

MEMORANDUM

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Office of Transportation Planning
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FROM: Mr. Jeffrey S. Dirk, P.E., PTOE, FITE
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DATE: February 3, 2023 **REF:** 2073

SUBJECT: The Pinehills – 2022 Traffic Monitoring Program
Plymouth, Massachusetts

Pinehills LLC and Vanasse & Associates, Inc. (VAI) are pleased to submit the results of the 2022 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 2022 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, the interconnected network of sidewalks, pathways and walking trails has been expanded to connect the residential neighborhoods to the Village 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 2022 Traffic Monitoring Program have indicated the following:

1. As configured and occupied as of October 2022, The Pinehills was shown to generate approximately 19,820 vehicle trips on an average weekday and approximately 16,340 vehicle trips on a Saturday (both two-way, 24-hour volumes), with approximately 1,264 vehicle trips during the weekday morning peak-hour, 1,772 vehicle trips during the weekday evening peak-hour and approximately 1,443 vehicle trips during the Saturday midday peak-hour;



2. The actual measured (October and November 2022) traffic volumes associated with The Pinehills were found to be approximately 4 percent below the projected traffic volumes for the community on an average weekday and 19 percent below the projections on a Saturday. During the peak hours, the measured traffic volumes were found to be approximately less than 1 percent above the projected traffic volumes during the weekday morning peak-hour, 5 percent below the projected traffic volumes during the weekday evening peak-hour and approximately 29 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 1.1 and 4.6 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 (an average weekday daily and Saturday traffic volume of 260 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, motorist delays and vehicle queuing have increased within the interchange area. 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) that has improved operating conditions at the intersection and, tangentially, created gaps in the flow of traffic along Clark Road within the interchange area that afford increased opportunities for turns to and from the Route 3 ramps. 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 May 2022¹ 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 intersections.

The following summarizes the results of the 2022 Traffic Monitoring Program.

¹*Traffic Signal Warrants Analysis, Clark Road/Beaver Dam Road Corridor, Plymouth, Massachusetts; VAI; May 16, 2022.*



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 2,145 limited occupancy homes; 920 retirement homes; three (3) 18-hole golf courses; and 1.3 million square feet (sf) of commercial space (including a community retail center, apartment units, office and medical office space, a boutique hotel and spa, an assisted living residence, and recreational facilities).

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 previously 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 build-out by land use for The Pinehills at the time of completion of the traffic counts that form the basis of the 2022 Traffic Monitoring Program (October/November 2022), respectively.

Table 1
THE PINEHILLS MASTER PLAN SUMMARY

Land Use Description	Master Plan Development Program	Constructed to Date (October/November 2022)
Limited Occupancy Homes	2,145 homes	1,740 homes
Planned Retirement Homes	920 homes	726 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/November 2022)
<i>Residential Component:</i>	
Attached Homes	1,238 homes
Detached Homes	1,228 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, 693sf
Medical Office	12,139sf
<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 2022 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 2022 Traffic Monitoring Program were obtained from automatic traffic recorder (ATR) counts and turning movement counts (TMCs) conducted in October and November 2022. 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-day, week-long period in order to record the traffic characteristics of the community roadway network over an extended period, with 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 performed at the study area intersections.



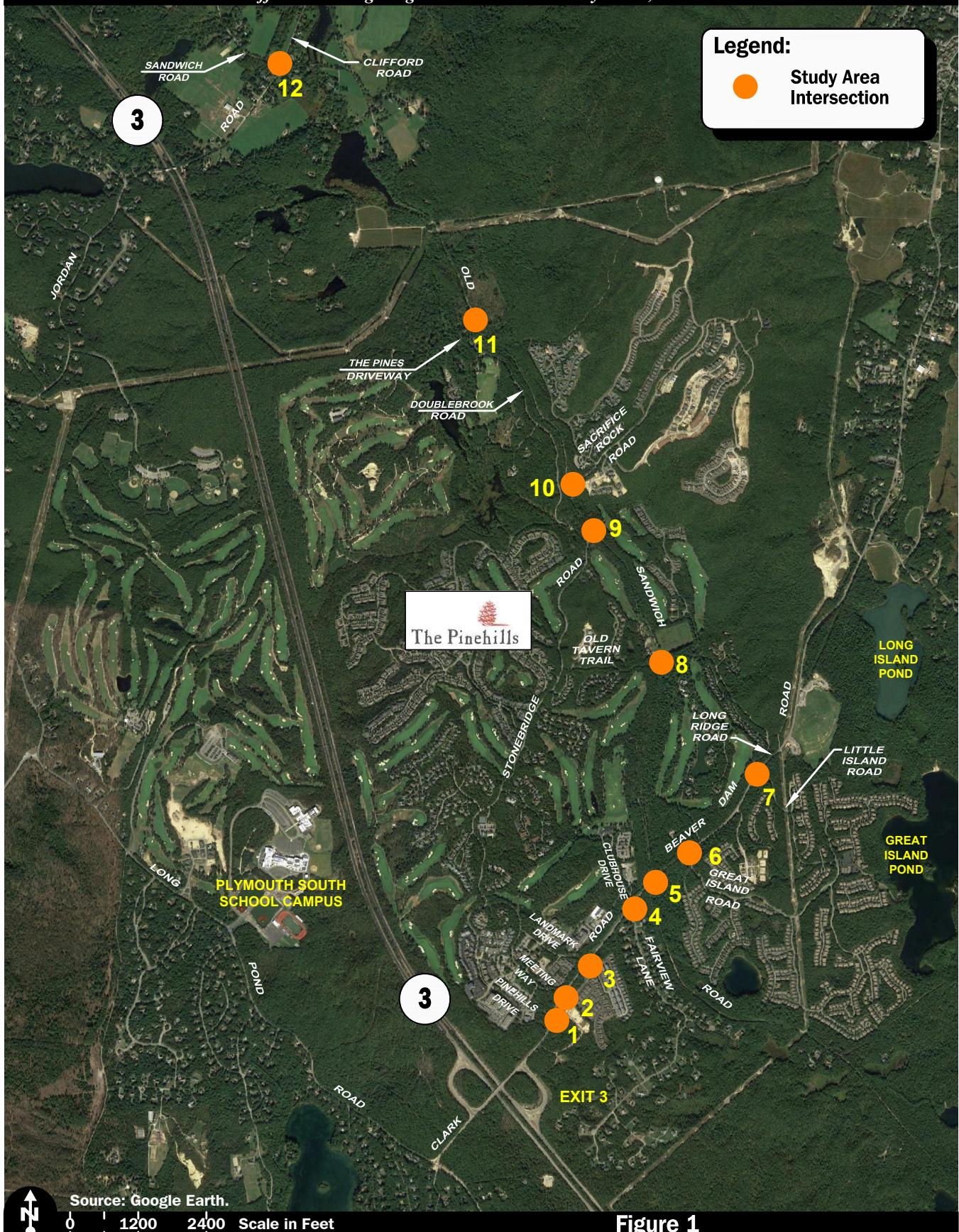


Figure 1

Study Area Map

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.² Table 3 presents the average daily traffic volumes at this count station during the months of October and November, as well as the yearly average.

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

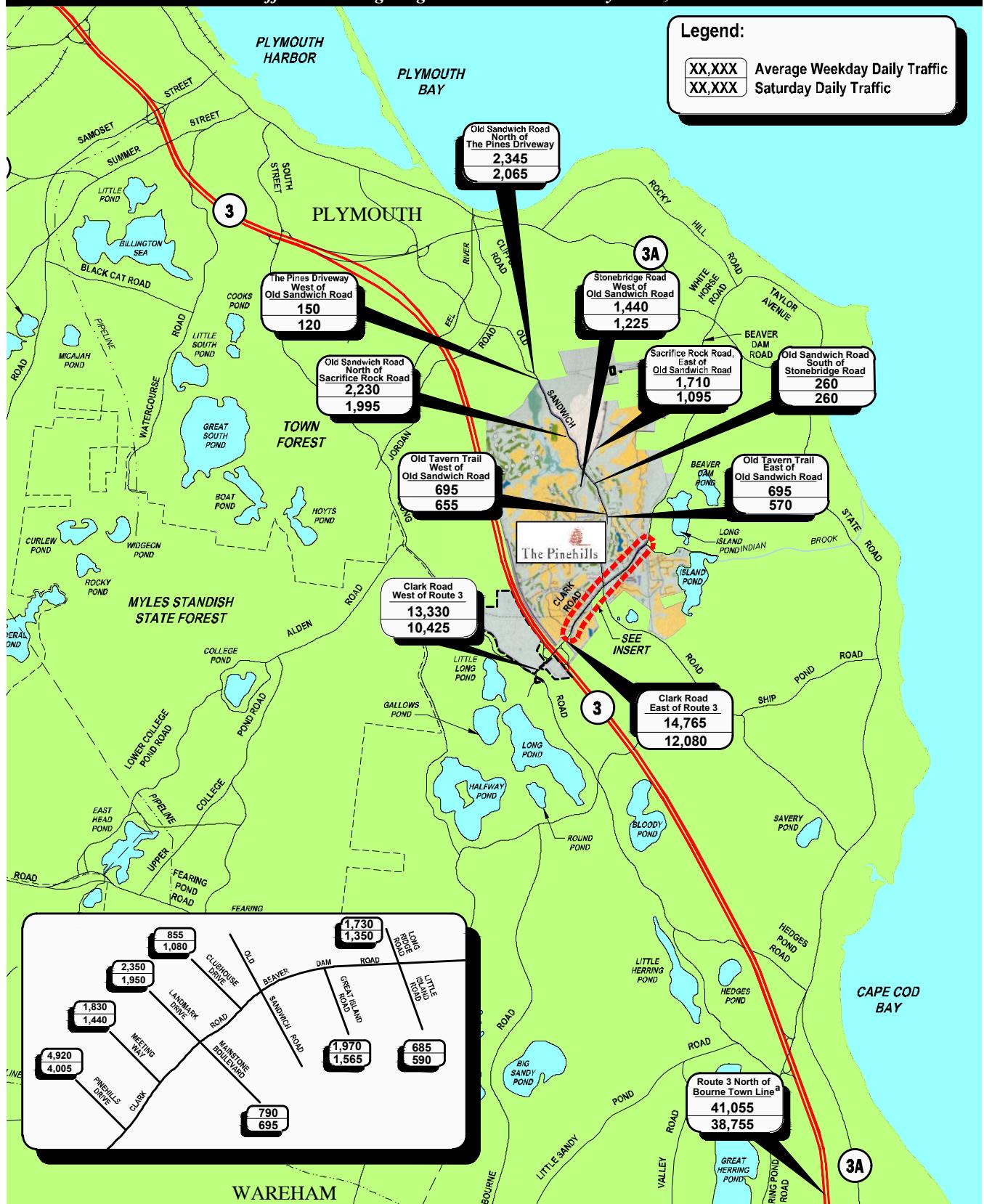
Year	Vehicles Per Day		
	October	November	Yearly Average
2019	39,625	37,559	40,215

The traffic-volume data obtained from the count station shown in Table 3 indicates that traffic volumes for the months of October and November are approximately 1.5 and 7.1 percent below average-month conditions, respectively. In order to allow for a comparison between the 2022 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 and the November traffic volumes were adjusted upward by 7.1 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 and November 2022 were compared to data collected at the same count station in October and November 2019. 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 1.8 percent above the October 2022 average-month traffic volumes, and approximately 0.4 percent above the November 2022 average-month traffic volumes and, therefore, a COVID-19 adjustment was not applied (or necessary) to the 2022 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 2022 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.

²MassDOT 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.

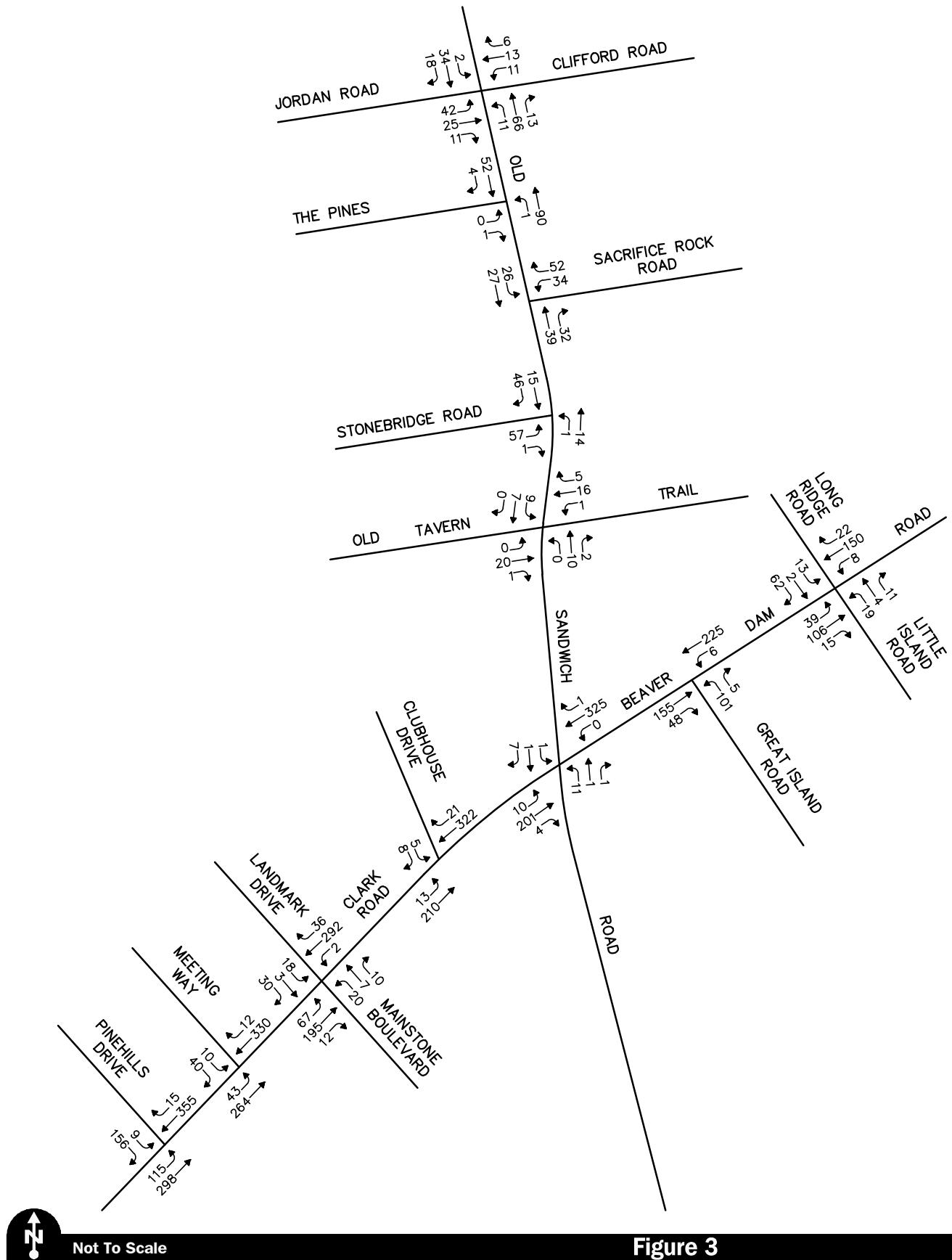


^aBased on the most recent traffic data available (2022) for MassDOT permanent count station 20.

Not To Scale

Figure 2

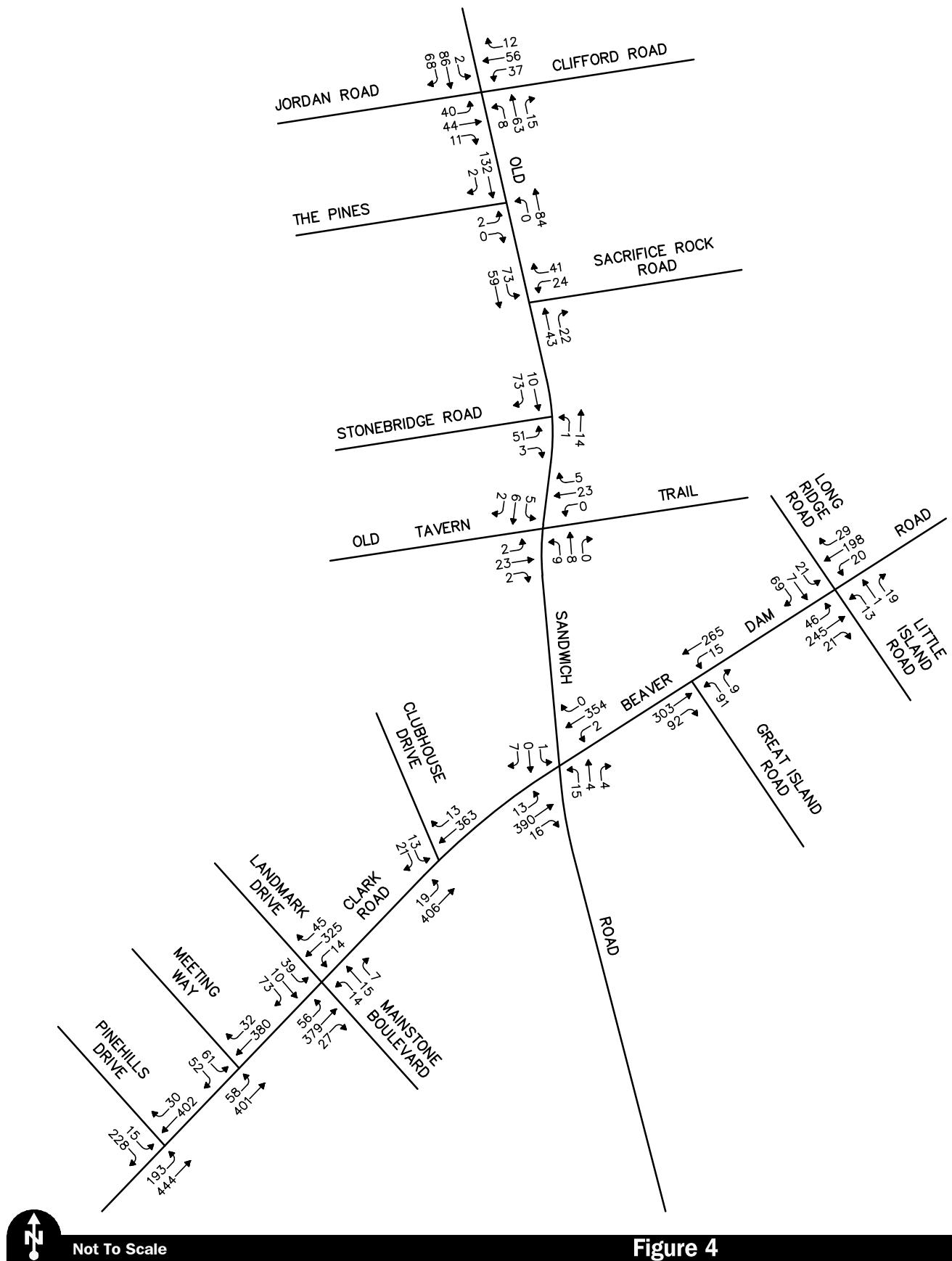
2022 Average-Month
Average Weekday and Saturday
Traffic Volumes



Not To Scale

Figure 3

2022 Existing Average-Month Weekday Morning Peak-Hour Traffic Volumes



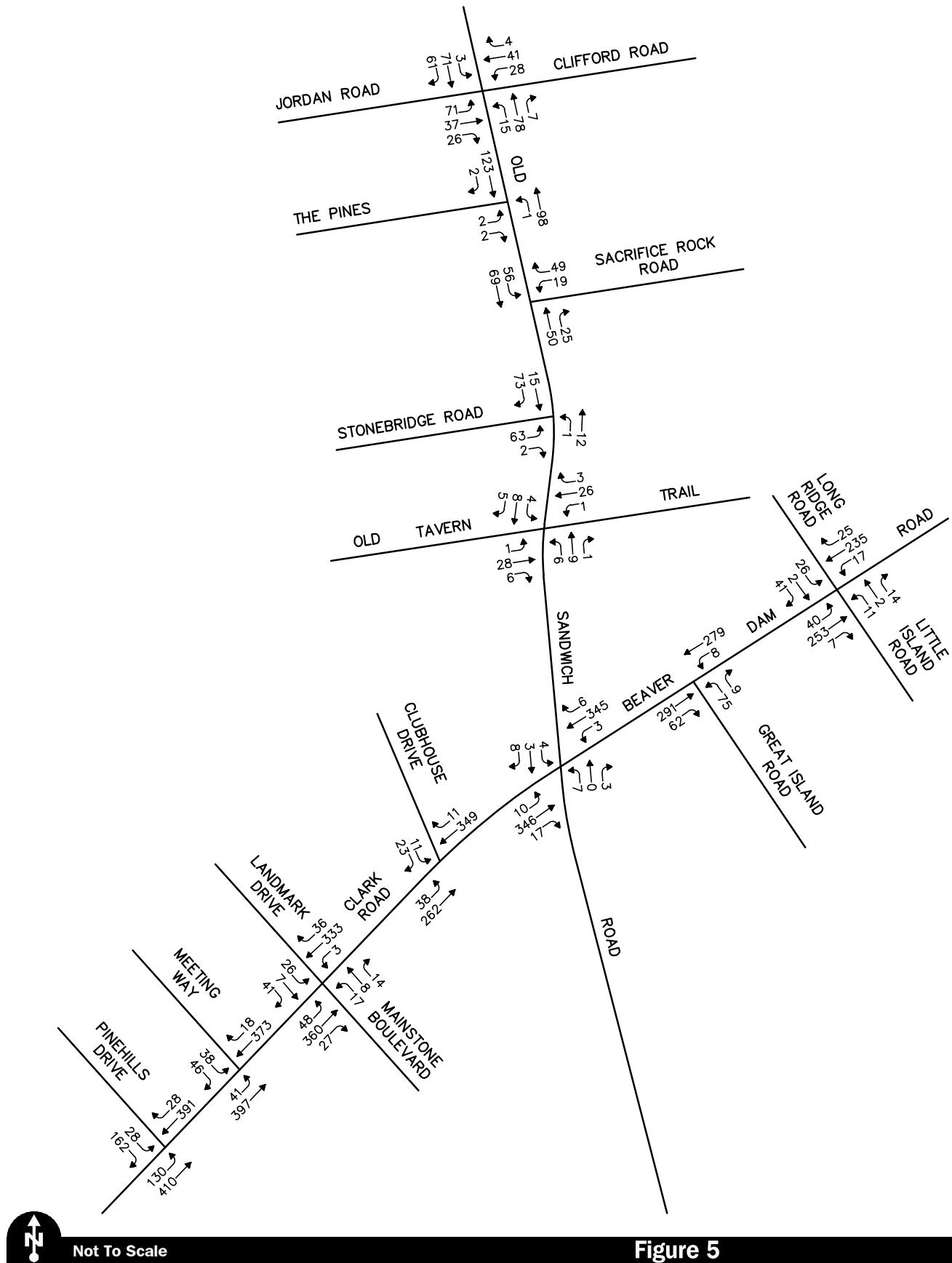
Not To Scale

Figure 4

2022 Existing Average-Month Weekday Evening Peak-Hour Traffic Volumes



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Not To Scale

Figure 5

2022 Existing Average-Month Saturday Midday Peak-Hour Traffic Volumes



Vanasse & Associates inc

Table 4
2022 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	14,765	924	55.3% WB	1,267	50.3% EB	12,080	1,093	50.6% WB
Clark Road, west of Route 3	13,330	990	58.4% EB	1,175	60.6% WB	10,425	865	60.1% WB
Old Sandwich Road, north of The Pines driveway	2,345	146	61.6% NB	220	60.9% SB	2,065	225	55.6% SB
Old Sandwich Road, north of Sacrifice Rock Road	2,230	144	63.2% NB	216	61.1% SB	1,995	224	67.9% SB
Old Sandwich Road, south of Stonebridge Road	260	31	51.6% SB	28	53.6% NB	260	30	56.7% SB
Pinehills Drive, north of Clark Road	4920	295	55.9% SB	466	52.1% SB	4,005	348	54.6% SB
Landmark Drive, north of Clark Road	2,350	161	68.3% NB	238	51.3% SB	1,950	166	55.4% NB
Meeting Way, north of Clark Road	1,830	105	52.4% NB	203	55.7% SB	1,440	143	58.7% SB
Clubhouse Drive, north of Clark Road	855	47	72.3% NB	66	51.5% SB	1,080	83	59.0% NB
Great Island Road, south of Beaver Dam Road	1,970	160	66.3% NB	207	51.7% SB	1,565	154	54.5% NB
Little Island Road, south of Beaver Dam Road	685	59	57.6% NB	81	59.3% SB	590	53	50.9% NB
Long Ridge Road, north of Beaver Dam Road	1,730	142	54.2% SB	173	56.1% SB	1,350	136	50.7% SB
Old Tavern Trail, east of Old Sandwich Road	695	53	58.5% EB	56	50.0% EB/WB	570	63	52.4% EB
Old Tavern Trail, west of Old Sandwich Road	695	37	56.8% EB	61	55.7% WB	655	72	51.4% WB
Stonebridge Road, west of Old Sandwich Road	1,440	105	55.2% EB	128	57.8% WB	1,225	139	53.2% WB

See notes at end of table.

Table 4 (Continued)**2022 EXISTING TRAFFIC-VOLUME SUMMARY – AVERAGE-MONTH CONDITIONS**

Location	Average Weekday Daily ^a	Weekday Morning Peak Hour		Weekday Evening Peak Hour		Saturday Midday Peak Hour		
		Volume ^b	Directional Distribution	Volume	Directional Distribution	Saturday Daily ^c	Volume	Directional Distribution
Sacrifice Rock Road, east of Old Sandwich Road	1,710	144	59.7% WB	160	59.4% EB	1,095	149	54.4% EB
The Pines driveway, west of Old Sandwich Road	150	6	83.3% WB	4	50.0% EB/WB	120	7	57.1% EB
Mainstone Boulevard, south of Clark Road	790	54	68.5% NB	87	70.1% SB	695	76	51.3% 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 2022. 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 ^q
	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	2022 ^p	
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	14,765	4.1
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	13,330	2.1
Old Sandwich Road, south of Stonebridge Road	155 ^q	200	180	235	215	450	380	420	590	385	275 ^r	455	405	260	10.9
Saturday ^b															
Location	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	2022 ^p	Percent Growth ^q
Clark Road, east of Route 3	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	12,080	4.6
Clark Road, west of Route 3	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	10,425	1.1
Old Sandwich Road, south of Stonebridge Road	140	105 ^q	190	235	220	220	290	375	405	540	320	355 ^r	390	260	13.0

^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.

^pTraffic-volume data collected in October and November 2022.

^qAverage annual growth rate between 2007 and 2022.

^rEstimated 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 a 2022 average weekday daily and Saturday traffic volume of 260 vehicles per day.

THE PINEHILLS COMMUNITY TRAFFIC CHARACTERISTICS

As discussed in the previous section, ATR counts were conducted on the roadways serving The Pinehills in October and November 2022 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 Wednesday or a Friday, and the lowest traffic volumes generally occurring on a Sunday.

Table 6 presents a comparison of the 2022 measured traffic volumes on the roadways serving The Pinehills to the traffic-volume projections for the community as constructed and occupied as of October/November 2022 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 incorporated 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.

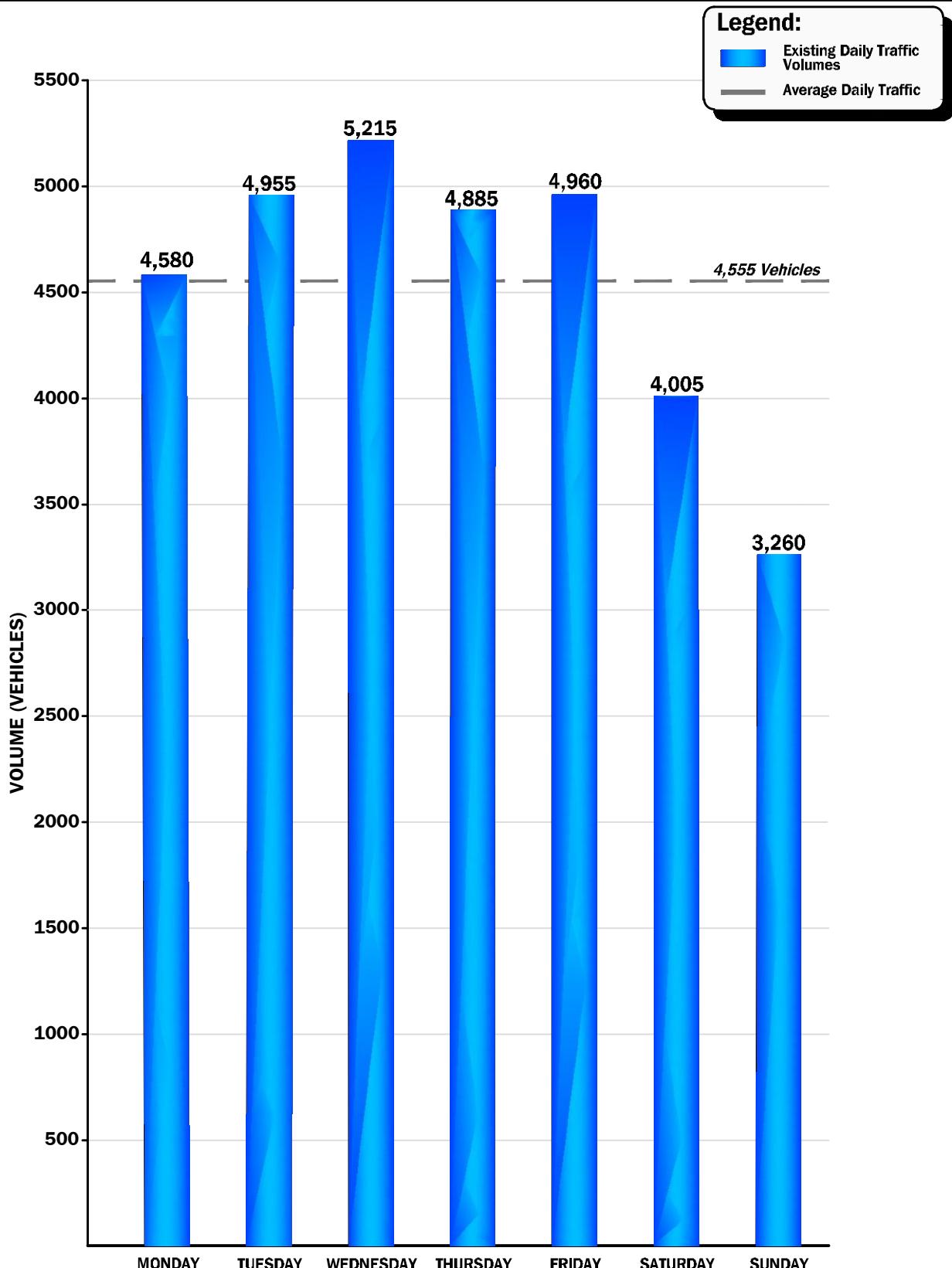


Figure 6



Existing 2022 Average-Month
Average Daily Traffic Volumes
Pinehills Drive

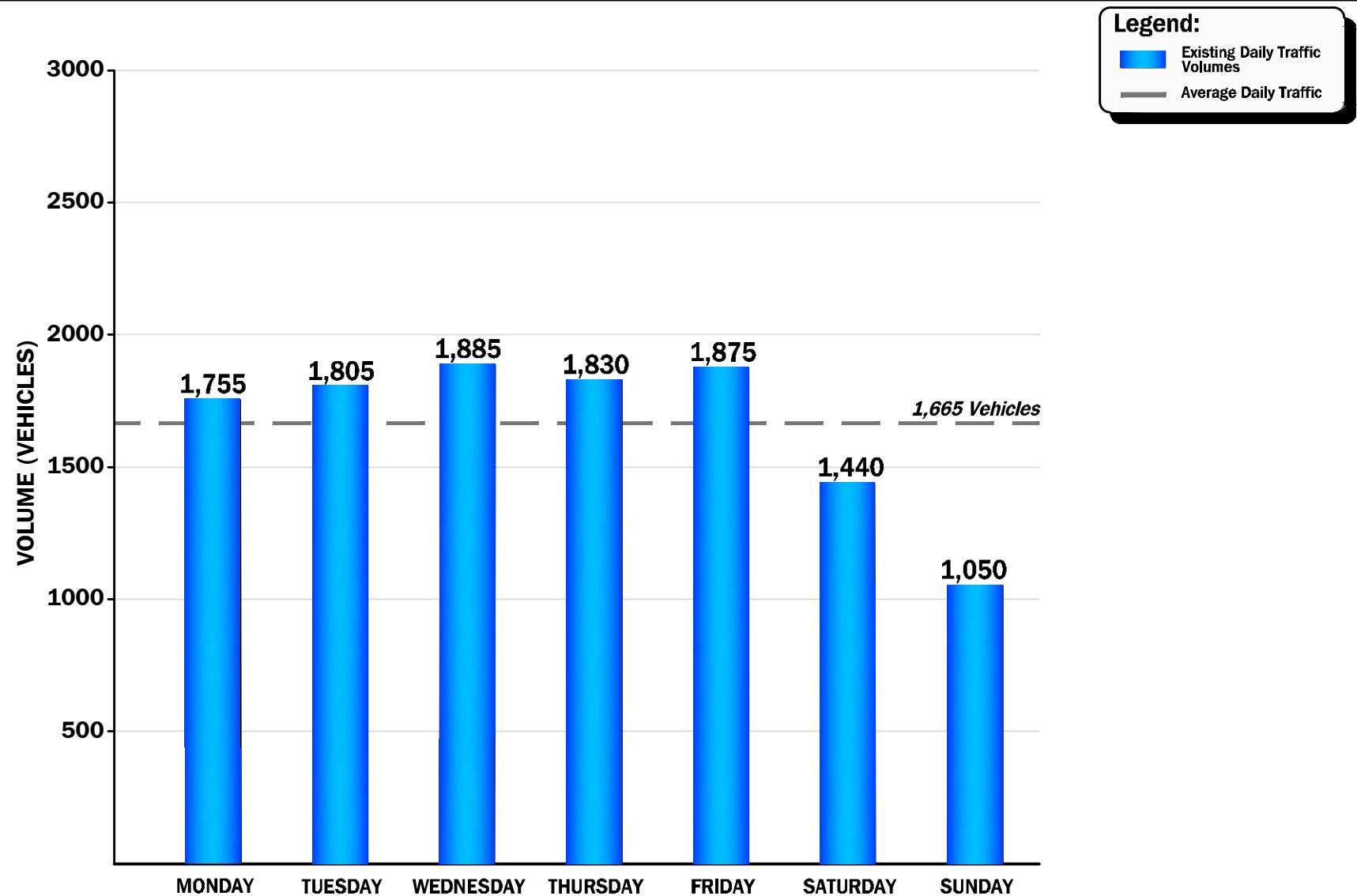


Figure 7

Existing 2022 Average-Month
Average Daily Traffic Volumes
Meeting Way

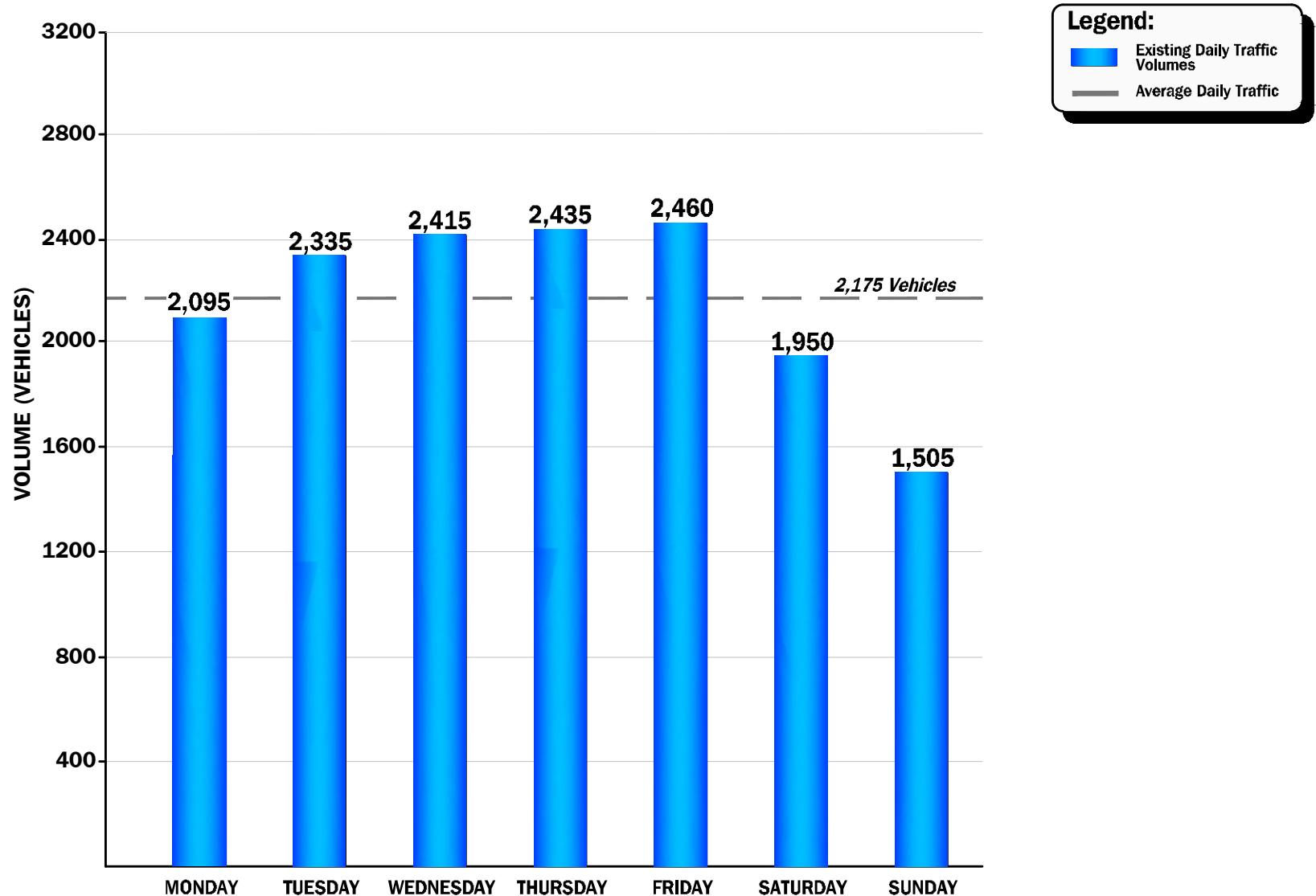


Figure 8

Existing 2022 Average-Month
Average Daily Traffic Volumes
Landmark Drive

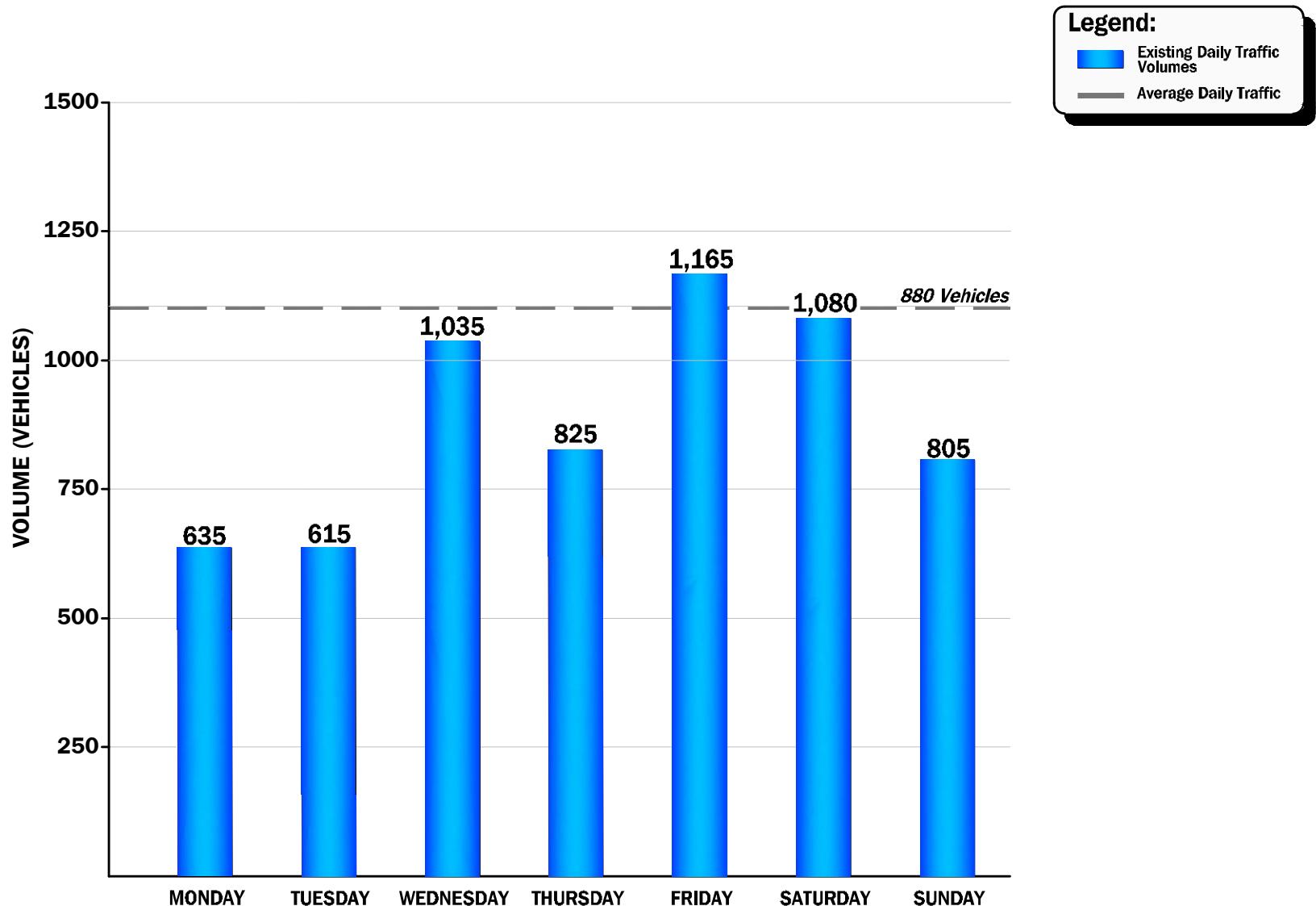


Figure 9

Existing 2022 Average-Month
Average Daily Traffic Volumes
Clubhouse Drive

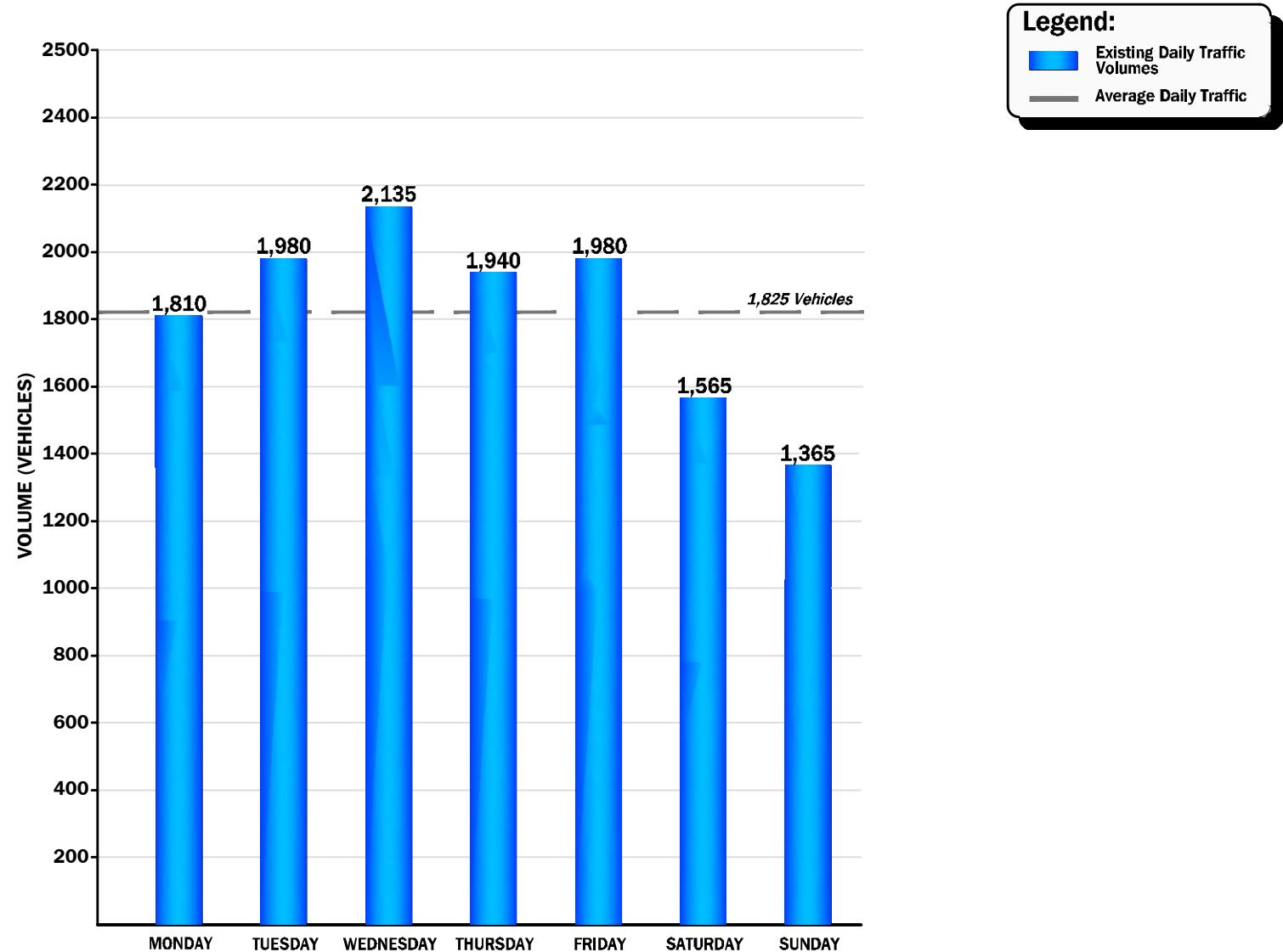


Figure 10

Existing 2022 Average-Month
Average Daily Traffic Volumes
Great Island Road

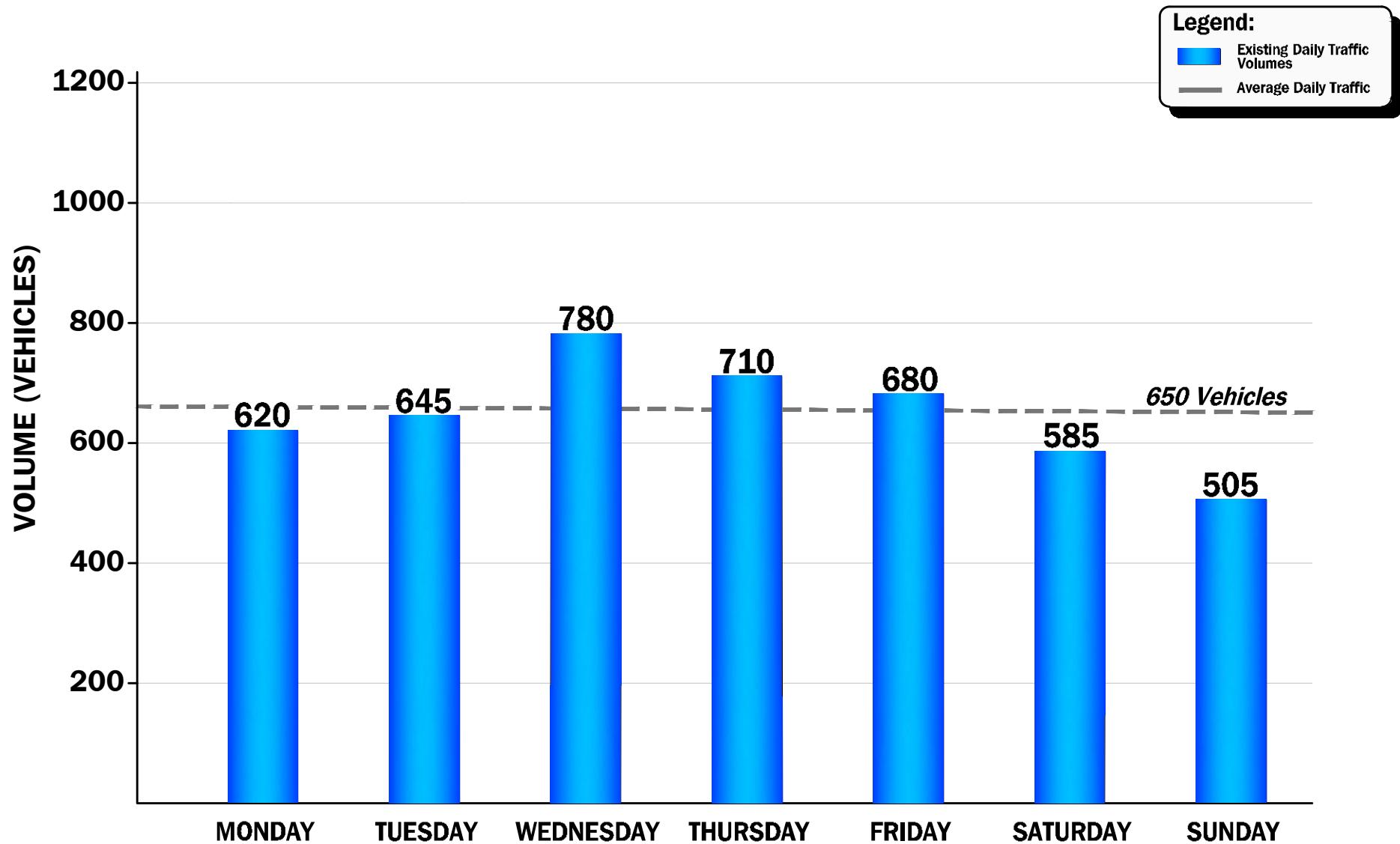


Figure 11

Existing 2022 Average-Month
Average Daily Traffic Volumes
Little Island Road

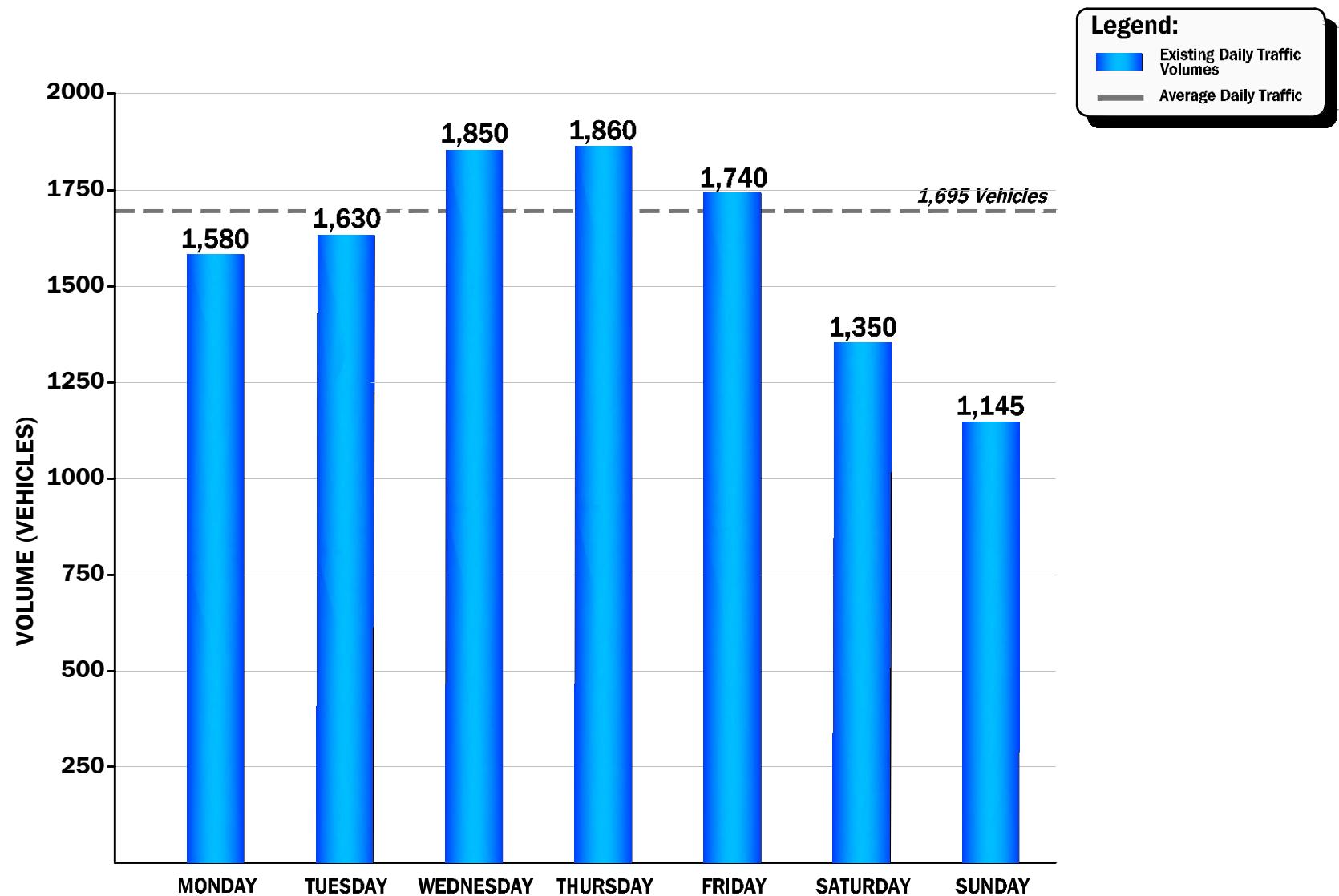


Figure 12

Existing 2022 Average-Month
Average Daily Traffic Volumes
Long Ridge Road

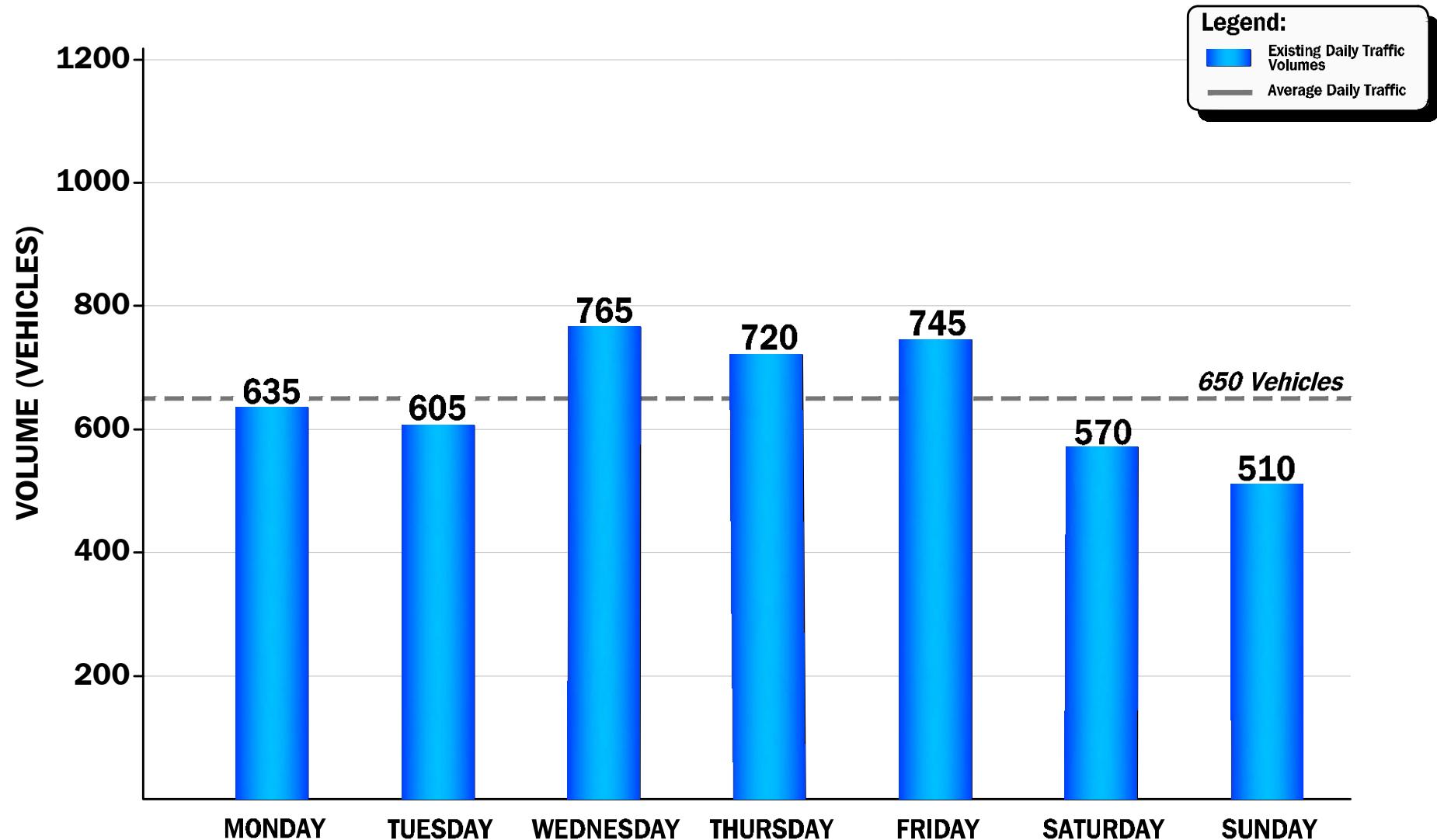


Figure 13

Existing 2022 Average-Month
Average Daily Traffic Volumes
Old Tavern Trail, East of
Old Sandwich Road



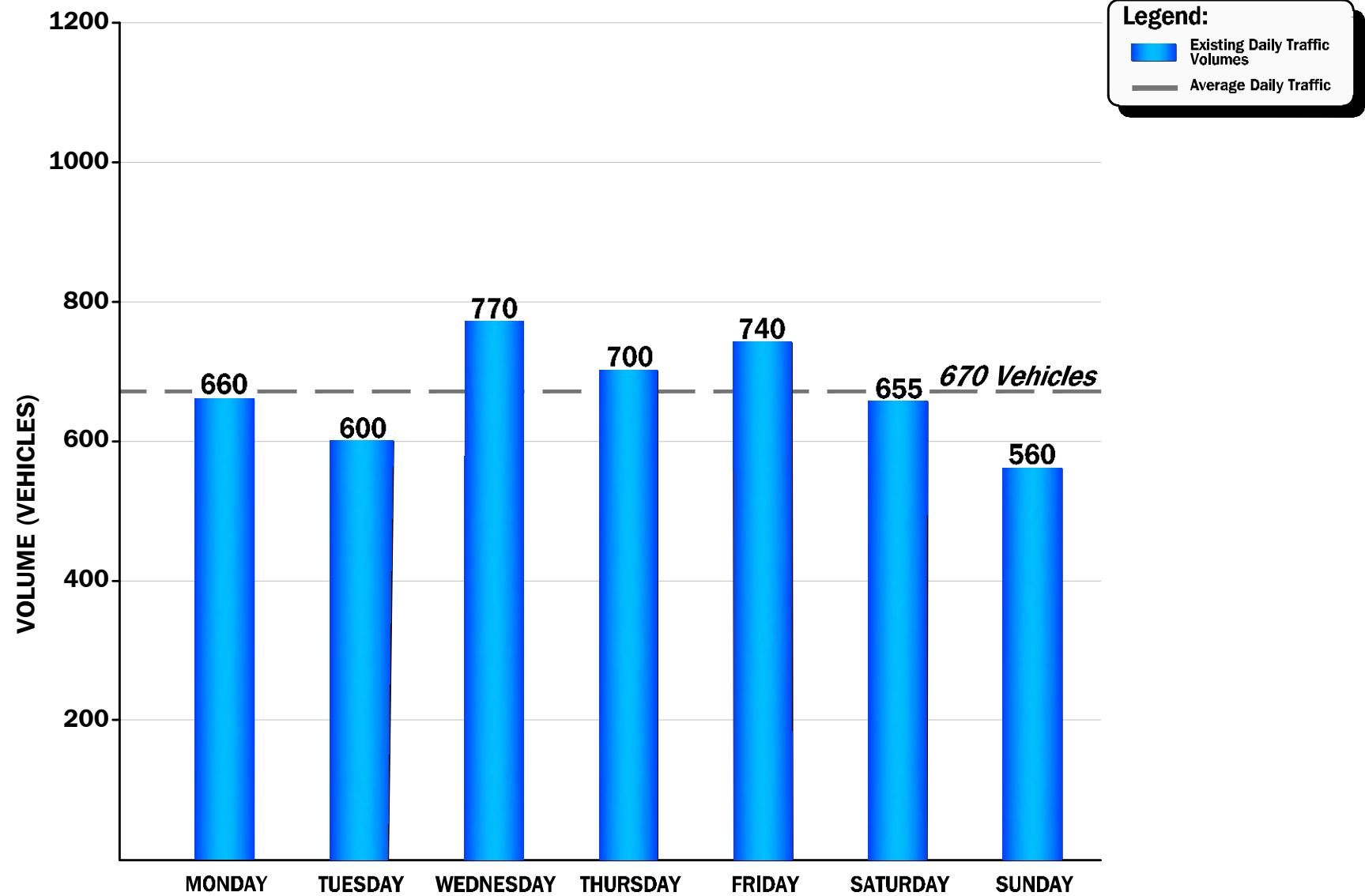


Figure 14

Existing 2022 Average-Month
Average Daily Traffic Volumes
Old Tavern Trail, West of
Old Sandwich Road



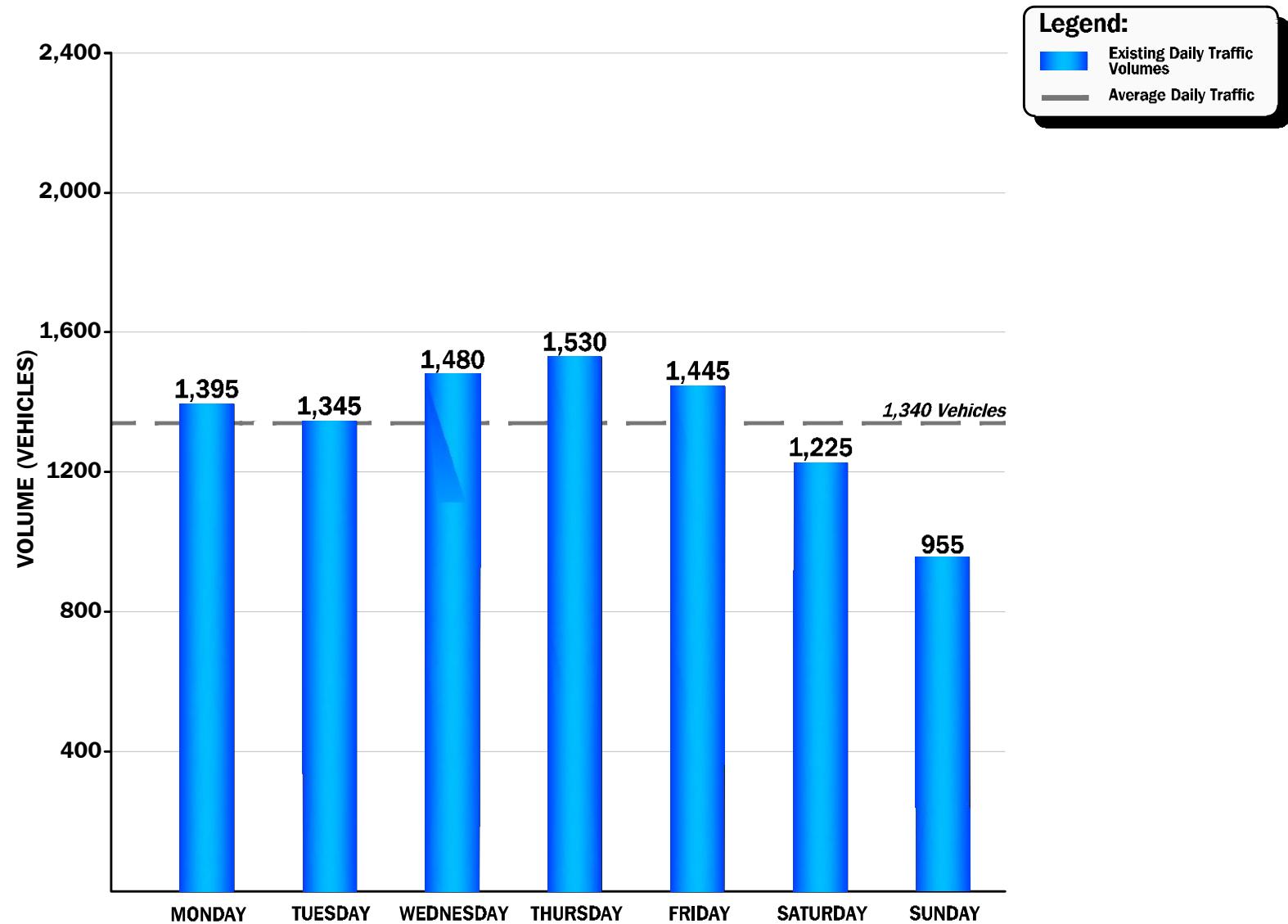


Figure 15

Existing 2022 Average-Month
Average Daily Traffic Volumes
Stonebridge Road

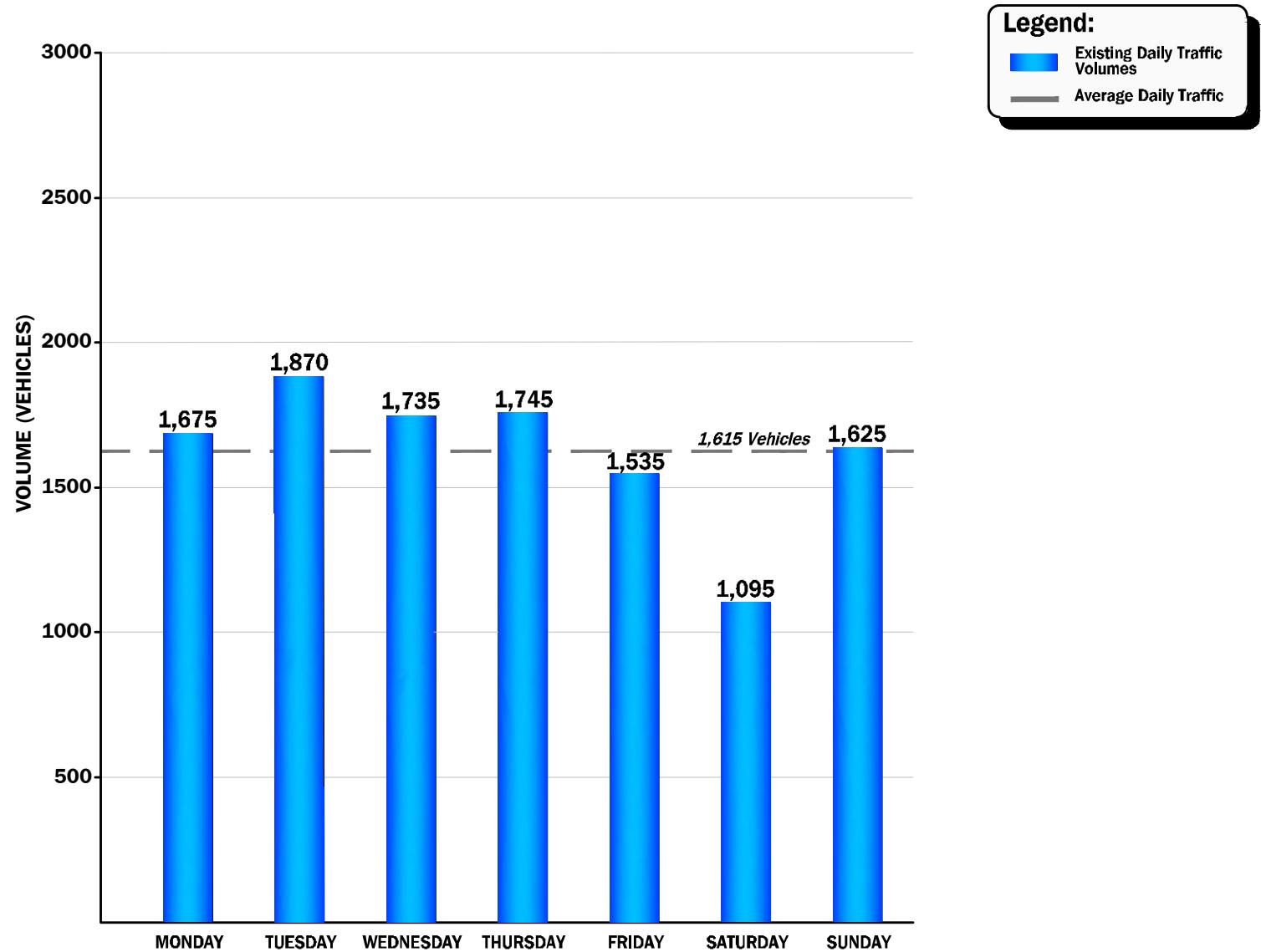


Figure 16

Existing 2022 Average-Month
Average Daily Traffic Volumes
Sacrifice Rock Road

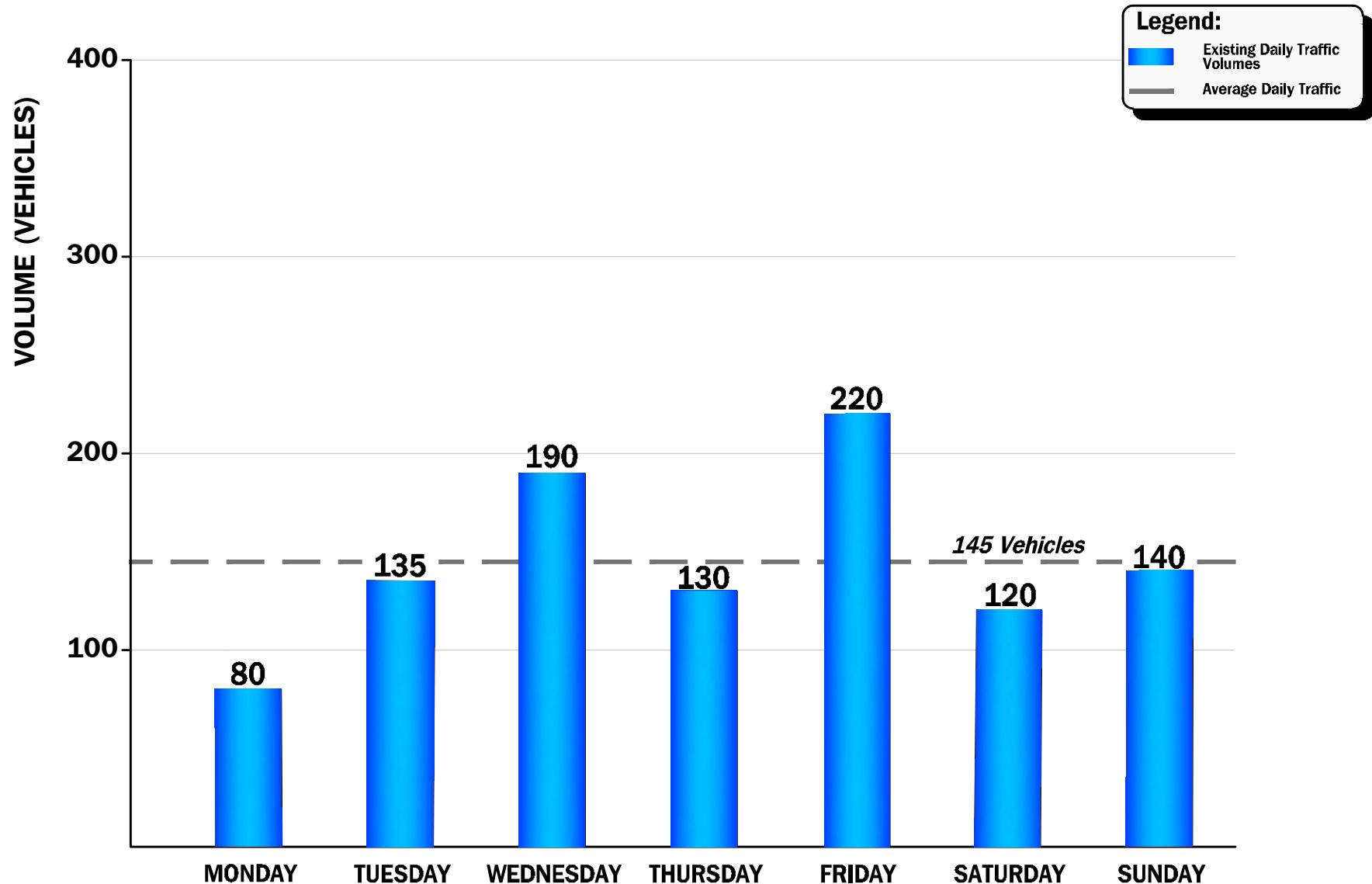


Figure 17

Existing 2022 Average-Month
Average Daily Traffic Volumes
The Pines Drive

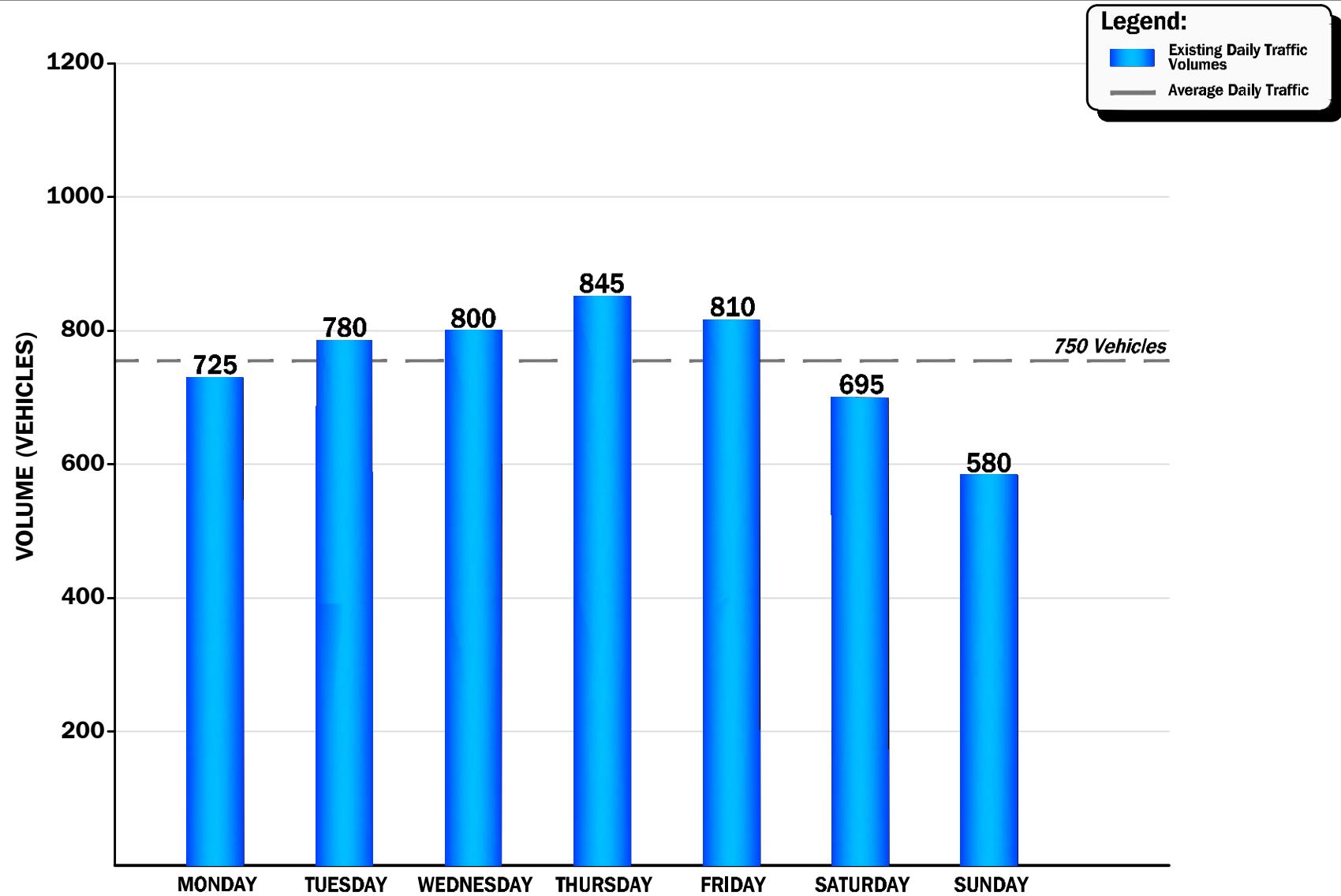


Figure 18

Existing 2022 Average-Month
Average Daily Traffic Volumes
Mainstone Boulevard

Table 6
THE PINEHILLS
TRAFFIC-VOLUME SUMMARY AND COMPARISON

Time Period/Direction	(A) 2022 Measured Traffic Volumes ^a	(B) Projected Traffic Volumes ^b	(C=A-B) Difference
Average Weekday Daily ^c	19,820	20,714	-894
<i>Weekday Morning Peak Hour:</i>			
Entering	595	640	
Exiting	<u>669</u>	<u>623</u>	
Total	1,264	1,263	+1
<i>Weekday Evening Peak Hour:</i>			
Entering	897	967	
Exiting	<u>875</u>	<u>894</u>	
Total	1,772	1,861	-89
Saturday Daily	16,340	20,160	-3,820
<i>Saturday Midday Peak Hour:</i>			
Entering	713	1,011	
Exiting	<u>730</u>	<u>1,017</u>	
Total	1,443	2,028	-585

^aSummation of traffic count data as measured in October and November 2022 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/November 2022, was shown to generate approximately 19,820 vehicle trips on an average weekday and approximately 16,340 vehicle trips on a Saturday (both two-way, 24-hour volumes) as measured on the roadways serving The Pinehills,⁴ with approximately 1,264 vehicle trips (595 vehicles entering and 669 exiting) during the weekday morning peak-hour, 1,772 vehicle trips (897 vehicles entering and 875 exiting) during the weekday evening peak-hour and 1,443 vehicle trips (713 vehicles entering and 730 exiting) during the Saturday midday peak-hour.

In comparison to the traffic-volume projections for The Pinehills as configured and occupied as of October/November 2022 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 894 vehicle trips lower on an average weekday (4 percent) and 3,820 vehicle trips lower (19 percent) on a Saturday. Peak-hour traffic volumes were found to be approximately one (1) vehicle trip higher (less than 1 percent) during the weekday morning peak-hour, 89 vehicle trips lower (5 percent) during the weekday evening peak-hour and 585 vehicle trips lower (29 percent) during the Saturday midday

⁴Inclusive 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.

peak-hour. The noted traffic-volume reductions illustrate the benefits of a master-planned community such as 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 2022 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 2022 Traffic Monitoring Program have indicated the following:

1. As configured and occupied as of October 2022, The Pinehills was shown to generate approximately 19,820 vehicle trips on an average weekday and approximately 16,340 vehicle trips on a Saturday (both two-way, 24-hour volumes), with approximately 1,264 vehicle trips during the weekday morning peak-hour, 1,772 vehicle trips during the weekday evening peak-hour and approximately 1,443 vehicle trips during the Saturday midday peak-hour;
2. The actual measured (October and November 2022) traffic volumes associated with The Pinehills were found to be approximately 4 percent below the projected traffic volumes for the community on an average weekday and 19 percent below the projections on a Saturday. During the peak hours, the measured traffic volumes were found to be approximately less than 1 percent above the projected traffic volumes during the weekday morning peak-hour, 5 percent below the projected traffic volumes during the weekday evening peak-hour and approximately 29 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 1.1 and 4.6 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 (an average weekday daily and Saturday traffic volume of 260 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, motorist delays and vehicle queuing have increased within the interchange area. A traffic signal control has been installed at the Clark Road/Long Pond Road intersection as a part of the Redbrook mixed-use development that has improved operating conditions at the intersection and has also benefited operations within the Clark Road/Route 3 interchange. 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 DPW, a Traffic Signal Warrants Analysis was performed in May 2022⁵ 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 that the installation of a traffic control signal is not warranted at the subject intersections.

cc: R. Tepper – Secretary of Energy and Environmental Affairs
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L. Hartmann, AICP - Director of Planning and Development, Town of Plymouth
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File

⁵Ibid 1.