

MEMORANDUM

TO: Mr. Lionel J. Lucien, P.E., Manager
Public/Private Development Unit
MassDOT Highway Division
Office of Transportation Planning
10 Park Plaza, Room 4150
Boston MA 02116

FROM: Mr. Jeffrey S. Dirk, P.E., PTOE, FITE
Managing Partner
Vanasse & Associates, Inc.
35 New England Business Center Drive
Suite 140
Andover, MA 01810-1066
(978) 269-6830
jdirk@rdva.com
Professional Engineer in CT, MA, ME, NH, RI and VA

DATE: May 20, 2022

REF: 2073

SUBJECT: The Pinehills – 2021 Traffic Monitoring Program
Plymouth, Massachusetts

Pinehills LLC and Vanasse & Associates, Inc. (VAI) are pleased to submit the results of the 2021 Traffic Monitoring Program for The Pinehills located in Plymouth, Massachusetts. This document has been prepared in continued fulfillment of the Traffic Monitoring Program requirement specified in the Massachusetts Department of Transportation (MassDOT) Section 61 Findings that have been issued for The Pinehills. As required therein, the results of the 2021 Traffic Monitoring Program are being submitted to MassDOT, the Town of Plymouth, the Old Colony Planning Council (OCPC), and the Secretary of Energy and Environmental Affairs.

The purpose of the Traffic Monitoring Program is to provide an annual update of traffic volumes on the roadways serving The Pinehills and to document the traffic characteristics of the community as it is developed. The goal of the program is to identify the need for future improvements to the transportation infrastructure as traffic volumes in the area increase as a result of the continued build-out of The Pinehills and other unrelated development projects. Given the desire to maintain the rural character and landscape of the environment in and around The Pinehills, the annual monitoring program will ensure that the timing and scope of the improvements reflect actual traffic demands and conditions on the roadways serving The Pinehills. As the community has been developed, an interconnected network of sidewalks, pathways and walking trails has been expanded to connect the residential neighborhoods to the Neighborhood Green commercial area, where bicycle parking is provided. In addition, Pinehills LLC has coordinated with the Greater Attleboro-Taunton Regional Transit Authority (GATRA) to provide fixed-route bus service to the community. These amenities have been advanced consistent with the Transportation Demand Management (TDM) program goals for the master planned community and have been effective at reducing off-site trips as documented as a part of the traffic monitoring program.

The results of the 2021 Traffic Monitoring Program have indicated the following:

1. As configured and occupied as of October 2021, The Pinehills was shown to generate approximately 20,028 vehicle trips on an average weekday and approximately 17,545 vehicle trips on a Saturday (both two-way, 24-hour volumes), with approximately 1,162 vehicle trips during the weekday morning peak-hour, 1,742 vehicle trips during the weekday evening peak-hour and approximately 1,634 vehicle trips during the Saturday midday peak-hour;



2. The actual measured (October 2021) traffic volumes associated with The Pinehills were found to be approximately 3 percent below the projected traffic volumes for the community on an average weekday and 12 percent below the projections on a Saturday. During the peak hours, the measured traffic volumes were found to be approximately 7 percent below the projected traffic volumes during the weekday morning peak-hour, 6 percent below the projected traffic volumes during the weeks evening peak-hour, and approximately 19 percent below the projected volumes during the Saturday midday peak-hour;
3. Traffic volumes along the Clark Road/Beaver Dam Road corridor were shown to have generally increased by between 0.4 and 3.7 percent, with the largest increases shown to have occurred east of the Route 3/Clark Road interchange;
4. Based on the measured traffic volumes at the Clark Road/Pinehills Drive intersection, Pinehills LLC is advancing improvements along Clark Road that include the addition of an eastbound left-turn lane on Clark Road. In addition, Pinehills LLC installed a crosswalk with an accompanying pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) for crossing Clark Road at Landmark Drive;
5. Traffic volumes along the unpaved portion of Old Sandwich Road continue to remain relatively low (average weekday daily traffic volumes of 405 vehicles per day and Saturday traffic volumes of 390 vehicles per day); and
6. The relative distribution of Pinehills-related traffic to the access roadways serving the community indicates that approximately 75 percent of the trips associated with The Pinehills use the access roadways located along Clark Road/Beaver Dam Road, consistent with the stated goal of limiting the use of Old Sandwich Road by project-related traffic.

Consistent with the findings presented in the traffic monitoring programs for prior years, traffic volumes west of the Route 3/Clark Road interchange and at the Clark Road/Long Pond Road intersection have been steadily increasing over the past several years. As a result, overall operating conditions within the interchange area and at the Clark Road/Long Pond Road intersection have deteriorated resulting in increased motorist delays and vehicle queuing. A traffic signal control has been installed at the Clark Road/Long Pond Road intersection as a part of the Redbrook (formerly River Run) mixed-use development (EEA No. 13580). With the installation of traffic signal control and associated geometric modifications, traffic operations and safety at the subject intersection and within the Route 3/Clark Road interchange have been improved. Further, if warranted, Pinehills LLC has reserved land situated in the northeast and southwest quadrants of the Route 3/ Clark Road interchange for MassDOT's use in completing future interchange improvements including a full on/off ramp system in the southwest quadrant and a northbound slip-ramp in the northeast quadrant.

As a separate undertaking at the request of the Town of Plymouth Department of Public Works (DPW), a Traffic Signal Warrants Analysis was performed in February 2022 for the following intersections along the Clark Road/Beaver Dam Road corridor that serve The Pinehills: Clark Road at Pinehills Drive; Clark Road at Meeting Way; Clark Road at Landmark Drive and Mainstone Boulevard; Clark Road at Fairview Lane; Beaver Dam Road at Great Island Road; and Beaver Dam Road at Long Ridge Road and Little Island Road. This analysis concluded that the installation of a traffic control signal is not warranted at the subject locations at this time.

The following summarizes the results of the 2021 Traffic Monitoring Program.



PROJECT STATUS AND BUILD-OUT

The Pinehills is a planned mixed-use village that is being developed on 3,256± acres of land generally situated in all four quadrants of the Route 3/Clark Road interchange in the Town of Plymouth, Massachusetts, with the majority of the project located in the northeast quadrant. When complete, The Pinehills will encompass approximately 2,158 limited occupancy homes; 920 retirement homes; four (4) 18-hole golf courses; and 1.3 million square feet (sf) of commercial space (including two conference centers, a community retail center, apartment units, office space, medical office space, and a mix of office and research and development (R&D) uses).

In accordance with the master plan for The Pinehills, the project will be developed in several phases over a period of years. The phased development program that has been approved (state and local) to date is as follows:

- **Phase I:** 100,000 sf of retail space; 100,000 sf of office space; 50,000 sf of general commercial space; 400 limited occupancy and planned retirement homes; a conference center with a 250-room hotel; an 18-hole golf course; and associated support facilities. The Phase I development abuts the east side of Route 3 and consists of a 797±-acre parcel of land.
- **Phase II:** 425 limited occupancy and planned retirement homes; 100,000 sf of commercial space; 100,000 sf of office space; 50,000 sf of retail space; an 18-hole golf course; and a 6,200 linear foot access road. Phase II is located on a 701±-acre parcel of land located north of Clark and Beaver Dam Roads.
- **Phase III:** 800 homes made up of 200 limited occupancy homes and 600 planned retirement homes; 50,000 sf of general commercial space; and 74,300 linear feet of private road. Phase III is located on a 546±-acre parcel of land generally situated north and south of Clark and Beaver Dam Roads, and east of Old Sandwich Road.
- **Phase IV:** 350 limited occupancy homes and a private, limited membership 18-hole golf course on a 635±-acre parcel of land located along the east side of Route 3, north of Clark Road and west of Old Sandwich Road.
- **Phase V:** 320 planned retirement homes to be located on 156± acres of land, a portion of which will be located in the northern portion of the site east of Old Sandwich Road, with the remainder to be constructed in the southern portion of the site in the vicinity of Great Island Pond and Clam Pudding Pond. In addition, 17,400 linear feet of private road will also be constructed.
- **Phase VI:** 757 limited occupancy homes on approximately 409± acres of land located in the northern portion of the project site, east of Old Sandwich Road. In addition, 60,560 linear feet of private road will also be constructed.
- **Phase VII:** 13 limited occupancy homes and 500,000 sf of commercial space consisting of 200 multifamily residential units, 250,000 sf of general office space and 50,000 sf of medical office space. The medical office and 50,000 sf of office space will replace 100,000 sf of previous approved retail space. In addition, approximately 13± acres of land was added to the overall site and 11,620 linear feet of private road will be constructed. Phase VII is located along both sides of Clark Road between Route 3 and Clubhouse Drive.

Tables 1 and 2 summarize the master plan development program and the current built-out by land use for The Pinehills at the time of completion of the traffic counts that form the basis of the 2021 Traffic Monitoring Program (October 2021), respectively.



Table 1
THE PINEHILLS MASTER PLAN SUMMARY

| Land Use Description | Master Plan Development Program | Constructed to Date (October 2021) |
|-----------------------------|--|---|
| Limited Occupancy Homes | 2,158 homes | 1,618 homes |
| Planned Retirement Homes | 920 homes | 781 homes |
| Golf Courses | 72 holes | 54 holes |
| Commercial Space: | 1.3 million sf | 487,344 sf |

Table 2
THE PINEHILLS
CURRENT BUILD-OUT BY LAND USE

| Land Use Description | Constructed to Date (October 2021) |
|--------------------------------------|---|
| <i>Residential Component:</i> | |
| Attached Homes | 1,219 homes |
| Detached Homes | 1,180 homes |
| <i>Commercial Component:</i> | |
| Assisted Living Facility | 80 rooms |
| Apartments | 412 units |
| Hotel | 50 rooms |
| Retail/Service | 33,752 sf |
| Gas Station | 2,884 sf |
| Athletic Club | 43,140 sf |
| Grocery/Liquor Store | 17,693 sf |
| Medical Office | 12,139 sf |
| <i>Golf Course Component:</i> | 54 holes |



In addition, construction workers and private contractors are typically on-site on a daily basis. The traffic volumes associated with: i) the constructed portion of The Pinehills; ii) construction workers/contractors; and iii) non-Pinehills related traffic that uses the community roadway network to travel between Clark Road and Old Sandwich Road; are reflected in the 2021 traffic count data that forms the basis of this report.

TRAFFIC MONITORING PROGRAM STUDY AREA

The traffic monitoring program study area contains the major roadways providing access to The Pinehills, including Clark Road/Beaver Dam Road and Old Sandwich Road, as well as the 12 roadways currently serving the community (Pinehills Drive, Meeting Way, Landmark Drive, Mainstone Boulevard, Clubhouse Drive, Great Island Road, Long Ridge Road, Little Island Road, Old Tavern Trail, Stonebridge Road, Sacrifice Rock Road, and The Pines). Twelve intersections were also included in the traffic monitoring program which are listed below and are depicted on Figure 1:

1. Clark Road at Pinehills Drive
2. Clark Road at Meeting Way
3. Clark Road at Landmark Drive and Mainstone Boulevard
4. Clark Road at Clubhouse Drive
5. Clark Road and Beaver Dam Road at Old Sandwich Road
6. Beaver Dam Road at Great Island Road
7. Beaver Dam Road at Little Island Road and Long Ridge Road
8. Old Sandwich Road at Old Tavern Trail
9. Old Sandwich Road at Stonebridge Road
10. Old Sandwich Road at Sacrifice Rock Road
11. Old Sandwich Road at The Pines
12. Old Sandwich Road and Sandwich Road at Jordan Road and Clifford Road

DATA COLLECTION

Traffic volumes for the 2021 Traffic Monitoring Program were obtained from automatic traffic recorder (ATR) counts and turning movement counts (TMCs) conducted in October 2021. The ATR counts were conducted on Clark Road east and west of the Route 3 interchange; on Old Sandwich Road north of Sacrifice Rock Road; on Old Sandwich Road north of the driveway serving The Pines; on Old Sandwich Road south of Stonebridge Road; and on the primary roadways that provide access to The Pinehills. The ATR counts conducted on the roadways serving The Pinehills were performed over a continuous 24-hour, seven (7) day period in order to record the traffic characteristics of the community roadway network over an extended period. Weekday morning (7:00 to 9:00 AM), weekday evening (4:00 to 6:00 PM) and Saturday midday (11:00 AM to 2:00 PM) peak-period TMCs were also performed at the study area intersections.

Seasonal Adjustments

In order to evaluate the potential for seasonal fluctuation of traffic volumes within the study area, historic traffic-volume data were reviewed for the nearest MassDOT permanent count station.¹ Table 3 presents the average daily traffic volumes at this count station during the month of October, as well as the yearly average.

¹MassDOT Traffic Volumes for the Commonwealth of Massachusetts; 2022. Permanent Count Station No. 20 located on Route 3 in Plymouth, north of the Bourne Town Line.



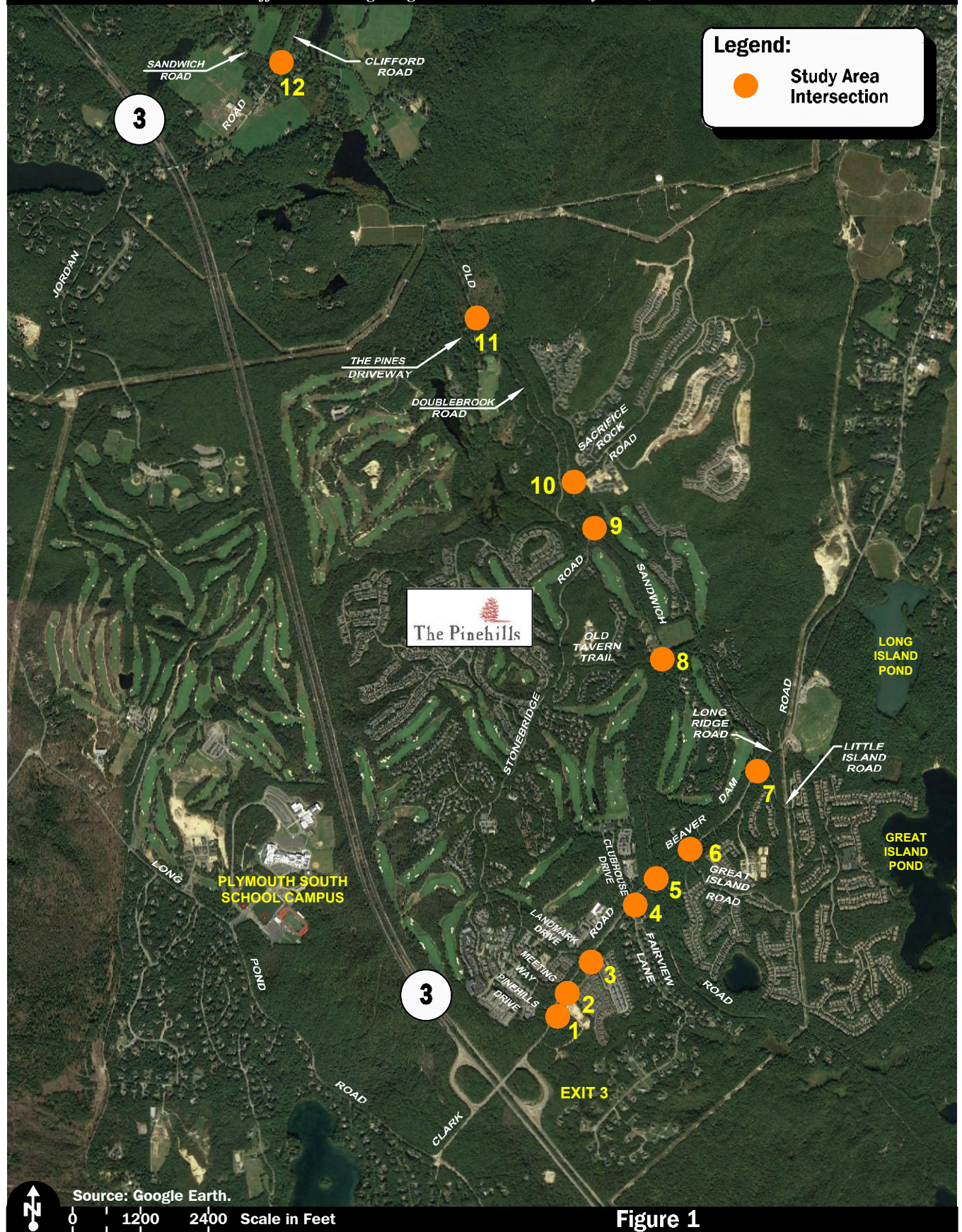


Table 3
MASSDOT PERMANENT COUNT STATION
NO. 20 (PLYMOUTH)
AVERAGE TRAFFIC VOLUMES

| Year | Vehicles Per Day | |
|------|------------------|----------------|
| | October | Yearly Average |
| 2019 | 39,625 | 40,215 |

The traffic volume data obtained from the count station shown in Table 3 indicates that traffic volumes for the month of October are approximately 1.5 percent below average-month conditions. In order to allow for a comparison between the 2021 traffic volume data and the traffic volume data presented in the prior traffic monitoring studies for The Pinehills, the October traffic volumes were adjusted upward by 1.5 percent in order to reflect average-month conditions within the study area and to normalize the count data to a common baseline.

In order to account for the impact on traffic volumes and trip patterns resulting from the COVID-19 pandemic, traffic-volume data collected at MassDOT Continuous Count Station No. 20 in October 2021 were compared to data collected at the same count station in October 2019. The October 2019 traffic volumes were expanded to 2021 by applying a background traffic growth rate of 1.0 percent per year.² Based on this pre and post COVID-19 traffic count data comparison, the seasonally adjusted pre COVID-19 traffic volume data was found to be approximately 5.7 percent below the October 2021 average-month traffic volumes and, therefore, a COVID-19 adjustment was not applied (or necessary) to the 2021 traffic volume data.

The adjusted (average-month) average weekday daily and Saturday traffic volumes for the study area roadways are summarized in Table 4 and graphically depicted on Figure 2. The 2021 Existing average-month peak-hour traffic volumes are graphically depicted on Figures 3, 4 and 5 for the weekday morning, weekday evening, and Saturday midday peak hours, respectively.

²Growth rate data was obtained from MassDOT Permanent Count Station No. 20.



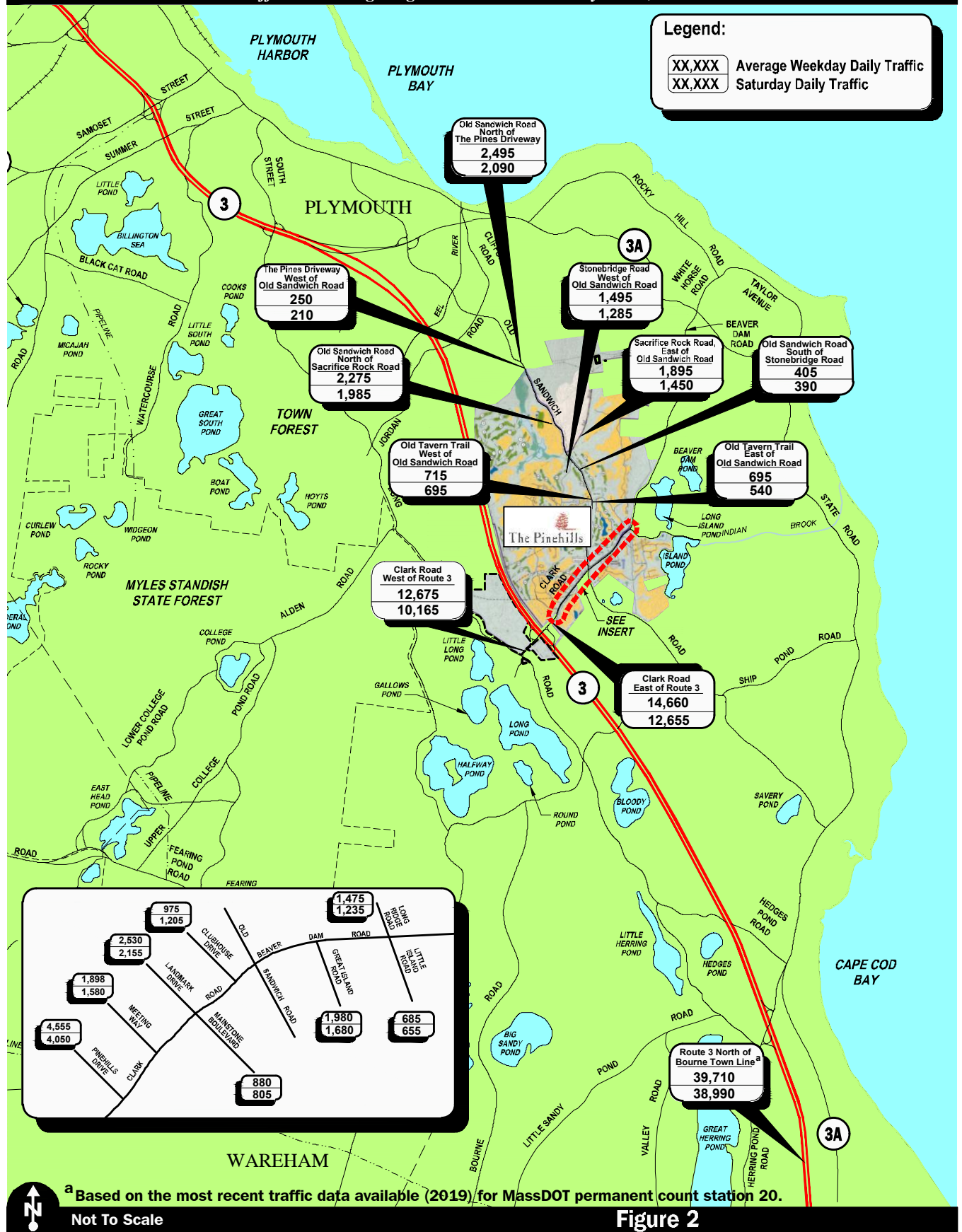
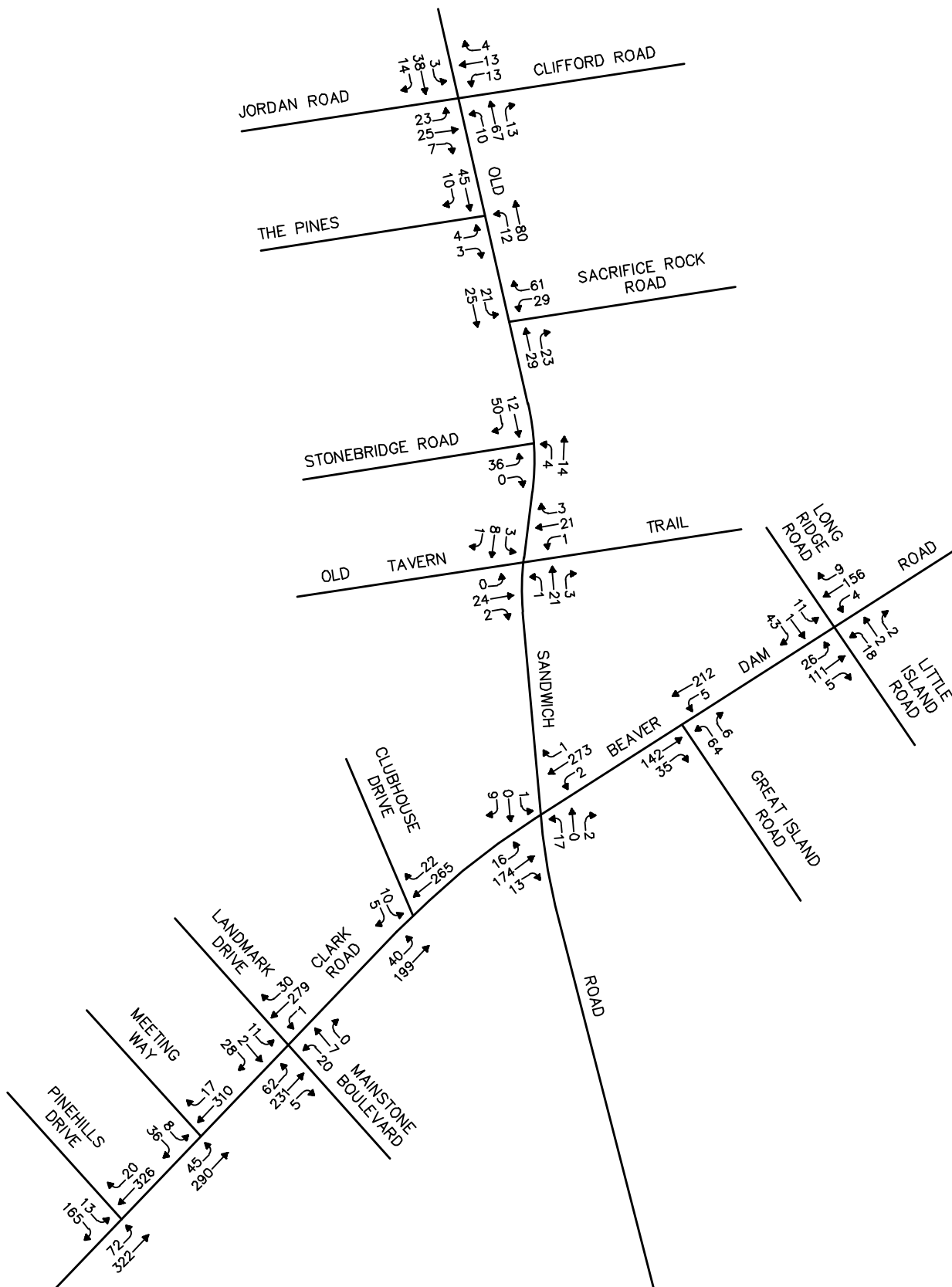


Figure 2

2021 Average-Month
Average Weekday and Saturday
Traffic Volumes

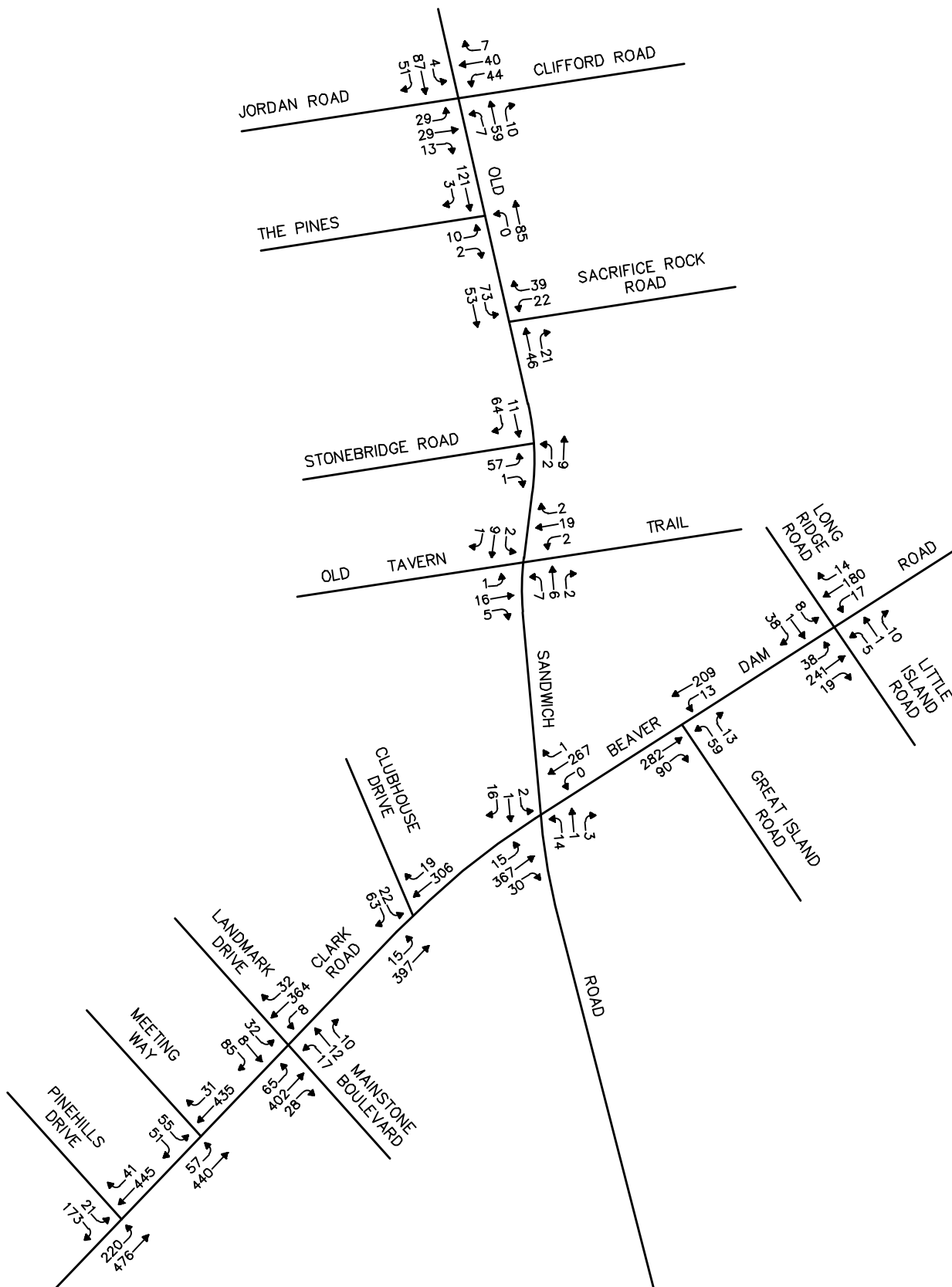


Not To Scale



Figure 3

2021 Existing
Average-Month
Weekday Morning
Peak-Hour Traffic Volumes



Not To Scale



Figure 4

2021 Existing
Average-Month
Weekday Evening
Peak-Hour Traffic Volumes



2021 Existing Average-Month Saturday Midday Peak-Hour Traffic Volumes

Table 4
2021 EXISTING TRAFFIC-VOLUME SUMMARY – AVERAGE-MONTH CONDITIONS

| Location | Average Weekday Daily ^a | Weekday Morning Peak Hour | | Weekday Evening Peak Hour | | Saturday Daily ^c | Saturday Midday Peak Hour | |
|---|------------------------------------|---------------------------|--------------------------|---------------------------|--------------------------|-----------------------------|---------------------------|--------------------------|
| | | Volume ^b | Directional Distribution | Volume | Directional Distribution | | Volume | Directional Distribution |
| Clark Road, east of Route 3 | 14,660 | 885 | 55.5% EB | 1,314 | 53.0% EB | 12,655 | 1,225 | 52.9% WB |
| Clark Road, west of Route 3 | 12,675 | 1,000 | 60.7% EB | 1,098 | 59.0% WB | 10,165 | 864 | 52.2% EB |
| Old Sandwich Road, north of The Pines driveway | 2,495 | 139 | 60.4% NB | 219 | 56.6% SB | 2,090 | 215 | 52.1% NB |
| Old Sandwich Road, north of Sacrifice Rock Road | 2,275 | 136 | 66.2% NB | 211 | 59.7% SB | 1,985 | 210 | 51.4% NB |
| Old Sandwich Road, south of Stonebridge Road | 405 | 36 | 66.7% NB | 21 | 57.1% SB | 390 | 46 | 52.2% SB |
| Pinehills Drive, north of Clark Road | 4,555 | 270 | 65.9% SB | 455 | 57.4% NB | 4,050 | 400 | 53.5% SB |
| Landmark Drive, north of Clark Road | 2,530 | 140 | 70.7% NB | 234 | 53.4% SB | 2,155 | 225 | 50.2% NB |
| Meeting Way, north of Clark Road | 1,890 | 106 | 58.5% NB | 194 | 54.6% SB | 1,580 | 172 | 64.0% SB |
| Clubhouse Drive, north of Clark Road | 975 | 77 | 80.5% NB | 119 | 71.4% SB | 1,205 | 76 | 61.8% NB |
| Great Island Road, south of Beaver Dam Road | 1,980 | 110 | 63.6% NB | 175 | 58.9% SB | 1,680 | 167 | 52.1% NB |
| Little Island Road, south of Beaver Dam Road | 685 | 32 | 68.8% NB | 53 | 69.8% SB | 655 | 61 | 52.5% SB |
| Long Ridge Road, north of Beaver Dam Road | 1,475 | 92 | 59.8% SB | 100 | 53.0% NB | 1,235 | 117 | 53.0% SB |
| Old Tavern Trail, east of Old Sandwich Road | 695 | 55 | 54.5% EB | 43 | 53.5% WB | 540 | 54 | 57.4% WB |
| Old Tavern Trail, west of Old Sandwich Road | 715 | 49 | 53.1% EB | 49 | 55.1% WB | 695 | 65 | 56.7% EB |
| Stonebridge Road, west of Old Sandwich Road | 1,495 | 90 | 60.1% WB | 124 | 53.2% WB | 1,285 | 132 | 53.0% WB |

See notes at end of table.



Table 4 (Continued)**2021 EXISTING TRAFFIC-VOLUME SUMMARY – AVERAGE-MONTH CONDITIONS**

| Location | Average Weekday Daily ^a | Weekday Morning Peak Hour | | Weekday Evening Peak Hour | | Saturday Daily ^c | Saturday Midday Peak Hour | |
|--|------------------------------------|---------------------------|--------------------------|---------------------------|--------------------------|-----------------------------|---------------------------|--------------------------|
| | | Volume ^b | Directional Distribution | Volume | Directional Distribution | | Volume | Directional Distribution |
| Sacrifice Rock Road, east of Old Sandwich Road | 1,895 | 134 | 67.2% WB | 155 | 60.6% EB | 1,450 | 142 | 54.9% WB |
| The Pines driveway, west of Old Sandwich Road | 250 | 29 | 75.9% WB | 15 | 80.0% EB | 210 | 14 | 57.1% EB |
| Mainstone Boulevard, south of Clark Road | 880 | 35 | 77.1% NB | 83 | 53.0% SB | 805 | 81 | 53.1% NB |

^aVehicles per day.^bVehicles per hour.^cVehicles.

EB = eastbound; WB = westbound; NB = northbound; SB = southbound.

Traffic Volume Comparison

Table 5 shows a comparison of traffic volumes as collected on the study roadways between 2007 and 2021. All traffic volumes have been normalized to average-month conditions in order to allow for a meaningful comparison of the data.



Table 5
STUDY AREA ROADWAY TRAFFIC-VOLUME COMPARISON

| Location | Weekday Daily ^a | | | | | | | | | | | | | Percent Growth ^p | Saturday ^b | | | | | | | | | | | | | Percent Growth ^p |
|--|----------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------------------|-----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------------------|
| | 2007 ^c | 2008 ^d | 2009 ^e | 2010 ^f | 2011 ^g | 2013 ^h | 2015 ⁱ | 2016 ^j | 2017 ^k | 2018 ^l | 2019 ^m | 2020 ⁿ | 2021 ^o | | 2007 ^c | 2008 ^d | 2009 ^e | 2010 ^f | 2011 ^g | 2013 ^h | 2015 ⁱ | 2016 ^j | 2017 ^k | 2018 ^l | 2019 ^m | 2020 ⁿ | 2021 ^o | |
| Clark Road, east of Route 3 | 9,125 | 9,240 | 9,015 | 9,495 | 11,285 | 11,590 | 13,500 | 14,585 | 14,540 | 12,200 | 13,365 | 13,565 | 14,660 | 3.7 | 8,045 | 8,280 | 8,385 | 8,625 | 7,920 | 7,920 | 9,895 | 11,605 | 9,155 | 11,645 | 11,765 | 12,135 | 12,655 | 3.5 |
| Clark Road, west of Route 3 | 10,575 | 10,420 | 10,285 | 9,750 | 10,605 | 11,090 | 12,125 | 12,765 | 12,050 | 11,920 | 11,070 | 13,245 | 12,675 | 1.4 | 9,620 | 10,075 | 9,825 | 9,495 | 8,830 | 10,845 | 9,410 | 10,195 | 9,300 | 9,920 | 10,020 | 11,945 | 10,165 | 0.4 |
| Old Sandwich Road, south of Stonebridge Road | 155 ^q | 200 | 180 | 235 | 215 | 450 | 380 | 420 | 590 | 385 | 275 ^p | 455 | 405 | 4.7 | 140 | 105 ^q | 190 | 235 | 220 | 220 | 290 | 375 | 405 | 540 | 320 | 355 ^p | 390 | 5.8 |

^aWeekday daily traffic in vehicles per day.
^bSaturday traffic in vehicles.
^cTraffic volume data collected in September 2007.
^dTraffic volume data collected in June 2008.
^eTraffic volume data collected in October 2009.
^fTraffic volume data collected in July/August 2010.
^gTraffic volume data collected in November 2011.
^hTraffic volume data collected in October 2013.
ⁱTraffic volume data collected in October 2015.
^jTraffic volume data collected in December 2016 and January 2017.
^kTraffic volume data collected in October 2017.
^lTraffic volume data collected in October 2018.
^mTraffic volume data collected in October and November 2019.
ⁿTraffic volume data collected in October 2020.
^oTraffic volume data collected in October 2021.
^pAverage annual growth rate between 2007 and 2021.
^qEstimated based on peak-hour traffic counts.



As can be seen in Table 5, weekday daily and Saturday traffic volumes within the study area have generally increased over the past several years. The largest traffic volume increases were shown to occur on Clark Road east of Route 3 and on Old Sandwich Road south of Stonebridge Road. The growth on Clark Road can be attributed to recent development in the area since 2007, including the continuing build-out of The Pinehills and other area development that has occurred since that time. The increase in traffic on Old Sandwich Road can be attributed, in part, to the continued build-out of The Pinehills; however, traffic volumes continue to remain relatively low, with 2021 average weekday daily traffic volumes of 405 vehicles per day and Saturday traffic volumes of 390 vehicles per day.

THE PINEHILLS COMMUNITY TRAFFIC CHARACTERISTICS

As discussed in previous section, ATR counts were conducted on the roadways serving The Pinehills in October 2021 over a continuous 24-hour, seven day period. These counts were adjusted to average-month conditions using the procedures described herein and are summarized graphically on Figures 6 through 18. As depicted thereon, daily traffic volumes associated with The Pinehills fluctuate over the course of the week, with the highest traffic volumes generally occurring on a Friday and the lowest traffic volumes generally occurring on a Sunday.

Table 6 presents a comparison of the 2021 measured traffic volumes on the roadways serving The Pinehills to the traffic volume projections for the community as constructed and occupied as of October 2021 and defined in Table 2. The traffic volume projections were obtained using trip-generation data provided by the Institute of Transportation Engineers (ITE)³ for the appropriate Land Use Codes (LUCs) and incorporate a 10 percent reduction to account for internal trips. The 10 percent internal trip reduction is below the 35 percent reduction that has been applied to the full build-out of the various development phases of The Pinehills as presented in the *Infrastructure Plan and Phased Review Document Phase I* and subsequent Phased Review Documents prepared in support of The Pinehills. The lower internal trip rate is reflective of the projected interaction between uses within the community given the current level of commercial and retail space that was occupied at the time that the traffic counts that form the basis of this assessment were performed (487,344 sf). It is anticipated that the internal trip rate will increase as the amount of commercial and retail space within the community eventually expands to the approved level of 1.3 million sf.

³*Trip Generation, 11th Edition*; Institute of Transportation Engineers; Washington, D.C.; 2021.



Table 6
THE PINEHILLS
TRAFFIC-VOLUME SUMMARY AND COMPARISON

| Time Period/Direction | (A) 2021 Measured Traffic Volumes ^a | (B) Projected Traffic Volumes ^b | (C=A-B) Difference |
|------------------------------------|---|---|-----------------------|
| Average Weekday Daily ^c | 20,028 | 20,542 | -514 |
| <i>Weekday Morning Peak Hour:</i> | | | |
| Entering | 526 | 631 | |
| <u>Exiting</u> | <u>636</u> | <u>617</u> | |
| Total | 1,162 | 1,248 | -86 |
| <i>Weekday Evening Peak Hour:</i> | | | |
| Entering | 882 | 962 | |
| <u>Exiting</u> | <u>860</u> | <u>883</u> | |
| Total | 1,742 | 1,845 | -103 |
| Saturday Daily | 17,545 | 19,970 | -2,425 |
| <i>Saturday Midday Peak Hour:</i> | | | |
| Entering | 741 | 1,005 | |
| <u>Exiting</u> | <u>893</u> | <u>1,011</u> | |
| Total | 1,634 | 2,016 | -382 |

^aSummation of traffic count data as measured in October 2021 at the access roads serving The Pinehills and includes non-Pinehills related cut-through traffic.

^bBased on the use of ITE LUC's 221, 251, 252, 254, 260, 310, 430, 493, 720, 822, 850 and 944, and applying a 10 percent internal trip reduction to all land uses except LUC 822.

^cAverage of the traffic-volume data collected Monday through Friday.

As can be seen in Table 6, The Pinehills as configured and occupied as of October 2021, was shown to generate approximately 20,028 vehicle trips on an average weekday and approximately 17,545 vehicle trips on a Saturday (both two-way, 24-hour volumes) as measured on the roadways serving The Pinehills,⁴ with approximately 1,162 vehicle trips (526 vehicles entering and 636 exiting) during the weekday morning peak-hour, 1,742 vehicle trips (882 vehicles entering and 860 exiting) during the weekday evening peak-hour and 1,634 vehicle trips (741 vehicles entering and 893 exiting) during the Saturday midday peak-hour.

In comparison to the traffic-volume projections for The Pinehills as configured and occupied as of October 2021 and after applying a 10 percent internal trip rate to all land uses except those associated with the retail/restaurant/service component, the actual measured traffic volumes were found to be approximately 514 vehicle trips lower on an average weekday (3 percent) and 2,425 vehicle trips lower (12 percent) on a Saturday. Peak-hour traffic volumes were found to be approximately 86 vehicle trips lower (7 percent) during the weekday morning peak-hour, 103 vehicle trips lower (6 percent) during the weekday evening peak-hour and 382 vehicle trips lower (19 percent) during the Saturday midday peak-hour. The noted traffic volume reductions illustrate the benefits of a master planned community such as

⁴Two-way, 24-hour volume, inclusive of pass-by trips and cut-through traffic (i.e., non-Pinehills related) using The Pinehills internal roadway system to travel between Clark Road and Old Sandwich Road.



The Pinehills that includes specific amenities to support internal trips, including a mix of commercial uses to serve the residences within the community and the advancement of safe and interconnected pedestrian and bicycle accommodations.

A review of the relative distribution of Pinehills traffic to the access roadways serving the community indicates that approximately 75 percent of the trips associated with the development use the access roadways located along Clark Road/Beaver Dam Road. This statistic is consistent with the stated goal of limiting the use of the unpaved portion of Old Sandwich Road by The Pinehills-related traffic.

SUMMARY

On behalf of Pinehills LLC, VAI has completed the 2021 Traffic Monitoring Program for The Pinehills located in Plymouth, Massachusetts. This document has been prepared in continued fulfillment of the Traffic Monitoring Program requirement specified in the MassDOT Section 61 Findings that have been issued for The Pinehills. The results of the 2021 Traffic Monitoring Program have indicated the following:

1. As configured and occupied as of October 2021, The Pinehills was shown to generate approximately 20,028 vehicle trips on an average weekday and approximately 17,545 vehicle trips on a Saturday (both two-way, 24-hour volumes), with approximately 1,162 vehicle trips during the weekday morning peak-hour, 1,742 vehicle trips during the weekday evening peak-hour and approximately 1,634 vehicle trips during the Saturday midday peak-hour;
2. The actual measured (October 2021) traffic volumes associated with The Pinehills were found to be approximately 3 percent below the projected traffic volumes for the community on an average weekday and 12 percent below the projections on a Saturday. During the peak hours, the measured traffic volumes were found to be approximately 7 percent below the projected traffic volumes during the weekday morning peak-hour, 6 percent below the projected traffic volumes during the weekday evening peak-hour, and approximately 19 percent below the projected volumes during the Saturday midday peak-hour;
3. Traffic volumes along the Clark Road/Beaver Dam Road corridor were shown to have generally increased by between 0.4 and 3.7 percent, with the largest increases shown to have occurred east of the Route 3/Clark Road interchange;
4. Based on the measured traffic volumes at the Clark Road/Pinehills Drive intersection, Pinehills LLC is advancing improvements along Clark Road that include the addition of an eastbound left-turn lane on Clark Road. In addition, Pinehills LLC installed a crosswalk with an accompanying pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) for crossing Clark Road at Landmark Drive;
5. Traffic volumes along the unpaved portion of Old Sandwich Road continue to remain relatively low (average weekday daily traffic volumes of 405 vehicles per day and Saturday traffic volumes of 390 vehicles per day); and
6. The relative distribution of Pinehills-related traffic to the access roadways serving the community indicates that approximately 75 percent of the trips associated with The Pinehills use the access roadways located along Clark Road/Beaver Dam Road, consistent with the stated goal of limiting the use of Old Sandwich Road by project-related traffic.



Traffic volumes along the Clark Road/Beaver Dam Road corridor have increased over the past several years as a result of the continued build-out of development projects in the area, including The Pinehills; however, we note that traffic volumes along the unpaved portion of Old Sandwich Road continue to remain relatively low (average weekday daily traffic volumes of 405 vehicles per day and Saturday traffic volumes of 390 vehicles per day). The improvements that have been constructed by others at the Clark Road/Long Pond Road intersection and those that are planned within the Route 3/Clark Road interchange and along the Clark Road corridor proximate to the Route 3/Clark Road interchange are designed to address current operational and safety deficiencies that have been documented as a part of this and other recently completed assessments of operating conditions along the Clark Road corridor.

Pinehills LLC has initiated the design of improvements along the Clark Road corridor that include the addition of a left-turn lane on the Clark Road eastbound approach to Pinehills Drive in order to accommodate the increased left-turn volume at this intersection. Consistent with its commitment and when requested by MassDOT, Pinehills LLC is prepared to effectuate the transfer of the land reserved in the southwest quadrant of the Route 3/Clark Road interchange to facilitate construction by MassDOT or others of a full on/off ramp system in that quadrant, and in the northeast quadrant to facilitate construction by MassDOT or others of a northbound slip-ramp. Pinehills LLC has also undertaken a separate assessment of the intersections that serve The Pinehills along Clark Road/Beaver Dam Road at the request of the Town of Plymouth DPW in order to determine if the installation of a traffic control signal is warranted at these intersections. Based this assessment, it has been concluded that the installation of a traffic control signal is not warranted at the roadways that serve The Pinehills at this time.

cc: B. Card – Secretary of Energy and Environmental Affairs
M. Perry – District Highway Director, MassDOT Highway Division District 5
L. Hartmann - Director of Planning and Development, Town of Plymouth
M. Waldron – Executive Director, Old Colony Planning Council
D. Sedares, President and General Counsel – Pinehills LLC
File



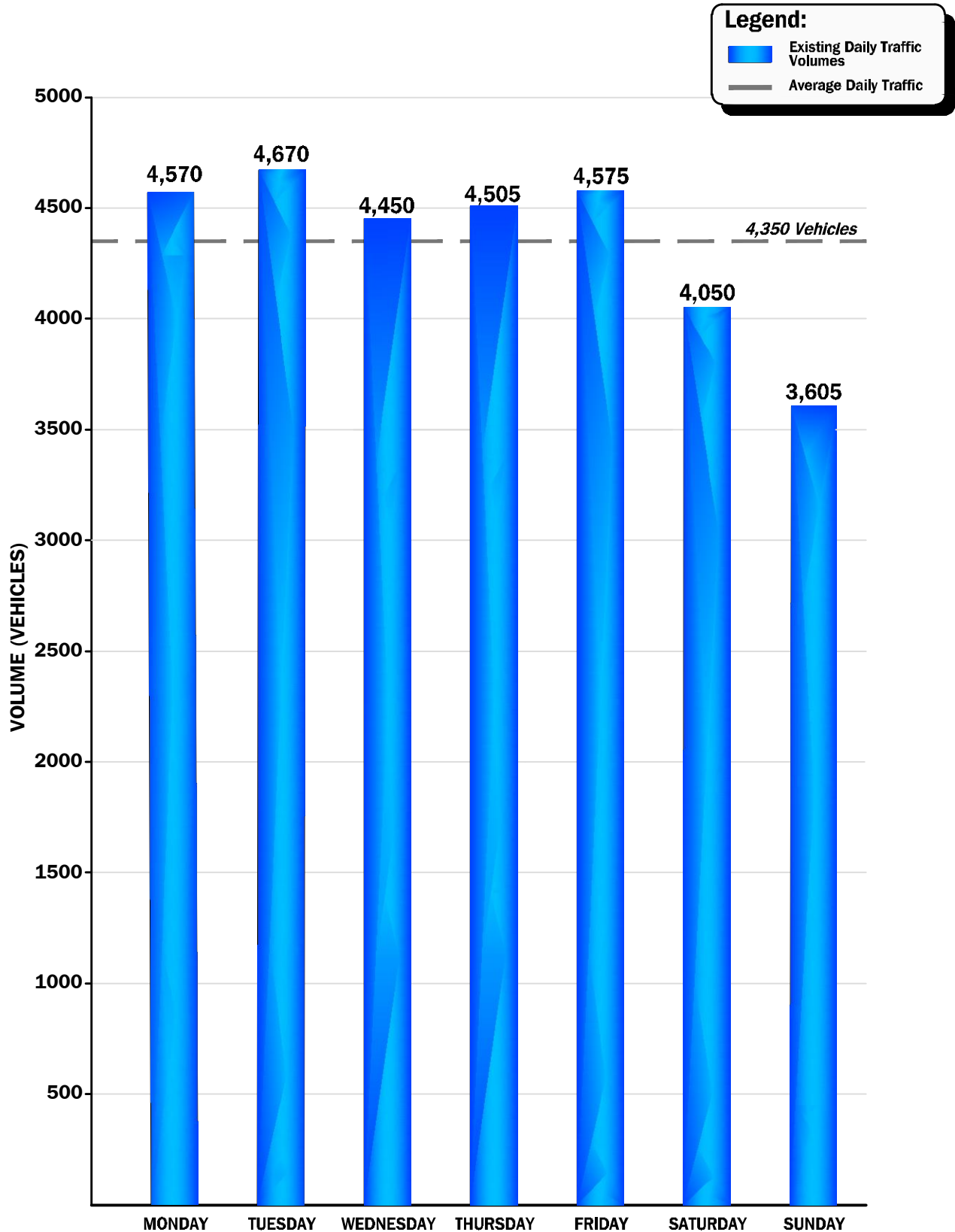


Figure 6

**Existing 2021 Average-Month
Average Daily Traffic Volumes
Pinehills Drive**



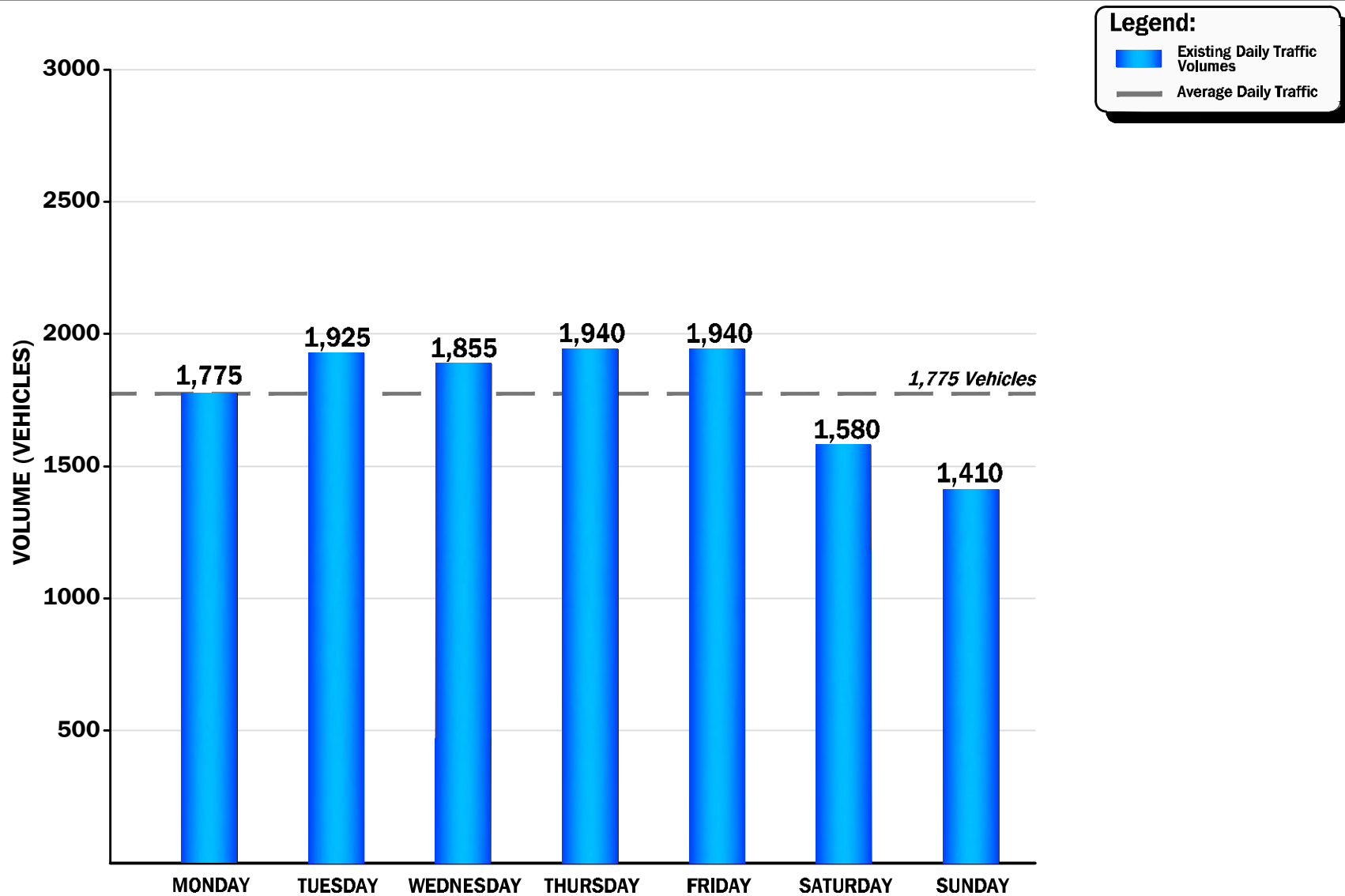


Figure 7

Existing 2021 Average-Month
Average Daily Traffic Volumes
Meeting Way

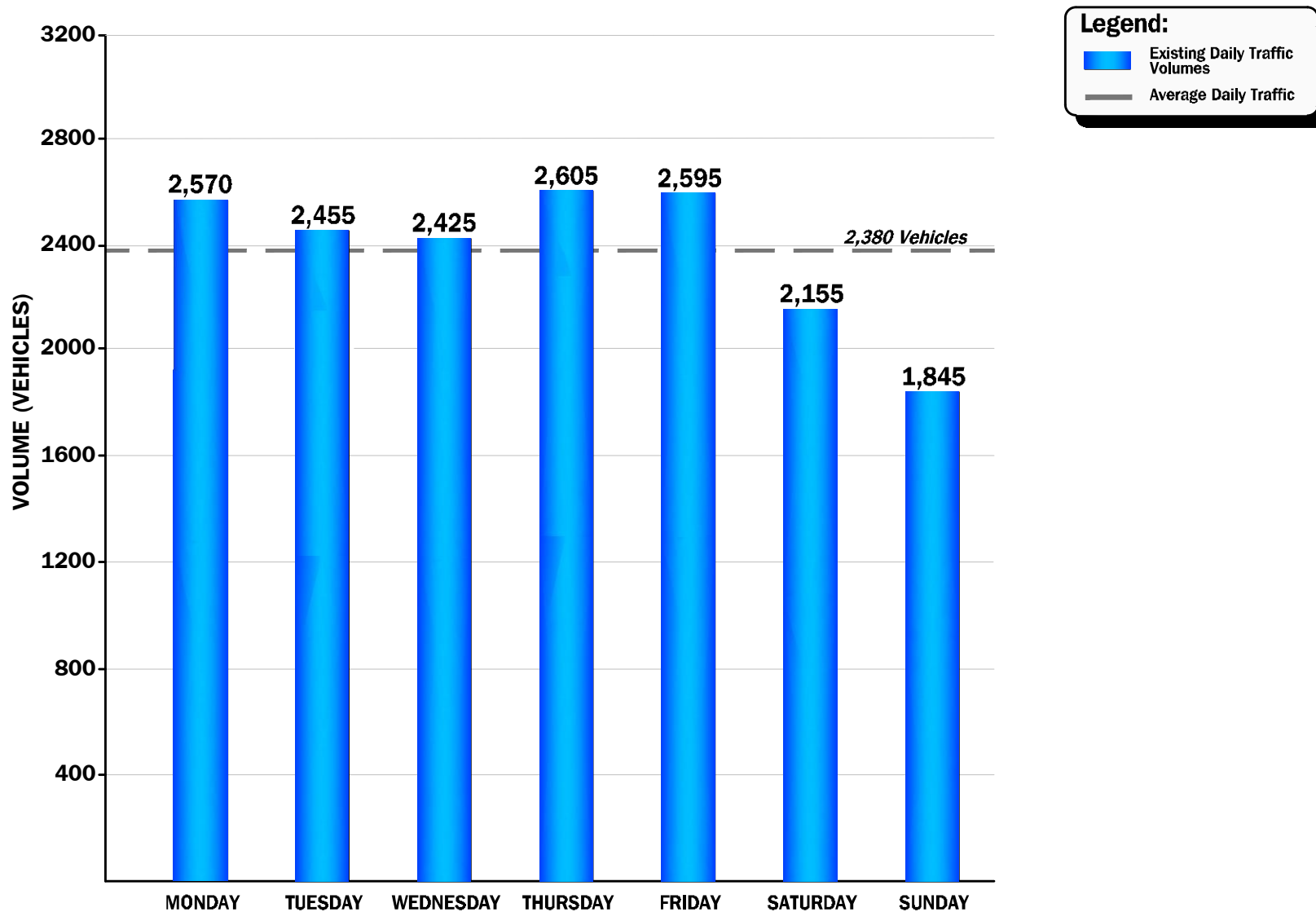


Figure 8

Existing 2021 Average-Month
Average Daily Traffic Volumes
Landmark Drive

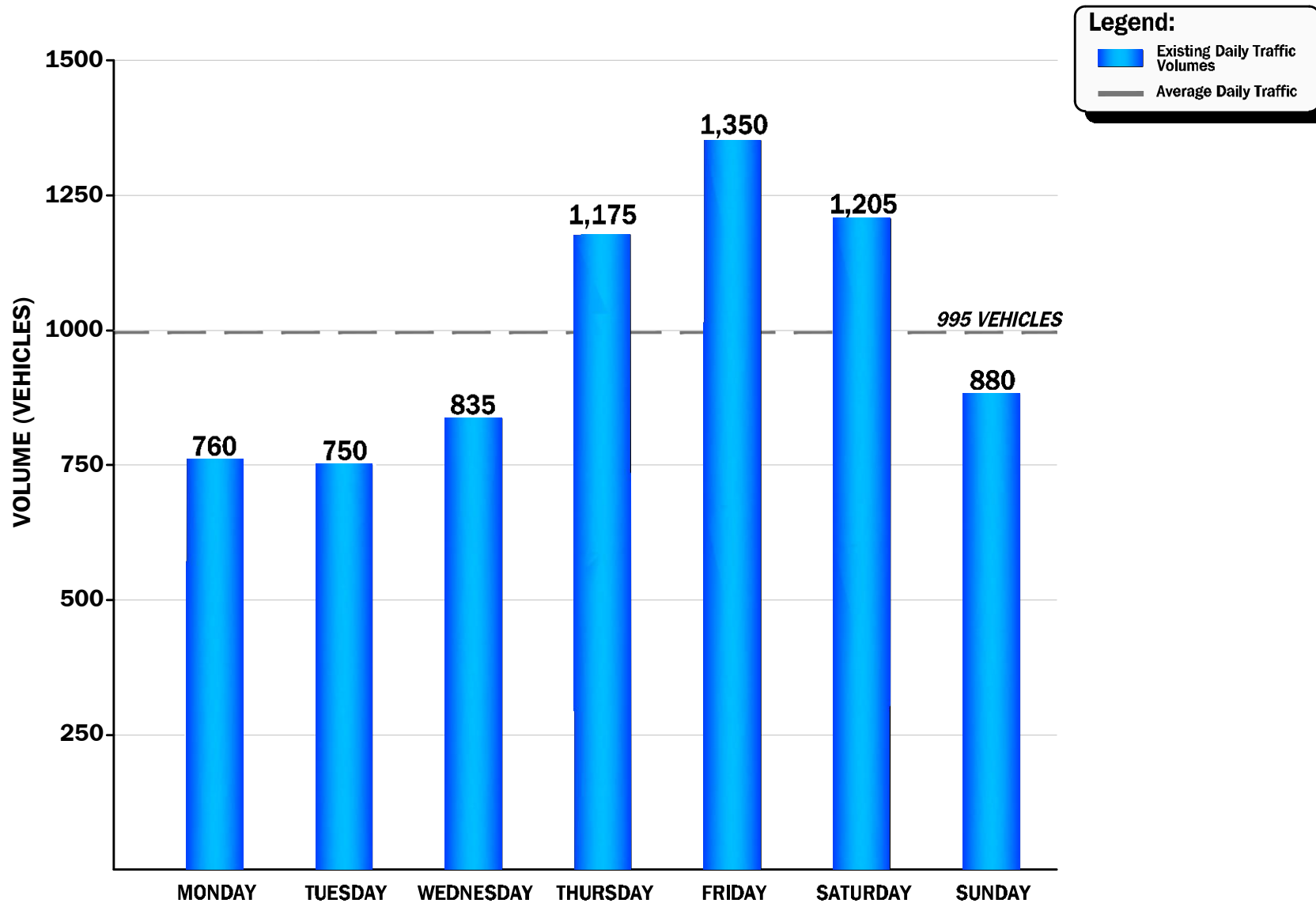


Figure 9

Existing 2021 Average-Month
Average Daily Traffic Volumes
Clubhouse Drive

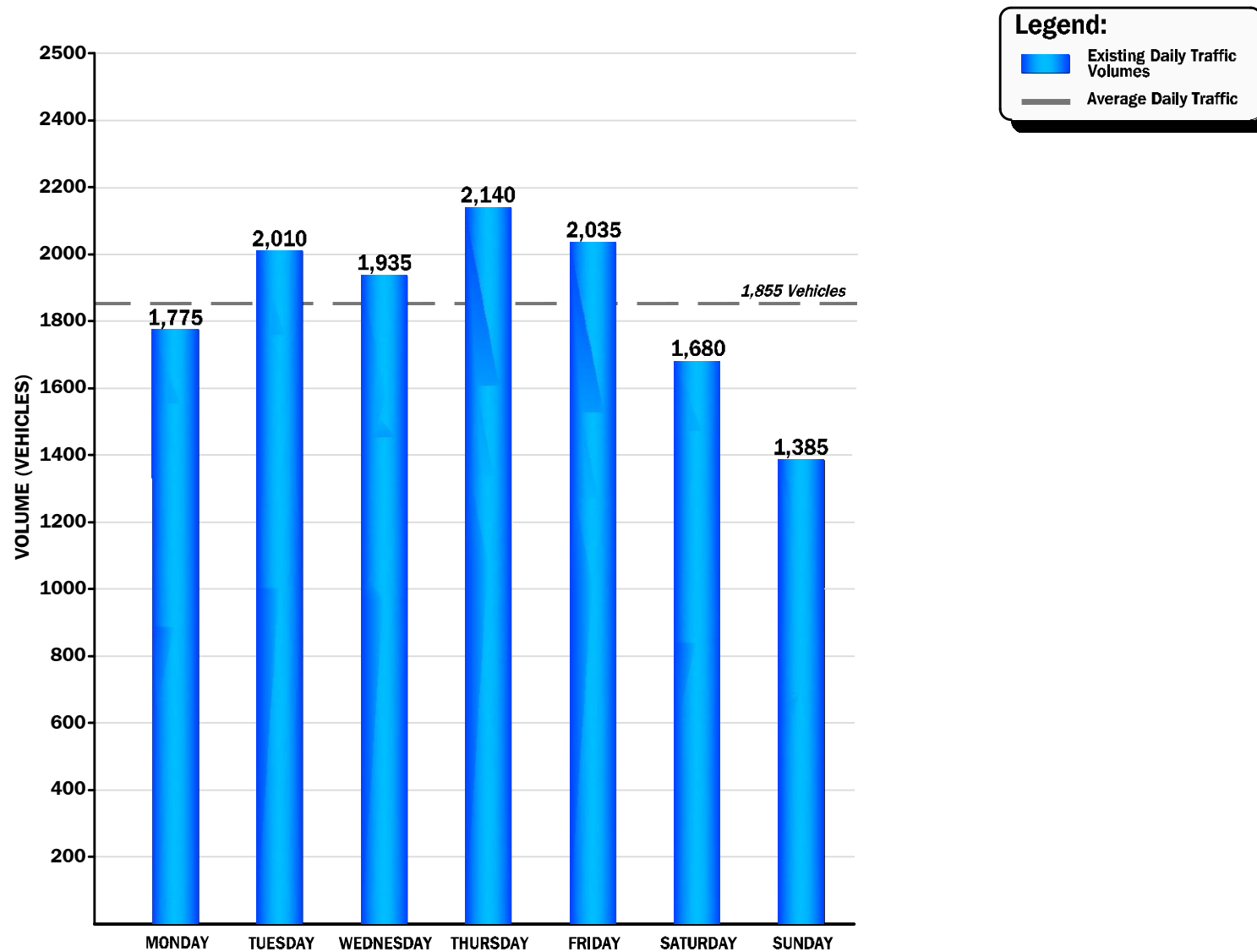


Figure 10

**Existing 2021 Average-Month
Average Daily Traffic Volumes
Great Island Road**

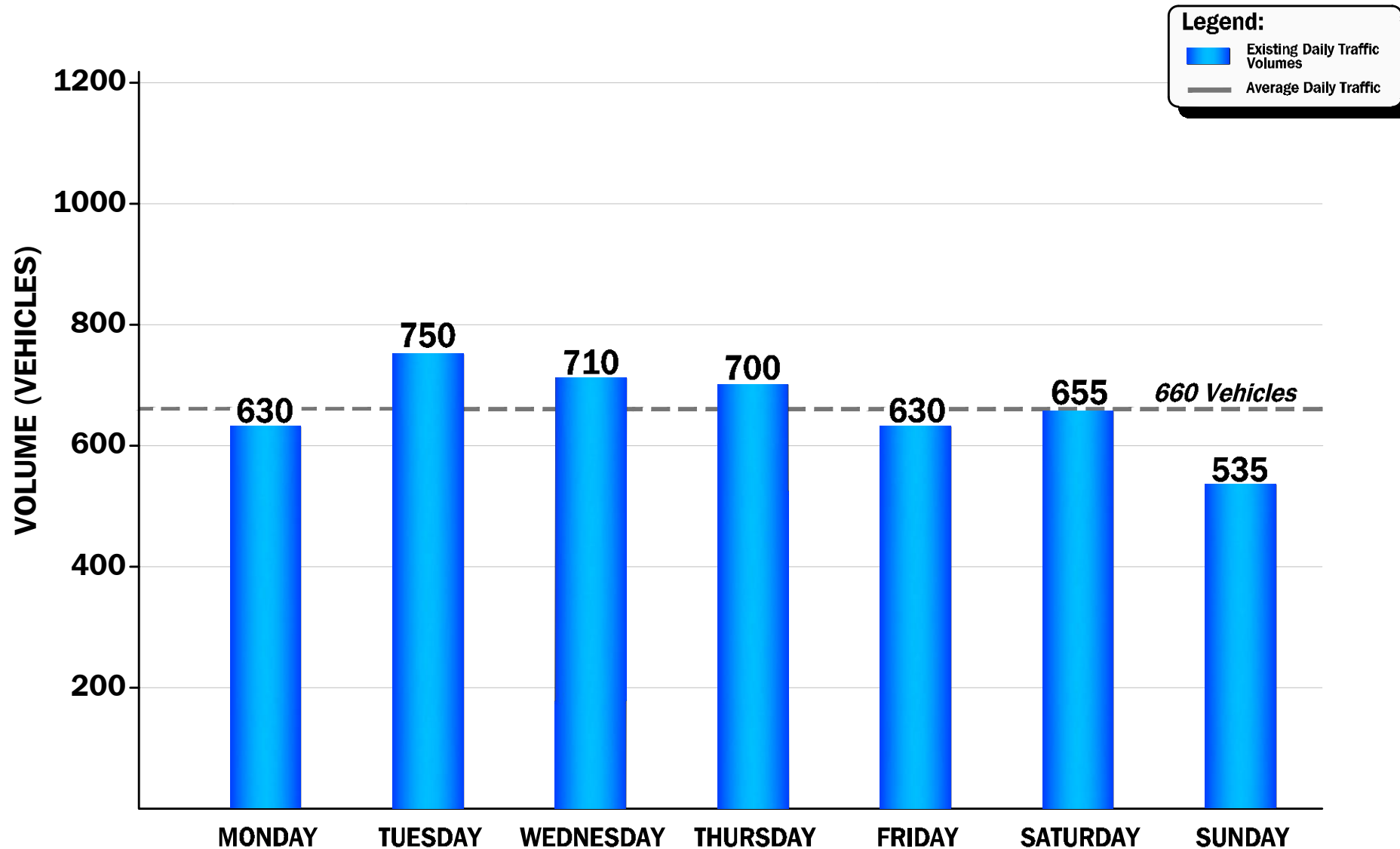


Figure 11

Existing 2021 Average-Month
Average Daily Traffic Volumes
Little Island Road

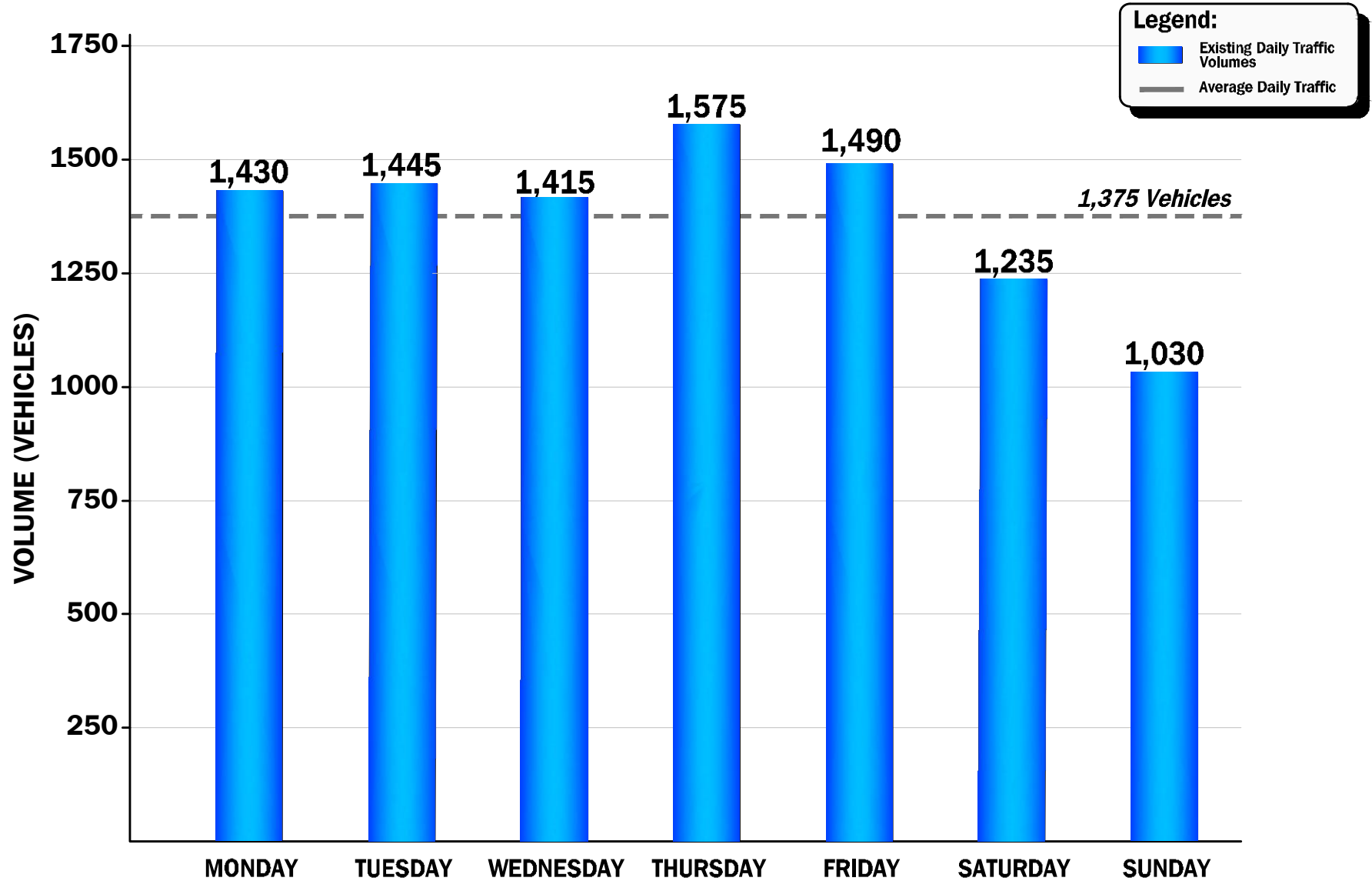


Figure 12

Existing 2021 Average-Month
Average Daily Traffic Volumes
Long Ridge Road

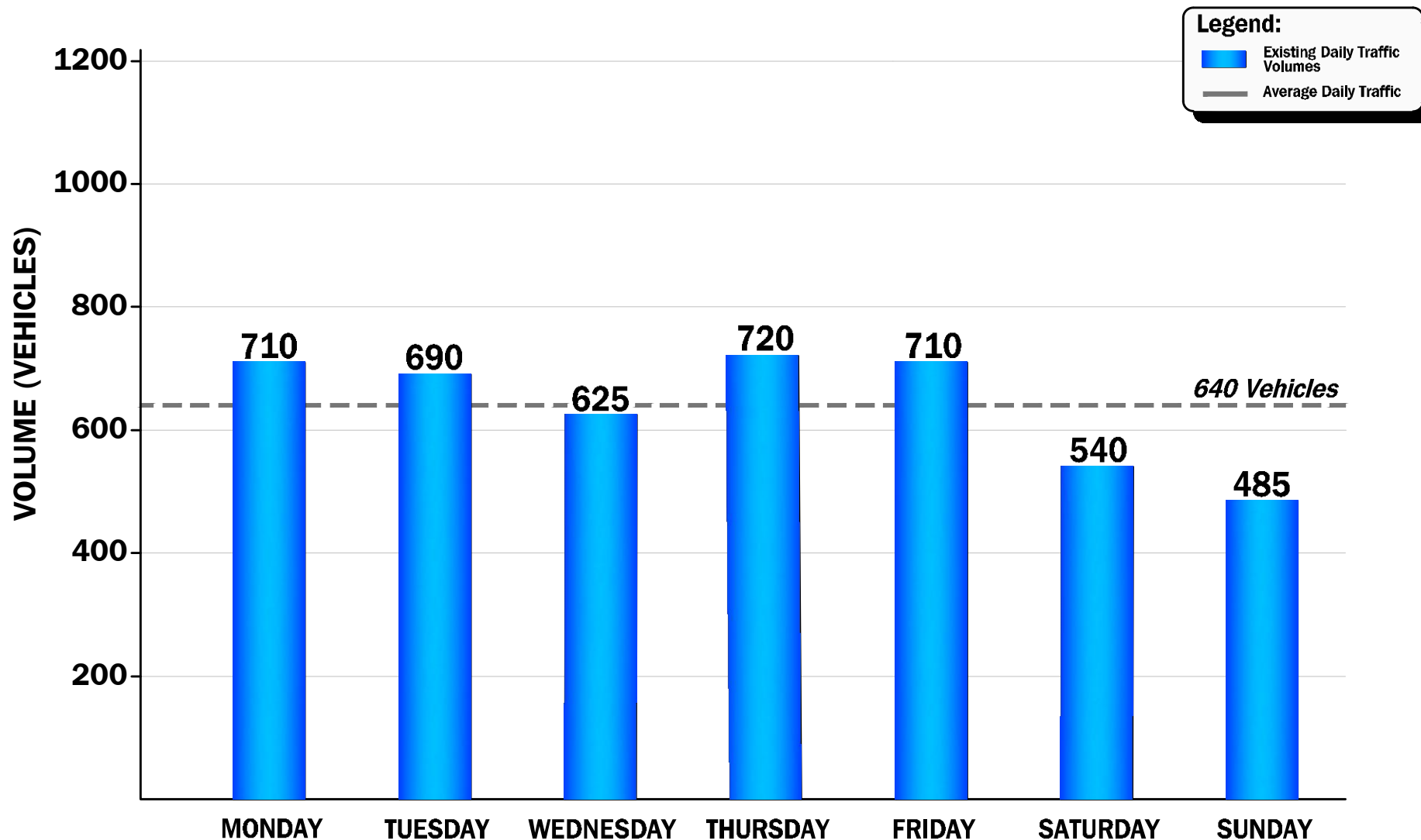


Figure 13

Existing 2021 Average-Month
Average Daily Traffic Volumes
Old Tavern Trail, East of
Old Sandwich Road

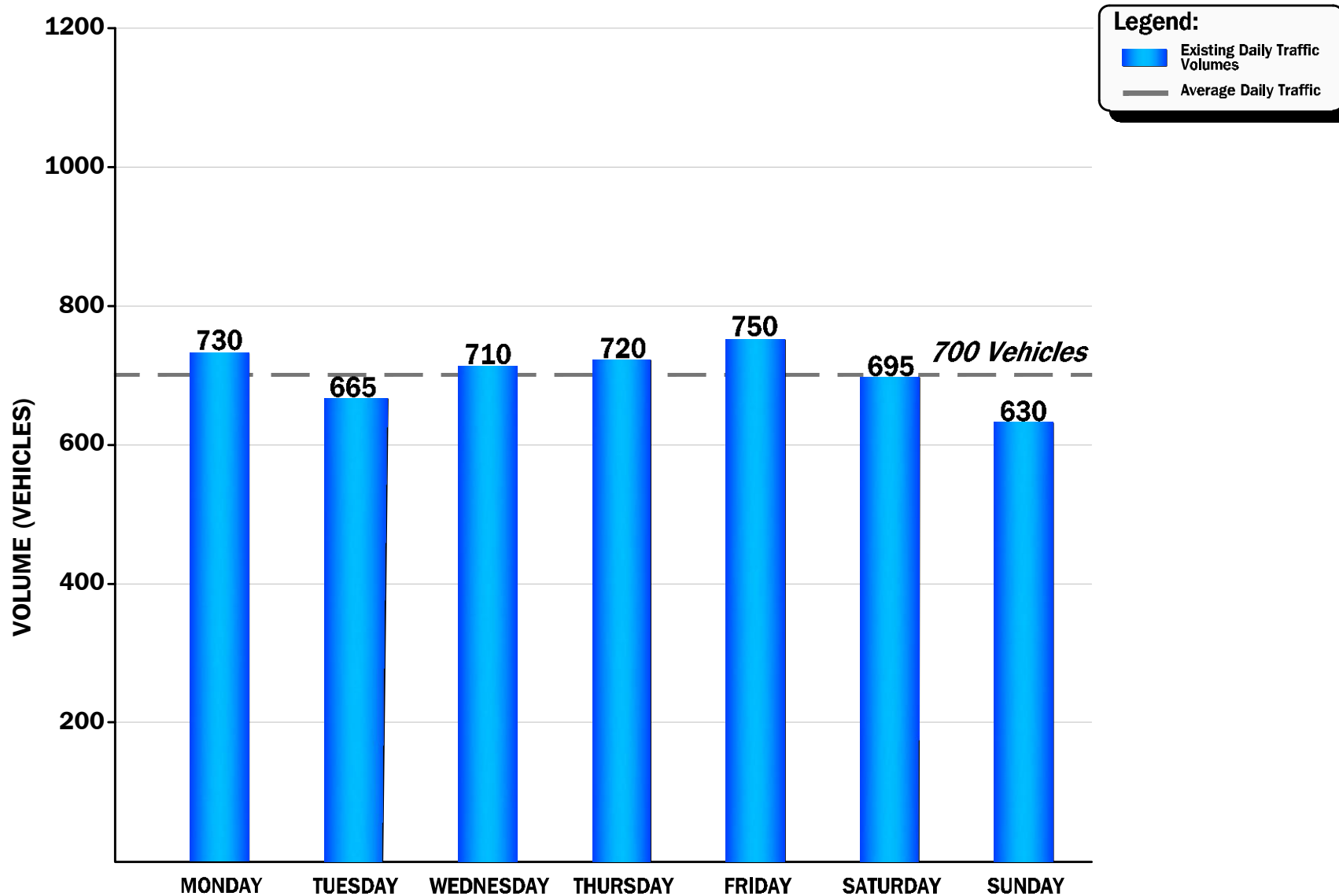


Figure 14

Existing 2021 Average-Month
Average Daily Traffic Volumes
Old Tavern Trail, West of
Old Sandwich Road

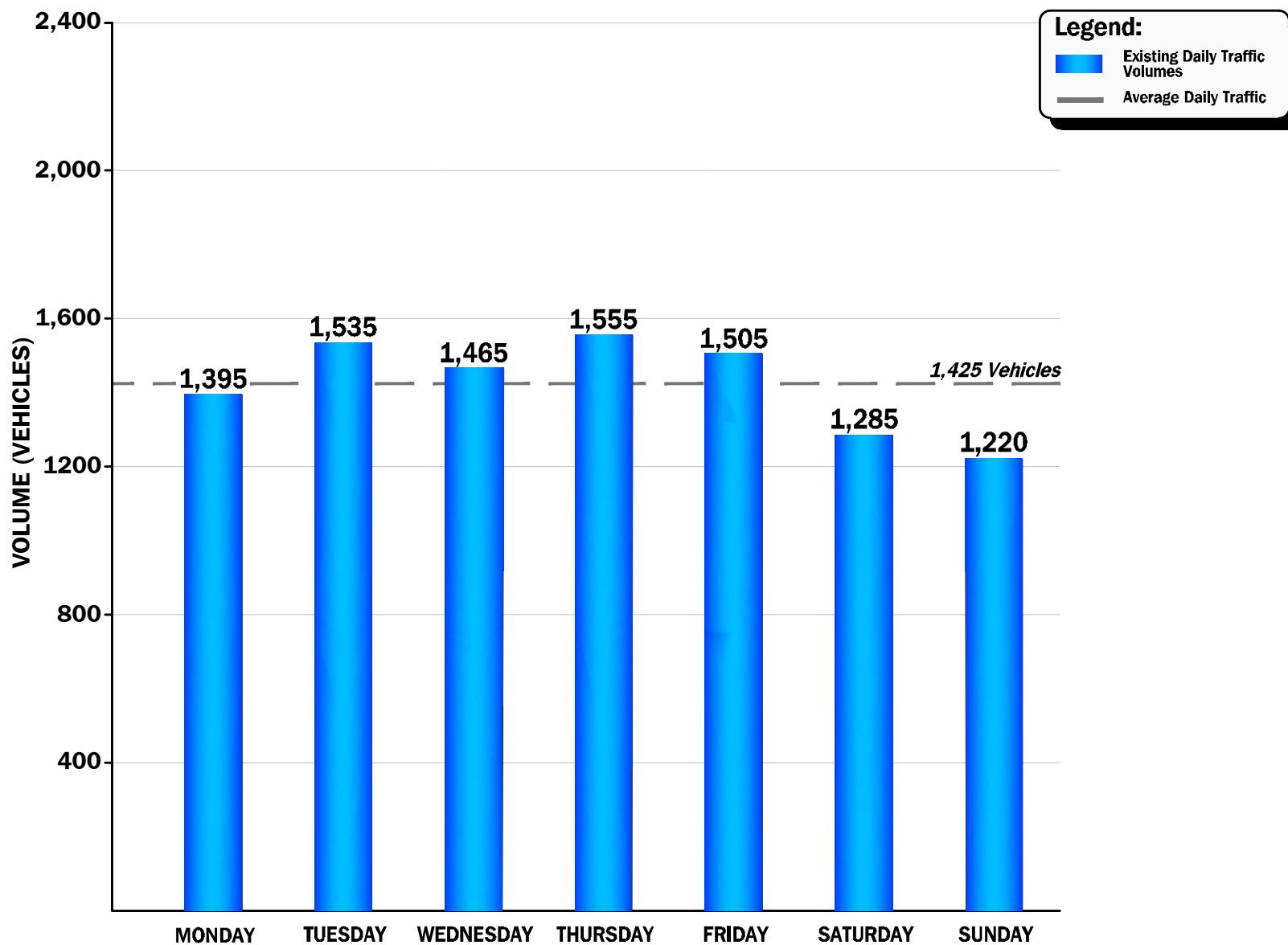


Figure 15

Existing 2021 Average-Month
Average Daily Traffic Volumes
Stonebridge Road

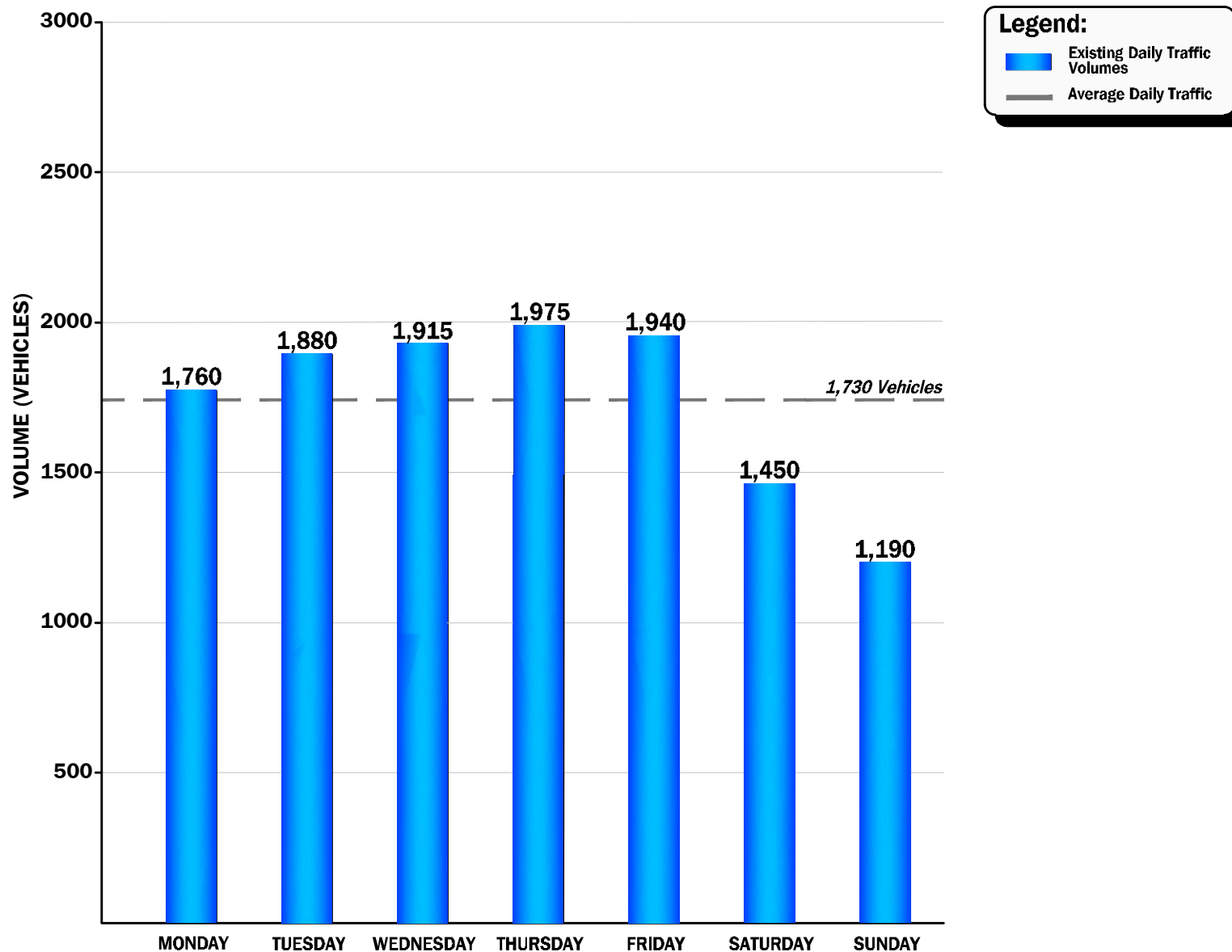


Figure 16

Existing 2021 Average-Month
Average Daily Traffic Volumes
Sacrifice Rock Road

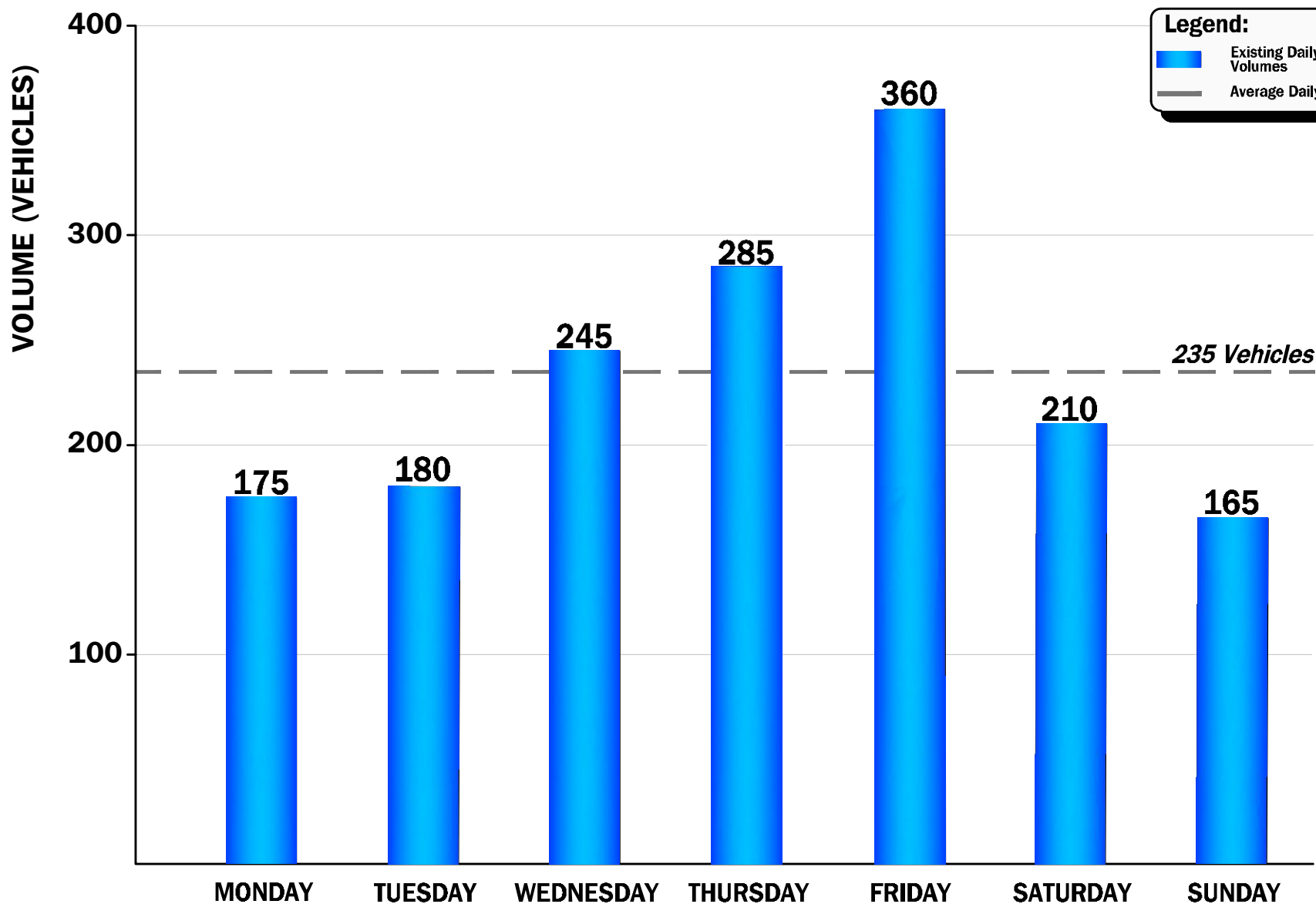


Figure 17

Existing 2021 Average-Month
Average Daily Traffic Volumes
The Pines Drive

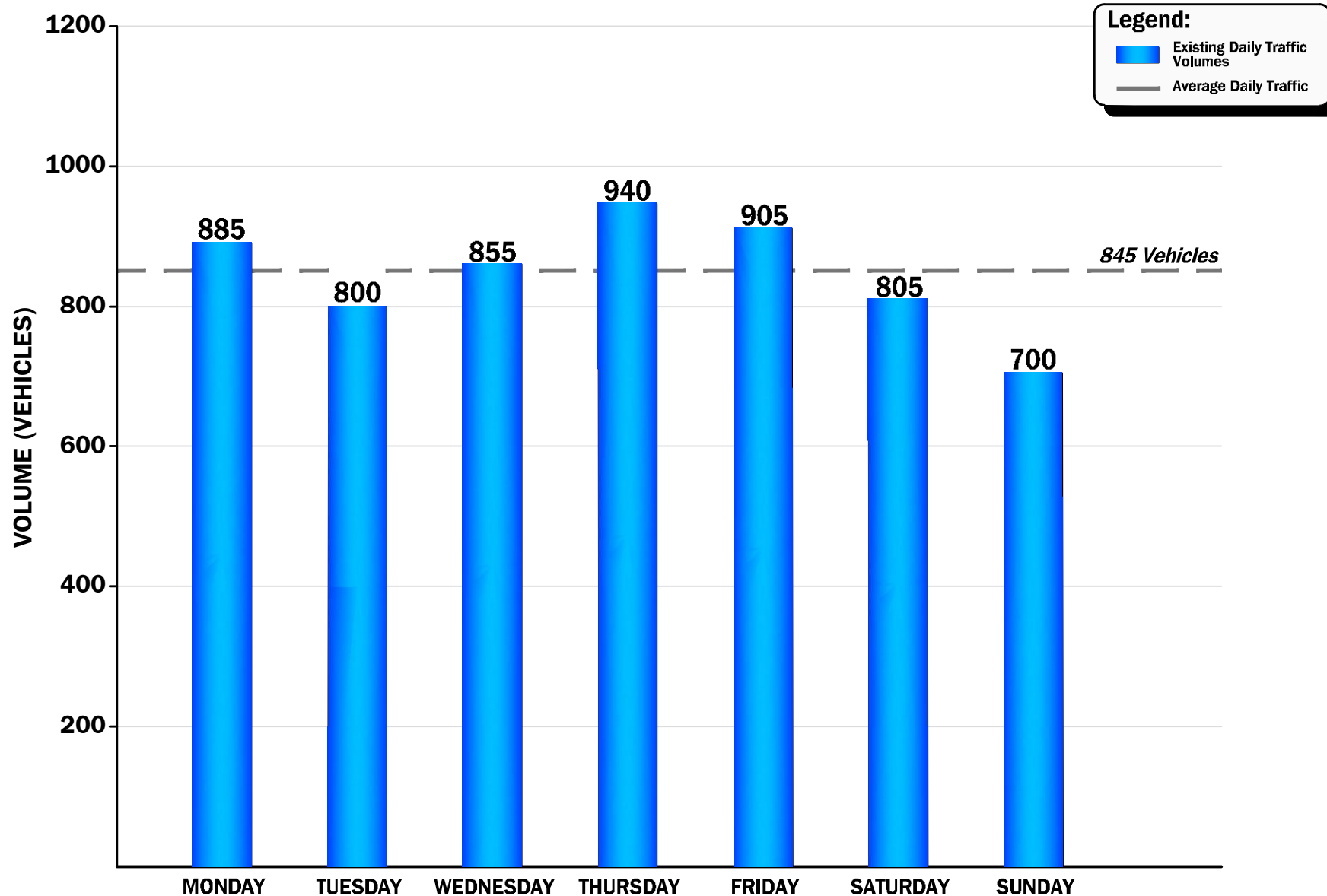


Figure 18

Existing 2021 Average-Month
Average Daily Traffic Volumes
Mainstone Boulevard