SPEED ZONING ENGINEERING STUDY

Green Street – US Route 6 to Beacon Street

Fairhaven, Massachusetts

Prepared for: **Massachusetts Department of Transportation**
Highway Division – District 5
1000 County Street
Taunton, Massachusetts 02780

Town of Fairhaven, Massachusetts
40 Center Street
Fairhaven, Massachusetts 02719

Prepared by: **TEC, Inc.**
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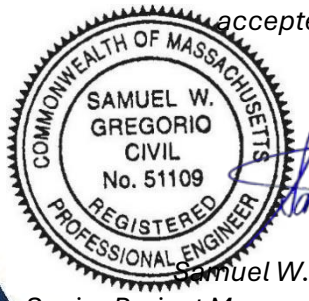
September 30, 2025

As the engineer in responsible charge, I have reviewed this document as it relates to the proposed planning of traffic operations and safety and concur that it is in conformity with accepted engineering standards.



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I. INTRODUCTION

Purpose of Study

TEC, Inc. (TEC) has been retained by the Town of Fairhaven (the "Town") to provide an evaluation of and recommendations for the establishment of a Special Speed Regulation along Green Street from US Route 6 to Beacon Street within the Town of Fairhaven. All speed zones, generally referred to as posted speed limits, within the Commonwealth of Massachusetts are set under the guidance of the Massachusetts Department of Transportation (MassDOT) publication *Procedures for Speed Zoning on State Highways and Municipal Roads* (herein referred to as the "Procedure")[1].

ESTABLISHING A SPECIAL SPEED REGULATION

Legally enforceable and regulatory speed limits in Massachusetts shall only be established after an engineering study has been conducted in compliance with standard traffic engineering practices outlined in Sections 1D.03 and 2B.21 of the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), *11th Edition*, as well as Section 2B.13 of the *Massachusetts Amendments on the MUTCD* (2022). The study will reflect each proposed speed zone to establish a safe, reasonable, self-enforcing speed limit as established by Massachusetts general Law (MGL) Chapter 90, Section 18 (Ch90 §18). Generally, new speeds are established based on a safe speed range centered on an analysis of the current speed distribution of free-flowing traffic along the existing roadway.

CONTEXT FOR GREEN STREET CORRIDOR

There is no MassDOT Special Speed Regulation along Green Street. The corridor in its entirety is thickly settled and therefore subject to a 30 miles per hour (mph) statutory speed limit under MGL Ch90 §17 in absence of a Special Speed Regulation.

This study outlines the observations and recommendations for the aforementioned speed zone to be established for a mix of 30 mph to 35 mph. This engineering study to modify the established Special Speed Regulation is intended to be a collaboration between TEC, the Fairhaven Police Department, and the Fairhaven Department of Public Works (DPW).

[1] *Procedures for Speed Zoning on State Highways and Municipal Roads - Standards and Practices to Promote Safe and Efficient Travel in Massachusetts*; Massachusetts Department of Transportation; Boston, MA; Revised September 2021

Relevant Statues

MGL Ch90 §17:

> *"...Unless a way is otherwise posted in accordance with the provisions of section eighteen, it shall be prima facie evidence of a rate of speed greater than is reasonable and proper as aforesaid (1) if a motor vehicle is operated on a divided highway outside a thickly settled or business district at a rate of speed exceeding fifty miles per hour for a distance of a quarter of a mile, or (2) on any other way outside a thickly settled or business district at a rate of speed exceeding forty miles per hour for a distance of a quarter of a mile, or (3) inside a thickly settled or business district at a rate of speed exceeding thirty miles per hour for a distance of one-eighth of a mile, or (4) within a school zone which may be established by a city or town as provided in section two of chapter eighty-five at a rate of speed exceeding twenty miles per hour..."*

MGL Ch90 §18 (amended by Chapter 358 Section 13 effective April 2, 2023):

> *"The city council, the transportation commission of the city of Boston, the board of selectmen, park commissioners, a traffic commission or traffic director or the department, on ways within their control, may make, amend or rescind special regulations as to the speed of motor vehicles and may prohibit the use of such vehicles altogether on such ways. In the case of a speed regulation, or an amendment or rescission thereof, no such action shall take effect unless the department shall have certified in writing that such regulation, amendment, or rescission is consistent with the public interests. In the case of any special regulation other than a speed regulation, no such special regulation or amendment or rescission thereof shall take effect unless it shall have been published in 1 or more newspapers, if there be any, published in the town in which the way is situated, otherwise in 1 or more newspapers published in the county in which the town is situated...No regulation, amendment or rescission under this section shall take effect until there shall have been erected, upon the ways affected thereby and at such points as the department or department of conservation and recreation may designate, signs, conforming to standards adopted by the department, setting forth the speed or other restrictions established by the regulation, and then only during the time such signs are in place. Any sign purporting to establish a speed limit that has not been erected in accordance with the foregoing provisions may be removed by or under the direction of the department."*

Methodology

This recommendation for establishment of speed zones as part of a Special Speed Regulation has been assembled based on the MassDOT Procedures for Speed Zoning and the standards of the Traffic Engineering and Transportation Planning professions for the preparation of such engineering studies. The document examines the existing traffic volumes, travel speeds, roadway geometrics, and crash history of the corridor segment in-line with the procedures outlined in the above-referenced publication.

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II. EXISTING CONDITIONS

Geometry & Infrastructure

A comprehensive field inventory of existing traffic conditions on the study corridor conducted during various site visits by TEC staff from March 2025 to September 2025. The field investigations consisted of existing roadway geometrics, observations of operating characteristics, researching corridor safety concerns, and documenting multi-modal accommodations. The study corridor with the existing statutory speed zones is shown graphically in Figure 1.

ROADWAY CHARACTERISITICS

Geometrics

Green Street is a north-south urban minor arterial roadway (south of US Route 6) and local roadway (north of US Route 6) under the jurisdiction of the Town of Fairhaven. The corridor provides a local connection between Mayflower Street to the north and Fort Pheonix to the south bisecting Huttleston Avenue (US Route 6). This engineering study for Special Speed Regulation focuses on only the section of Green Street between US Route 6 and Beacon Street which represents the southerly end of the corridor. The following describes the corridor segment under evaluation:

Image 1: Typical cross-section of Green Street

Although this section of Green Street is a minor arterial roadway, it operates as a localized residential, low-volume, and low-speed street. Green Street is typically ±24-feet to ±27-feet in width providing a single travel lane in each direction with on-street parking along the easterly side of the roadway north of Spring Street and along the westerly side of the roadway south of Spring Street. Note that the presence of on-street parking results in vehicles stopping and awaiting oncoming traffic to pass in order to proceed at many locations within the corridor. The directional flow along Green Street is unmarked. Sidewalk is provided along both sides of the corridor between US Route 6 and Deane Street where only the easterly sidewalk continues south to Fort Phoenix. Bicycle accommodation is not provided along the corridor.

Overall, the 1.28-mile Green Street corridor segment between US Route 6 and Beacon Street is a series of three (2) tangent sections roadway joined by one (1) horizontal curve and one (1) S-curves. Much of the corridor has trees and other vegetation adjacent to the edge of pavement, as well as a dense number of residential dwellings.

Traffic Control Conditions

Green Street flow is generally interrupted by activity along its entire length with traffic signal control at the northerly end of the study area (US Route 6) and entry to the Fort Phoenix State Reservation at the southerly end of the study area (Beacon Street). There are sixteen (16) neighborhood cross streets along the corridor segment with stop-control along Green Street at four (4) locations.

Traffic Volumes

Traffic volume data for this report was obtained from Automatic Traffic Recorder (ATR) counts conducted along the study corridor. The ATR counts were conducted for a continuous 24-hour midweek period on Tuesday, June 17, 2025. June represents an above-average month related to seasonal adjustment and therefore no seasonal adjustment has been superimposed on the area's traffic volumes. A summary of the weekday ATR traffic data is presented in Table 1. A detailed summary of the ATR data partitioned into 15-minute intervals is provided in Appendix A.

Table 1 – Existing Weekday Traffic Volume Summary

Location	Weekday Traffic Volume[a]	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
		Traffic Volume[b]	K Factor[c]	Directional Distribution	Traffic Volume	K Factor	Directional Distribution
Green Street, south of Washington Street	2,947	166	5.6%	55.4% NB	260	8.8%	50.4% NB

[a] Daily traffic expressed in vehicles per day
[b] Hourly traffic expressed in vehicles per hour
[c] Percent of daily traffic volumes which occurs during the peak hour
[d] Percent of peak-hour volume in the predominant direction of travel

1"=700'

PROJECT:	Fairhaven Speed Study
LOCATION:	Green Street from Route 6 to Beacon Street
CITY/STATE:	Fairhaven, Massachusetts
PREPARED BY:	TEC, Inc.
SOURCE:	Town of Fairhaven / MassDOT

GREEN STREET

= 30 MPH STATUTORY SPEED LIMIT

Figure 1

Green Street Corridor and Existing Statutory Speed Limit

III. DATA COLLECTION

Summary of Data Collection

The MassDOT "Procedure," as revised in September 2021, defines the process by which regulatory and statutory speed zones may be requested or changed by a municipality in Massachusetts. These procedures are based upon guidelines found within the Federal Highway Administration's (FHWA) publication, MUTCD, which is the overarching national standard.

To post a legally enforceable regulatory speed limit, a comprehensive engineering study must be conducted within each proposed speed zone to establish a safe, reasonable, self-enforcing speed limit. This has been established by MGL Ch90 §18 and as outlined in the Procedure. Generally, new speeds are established based on a safe speed range centered on an analysis of the current speed distribution of free-flowing traffic along the existing roadway.

One of the most important steps for defining the current speed distribution of free-flowing traffic is measuring the prevailing speeds of motorists on a particular section of a roadway under ideal conditions. The speed at or below which 85 percent of motorists travel is the primary value used for establishing speed control. This is commonly referred to as the 85th percentile speed. This method is based on numerous studies which indicate that the majority of motorists are prudent and capable of selecting safe speeds. The 85th percentile speed is the national standard for establishing safe speed limits. In Massachusetts, numerical limits are based on ideal conditions. More specifically, the posted speed limits represent the maximum safe speed under ideal driving conditions.

The measures for determining the 85th percentile speeds upon the study area roadways include travel trial runs and radar speed collection. Additional studies as required by the Procedure include a crash data analysis and field observations of existing geometric conditions. These analyses were undertaken by TEC on behalf of the Town of Fairhaven for the study area to determine the continued applicability of the existing speed regulations and the zones where change is recommended.

Pre-Proposal Corridor Trial Runs

TEC conducted multiple speed trial runs along the study corridor in advance of providing a speed zone recommendation per Section 5.c of the Procedure. In accordance with the Procedure, three (3) different drivers conducted three (3) runs in each direction of Green Street. For each trial run, the driver operated at a safe maximum comfortable speed while a passenger seated directly behind the driver recorded speedometer and odometer readings

approximately every one-tenth of a mile. The data from the trial runs was aggregated to develop a speed curve representing the average safe maximum comfortable speed along each point of the study area corridors. A compilation of the trial run speed data is provided in Appendix B and is depicted on the Speed Control Summary sheets provided in Figure 2.

Radar Speed Collection

DATA COLLECTION

Spot speed checks were conducted at five (5) locations within the identified corridor zone on Tuesday, September 2, 2025. The general 'rule of thumb' is to establish spot speed checks at intervals at no more than every 0.25 mile along the subject corridor. The various stop-control locations along Green Street do not lend to providing these spot speed locations every 0.25 miles; however, five (5) individual locations were taken over the 1.28-mile roadway segment on sections of tangent roadway, where possible, and distant from the stop-control locations where speed may be artificially lower for vehicle turning movements and the intersection's stop condition.

FORMAT OF DATA COLLECTION

The spot speeds were collected for both directions of travel on weekdays during off-peak hours under ideal conditions. For each spot collection, data was gathered for 100 vehicles over a maximum two-hour period in accordance with the Procedure. Spot speed data was only gathered for vehicles in which the driver was choosing his or her own speed. For vehicles in closely spaced platoons, only the lead vehicle's speed was recorded. National Data & Surveying Services (NDS) collected the data from hand-operating radar guns which also allowed for the deciphering of platooned vs. non-platooned vehicles.

SPEED CHARACTERISTICS

After compiling the spot speed data, an 85th percentile speed was calculated for each spot speed location in accordance with MassDOT standards. The speed associated with the 85th percentile numbered vehicle (rounded to the nearest whole number) was then recorded as the 85th percentile speed. In addition to the 85th percentile speed, the following information was also tabulated: 95th percentile speed, 50th percentile speed, mode (the speed at which the greatest number of vehicles are traveling), and the pace (the 10-mph speed range containing the greatest number of vehicles). A summary of these parameters at each location is depicted in Table 2. The Speed Distribution sheets containing these values are provided in Appendix C and the resulting summary data is also depicted on the Speed Control Summary sheets provided in Figure 2.

1"=700'

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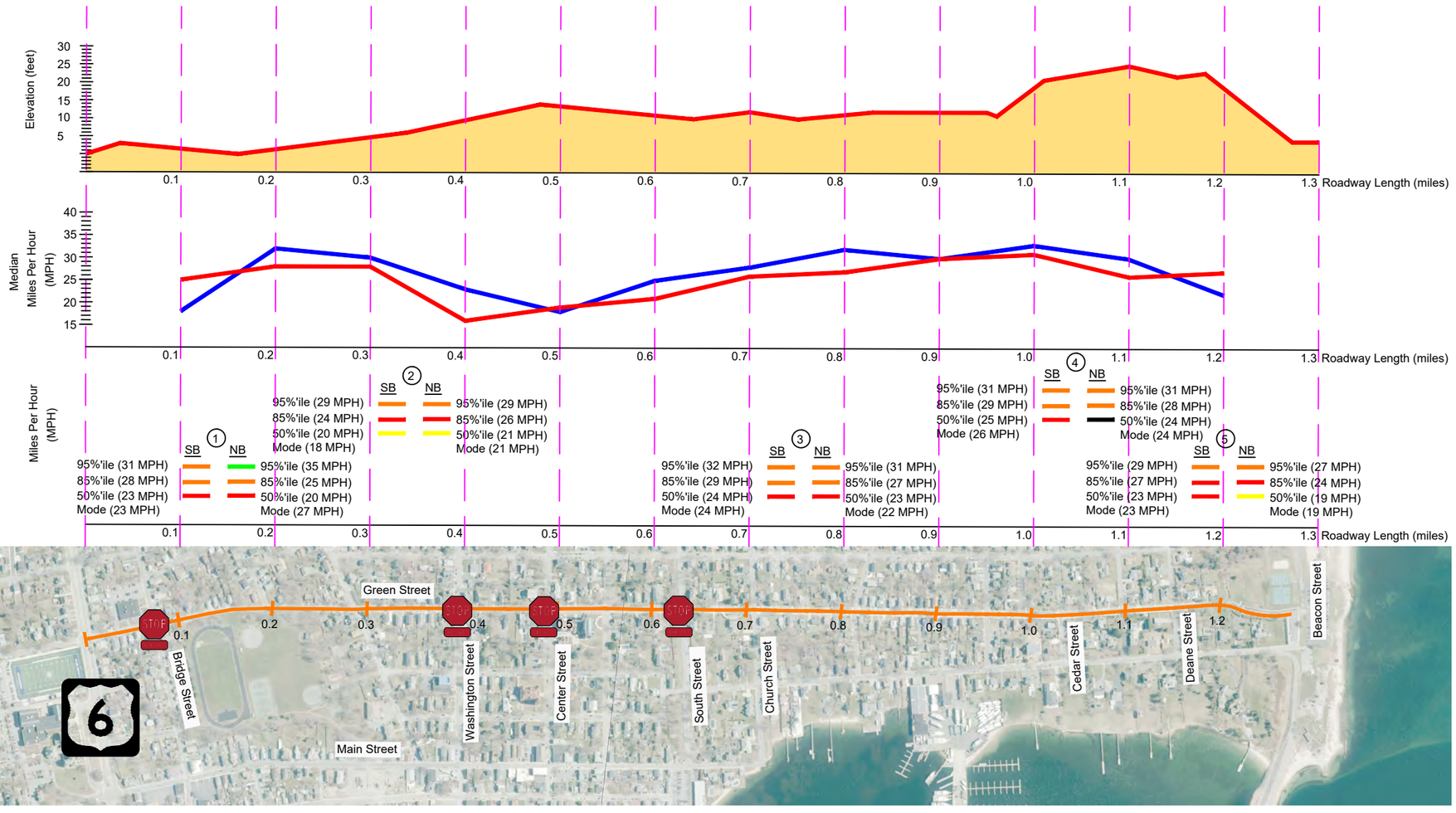
GREEN STREET



TRAIL RUN LEGEND:
= Northboound
= Southbound

STATUTORY SPEED LIMIT:
= 20 MPH
= 25 MPH
= 30 MPH
= 35 MPH

Figure 2

Speed Control Summary
Goulart Memorial Drive

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Table 2 – Radar Speed Data Summary

Corridor	Location	Measured Speed Characteristics				
		50th %'ile	85th %'ile	95th %'ile	Mode	Pace
Green Street NB	300' N/O Christian Street	25 MPH	30 MPH	35 MPH	27 MPH	20 – 29 MPH
	250' N/O Washington Street	21 MPH	26 MPH	29 MPH	21 MPH	17 – 26 MPH
	300' S/O Church Street	23 MPH	27 MPH	31 MPH	22 MPH	18 – 27 MPH
	150' S/O Cedar Street	24 MPH	28 MPH	31 MPH	24 MPH	20 – 29 MPH
	300' S/O Deane Street	19 MPH	24 MPH	27 MPH	19 MPH	15 – 24 MPH
Green Street SB	300' N/O Christian Street	23 MPH	28MPH	31 MPH	23 MPH	19 – 28 MPH
	250' N/O Washington Street	20 MPH	24 MPH	29 MPH	18 MPH	15 – 24 MPH
	300' S/O Church Street	24 MPH	29 MPH	32 MPH	24 MPH	19 – 28 MPH
	150' S/O Cedar Street	25 MPH	29 MPH	31 MPH	26 MPH	19 – 28 MPH
	300' S/O Deane Street	23 MPH	27 MPH	29 MPH	23 MPH	18 – 27 MPH

Crash History

Crash data for the study area corridor were compiled and analyzed for the most recent consecutive five-year period (2017 - 2021) of closed data on file through MassDOT's Interactive Mapping Portal and Crash Tracking (IMPACT) database. This data was reviewed to determine if any crash trends exist along the study area corridor; specifically pertaining to speed related crashes. A summary of the vehicle crash data is provided in Table 3. Crash data is provided in Appendix D. A corridor level collision diagram is provided in Figure 3.

SUMMARY OF KEY CRASH DATA

The crash data indicated 36 crashes over the five-year study period. The corridor experiences a crash rate of 5.23 crashes per million vehicle miles travelled (MVMT) which is significantly higher than the statewide average for urban minor arterial roadways (2.98 crashes per MVMT). Much of the crash history appears to be related to the various cross street intersection locations along Green Street which occur at regular intervals (data only those crashes along or involving a Green Street vehicle). More than half (19 of 36 crashes) of crashes were angled crashes which are likely to have occurred at these cross-street locations. Only one (1) crash denoted excessive speed as a contributing factor to the crash. Four (4) crashes did denote aggressive / erratic driving as a contributing factor. There were nine (9) crashes involving a parked vehicle and three (3) crashes involving swerving / avoiding which suggests that that narrow cross-section with on-street parking is a contributing factor to crash trends along the Green Street corridor.

North

1"=700'

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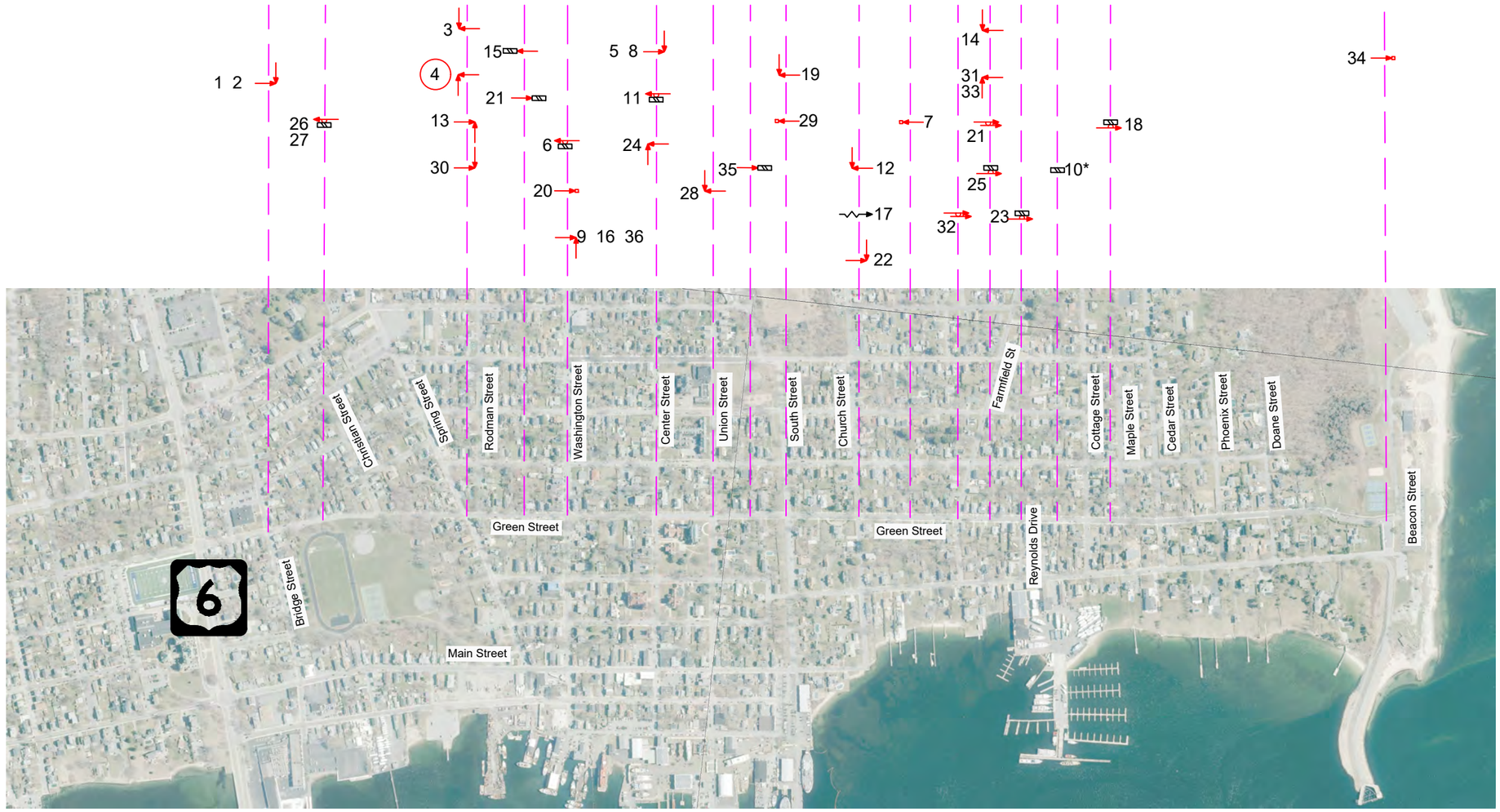
SOURCE: Town of Fairhaven / MassDOT

Green Street Corridor - Fairhaven, Massachusetts
Speed Zoning Engineering Study

TEC The Engineering Corp

Green Street Crash Summary
Figure 3



* Manner of collision cannot be determined from crash data.

LEGEND:

(#) = Directly speed related crash

= Non-speed related crash

Table 3 – Corridor Crash History Summary

Parameter		Green Street
Year	2017	6
	2018	6
	2019	10
	2020	7
	2021	7
	TOTAL	***36***
Average Annual Crashes		*7.2*
Rate per MEV (2017-2021)		*5.23*
Crash Type	Angle	19
	Rear-end	0
	Sideswipe	1
	Single Vehicle	15
	Head-On	0
	Not Reported	1
	TOTAL	***36***
Road Surface Conditions	Dry	26
	Wet	6
	Snow / Ice	0
	Other / Unknown	4
	TOTAL	***36***
Injury Status (Crash Severity)	Property Damage	26
	Non-Fatal Injury	6
	Fatal Injury	0
	Not Reported	4
	TOTAL	***36***
Day of Week	Monday-Friday	29
	Saturday-Sunday	7
	TOTAL	***36***
Time of Day	6:00AM-9:00AM	5
	9:00AM-3:00PM	13
	3:00PM-9:00PM	10
	9:00PM-6:00AM	8
	TOTAL	***36***

IV. ANALYSIS OF DATA

Safe Speed Range

The safe speed range is determined by both speed and other geometric impediments. The range is based on a low-end equal to 7-mph below the 85th percentile speed and the high-end equal to the 85th percentile speed or the speed corresponding to the sight distance allotted for the vertical and horizontal curvature along the roadway based on the American Association of State Highway and Transportation Officials (AASHTO)'s publication *A Policy on Geometric Design of Highways and Streets*, whichever is lowest. Any newly proposed speed limit should be within this range.

Horizontal Curvature – Sight Lines

There is one (1) prominent S-curve along Green Street which changes the way vehicles travel in the corridor. From field observations, these changes in the horizontal alignment provide sufficient sight distance above the 85th percentile speed as recorded in the speed radar counts. No adjustment to the high-end of the safe speed range is documented.

Table 4 contains a summary of the safe speed range for each spot speed location along Green Street.

Table 4 – Safe Speed Range

Corridor	Location	Safe Speed Range	
		Low End	High End
Green Street NB	300' N/O Christian Street	23 MPH	30 MPH
	250' N/O Washington Street	19 MPH	26 MPH
	300' S/O Church Street	20 MPH	27 MPH
	150' S/O Cedar Street	21 MPH	28 MPH
	300' S/O Deane Street	17 MPH	24 MPH
Green Street SB	300' N/O Christian Street	21 MPH	28 MPH
	250' N/O Washington Street	17 MPH	24 MPH
	300' S/O Church Street	22 MPH	29 MPH
	150' S/O Cedar Street	22 MPH	29 MPH
	300' S/O Deane Street	20 MPH	27 MPH

[a] Spot count location corresponding to the horizontal curve limitations. May be lower than low-end of safe speed range.

IV. RECOMMENDATIONS

In accordance with the MassDOT Procedures for Speed Zoning, the 85th percentile speed is one of the bases for establishing speed zoning. This method assumes that most motorists will select a safe speed that they are comfortable driving on a particular roadway. Should the number of crashes along a section of roadway be unusual, the roadway geometrics provide for lowered sight lines, the present of adjacent land uses, and other context items be present, the speed zone may be lower than the 85th percentile speed up to 7 mph.

Request for Special Speed Regulation

TEC and the Town of Fairhaven recommend that MassDOT establish a Special Speed Regulation along Green Street of 25 mph for the length of the subject segment. Table 5 contains TEC's recommended speed regulations along each speed study corridor. Graphical depictions of these recommended speed regulations are provided in Figure 4.

Table 5 – Recommended Speed Regulations

Corridor	Location (Speed Zone)	Mile Post [a]	Direction	Distance	Recommended Speed Regulation
Green Street	Beacon Street to US Route	0.00 to 1.28	Northbound	1.28 miles	Proposed 25 MPH
	US Route 6 to Beacon Street	0.00 to 1.28	Southbound	1.28 miles	Proposed 25 MPH

Justification

The following provides the engineering judgement reasoning for this request:

- *PROPOSED 25 MPH* – Measured from mile marker (MM) 0.00 to 1.28 (entire corridor segment). Green Street is classified as thickly settled where residential driveway access to the subject roadway over a distance of a quarter mile is less than 200-feet in addition to sixteen (16) neighborhood cross streets. A proposed 25 mph regulated speed zone would formalize the "thickly settled" similar to MGL Ch90 §17C in place of the statutory 30-mph speed established by Ch90 §17. The proposed 25 mph speed zone provides a regulated speed within the safe speed range for all locations both northbound and southbound. Note that the high-end of the safe speed range for all but one spot count location was less than 30 mph. All ten (10) spot count locations denote a 'Pace" below 30 mph.

North

1"=700'

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GREEN STREET

LEGEND:

= 25 MPH

= SPEED LIMIT SIGN

TEC The Engineering Corp

Figure 4

Green Street Corridor
Proposed Special speed Regulation

- On-street parking is present along the easterly side of the roadway north of Spring Street and along the westerly side of the roadway south of Spring Street. Note that the presence of on-street parking results in vehicles stopping and awaiting oncoming traffic to pass in order to proceed at many locations within the corridor.
- Much of the crash history appears to be related to the various cross street intersection locations along Green Street which occur at regular intervals. More than half (19 of 36 crashes) of crashes were angled crashes which are likely to have occurred at these cross-street locations. There were nine (9) crashes involving a parked vehicle and three (3) crashes involving swerving / avoiding which suggests that that narrow cross-section with on-street parking is a contributing factor to crash trends along the Green Street corridor. The amount of conflict potential on the corridor suggests a lower speed needed which is being acted upon by the exiting drivers.

In the absence of a Special Speed Regulation approval from MassDOT, the Town will evaluate an opt in of MGL Ch90 §17C on a roadway-by-roadway basis for Green Street only.

APPENDIX

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Appendix A

Automatic Traffic Recorder Counts

Appendix B

Pre-Proposal Trail Run Data

Appendix C

Speed Radar Data

Appendix D

Crash Data