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TO:	Dan Doyle Martha's Vineyard Commission	DATE:	August 23, 2019
FROM:	Keri Pyke, P.E., PTOE Sarah Davis	HSH PROJECT NO.:	2018042.08
SUBJECT:	Oak Bluffs High School Pedestrian Crossing Safety Improvements		

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## Introduction

*Howard Stein Hudson (HSH)* has prepared this technical memorandum for the Martha's Vineyard Commission (MVC) to present both short- and long-term safety improvements that could be implemented at the Edgartown-Vineyard Haven Road crossing between Martha's Vineyard Regional High School (MVRHS) on the southern side of the road and the YMCA of Martha's Vineyard, Martha's Vineyard Community Services (MVCS), and the Martha's Vineyard Ice Arena on the northern side of the road.

## Existing Conditions

MVRHS is located on Edgartown-Vineyard Haven Road. Located directly across the street are the YMCA of Martha's Vineyard, MVCS, and the Martha's Vineyard Ice Arena. Before, during, and after the school day, both staff and students must cross Edgartown Vineyard-Haven Road in order to move between the school and the facilities on the other side of the road.



*Looking west from the entrance to MVRHS, pedestrian sightlines are blocked by a bus stop on the shared use path that runs along the roadway.*

The road itself is two lanes wide, with narrow (~one to two feet wide) paved shoulders. On the south side of the road is a paved shared use path with roughly two feet of grass buffer separating it from



the roadway. No sidewalks are present on this road. Two bus stops (one in each direction) are located in the study area; the eastbound bus stop is directly in front of the school (west of the crossing) with a pull-off area on the shared use path; the westbound bus stop is located approximately 225 feet east of the crosswalk, directly in front of the skate park.

The existing crosswalk has been recently remarked with zebra striping. The crosswalk lacks any signage to warn approaching motorists but is lit by streetlights mounted on utility poles; it is uncertain how well-lit the crosswalk is under the existing lighting conditions. There are additional mid-block crossings located on either side of the focus crosswalk: one approximately 390 feet to the east, and one approximately 1,260 feet to the west (approximately 760 feet west of this crossing is a recently installed roundabout). Both crosswalks have the same zebra marking as the focus crosswalk. A locus map of the area can be seen in **Figure 1**. Separately from crosswalk safety improvements, plans are in place to reconfigure Village Road, which is immediately west of the focus crosswalk. A separate project is underway to improve lighting at the skate park, which is approximately 215 feet east of the focus crosswalk.



*Looking east from the entrance to MVRHS on Edgartown-Vineyard Haven Road.*

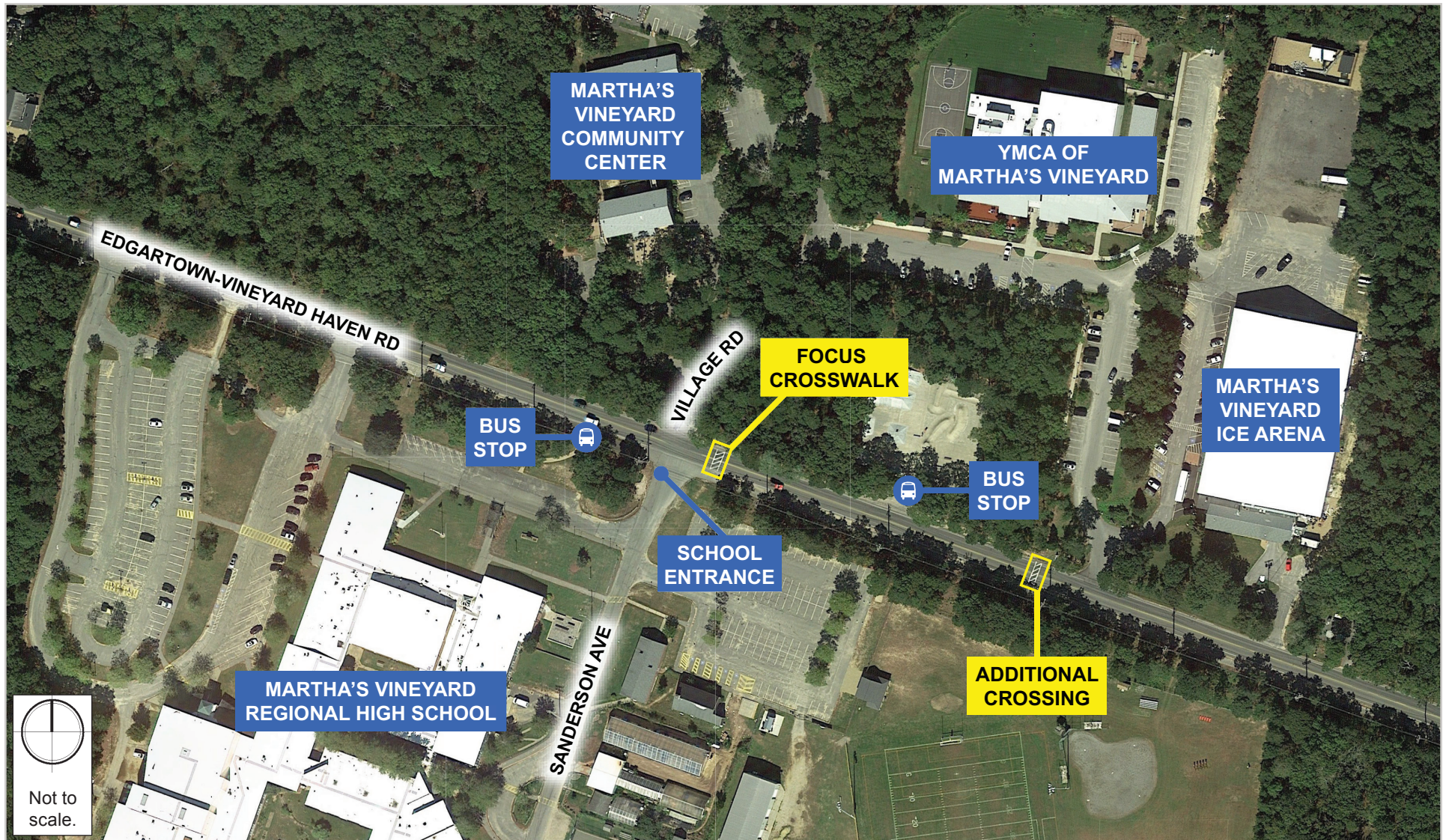


*The various types of crosswalk markings with names. Source: SF Better Streets, <https://www.sfbetterstreets.org/find-project-types/pedestrian-safety-and-traffic-calming/crosswalks/>*





Figure 1. *Locus Map of Study Area*







## Short-Term Alternatives

HSH has developed multiple short-term alternatives, all of which can be implemented independently or in conjunction with other short-term alternatives. For this analysis, short-term is any alternative that could be implemented prior to the start of the 2019-2020 school year. In addition to these safety mechanisms, HSH recommends installing tactile warning strips at the entrance to the crosswalk on either side of the road in order to create a fully accessible crossing that is safe for users of all abilities. Potential locations for each short-term alternative are shown in **Figure 2**.

### 1) *Install Crosswalk / Pedestrian Crossing Signage*

Because road users may not be expecting a road crossing away from an intersection, the installation of pedestrian crossing signage can be helpful to alert drivers that they are approaching the crossing. Both roadside Pedestrian Crossing signage (Manual on Uniform Traffic Control Devices (MUTCD) W11-2) and center-of road Yield Here For/Stop Here for Pedestrian (MUTCD R1-6a) signage would be appropriate at this crosswalk. Additionally, "Yield to Pedestrians Ahead" signage placed ahead of the crosswalk can warn drivers of the upcoming crosswalk before it would be otherwise visible.

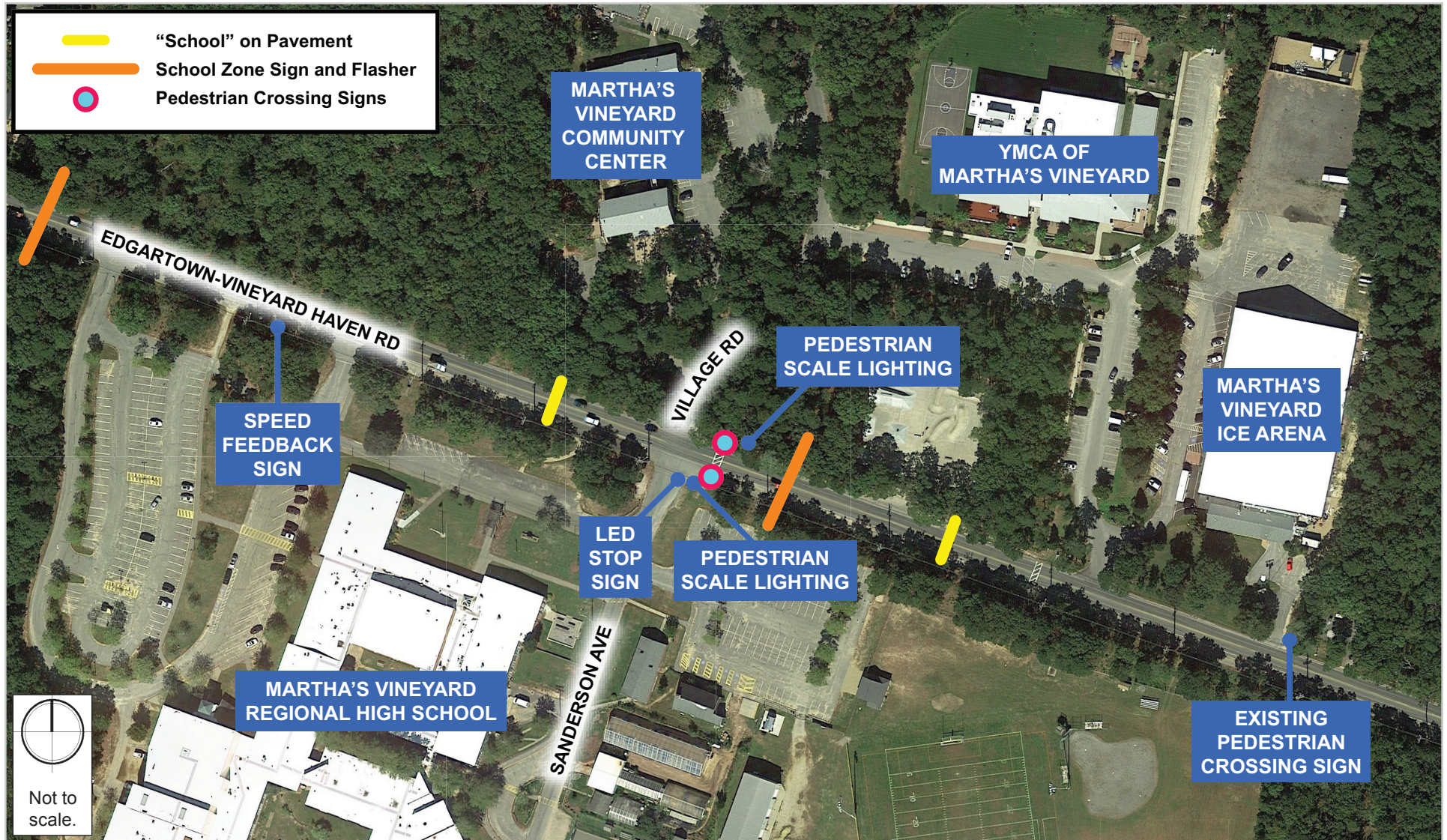


*A Pedestrian Crossing: MUTCD W11-2 Sign.*





Figure 2. *Potential Locations for Short-Term Alternatives*







## 2) *Add "School" Marking to Pavement*

Marking "School," "School X-ing," or "Slow" on the roadway can serve as an additional warning to drivers that there is a school zone with pedestrian traffic, serving as an indication for drivers to slow down.



*Marking on the roadway can provide further warning to drivers about the upcoming school zone. Photo: Florida Seal Coating, <http://www.floridasealcoating.com/asphaltstriping.html>*

## 3) *Pilot / Install Speed Feedback Signs*

Speed limits within the school zone can be further enforced with speed feedback signs that display the speed limit of the zone and "Your Speed" to passing vehicles. Feedback signs can include positive and negative reinforcement. Prior to purchasing and installing permanent signs, the Town can pilot the installation of these signs by utilizing some of their mobile, temporary speed feedback signs in order to gauge the impact on driver speeds. Sometimes, these signs have the capability to collect speed data; collecting this data would be beneficial in further working to create a safer crossing on this road.





4) *Relocate Westbound Bus Stop to the Far Sides of the Crossing*

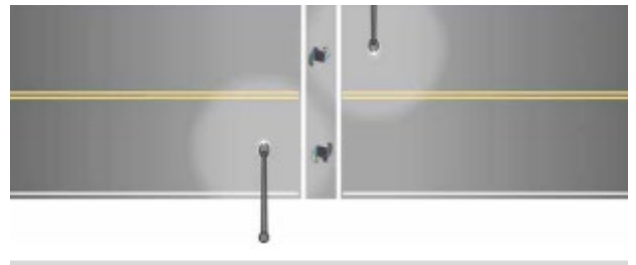
Currently, the buses stop prior to the crosswalk, both eastbound and westbound. While the eastbound stop was recently relocated and improved in its current location, relocating the westbound stop to be after, or on the far side of the crosswalk, allows increased pedestrian visibility for motorists.<sup>1</sup> Additionally, the relocation of one bus stop expands sightlines for pedestrians waiting to cross, particularly those crossing from the north side towards MVRHS.



*Pedestrian scale lighting is shorter and slightly dimmer than streetlights. Source: FHWA. Source: [https://safety.fhwa.dot.gov/roadway\\_dept/night\\_visib/lighting\\_hanbook/#fig46](https://safety.fhwa.dot.gov/roadway_dept/night_visib/lighting_hanbook/#fig46)*

5) *Install Pedestrian Scale Lighting*

The existing streetlights are mounted on utility poles, resulting in uneven spacing and lopsided lighting on the roadway. The installation of shorter, pedestrian-scale lighting near the intersection will increase visibility for both pedestrians and motorists at the intersection; according to *The Information Report on Lighting Design for Mid-block Crosswalks*, lighting should be installed “on either side of the road and placed prior to the crosswalk from the drivers’ perspective”.<sup>2</sup> Additional lighting at the two adjacent bus stops may also be considered with this installation or in coordination with town efforts to improve lighting at the skate park.



*Lighting placement for mid-block crosswalks as recommended by the FHWA. Source: FHWA*

<sup>1</sup> <https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/crosswalks-and-crossings/midblock-crosswalks/>

<sup>2</sup> <https://www.fhwa.dot.gov/publications/research/safety/08053/08053.pdf>



6) *Upgrade Stop Sign on Fire Road A / Sanderson Avenue*

Fire Road A / Sanderson Avenue provides access to the high school and adjacent athletic facilities, intersecting with Edgartown-Vineyard Haven Road immediately west of the focus crosswalk. A stop sign currently controls traffic moving north from Fire Road A / Sanderson Avenue to Edgartown-Vineyard Haven Road; however, a wide turning radius encourages low-compliance from students leaving school. LED stop signs have been shown to reduce vehicle approach speeds by one to three miles per hour while also reducing the number of vehicles not fully stopping by 28.9%.<sup>3,4</sup>



*Stop signs with LEDs can increase the visibility and effectiveness of stop signs. Source: US Traffic Systems. Source: <https://ustrafficsystems.com/solar-stop-sign/>*

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<sup>3</sup> [https://safety.fhwa.dot.gov/intersection/conventional/unsignalized/tech\\_sum/fhwasa09006/](https://safety.fhwa.dot.gov/intersection/conventional/unsignalized/tech_sum/fhwasa09006/)

<sup>4</sup> <https://www.dot.state.mn.us/trafficeng/safety/docs/ledstopsigns.pdf>





# Long-Term Alternatives

## 1) *Restripe Existing Crosswalks*

The existing crosswalks have recently been restriped with zebra markings. As these crosswalks fade with age, HSH recommends restriping all three crosswalks with high-visibility ladder markings to ensure that all vehicles can see the crossings from further away.



*The zebra-striped crosswalk in front of the school is faded, which may cause visibility issues for drivers.*



*An RRFB alerts vehicles to crossing pedestrians.*

## 2) *Install Rectangular Rapid Flashing Beacon (RRFB)*

RRFBs are pedestrian-actuated LEDs that supplement warning signs at unsignalized intersections or mid-block crosswalks. When paired with signage, RRFBs have been shown to increase driver yielding behavior significantly.<sup>5</sup> RRFBs could be installed on both sides of the roadway facing each direction and paired with “State Law-Yield to Pedestrians” in-street signage. RRFBs will be particularly helpful during nighttime hours and dark Massachusetts winters.

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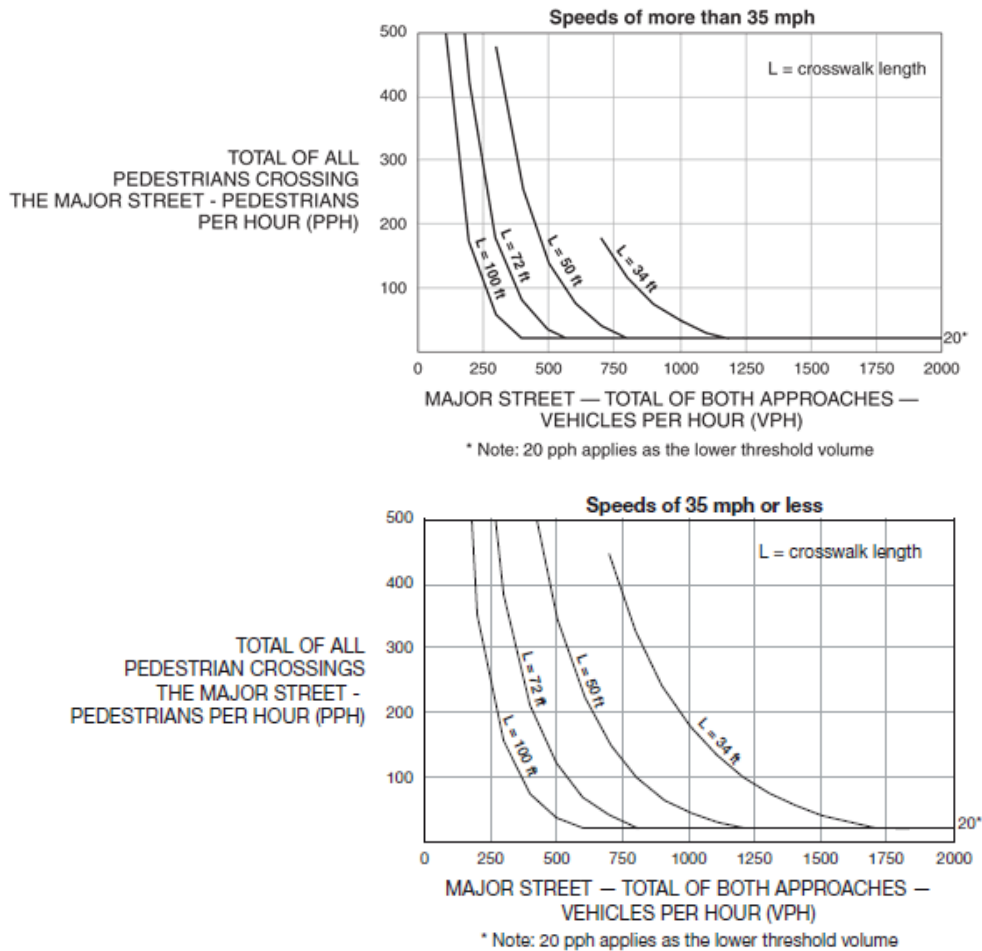
<sup>5</sup> [https://safety.fhwa.dot.gov/intersection/conventional/unsignalized/tech\\_sum/fhwasa09009/](https://safety.fhwa.dot.gov/intersection/conventional/unsignalized/tech_sum/fhwasa09009/)



3) *Determine whether a Pedestrian Hybrid Beacon (PHB)/ High-Intensity Activated crossWalk beacon (HAWK signal) would be appropriate*

Like an RRFB, PHB/HAWK signals do not light up unless they are activated by a pedestrian; however, PHB/HAWK signals hang over a roadway and require a driver's complete stop when lit up. A study must be done prior to installation to establish whether traffic and pedestrian counts show that volume totals meet standards set forth in MUTCD Chapter 4F for PHB/HAWK crossings. If a PHB/HAWK crossing is installed, stop lines would need to be added to the existing crosswalk markings.

**Figure 4F-2. Guidelines for the Installation of Pedestrian Hybrid Beacons on High-Speed Roadways**



*These two graphs show required vehicle and pedestrian volumes to justify the installation of a PHB/HAWK. Source: MUTCD*

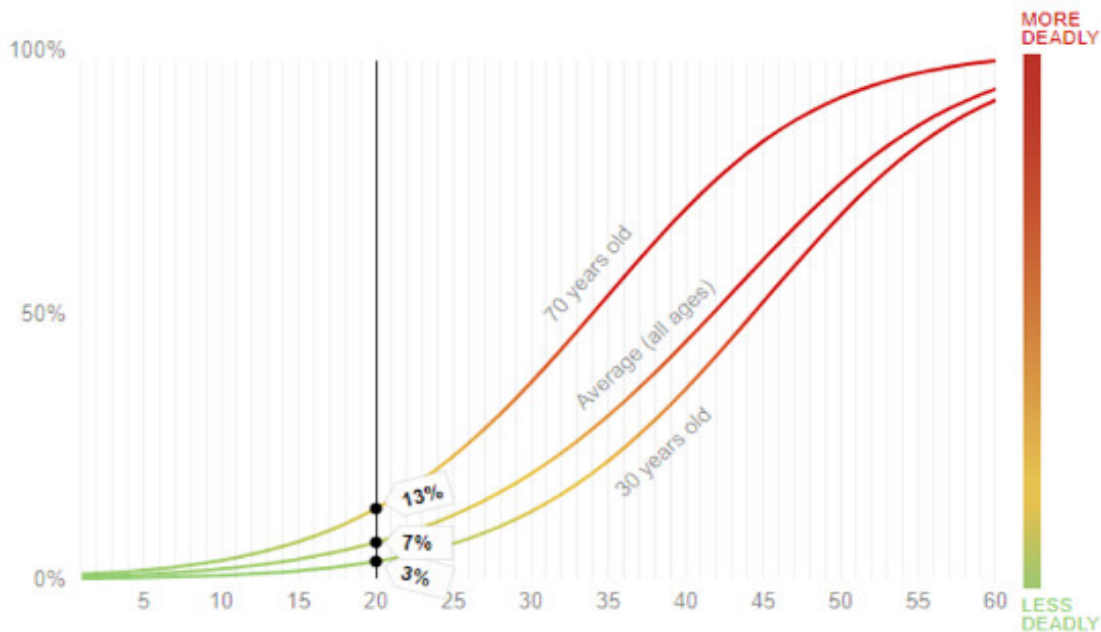




#### 4) *Create Transition Speed Zones*<sup>6</sup>

Currently, the placement of speed limit signs on Edgartown-Vineyard Haven Road leads to an abrupt drop from 45 mph to 20 mph for the signed school zone. Creating an intermediate 35-mph zone ahead of the school zone could help to reduce vehicle speeds more gradually; research shows that school zone speed limits should only be approximately 10 to 15 mph below the normal limit.<sup>7</sup> Vehicles traveling 45 mph have over a 50% likelihood of being deadly to pedestrians in a crash, while at 20 mph that likelihood drops to just 7% for a person of average age. Intermediate speed zones could be marked in advance with a “Reduced Speed Limit Ahead” sign (MUTCS W3-5). Altering speed limits requires a traffic engineering study be submitted to MassDOT to “justify a proposed speed limit that is safe, reasonable, and self-enforcing”.<sup>8</sup>

### The Chance of Being Killed by a Car Going 20 mph



*The deadliness of car crashes for pedestrians increases dramatically with vehicle speed. Source: MnDOT, <http://www.dot.state.mn.us/trafficeng/committees/minutes/2012/mayattachment3.pdf>*

<sup>6</sup> <https://www.mvtimes.com/2014/07/30/oak-bluffs-takes-speed-limit-hands/>

<sup>7</sup> <http://www.dot.state.mn.us/trafficeng/committees/minutes/2012/mayattachment3.pdf>

<sup>8</sup> [https://www.mass.gov/files/documents/2018/07/12/Procedures\\_for\\_Speed\\_Zoning\\_02-2017.pdf](https://www.mass.gov/files/documents/2018/07/12/Procedures_for_Speed_Zoning_02-2017.pdf)



5) *Construct a Pedestrian Refuge Island*

A pedestrian refuge island would allow additional opportunities for the installation of lighting and signage, while also transforming the existing crossing into a two-stage crossing. Rather than waiting for an extended gap in both directions, a pedestrian can utilize shorter gaps in traffic and focus their attention on just one direction of traffic at a time. Because refuge islands also work as traffic calming mechanisms, vehicles would be further motivated to obey posted lower speed limits in this section of the roadway. This alternative would require further study to determine potential impacts to adjacent driveways and large vehicles using the street (including trucks and buses), and some widening of Edgartown-Vineyard Haven Road to accommodate the minimum six-foot width needed for waiting in the refuge island.

6) *Conduct a Lighting Assessment*

With short winter days and early school mornings, this crosswalk is utilized frequently under dark skies. A lighting assessment could reveal whether a more thorough lighting upgrade or supplement to the existing lighting would increase safety before sunrise and after sunset.

## Conclusion

The mid-block pedestrian crosswalk between the Martha's Vineyard Regional High School and the YMCA of Martha's Vineyard/Martha's Vineyard Community Center/Martha's Vineyard Ice Arena lies in the center of a long, flat stretch of Edgartown-Vineyard Haven Road with a 45-mph speed limit. The current markings are not enough to create a safe crossing for students and faculty; multiple near crashes have taken place in recent months. Signage, RRFBs, lighting, and new markings can significantly increase safety. If these measures do not appear to be enough, additional long-term interventions can include the installation of a pedestrian refuge island or a study to determine whether a HAWK is a viable option.