

MEMORANDUM

TO: Mr. Michael Larkin
Larkin Real Estate Group, Inc.
P.O. Box 129
Medfield, MA 02052

FROM: Scott W. Thornton, P.E. *and*
Jennifer Conners
Vanasse & Associates, Inc.
35 New England Business Center Drive
Suite 140
Andover, MA 01810-1066

DATE: July 1, 2022

RE: 9398

SUBJECT: Transportation Impact Assessment Memorandum
Proposed Residential Development – 159 Beach Road
Salisbury, Massachusetts

Vanasse & Associates, Inc. (VAI) has prepared this Transportation Impact Assessment Memorandum in order to determine the potential impacts on the transportation infrastructure associated with the Proposed Residential development to be located at 159 Beach Road in Salisbury, Massachusetts (hereafter referred to as the “Project”). This memorandum identifies and analyzes traffic conditions, both with and without the project, safety considerations, and potential improvements to improve operation of roadway facilities.

PROJECT DESCRIPTION

The proposed Project entails construction of 10 duplex buildings plus 3 single family dwellings. All duplex units will have two (2) bedrooms and the single unit dwellings will have three (3) bedrooms. As part of this Project, parking will be provided in individual driveways for a minimum ratio of 2 parking spaces per unit. An additional 12 parking spaces will be provided on site for visitors use. Access to the 3 single family dwellings and 2 duplex buildings will be provided by individual driveways off Beach Road (Route 1A). Access to the remaining 8 duplex buildings will be provided by individual driveways off Old County Road. At present, the project site consists of a vacant commercial building and is bounded by residential properties. All existing structures on-site will be demolished as part of this Project. Figure 1 depicts the Project site location in relation to the existing roadway network.

STUDY METHODOLOGY


This study was prepared in consultation with the Town of Salisbury and in accordance with the Massachusetts Department of Transportation (MassDOT) Guidelines for Transportation Impact Assessments (TIAs) and was conducted pursuant to 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; observations of traffic flow; and collection of daily and peak period traffic 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



Legend:

 Unsignalized Study Intersection

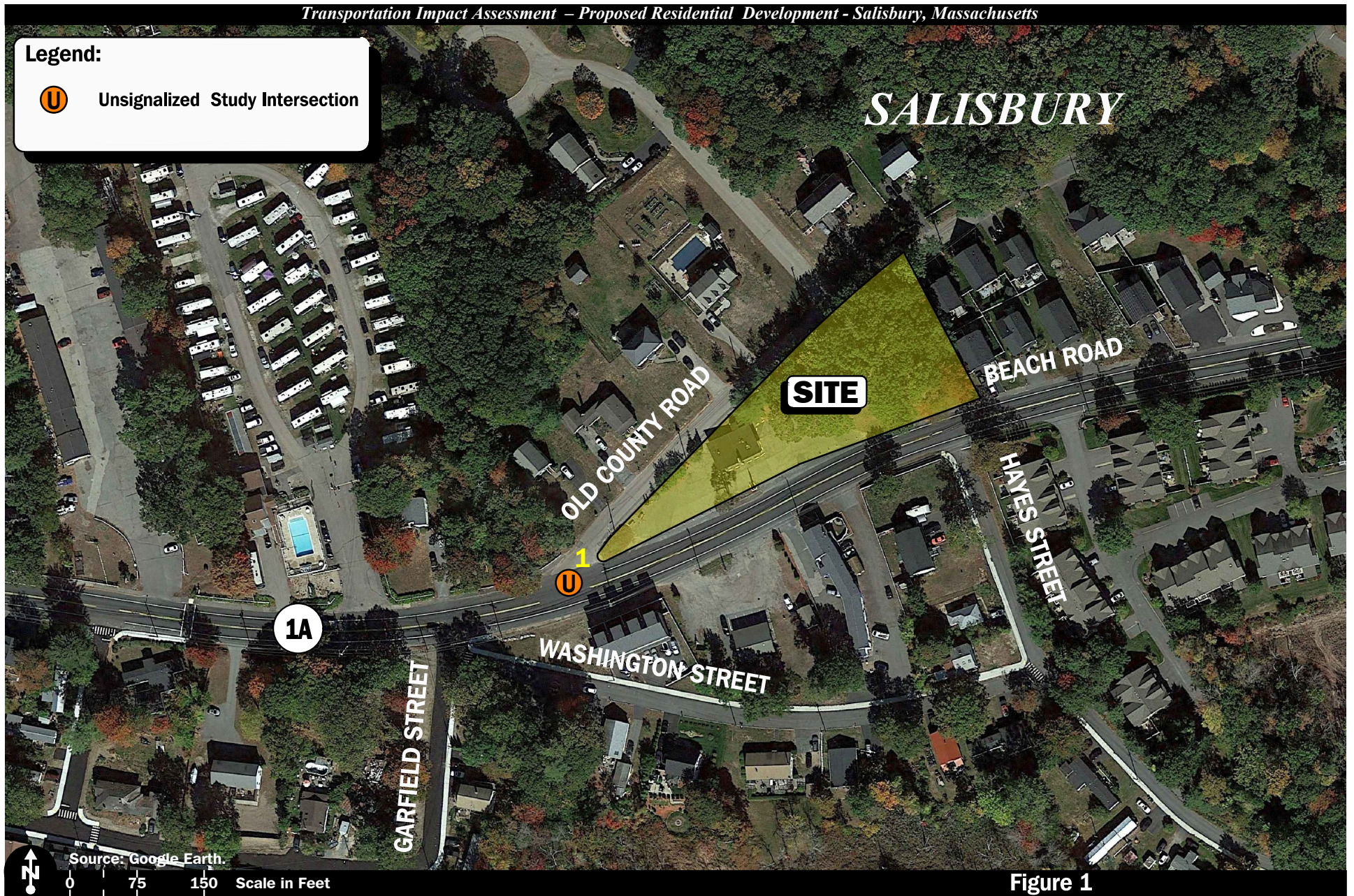


Figure 1

Site Location and Study Area Map

growth independent of the Project. A seven-year time horizon was selected for analyses consistent with state guidelines for the preparation of TIAs. The traffic analysis conducted in stage two identifies existing or projected future roadway capacity, traffic safety, and site access issues.

The third stage of the study presents and evaluates measures to address traffic and safety issues, if any, identified in stage two of the study.

EXISTING CONDITIONS

A comprehensive field inventory of traffic conditions on the study area roadways was conducted in June 2021. The field investigation consisted of an inventory of existing roadway geometrics, pedestrian facilities, traffic volumes, and operating characteristics, as well as posted speed limits and land use information for the roadways that provide access to the Project including Beach Road and Old County Road as well as the intersection of Beach Road at Old County Road.

The following describes the study area geometric conditions.

GEOMETRY

Beach Road

Beach Road is an Urban Minor Arterial roadway extending in a generally west/east direction through the Town of Salisbury and into New Hampshire. Within the study area, Beach Road is under Massachusetts Department of Transportation (MassDOT) jurisdiction and provides one 12-foot wide travel lane in each direction separated by a double yellow centerline with 7- to 9-foot wide shoulders present. The posted speed limit in the vicinity of the site is 35 miles per hour (mph) in the westbound direction and 40 mph in the eastbound direction. Illumination is provided by way of streetlights. Land use within the study area consists of residential properties.

Old County Road

Old County Road is a local roadway extending in a generally west/east direction. Within the study area, Old County Road is under local jurisdiction and provides one 12-foot wide travel lane in each direction with no pavement markings. The posted speed limit in the vicinity of the site is 30 miles per hour (mph). Within the study area, no pedestrian or bicycle facilities were identified. Illumination is provided by way of streetlights. Land use within the study area consists of residential properties.

Figure 2 summarizes existing lane use and travel lane widths at the study area intersection as observed in June 2022.

EXISTING TRAFFIC VOLUMES

In order to establish base traffic-volume conditions within the study area, manual turning movement counts (TMCs) were completed on Thursday, June 16, 2022. The TMCs were conducted during the weekday morning (7:00 to 9:00 AM) and weekday evening (4:00 to 6:00 PM) peak periods, which represent the peak periods for residential traffic.



Legend:

- Ⓢ Unsignalized Intersection
- Sidewalk
- xx' ↔ Lane Use and Travel Lane Width

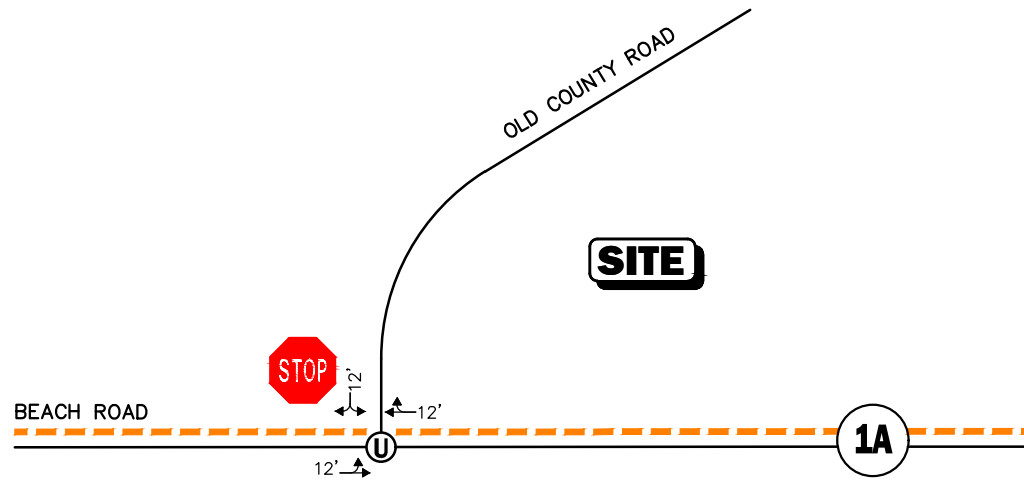


Figure 2

**Existing Intersection Lane Use,
Travel Lane Width and
Pedestrian Facilities**

Traffic Adjustment

In accordance with MassDOT guidelines, traffic counts collected in 2022 may not be representative of typical traffic volumes due to the effects of the COVID-19 pandemic. In order to determine whether a pandemic adjustment should be made to the June 2022 traffic counts, count data from the MassDOT permanent count station ID 5128, located close by the site were reviewed. Traffic-volume data collected at this continuous count station in June 2022 was compared to June 2019 traffic volumes that were collected at the same location. Based on this pre- and post-COVID-19 traffic data comparison, the 2022 traffic-volume data that was collected as a part of this assessment was adjusted upward by an additional 7 percent during the weekday morning and evening peak hours and 21 percent during a daily basis, in order to account for the reduced traffic volumes, an approach consistent with MassDOT guidelines. Although traffic levels have been steadily increasing over the last several months, available traffic data suggests that traffic conditions have not yet returned to pre-pandemic levels.

Seasonal Adjustment

In addition to developing correction factors for COVID-19, adjustments were made to account for seasonal fluctuations in traffic. The MassDOT permanent count station ID 5128 was used to evaluate the traffic volumes for seasonal fluctuations. Based on this data, it was determined that June traffic volumes are approximately 9 percent above average-month conditions for this station. As such, the June traffic volumes was not adjusted downward to average-month conditions, as they are representative of traffic volume conditions and are higher than those under average-month conditions.

The 2022 Existing traffic volumes are summarized in Table 1, with the weekday morning and evening peak-hour traffic volumes graphically depicted on Figure 3. It is important to note that the peak-hour traffic volumes presented in Table 1 were obtained from the TMCs and are reflected on the aforementioned figure.

Table 1
EXISTING ROADWAY TRAFFIC-VOLUME SUMMARY

Location	Daily Volume (vpd) ^a	Weekday Morning Peak Hour (8:00 – 9:00 AM)			Weekday Evening Peak Hour (4:15 – 5:15 PM)		
		Volume (vph) ^b	Percent of Daily Traffic	Predominant Flow	Volume (vph)	Percent of Daily Traffic	Predominant Flow
Beach Road, west of Old County Road	8,400	575	6.9	59% WB	754	9.0	55% EB

^aTwo-way daily traffic expressed in vehicles per day (estimated).

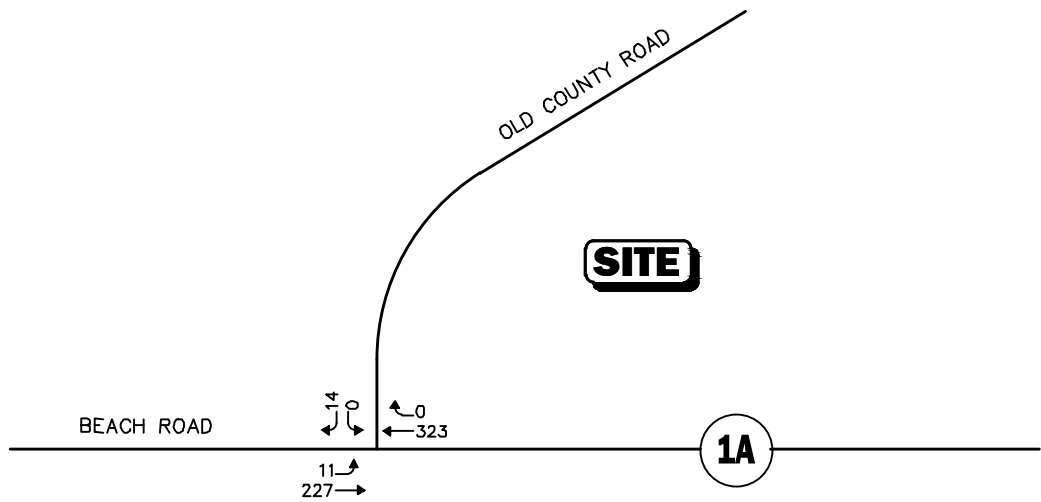
^bManual turning movement counts conducted in June 2022 (adjusted).

^cThe percent of daily traffic that occurs during the peak hour.

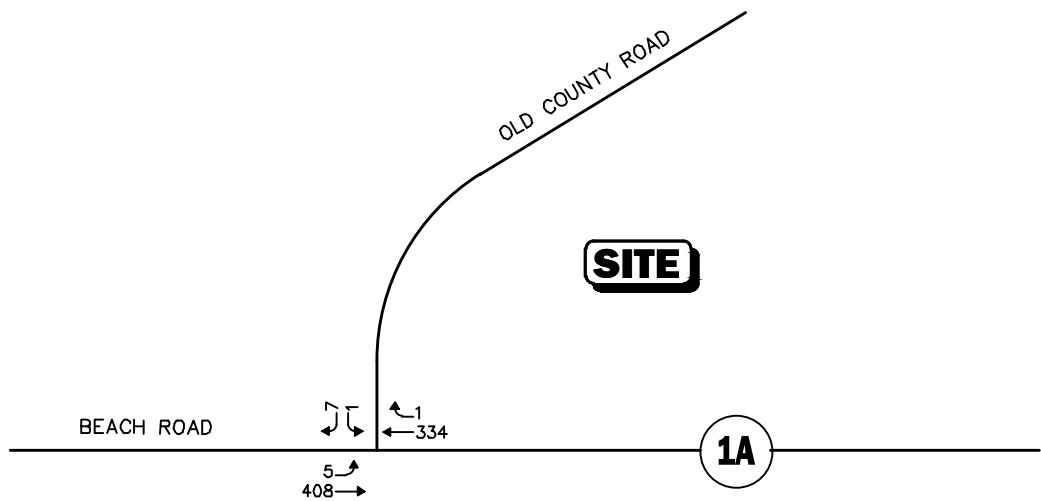
WB= westbound; EB= eastbound.

As can be seen in Table 1, Beach Road west of Old County Road was found to accommodate approximately 575 vehicles per hour (vph) during the weekday morning peak hour and 754 vph during the weekday evening peak hour. Beach Road is estimated to carry approximately 8,400 vehicles on an average weekday (24-hour, two-way volume). The predominant flow on Beach Road during the weekday morning peak hour is in the westbound direction and during the weekday evening peak hour is in the eastbound direction.





WEEKDAY EVENING PEAK HOUR (4:15 - 5:15 PM)



PEDESTRIAN AND BICYCLE FACILITIES

A comprehensive field inventory of pedestrian and bicycle facilities within the study area was undertaken in June 2022. The field inventory consisted of a review of the location of sidewalks and pedestrian crossing locations along the study roadway and at the study intersections, as well as the location of existing and planned future bicycle facilities. As detailed on Figure 2, sidewalks are only provided along the north side of Beach Road within the study area. No bicycle facilities currently exist or are planned in the area; however, the shoulder width on Beach Road is sufficient to accommodate bicyclists based on MassDOT guidelines.

PUBLIC TRANSPORTATION

Public transportation services are provided within the study area by the Merrimack Valley Transportation Authority (MVRTA) for fixed and seasonal bus routes. Within the study area the MVRTA operates the following bus service:

- **Route 54 - Amesbury-Newburyport-Salisbury** – Route 54 provides access from Salisbury Beach to Amesbury and Newburyport. This route stops at the intersection of Beach Road with Washington Street and is approximately 300 ft from the proposed project site. Starting from March 1, 2022 all MVRTA fixed routes are fare-free.
- **Route 83 - Amesbury to Salisbury** - Route 83 provides access from the Nicholas Costello Transportation Center in Amesbury to Salisbury Beach to the east. Route 83 is a peak summer seasonal route only.

In addition to the MVRTA fixed-bus routes, the Massachusetts Bay Transportation Authority (MBTA) provides commuter rail service. The MBTA Newburyport/Rockport line provides service between North Station in Boston and Rockport. The closest MBTA Commuter Rail station is located in Newburyport which is located 6 miles south from the project site.

The public transportation schedules and fare information are provided in the Appendix.

VEHICLE SPEEDS

Existing vehicle speeds along Beach Road were recorded to determine the average and the 85th percentile speed. The results of the speed measurements are shown in Table 2.



Table 2
OBSERVED VEHICLE SPEEDS – BEACH ROAD

	Beach Road Westbound	Beach Road Eastbound
Mean Travel Speed (mph)	38	37
85 th Percentile Speed (mph)	40	41
Speed Limit (mph)	35	40

mph = miles per hour.

As can be seen in Table 2, the mean (average) vehicle travel speed along Beach Road in the vicinity of the project site was found to be approximately 38 mph in the westbound and approximately 37 mph eastbound direction. The measured 85th percentile vehicle travel speed, or the speed at which 85 percent of the observed vehicles traveled at or below, was found to be approximately 40 mph in the westbound direction and 41 mph the eastbound direction.

SAFETY ANALYSIS

In order to evaluate whether there are any notable trends that would indicate potential safety deficiencies within the study area, a motor vehicle accident analysis was conducted in accordance with State guidelines as described below.

Vehicle Accident Data

Motor vehicle accident data was acquired from the MassDOT Safety Management/Traffic Operations Unit for the most recent five-year period available (2015 through 2019) in order to examine motor vehicle accident trends occurring within the study area. The data is summarized by intersection, type, and severity, and is presented in Table 3.

As summarized in Table 3, the intersection of Beach Road at Old County Road experienced one (1) accident over the five-year review period, which is an average of 0.2 accidents per year. This accident occurred in a sunny daylight period around 11:00 AM where two vehicles were traveling straight ahead in the eastbound direction, towards Beach direction. A vehicle collided with the back of a second vehicle (rear-end collision) and potentially caused injury to one of the drivers.

This intersection was found to have a motor vehicle crash rate *below* the MassDOT average for the District in which the Project is located (District 4). No fatalities were reported over the five-year period reviewed. In addition, the Highway Safety Improvement Program (HSIP) database was reviewed, and this intersection is not listed as an HSIP-eligible cluster in the most recent (2017 through 2019) HSIP cluster listing. The detailed MassDOT Crash Rate Worksheets are provided in the Appendix.



Table 3
MOTOR VEHICLE CRASH DATA SUMMARY^a

Scenario	Beach Road at Old County Road
<i>Year:</i>	
2015	0
2016	0
2017	0
2018	0
<u>2019</u>	<u>0</u>
Total	1
Average ^b	0.2
Crash Rate ^c	0.39
Significance ^d	No
<i>Type:</i>	
Angle	0
Rear-End	1
Head-On	0
Sideswipe	0
Fixed Object	0
<u>Other</u>	<u>0</u>
Total	1
<i>Weather Conditions:</i>	
Clear	1
Cloudy/Rain	0
Snow/Ice	0
Fog	0
<u>Unknown</u>	<u>0</u>
Total	1
<i>Lighting Conditions:</i>	
Daylight	1
Dawn/Dusk	0
Dark (lit)	0
Dark (unlit)	0
<u>Unknown</u>	<u>0</u>
Total	1
<i>Pavement Conditions:</i>	
Dry	1
Wet	0
Snow/Ice	0
<u>Unknown/ Other</u>	<u>0</u>
Total	1
<i>Severity:</i>	
Property Damage Only	0
Personal Injury	1
Fatality	0
<u>Unknown</u>	<u>0</u>
Total	1

^aSource: MassDOT Safety Management/Traffic Operations Unit records, 2015 through 2019.

^bAverage crashes over five-year period.

^cCrash rate per million entering vehicles (mev).

^dUnsignalized intersections are significant if rate 0.57 crashes per mev for locations within District 4.



FUTURE CONDITIONS

Traffic volumes in the study area were projected to the year 2029, which reflects a seven-year planning horizon consistent with MassDOT's *Transportation Impact Assessment (TIA) Guidelines*. Independent of the Project, traffic volumes on the roadway network in the year 2029 under No-Build conditions include all existing traffic and new traffic resulting from background traffic growth. Anticipated Project-generated traffic volumes superimposed upon this 2029 No-Build traffic network reflect the 2029 Build 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, the drawback of this procedure is that the potential growth in population and development external to the study area would not be accounted for in the traffic projections.

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

General Background Traffic Growth

Traffic-volume data compiled by MassDOT from permanent count stations and historic traffic counts in the area were reviewed in order to determine general background traffic growth trends. Based on this data, it was determined that traffic volumes within the study area have fluctuated over the past several years. In order to be consistent with previous traffic studies in the area, a 1.0 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.

Specific Development by Others

The Town of Salisbury Planning Board was contacted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes within the study area. No background projects were identified at this time that are expected to result in a significant increase in traffic within the study area beyond the background traffic growth rate.

Roadway Improvement Projects

The Town of Salisbury Planning Board was contacted in order to determine if there are any planned roadway improvement projects expected to be completed within the study area and seven-year time frame. No roadway improvements beyond typical maintenance were identified.



NO-BUILD TRAFFIC VOLUMES

The 2029 No-Build condition peak-hour traffic-volumes were developed by applying the 1.0 percent per year compounded annual background traffic growth rate to the 2022 Baseline condition peak-hour traffic volumes. The resulting 2029 No-Build weekday morning and evening peak-hour traffic volumes are shown on Figure 4.

PROJECT-GENERATED TRAFFIC

The proposed Project entails construction of 10 duplex buildings with a total of 20 units plus 3 single family dwellings. In order to develop the anticipated traffic characteristics of the Project, trip-generation statistics published by ITE¹ were reviewed. ITE Lane Use Code (LUC) 210, *Single-Family Detached Housing* and LUC 220, *Multifamily Housing Attached Housing (Low Rise)* was used to develop the traffic characteristics of the proposal. Trip-generation calculations were performed for a typical weekday as well as the weekday morning and evening peak hours. These are critical time periods for Project-related traffic activity.

Based upon *Means of Transportation to Work* from the U.S. Census, approximately 14 percent of trips in Salisbury are either public transportation or walking or work from home. Public transportation services are limited to one line in the immediate proximity of the Project site. Due to the Project location and limited public transit options, the transit usage was neglected and for analysis purpose no credit for non-auto trip reductions was used. The detailed trip-generation calculations are provided in the Appendix. A summary of the expected vehicle trip-generation is summarized in Table 4.

Table 4
PROPOSED SITE TRIP-GENERATION SUMMARY

Time Period/ Directional Distribution	Proposed Single Family Housing (3-units) ^a	Proposed Duplex Units (20-units) ^b	Total New Trips
<i>Weekday Daily</i>	28	136	164
<i>Weekday Morning Peak Hour:</i>			
Entering	0	2	2
Exiting	<u>2</u>	<u>6</u>	<u>8</u>
Total	2	8	10
<i>Weekday Evening Peak Hour:</i>			
Entering	2	6	8
Exiting	<u>1</u>	<u>4</u>	<u>5</u>
Total	3	10	13

^aBased on ITE LUC 210, *Single-Family Detached Housing*

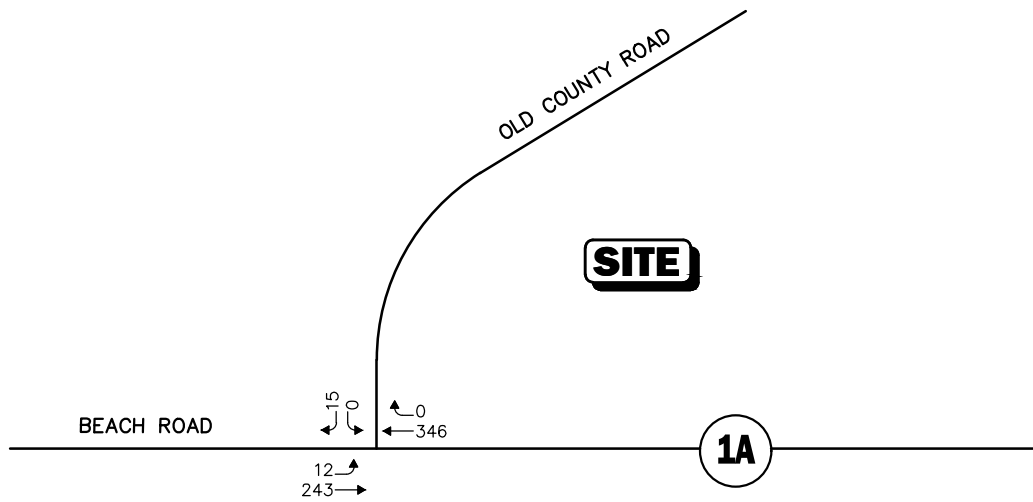
^bBased on ITE LUC 220, *Multifamily Housing Attached Housing (Low Rise)*

As shown in Table 4, the proposed residential development is expected to generate approximately 164 new

¹Ibid 4.



WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR

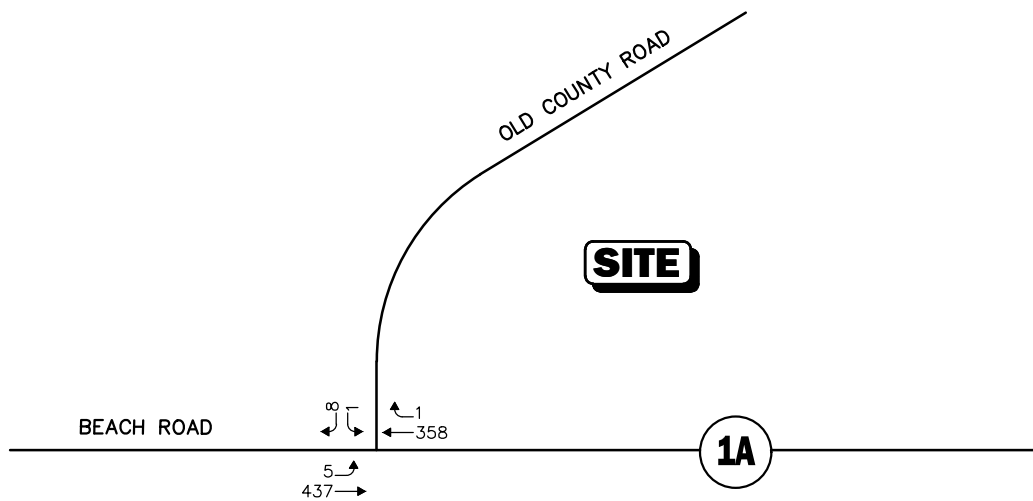


Figure 4

**2028 No-Build Condition
Weekday
Peak Hour Traffic Volumes**

vehicle trips on an average weekday (two-way, 24-hour volume), with 10 new vehicle trips (2 entering and 8 exiting) expected during the weekday morning peak hour and 13 new vehicle trips (8 entering and 5 exiting) expected during the weekday evening peak hour.

TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of the site-generated trips to and from the proposed development were determined based on a review of the Journey-to-Work data obtained from the United States Census Bureau² and then refined based on existing traffic patterns within the study area. The general trip distribution for the Project is summarized in Table 5 and graphically depicted on Figure 5.

Table 5
TRIP-DISTRIBUTION SUMMARY

Roadway	Direction (To/From)	(To/From)
Beach Road	West	95
<u>Beach Road</u>	East	<u>5</u>
TOTAL		100

The weekday morning and weekday evening peak-hour traffic volumes expected to be generated by the residential development were assigned on the study area roadway network as shown on Figure 6.

FUTURE TRAFFIC VOLUMES – BUILD CONDITION

The 2029 Build condition networks consist of the 2029 No-Build traffic volumes, plus the proposed site-generated traffic added to them. The 2029 Build weekday morning and weekday evening peak-hour traffic-volume networks are graphically depicted on Figure 7. A summary of peak-hour projected traffic-volume increases external to the study area that is the subject of this assessment is shown in Table 6. These volumes are based on the expected increases from the Project.

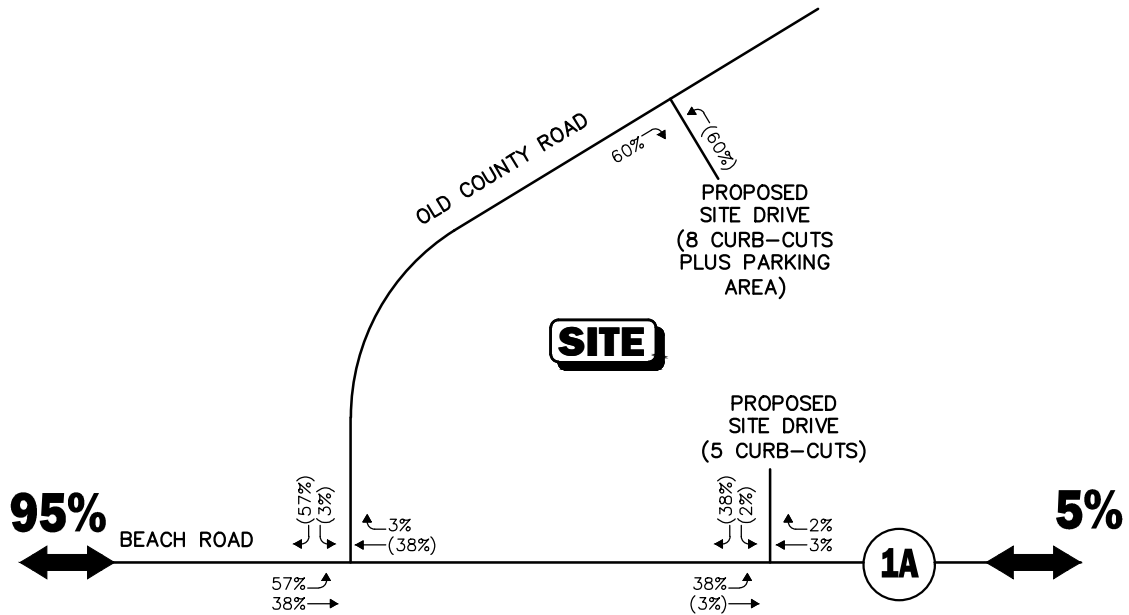
²Table 3. Residence MCD/County to Workplace MCD/County Commuting Flows for the United States and Puerto Rico Sorted by Residence Geography: 5-Year ACS, 2011-2015.



Legend:

XX Entering Trips
(XX) Exiting Trips

Note: This project proposed a total of 13 individual driveways plus a parking area off Old County Road. For purpose of this analysis, the proposed individual driveways were combined into one driveway onto Beach road which will represent 5 curb cuts and one onto Old County Road which will represent 8 curb cuts plus access to the parking area.



Not To Scale

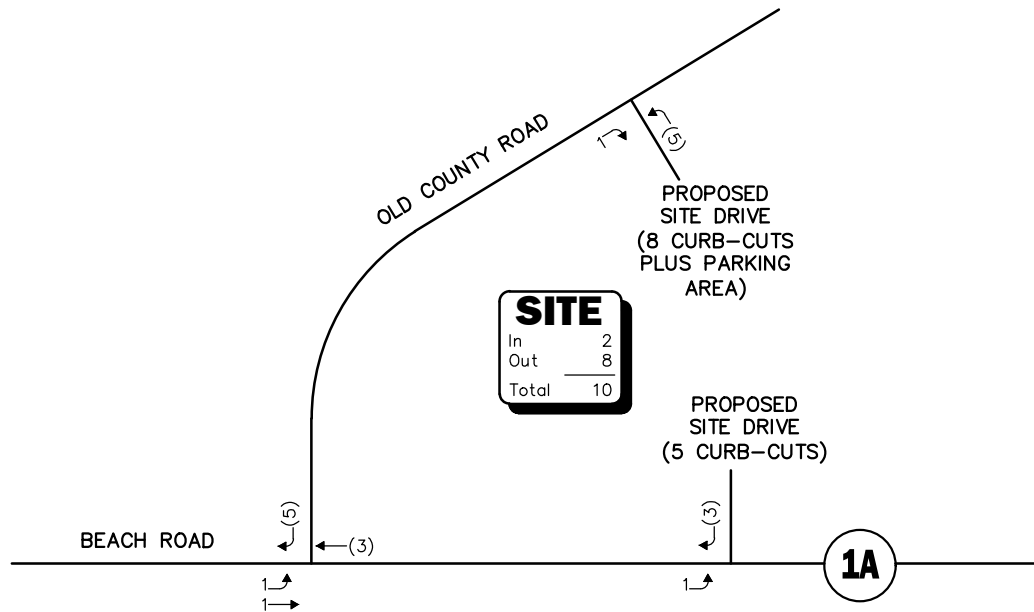


Vanasse &
Associates inc

Figure 5

Trip Distribution Map

WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR

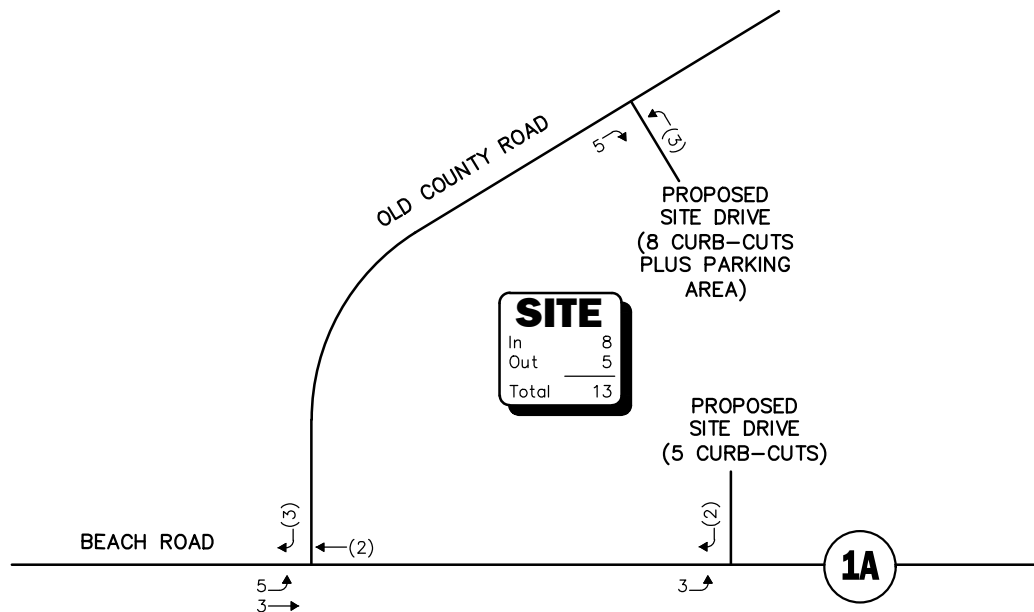
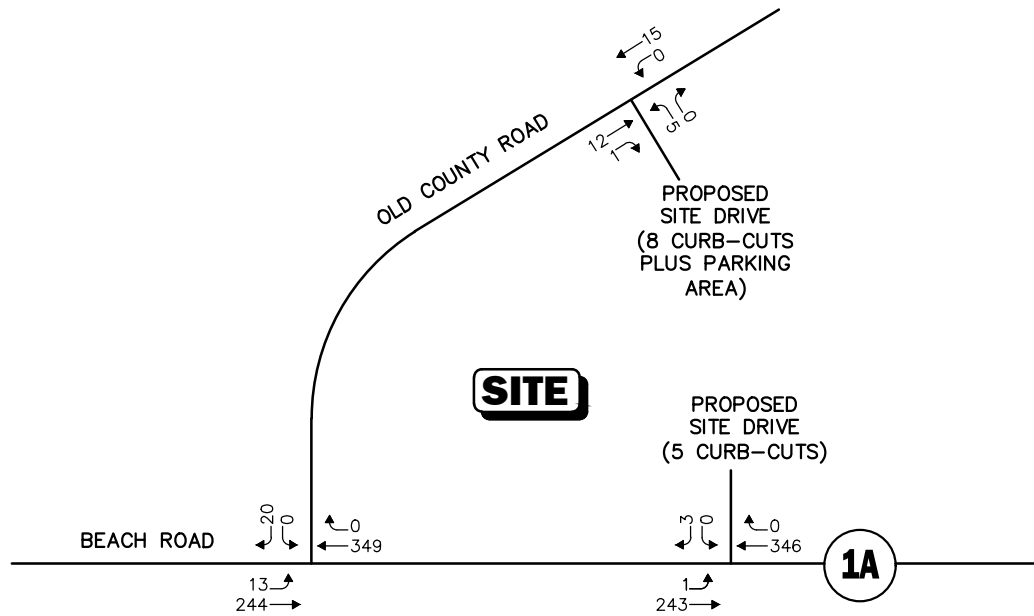


Figure 6

**Project Generation
Weekday
Peak Hour Traffic Volumes**

WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR

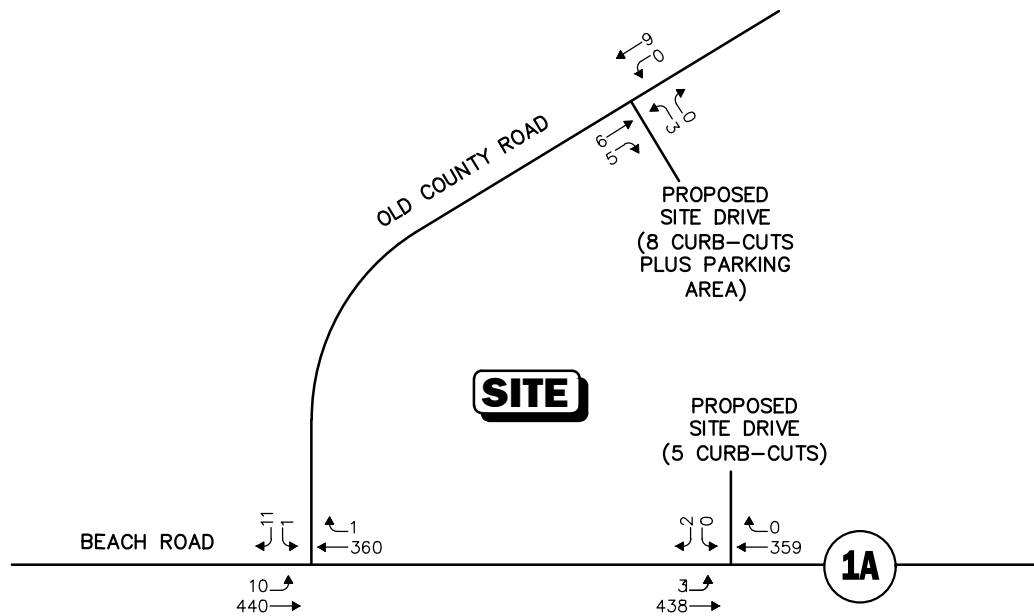


Figure 7

**2029 Build Condition
Weekday
Peak Hour Traffic Volumes**

Table 6
PEAK-HOUR TRAFFIC-VOLUME INCREASES

Location/Peak Hour	2029 No Build	2029 Build	Traffic-Volume Increase Over No-Build	Percent Increase Over No-Build
Beach Road, <i>west of Old County Road</i> :				
Weekday Morning	616	626	10	1.6
Weekday Evening	808	821	13	1.6

As shown in Table 6, in comparison to future No-Build conditions, project-related traffic increases are projected to range between 10 to 13 vehicles during peak hours, with traffic percent increases of 1.6 percent.

SIGHT DISTANCE EVALUATION

Sight distance measurements were performed at 2 of the 5 proposed driveways onto Beach Road in accordance with MassDOT and American Association of State Highway and Transportation Officials (AASHTO)³ recommendations. Both stopping sight distance (SSD) and intersection sight distance (ISD) measurements were performed. In brief, SSD is the distance recommended to be provided to 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 recommended to be provided to 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 recommended SSD value for the appropriate design speed, the intersection can operate in a safe manner. Table 7 presents the measured SSD and ISD at the subject intersections.

³A *Policy on Geometric Design of Highway and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018.



Table 7
SIGHT DISTANCE MEASUREMENTS^a

Intersection/Sight Distance Measurement	Recommended Minimum (Feet) ^b		
	40 mph	45 mph	Measured
<i>Beach Road at the proposed Western Site Driveway</i>			
<i>Stopping Sight Distance:</i>			
Beach Road approaching from the west	305	360	500+
Beach Road approaching from the east	305	360	500+
<i>Intersection Sight Distance:</i>			
Looking to the west from the Project Site Driveway	445	500	500+ ^c
Looking to the east from the Project Site Driveway	385	430	500+
<i>Beach Road at the proposed Eastern Site Driveway</i>			
<i>Stopping Sight Distance:</i>			
Beach Road approaching from the west	305	360	500+
Beach Road approaching from the east	305	360	500+
<i>Intersection Sight Distance:</i>			
Looking to the west from the Project Site Driveway	445	500	500+ ^c
Looking to the east from the Project Site Driveway	385	430	500+

^aRecommended minimum values obtained from *A Policy on Geometric Design of Highways and Streets*, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); 2018; and based on speeds of 40 mph and 45 mph along Beach Road.

^bValues shown are the intersection sight distance for a vehicle turning right 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.

^cClear lines of sight will be provided if existing site vegetation is trimmed.

As can be seen in Table 7, the sight distance at Beach Road with site driveway was found to exceed the recommended minimum sight distances, based on the vehicle travel speeds of 40 and 45 mph with the clearing of vegetation within the sight line triangles. Based on AASHTO standards, if the measured ISD is greater than the recommended SSD value, therefore, this driveway will function in a safe manner. VAI recommends that any new plantings (shrubs, bushes) or physical landscape features to be located within driveway sight lines should be maintained at a height of 2 feet or less above the adjacent existing roadway grade to ensure unobstructed lines of sight.

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 for the study intersections. 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.



METHODOLOGY

Levels of Service

A primary result of capacity analyses is the assignment of the level of service to traffic facilities under various traffic-flow conditions. The concept of level-of-service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to the quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F representing the worst.

Since the level of service of a traffic facility is a function of the traffic 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 year.

Unsignalized Intersections

The six levels of service for unsignalized intersections may be described as follows:

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds the capacity of an approach lane, with extreme control delays resulting.

The levels of service of unsignalized intersections are determined by application of a procedure described in the 2010 *Highway Capacity Manual*.⁴ Level of service is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the effects of the initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for level of service at unsignalized intersections are also given in the 2010 *Highway Capacity Manual*. Table 8 summarizes the relationship between level of service and average control delay for two-way stop controlled and all-way stop controlled intersections.

⁴*ibid* 2



Table 8
LEVEL-OF-SERVICE CRITERIA FOR
UNSIGNALIZED INTERSECTIONS^a

Level-of-Service by Volume-to-Capacity Ratio		Average Control Delay (Seconds Per Vehicle)
$v/c \leq 1.0$	$v/c > 1.0$	
A	F	≤ 10.0
B	F	10.1 to 15.0
C	F	15.1 to 25.0
D	F	25.1 to 35.0
E	F	35.1 to 50.0
F	F	> 50.0

^aSource: *Highway Capacity Manual*; Transportation Research Board; Washington, DC; 2010; page 19-2.

Analysis Results

Level-of-service and vehicle queue analyses were conducted for 2022 Existing, 2029 No-Build, and 2029 Build conditions for the study intersection. The results of the intersection capacity and vehicle queue analyses are summarized for unsignalized intersections in Table 9, with the detailed analysis results presented in the Appendix.

Beach Road at Old County Road

Under all conditions, the critical movements at this unsignalized intersection (all movements from old County Road) were shown to operate at LOS B during the weekday morning and evening peak hours. The project is expected to add approximately 10 to 13 vehicles trips at this intersection during peak hours. This type of increases is minimal and represents a minor change in area roadway volumes, a level of change that falls within normal day-to-day fluctuations in traffic entering and exiting this area.

Beach Road at Site Driveway and Old County Road at Site Driveway

This project proposed a total of 13 individual driveways plus a parking area off Old County Road. For purposes of this analysis, the proposed individual driveways were combined into one driveway onto Beach Road and one onto Old County Road. This approach provides a more conservative analysis and indicates that the actual delays for vehicles exiting the site driveway will be less than here predicted. Overall, the critical movements at the combined site driveway with Beach Road were shown to operate at LOS B during the weekday morning and evening peak hours.



TABLE 9
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Unsignalized Intersection/Peak Hour	2022 Existing				2029 No-Build				2029 Build			
	Demand ^a	Delay ^b	LOS ^c	Queue ^d 95 th	Demand	Delay	LOS	Queue 95 th	Demand	Delay	LOS	Queue 95 th
<i>Beach Road at Old County Road</i>												
<i>Weekday Morning:</i>												
Beach Road EB LT	11	8.1	A	0.0	12	8.2	A	0.0	13	8.2	A	0.0
Old County Road SBLT RT	14	10.7	B	0.1	15	10.9	B	0.1	20	11.0	B	0.2
<i>Weekday Evening:</i>												
Beach Road EB LT	5	8.0	A	0.0	5	8.0	A	0.0	12	8.0	A	0.0
Old County Road SBLT RT	8	11.1	B	0.1	9	11.3	B	0.1	10	11.2	B	0.1
<i>Beach Road at Site Driveway</i>												
<i>Weekday Morning:</i>												
Beach Road EB LT	--	--	--	--	--	--	--	--	1	8.2	A	0.0
Site Driveway SB LT RT	--	--	--	--	--	--	--	--	3	11.0	B	0.2
<i>Weekday Evening:</i>												
Beach Road EB LT	--	--	--	--	--	--	--	--	12	8.1	A	0.0
Site Driveway SB LT RT	--	--	--	--	--	--	--	--	52	11.2	B	0.1
<i>Old County Road at Site Driveway</i>												
<i>Weekday Morning:</i>												
Site Driveway SB LT RT	--	--	--	--	--	--	--	--	5	8.7	A	0.0
<i>Weekday Evening:</i>												
Site Driveway SB LT RT	--	--	--	--	--	--	--	--	3	8.7	A	0.0

^aDemand in vehicles per hour.

^bAverage control delay per vehicle (in seconds).

^cLevel-of-Service.

^dQueue length in vehicles.

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



SUMMARY

VAI has completed a detailed assessment of the potential impacts on the transportation infrastructure associated with the Proposed Residential development to be located at 159 Beach Road in Salisbury (hereafter referred to as the “Project”). 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. The Project is expected to generate 164 new vehicle trips on an average weekday (two-way, 24-hour volume), with 10 new vehicle trips (2 entering and 8 exiting) expected during the weekday morning peak hour and 13 new vehicle trips (8 entering and 5 exiting) expected during the weekday evening peak hour.
2. Project-related traffic-volume increases external to the study area relative to 2029 No-Build conditions are anticipated to be approximately 1.6 percent during the peak periods;
3. The Project will not have a significant impact (increase) on motorist delays or vehicle queuing over Existing or anticipated Future conditions without the Project (No-Build conditions);
4. All movements exiting the Project site driveway onto Beach Road are predicted to operate at LOS B or better during the weekday morning and evening peak hour; and
5. No apparent safety deficiencies were noted with respect to the motor vehicle crash history at the study intersection, which was found to have a motor vehicle crash rate below both the MassDOT statewide and District 4 average crash rate.

Based on 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 implementation of the recommendations that follow.

RECOMMENDATIONS

Project Access

Access to the Project site will be provided by way of 14 individual access driveways including 5 individual driveways to Beach Road and 8 individual driveways to Old County Road. The following recommendations are offered to improve overall operation of the Project driveway:

- Signs and landscaping to be installed as a part of the Project within the intersection sight triangle area of the Project site driveway should be designed and maintained so as not to restrict lines of sight; and



Off-Site Improvements

Beach Road at Old County Road Realignment Improvement

This intersection features a skewed geometric layout. In order to improve the overall pedestrian safety and operation of the intersection, the project proponent has proposed to improve this intersection to geometrically narrow the Old County Road leg approach. This provides for a shorter crosswalk and safer pedestrian crossing.

CONCLUSIONS

The proposed Project will not have a significant impact on overall traffic operations. With the implementation of the above recommendations, safe and efficient access will be provided to the planned Project, and the proposed Project can be constructed with minimal impact to the area as designed.

If you should have any questions on the information contained in this memo, feel free to contact us at sthornton@rdva.com or jconners@rdva.com.

cc: File

Enclosure: Technical Appendix



APPENDIX

SITE PLAN

TURNING MOVEMENT COUNTS

TRAFFIC ADJUSTMENTS

PUBLIC TRANSPORTATION SCHEDULES

SPEED STUDY

MOTOR VEHICLE CRASH DATA

GROWTH RATE CALCULATIONS

BACKGROUND DEVELOPMENT

TRIP DISTRIBUTION

TRIP GENERATION

CAPACITY ANALYSIS



SITE PLAN





LAND USE TABLE	
LOCATION:	159 BEACH ROAD (RT-1A)
ZONE:	BEACH COMMERCIAL
USE:	MULTIFAMILY
MIN. LOT AREA	---
MIN. LOT FRONTAGE / WIDTH	---
MIN. FRONT YARD SETBACK	5-FT
MIN. SIDE YARD SETBACK	5-FT
MIN. REAR YARD SETBACK	5-FT
MAX. BUILDING HEIGHT	35-FT



DATE	DESCRIPTION
REVISIONS	
PREPARED FOR:	
LARKIN REAL ESTATE GROUP INC.	
LOT 8 - OLD COUNTY ROAD SALISBURY, MA 01952	
PROJECT:	
159 BEACH ROAD TAX MAP 28 - LOT 1 SALISBURY, MA. 01952	
DATE ISSUED:	FEBRUARY 18, 2022
PROJECT #:	21-10254
PREPARED BY:	WILLIAM HALL, P.E.

DRAFT - ISSUED FOR REVIEW
FEBRUARY 18, 2022

PROFESSIONAL ENGINEER FOR CIVIL DESIGN
CONSULTANTS, INC.

CIVIL DESIGN
Consultants, Inc.

SURVEY • DESIGN • PERMITTING • CONSTRUCTION ADMINISTRATION

344 North Main Street
Andover, MA 01810
Tel: (978) 416-0920
Fax: (978) 416-7865

DRAWING TITLE:
PRESENTATION PLAN

DRAWING #:
CP-1

TURNING MOVEMENT COUNTS



Accurate Counts

978-664-2565

N/S Street : Old County Road
E/W Street : Beach Road
City/State : Salisbury, MA
Weather : Cloudy

File Name : 93980001
Site Code : 93980001
Start Date : 6/16/2022
Page No : 1

Groups Printed- Cars - Trucks

	Old County Rd From North		Beach Rd From East		Beach Rd From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
07:00 AM	0	6	79	0	0	25	110
07:15 AM	0	0	76	0	1	41	118
07:30 AM	0	3	77	0	1	30	111
07:45 AM	0	3	70	1	3	36	113
Total	0	12	302	1	5	132	452
08:00 AM	0	2	79	0	5	52	138
08:15 AM	0	3	67	0	2	56	128
08:30 AM	0	5	71	0	1	48	125
08:45 AM	0	3	85	0	2	56	146
Total	0	13	302	0	10	212	537
Grand Total	0	25	604	1	15	344	989
Apprch %	0	100	99.8	0.2	4.2	95.8	
Total %	0	2.5	61.1	0.1	1.5	34.8	
Cars	0	23	592	1	13	335	964
% Cars	0	92	98	100	86.7	97.4	97.5
Trucks	0	2	12	0	2	9	25
% Trucks	0	8	2	0	13.3	2.6	2.5

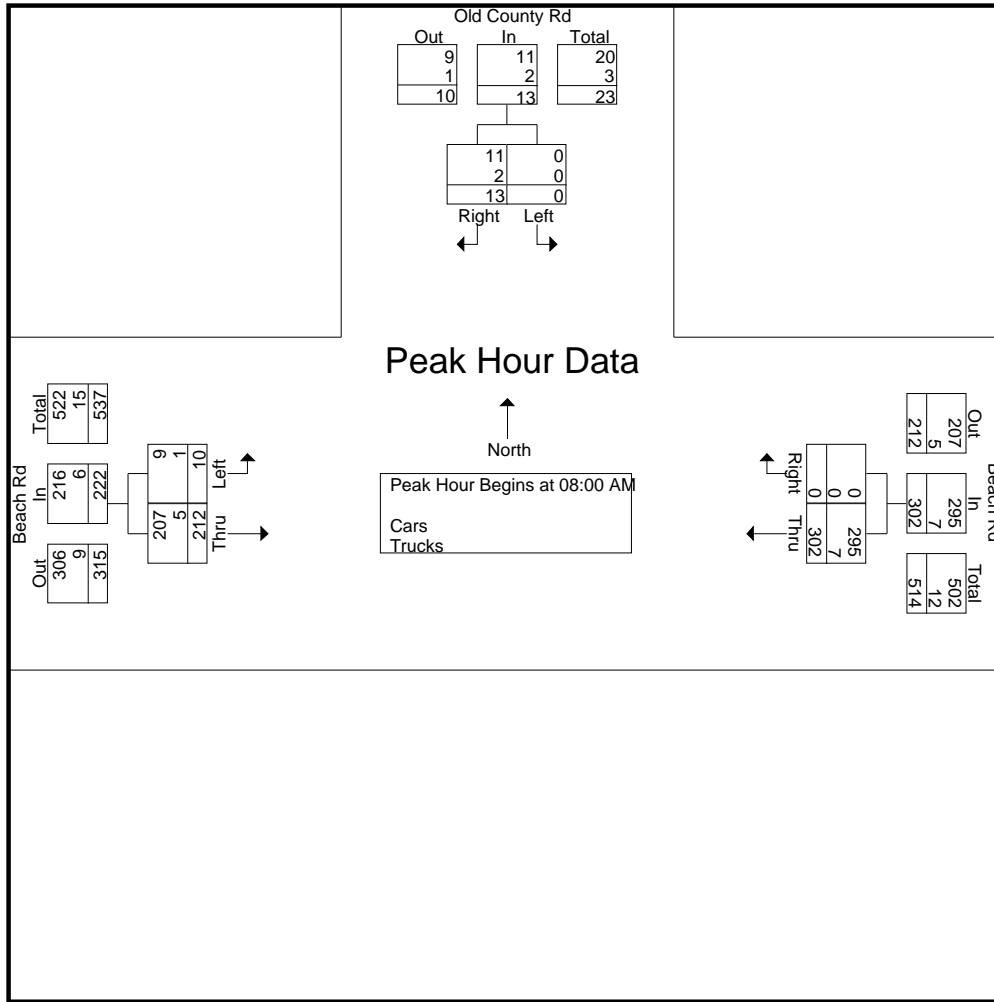
	Old County Rd From North			Beach Rd From East			Beach Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	0	2	2	79	0	79	5	52	57	138
08:15 AM	0	3	3	67	0	67	2	56	58	128
08:30 AM	0	5	5	71	0	71	1	48	49	125
08:45 AM	0	3	3	85	0	85	2	56	58	146
Total Volume	0	13	13	302	0	302	10	212	222	537
% App. Total	0	100		100	0		4.5	95.5		
PHF	.000	.650	.650	.888	.000	.888	.500	.946	.957	.920
Cars	0	11	11	295	0	295	9	207	216	522
% Cars	0	84.6	84.6	97.7	0	97.7	90.0	97.6	97.3	97.2
Trucks	0	2	2	7	0	7	1	5	6	15
% Trucks	0	15.4	15.4	2.3	0	2.3	10.0	2.4	2.7	2.8

Accurate Counts

978-664-2565

N/S Street : Old County Road
 E/W Street : Beach Road
 City/State : Salisbury, MA
 Weather : Cloudy

File Name : 93980001
 Site Code : 93980001
 Start Date : 6/16/2022
 Page No : 2



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

	07:45 AM			07:00 AM			08:00 AM		
+0 mins.	0	3	3	79	0	79	5	52	57
+15 mins.	0	2	2	76	0	76	2	56	58
+30 mins.	0	3	3	77	0	77	1	48	49
+45 mins.	0	5	5	70	1	71	2	56	58
Total Volume	0	13	13	302	1	303	10	212	222
% App. Total	0	100		99.7	0.3		4.5	95.5	
PHF	.000	.650	.650	.956	.250	.959	.500	.946	.957
Cars	0	11	11	297	1	298	9	207	216
% Cars	0	84.6	84.6	98.3	100	98.3	90	97.6	97.3
Trucks	0	2	2	5	0	5	1	5	6
% Trucks	0	15.4	15.4	1.7	0	1.7	10	2.4	2.7

Accurate Counts

978-664-2565

N/S Street : Old County Road
E/W Street : Beach Road
City/State : Salisbury, MA
Weather : Cloudy

File Name : 93980001
Site Code : 93980001
Start Date : 6/16/2022
Page No : 10

Groups Printed- Bikes Peds

	Old County Rd From North			Beach Rd From East			Beach Rd From West			Exclu. Total	Inclu. Total	Int. Total
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds			
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	1	0	0	1	1
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	1	0	0	1	0	0	0	2	2
Total	0	0	0	1	0	0	1	1	0	0	3	3
08:00 AM	0	0	0	0	0	0	0	1	0	0	1	1
08:15 AM	0	0	0	1	0	0	0	1	0	0	2	2
08:30 AM	0	0	1	2	0	0	0	0	2	3	2	5
08:45 AM	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	0	1	3	0	0	0	3	2	3	6	9
Grand Total	0	0	1	4	0	0	1	4	2	3	9	12
Apprch %	0	0		100	0		20	80				
Total %	0	0		44.4	0		11.1	44.4		25	75	

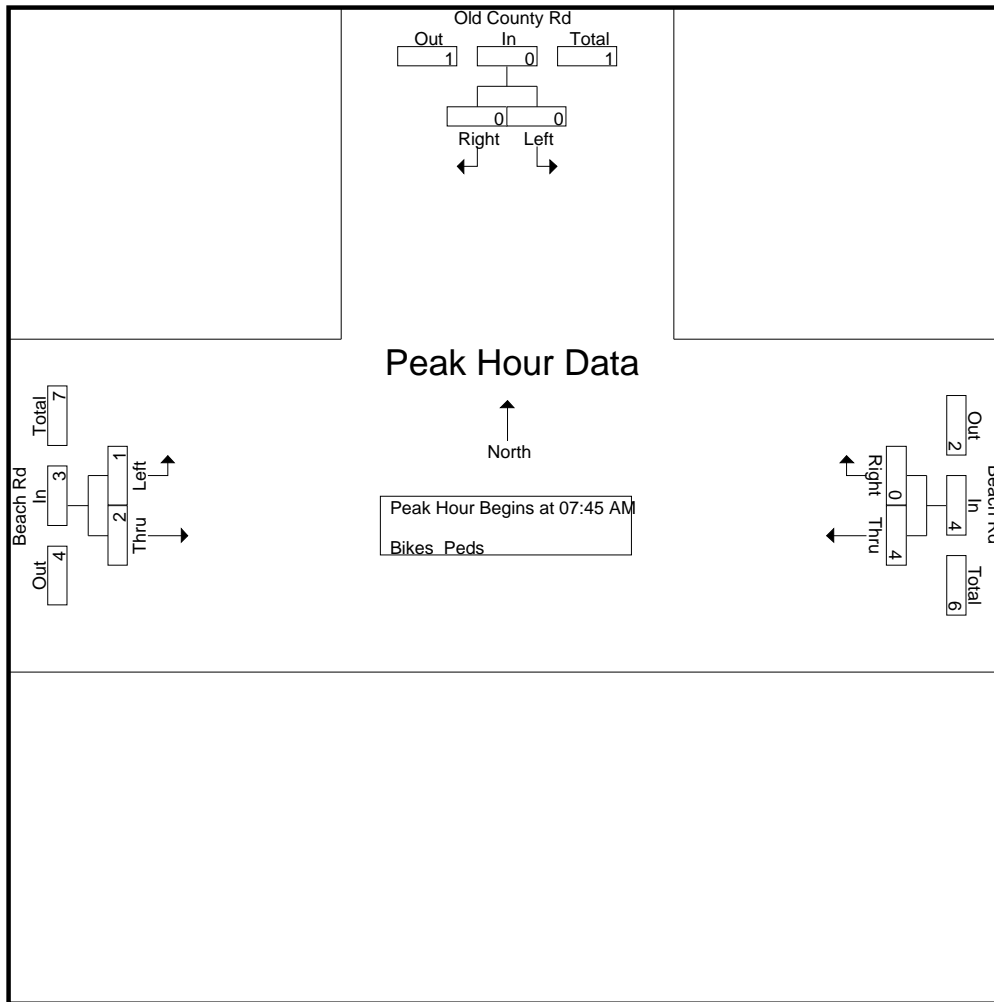
	Old County Rd From North			Beach Rd From East			Beach Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	0	0	0	1	0	1	1	0	1	2
08:00 AM	0	0	0	0	0	0	0	1	1	1
08:15 AM	0	0	0	1	0	1	0	1	1	2
08:30 AM	0	0	0	2	0	2	0	0	0	2
Total Volume	0	0	0	4	0	4	1	2	3	7
% App. Total	0	0		100	0		33.3	66.7		
PHF	.000	.000	.000	.500	.000	.500	.250	.500	.750	.875

Accurate Counts

978-664-2565

N/S Street : Old County Road
 E/W Street : Beach Road
 City/State : Salisbury, MA
 Weather : Cloudy

File Name : 93980001
 Site Code : 93980001
 Start Date : 6/16/2022
 Page No : 11



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			07:15 AM		
+0 mins.	0	0	0	1	0	1	0	1	1
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	1	0	1	1	0	1
+45 mins.	0	0	0	2	0	2	0	1	1
Total Volume	0	0	0	4	0	4	1	2	3
% App. Total	0	0		100	0		33.3	66.7	
PHF	.000	.000	.000	.500	.000	.500	.250	.500	.750

Accurate Counts

978-664-2565

N/S Street : Old County Road
E/W Street : Beach Road
City/State : Salisbury, MA
Weather : Cloudy

File Name : 93980001
Site Code : 93980001
Start Date : 6/16/2022
Page No : 1

Groups Printed- Cars - Trucks

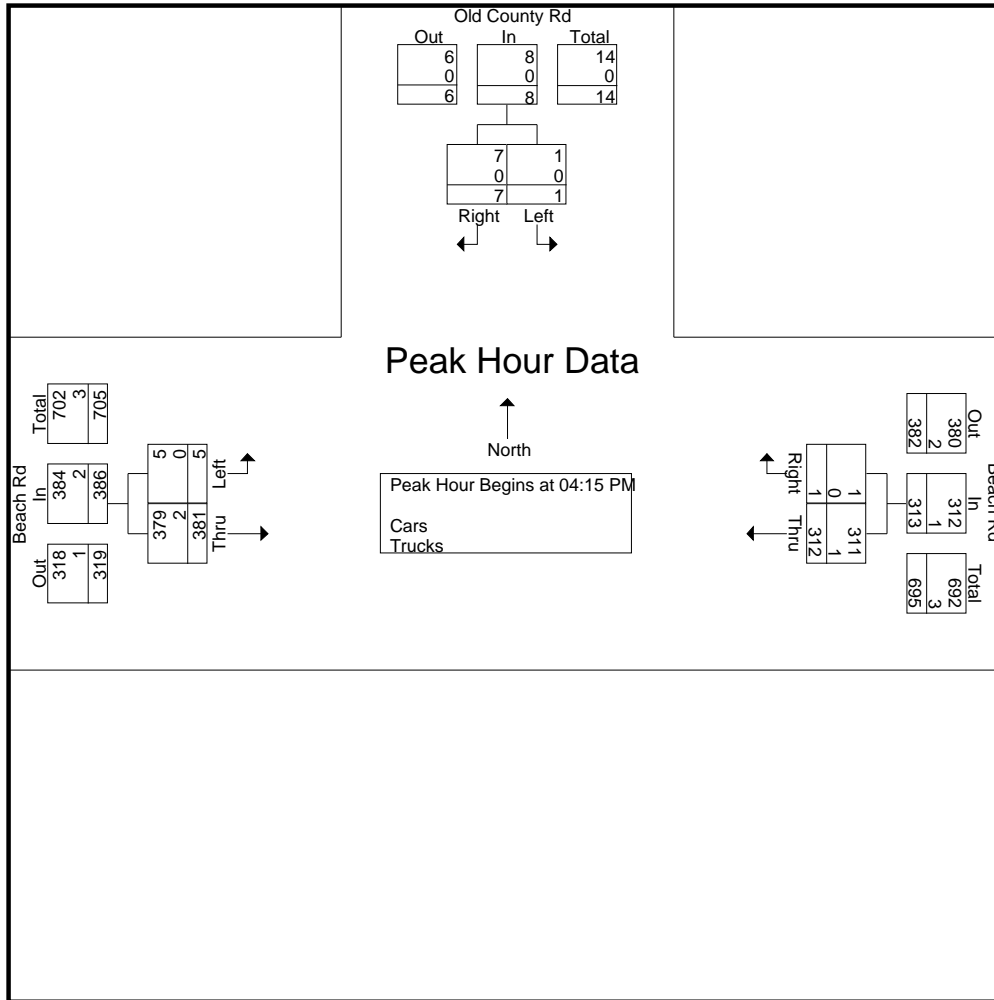
	Old County Rd From North		Beach Rd From East		Beach Rd From West		
Start Time	Left	Right	Thru	Right	Left	Thru	Int. Total
04:00 PM	0	4	74	0	1	91	170
04:15 PM	1	2	75	0	2	87	167
04:30 PM	0	1	87	0	0	101	189
04:45 PM	0	2	73	1	2	95	173
Total	1	9	309	1	5	374	699
05:00 PM	0	2	77	0	1	98	178
05:15 PM	0	0	58	0	3	99	160
05:30 PM	0	0	64	0	5	77	146
05:45 PM	0	1	60	0	1	102	164
Total	0	3	259	0	10	376	648
Grand Total	1	12	568	1	15	750	1347
Apprch %	7.7	92.3	99.8	0.2	2	98	
Total %	0.1	0.9	42.2	0.1	1.1	55.7	
Cars	1	12	566	1	15	746	1341
% Cars	100	100	99.6	100	100	99.5	99.6
Trucks	0	0	2	0	0	4	6
% Trucks	0	0	0.4	0	0	0.5	0.4

	Old County Rd From North			Beach Rd From East			Beach Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	1	2	3	75	0	75	2	87	89	167
04:30 PM	0	1	1	87	0	87	0	101	101	189
04:45 PM	0	2	2	73	1	74	2	95	97	173
05:00 PM	0	2	2	77	0	77	1	98	99	178
Total Volume	1	7	8	312	1	313	5	381	386	707
% App. Total	12.5	87.5		99.7	0.3		1.3	98.7		
PHF	.250	.875	.667	.897	.250	.899	.625	.943	.955	.935
Cars	1	7	8	311	1	312	5	379	384	704
% Cars	100	100	100	99.7	100	99.7	100	99.5	99.5	99.6
Trucks	0	0	0	1	0	1	0	2	2	3
% Trucks	0	0	0	0.3	0	0.3	0	0.5	0.5	0.4

Accurate Counts
978-664-2565

N/S Street : Old County Road
E/W Street : Beach Road
City/State : Salisbury, MA
Weather : Cloudy

File Name : 93980001
Site Code : 93980001
Start Date : 6/16/2022
Page No : 2



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			04:15 PM			04:30 PM		
+0 mins.	0	4	4	75	0	75	0	101	101
+15 mins.	1	2	3	87	0	87	2	95	97
+30 mins.	0	1	1	73	1	74	1	98	99
+45 mins.	0	2	2	77	0	77	3	99	102
Total Volume	1	9	10	312	1	313	6	393	399
% App. Total	10	90		99.7	0.3		1.5	98.5	
PHF	.250	.563	.625	.897	.250	.899	.500	.973	.978
Cars	1	9	10	311	1	312	6	391	397
% Cars	100	100	100	99.7	100	99.7	100	99.5	99.5
Trucks	0	0	0	1	0	1	0	2	2
% Trucks	0	0	0	0.3	0	0.3	0	0.5	0.5

Accurate Counts

978-664-2565

N/S Street : Old County Road
E/W Street : Beach Road
City/State : Salisbury, MA
Weather : Cloudy

File Name : 93980001
Site Code : 93980001
Start Date : 6/16/2022
Page No : 10

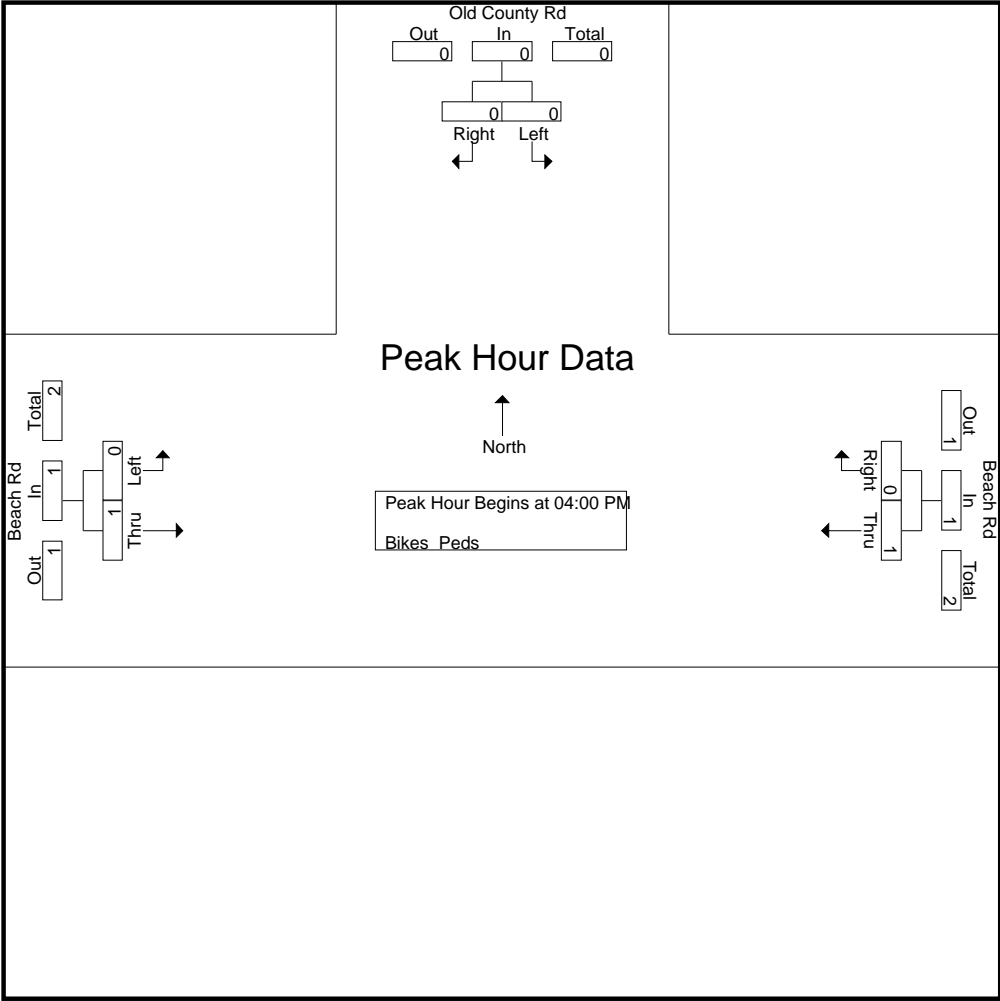
Groups Printed- Bikes Peds

	Old County Rd From North			Beach Rd From East			Beach Rd From West			Exclu. Total	Inclu. Total	Int. Total
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds			
04:00 PM	0	0	0	1	0	0	0	0	0	0	1	1
04:15 PM	0	0	0	0	0	0	0	0	1	1	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	0	0	1	0	0	0	1	1	1	2	3
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	2	0	0	0	0	0	0	2	0	2
05:30 PM	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
Total	0	0	2	0	0	0	0	0	0	2	0	2
Grand Total	0	0	2	1	0	0	0	1	1	3	2	5
Apprch %	0	0		100	0		0	100				
Total %	0	0		50	0		0	50		60	40	

	Old County Rd From North			Beach Rd From East			Beach Rd From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. 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	1	0	1	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	1	1	1
Total Volume	0	0	0	1	0	1	0	1	1	2
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.250	.000	.250	.000	.250	.250	.500

N/S Street : Old County Road
E/W Street : Beach Road
City/State : Salisbury, MA
Weather : Cloudy

File Name : 93980001
Site Code : 93980001
Start Date : 6/16/2022
Page No : 11

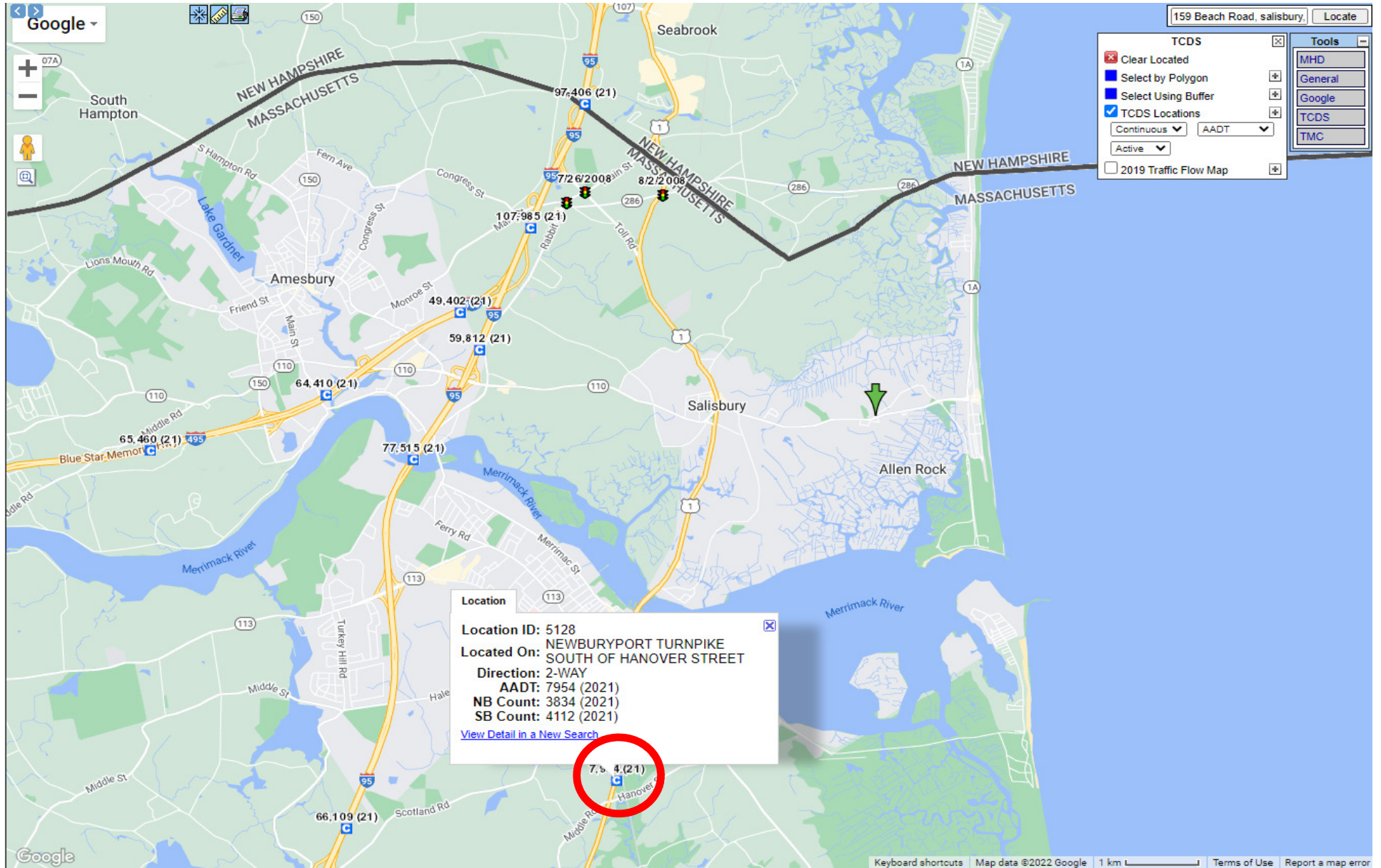


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM			04:00 PM		
+0 mins.	0	0	0	1	0	1	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	1	1
Total Volume	0	0	0	1	0	1	0	1	1
% App. Total	0	0		100	0		0	100	
PHF	.000	.000	.000	.250	.000	.250	.000	.250	.250

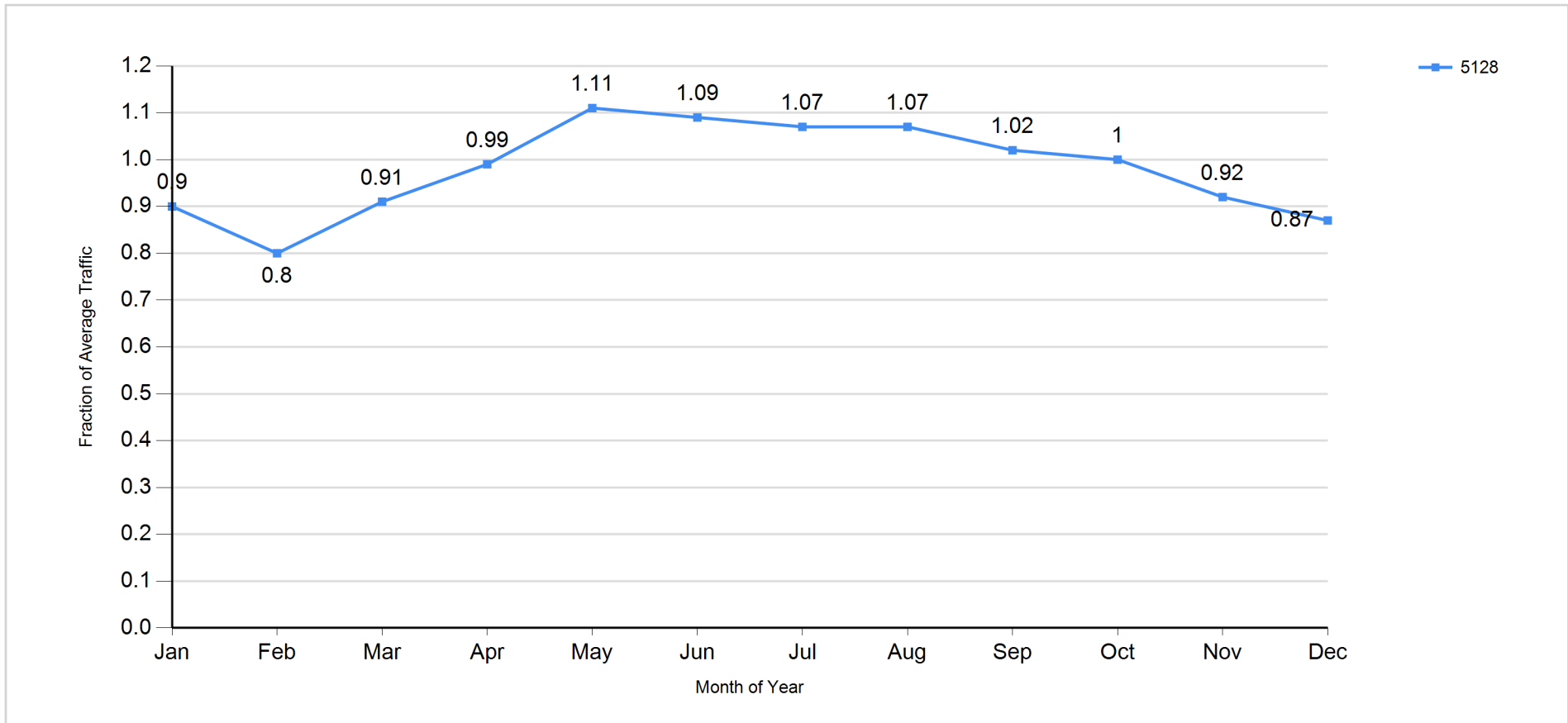
TRAFFIC ADJUSTMENTS





Massachusetts Highway Department

Traffic Pattern by Month for 1/1/2019 - 12/31/2019
Criteria: Location ID = 5128, From 1/1/1900 To 12/31/2049 12:00:00 AM



Massachusetts Highway Department

5128: Monthly Hourly Volume for June 2019

Location ID: 5128
County: Essex
Functional Class: 3
Location: NEWBURYPORT TURNPIKE
Seasonal Factor Group: U3
Daily Factor Group:
Axle Factor Group: U3
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
1	33	22	18	11	9	73	185	342	469	618	736	820	881	871	808	774	758	574	501	367	253	191	145	122	9581
2	66	24	13	6	18	39	112	182	311	382	581	649	717	694	731	706	634	562	445	230	178	123	66	43	7512
3	11	8	7	8	29	129	446	791	723	558	538	609	637	700	762	841	777	839	509	422	285	144	63	53	9889
4																									
5	28	14	12	8	46	132	417	788	760	562	628	677	700	727	830	833	871	908	572	403	268	171	86	55	10496
6	32	12	7	10	27	132	396	757	772	584	585	652	693	708	787	884	819	888	537	442	305	172	108	85	10394
7	35	14	6	9	35	128	381	778	688	630	664	754	793	774	866	953	905	923	616	514	389	269	195	125	11444
8	61	33	17	13	10	70	202	349	485	688	831	800	857	996	819	777	716	704	618	421	383	281	198	119	10448
9	81	41	27	22	53	66	111	218	357	496	611	741	760	881	729	715	687	606	514	426	242	165	98	65	8712
10	21	18	7	10	34	141	394	729	763	581	584	628	660	680	718	866	784	827	516	363	247	164	93	45	9873
11	23	11	13	10	24	121	351	734	731	602	597	584	688	686	746	859	875	915	599	438	333	248	114	52	10354
12	37	9	10	11	31	131	439	761	700	615	638	649	712	747	781	906	965	901	602	492	288	181	109	77	10792
13	39	15	10	6	33	135	377	748	693	544	613	695	667	696	719	774	750	783	542	358	298	164	83	59	9801
14	29	11	10	7	38	138	375	716	669	612	701	768	773	756	782	877	917	843	631	531	372	266	201	110	11133
15	59	31	17	17	16	82	192	335	446	599	773	828	798	773	783	763	703	680	601	472	396	333	191	108	9996
16	63	35	18	9	8	51	89	166	293	458	550	740	641	614	665	534	505	497	333	297	172	107	78	35	6958
17	16	7	13	7	30	113	363	604	681	573	546	646	702	653	743	799	855	833	561	413	314	189	111	55	9827
18	28	15	15	7	36	134	391	688	732	597	603	663	688	670	693	757	803	808	515	371	246	160	102	60	9782
19	35	14	10	11	46	120	375	608	699	613	571	615	659	664	730	785	855	895	580	373	340	191	127	56	9972
20	35	17	6	11	42	139	397	597	634	596	601	644	626	706	683	666	734	798	490	322	254	179	97	76	9350
21	33	6	7	15	32	113	350	534	601	545	642	637	752	723	709	719	805	726	509	387	262	223	145	107	9582
22	66	25	14	13	18	78	158	267	415	577	701	789	759	751	699	679	674	608	522	425	303	270	186	105	9102
23	52	36	15	14	20	62	124	230	361	475	689	663	731	782	752	706	722	681	536	404	339	235	126	74	8829
24	20	11	11	16	29	107	393	562	666	605	606	686	654	657	695	762	854	883	543	374	303	181	93	51	9762
25	32	8	14	11	38	122	344	608	743	636	627	686	687	657	681	670	719	817	472	321	218	154	92	40	9397
26	21	12	12	10	36	108	377	606	725	571	571	676	656	701	759	782	855	872	601	430	355	228	152	65	10181
27	30	8	5	13	39	128	364	622	759	603	613	657	719	705	748	831	889	881	650	496	356	247	149	70	10582
28	42	7	6	14	49	109	373	583	679	665	655	730	738	786	786	856	822	813	578	515	344	263	217	122	10752
29	75	33	10	14	18	83	172	246	344	522	635	680	707	723	666	658	551	514	448	357	314	248	201	98	8317
30	77	27	8	11	11	47	103	191	304	422	555	608	588	697	595	510	557	382	413	289	219	151	93	43	6901
Average	41	18	12	11	29	105	302	529	593	570	629	689	712	730	740	767	771	757	536	402	296	203	128	75	9645

Massachusetts Highway Department

5128: Monthly Hourly Volume for June 2022

Location ID: 5128
County: Essex
Functional Class: 3
Location: NEWBURYPORT TURNPIKE

Seasonal Factor Group: U3
Daily Factor Group: U3
Axle Factor Group: U3
Growth Factor Group: U3

	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
1	19	7	9	7	19	99	292	679	681	545	584	592	609	670	770	748	751	703	485	283	242	158	81	37	9070
2	15	5	5	12	26	108	310	700	759	600	597	587	654	663	780	908	880	852	505	377	279	183	92	67	9964
3	18	17	12	12	20	85	275	611	666	530	576	606	634	685	744	813	781	684	471	325	272	153	97	66	9153
4	33	25	8	6	20	57	120	301	409	581	722	666	826	830	713	695	639	612	498	408	298	261	133	86	8947
5	44	20	11	7	25	66	90	161	297	501	603	639	729	729	756	711	570	523	486	349	267	129	64	41	7818
6	14	7	6	9	26	102	314	630	630	485	540	568	622	653	676	787	760	757	463	338	239	143	90	44	8903
7	12	5	3	9	20	114	337	733	742	553	607	581	678	679	820	892	822	821	483	369	274	167	86	46	9853
8	18	7	10	8	19	90	286	645	671	503	510	559	606	628	666	779	758	750	498	410	277	174	66	61	8999
9	28	11	11	8	18	107	280	627	642	505	500	521	614	655	717	762	718	743	529	421	291	179	107	56	9050
10	26	14	6	10	20	109	296	607	723	614	629	702	674	792	761	877	843	805	619	486	396	249	149	83	10490
11	54	31	12	8	20	47	134	251	376	515	610	738	713	729	701	675	662	589	460	401	327	249	178	97	8577
12	58	35	11	11	22	52	109	188	320	441	623	686	693	720	651	660	572	503	405	330	260	161	76	26	7613
13	19	9	5	12	23	93	286	650	641	518	545	614	587	662	656	785	784	769	468	319	257	133	48	35	8918
14	21	14	3	20	26	113	318	699	739	600	615	668	637	719	797	882	879	822	535	390	317	166	96	46	10122
15	18	11	14	10	30	103	330	674	664	552	591	593	658	666	720	807	863	904	551	364	327	170	88	33	9741
16	26	11	11	11	26	104	293	647	679	565	633	665	714	667	748	781	834	792	508	363	303	170	80	51	9682
17	18	11	10	14	25	97	287	564	642	552	645	761	747	684	729	795	764	712	572	383	313	301	183	103	9912
18	42	28	12	12	14	58	139	247	395	604	613	824	742	748	795	716	584	634	406	325	268	203	158	88	8655
19	42	17	12	6	6	42	62	114	221	343	432	529	587	582	539	556	535	406	360	309	215	127	69	36	6147
20	22	9	6	6	27	87	247	416	447	554	567	640	714	639	753	725	773	678	486	353	306	161	71	44	8731
21	29	9	8	15	28	120	302	556	664	557	585	608	652	667	708	775	851	769	537	387	328	190	90	51	9486
22	24	12	8	12	27	100	295	510	581	527	582	608	713	631	704	748	782	691	506	348	251	192	88	45	8985
23	22	9	7	16	25	105	291	532	624	551	599	640	683	687	684	777	788	757	493	384	308	219	124	48	9373
24	24	8	9	8	28	105	245	466	578	594	591	679	669	735	641	797	780	677	517	381	335	277	157	92	9393
25	43	24	13	10	18	59	125	269	393	521	632	753	684	678	650	632	582	590	508	404	347	278	179	107	8499
26	64	27	13	7	24	42	99	165	279	459	550	583	641	642	568	567	545	539	462	408	310	190	94	45	7323
27	16	11	7	7	25	107	260	481	568	538	512	558	512	542	558	569	643	664	413	252	193	121	73	38	7668
28	15	4	6	5	25	94	318	513	669	615	599	621	680	673	724	721	795	781	540	377	312	194	78	50	9409
29	14	6	9	14	33	109	319	499	651	621	591	598	687	665	682	752	842	728	553	396	297	229	121	45	9461
30																									
Average	28	14	9	10	23	89	243	487	564	539	586	634	668	680	704	748	737	698	494	367	290	191	104	57	8964

Traffic Study Stations - Month

Sta 5128 2019 -2022																									
	12:00 AM	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM	Daily
2019June ADT	41	18	12	11	29	105	302	529	593	570	629	689	712	730	740	767	771	757	536	402	296	203	128	75	8829
2022 JuneADT	28	14	9	10	23	89	243	487	564	539	586	634	668	680	704	748	737	698	494	367	290	191	104	57	7323
VID March Adjustment	1.48	1.30	1.32	1.11	1.29	1.18	1.24	1.09	1.05	1.06	1.07	1.09	1.07	1.07	1.05	1.03	1.05	1.08	1.09	1.10	1.02	1.07	1.23	1.30	1.21
								1.07									1.07								

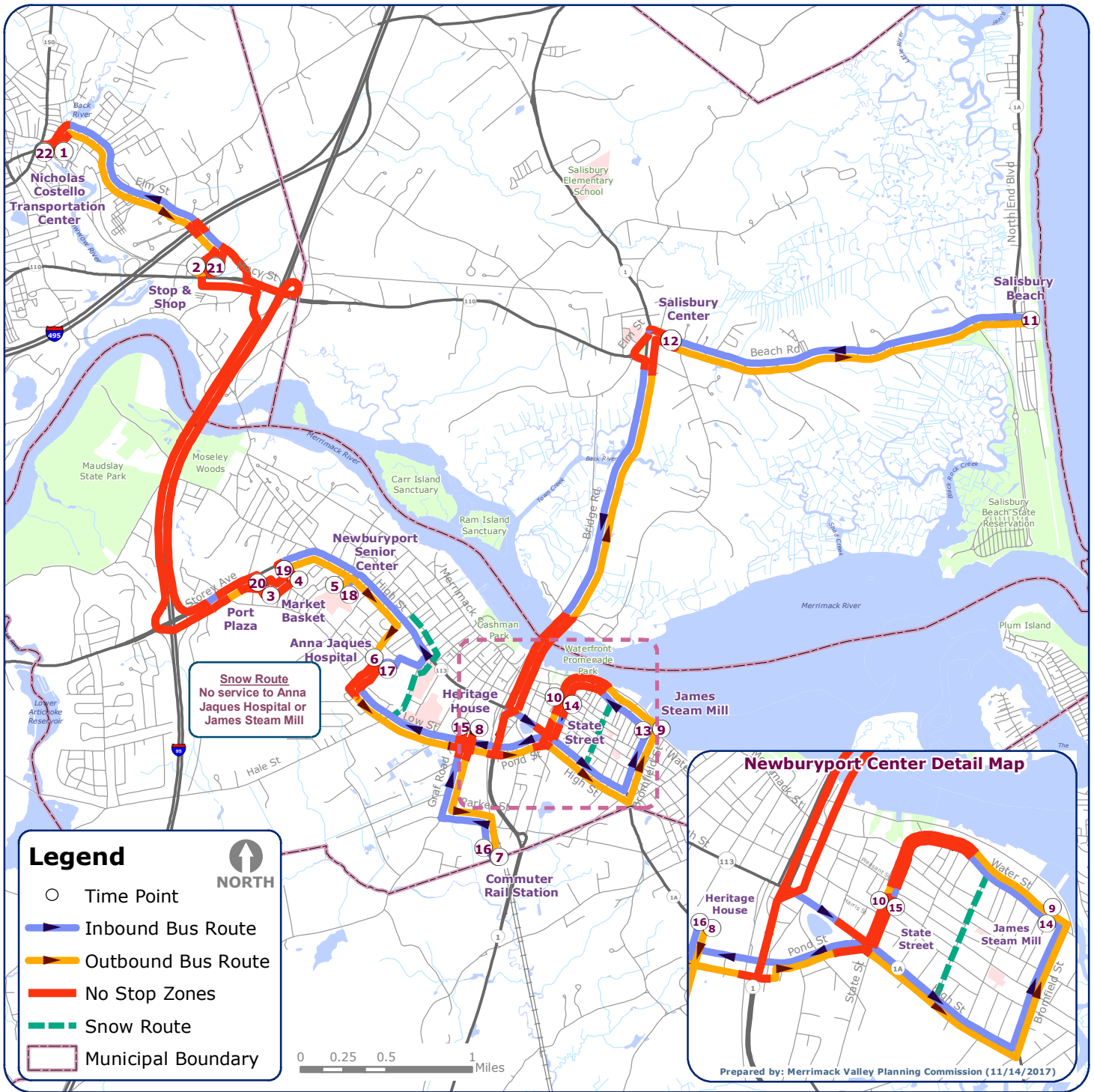
PUBLIC TRANSPORTATION SCHEDULES



Effective: Sunday, September 6, 2020

OUTBOUND															
WEEKDAYS															
		1	2	3	4	5	6	7	8	9	10	11			
		Bus starts	Bus leaves	Bus leaves	Bus leaves	Bus leaves	Bus leaves	Bus leaves	Bus leaves	Bus leaves	Bus leaves	Bus ends			
		at Nicholas Costello Transit Ctr.	from Stop & Shop	from Plaza	Port	from Market Basket	from Anna Jacques	from Commuter Rail	from Heritage House	from Garage	City	from Steam Mill	James from State Street	at Salisbury Beach	
AM		5:45	5:50	6:00		6:05	6:15	6:25	6:30	6:35	-	6:40	6:55		
		6:45	6:50	7:00		7:05	7:15	7:25	7:30	7:35	-	7:40	7:55		
		7:45	7:50	8:00		8:05	8:15	8:25	8:30	8:35	-	8:40	8:55		
		8:45	8:50	9:00		9:05	9:15	9:25	9:30	9:35	-	9:40	9:55		
		9:45	9:50	10:00		10:05	10:15	10:25	10:30	10:35	-	10:40	10:55		
		10:45	10:50	11:00		11:05	11:15	11:25	11:30	11:35	-	11:40	11:55		
		11:45	11:50	12:00		12:05	12:15	12:25	12:30	12:35	-	12:40	12:55		
		12:45	12:50	1:00		1:05	1:15	1:25	1:30	1:35	-	1:40	1:55		
		1:45	1:50	2:00		2:05	2:15	2:25	2:30	2:35	-	2:40	2:55		
		2:45	2:50	3:00		3:05	3:15	3:25	3:30	3:35	-	3:40	3:55		
PM		3:45	3:50	4:00		4:05	4:15	4:25	4:30	4:35	-	4:40	4:55		
		4:45	4:50	5:00		5:05	5:15	5:25	5:30	5:35	-	5:40	5:55		
		5:45	5:50	6:00		6:05	6:15	6:25	6:30	6:35		6:40	6:55		
		6:45	6:50	7:00		7:05	7:15	7:25	7:30	7:35		7:40	-		
	SATURDAY / SUNDAY														
		8:48	8:51	8:59		9:04	9:11	9:17	9:20	9:25	-	9:30	9:45		
AM		9:58	10:01	10:09		10:14	10:21	10:27	10:30	10:35	-	10:40	10:55		
		11:08	11:11	11:19		11:24	11:31	11:37	11:40	11:45	-	11:50	12:05		
		12:18	12:21	12:29		12:34	12:41	12:47	12:50	12:55	12:57	1:00	1:15		
PM		1:28	1:31	1:39		1:44	1:51	1:57	2:00	2:05	-	2:10	2:25		
		2:38	2:41	2:49		2:54	3:01	3:07	3:10	3:15	-	3:20	3:35		
		3:48	3:51	3:59		4:04	4:11	4:17	4:20	4:25	4:27	4:30	4:45		
		4:58	5:01	5:09		5:14	5:21	5:27	5:30	5:35	-	5:40	5:55		
		6:08	6:11	6:19		6:24	6:31	6:37	6:40	6:45	-	6:50	7:05		
INBOUND															
WEEKDAYS															
		11	12	13	14	15	16	17	18	19	20	21	22		
		Bus starts	Bus leaves	Bus leaves	Bus leaves	Bus leaves	Bus leaves	Bus leaves	Bus leaves	Bus leaves	Bus leaves	Bus leaves	Bus ends		
at	Salisbury Beach	from Salisbury Center	from Garage	City	from James Steam Mill	from State Street	from Heritage House	from Commuter Rail	from Anna Jacques	from Market Basket	from Plaza	Port	from Stop & Shop	at Nicholas Costello Transit Ctr.	Bus continues on as Route
AM	-	-	-	-	5:00	-	5:06	-	5:12	5:15		5:25	5:30	51	
	6:00	6:10	6:20	-	6:25	6:35	6:40	6:45	6:55	7:00		7:10	7:15	51	
	7:00	7:10	7:20	-	7:25	7:35	7:40	7:45	7:55	8:00		8:10	8:15	51	
	8:00	8:10	8:20	-	8:25	8:35	8:40	8:45	8:55	9:00		9:10	9:15	51	
	9:00	9:10	9:20	-	9:25	9:35	9:40	9:45	9:55	10:00		10:10	10:15	51	
	10:00	10:10	10:20	-	10:25	10:35	10:40	10:45	10:55	11:00		11:10	11:15	51	
	11:00	11:10	11:20	-	11:25	11:35	11:40	11:45	11:55	12:00		12:10	12:15	51	
PM	12:00	12:10	12:20	-	12:25	12:35	12:40	12:45	12:55	1:00		1:10	1:15	51	
	1:00	1:10	1:20	-	1:25	1:35	1:40	1:45	1:55	2:00		2:10	2:15	51	
	2:00	2:10	2:20	-	2:25	2:35	2:40	2:45	2:55	3:00		3:10	3:15	51	
	3:00	3:10	3:20	-	3:25	3:35	3:40	3:45	3:55	4:00		4:10	4:15	51	
	4:00	4:10	4:20		4:25	4:35	4:40	4:45	4:55	5:00		5:10	5:15	51	
	5:00	5:10	5:20	-	5:25	5:35	5:40	5:45	5:55	6:00		6:10	6:15	51	
	6:00	6:10	6:20	-	6:25	6:35	6:40	6:45	6:55	7:00		7:10	7:15	51	
	7:00	7:10	7:20	-	7:25	-	-	-	-	-		-	-	-	
SATURDAY / SUNDAY															
AM	7:34	7:40	7:47	-	7:50	8:00	8:03	8:09	8:16	8:25		8:30	8:32	51	
	8:44	8:50	8:57	-	9:00	9:10	9:13	9:19	9:26	9:35		9:40	9:42	51	
	9:54	10:00	10:07	10:09	10:10	10:20	10:23	10:29	10:36	10:45		10:50	10:52	51	
	11:04	11:10	11:17	-	11:20	11:30	11:33	11:39	11:46	11:55		12:00	12:02	51	
	12:14	12:20	12:27	-	12:30	12:40	12:43	12:49	12:56	1:05		1:10	1:12	51	
PM	1:24	1:30	1:37	-	1:40	1:50	1:53	1:59	2:06	2:15		2:20	2:22	51	
	2:34	2:40	2:47	2:49	2:50	3:00	3:03	3:09	3:16	3:25		3:30	3:32	51	
	3:44	3:50	3:57	-	4:00	4:10	4:13	4:19	4:26	4:35		4:40	4:42	51	
	4:54	5:00	5:07	-	5:10	5:20	5:33	5:38	5:42	5:45		5:50	5:52	51	
	6:04	6:10	6:17		6:20	6:30	6:33	6:39	6:46	6:55		7:00	7:02	51	

This trip will run on Saturday only.





WE ARE GOING FARE FREE ON MARCH 1, 2022

Fares	▼
Statewide Access Pass	▼
How to Ride	▼
More	▼

The Merrimack Valley Regional Transit Authority (MVRTA) board voted unanimously to go fare-free for all local fixed routes and EZ Trans paratransit services starting March 1, 2022 for at least 2 years. Fares will still be collected on the Boston Commuter bus.

[« Cancellation – Monday, December 6, 2021](#) [Cancellations – Friday, January 07, 2022 »](#)

Contact Us

MVRTA Administrative Offices

Monday - Friday
8:00AM - 5:00PM

85 Railroad Avenue
Haverhill, MA 01835

(978) 469-6878

(978) 521-5956

marketing@mvrta.com

Follow Us

[Like us on Facebook](#)

[Follow @MVRTA on Twitter](#)

Administration

[Advisory Board Meeting](#)

[Careers](#)

[Contact Us](#)

[Open Government](#)

[Title VI Policy](#)

About

The MVRTA serves the northeast corner of Massachusetts with over 1 million miles of scheduled bus routes, and elderly and disabled transportation.

[Read more about MVRTA](#)

SPEED STUDY





Vanasse & Associates, Inc.
Transportation Engineers & Planners

Job
Location
Calculated By:
Checked By:

Salisbury, MA
At Site Drive
S.R.F.

Job # **9398**
Date **6/23/2022**

Street: **Beach Street**
Direction: **Westbound**

Speed Limit: **35**
Time of Day **10:00 a.m.**
Observations **20**

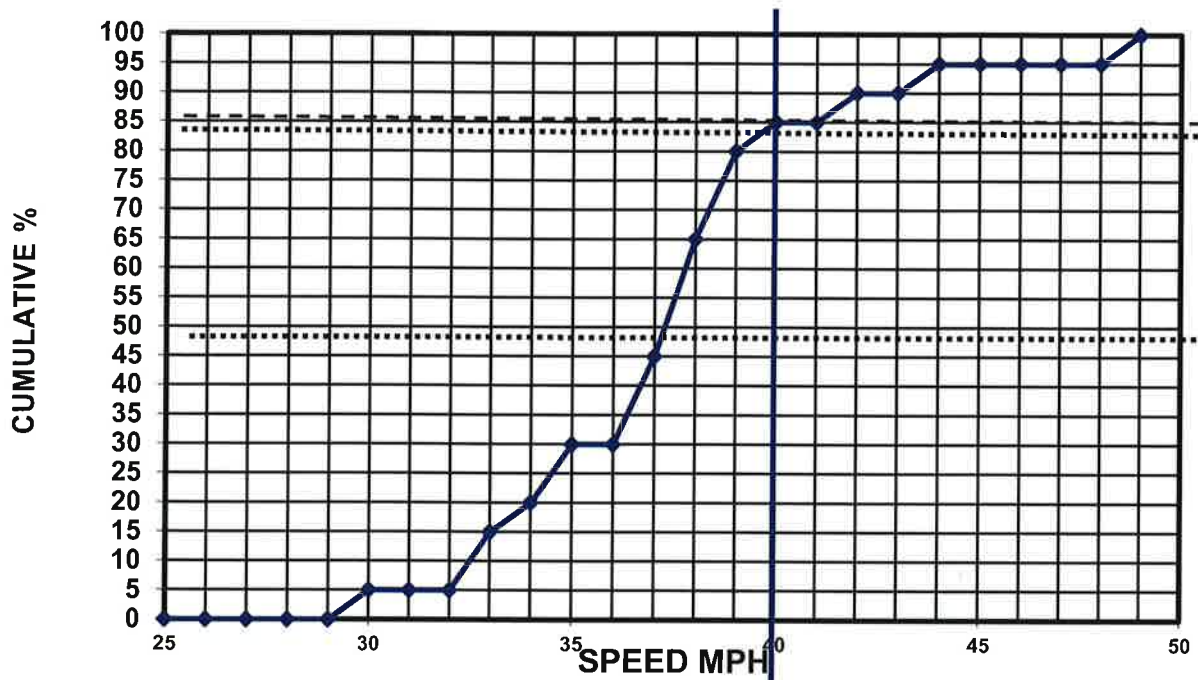
Speed	# of Observation	CUM. # Of OBS	% OF TOTAL OBS	CUM %
55				
54				
53				
52				
51				
50				
49	1	1	5	100
48	0	1	0	95
47	0	1	0	95
46	0	1	0	95
45	0	1	0	95
44	1	2	5	95
43	0	2	0	90
42	1	3	5	90
41	0	3	0	85
40	1	4	5	85
39	3	7	15	80
38	4	11	20	65
37	3	14	15	45
36	0	14	0	30
35	2	16	10	30
34	1	17	5	20
33	2	19	10	15
32	0	19	0	5
31	0	19	0	5
30	1	20	5	5
29				
28				
27				
26				
25				
24				
23				
22				
21				
20				

Average: **37.75**
Comments: **85% = 40.0 m.p.h.**

Street: Beach Street
Direction: Westbound

Job # 9398
Date 6/23/2022

SPEED GRAPH





Vanasse & Associates, Inc.
Transportation Engineers & Planners

Job
Location
Calculated By:
Checked By:

Salisbury, MA
At Site Drive
S.R.F.

Job # 9398
Date 6/23/2022

Street: Beach Street
Direction: Eastbound

Speed Limit: 40
Time of Day 10:00 a.m.
Observations 20

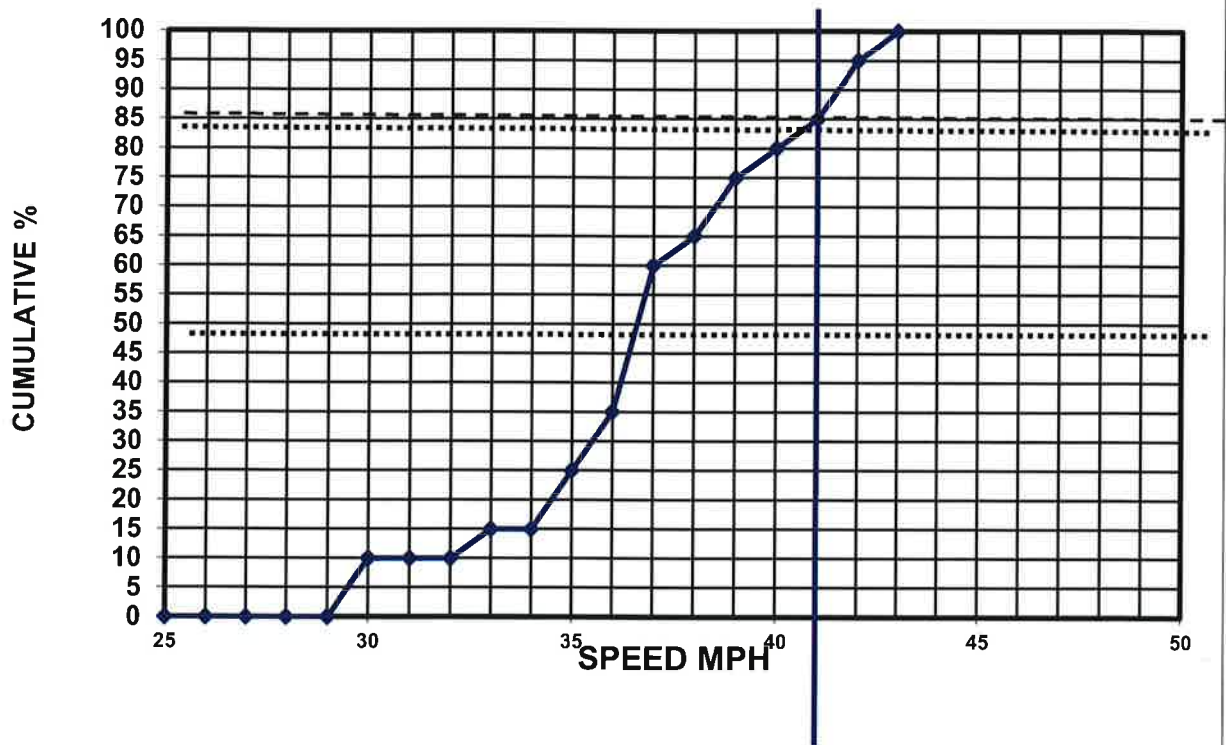
Speed	# of Observation	CUM. # Of OBS	% OF TOTAL OBS	CUM %
55				
54				
53				
52				
51				
50				
49				
48				
47				
46				
45				
44				
43	1	1	5	100
42	2	3	10	95
41	1	4	5	85
40	1	5	5	80
39	2	7	10	75
38	1	8	5	65
37	5	13	25	60
36	2	15	10	35
35	2	17	10	25
34	0	17	0	15
33	1	18	5	15
32	0	18	0	10
31	0	18	0	10
30	2	20	10	10
29				
28				
27				
26				
25				
24				
23				
22				
21				
20				

Average: 37.2
Comments: 85% = 41.0 m.p.h.

Street: Beach Street
Direction: Eastbound

Job # 9398
Date 6/23/2022

SPEED GRAPH



MOTOR VEHICLE CRASH DATA



MassHighway

CRASH RATE WORKSHEET

CITY/TOWN : SALISBURY COUNT DATE : 2022

DISTRICT : 4 UNSIGNALIZED : ☒ SIGNALIZED : ☐

MHD USE ONLY

Source #

~ INTERSECTION DATA ~

MAJOR STREET : Beach Road (Route 1A)

ST #

MINOR STREET(S) : Old County Road

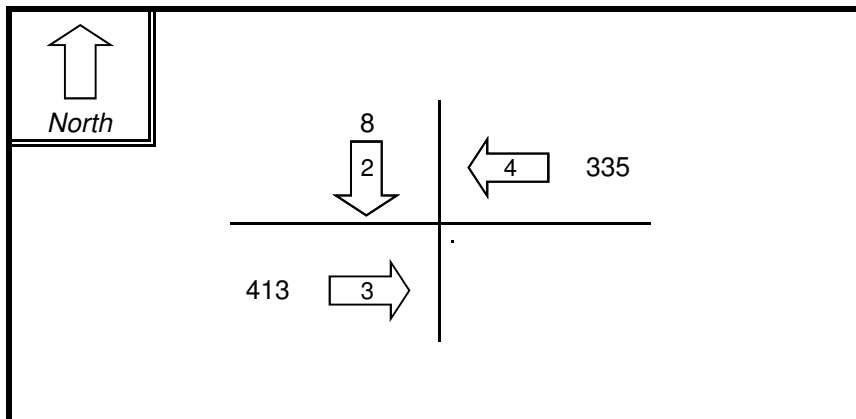
ST #

ST #

ST #

ST #

**INTERSECTION
DIAGRAM**
(Label Approaches)



INTERSECTION
REF #

Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :		SB	EB	WB		
VOLUMES (PM) :		8	413	335		756

" K " FACTOR : APPROACH ADT : ADT = TOTAL VOL/"K" FACT.

TOTAL # OF
ACCIDENTS : # OF
YEARS : AVERAGE # OF
ACCIDENTS (A) :

CRASH RATE CALCULATION : RATE = $\frac{(A * 1,000,000)}{(ADT * 365)}$

Comments : Accident Rate for District 4 unsignalized intersections = 0.57

Statewide Accident Rate for Signalized Inteserction = 0.78 and Unsignalized/Inteserction = 0.57

S:\Jobs\9398\5 - Crash\Crash Rates Worksheet

MAssDOT Vehicle Crash Data

Crash Number 4707542
City Town Name SALISBURY
Crash Date 04/19/2019
Crash Severity
Crash Status Closed
Crash Time 11:31 AM
Crash Year 2019
Max Injury Severity Reported Possible Injury (C)
Number of Vehicles 2
Police Agency Type Local police
sptroop
Age of Driver - Youngest Known 25-34
Age of Driver - Oldest Known >84
Age of Non-Motorist - Youngest Known
Age of Non-Motorist - Oldest Known
Crash Hour 11:00AM to 11:59AM
Driver Contributing Circumstances (All Drivers) D1: (No improper driving) / D2: (No improper driving)
Driver Distracted By (All Vehicles) D1: Not Distracted
First Harmful Event Collision with motor vehicle in traffic
Is Geocoded Yes
Light Conditions Daylight
Manner of Collision Rear-end
MassDOT District 4
Non-Motorist Action (All Persons)
Non-Motorist Location (All Persons)
Non-Motorist Type (All Persons)
RMV Document Numbers PW201915400421
Road Surface Condition Dry
Roadway Junction Type Not at junction
RPA Abbreviation MVPC
Total Fatalities 0
Total Non-Fatal Injuries 0
Traffic Control Device Type No controls
Trafficway Description Two-way, divided, unprotected median
Vehicle Actions Prior to Crash (All Vehicles) V1: Travelling straight ahead / V2: Travelling straight ahead
Vehicle Configuration (All Vehicles) V1:(Unknown vehicle configuration) / V2:(Unknown vehicle configuration)
Vehicle Emergency Use (All Vehicles) V1:(No) / V2:(No)
Vehicle Towed From Scene (All Vehicles) V1:(No) / V2:(No)
Vehicle Travel Directions (All Vehicles) V1: E / V2: E
Weather Conditions Clear
County Name ESSEX
Crash Report IDs 19-64-AC
FMCSA Reportable (All Vehicles)
FMCSA Reportable (Crash)
First Harmful Event Location Roadway
Geocoding Method At Intersection
Hit and Run No hit and run
Locality
Most Harmful Event (All Vehicles) V1:(Collision with motor vehicle in traffic) / V2:(Collision with motor vehicle in traffic)
Road Contributing Circumstance None
School Bus Related No, school bus not involved
Speed Limit
Traffic Control Device Function Not reported
Vehicle Sequence of Events (All Vehicles) V1:(Collision with motor vehicle in traffic) V2:(Collision with motor vehicle in traffic)
Work Zone Related No
X 254386.8433
Y 954574.3751
Latitude 42.83987735
Longitude -70.83474799
Street Number
Roadway BEACH ROAD / OLD COUNTY ROAD

GROWTH RATE CALCULATIONS



General Background Traffic Growth - Daily Traffic Volumes

Station Number	ROUTE/STREET	LOCATION	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average Annual Growth Rate
5108	INTERSTATE 95	SOUTH OF MAIN ST.	99,787	100,000	104,307	100,735	105,993	105,357	107,886	110,583	111,357	112,916	114,158	1.42%
225926	LAFAYETTE ROAD SOUTH OF 1000FT S OF TOLL ROAD	NORTH OF WATER STREET								11,613	11,810	11,845	11,798	0.51%
257581	LAFAYETTE ROAD NORTH OF INTERSTATE 95 CONNECTOR	NORTH OF WATER STREET								8,361	8,503	8,529	8,495	0.51%
														0.82%
														USE:1.0%

TRIP DISTRIBUTION



For more information on sampling and estimation methods, confidentiality protection, and sampling and nonsampling errors, see <http://www2.census.gov/programs-surveys/acs>
Universe: Workers 16 years and over.

Residence		Place of Work		Commuting Flow	
State Name	Minor Civil Division Name	State Name	Minor Civil Division Name	Workers in Commuting Flow	%
Massachusetts	Salisbury town	Massachusetts	Salisbury town	835	19%
Massachusetts	Salisbury town	Massachusetts	Newburyport city	511	12%
Massachusetts	Salisbury town	Massachusetts	Amesbury Town city	290	7%
Massachusetts	Salisbury town	Massachusetts	Boston city	228	5%
Massachusetts	Salisbury town	Massachusetts	Danvers town	133	3%
Massachusetts	Salisbury town	Massachusetts	Peabody city	128	3%
Massachusetts	Salisbury town	Massachusetts	North Andover town	114	3%
Massachusetts	Salisbury town	New Hampshire	Seabrook town	113	3%
Massachusetts	Salisbury town	Massachusetts	Lawrence city	105	2%
Massachusetts	Salisbury town	Massachusetts	Newbury town	105	2%
Massachusetts	Salisbury town	Massachusetts	Haverhill city	102	2%
Massachusetts	Salisbury town	Massachusetts	Ipswich town	94	2%
Massachusetts	Salisbury town	New Hampshire	Portsmouth city	90	2%
Massachusetts	Salisbury town	Massachusetts	Georgetown town	73	2%
Massachusetts	Salisbury town	Massachusetts	Methuen Town city	67	2%
Massachusetts	Salisbury town	Massachusetts	Beverly city	65	1%
Massachusetts	Salisbury town	Massachusetts	Marblehead town	56	1%
Massachusetts	Salisbury town	Massachusetts	Salem city	56	1%
Massachusetts	Salisbury town	Massachusetts	Andover town	55	1%
Massachusetts	Salisbury town	Massachusetts	Chelmsford town	46	1%
Massachusetts	Salisbury town	Massachusetts	Melrose city	46	1%
Massachusetts	Salisbury town	Massachusetts	Saugus town	44	1%
Massachusetts	Salisbury town	Massachusetts	Somerville city	41	1%
Massachusetts	Salisbury town	New Hampshire	Hampton town	41	1%
Massachusetts	Salisbury town	Massachusetts	Gloucester city	38	1%
Massachusetts	Salisbury town	Massachusetts	Middleton town	35	1%
Massachusetts	Salisbury town	Massachusetts	Lowell city	35	1%
Massachusetts	Salisbury town	Massachusetts	Newton city	33	1%
Massachusetts	Salisbury town	Massachusetts	Weymouth Town city	33	1%
Massachusetts	Salisbury town	Massachusetts	Wakefield town	32	1%
Massachusetts	Salisbury town	Massachusetts	Waltham city	29	1%
Massachusetts	Salisbury town	Massachusetts	Merrimac town	28	1%
Massachusetts	Salisbury town	Massachusetts	Burlington town	28	1%
Massachusetts	Salisbury town	New Hampshire	Brentwood town	27	1%
Massachusetts	Salisbury town	New Hampshire	Dover city	25	1%
Massachusetts	Salisbury town	Maine	Fairfield town	24	1%
Massachusetts	Salisbury town	New Hampshire	Exeter town	24	1%
Massachusetts	Salisbury town	Connecticut	Stamford town	23	1%
Massachusetts	Salisbury town	Massachusetts	Tewksbury town	23	1%
Massachusetts	Salisbury town	Massachusetts	Lynn city	22	1%
Massachusetts	Salisbury town	Massachusetts	Rowley town	22	1%

Trips		
Exit		
Beach Road (West)	Beach Road (East)	Total
835	0	835
511	0	511
290	0	290
228	0	228
133	0	133
128	0	128
114	0	114
113	0	113
105	0	105
105	0	105
102	0	102
94	0	94
45	45	90
73	0	73
67	0	67
65	0	65
56	0	56
56	0	56
55	0	55
46	0	46
46	0	46
44	0	44
41	0	41
41	41	82
38	0	38
35	0	35
35	0	35
33	0	33
33	0	33
32	0	32
29	0	29
28	0	28
28	0	28
27	0	27
25	0	25
24	0	24
24	0	24
23	0	23
23	0	23
22	0	22
3852	86	3938
98%	2%	
95	5	100

Say

TRIP GENERATION



Single-Family Detached Housing (210)

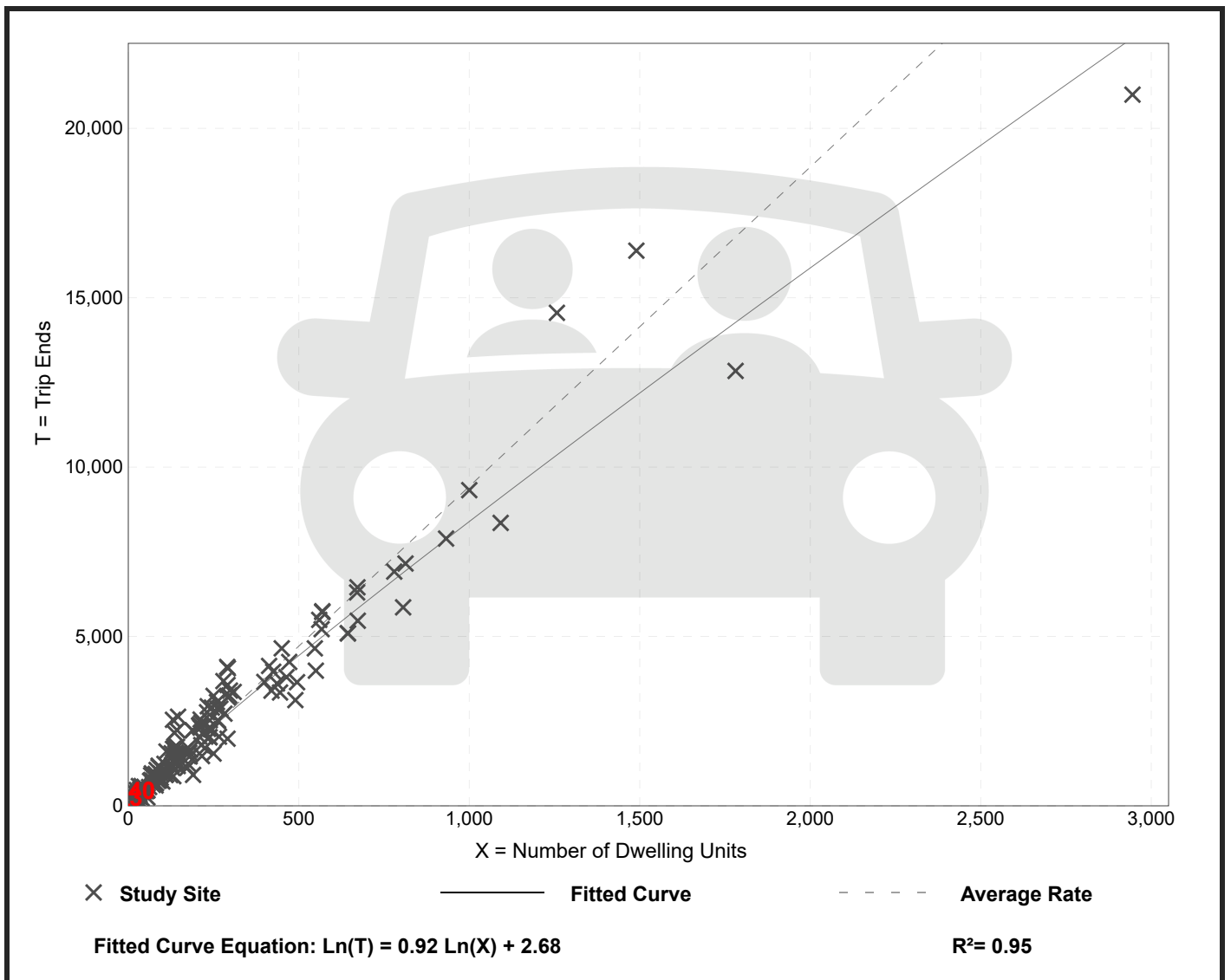
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

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: 192

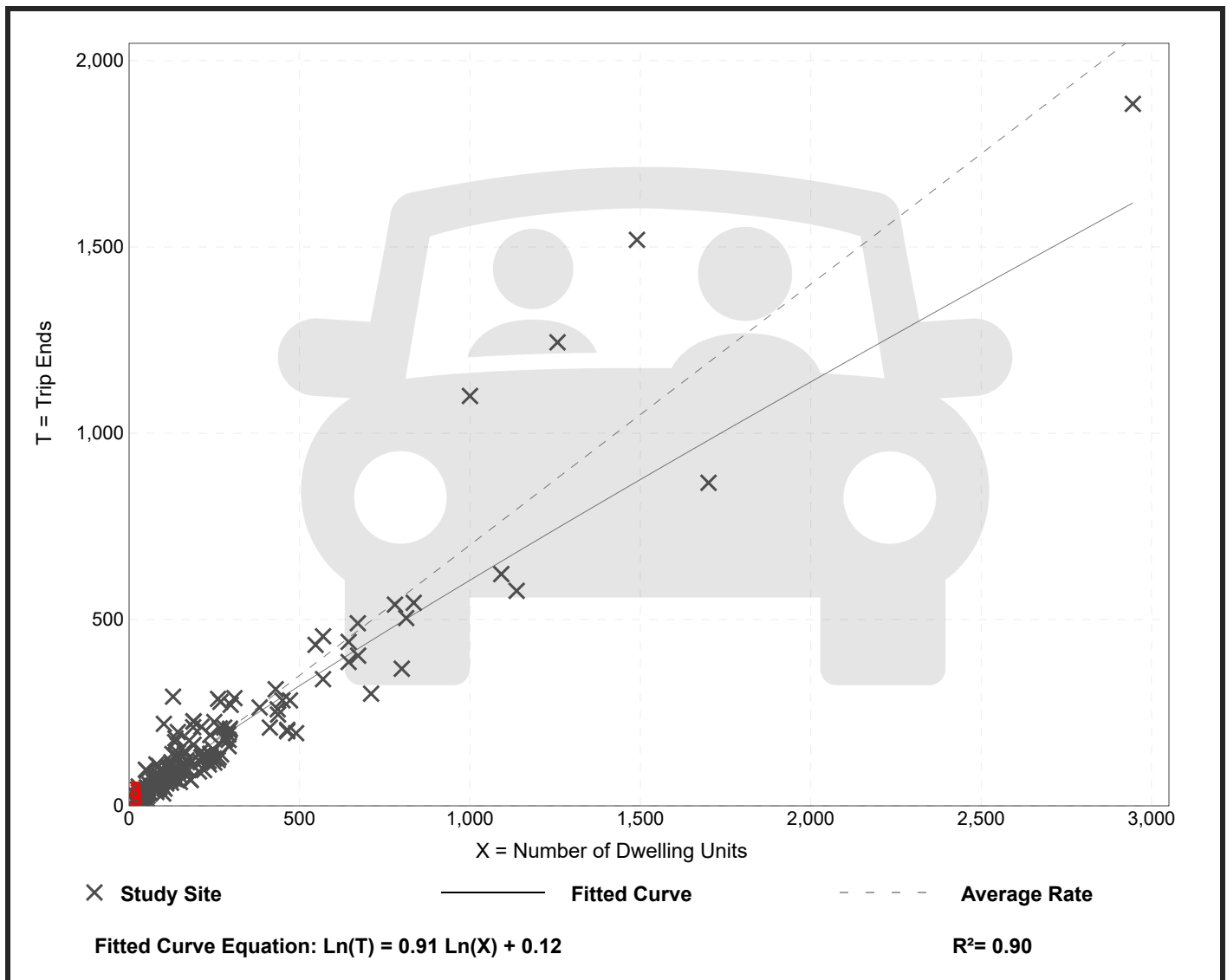
Avg. Num. of Dwelling Units: 226

Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

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: 208

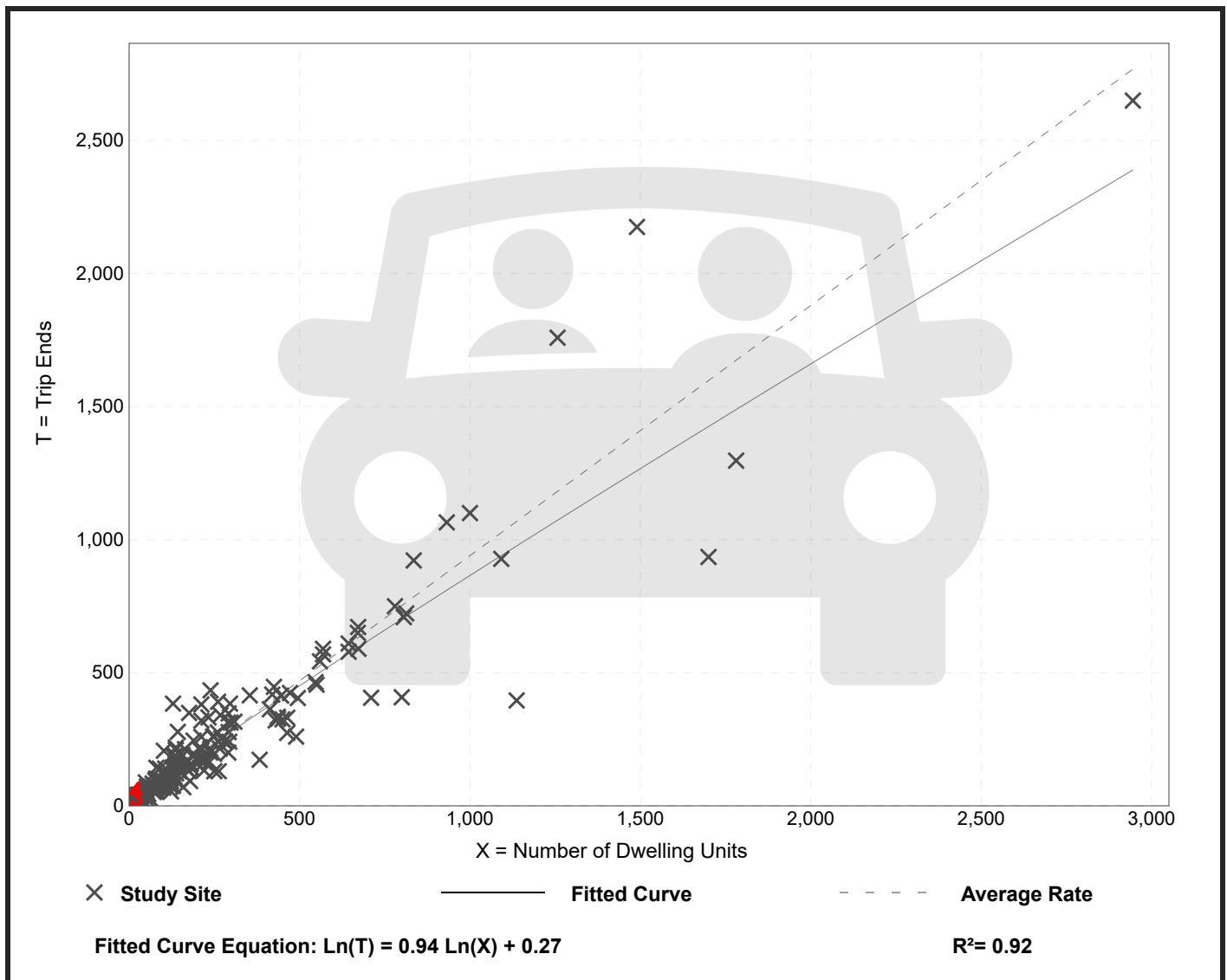
Avg. Num. of Dwelling Units: 248

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



Multifamily Housing (Low-Rise)

Not Close to Rail Transit (220)

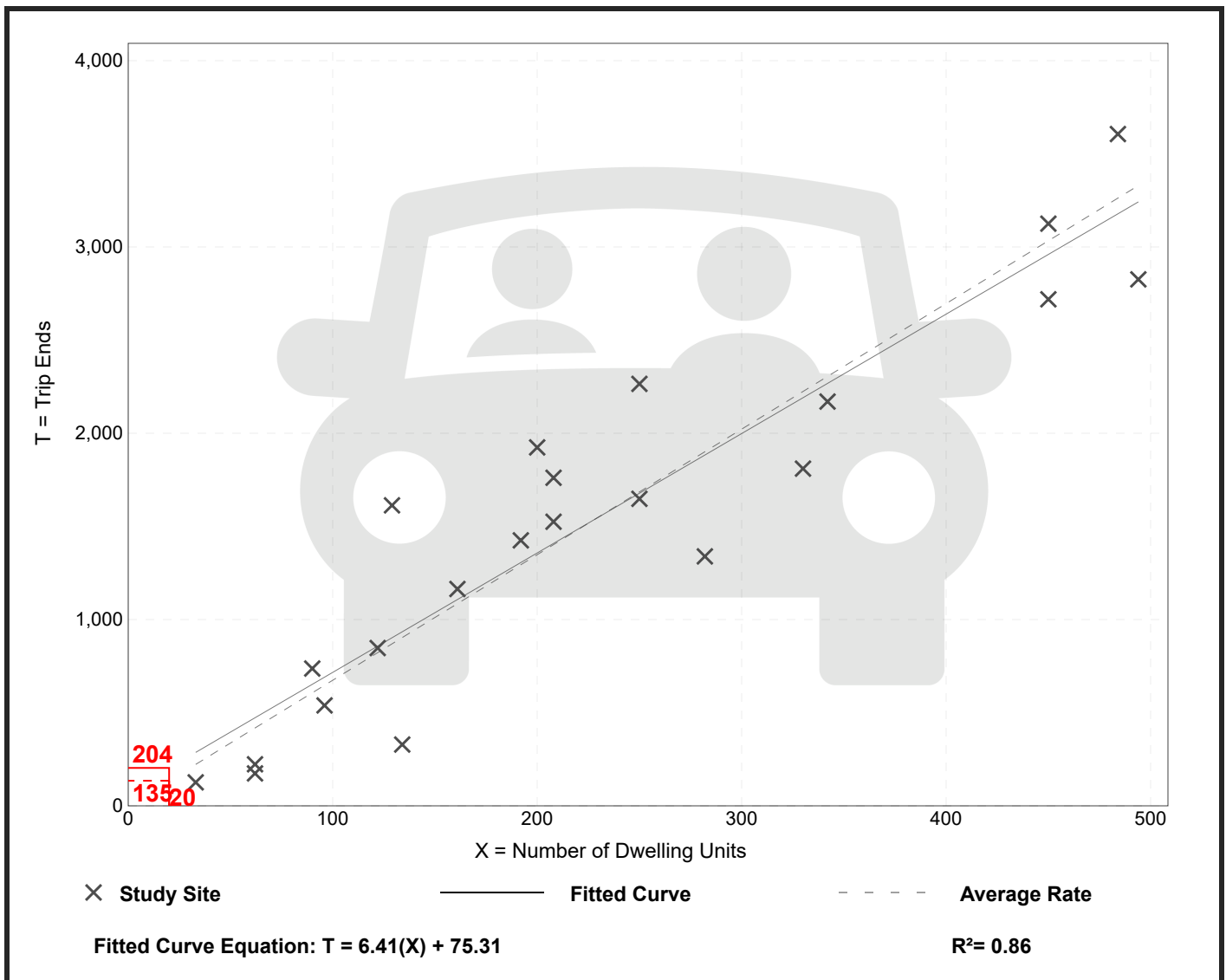
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 22
Avg. Num. of Dwelling Units: 229
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.74	2.46 - 12.50	1.79

Data Plot and Equation



Multifamily Housing (Low-Rise)

Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

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: 49

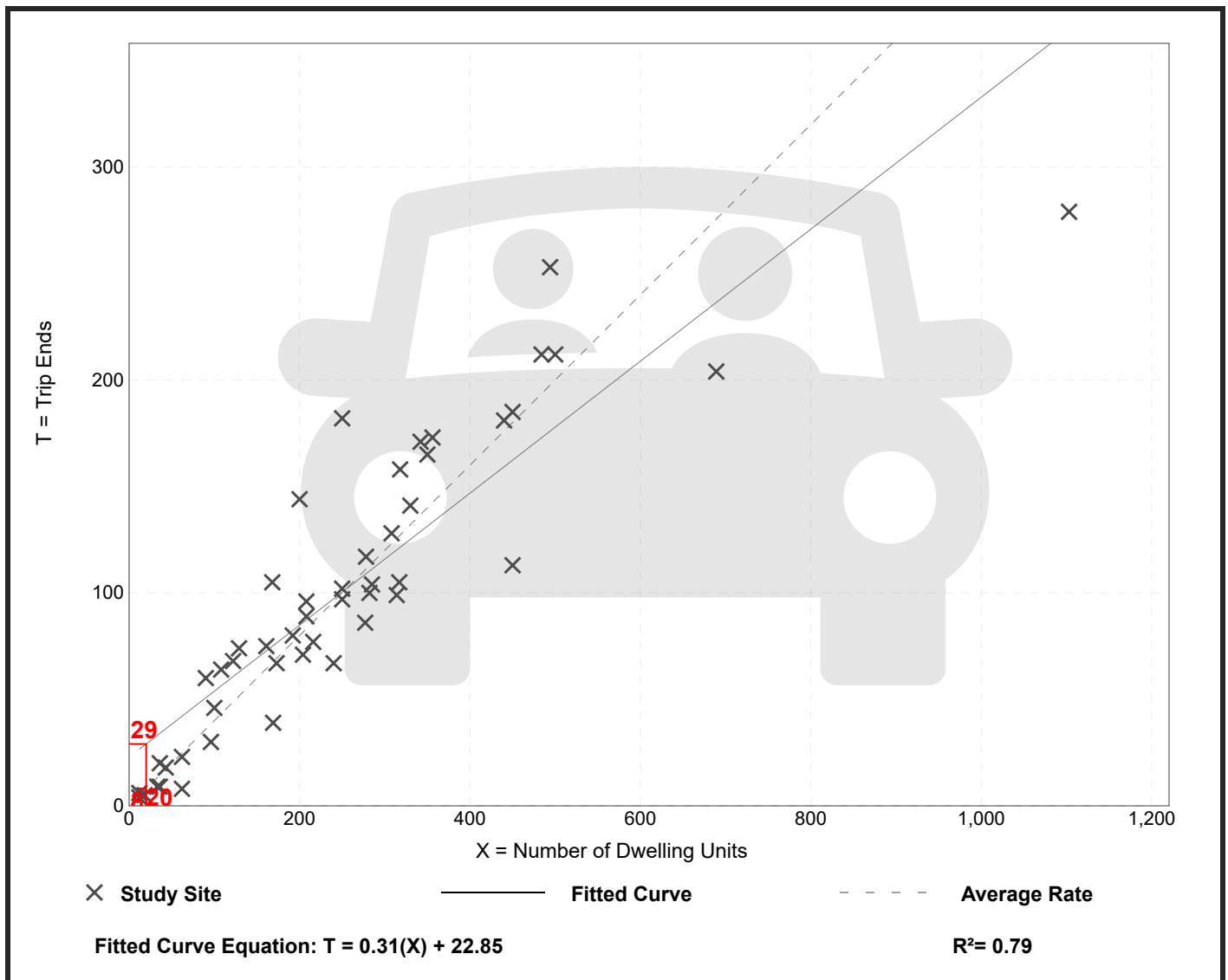
Avg. Num. of Dwelling Units: 249

Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units

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: 59

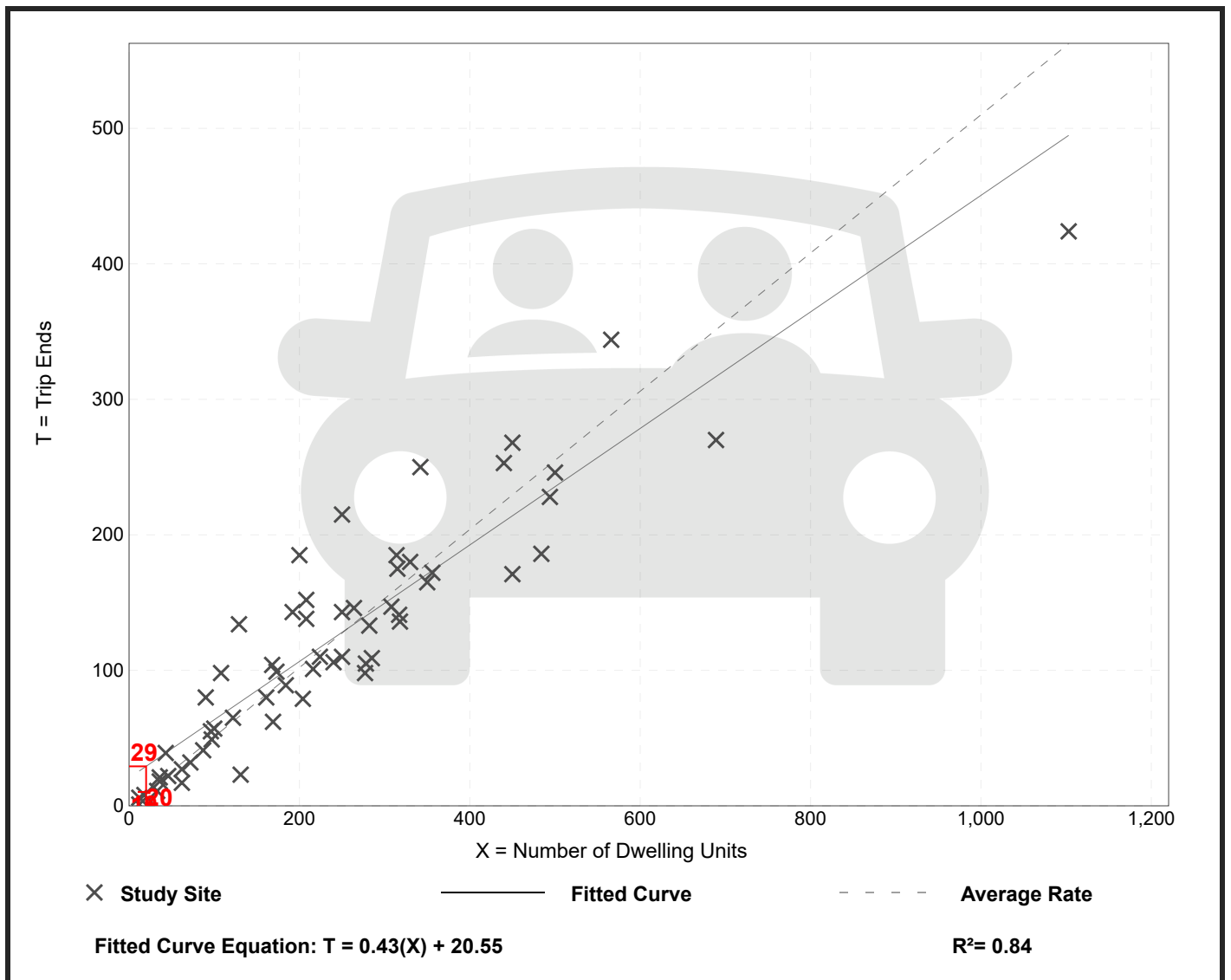
Avg. Num. of Dwelling Units: 241

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

Data Plot and Equation



CAPACITY ANALYSIS

Beach Road at Old County Road (unsignalized)

Beach Road at Site Driveway

Old County Road at Site Driveway









Beach Road at Old County Road (unsignalized)



HCM 2010 TWSC
3: Beach Road (Route 1A) & Old County Road




1 - 2022 Existing Condition Weekday Morning
07/01/2022




Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	227	323	0	0	14
Future Vol, veh/h	11	227	323	0	0	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	89	89	65	65
Heavy Vehicles, %	10	2	2	0	0	15
Mvmt Flow	11	236	363	0	0	22
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	363	0	-	0	621	363
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	258	-
Critical Hdwy	4.2	-	-	-	6.4	6.35
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.29	-	-	-	3.5	3.435
Pot Cap-1 Maneuver	1153	-	-	-	454	654
Stage 1	-	-	-	-	708	-
Stage 2	-	-	-	-	790	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1153	-	-	-	449	654
Mov Cap-2 Maneuver	-	-	-	-	449	-
Stage 1	-	-	-	-	700	-
Stage 2	-	-	-	-	790	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.4	0		10.7		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1153	-	-	-	654	
HCM Lane V/C Ratio	0.01	-	-	-	0.033	
HCM Control Delay (s)	8.2	0	-	-	10.7	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	




Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	408	334	1	1	7
Future Vol, veh/h	5	408	334	1	1	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	90	90	67	67
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	5	429	371	1	1	10
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	372	0	-	0	811	372
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	439	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1198	-	-	-	352	678
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	654	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1198	-	-	-	350	678
Mov Cap-2 Maneuver	-	-	-	-	350	-
Stage 1	-	-	-	-	698	-
Stage 2	-	-	-	-	654	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		11.1		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1198	-	-	-	607	
HCM Lane V/C Ratio	0.004	-	-	-	0.02	
HCM Control Delay (s)	8	0	-	-	11.1	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	




HCM 2010 TWSC
3: Beach Road (Route 1A) & Old County Road




3 - 2029 No Build Condition Weekday Morning
07/01/2022

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	243	346	0	0	15
Future Vol, veh/h	12	243	346	0	0	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	89	89	65	65
Heavy Vehicles, %	10	2	2	0	0	15
Mvmt Flow	13	253	389	0	0	23
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	389	0	-	0	668	389
Stage 1	-	-	-	-	389	-
Stage 2	-	-	-	-	279	-
Critical Hdwy	4.2	-	-	-	6.4	6.35
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.29	-	-	-	3.5	3.435
Pot Cap-1 Maneuver	1127	-	-	-	426	632
Stage 1	-	-	-	-	689	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1127	-	-	-	420	632
Mov Cap-2 Maneuver	-	-	-	-	420	-
Stage 1	-	-	-	-	680	-
Stage 2	-	-	-	-	773	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.4	0		10.9		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1127	-	-	-	632	
HCM Lane V/C Ratio	0.011	-	-	-	0.037	
HCM Control Delay (s)	8.2	0	-	-	10.9	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	437	358	1	1	8
Future Vol, veh/h	5	437	358	1	1	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	90	90	67	67
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	5	460	398	1	1	12
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	399	0	-	0	869	399
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	470	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1171	-	-	-	325	655
Stage 1	-	-	-	-	682	-
Stage 2	-	-	-	-	633	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1171	-	-	-	323	655
Mov Cap-2 Maneuver	-	-	-	-	323	-
Stage 1	-	-	-	-	678	-
Stage 2	-	-	-	-	633	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		11.3		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1171	-	-	-	588	
HCM Lane V/C Ratio	0.004	-	-	-	0.023	
HCM Control Delay (s)	8.1	0	-	-	11.3	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	




Intersection						
Int Delay, s/veh	0					
Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	0	0	1	0
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	1	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	-	-	1022	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	1022	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	1022	-
Mov Cap-2 Maneuver	-	-	-	-	1022	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	1022	-
Approach	NB	SB	NW			
HCM Control Delay, s	0	0	0			
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	NWLn1	SBL	SBT	
Capacity (veh/h)	-	-	-	-	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	-	-	0	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	-	-	-	




Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	13	244	349	0	0	20
Future Vol, veh/h	13	244	349	0	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	89	89	65	65
Heavy Vehicles, %	10	2	2	0	0	15
Mvmt Flow	14	254	392	0	0	31
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	392	0	-	0	674	392
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	282	-
Critical Hdwy	4.2	-	-	-	6.4	6.35
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.29	-	-	-	3.5	3.435
Pot Cap-1 Maneuver	1124	-	-	-	423	629
Stage 1	-	-	-	-	687	-
Stage 2	-	-	-	-	770	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1124	-	-	-	417	629
Mov Cap-2 Maneuver	-	-	-	-	417	-
Stage 1	-	-	-	-	677	-
Stage 2	-	-	-	-	770	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.4	0		11		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1124	-	-	-	-	629
HCM Lane V/C Ratio	0.012	-	-	-	-	0.049
HCM Control Delay (s)	8.2	0	-	-	-	11
HCM Lane LOS	A	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	-	0.2

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	440	360	1	1	11
Future Vol, veh/h	10	440	360	1	1	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	90	90	67	67
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	11	463	400	1	1	16
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	401	0	-	0	886	401
Stage 1	-	-	-	-	401	-
Stage 2	-	-	-	-	485	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1169	-	-	-	318	653
Stage 1	-	-	-	-	681	-
Stage 2	-	-	-	-	623	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1169	-	-	-	314	653
Mov Cap-2 Maneuver	-	-	-	-	314	-
Stage 1	-	-	-	-	672	-
Stage 2	-	-	-	-	623	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.2	0		11.2		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1169	-	-	-	599	
HCM Lane V/C Ratio	0.009	-	-	-	0.03	
HCM Control Delay (s)	8.1	0	-	-	11.2	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Beach Road at Site Driveway









Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	243	346	0	0	3
Future Vol, veh/h	1	243	346	0	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	96	96	89	89	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	253	389	0	0	3
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	389	0	-	0	644	389
Stage 1	-	-	-	-	389	-
Stage 2	-	-	-	-	255	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1170	-	-	-	437	659
Stage 1	-	-	-	-	685	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1170	-	-	-	437	659
Mov Cap-2 Maneuver	-	-	-	-	437	-
Stage 1	-	-	-	-	684	-
Stage 2	-	-	-	-	788	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		10.5		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1170	-	-	-	-	659
HCM Lane V/C Ratio	0.001	-	-	-	-	0.005
HCM Control Delay (s)	8.1	0	-	-	-	10.5
HCM Lane LOS	A	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	-	0

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	438	359	0	0	2
Future Vol, veh/h	3	438	359	0	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	90	90	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	461	399	0	0	2
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	399	0	-	0	866	399
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	467	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1160	-	-	-	324	651
Stage 1	-	-	-	-	678	-
Stage 2	-	-	-	-	631	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1160	-	-	-	323	651
Mov Cap-2 Maneuver	-	-	-	-	323	-
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	631	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		10.5		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1160	-	-	-	651	
HCM Lane V/C Ratio	0.003	-	-	-	0.003	
HCM Control Delay (s)	8.1	0	-	-	10.5	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0	

Old County Road at Site Driveway



Intersection						
Int Delay, s/veh	1					
Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Vol, veh/h	12	1	0	15	5	0
Future Vol, veh/h	12	1	0	15	5	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	65	65	65	65	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	2	0	23	5	0
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	20	0	42	19
Stage 1	-	-	-	-	19	-
Stage 2	-	-	-	-	23	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1596	-	969	1059
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	1000	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1596	-	969	1059
Mov Cap-2 Maneuver	-	-	-	-	969	-
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	1000	-
Approach	NB	SB		NW		
HCM Control Delay, s	0	0		8.7		
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	NWLn1	SBL	SBT	
Capacity (veh/h)	-	-	969	1596	-	
HCM Lane V/C Ratio	-	-	0.006	-	-	
HCM Control Delay (s)	-	-	8.7	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0	0	-	

Intersection						
Int Delay, s/veh	0.9					
Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Vol, veh/h	6	5	0	9	3	0
Future Vol, veh/h	6	5	0	9	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	67	67	67	67	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	7	0	13	3	0
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	16	0	26	13
Stage 1	-	-	-	-	13	-
Stage 2	-	-	-	-	13	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1602	-	989	1067
Stage 1	-	-	-	-	1010	-
Stage 2	-	-	-	-	1010	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1602	-	989	1067
Mov Cap-2 Maneuver	-	-	-	-	989	-
Stage 1	-	-	-	-	1010	-
Stage 2	-	-	-	-	1010	-
Approach	NB		SB		NW	
HCM Control Delay, s	0		0		8.7	
HCM LOS	A					
Minor Lane/Major Mvmt	NBT	NBR	NWLn1	SBL	SBT	
Capacity (veh/h)	-	-	989	1602	-	
HCM Lane V/C Ratio	-	-	0.003	-	-	
HCM Control Delay (s)	-	-	8.7	0	-	
HCM Lane LOS	-	-	A	A	-	
HCM 95th %tile Q(veh)	-	-	0	0	-	