0	3	7	15	36	12	6	4	0	0	0	83
08:00	0	0	0	0	5	21	36	66	34	15	2	0	0	0	179
09:00	5	0	5	10	15	38	31	49	19	3	1	0	0	0	176
10:00	3	0	0	7	18	19	27	16	5	6	1	2	0	0	104
11:00	4	0	0	3	14	24	25	23	13	8	1	0	0	0	115
12 PM	2	0	1	1	5	22	31	40	26	13	3	1	0	0	145
13:00	3	0	1	4	13	25	36	31	13	10	6	1	0	0	143
14:00	2	0	2	5	12	32	41	39	23	11	5	0	0	0	172
15:00	16	0	4	5	12	32	36	35	20	9	1	0	0	0	170
16:00	0	1	0	3	13	26	25	27	25	6	2	1	0	0	129
17:00	2	0	0	6	10	18	17	19	11	5	1	0	0	0	89
18:00	3	0	3	4	16	21	15	18	14	2	0	0	0	0	96
19:00	0	0	0	2	9	11	13	12	9	4	0	0	0	0	60
20:00	0	0	0	0	1	5	5	9	6	1	1	0	0	0	28
21:00	0	0	0	0	2	4	10	9	3	5	1	0	0	0	34
22:00	0	0	0	2	5	1	5	4	4	1	0	0	0	0	22
23:00	0	0	0	0	0	1	3	5	3	1	0	0	0	0	13
<b>Total</b>	<b>51</b>	<b>1</b>	<b>16</b>	<b>54</b>	<b>162</b>	<b>332</b>	<b>407</b>	<b>496</b>	<b>296</b>	<b>132</b>	<b>33</b>	<b>7</b>	<b>0</b>	<b>0</b>	<b>1987</b>

Daily

15th Percentile : 15 MPH  
 50th Percentile : 20 MPH  
 85th Percentile : 25 MPH  
 95th Percentile : 28 MPH

Mean Speed(Average) : 21 MPH  
 10 MPH Pace Speed : 16-25 MPH  
 Number in Pace : 1334  
 Percent in Pace : 67.1%  
 Number of Vehicles > 20 MPH : 1100  
 Percent of Vehicles > 20 MPH : 55.3%



**Accurate Counts**  
978-664-2565

Location : Latti Farm Road  
Location : South of Route 20  
City/State: Worcester, MA

8854SP01

**SB, NB**

Start Time	1	4	7	10	13	16	19	22	25	28	31	34	37	40	Total
	3	6	9	12	15	18	21	24	27	30	33	36	39	999	
01/22/21	0	0	0	1	3	2	3	4	0	1	4	0	0	0	18
01:00	0	0	2	2	1	3	6	4	3	3	0	0	0	0	24
02:00	0	0	0	0	1	1	1	4	0	1	0	0	0	0	8
03:00	0	0	0	0	2	0	7	8	4	4	0	0	0	0	25
04:00	0	0	0	0	2	4	6	10	12	4	0	0	0	0	38
05:00	0	0	0	0	0	0	5	21	3	10	0	0	0	0	39
06:00	0	0	0	1	2	6	12	18	16	8	1	0	0	0	64
07:00	0	0	0	0	3	11	15	39	23	5	2	1	0	0	99
08:00	4	1	0	0	6	17	29	42	49	12	1	0	0	0	161
09:00	10	0	2	1	7	36	35	58	25	2	1	0	0	0	177
10:00	4	0	1	2	8	11	18	20	27	6	3	2	0	0	102
11:00	5	1	1	2	11	24	23	14	18	2	0	0	1	0	102
12 PM	7	0	2	2	16	24	37	36	28	13	2	2	0	0	169
13:00	4	0	0	7	15	27	30	24	16	6	1	1	0	0	131
14:00	7	0	0	6	18	25	37	28	21	11	0	0	0	0	153
15:00	14	0	2	9	18	43	30	38	26	10	2	1	0	1	194
16:00	2	0	0	5	9	26	29	32	20	10	1	0	0	0	134
17:00	2	0	0	1	10	15	10	13	15	3	0	0	0	0	69
18:00	5	0	0	2	13	26	14	15	15	4	0	0	0	0	94
19:00	0	0	0	2	3	12	12	14	8	6	2	0	0	0	59
20:00	0	0	0	1	2	5	3	5	4	6	2	0	0	0	28
21:00	0	0	0	0	2	2	4	5	10	3	3	0	0	0	29
22:00	0	0	0	0	3	4	2	3	4	0	0	0	0	0	16
23:00	0	0	0	1	1	0	2	4	1	0	0	1	0	0	10
<b>Total</b>	<b>64</b>	<b>2</b>	<b>10</b>	<b>45</b>	<b>156</b>	<b>324</b>	<b>370</b>	<b>459</b>	<b>348</b>	<b>130</b>	<b>25</b>	<b>8</b>	<b>1</b>	<b>1</b>	<b>1943</b>

Daily

15th Percentile : 15 MPH  
 50th Percentile : 21 MPH  
 85th Percentile : 25 MPH  
 95th Percentile : 28 MPH

Mean Speed(Average) : 21 MPH  
 10 MPH Pace Speed : 18-27 MPH  
 Number in Pace : 1285  
 Percent in Pace : 66.1%  
 Number of Vehicles > 20 MPH : 1095  
 Percent of Vehicles > 20 MPH : 56.4%

**Accurate Counts**  
978-664-2565

Location : Latti Farm Road  
Location : South of Route 20  
City/State: Worcester, MA

8854SP01

**SB, NB**

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
01/23/21	0	0	0	0	0	3	0	2	2	4	2	0	0	0	13
01:00	3	0	3	3	1	3	3	3	3	1	0	0	0	0	23
02:00	0	0	0	0	0	2	3	2	5	0	0	0	0	0	12
03:00	0	0	0	0	0	0	5	4	3	3	1	0	0	0	16
04:00	0	0	0	1	1	1	4	3	4	1	0	0	0	0	15
05:00	0	0	0	0	1	0	3	10	11	1	0	0	0	0	26
06:00	0	0	0	0	0	1	5	6	8	2	0	0	0	0	22
07:00	0	0	1	0	1	1	3	10	3	4	0	0	0	0	23
08:00	0	0	0	1	4	7	15	12	12	1	0	0	0	0	52
09:00	0	0	0	2	3	15	12	13	11	1	0	1	0	0	58
10:00	0	0	1	4	16	9	7	7	15	8	1	0	0	0	68
11:00	2	0	0	2	10	11	15	9	8	1	1	0	0	0	59
12 PM	1	0	0	4	13	19	13	10	8	7	0	0	0	0	75
13:00	0	0	0	5	20	22	14	6	11	2	1	1	0	0	82
14:00	4	0	0	4	26	11	17	4	6	1	2	0	0	0	75
15:00	0	0	0	1	9	18	12	10	4	0	2	0	0	0	56
16:00	0	0	0	1	5	18	8	4	0	2	1	1	0	0	40
17:00	0	0	0	2	9	6	6	2	5	0	1	0	0	0	31
18:00	0	0	0	0	1	5	5	1	4	1	1	0	0	0	18
19:00	0	0	0	1	2	2	2	0	1	0	0	0	0	0	8
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00	0	0	0	0	1	2	1	2	1	0	0	0	0	0	7
22:00	0	0	0	0	0	3	1	0	1	0	0	0	0	0	5
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>10</b>	<b>0</b>	<b>5</b>	<b>31</b>	<b>123</b>	<b>159</b>	<b>154</b>	<b>120</b>	<b>126</b>	<b>40</b>	<b>13</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>784</b>

Daily  
 15th Percentile : 13 MPH  
 50th Percentile : 19 MPH  
 85th Percentile : 25 MPH  
 95th Percentile : 28 MPH  
  
 Mean Speed(Average) : 20 MPH  
 10 MPH Pace Speed : 13-22 MPH  
 Number in Pace : 476  
 Percent in Pace : 60.7%  
 Number of Vehicles > 20 MPH : 353  
 Percent of Vehicles > 20 MPH : 45.1%

<b>Grand Total</b>	<b>125</b>	<b>3</b>	<b>31</b>	<b>130</b>	<b>441</b>	<b>815</b>	<b>931</b>	<b>1075</b>	<b>770</b>	<b>302</b>	<b>71</b>	<b>18</b>	<b>1</b>	<b>1</b>	<b>4714</b>
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Overall  
 15th Percentile : 14 MPH  
 50th Percentile : 20 MPH  
 85th Percentile : 25 MPH  
 95th Percentile : 28 MPH  
  
 Mean Speed(Average) : 21 MPH  
 10 MPH Pace Speed : 16-25 MPH  
 Number in Pace : 3078  
 Percent in Pace : 65.3%  
 Number of Vehicles > 20 MPH : 2548  
 Percent of Vehicles > 20 MPH : 54.1%



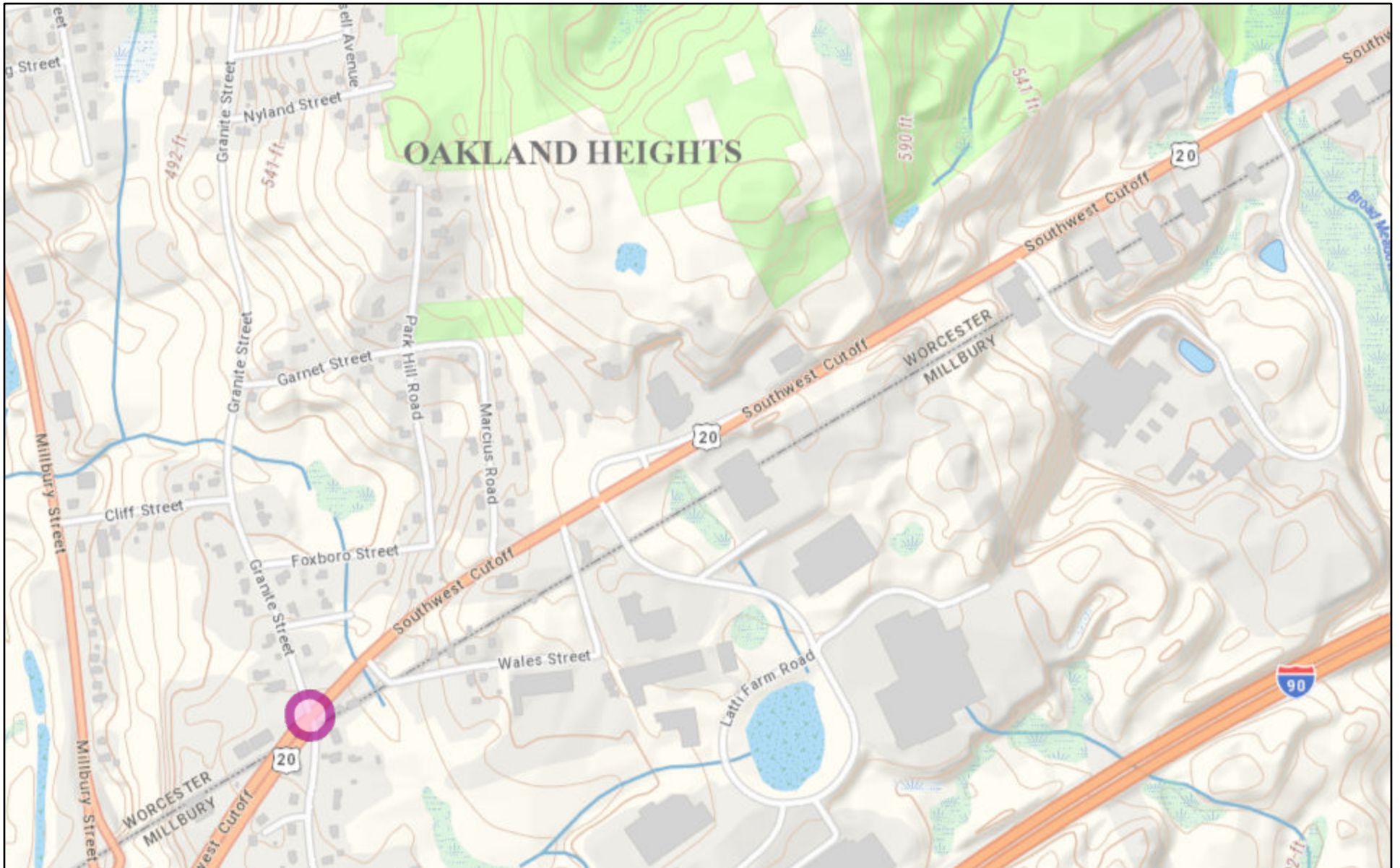
MASSDOT CRASH RATE WORKSHEETS AND HIGH CRASH LOCATION MAPPING








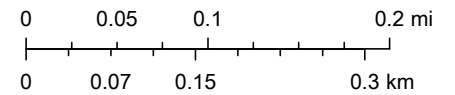
# MassDOT Top Crash Locations



2/23/2021, 6:13:15 PM

 2015-2017 HSIP Cluster

1:9,028



MassGIS

MassDOT  
MassGIS |

GENERAL BACKGROUND TRAFFIC GROWTH

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**General Background Traffic Growth - Daily Traffic Volumes**

CITY/TOWN	ROUTE/STREET	LOCATION	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average Annual
Worcester	Massasoit Road	North of Route 20				5,623	5,680	5,856	5,828	6,189	6,294	5,762	5,739	<b>0.56%</b>
Millbury	Howe Avenue	South of Millbury Avenue						6,565	6,716	7,132	7,253	7,275	7,246	<b>2.15%</b>
Worcester	Granite Street	North of Route 20				4,452	4,481	4,620	5,363	5,696	5,793	4,851	4,832	<b>2.08%</b>
Worcester	Greenwood Street	North of Route 20				9,672	9,718	10,019	10,501	11,152	11,342	11,427	11,381	<b>2.80%</b>
Worcester	Massasoit Road	at the Millbury Town Line				7,597	7,677	7,915	7,403	7,862	7,996	7,848	7,817	<b>0.48%</b>
Worcester	Greenwood Street	at the Millbury Town Line	6,349	7,000	7,081	7,204	7,239	7,826	8,006	7,445	5,955	6,274	5,977	<b>-0.81%</b>
Worcester	Route 20	East of Massasoit Road		24,988			23,030	18,270	26,945	27,295	27,595	23,230	23,323	<b>1.62%</b>
Worcester	Route 146	North of Interstate 90							51,216	51,150	52,859	52,827	52,685	<b>0.87%</b>
Worcester	Millbury Street	South of Winnipeg Street				4,618	4,646	4,790	5,054	5,367	5,458	5,344	5,323	<b>2.51%</b>
														<b>1.36%</b>

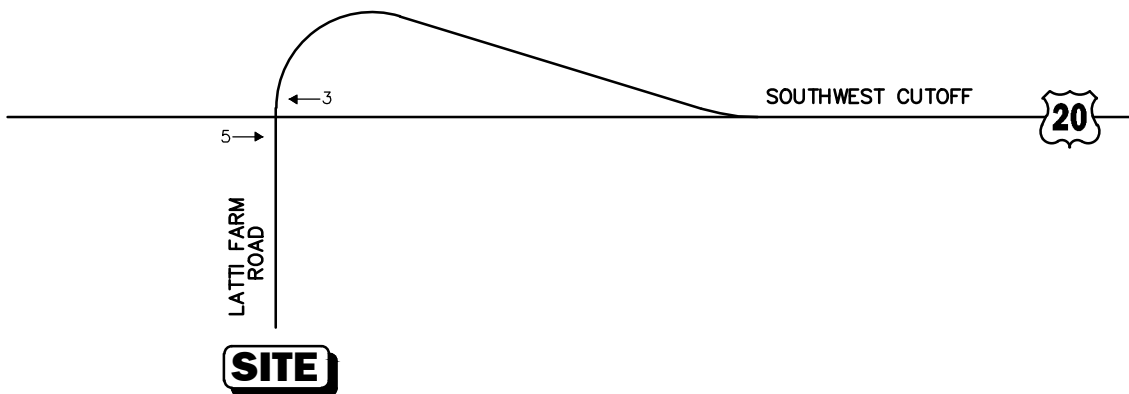


BACKGROUND DEVELOPMENT TRAFFIC-VOLUME NETWORKS

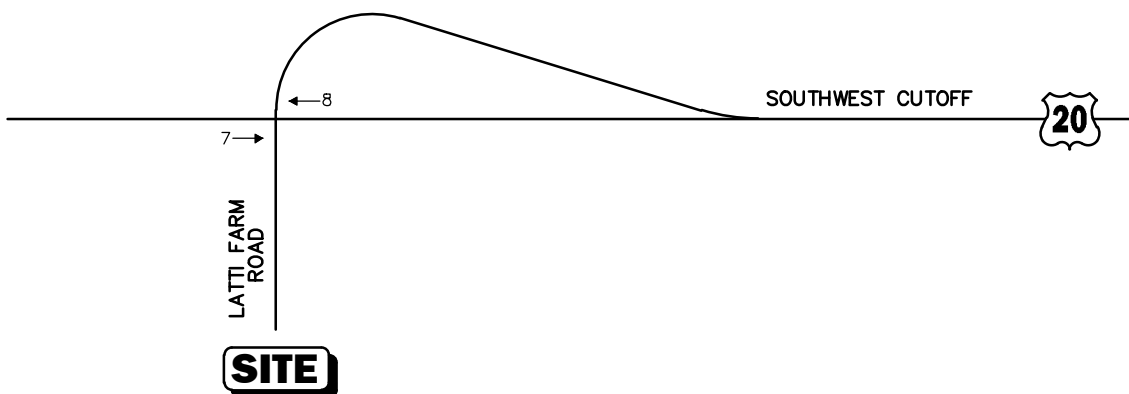




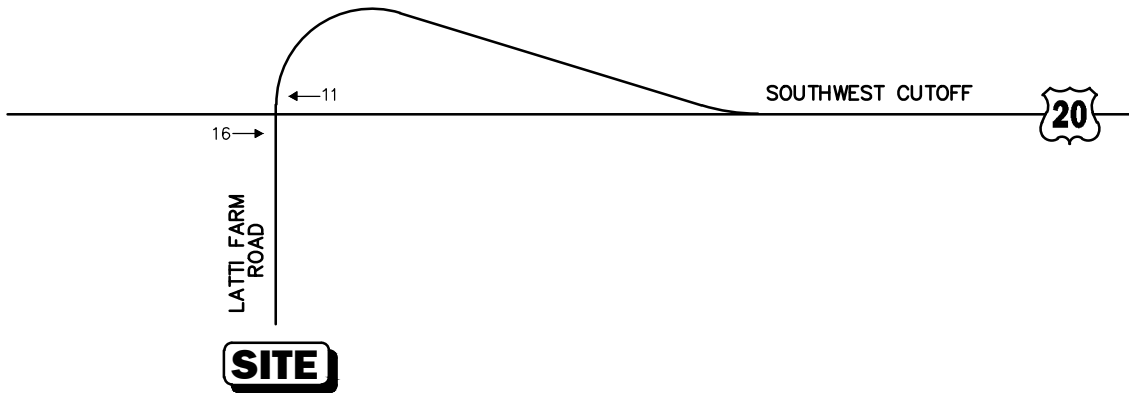
**WEEKDAY MORNING PEAK HOUR (7:30-8:30 AM)**



**WEEKDAY EVENING PEAK HOUR (4:00-5:00 PM)**



**SATURDAY MIDDAY PEAK HOUR (12:00-1:00 PM)**



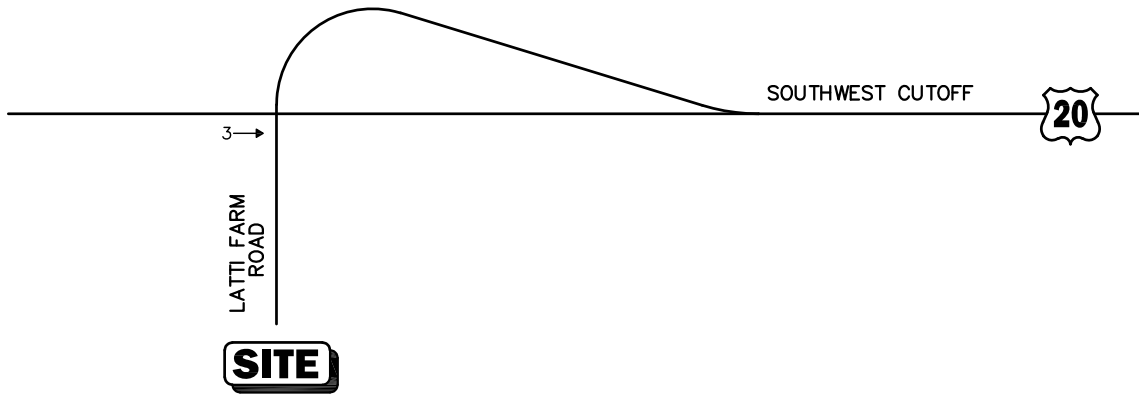
 Not To Scale



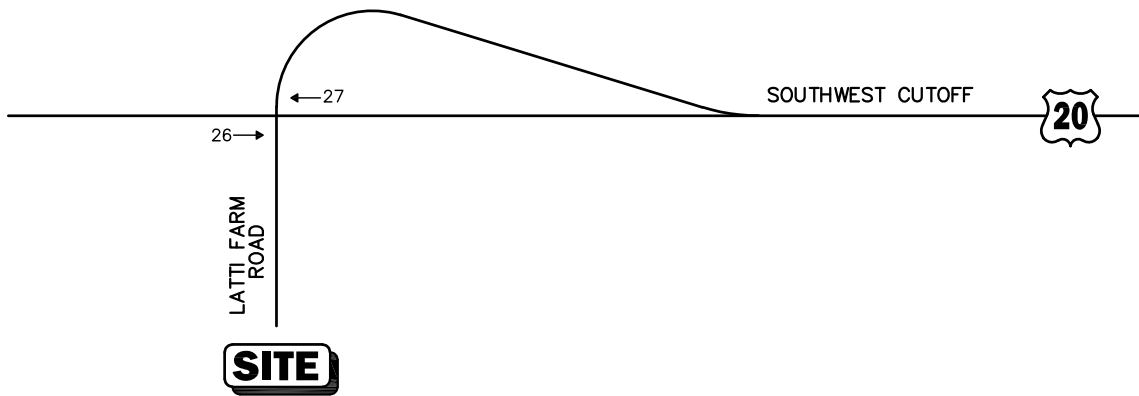
**Figure A-1**

**Proposed Self-Storage Facility  
210 Southwest Cutoff  
Peak Hour Traffic Volumes**

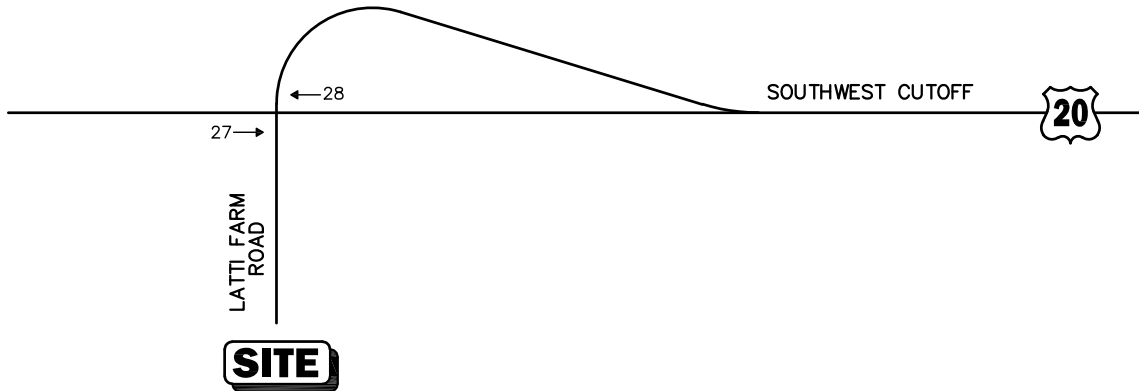
**WEEKDAY MORNING PEAK HOUR (7:30-8:30 AM)**



**WEEKDAY EVENING PEAK HOUR (4:00-5:00 PM)**



**SATURDAY MIDDAY PEAK HOUR (12:00-1:00 PM)**



 Not To Scale



**Figure A-2**

**Proposed Marijuana Dispensary  
141 Southwest Cutoff  
Peak Hour Traffic Volumes**

## TRIP-GENERATION CALCULATIONS

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# Marijuana Dispensary (882)

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

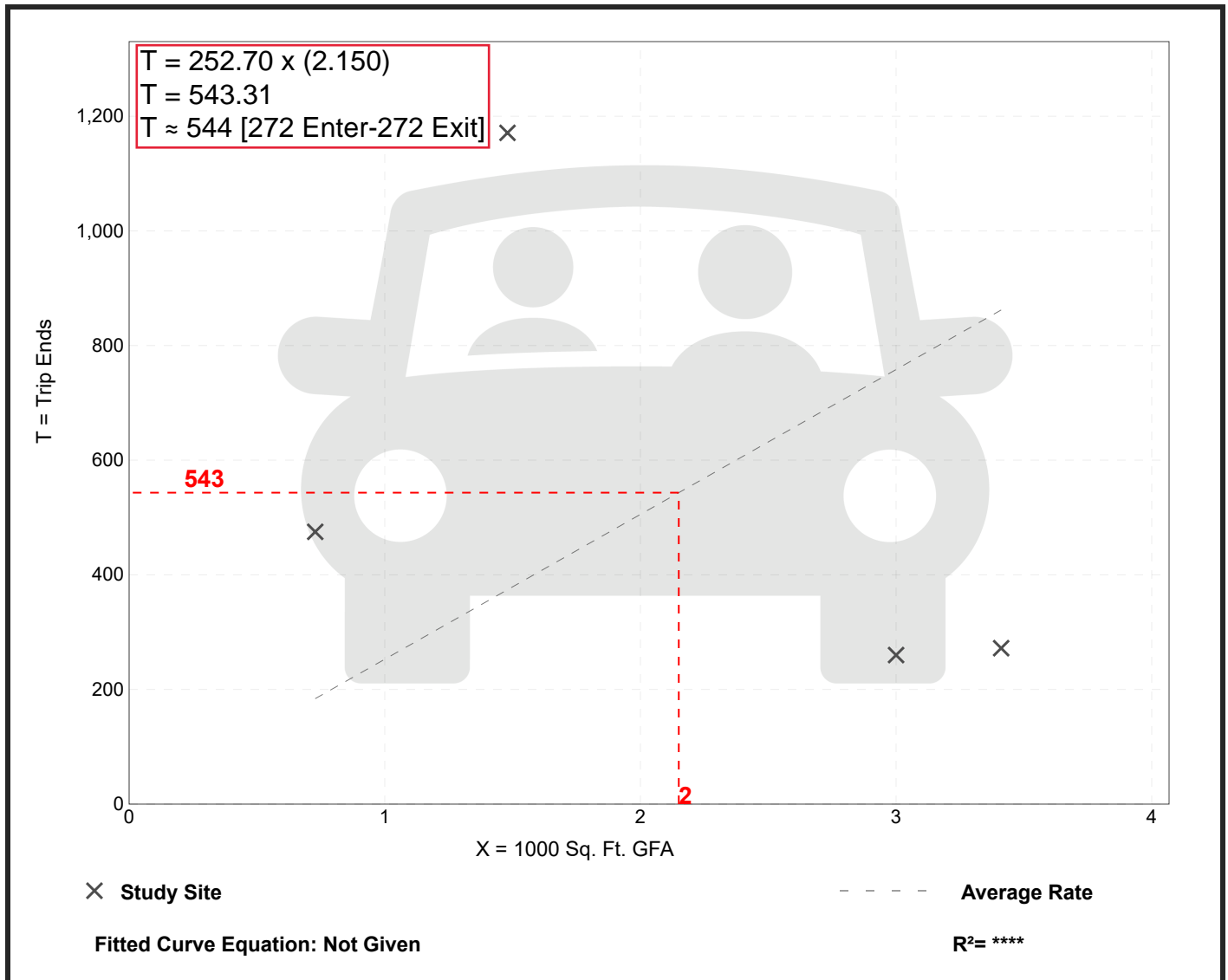
Setting/Location: General Urban/Suburban  
Number of Studies: 4  
Avg. 1000 Sq. Ft. GFA: 2  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
252.70	79.74 - 791.22	336.11

## Data Plot and Equation

Caution – Small Sample Size



# Marijuana Dispensary (882)

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

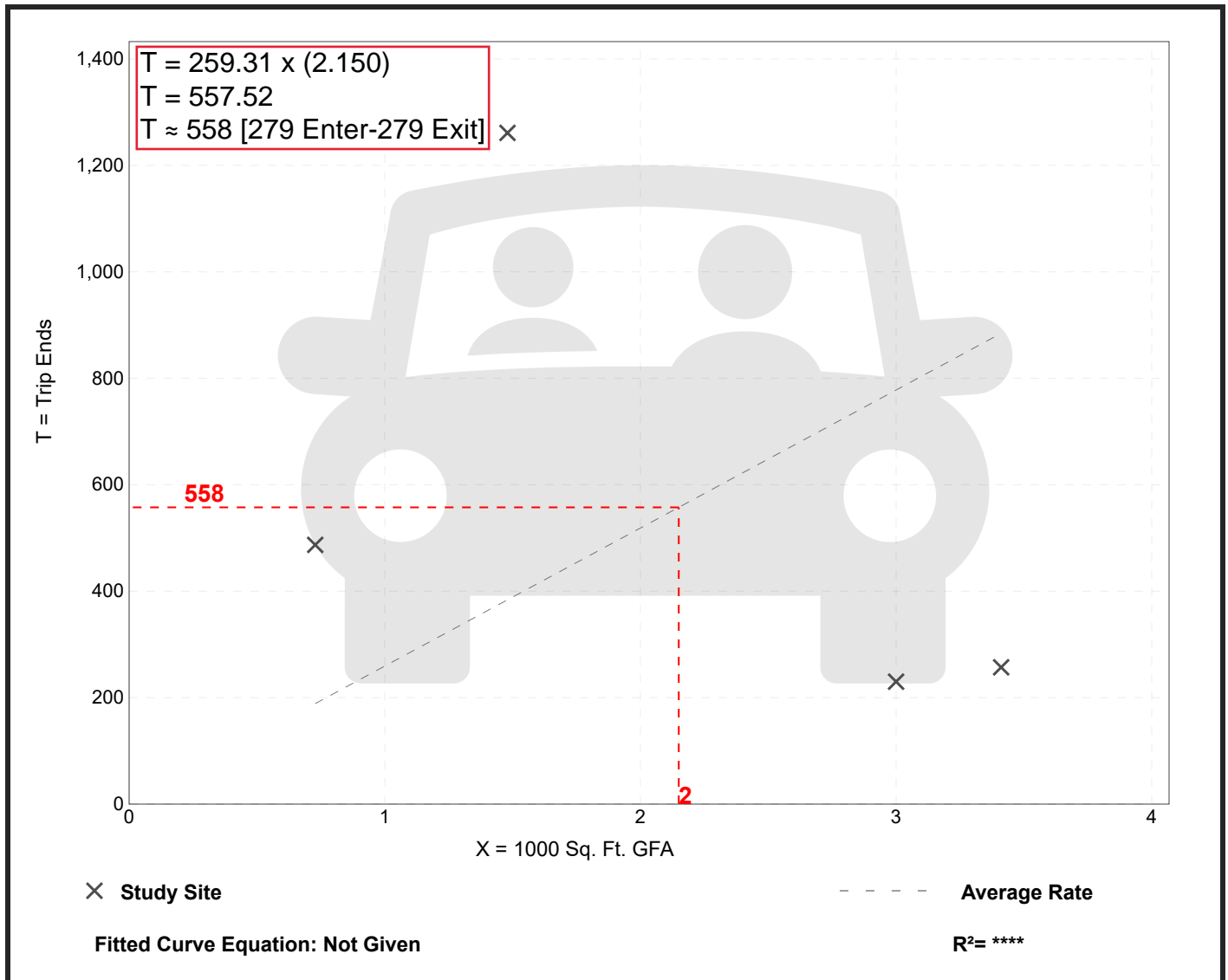
**Setting/Location: General Urban/Suburban**  
Number of Studies: 4  
Avg. 1000 Sq. Ft. GFA: 2  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
259.31	75.34 - 852.03	364.24

## Data Plot and Equation

*Caution – Small Sample Size*



# VAI Calculations

Job: Millbury  
 Location: 266 N. Main Street  
 Title: Traffic Count (Weekday)  
 Calculated by: SRF

Job Number: 8667  
 Date: 7/29/20  
 Sheet: 1 of 1  
 Size: 3,700 SF

Start Time	Ins	Outs	Total	Hourly Total	Trip Rate Hourly Total	Parking Demand	Parking Demand Ratio
7:00AM	0	0	0		0.00	1	0.27
7:15	1	0	1		0.00	2	0.54
7:30	1	0	1		0.00	3	0.81
7:45	2	0	2	4	1.08	5	1.35
8:00	1	0	1	5	1.35	6	1.62
8:15	3	0	3	7	1.89	9	2.43
8:30	1	0	1	7	1.89	10	2.70
8:45	0	0	0	5	1.35	10	2.70
9:00	1	0	1	5	1.35	11	2.97
9:15	0	0	0	2	0.54	11	2.97
9:30	0	0	0	1	0.27	11	2.97
9:45	2	0	2	3	0.81	13	3.51
10:00	7	5	12	14	3.78	15	4.05
→ 10:15	11	7	18	32	8.65	19	5.14
10:30	11	15	26	58	15.68	15	4.05
10:45	10	7	17	73	19.73	18	4.86
11:00	7	10	17	78	21.08	15	4.05
11:15	10	8	18	78	21.08	17	4.59
11:30	6	8	14	66	17.84	15	4.05
11:45	7	6	13	62	16.76	16	4.32
12:00	9	10	19	64	17.30	15	4.05
12:15	7	6	13	59	15.95	16	4.32
12:30	13	7	20	65	17.57	22	5.95
12:45	8	15	23	75	20.27	15	4.05
1:00	10	9	19	75	20.27	16	4.32
1:15	9	5	14	76	20.54	20	5.41
1:30	5	8	13	69	18.65	17	4.59
1:45	7	5	12	58	15.68	19	5.14
2:00	10	9	19	58	15.68	20	5.41
2:15	5	7	12	56	15.14	18	4.86
2:30	4	3	7	50	13.51	19	5.14
2:45	7	6	13	51	13.78	20	5.41
3:00	10	9	19	51	13.78	21	5.68
3:15	8	12	20	59	15.95	17	4.59
3:30	11	11	22	74	20.00	17	4.59
3:45	7	9	16	77	20.81	15	4.05
→ 4:00	11	10	21	79	21.35	16	4.32
4:15	11	13	24	83	22.43	14	3.78
4:30	17	10	27	88	23.78	21	5.68
4:45	11	20	31	103	27.84	12	3.24
5:00	10	10	20	102	27.57	12	3.24
5:15	11	13	24	102	27.57	10	2.70
5:30	6	7	13	88	23.78	9	2.43
5:45	12	7	19	76	20.54	14	3.78
6:00	9	11	20	76	20.54	12	3.24
6:15	15	12	27	79	21.35	15	4.05
6:30	8	12	20	86	23.24	11	2.97
6:45	10	8	18	85	22.97	13	3.51
Total	342	330	672				
Pk Hr Total	50	53	103				

1 car in lot at 7:00 am / 13 cars in lot at 7 pm

# VAI Calculations

Job: Millbury  
 Location: 266 N. Main Street  
 Title: Traffic Count (Saturday)  
 Calculated by: SRF

Job Number: 8667  
 Date: 7/25/20  
 Sheet: 1 of 1  
 Checked by:  
 Size: 3,700 SF

Start Time	Ins	Outs	Total	Hourly	Trip Rate	Parking	Parking
				Total	Hourly Total	Demand	Demand Ratio
→ 11:00AM	14	14	28		0.00	18	4.86
11:15	12	14	26		0.00	16	4.32
11:30	11	13	24		0.00	14	3.78
11:45	15	14	29	107	28.92	15	4.05
12:00	8	10	18	97	26.22	13	3.51
12:15	14	11	25	96	25.95	16	4.32
12:30	13	11	24	96	25.95	18	4.86
12:45	10	10	20	87	23.51	18	4.86
1:00	10	11	21	90	24.32	17	4.59
1:15	9	8	17	82	22.16	18	4.86
1:30	10	9	19	77	20.81	19	5.14
1:45	6	11	17	74	20.00	14	3.78
<b>Total</b>	132	136	268				
Pk Hr Total	52	55	107				

\* 17 cars and 1 box truck in lot at 11:00 am.

\*\*\* 14 cars in lot at 2:00 pm.

\*\* 1 of the outs in interval 1 (11:00-11:15) was the box truck

**Empirical Weekday Morning Peak Hour of Roadway Rate = 1.89**

$$T = 1.89 \times (2.150) = 4.06$$

$$T \approx 4 [4 \text{ Enter} - 0 \text{ Exit}]$$

**Empirical Weekday Morning Peak Hour of Generator Rate = 21.08**

$$T = 21.08 \times (2.150) = 45.32$$

$$T \approx 45 [23 \text{ Enter} - 22 \text{ Exit}]$$

**Empirical Weekday Evening Peak Hour Rate (Generator and Roadway) = 27.84**

$$T = 27.84 \times (2.150) = 59.86$$

$$T \approx 60 [29 \text{ Enter} - 31 \text{ Exit}]$$

**Empirical Saturday Midday Peak Hour of Generator Rate = 28.92**

$$T = 28.92 \times (2.150) = 62.18$$

$$T \approx 62 [30 \text{ Enter} - 32 \text{ Exit}]$$

# Manufacturing (140)

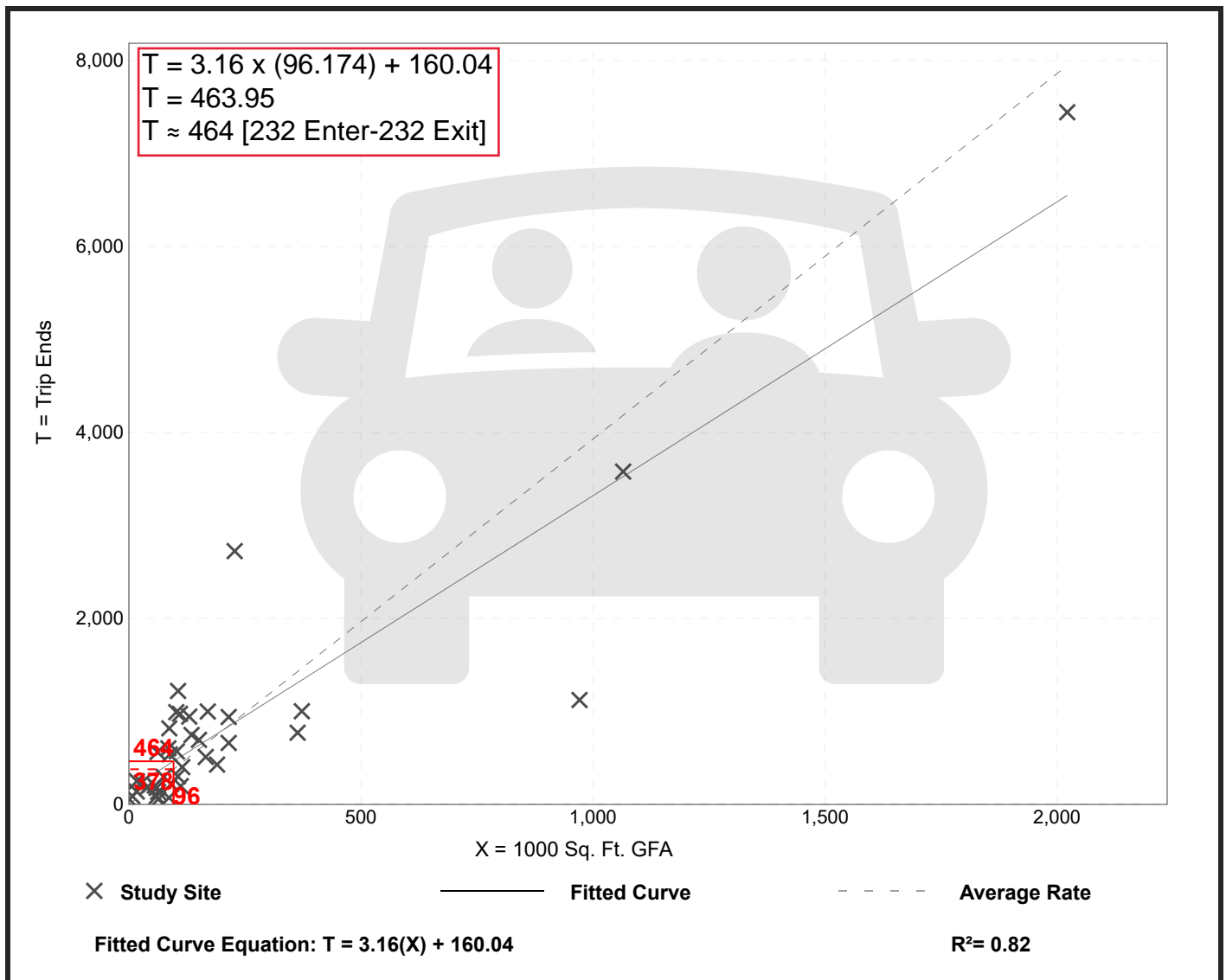
**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 39  
 Avg. 1000 Sq. Ft. GFA: 209  
 Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.93	0.83 - 49.50	2.62

## Data Plot and Equation



# Manufacturing (140)

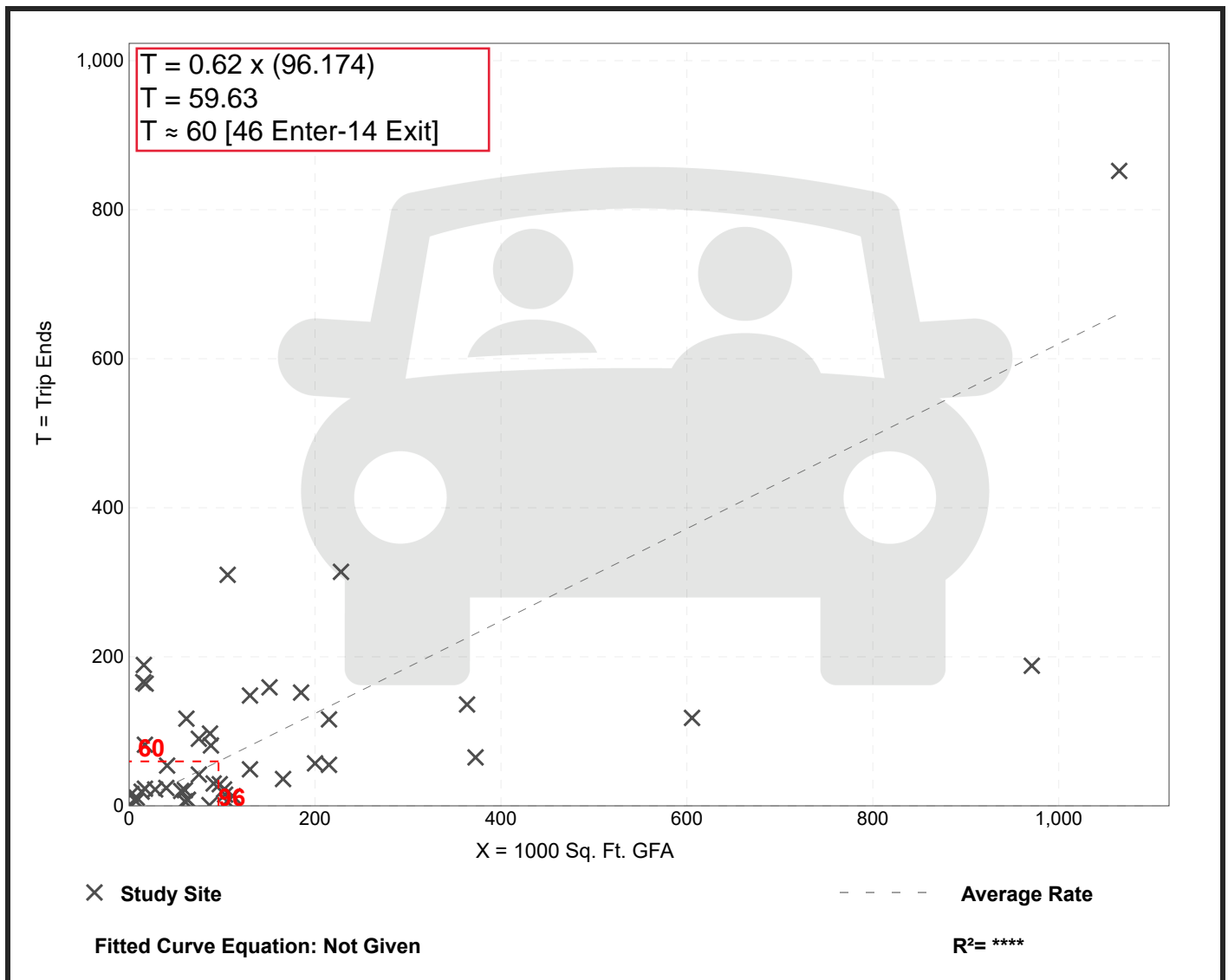
**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 45  
 Avg. 1000 Sq. Ft. GFA: 149  
 Directional Distribution: 77% entering, 23% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.62	0.01 - 11.93	1.03

## Data Plot and Equation





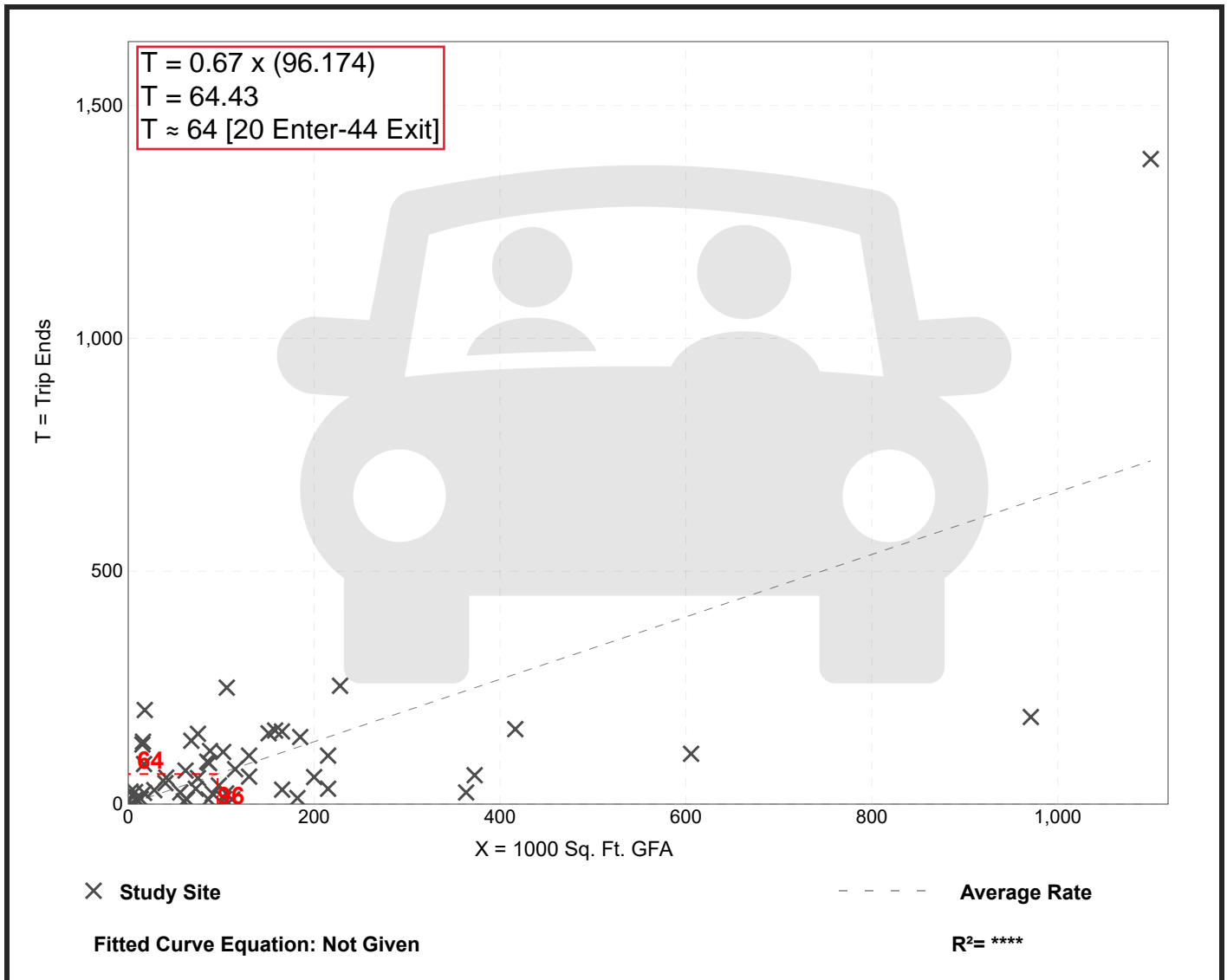
# Manufacturing (140)

**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: 52  
 Avg. 1000 Sq. Ft. GFA: 152  
 Directional Distribution: 31% entering, 69% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.67	0.07 - 11.37	0.94

## Data Plot and Equation







Land Use	110 General Light Industrial		140 Manufacturing		150 Warehousing		151 Mini-Warehouse					
	General Urban/ Suburban		General Urban/ Suburban		General Urban/ Suburban		General Urban/Suburban					
Time Period	Weekday		Weekday		Weekday		Weekday		Saturday		Sunday	
Trip Type	Vehicle		Vehicle		Vehicle		Vehicle		Vehicle		Vehicle	
# Data Sites	30		17		13		10		1		1	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
12:00	0.0	9.8	1.3	7.5	0.3	8.6	0.0	8.6	0.0	11.5	0.0	19.2
12:15	0.0	8.9	1.0	6.5	0.6	7.9	0.0	9.3	0.0	10.3	0.0	17.3
12:30	0.0	8.9	1.1	6.5	0.5	7.4	0.0	10.7	0.0	12.6	0.0	15.4
12:45	0.0	7.8	1.0	6.9	0.5	6.8	0.0	11.7	0.0	10.3	0.0	13.5
1:00	0.0	7.2	0.9	6.9	0.5	6.6	0.0	12.2	0.0	9.2	0.0	9.6
1:15	0.1	6.1	0.4	6.9	0.2	6.4	0.0	12.8	0.0	6.9	0.0	7.7
1:30	0.1	5.7	0.2	6.6	0.3	6.7	0.0	10.6	0.0	3.4	0.0	11.5
1:45	0.0	6.9	0.5	6.4	0.4	7.4	0.0	10.7	0.0	4.6	0.0	11.5
2:00	0.0	8.1	0.7	6.0	0.4	7.0	0.0	12.2	0.0	6.9	0.0	21.2
2:15	0.0	8.2	1.0	7.7	0.5	8.3	0.0	8.9	0.0	10.3	0.0	21.2
2:30	0.0	9.2	0.9	10.2	0.6	8.4	0.0	9.4	0.0	10.3	0.0	15.4
2:45	0.0	9.3	0.7	13.4	0.5	9.2	0.0	7.8	0.0	10.3	0.0	11.5
3:00	0.0	8.8	0.6	15.1	0.7	10.0	0.0	5.7	0.0	6.9	0.0	3.8
3:15	0.1	9.0	0.5	14.8	0.9	8.8	0.0	7.3	0.0	3.4	0.0	5.8
3:30	0.2	7.8	0.6	12.7	1.1	8.6	0.0	7.6	0.0	6.9	0.0	5.8
3:45	0.3	7.0	0.7	9.4	1.3	8.1	0.0	7.3	0.0	6.9	0.0	5.8
4:00	0.3	7.4	0.8	7.6	1.4	7.8	0.0	8.8	0.0	9.2	0.0	3.8
4:15	0.2	9.9	0.8	7.6	1.5	9.0	0.0	11.4	0.0	9.2	0.0	3.8
4:30	0.3	10.3	0.9	6.9	1.6	8.8	0.6	10.4	0.0	12.6	0.0	5.8
4:45	0.8	9.4	1.1	6.0	2.4	7.8	0.6	10.1	0.0	12.6	0.0	7.7
5:00	2.4	7.7	1.6	6.1	3.1	6.6	0.6	9.6	0.0	11.5	0.0	9.6
5:15	3.3	4.5	3.6	4.0	3.8	5.0	0.6	5.8	0.0	13.8	0.0	9.6
5:30	3.6	3.3	5.2	3.4	4.2	4.1	0.0	6.8	0.0	9.2	0.0	9.6
5:45	4.1	2.4	7.8	2.7	4.8	3.1	0.0	7.1	0.0	10.3	0.0	13.5
6:00	5.3	1.7	9.7	1.8	6.3	2.7	0.0	5.8	0.0	13.8	0.0	13.5
6:15	7.2	0.9	9.8	1.6	6.9	1.7	0.0	4.7	0.0	11.5	0.0	11.5
6:30	8.0	0.4	10.6	1.7	7.4	1.2	0.0	2.8	0.0	9.2	0.0	9.6
6:45	9.4	0.3	9.5	1.5	7.4	1.2	1.0	0.8	0.0	5.7	0.0	1.9
7:00	10.4	0.4	8.5	1.4	7.3	0.9	1.9	0.6	0.0	0.0	0.0	0.0
7:15	11.0	0.4	7.5	1.2	7.4	0.7	4.2	1.0	0.0	0.0	0.0	0.0
7:30	11.0	0.4	6.1	1.0	7.7	0.8	7.1	1.3	0.0	0.0	0.0	0.0
7:45	9.9	0.3	5.2	1.2	7.1	0.6	9.1	1.3	0.0	0.0	0.0	0.0
8:00	7.4	0.1	4.2	1.3	6.0	0.6	8.8	1.3	0.0	0.0	0.0	0.0
8:15	5.5	0.0	3.6	1.2	5.3	0.7	7.8	0.6	0.0	0.0	3.8	0.0
8:30	6.2	0.0	3.2	1.2	4.8	0.6	6.5	0.0	0.0	0.0	3.8	0.0
8:45	6.4	0.0	3.2	1.2	6.3	0.7	4.7	0.0	3.4	0.0	7.7	0.0
9:00	7.1	0.4	3.2	1.6	6.5	0.7	5.5	0.0	4.6	0.0	7.7	0.0
9:15	7.5	0.4	3.4	2.1	7.5	0.7	5.4	0.0	4.6	0.0	7.7	0.0
9:30	7.1	0.4	3.3	2.3	7.9	0.5	5.0	0.0	4.6	0.0	7.7	0.0
9:45	7.7	0.4	3.2	2.4	7.0	0.7	7.3	0.0	1.1	0.0	11.5	0.0
10:00	7.4	0.0	3.0	2.1	6.5	0.8	8.0	0.0	5.7	0.0	11.5	0.0
10:15	7.2	0.0	3.3	2.0	6.6	1.1	11.9	0.0	9.2	0.0	7.7	0.0
10:30	7.3	0.0	3.8	2.0	6.8	1.2	11.9	0.0	12.6	0.0	7.7	0.0
10:45	7.2	0.0	4.3	2.0	6.9	1.0	11.4	0.0	25.3	0.0	0.0	0.0
11:00	7.9	0.0	5.5	2.5	7.6	1.0	10.4	0.0	20.7	0.0	0.0	0.0
11:15	9.7	0.0	6.7	2.8	8.0	0.6	8.3	0.0	20.7	0.0	3.8	0.0
11:30	9.8	0.0	7.1	2.5	8.4	0.6	9.3	0.0	18.4	0.0	7.7	0.0
11:45	10.3	0.0	7.6	2.2	8.3	0.5	9.1	0.0	9.2	0.0	15.4	0.0

## **Manufacturing Use; Weekday Morning Peak Hour of Dispensary Generator Trips**

Peak Hour of Dispensary begins at 11:00 AM

Per ITE, LUC 140 percent of daily traffic occurring for the hour beginning at 11:00 AM = 5.5%

$$T = 0.055 \times 464 = 25.52$$

$$T \approx 26 [13 \text{ Enter} - 13 \text{ Exit}]$$

**CAPACITY ANALYSIS WORKSHEETS**

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Route 20 at Latti Farm Road





Route 20 at Latti Farm Road

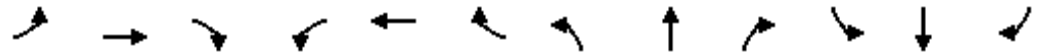
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2021 Existing Weekday Morning Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖			↕			↕	
Traffic Volume (vph)	0	945	124	4	705	0	45	0	22	12	56	10
Future Volume (vph)	0	945	124	4	705	0	45	0	22	12	56	10
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.956			0.983	
Flt Protected								0.968			0.992	
Satd. Flow (prot)	0	3343	1561	0	3313	0	0	1791	0	0	1971	0
Flt Permitted					0.950			0.827			0.948	
Satd. Flow (perm)	0	3343	1561	0	3148	0	0	1530	0	0	1884	0
Satd. Flow (RTOR)			148					27			6	
Adj. Flow (vph)	0	1125	148	4	742	0	94	0	46	16	75	13
Lane Group Flow (vph)	0	1125	148	0	746	0	0	140	0	0	104	0
Turn Type		NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4	8			2			6		
Detector Phase		4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)		8.0	8.0	8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)		14.0	14.0	14.0	14.0		12.0	12.0		12.0	12.0	
Total Split (s)		86.0	86.0	86.0	86.0		34.0	34.0		34.0	34.0	
Total Split (%)		71.7%	71.7%	71.7%	71.7%		28.3%	28.3%		28.3%	28.3%	
Maximum Green (s)		80.0	80.0	80.0	80.0		30.0	30.0		30.0	30.0	
Yellow Time (s)		4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)		2.0	2.0	2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0			0.0			0.0	
Total Lost Time (s)		4.0	4.0		4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		None	None	None	None		None	None		None	None	
v/c Ratio		0.48	0.13		0.34			0.36			0.23	
Control Delay		5.8	1.2		4.8			18.9			19.0	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		5.8	1.2		4.8			18.9			19.0	
Queue Length 50th (ft)		73	0		42			26			22	
Queue Length 95th (ft)		134	13		90			38			58	
Internal Link Dist (ft)		120			120			120			120	
Turn Bay Length (ft)			160									
Base Capacity (vph)		3343	1561		3148			1045			1278	
Starvation Cap Reductn		0	0		0			0			0	
Spillback Cap Reductn		0	0		0			0			0	
Storage Cap Reductn		0	0		0			0			0	
Reduced v/c Ratio		0.34	0.09		0.24			0.13			0.08	
<b>Intersection Summary</b>												
Cycle Length: 120												
Actuated Cycle Length: 46.4												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												

# 2021 Existing Weekday Morning Peak Hour 1: Latti Farms Road/Jughandle & Route 20

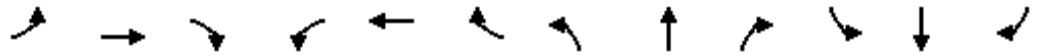
Splits and Phases: 1: Latti Farms Road/Jughandle & Route 20



2021 Existing Weekday Morning Peak Hour  
1: Latti Farms Road/Jughandle & Route 20

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑			↕			↕	
Traffic Volume (vph)	0	945	124	4	705	0	45	0	22	12	56	10
Future Volume (vph)	0	945	124	4	705	0	45	0	22	12	56	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	12	12	15	15	15	16	16	16
Total Lost time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Util. Factor		0.95	1.00		0.95			1.00			1.00	
Frt		1.00	0.85		1.00			0.96			0.98	
Flt Protected		1.00	1.00		1.00			0.97			0.99	
Satd. Flow (prot)		3343	1561		3313			1789			1972	
Flt Permitted		1.00	1.00		0.95			0.83			0.95	
Satd. Flow (perm)		3343	1561		3146			1530			1884	
Peak-hour factor, PHF	0.84	0.84	0.84	0.95	0.95	0.95	0.48	0.48	0.48	0.75	0.75	0.75
Adj. Flow (vph)	0	1125	148	4	742	0	94	0	46	16	75	13
RTOR Reduction (vph)	0	0	51	0	0	0	0	22	0	0	5	0
Lane Group Flow (vph)	0	1125	97	0	746	0	0	118	0	0	99	0
Heavy Vehicles (%)	0%	8%	0%	0%	9%	0%	9%	0%	6%	22%	0%	25%
Turn Type		NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4	8			2			6		
Actuated Green, G (s)		28.6	28.6		28.6			8.0			8.0	
Effective Green, g (s)		30.6	30.6		30.6			8.0			8.0	
Actuated g/C Ratio		0.66	0.66		0.66			0.17			0.17	
Clearance Time (s)		6.0	6.0		6.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		2195	1025		2065			262			323	
v/s Ratio Prot		c0.34										
v/s Ratio Perm			0.06		0.24			c0.08			0.05	
v/c Ratio		0.51	0.09		0.36			0.45			0.31	
Uniform Delay, d1		4.1	2.9		3.6			17.3			16.9	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		0.2	0.0		0.1			1.2			0.5	
Delay (s)		4.3	3.0		3.7			18.5			17.4	
Level of Service		A	A		A			B			B	
Approach Delay (s)		4.2			3.7			18.5			17.4	
Approach LOS		A			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			5.5		HCM 2000 Level of Service					A		
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			46.6		Sum of lost time (s)					8.0		
Intersection Capacity Utilization			43.9%		ICU Level of Service					A		
Analysis Period (min)			15									
c Critical Lane Group												

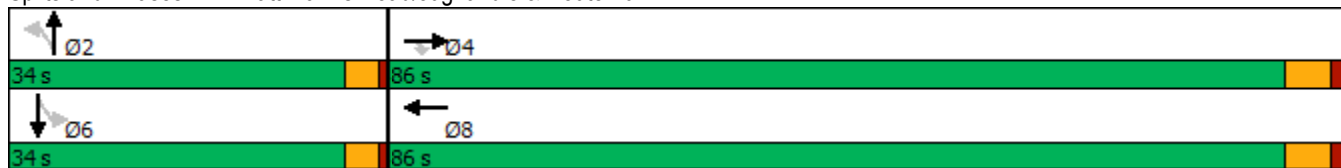
2021 Existing Weekday Evening Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20



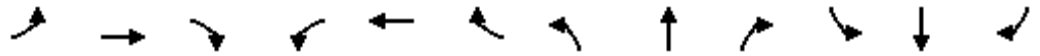
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑			↕			↕	
Traffic Volume (vph)	0	825	26	0	1254	0	40	0	30	13	22	32
Future Volume (vph)	0	825	26	0	1254	0	40	0	30	13	22	32
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>			0.850					0.942			0.935	
Fl <sub>t</sub> Protected								0.972			0.990	
Satd. Flow (prot)	0	3406	1301	0	3471	0	0	1850	0	0	1851	0
Fl <sub>t</sub> Permitted								0.852			0.940	
Satd. Flow (perm)	0	3406	1301	0	3471	0	0	1622	0	0	1757	0
Satd. Flow (RTOR)			29					30			37	
Adj. Flow (vph)	0	917	29	0	1393	0	63	0	47	16	27	40
Lane Group Flow (vph)	0	917	29	0	1393	0	0	110	0	0	83	0
Turn Type		NA	Perm		NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4				2			6		
Detector Phase		4	4		8		2	2		6	6	
Switch Phase												
Minimum Initial (s)		8.0	8.0		8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)		14.0	14.0		14.0		12.0	12.0		12.0	12.0	
Total Split (s)		86.0	86.0		86.0		34.0	34.0		34.0	34.0	
Total Split (%)		71.7%	71.7%		71.7%		28.3%	28.3%		28.3%	28.3%	
Maximum Green (s)		80.0	80.0		80.0		30.0	30.0		30.0	30.0	
Yellow Time (s)		4.0	4.0		4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)		2.0	2.0		2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0			0.0			0.0	
Total Lost Time (s)		4.0	4.0		4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Recall Mode		None	None		None		None	None		None	None	
v/c Ratio		0.37	0.03		0.55			0.31			0.21	
Control Delay		4.2	1.5		5.5			19.3			15.3	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		4.2	1.5		5.5			19.3			15.3	
Queue Length 50th (ft)		47	0		89			20			11	
Queue Length 95th (ft)		98	6		178			46			45	
Internal Link Dist (ft)		120			120			120			120	
Turn Bay Length (ft)			160									
Base Capacity (vph)		3406	1301		3471			1062			1152	
Starvation Cap Reductn		0	0		0			0			0	
Spillback Cap Reductn		0	0		0			0			0	
Storage Cap Reductn		0	0		0			0			0	
Reduced v/c Ratio		0.27	0.02		0.40			0.10			0.07	
<b>Intersection Summary</b>												
Cycle Length: 120												
Actuated Cycle Length: 49.7												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												

# 2021 Existing Weekday Evening Peak Hour 1: Latti Farms Road/Jughandle & Route 20

Splits and Phases: 1: Latti Farms Road/Jughandle & Route 20



2021 Existing Weekday Evening Peak Hour  
1: Latti Farms Road/Jughandle & Route 20



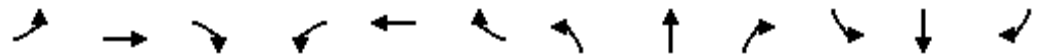
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑			↕			↕	
Traffic Volume (vph)	0	825	26	0	1254	0	40	0	30	13	22	32
Future Volume (vph)	0	825	26	0	1254	0	40	0	30	13	22	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	12	12	15	15	15	16	16	16
Total Lost time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Util. Factor		0.95	1.00		0.95			1.00			1.00	
Frt		1.00	0.85		1.00			0.94			0.93	
Flt Protected		1.00	1.00		1.00			0.97			0.99	
Satd. Flow (prot)		3406	1301		3471			1851			1851	
Flt Permitted		1.00	1.00		1.00			0.85			0.94	
Satd. Flow (perm)		3406	1301		3471			1622			1757	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.64	0.64	0.64	0.81	0.81	0.81
Adj. Flow (vph)	0	917	29	0	1393	0	62	0	47	16	27	40
RTOR Reduction (vph)	0	0	9	0	0	0	0	26	0	0	32	0
Lane Group Flow (vph)	0	917	20	0	1393	0	0	84	0	0	51	0
Heavy Vehicles (%)	0%	6%	20%	0%	4%	0%	6%	0%	0%	10%	0%	12%
Turn Type		NA	Perm		NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)		32.9	32.9		32.9			7.2			7.2	
Effective Green, g (s)		34.9	34.9		34.9			7.2			7.2	
Actuated g/C Ratio		0.70	0.70		0.70			0.14			0.14	
Clearance Time (s)		6.0	6.0		6.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		2372	906		2417			233			252	
v/s Ratio Prot		0.27			c0.40							
v/s Ratio Perm			0.02					c0.05			0.03	
v/c Ratio		0.39	0.02		0.58			0.36			0.20	
Uniform Delay, d1		3.2	2.3		3.9			19.4			18.9	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		0.1	0.0		0.3			1.0			0.4	
Delay (s)		3.3	2.4		4.2			20.3			19.3	
Level of Service		A	A		A			C			B	
Approach Delay (s)		3.2			4.2			20.3			19.3	
Approach LOS		A			A			C			B	

Intersection Summary

HCM 2000 Control Delay	5.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	50.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

2021 Existing Saturday Midday Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20

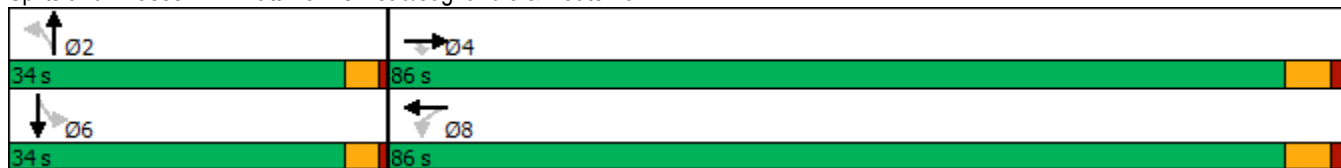


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖			↕			↕	
Traffic Volume (vph)	0	878	28	4	850	0	52	0	12	4	14	12
Future Volume (vph)	0	878	28	4	850	0	52	0	12	4	14	12
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.974			0.946	
Flt Protected								0.961			0.993	
Satd. Flow (prot)	0	3539	1561	0	3574	0	0	1956	0	0	1938	0
Flt Permitted					0.951			0.905			0.935	
Satd. Flow (perm)	0	3539	1561	0	3399	0	0	1842	0	0	1825	0
Satd. Flow (RTOR)			30					27			23	
Adj. Flow (vph)	0	954	30	4	904	0	68	0	16	8	27	23
Lane Group Flow (vph)	0	954	30	0	908	0	0	84	0	0	58	0
Turn Type		NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4	8			2			6		
Detector Phase		4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)		8.0	8.0	8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)		14.0	14.0	14.0	14.0		12.0	12.0		12.0	12.0	
Total Split (s)		86.0	86.0	86.0	86.0		34.0	34.0		34.0	34.0	
Total Split (%)		71.7%	71.7%	71.7%	71.7%		28.3%	28.3%		28.3%	28.3%	
Maximum Green (s)		80.0	80.0	80.0	80.0		30.0	30.0		30.0	30.0	
Yellow Time (s)		4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)		2.0	2.0	2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0			0.0			0.0	
Total Lost Time (s)		4.0	4.0		4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		None	None	None	None		None	None		None	None	
v/c Ratio		0.36	0.03		0.36			0.14			0.10	
Control Delay		4.0	1.8		4.0			10.7			10.2	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		4.0	1.8		4.0			10.7			10.2	
Queue Length 50th (ft)		47	0		45			9			5	
Queue Length 95th (ft)		82	6		79			31			14	
Internal Link Dist (ft)		120			120			120			120	
Turn Bay Length (ft)			160									
Base Capacity (vph)		3539	1561		3399			1583			1568	
Starvation Cap Reductn		0	0		0			0			0	
Spillback Cap Reductn		0	0		0			0			0	
Storage Cap Reductn		0	0		0			0			0	
Reduced v/c Ratio		0.27	0.02		0.27			0.05			0.04	
<b>Intersection Summary</b>												
Cycle Length: 120												
Actuated Cycle Length: 31.2												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												



# 2021 Existing Saturday Midday Peak Hour 1: Latti Farms Road/Jughandle & Route 20

Splits and Phases: 1: Latti Farms Road/Jughandle & Route 20



2021 Existing Saturday Midday Peak Hour  
1: Latti Farms Road/Jughandle & Route 20

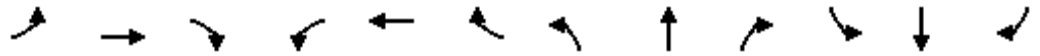


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑			↕			↕	
Traffic Volume (vph)	0	878	28	4	850	0	52	0	12	4	14	12
Future Volume (vph)	0	878	28	4	850	0	52	0	12	4	14	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	12	12	15	15	15	16	16	16
Total Lost time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Util. Factor		0.95	1.00		0.95			1.00			1.00	
Frt		1.00	0.85		1.00			0.97			0.95	
Flt Protected		1.00	1.00		1.00			0.96			0.99	
Satd. Flow (prot)		3539	1561		3574			1957			1939	
Flt Permitted		1.00	1.00		0.95			0.90			0.93	
Satd. Flow (perm)		3539	1561		3398			1842			1826	
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.77	0.77	0.77	0.52	0.52	0.52
Adj. Flow (vph)	0	954	30	4	904	0	68	0	16	8	27	23
RTOR Reduction (vph)	0	0	11	0	0	0	0	24	0	0	20	0
Lane Group Flow (vph)	0	954	19	0	908	0	0	60	0	0	38	0
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	11%
Turn Type		NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4	8			2			6		
Actuated Green, G (s)		18.3	18.3		18.3			4.0			4.0	
Effective Green, g (s)		20.3	20.3		20.3			4.0			4.0	
Actuated g/C Ratio		0.63	0.63		0.63			0.12			0.12	
Clearance Time (s)		6.0	6.0		6.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		2224	981		2135			228			226	
v/s Ratio Prot		c0.27										
v/s Ratio Perm			0.01		0.27			c0.03			0.02	
v/c Ratio		0.43	0.02		0.43			0.26			0.17	
Uniform Delay, d1		3.1	2.3		3.0			12.8			12.7	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		0.1	0.0		0.1			0.6			0.4	
Delay (s)		3.2	2.3		3.2			13.4			13.0	
Level of Service		A	A		A			B			B	
Approach Delay (s)		3.2			3.2			13.4			13.0	
Approach LOS		A			A			B			B	

Intersection Summary		
HCM 2000 Control Delay	3.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.40	A
Actuated Cycle Length (s)	32.3	Sum of lost time (s)
Intersection Capacity Utilization	46.9%	8.0
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

2028 No Build Weekday Morning Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖			↕			↕	
Traffic Volume (vph)	0	1057	138	4	785	0	50	0	24	13	62	11
Future Volume (vph)	0	1057	138	4	785	0	50	0	24	13	62	11
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.956			0.982	
Flt Protected								0.967			0.993	
Satd. Flow (prot)	0	3343	1561	0	3313	0	0	1789	0	0	1971	0
Flt Permitted					0.950			0.772			0.947	
Satd. Flow (perm)	0	3343	1561	0	3148	0	0	1428	0	0	1880	0
Satd. Flow (RTOR)			164					27			6	
Adj. Flow (vph)	0	1258	164	4	826	0	104	0	50	17	83	15
Lane Group Flow (vph)	0	1258	164	0	830	0	0	154	0	0	115	0
Turn Type		NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4	8			2			6		
Detector Phase		4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)		8.0	8.0	8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)		14.0	14.0	14.0	14.0		12.0	12.0		12.0	12.0	
Total Split (s)		86.0	86.0	86.0	86.0		34.0	34.0		34.0	34.0	
Total Split (%)		71.7%	71.7%	71.7%	71.7%		28.3%	28.3%		28.3%	28.3%	
Maximum Green (s)		80.0	80.0	80.0	80.0		30.0	30.0		30.0	30.0	
Yellow Time (s)		4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)		2.0	2.0	2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0			0.0			0.0	
Total Lost Time (s)		4.0	4.0		4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		None	None	None	None		None	None		None	None	
v/c Ratio		0.60	0.16		0.42			0.47			0.28	
Control Delay		7.6	1.3		6.0			24.5			22.9	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		7.6	1.3		6.0			24.5			22.9	
Queue Length 50th (ft)		99	0		55			35			29	
Queue Length 95th (ft)		189	15		123			49			75	
Internal Link Dist (ft)		120			120			120			120	
Turn Bay Length (ft)			160									
Base Capacity (vph)		3321	1552		3127			818			1065	
Starvation Cap Reductn		0	0		0			0			0	
Spillback Cap Reductn		0	0		0			0			0	
Storage Cap Reductn		0	0		0			0			0	
Reduced v/c Ratio		0.38	0.11		0.27			0.19			0.11	
<b>Intersection Summary</b>												
Cycle Length: 120												
Actuated Cycle Length: 57.4												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												

# 2028 No Build Weekday Morning Peak Hour 1: Latti Farms Road/Jughandle & Route 20

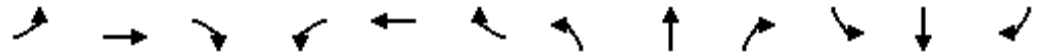
Splits and Phases: 1: Latti Farms Road/Jughandle & Route 20



2028 No Build Weekday Morning Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑			↕			↕	
Traffic Volume (vph)	0	1057	138	4	785	0	50	0	24	13	62	11
Future Volume (vph)	0	1057	138	4	785	0	50	0	24	13	62	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	12	12	15	15	15	16	16	16
Total Lost time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Util. Factor		0.95	1.00		0.95			1.00			1.00	
Frt		1.00	0.85		1.00			0.96			0.98	
Flt Protected		1.00	1.00		1.00			0.97			0.99	
Satd. Flow (prot)		3343	1561		3312			1789			1971	
Flt Permitted		1.00	1.00		0.95			0.77			0.95	
Satd. Flow (perm)		3343	1561		3146			1429			1881	
Peak-hour factor, PHF	0.84	0.84	0.84	0.95	0.95	0.95	0.48	0.48	0.48	0.75	0.75	0.75
Adj. Flow (vph)	0	1258	164	4	826	0	104	0	50	17	83	15
RTOR Reduction (vph)	0	0	59	0	0	0	0	21	0	0	5	0
Lane Group Flow (vph)	0	1258	105	0	830	0	0	133	0	0	110	0
Heavy Vehicles (%)	0%	8%	0%	0%	9%	0%	9%	0%	6%	22%	0%	25%
Turn Type		NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4	8			2			6		
Actuated Green, G (s)		34.1	34.1		34.1			12.5			12.5	
Effective Green, g (s)		36.1	36.1		36.1			12.5			12.5	
Actuated g/C Ratio		0.64	0.64		0.64			0.22			0.22	
Clearance Time (s)		6.0	6.0		6.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		2132	995		2006			315			415	
v/s Ratio Prot		c0.38										
v/s Ratio Perm			0.07		0.26			c0.09			0.06	
v/c Ratio		0.59	0.11		0.41			0.42			0.27	
Uniform Delay, d1		6.0	4.0		5.0			18.9			18.3	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		0.4	0.0		0.1			0.9			0.3	
Delay (s)		6.4	4.0		5.2			19.9			18.6	
Level of Service		A	A		A			B			B	
Approach Delay (s)		6.1			5.2			19.9			18.6	
Approach LOS		A			A			B			B	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			7.2		HCM 2000 Level of Service					A		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			56.6		Sum of lost time (s)				8.0			
Intersection Capacity Utilization			47.0%		ICU Level of Service					A		
Analysis Period (min)			15									
c Critical Lane Group												

2028 No Build Weekday Evening Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑			↕			↕	
Traffic Volume (vph)	0	949	26	0	1427	0	44	0	33	14	24	36
Future Volume (vph)	0	949	26	0	1427	0	44	0	33	14	24	36
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>			0.850					0.942			0.935	
Fl <sub>t</sub> Protected								0.972			0.991	
Satd. Flow (prot)	0	3406	1301	0	3471	0	0	1850	0	0	1853	0
Fl <sub>t</sub> Permitted								0.834			0.947	
Satd. Flow (perm)	0	3406	1301	0	3471	0	0	1588	0	0	1771	0
Satd. Flow (RTOR)			29					30			37	
Adj. Flow (vph)	0	1054	29	0	1586	0	69	0	52	17	30	44
Lane Group Flow (vph)	0	1054	29	0	1586	0	0	121	0	0	91	0
Turn Type		NA	Perm		NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4				2			6		
Detector Phase		4	4		8		2	2		6	6	
Switch Phase												
Minimum Initial (s)		8.0	8.0		8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)		14.0	14.0		14.0		12.0	12.0		12.0	12.0	
Total Split (s)		86.0	86.0		86.0		34.0	34.0		34.0	34.0	
Total Split (%)		71.7%	71.7%		71.7%		28.3%	28.3%		28.3%	28.3%	
Maximum Green (s)		80.0	80.0		80.0		30.0	30.0		30.0	30.0	
Yellow Time (s)		4.0	4.0		4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)		2.0	2.0		2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0			0.0			0.0	
Total Lost Time (s)		4.0	4.0		4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Recall Mode		None	None		None		None	None		None	None	
v/c Ratio		0.41	0.03		0.60			0.38			0.25	
Control Delay		4.3	1.4		6.0			24.8			19.5	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		4.3	1.4		6.0			24.8			19.5	
Queue Length 50th (ft)		65	0		124			29			17	
Queue Length 95th (ft)		134	6		254			60			58	
Internal Link Dist (ft)		120			120			120			120	
Turn Bay Length (ft)			160									
Base Capacity (vph)		3359	1283		3423			907			1013	
Starvation Cap Reductn		0	0		0			0			0	
Spillback Cap Reductn		0	0		0			0			0	
Storage Cap Reductn		0	0		0			0			0	
Reduced v/c Ratio		0.31	0.02		0.46			0.13			0.09	
<b>Intersection Summary</b>												
Cycle Length: 120												
Actuated Cycle Length: 59.8												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												

# 2028 No Build Weekday Evening Peak Hour 1: Latti Farms Road/Jughandle & Route 20

Splits and Phases: 1: Latti Farms Road/Jughandle & Route 20

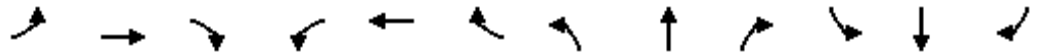


2028 No Build Weekday Evening Peak Hour  
1: Latti Farms Road/Jughandle & Route 20

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑			↕			↕	
Traffic Volume (vph)	0	949	26	0	1427	0	44	0	33	14	24	36
Future Volume (vph)	0	949	26	0	1427	0	44	0	33	14	24	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	12	12	15	15	15	16	16	16
Total Lost time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Util. Factor		0.95	1.00		0.95			1.00			1.00	
Frt		1.00	0.85		1.00			0.94			0.93	
Flt Protected		1.00	1.00		1.00			0.97			0.99	
Satd. Flow (prot)		3406	1301		3471			1851			1852	
Flt Permitted		1.00	1.00		1.00			0.83			0.95	
Satd. Flow (perm)		3406	1301		3471			1588			1769	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.64	0.64	0.64	0.81	0.81	0.81
Adj. Flow (vph)	0	1054	29	0	1586	0	69	0	52	17	30	44
RTOR Reduction (vph)	0	0	8	0	0	0	0	26	0	0	32	0
Lane Group Flow (vph)	0	1054	21	0	1586	0	0	95	0	0	59	0
Heavy Vehicles (%)	0%	6%	20%	0%	4%	0%	6%	0%	0%	10%	0%	12%
Turn Type		NA	Perm		NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)		41.9	41.9		41.9			8.2			8.2	
Effective Green, g (s)		43.9	43.9		43.9			8.2			8.2	
Actuated g/C Ratio		0.73	0.73		0.73			0.14			0.14	
Clearance Time (s)		6.0	6.0		6.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		2487	950		2535			216			241	
v/s Ratio Prot		0.31			c0.46							
v/s Ratio Perm			0.02					c0.06			0.03	
v/c Ratio		0.42	0.02		0.63			0.44			0.25	
Uniform Delay, d1		3.2	2.2		4.0			23.8			23.2	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		0.1	0.0		0.5			1.4			0.5	
Delay (s)		3.3	2.2		4.5			25.3			23.7	
Level of Service		A	A		A			C			C	
Approach Delay (s)		3.3			4.5			25.3			23.7	
Approach LOS		A			A			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			5.5		HCM 2000 Level of Service					A		
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			60.1		Sum of lost time (s)					8.0		
Intersection Capacity Utilization			57.1%		ICU Level of Service					B		
Analysis Period (min)			15									
c Critical Lane Group												



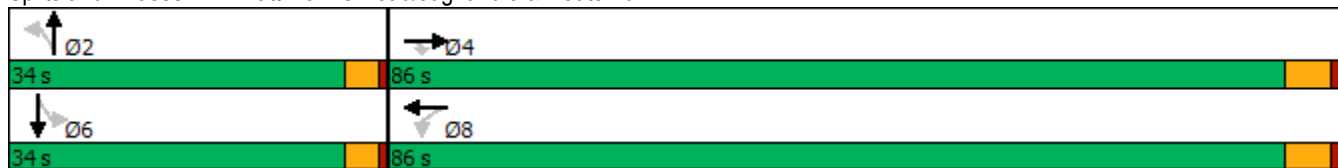
2028 No Build Saturday Midday Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖			↕			↕	
Traffic Volume (vph)	0	1017	31	4	982	0	58	0	13	4	16	13
Future Volume (vph)	0	1017	31	4	982	0	58	0	13	4	16	13
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.975			0.947	
Flt Protected								0.961			0.994	
Satd. Flow (prot)	0	3539	1561	0	3574	0	0	1958	0	0	1943	0
Flt Permitted					0.951			0.722			0.951	
Satd. Flow (perm)	0	3539	1561	0	3399	0	0	1471	0	0	1859	0
Satd. Flow (RTOR)			34					27			25	
Adj. Flow (vph)	0	1105	34	4	1045	0	75	0	17	8	31	25
Lane Group Flow (vph)	0	1105	34	0	1049	0	0	92	0	0	64	0
Turn Type		NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4	8			2			6		
Detector Phase		4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)		8.0	8.0	8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)		14.0	14.0	14.0	14.0		12.0	12.0		12.0	12.0	
Total Split (s)		86.0	86.0	86.0	86.0		34.0	34.0		34.0	34.0	
Total Split (%)		71.7%	71.7%	71.7%	71.7%		28.3%	28.3%		28.3%	28.3%	
Maximum Green (s)		80.0	80.0	80.0	80.0		30.0	30.0		30.0	30.0	
Yellow Time (s)		4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)		2.0	2.0	2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0			0.0			0.0	
Total Lost Time (s)		4.0	4.0		4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		None	None	None	None		None	None		None	None	
v/c Ratio		0.46	0.03		0.45			0.23			0.13	
Control Delay		5.0	1.6		5.0			14.0			12.0	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		5.0	1.6		5.0			14.0			12.0	
Queue Length 50th (ft)		58	0		55			12			7	
Queue Length 95th (ft)		107	6		102			40			17	
Internal Link Dist (ft)		120			120			120			120	
Turn Bay Length (ft)			160									
Base Capacity (vph)		3539	1561		3399			1132			1428	
Starvation Cap Reductn		0	0		0			0			0	
Spillback Cap Reductn		0	0		0			0			0	
Storage Cap Reductn		0	0		0			0			0	
Reduced v/c Ratio		0.31	0.02		0.31			0.08			0.04	
<b>Intersection Summary</b>												
Cycle Length: 120												
Actuated Cycle Length: 38.1												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												

# 2028 No Build Saturday Midday Peak Hour 1: Latti Farms Road/Jughandle & Route 20

Splits and Phases: 1: Latti Farms Road/Jughandle & Route 20



2028 No Build Saturday Midday Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20

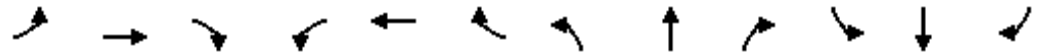


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑			↕			↕	
Traffic Volume (vph)	0	1017	31	4	982	0	58	0	13	4	16	13
Future Volume (vph)	0	1017	31	4	982	0	58	0	13	4	16	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	12	12	15	15	15	16	16	16
Total Lost time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Util. Factor		0.95	1.00		0.95			1.00			1.00	
Frt		1.00	0.85		1.00			0.98			0.95	
Flt Protected		1.00	1.00		1.00			0.96			0.99	
Satd. Flow (prot)		3539	1561		3574			1958			1944	
Flt Permitted		1.00	1.00		0.95			0.72			0.95	
Satd. Flow (perm)		3539	1561		3398			1471			1859	
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.77	0.77	0.77	0.52	0.52	0.52
Adj. Flow (vph)	0	1105	34	4	1045	0	75	0	17	8	31	25
RTOR Reduction (vph)	0	0	13	0	0	0	0	23	0	0	21	0
Lane Group Flow (vph)	0	1105	21	0	1049	0	0	69	0	0	43	0
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	11%
Turn Type		NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4	8			2			6		
Actuated Green, G (s)		22.1	22.1		22.1			6.2			6.2	
Effective Green, g (s)		24.1	24.1		24.1			6.2			6.2	
Actuated g/C Ratio		0.63	0.63		0.63			0.16			0.16	
Clearance Time (s)		6.0	6.0		6.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		2226	982		2138			238			300	
v/s Ratio Prot		c0.31										
v/s Ratio Perm			0.01		0.31			c0.05			0.02	
v/c Ratio		0.50	0.02		0.49			0.29			0.14	
Uniform Delay, d1		3.8	2.7		3.8			14.1			13.8	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		0.2	0.0		0.2			0.7			0.2	
Delay (s)		4.0	2.7		4.0			14.8			14.0	
Level of Service		A	A		A			B			B	
Approach Delay (s)		4.0			4.0			14.8			14.0	
Approach LOS		A			A			B			B	

Intersection Summary		
HCM 2000 Control Delay	4.7	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.45	A
Actuated Cycle Length (s)	38.3	Sum of lost time (s)
Intersection Capacity Utilization	50.6%	8.0
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

2028 Build Weekday Morning Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖			↕			↕	
Traffic Volume (vph)	0	1061	173	4	789	0	59	0	29	13	78	11
Future Volume (vph)	0	1061	173	4	789	0	59	0	29	13	78	11
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>			0.850					0.956			0.985	
Fl <sub>t</sub> Protected								0.967			0.994	
Satd. Flow (prot)	0	3343	1561	0	3313	0	0	1789	0	0	1998	0
Fl <sub>t</sub> Permitted					0.950			0.720			0.954	
Satd. Flow (perm)	0	3343	1561	0	3148	0	0	1332	0	0	1918	0
Satd. Flow (RTOR)			206					27			5	
Adj. Flow (vph)	0	1263	206	4	831	0	123	0	60	17	104	15
Lane Group Flow (vph)	0	1263	206	0	835	0	0	183	0	0	136	0
Turn Type		NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4	8			2			6		
Detector Phase		4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)		8.0	8.0	8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)		14.0	14.0	14.0	14.0		12.0	12.0		12.0	12.0	
Total Split (s)		86.0	86.0	86.0	86.0		34.0	34.0		34.0	34.0	
Total Split (%)		71.7%	71.7%	71.7%	71.7%		28.3%	28.3%		28.3%	28.3%	
Maximum Green (s)		80.0	80.0	80.0	80.0		30.0	30.0		30.0	30.0	
Yellow Time (s)		4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)		2.0	2.0	2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0			0.0			0.0	
Total Lost Time (s)		4.0	4.0		4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		None	None	None	None		None	None		None	None	
v/c Ratio		0.60	0.19		0.42			0.55			0.30	
Control Delay		8.7	1.4		6.9			28.4			24.7	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		8.7	1.4		6.9			28.4			24.7	
Queue Length 50th (ft)		118	0		66			49			39	
Queue Length 95th (ft)		234	18		153			64			93	
Internal Link Dist (ft)		120			120			120			120	
Turn Bay Length (ft)			160									
Base Capacity (vph)		3236	1518		3047			696			986	
Starvation Cap Reductn		0	0		0			0			0	
Spillback Cap Reductn		0	0		0			0			0	
Storage Cap Reductn		0	0		0			0			0	
Reduced v/c Ratio		0.39	0.14		0.27			0.26			0.14	
<b>Intersection Summary</b>												
Cycle Length: 120												
Actuated Cycle Length: 64.3												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												

2028 Build Weekday Morning Peak Hour  
1: Latti Farms Road/Jughandle & Route 20

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Splits and Phases: 1: Latti Farms Road/Jughandle & Route 20



2028 Build Weekday Morning Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20

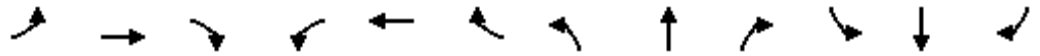


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑			↕			↕	
Traffic Volume (vph)	0	1061	173	4	789	0	59	0	29	13	78	11
Future Volume (vph)	0	1061	173	4	789	0	59	0	29	13	78	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	12	12	15	15	15	16	16	16
Total Lost time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Util. Factor		0.95	1.00		0.95			1.00			1.00	
Frt		1.00	0.85		1.00			0.96			0.99	
Flt Protected		1.00	1.00		1.00			0.97			0.99	
Satd. Flow (prot)		3343	1561		3312			1789			1998	
Flt Permitted		1.00	1.00		0.95			0.72			0.95	
Satd. Flow (perm)		3343	1561		3147			1331			1918	
Peak-hour factor, PHF	0.84	0.84	0.84	0.95	0.95	0.95	0.48	0.48	0.48	0.75	0.75	0.75
Adj. Flow (vph)	0	1263	206	4	831	0	123	0	60	17	104	15
RTOR Reduction (vph)	0	0	75	0	0	0	0	21	0	0	4	0
Lane Group Flow (vph)	0	1263	131	0	835	0	0	162	0	0	132	0
Heavy Vehicles (%)	0%	8%	0%	0%	9%	0%	9%	0%	6%	22%	0%	25%
Turn Type		NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4	8			2			6		
Actuated Green, G (s)		38.4	38.4		38.4			15.0			15.0	
Effective Green, g (s)		40.4	40.4		40.4			15.0			15.0	
Actuated g/C Ratio		0.64	0.64		0.64			0.24			0.24	
Clearance Time (s)		6.0	6.0		6.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		2130	994		2005			314			453	
v/s Ratio Prot		c0.38										
v/s Ratio Perm			0.08		0.27			c0.12			0.07	
v/c Ratio		0.59	0.13		0.42			0.52			0.29	
Uniform Delay, d1		6.7	4.6		5.7			21.1			19.8	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		0.4	0.1		0.1			1.4			0.4	
Delay (s)		7.2	4.6		5.8			22.5			20.2	
Level of Service		A	A		A			C			C	
Approach Delay (s)		6.8			5.8			22.5			20.2	
Approach LOS		A			A			C			C	

Intersection Summary		
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.57	A
Actuated Cycle Length (s)	63.4	Sum of lost time (s)
Intersection Capacity Utilization	49.3%	8.0
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group

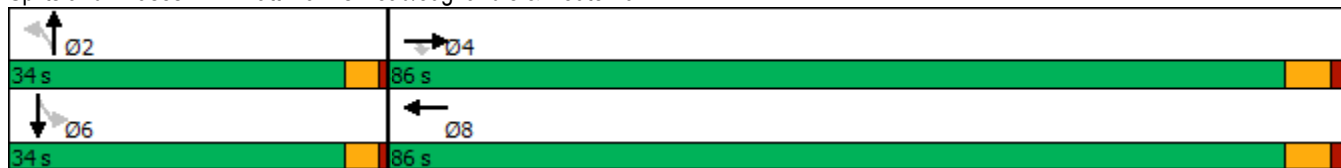
2028 Build Weekday Evening Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑			↕			↕	
Traffic Volume (vph)	0	952	62	0	1432	0	94	0	58	14	40	36
Future Volume (vph)	0	952	62	0	1432	0	94	0	58	14	40	36
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.948			0.946	
Flt Protected								0.970			0.992	
Satd. Flow (prot)	0	3406	1301	0	3471	0	0	1853	0	0	1900	0
Flt Permitted								0.745			0.949	
Satd. Flow (perm)	0	3406	1301	0	3471	0	0	1423	0	0	1818	0
Satd. Flow (RTOR)			69					27			27	
Adj. Flow (vph)	0	1058	69	0	1591	0	147	0	91	17	49	44
Lane Group Flow (vph)	0	1058	69	0	1591	0	0	238	0	0	110	0
Turn Type		NA	Perm		NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4				2			6		
Detector Phase		4	4		8		2	2		6	6	
Switch Phase												
Minimum Initial (s)		8.0	8.0		8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)		14.0	14.0		14.0		12.0	12.0		12.0	12.0	
Total Split (s)		86.0	86.0		86.0		34.0	34.0		34.0	34.0	
Total Split (%)		71.7%	71.7%		71.7%		28.3%	28.3%		28.3%	28.3%	
Maximum Green (s)		80.0	80.0		80.0		30.0	30.0		30.0	30.0	
Yellow Time (s)		4.0	4.0		4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)		2.0	2.0		2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0			0.0			0.0	
Total Lost Time (s)		4.0	4.0		4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Recall Mode		None	None		None		None	None		None	None	
v/c Ratio		0.47	0.08		0.69			0.68			0.25	
Control Delay		7.8	1.8		10.9			38.5			24.5	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		7.8	1.8		10.9			38.5			24.5	
Queue Length 50th (ft)		114	0		218			93			32	
Queue Length 95th (ft)		222	14		417			145			86	
Internal Link Dist (ft)		120			120			120			120	
Turn Bay Length (ft)			160									
Base Capacity (vph)		3110	1194		3169			591			750	
Starvation Cap Reductn		0	0		0			0			0	
Spillback Cap Reductn		0	0		0			0			0	
Storage Cap Reductn		0	0		0			0			0	
Reduced v/c Ratio		0.34	0.06		0.50			0.40			0.15	
<b>Intersection Summary</b>												
Cycle Length: 120												
Actuated Cycle Length: 80.9												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												

# 2028 Build Weekday Evening Peak Hour 1: Latti Farms Road/Jughandle & Route 20

Splits and Phases: 1: Latti Farms Road/Jughandle & Route 20





2028 Build Weekday Evening Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20

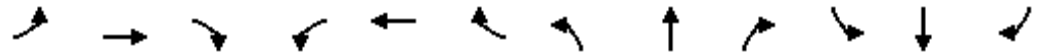


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↑↑			↕			↕	
Traffic Volume (vph)	0	952	62	0	1432	0	94	0	58	14	40	36
Future Volume (vph)	0	952	62	0	1432	0	94	0	58	14	40	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	12	12	15	15	15	16	16	16
Total Lost time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Util. Factor		0.95	1.00		0.95			1.00			1.00	
Frt		1.00	0.85		1.00			0.95			0.95	
Flt Protected		1.00	1.00		1.00			0.97			0.99	
Satd. Flow (prot)		3406	1301		3471			1854			1901	
Flt Permitted		1.00	1.00		1.00			0.75			0.95	
Satd. Flow (perm)		3406	1301		3471			1424			1817	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.64	0.64	0.64	0.81	0.81	0.81
Adj. Flow (vph)	0	1058	69	0	1591	0	147	0	91	17	49	44
RTOR Reduction (vph)	0	0	23	0	0	0	0	21	0	0	21	0
Lane Group Flow (vph)	0	1058	46	0	1591	0	0	217	0	0	89	0
Heavy Vehicles (%)	0%	6%	20%	0%	4%	0%	6%	0%	0%	10%	0%	12%
Turn Type		NA	Perm		NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)		51.3	51.3		51.3			18.8			18.8	
Effective Green, g (s)		53.3	53.3		53.3			18.8			18.8	
Actuated g/C Ratio		0.67	0.67		0.67			0.23			0.23	
Clearance Time (s)		6.0	6.0		6.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		2266	865		2309			334			426	
v/s Ratio Prot		0.31			c0.46							
v/s Ratio Perm			0.04					c0.15			0.05	
v/c Ratio		0.47	0.05		0.69			0.65			0.21	
Uniform Delay, d1		6.5	4.6		8.3			27.7			24.7	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		0.2	0.0		0.9			4.5			0.2	
Delay (s)		6.7	4.7		9.2			32.2			24.9	
Level of Service		A	A		A			C			C	
Approach Delay (s)		6.5			9.2			32.2			24.9	
Approach LOS		A			A			C			C	

Intersection Summary		
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.68	B
Actuated Cycle Length (s)	80.1	Sum of lost time (s)
Intersection Capacity Utilization	61.7%	8.0
Analysis Period (min)	15	ICU Level of Service
		B

c Critical Lane Group

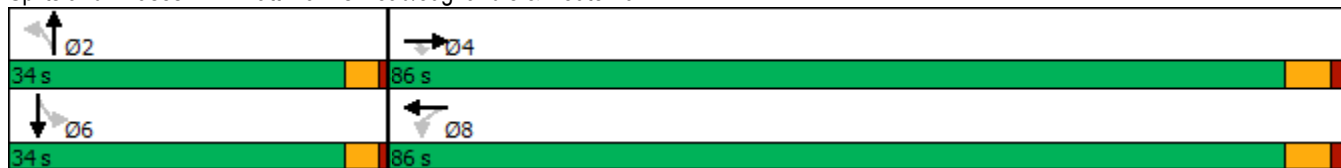
2028 Build Saturday Midday Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖			↕			↕	
Traffic Volume (vph)	0	1022	82	4	986	0	110	0	38	4	41	13
Future Volume (vph)	0	1022	82	4	986	0	110	0	38	4	41	13
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850					0.966			0.970	
Flt Protected								0.964			0.996	
Satd. Flow (prot)	0	3539	1561	0	3574	0	0	1946	0	0	2031	0
Flt Permitted					0.951			0.778			0.976	
Satd. Flow (perm)	0	3539	1561	0	3399	0	0	1571	0	0	1990	0
Satd. Flow (RTOR)			89					27			11	
Adj. Flow (vph)	0	1111	89	4	1049	0	143	0	49	8	79	25
Lane Group Flow (vph)	0	1111	89	0	1053	0	0	192	0	0	112	0
Turn Type		NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4	8			2			6		
Detector Phase		4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)		8.0	8.0	8.0	8.0		8.0	8.0		8.0	8.0	
Minimum Split (s)		14.0	14.0	14.0	14.0		12.0	12.0		12.0	12.0	
Total Split (s)		86.0	86.0	86.0	86.0		34.0	34.0		34.0	34.0	
Total Split (%)		71.7%	71.7%	71.7%	71.7%		28.3%	28.3%		28.3%	28.3%	
Maximum Green (s)		80.0	80.0	80.0	80.0		30.0	30.0		30.0	30.0	
Yellow Time (s)		4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
All-Red Time (s)		2.0	2.0	2.0	2.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0			0.0			0.0	
Total Lost Time (s)		4.0	4.0		4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode		None	None	None	None		None	None		None	None	
v/c Ratio		0.54	0.09		0.53			0.47			0.22	
Control Delay		7.5	1.7		7.5			20.3			17.4	
Queue Delay		0.0	0.0		0.0			0.0			0.0	
Total Delay		7.5	1.7		7.5			20.3			17.4	
Queue Length 50th (ft)		82	0		77			39			23	
Queue Length 95th (ft)		171	14		163			95			38	
Internal Link Dist (ft)		120			120			120			120	
Turn Bay Length (ft)			160									
Base Capacity (vph)		3539	1561		3399			997			1254	
Starvation Cap Reductn		0	0		0			0			0	
Spillback Cap Reductn		0	0		0			0			0	
Storage Cap Reductn		0	0		0			0			0	
Reduced v/c Ratio		0.31	0.06		0.31			0.19			0.09	
<b>Intersection Summary</b>												
Cycle Length: 120												
Actuated Cycle Length: 50.8												
Natural Cycle: 40												
Control Type: Actuated-Uncoordinated												

# 2028 Build Saturday Midday Peak Hour 1: Latti Farms Road/Jughandle & Route 20

Splits and Phases: 1: Latti Farms Road/Jughandle & Route 20



2028 Build Saturday Midday Peak Hour  
 1: Latti Farms Road/Jughandle & Route 20



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↗		↖			↕			↕	
Traffic Volume (vph)	0	1022	82	4	986	0	110	0	38	4	41	13
Future Volume (vph)	0	1022	82	4	986	0	110	0	38	4	41	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	11	12	12	12	15	15	15	16	16	16
Total Lost time (s)		4.0	4.0		4.0			4.0			4.0	
Lane Util. Factor		0.95	1.00		0.95			1.00			1.00	
Frt		1.00	0.85		1.00			0.97			0.97	
Flt Protected		1.00	1.00		1.00			0.96			1.00	
Satd. Flow (prot)		3539	1561		3574			1946			2031	
Flt Permitted		1.00	1.00		0.95			0.78			0.98	
Satd. Flow (perm)		3539	1561		3399			1570			1990	
Peak-hour factor, PHF	0.92	0.92	0.92	0.94	0.94	0.94	0.77	0.77	0.77	0.52	0.52	0.52
Adj. Flow (vph)	0	1111	89	4	1049	0	143	0	49	8	79	25
RTOR Reduction (vph)	0	0	36	0	0	0	0	20	0	0	8	0
Lane Group Flow (vph)	0	1111	53	0	1053	0	0	172	0	0	104	0
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	11%
Turn Type		NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases			4	8			2			6		
Actuated Green, G (s)		27.7	27.7		27.7			12.5			12.5	
Effective Green, g (s)		29.7	29.7		29.7			12.5			12.5	
Actuated g/C Ratio		0.59	0.59		0.59			0.25			0.25	
Clearance Time (s)		6.0	6.0		6.0			4.0			4.0	
Vehicle Extension (s)		3.0	3.0		3.0			3.0			3.0	
Lane Grp Cap (vph)		2093	923		2010			390			495	
v/s Ratio Prot		c0.31										
v/s Ratio Perm			0.03		0.31			c0.11			0.05	
v/c Ratio		0.53	0.06		0.52			0.44			0.21	
Uniform Delay, d1		6.1	4.3		6.1			15.9			14.9	
Progression Factor		1.00	1.00		1.00			1.00			1.00	
Incremental Delay, d2		0.3	0.0		0.2			0.8			0.2	
Delay (s)		6.4	4.4		6.3			16.7			15.1	
Level of Service		A	A		A			B			B	
Approach Delay (s)		6.2			6.3			16.7			15.1	
Approach LOS		A			A			B			B	

Intersection Summary		
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.50	A
Actuated Cycle Length (s)	50.2	Sum of lost time (s)
Intersection Capacity Utilization	51.8%	8.0
Analysis Period (min)	15	ICU Level of Service
		A

c Critical Lane Group