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Traffic Impact Study

Senior Residential Community Development and 10 Single-Family Dwellings

Tilden Road and Hatherly Road

Scituate, MA

Toll Brothers
America's Luxury Home Builder®

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INTRODUCTION

McMahon Associates has reviewed the potential traffic impacts associated with the proposed Senior Residential Community Development and 10 Single-Family Dwellings to be located between Hatherly Road and Tilden Road in Scituate, Massachusetts. The purpose of this study is to evaluate existing and projected traffic operational and safety conditions in the vicinity of the site and identify if mitigating measures are necessary to offset potential project-related traffic impacts on the surrounding roadways.

The following assessment is based on a review of current traffic volumes and crash data collected for this study, and the anticipated traffic generating characteristics of the proposed development. This study examines existing and projected traffic operations (both with and without the proposed development) at key intersections in the vicinity of the project site. The study area was chosen based on a review of the surrounding roadway network. This study provides a detailed analysis of traffic operations during the weekday morning and weekday afternoon peak hours, when adjacent roadway volumes would be greatest.

Based on the analysis presented in this study, the projected traffic increases associated with the traffic expected to be generated by the development are expected to have a minimal effect on the area roadways and intersections. This report documents these findings.

Project Description

The project site, shown in Figure 1 is located between Hatherly Road and Tilden Road in Scituate, Massachusetts. The primary portion of the existing site is bound by Tilden Road and the Wampatuck School to the west, Irving Road, Norwell Avenue, and Longley Road to the north, Hatherly Road to the east, and Turner Road to the south. The remaining section of the proposed project site is located on the east side of Hatherly Road between Tenth Street to the south and Sixth Street to the north. The project site is primarily undeveloped land abutting existing residential land use.

The proposed project calls for the construction 152 residential units (10 single-family units, 142 senior residential townhome units) and a clubhouse/amenities area. The 10 single-family units will be constructed outside the primary portion of the project site, with seven homes to be located on Hatherly Road, two homes on Sixth Street, and one home on Longley Road. The 142 senior residential townhomes and clubhouse/amenities area will be constructed on the land between Tilden Road and Hatherly Road, north of Turner Road. Access to the proposed townhomes is to be provided by two unsignalized full access driveways on Hatherly Road and Tilden Road at the approximate location of the existing Crescent Boulevard intersections. Residents are expected to use the driveway most convenient to their residence when entering and exiting the site. Interior to the site, access to the homes and amenities are proposed to be provided via a series of internal roadways, including a gated emergency access between Ermine Street and the internal site roadways.

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Figure 1
Site Location Map
Residential Development
Scituate, Massachusetts

Study Methodology

This study evaluates existing and projected traffic operations at study area intersections for the weekday morning and weekday afternoon peak hour traffic conditions when adjacent roadway volumes would be greatest.

The study was conducted in three steps. The first step involved an inventory of existing traffic conditions in the vicinity of the site. As part of this inventory, traffic counts were collected at key intersections during the weekday morning and weekday afternoon peak periods. Crash data for the study area intersections was obtained from the Massachusetts Department of Transportation (MassDOT) to evaluate existing traffic safety within the study area.

The second step of the study builds upon data collected in the first phase and establishes the basis for evaluating the transportation impacts associated with the future conditions. In this step, the projected traffic demands of other future developments that could influence traffic volumes at the study area intersections were assessed. Existing 2016 traffic volumes were projected to the 2023 No Build (without project) condition and the 2023 Build (with project) condition.

The final step evaluated if measures were necessary to improve existing and future traffic operations and safety, minimize potential traffic impacts, and provide safe and efficient access to the project site.

Study Area Intersections

The area identified for detailed analysis in this study was determined based on a review of the surrounding roadway network serving the project site. The study area intersections include:

- Hatherly Road at Longley Road
- Hatherly Road at Project Site Drive (Crescent Boulevard)
- Hatherly Road at Turner Road (signalized)
- Tilden Road at Project Site Drive (Crescent Boulevard)
- Tilden Road at Edith Holmes Drive
- Tilden Road at Norwell Avenue
- Norwell Avenue at Ermine Street/Longley Road

EXISTING CONDITIONS

Effective evaluation of potential traffic impacts associated with the proposed development requires a thorough understanding of the existing traffic conditions on the roadways and intersections serving the project site. The assessment of existing conditions consists of an inventory of the roadway and intersection geometries and traffic control devices, collection of peak-period traffic volumes, and a review of recent crash history. A discussion of this information is presented below.

Roadway Network

The project site benefits from excellent access via the local and regional roadway systems. A brief description of the principal roadway serving the project site is presented below.

Hatherly Road
Hatherly Road generally extends in a north-south direction through the Town of Scituate with a posted speed limit of 35 miles per hour. Hatherly Road is classified as an urban minor arterial under local jurisdiction. Hatherly Road is a two-lane, two-way roadway providing access to adjacent residential land uses. Hatherly Road runs parallel with Tilden Road in the vicinity of the project site. A sidewalk is located on the east side of the roadway. Hatherly Road is unsignalized with its intersections at Longley Road and Crescent Boulevard (the proposed site driveway), and is signalized with Turner Road.

Tilden Road
Tilden Road generally extends in a north-south direction through the Town of Scituate with a posted speed limit of 30 miles per hour. However, the speed limit decreases to 20 miles per hour in the vicinity of the Wampatuck School between the intersections of Tilden Road at Edith Homes Drive and Tilden Road at Norwell Avenue. The roadway is classified as an urban collector under local jurisdiction. Tilden Road is a two lane, two-way roadway with a sidewalk provided on the east side of the roadway. The roadway is unsignalized at its intersection with Norwell Avenue, Edith Holmes Drive and Crescent Boulevard (proposed site driveway).

Turner Road
Turner Road generally extends in an east-west direction providing direct access to residential land uses between Tilden Road and Hatherly Road. Turner Road is an urban collector under local jurisdiction. Turner Road is a two-way, two-lane roadway with a sidewalk provided on the northern side of the roadway. The roadway is signalized at its intersection with Hatherly Road and is unsignalized at its intersection with Tilden Road.

Norwell Avenue
Norwell Avenue generally extends in a north-south direction providing access to residential uses. Norwell Avenue is located to the north of the project site and connects Irving Road and Longley Road. Norwell Avenue is classified as a local road. Norwell Avenue is a two-way, two-lane roadway with no sidewalks on the roadway. The intersection of Norwell Avenue at Tilden Road, Norwell Avenue is a one-way, two-lane roadway. Norwell Avenue is unsignalized at the intersection of Norwell Avenue and Longley Road.

Longley Road
Longley Road generally extends in an east-west direction providing access to residential uses. Longley Road borders the project site to the north and connects Norwell Road to Hatherly Road. Longley is a two-way, two-lane roadway with no sidewalks on the roadway. Longley Road is unsignalized at the intersection of Longley Road and Hatherly Road.

Existing Traffic Volumes

Existing Peak Hour Traffic Volumes
To assess peak hour traffic conditions, Turning Movement counts (TMC) were conducted at the study area intersections during the weekday morning and weekday afternoon peak periods. Counts were conducted on Thursday, December 1, 2016 from 7:00 AM to 9:00 AM and from 2:00 PM to 6:00 PM. An extended afternoon peak period was reviewed due to the proximity of the Wampatuck School on the west side of the project site. The results of the TMCs are tabulated by 15-minute periods and are provided in Appendix A of this report. The four highest consecutive 15-minute intervals during each of these count periods constitute the peak hours that are the basis of the traffic analysis provided in this report. Based on the traffic counts, the weekday morning peak hour occurs between 8:00AM and 9:00 AM and the weekday afternoon peak hour occurs between 2:30 PM and 3:30 PM.

Seasonal Variation
In order to determine seasonal variation in traffic counts conducted for this study, continuous count data from a nearby count station on Route 3 in South Weymouth, MA was reviewed. Based on the seasonal variation in traffic volumes, traffic counts collected during the month of December are shown to be lower than traffic volumes during the average month. Therefore, the existing peak hour traffic volumes were adjusted upward by approximately five percent to represent an average month. The seasonal adjustment data from the continuous count station is summarized in Appendix B of this report. The resulting peak hourly traffic flows for the 2016 Existing condition are depicted in Figure 2 and Figure 3 and for the weekday morning and weekday afternoon peak hours, respectively.

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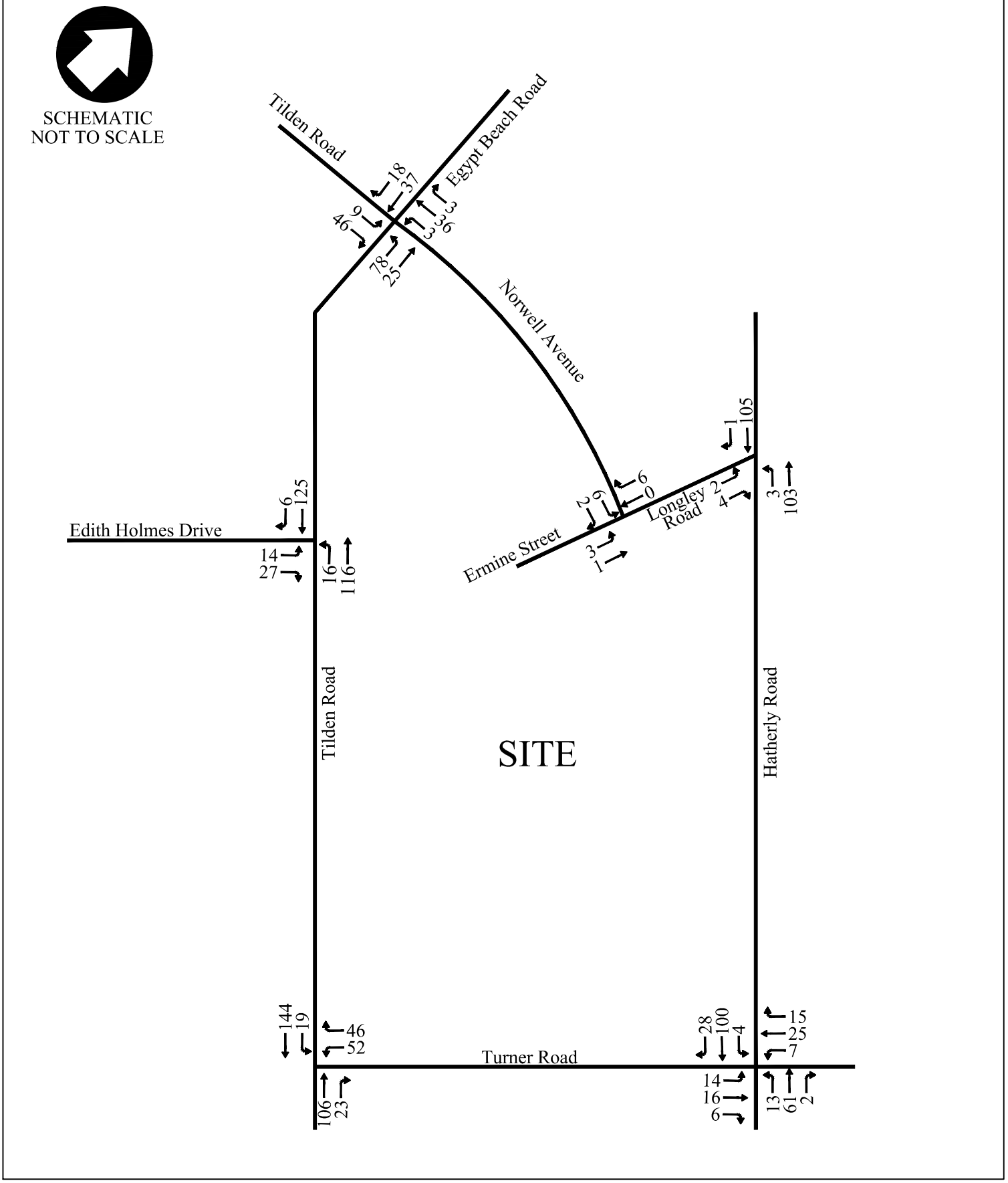

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Figure 2
2016 Existing Weekday Morning
Peak Hour Traffic Volumes
Residential Development
Scituate, Massachusetts

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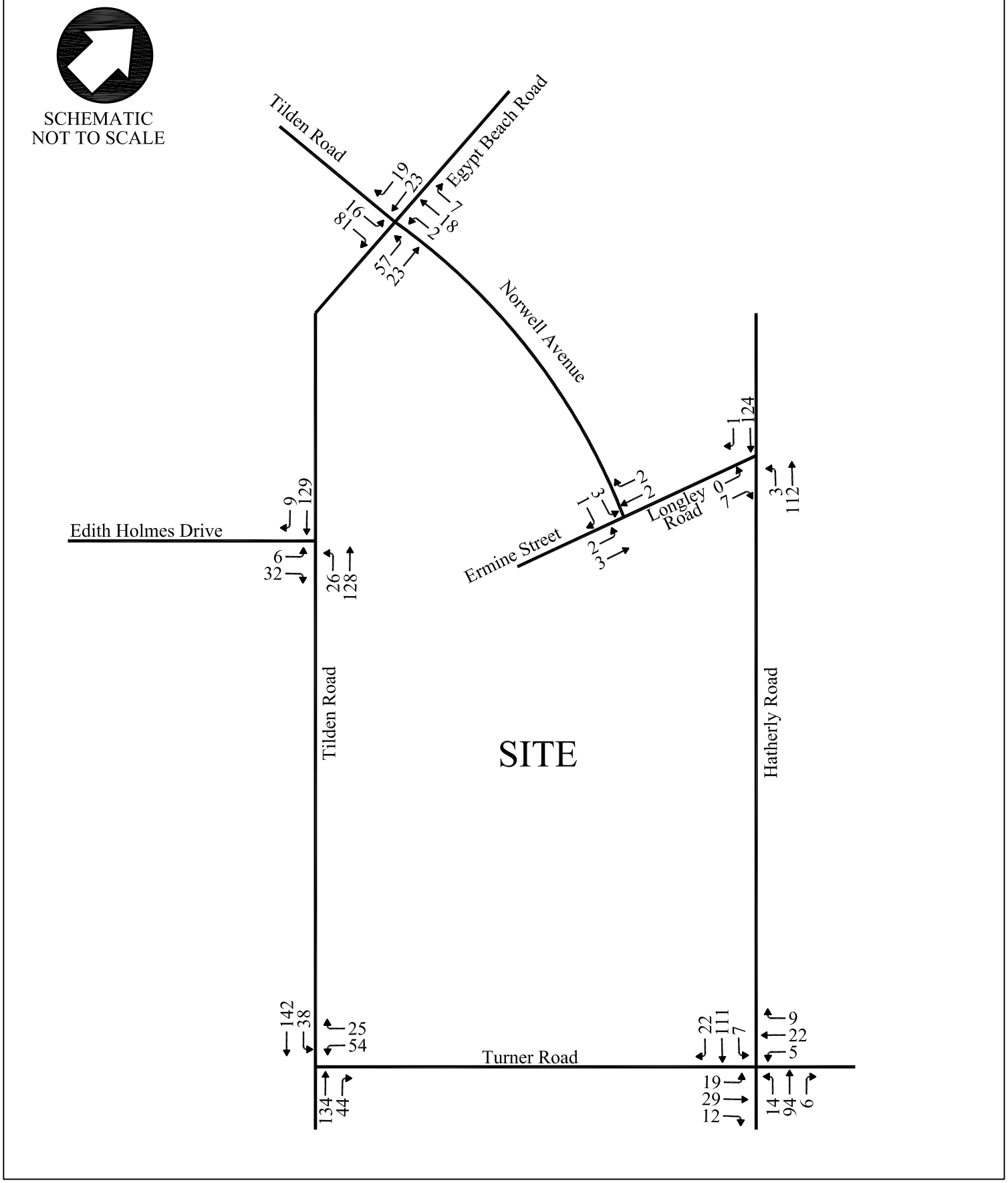

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Figure 3
2016 Existing Weekday Afternoon
Peak Hour Traffic Volumes
Residential Development
Scituate, Massachusetts

Crash Summary

Crash data from the study area intersections was obtained from MassDOT from the most recent three-year period available. This data includes complete yearly crash summarizes for 2012, 2013, 2014. A summary of the crash data is presented in Appendix C.

The MassDOT Crash Rate Worksheet was used to determine whether the crash frequencies at the study area intersections were unusually high given the travel demands at each location. The MassDOT Crash Rate Worksheet calculates a crash rate expressed in crashes per million entering vehicles. The calculated rate was then compared to the average rate for signalized and unsignalized intersections statewide and within the particular MassDOT District. For signalized and unsignalized intersections, the statewide average crash rates are 0.77 and 0.58 crashes per million entering vehicles, respectively. The MassDOT District 5 crash rates for signalized and unsignalized intersections are 0.76 and 0.58 crashes per million entering vehicles, respectively.

The intersection of Hatherly Road and Turner Road is shown to have experienced four crashes over the three year period from 2012 to 2014. The resulting crash rate of 0.83 crashes per million entering vehicles is slightly over statewide and district averages for signalized intersections. Of the reported crashes, two were angle collisions and two were single vehicle crashes. All crashes resulted in property damage only and no fatal crashes were reported at this location.

The intersection of Tilden Road and Norwell Avenue had two reported crashes over the three year period. The resulting crash rate of 0.59 crashes per million entering vehicles is slightly higher than both the statewide and district averages for unsignalized intersections. The reported crashes were a rear-end and sideswipe collision and no fatalities were reported.

The intersection of Tilden Road and Turner Road had one reported crash over the three year period. The resulting crash rate of 0.17 crashes per million entering vehicles is lower than the statewide and district averages. The reported crash was a single vehicle crash resulting in personal injury.

At the intersection of Hatherly Road and Longley Road, one crash was reported over the three year period resulting in a crash rate of 0.30 crashes per million entering vehicles which is under the statewide and district averages for unsignalized intersections. The single crash was a rear-end collision resulting in property damage only.

The remaining intersections had no crashes reported through the MassDOT data.

FUTURE CONDITIONS

To determine future traffic demands on the study area roadways, the 2016 Existing traffic volumes were projected to the future-year 2023, by which time the proposed development is expected to be fully constructed and occupied. Independent of the proposed project, traffic volumes on the roadways in 2023 are assumed to include all existing traffic, as well as new traffic resulting from general growth in the study area and from other planned development projects. The potential background traffic growth unrelated to the proposed project was considered in the development of the 2023 No Build (without project) peak hour traffic volume networks. The anticipated traffic increases associated with the proposed development were then added to the 2023 No Build volumes to reflect the 2023 Build (with project) traffic condition. A more detailed description of the development of the 2023 No Build and 2023 Build traffic volume networks is presented below.

Future Roadway Improvements

Planned roadway improvement projects can affect area travel patterns and future traffic operations. To develop a clearer understanding of future area roadway operations, Scituate Department of Public Works and MassDOT Project website were consulted. No projects were listed on the MassDOT website, but the Town of Scituate identified a complete streets roadway improvement project on Tilden Road between Turner Road and Beaver Damn Road, just south of the study area. The project is expected to add a mixed-use path to the roadway without reducing roadway capacity. This project is not expected to influence vehicle travel patterns, but it may encourage walking or bicycling by nearby land-uses.

Background Traffic Growth

Traffic growth is primarily a function of changes in motor vehicle use and expected land development in the region. To predict a rate at which traffic on the roadways in the vicinity of the site can be expected to grow during the seven-year forecast period (2016 to 2023), both planned area developments and historic traffic growth were examined.

Site-Specific Growth

Based on a conversation with the Scituate Town Planner, there are no significant traffic generators planned in the vicinity of the project. The projects underway in Scituate involve small residential projects that can be accounted for in the background traffic growth.

Historic Traffic Growth

The Metropolitan Area Planning Council (MAPC) was contacted to determine the standard annual growth rate for the Town of Scituate. MAPC recommended an annual growth rate of 0.25 percent per year based on the CTPS travel model. In order to account for the small developments identified by the Town of Scituate, an annual growth rate of 1.0% was used to provide a conservative estimate of potential growth.

2023 No Build Traffic Volumes

The 2016 Existing peak hour traffic volumes were grown by 1.0 percent per year over the seven-year study horizon (2016 to 2023) to establish the 2023 No Build volumes. The 2023 No Build weekday morning and weekday afternoon peak hour traffic volume networks are illustrated in Figure 4 and Figure 5 respectively.

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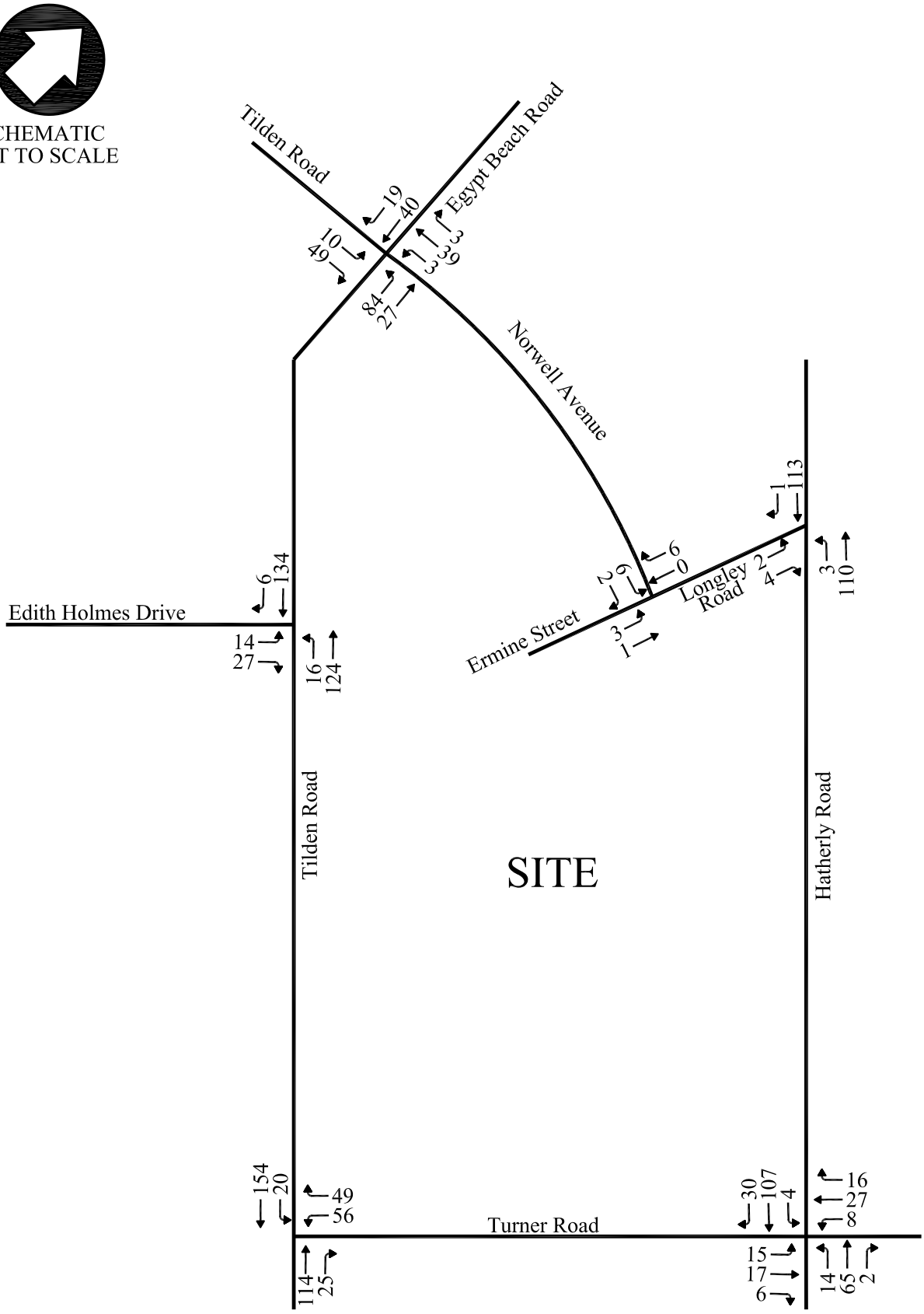

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Figure 4
2023 No Build Weekday Morning
Peak Hour Traffic Volumes
Residential Development
Scituate, Massachusetts

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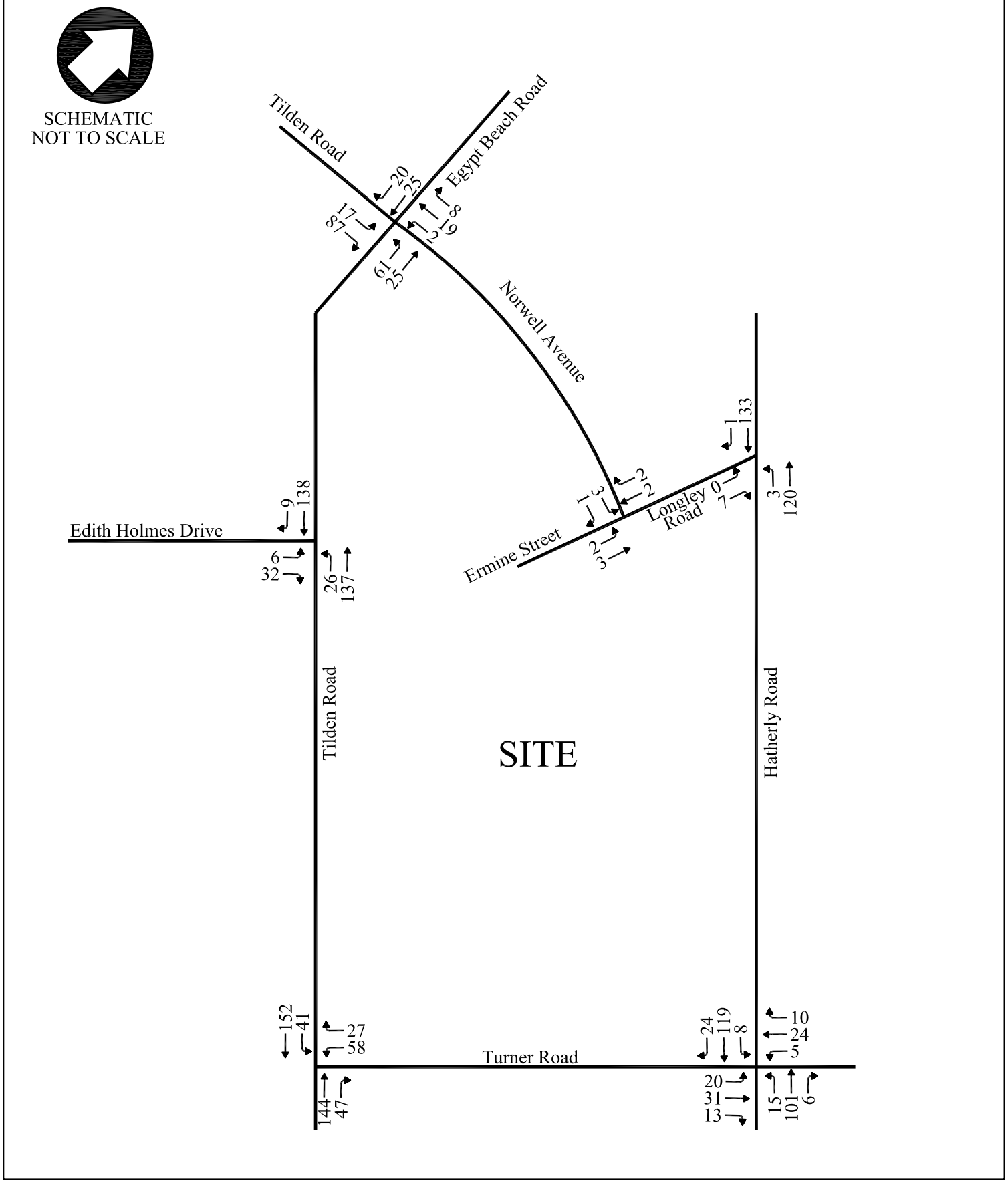

Figure 5
2023 No Build Weekday Afternoon
Peak Hour Traffic Volumes
Residential Development
Scituate, Massachusetts

Site-Generated Traffic

The Institute of Transportation Engineers (ITE) is a national research organization of transportation professionals. Their publication, *Trip Generation Manual, 9th Edition* provides traffic generation information for various land uses compiled from studies conducted by members nationwide. Vehicle trip estimates for the proposed senior residential community and 10 single-family dwellings project were developed based on data presented in this publication for Land Use Code 210 (Single-Family Detached Housing) and Land Use Code 252 (Senior Adult Housing - Attached). These references establish vehicle trip rates (in this case expressed in trips per dwelling unit) based on actual traffic counts conducted at similar existing developments. Land Use Code 210 was used for the proposed 10 single-family units and Land Use Code 252 was used for the proposed 142 senior residential townhome units. Table 1 depicts the projected future trip generation volumes of the senior residential community development and 10 single-family dwellings.

Table 1: Total Project Trips

	Weekday AM Peak Hour			Weekday PM Peak Hour		
Description	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Townhomes[(1)]	25	30	55	28	22	50
Single-Family[(2)]	5	14	19	9	5	14
Total	30	44	74	37	27	64

(1) ITE Land Use Code 252 (Senior Adult Housing-Attached), based on 142 dwelling units

(2) ITE Land Use Code 210 (Single-Family Detached Housing), based on 10 dwelling units

As shown in Table 1, the majority of project trips are expected to be generated by the townhomes. The peak hour trip generation estimates that approximately 74 new vehicle trips (30 entering vehicles and 44 exiting vehicles) during the weekday morning peak hour and approximately 64 new vehicles trips (37 entering vehicles and 27 exiting vehicles) during the weekday afternoon peak hour would be expected to be generated by the proposed development.

Project Trip Distribution and Assignment

The additional traffic expected to be generated by the proposed development was distributed onto the study area roadways and intersections based on the existing travel patterns of the adjacent roadways and US 2010 Census Journey-to-Work data for the Town of Scituate, provided in Appendix D and Appendix E of this report. Based on the layout of the proposed development, vehicle trips associated with the proposed townhomes will be distributed on the internal access roadways between Hatherly Road and Tilden Road. The internal roadways will connect to two unsignalized full access driveways on both Tilden Road and Hatherly Road. The vehicle trips associated with the single-family homes being proposed

along Hatherly Road, with seven units on Hatherly, two on Sixth Street and one on Longley Road, will be distributed to the north and south on Hatherly Road and to the south on Tilden Road via the site driveways. New vehicle trips expected to access the project site were assigned to the site driveways based on residence location. The resulting arrival and departure patterns are presented in Figure 6.

2023 Future Build Peak Hour Traffic Volumes

To establish the 2023 Build peak hour traffic volumes, the project-related traffic was assigned to the surrounding roadway network based on the project distribution patterns shown in Figure 6. These project trips were then added to the 2023 No Build peak hour traffic volumes to reflect the 2023 Build peak hour traffic volumes. The resulting 2023 Build weekday morning and weekday afternoon peak hour traffic volumes are presented in Figure 7 and Figure 8, respectively.

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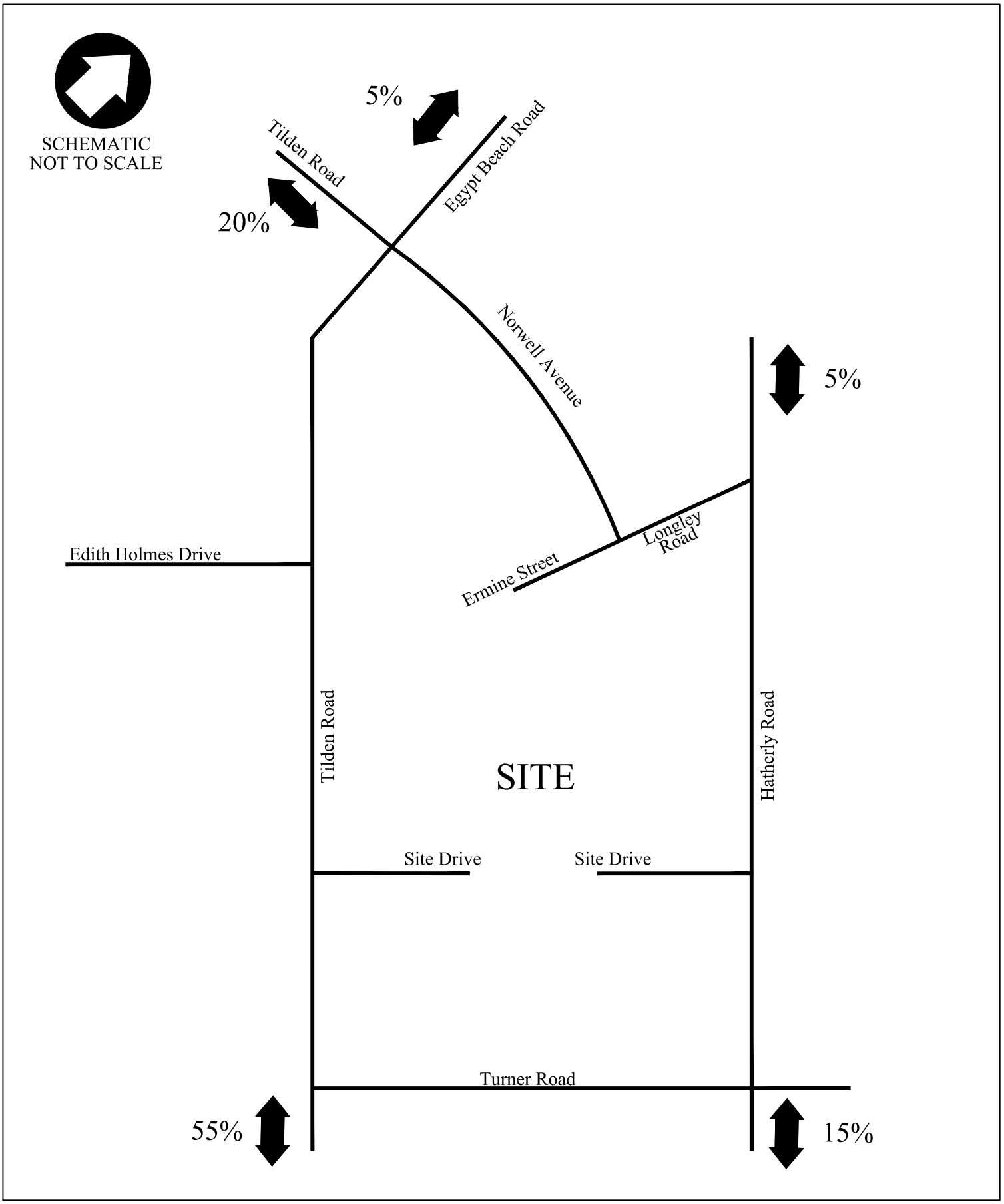

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Figure 6
Directions of Arrival and Departure
Peak Hour Traffic Volumes
Residential Development
Scituate, Massachusetts

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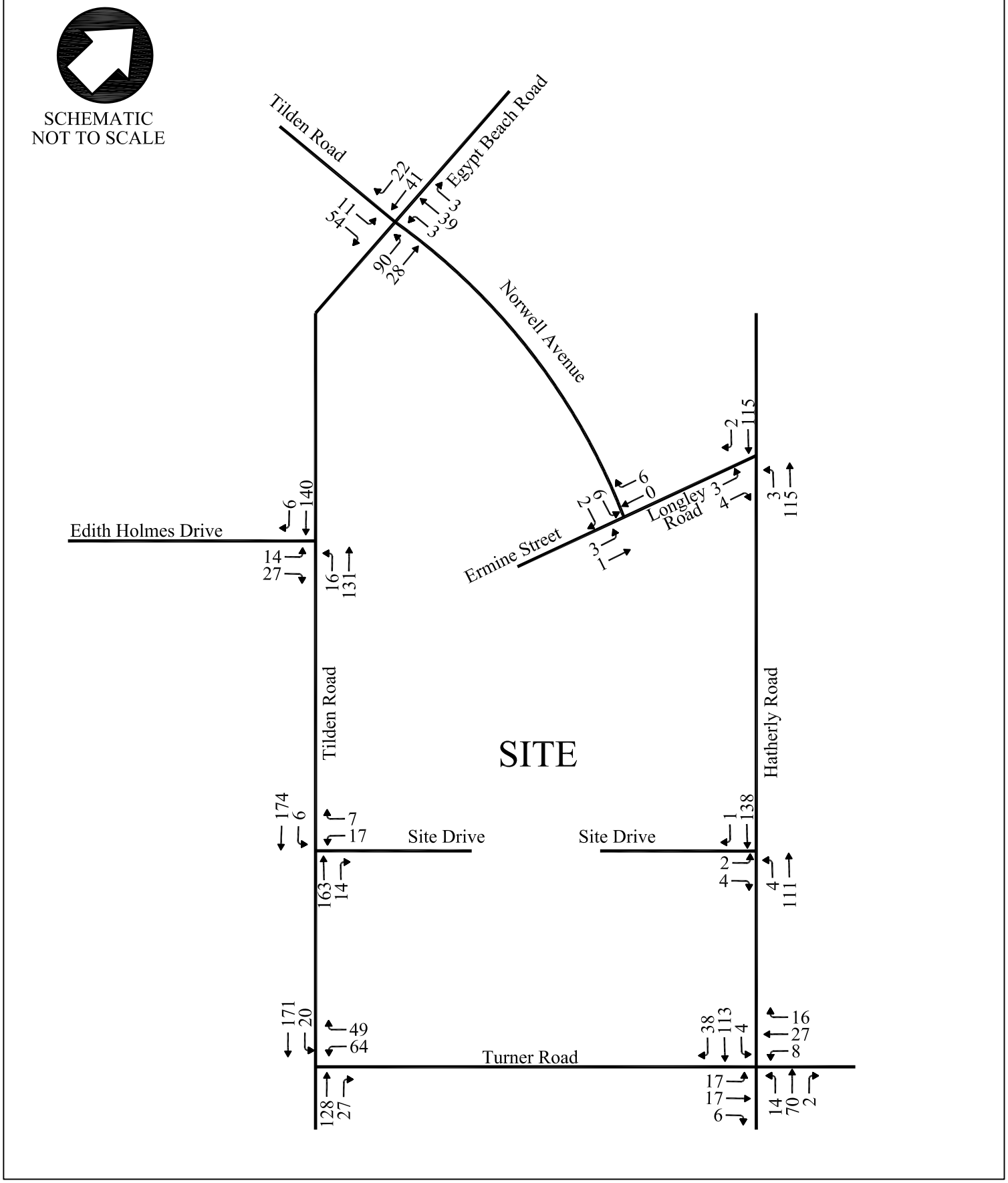

Figure 7
2023 Build Weekday Morning
Peak Hour Traffic Volumes
Residential Development
Scituate, Massachusetts

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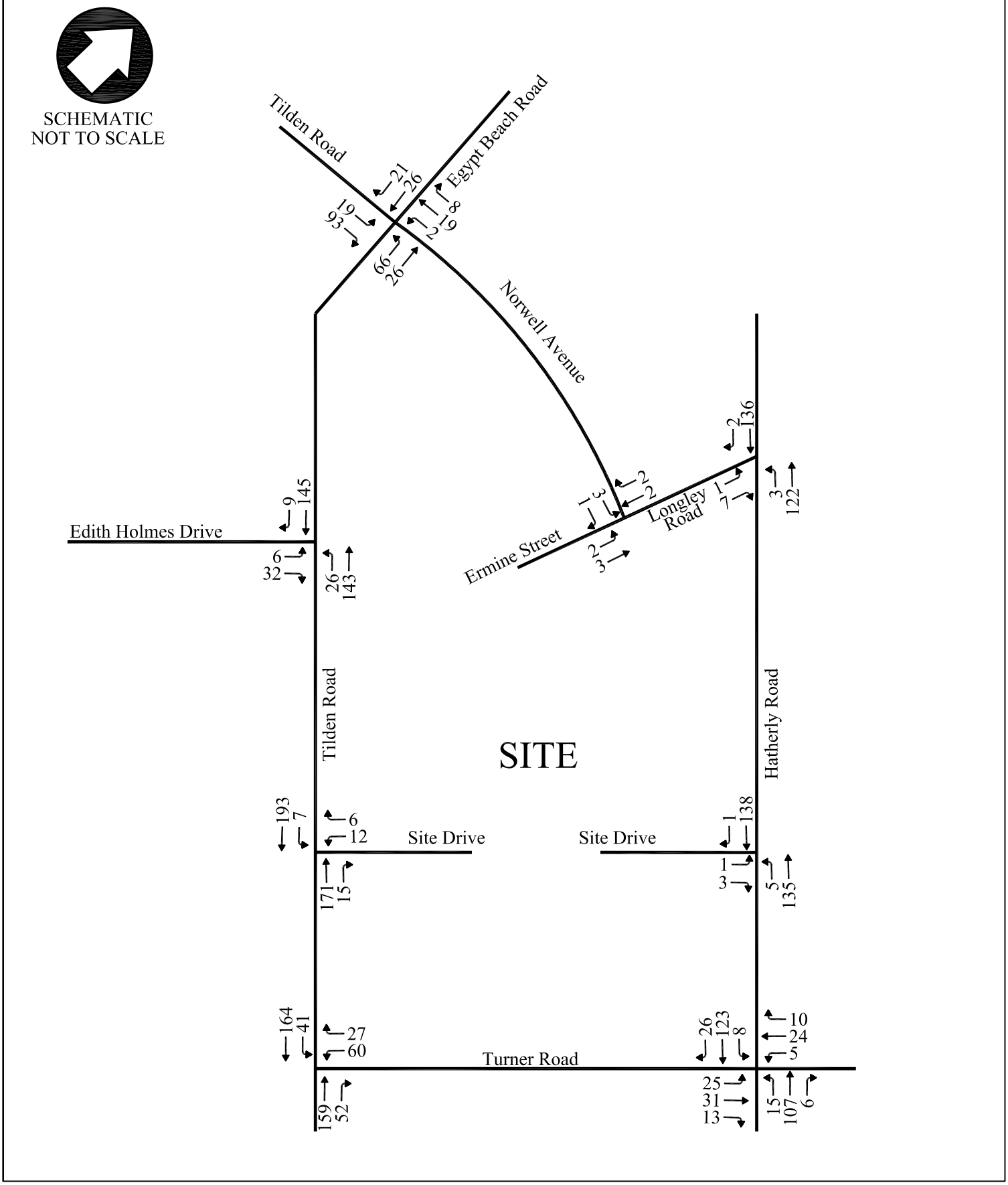

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Figure 8
2023 Build Weekday Afternoon
Peak Hour Traffic Volumes
Residential Development
Scituate, Massachusetts

TRAFFIC OPERATIONS ANALYSIS

In previous sections of this report, the quantity of traffic on the study area roadways was described. The following section describes the quality of traffic flow at the study area intersections for the given travel demands. As a basis for this assessment, intersection capacity analyses were conducted using Synchro capacity analysis software for the study area intersections under the 2016 Existing, 2023 No Build, and 2023 Build peak hour traffic conditions. This analysis is based on procedures contained in the 2010 Highway Capacity Manual (HCM) which are summarized in Appendix F. A discussion of the evaluation criteria and a summary of the results of the capacity analyses are presented below.

Level-of-Service Criteria

Operating levels of service (LOS) are reported on a scale of A to F with A representing the best conditions (with little or no delay) and F representing the worst operating conditions (long delays).

Capacity Analysis Results

Intersection capacity analyses were conducted for the study area intersections to evaluate the 2016 Existing, 2023 No Build, and 2023 Build peak hour traffic conditions. Based on the traffic counts, the weekday morning peak hour of the adjacent street traffic is shown to occur between 8:00 AM and 9:00 AM and the weekday afternoon peak hour of the adjacent street traffic is shown to occur between 2:30 PM and 3:30 PM.

The detailed capacity analysis worksheets for the 2016 Existing, 2023 No Build, and 2023 Build conditions are presented in Appendix G, Appendix H, and Appendix I, respectively. The overall signalized intersection operations at Hatherly Road and Turner Road are summarized in Table 2 below. The operations of the critical approach to each of the unsignalized study area intersections are presented in Table 3 and detailed traffic operations for the intersections are summarized in Appendix J.

Table 2: Signalized Capacity Analysis Results

	2016 Existing			2023 No Build			2023 Build		
	LOS[1]	Delay[2]	V/C[3]	LOS	Delay	V/C	LOS	Delay	V/C
AM	B	11.2	0.19	B	11.4	0.20	B	11.3	0.22
PM	B	11.1	0.20	B	11.1	0.22	B	11.2	0.24

(1) Level-of-Service

(2) Average vehicle delay in seconds

(3) Volume to capacity ratio

Hatherly Road at Turner Road

At the signalized intersection of Hatherly Road at Turner Road the capacity analysis indicates that the intersection currently operates at overall LOS B during both the weekday morning and weekday afternoon peak hours. The intersection is expected to continue to operate at overall LOS B under 2023 No Build and 2023 Build conditions during both the weekday morning and weekday afternoon peak hours. The proposed project is not expected to result in a significant increase in vehicle delay at the signalized intersection.

Table 3: Unsignalized Peak Hour Intersection Capacity Analysis Results

			2016 Existing			2023 No Build			2023 Build		
Intersection	**Movement**		**LOS[1]**	**Delay[2]**	**V/C[3]**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**
Hatherly Road at	EB L	AM	B	10.2	0.01	B	10.3	0.01	B	10.4	0.01
Longley Road		PM	A	0.0	0.00	A	0.0	0.00	B	10.4	0.00
Hatherly Road at	EB LR	AM	n/a	n/a	n/a	n/a	n/a	n/a	A	9.8	0.01
Project Site Drive		PM	n/a	n/a	n/a	n/a	n/a	n/a	A	9.5	0.01
Tilden Road at	WB LR	AM	B	11.4	0.22	B	11.8	0.24	B	12.4	0.27
Turner Road		PM	B	13.0	0.18	B	13.7	0.20	B	14.4	0.22
Tilden Road at	WB LR	AM	n/a	n/a	n/a	n/a	n/a	n/a	B	10.9	0.04
Project Site Drive		PM	n/a	n/a	n/a	n/a	n/a	n/a	B	11.7	0.04
Tilden Road at	EB LR	AM	B	10.5	0.08	B	10.6	0.08	B	10.7	0.08
Edith Holmes Drive		PM	B	10.4	0.08	B	10.5	0.08	B	10.6	0.08
Tilden Road at	NB LT	AM	A	9.2	0.28	A	9.5	0.31	A	9.8	0.33
Norwell Avenue		PM	A	8.1	0.13	A	8.2	0.14	A	8.3	0.15
Norwell Avenue at	EB LR	AM	A	8.6	0.02	A	8.6	0.02	A	8.6	0.02
Ermine Street/Longley Road		PM	A	8.6	0.01	A	8.6	0.01	A	8.6	0.01

(1)Level-of-Service
(2) Average vehicle delay in seconds
(3) Volume to capacity ratio
n/a Not Applicable

Hatherly Road at Longley Road

Capacity analysis indicates that the critical eastbound left-turn movement exiting from Longley Road onto Hatherly Road currently operates at LOS B during the weekday morning and at LOS A during the weekday afternoon peak hour. Under the 2023 No Build condition, the eastbound left-turn is expected to continue to operate at LOS B during the weekday morning peak hour and at LOS A during the weekday afternoon peak hour. With the project in place, the eastbound left is shown to operate at LOS B during both the weekday morning and weekday afternoon peak hours. The movements on Hatherly Road are shown to operate at LOS A and well below capacity with the proposed project in place.

Hatherly Road at Project Site Drive

The capacity analysis indicates that, with the project in place, the critical eastbound movement exiting from the Project Site Drive is expected to operate at LOS A during both the weekday morning and afternoon peak hours. Operations along Hatherly Road are not expected to be impacted by the proposed project and all the approaches to the unsignalized intersection are expected to operate well below capacity.

Tilden Road at Turner Road

The capacity analysis indicates that the critical westbound movement at the intersection of Tilden Road and Turner Road currently operates at LOS B during the weekday morning and weekday afternoon peak hours. Under the 2023 No Build and 2023 Build conditions, the westbound approach is expected to continue to operate at LOS B during both peak hours studied. The approaches on Tilden Road are shown to operate at LOS A and well below capacity with the proposed project in place.

Tilden Road at Project Site Drive

The capacity analysis indicates that the critical westbound movement exiting from the Project Site Driveway is expected to operate at LOS B during both the weekday morning and afternoon peak hours with the project in place. Operations along Tilden Road are not expected to be impacted by the proposed project and all the approaches to the unsignalized intersection are expected to operate well below capacity.

Tilden Road at Edith Holmes Drive

The capacity analysis indicates that the critical eastbound movement at the intersection of Tilden Road and Edith Holmes Drive currently operates at LOS B during the weekday morning and weekday afternoon peak hours. Under the 2023 No Build and 2023 Build conditions, the eastbound approach is expected to continue to operate at LOS B and well below capacity. The approaches on Tilden Road are shown to continue to operate at LOS A and under capacity with the proposed project in place

Tilden Road at Norwell Avenue

The southbound and westbound approaches to the intersection of Tilden Road at Norwell Avenue are under stop control and the northbound and eastbound approaches are free flowing. However, for the purposes of this report, the intersection of Tilden Road at Norwell Avenue was modeled as an all way stop controlled intersection. The capacity analysis indicates that all of the movements at the intersection currently operate at LOS A during the weekday morning and weekday afternoon peak hours. Under the 2023 No Build and 2023 Build conditions, all of the approaches are expected to continue to operate at LOS A during the weekday morning and weekday afternoon peak hours.

Norwell Avenue at Ermine Street/Longley Road

The capacity analysis indicates that the critical eastbound movement at the intersection of Norwell Avenue at Ermine Street/Longley Road is shown to currently operate at LOS A

during the weekday morning and weekday afternoon peak hours. Under the 2023 No Build and 2023 Build conditions, the eastbound approach is expected to continue to operate at LOS A and well below capacity with the proposed project in place. The movements at all intersection approaches are shown to operate at LOS A and well below capacity with the proposed project in place.

Site Access/Circulation

Under the proposed plan, access to the townhome portion of the project site will be provided via two unsignalized site drives, one located on Hatherly Road and one located on Tilden Road. Both site drives will provide full access with one lane entering the development and one lane exiting the development. Interior to the site, access to the townhomes and amenities will be provided via a series of proposed internal roadways. An additional emergency-only gated access driveway will connect to the internal roadways via Ermine Street. The proposed driveway configuration is expected to allow residents and emergency vehicles to access the site in a safe and efficient manner. Access to the single-family unit homes will be provided via existing roadways; including Hatherly Road, Longley Road, and Sixth Street.

Sight Distance

A field review of the available sight distances was conducted for the two proposed site drives. The posted speed limit along Hatherly Road is 35 miles per hour and the posted speed limit along Tilden Road is 30 miles per hour in the vicinity of the project site. The posted speed limits were utilized as part of the sight distance review.

The American Association of State Highway and Transportation Officials (AASHTO) publication, *A Policy on Geometric Design, 2011 Edition*, defines the minimum sight distances required at intersections. The minimum sight distance is based on the required stopping sight distance (SSD) for vehicles traveling along the main road and vehicles entering the main road from the minor street. According to AASHTO, "If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient time to anticipate and avoid collisions." Table 4 presents the field measured available sight distances from each of the project site drives and the required SSD.

Table 4: Stopping Sight Distance

Location	Direction	Speed (mph)	SSD Required (ft)[1]	Available Sight Distance Measured (ft)	Meets Requirements
Hatherly Road at Site Driveway	Left looking North	35	250	>500	Yes
	Right looking South	35	250	>500	Yes
Tilden Road at Site Driveway	Left looking South	30	200	450	Yes
	Right looking North	30	200	>500	Yes

(1) AASHTO stopping sight distance (see AASHTO Table 3-1).

As shown in Table 4, the available sight distance on Hatherly Road for a vehicle exiting the project site looking left and looking right is greater than 500 feet, which exceeds the required SSD of 250 feet for vehicles traveling at 35 miles per hour. The available sight distance for vehicles exiting the project site onto Tilden Road is approximately 450 feet looking to the left and is greater than 500 feet looking to the right, which both exceed the required SSD for vehicles traveling 30 miles per hour. Therefore, access to and from the townhome portion of the project site is expected to operate safely.

CONCLUSION

The proposed Senior Residential Community Development and Single-Family Dwellings are located between Hatherly Road and Tilden Road in Scituate, Massachusetts. The proposed project calls for the construction 152 units (10 single-family units, 142 senior residential townhome units) of and associated amenities. Access to the townhomes proposed as part of the senior residential community development is to be provided by two unsignalized full access site drives, one on Hatherly Road and one on Tilden Road. Access to the single-family homes is to be provided via existing roadways; including Hatherly Road, Longley Road, and Sixth Street.

The majority of the project trips are expected to be generated by the townhomes, which are expected to use the project site drives located on Hatherly Road and Tilden Road. The proposed development is expected to result in an increase of approximately 74 new vehicle trips (30 entering vehicles and 44 exiting vehicles) during the weekday morning peak hour and an increase of approximately 64 vehicle trips (37 entering vehicles and 27 exiting vehicles) during the weekday afternoon peak hour.

The capacity analysis indicates that the proposed Senior Residential Community Development and 10 Single-Family Dwellings will not have a significant impact on the traffic operations of the study area intersections. The exiting movements at both site driveways are expected to operate at LOS B or better and well under capacity during both the weekday morning and weekday afternoon peak hours under the 2023 Build conditions. With the proposed project in place, the level-of-service for all movements along Hatherly Road and Tilden Road within the study area are shown to be maintained from the 2023 No Build conditions during both peak hours studied.

Based on the analysis results presented in this report, the proposed Senior Residential Community Development and 10 Single-Family Dwellings are expected to have a negligible impact on the operations of the study area roadways.