

Pleasant Valley Road Speed Study

Introduction

The Town of Underhill requested the Chittenden County Regional Planning Commission (CCRPC) staff to investigate and evaluate the posted speed limit on Pleasant Valley Road between Mountain Road and Harvey Road. The Town of Underhill previously adopted a speed control ordinance in April 1980 which established a 45 mile per hour speed limit for Pleasant Valley Road from Mountain Road to the town line. The town expressed interest in whether or not the 1980 ordinance was still appropriate for this posted speed limit given the changed traffic and land use conditions overtime. In order for a Legislative Body to determine a safe and reasonable speed on town highways, a traffic engineering investigation (speed study) is required by the Vermont Statutes Annotated Title 23, § 1007. This document provides supporting findings that were used to develop recommendations for the existing speed limit on Pleasant Valley Road.

Existing Conditions

Pleasant Valley Road is paved and classified by the state as a Class II Town Highway and functionally classified as a Rural Major Collector. The CCRPC installed two Automatic Traffic Recorders (ATR) along Pleasant Valley Road at locations shown in Figure 1 to collect traffic volume and speed data. Data were collected between June 16, 2017 to July 6, 2017. Figure 1 shows the study area and ATR locations.

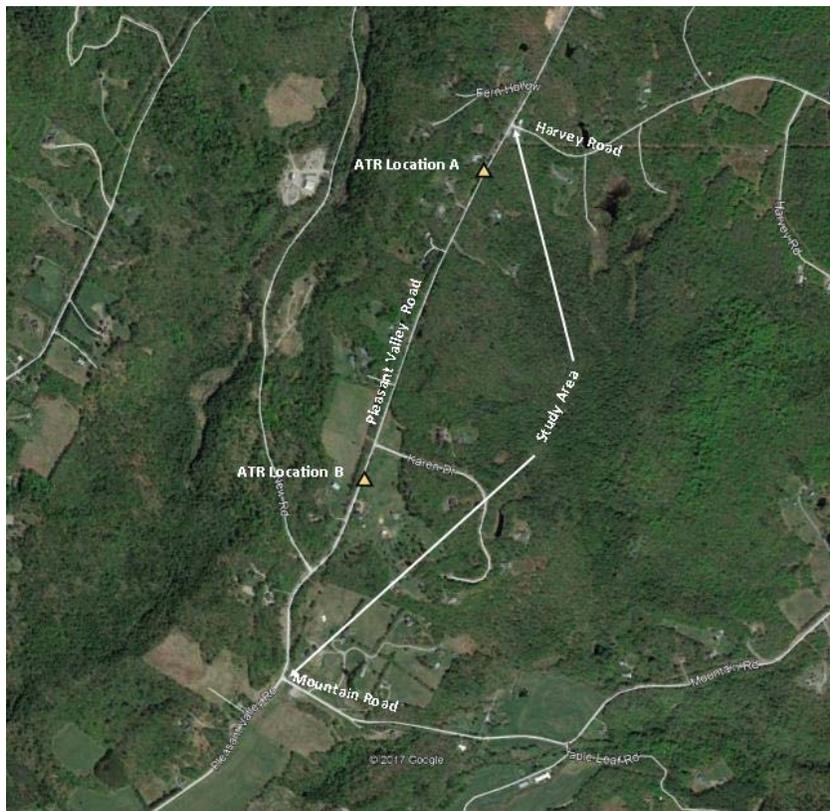


Figure 1: Study Area and ATR Locations

Findings of Windshield Survey

A windshield reconnaissance survey was conducted in both travel directions on Pleasant Valley Road by the team to identify safety related issues, roadway characteristics, limited sight distance locations and roadside safety hazards. The following is a list of findings from the windshield survey:

1. The roadway width varies between 20 and 24 ft. The typical travel lane width along Pleasant Valley Road is 10 ft with a wider width of 11 to 12 ft at curves.
2. Shoulders are marked and vary in width between 0.5 and 1.5 ft.
3. The posted speed limit is 45 mph in the study area.
4. Some driveways located along the roadway section are not visible for motorists, especially those located on curves.

Crash History and Analysis

There were two crashes reported between 2012 and 2016 along Pleasant Valley Road between Mountain Road and Harvey Road. Figure 2 shows historical crash locations along the study corridor.



Figure 2: Historical Crash Locations on Pleasant Valley Road

It is evident from the above figure that the two crashes occurred at intersections along Pleasant Valley Road. Table 1 shows day and time of reported crashes along the study corridor.

Table 1: Historical Crash Data

Report Number	Crash Date	Time	City/Town	Address	Crash Type	Collision Direction	Weather	Road Group
15A106002	11/24/2015	5:06 PM	Underhill	FAS-233 Pleasant Valley Road at Harvey Rd	Unknown	Unknown	Unknown	Federal Aid Secondary System (CL 2 TH)
13A104253	10/28/2013	6:43 PM	Underhill	FAS-233 Pleasant Valley Road at New Rd.	Unknown	Unknown	Unknown	Federal Aid Secondary System (CL 2 TH)

The contributing circumstances for crashes were either not recorded or unknown.

Speed Data Analysis

The 85th percentile speed associated with the traffic counts at Locations A and B are observed as 50 and 49 mph, respectively, whereas the posted speed limit is 45 mph. This indicates that 85 percent of drivers are comfortable driving at an operating speed of 50 mph or less along the study corridor.

A widely used metric in setting speed limits is the 85th percentile speed. This is defined as the speed in which 85% of motorists are traveling at or below. Based on the best available evidence and previous research, speed limits set using the 85th percentile speed data are not only acceptable by the majority of motorists, but also fall within the speed range where crash risk is lowest¹. The Manual on Uniform Traffic Control Devices (MUTCD), which is adopted as the standard for all traffic control devices in Vermont (Title 23 V.S.A. Section 1025), recommends setting speed limits within 5 mph of the 85th percentile speed while taking into consideration other factors such as roadway characteristics, shoulder condition, grade, the speed pace, land uses, development setbacks, parking, crash history, and bicycle/pedestrian activity.

Pedestrian Activity Factor

As mentioned above, other factors should be considered in determining a safe and reasonable speed limit. There were no severe crashes within the reporting period and parking along Pleasant Valley Road is not allowed within the study area. Based on research work in other states, the prevailing speeds may be reduced by 5 percent when the total pedestrian traffic exceeds 10 people per hour for any three hours within any eight-hour period. Pedestrian volume data are not available for the study area. However, anecdotal information from general observation indicates that pedestrian volume in the study area does not exceed 10 people per hour for any three hours in a day.

USLIMITS2

The Federal Highway Administration (FHWA) developed a web based tool, called USLIMITS2, to assist practitioners in determining reasonable, safe and consistent speed limits for specific segments of roads. FHWA disclaimer: "This tool does not constitute a standard, specification or regulation"².

With the given roadway conditions, traffic volume, 85th percentile speed and pedestrian activity, the USLIMITS2 tool recommends setting 50 mph speed limit for the Pleasant Valley Road segment in the study area. See the USLIMITS2 report in Appendix A.

¹ Synthesis of Speed Zoning Practice, FHWA-RD-85-096, Technical Summary.

² <https://safety.fhwa.dot.gov/uslimits/index.cfm>

Table 2: Technical Summary

Municipality:	Town of Underhill
Road Name:	Pleasant Valley Road
Location:	Between Mountain Road and Harvey Road
Recommended Speed Limit:	45 mph
Evaluation By:	Sai Sarepalli, P.E. Transportation Planning Engineer
Final Report Document Date:	11/28/2017

85th Percentile Speed (mph):	Location A: 54 MPH : Northbound 46 MPH : Southbound Location B: 51 MPH : Northbound 48 MPH : Southbound
10 mph Pace Speed (mph) & Percentage in the range	Location A: 46-55 MPH : Northbound (58.7%) 36-45 MPH : Southbound (69.7 %) Location B: 41-50 MPH : Northbound (62.6 %) 41-50 MPH : Southbound (66.4%)
Average Test Car Speed (mph)	45 MPH
Safe Speed at Curves and/or Intersections:	40 MPH
Safety problem related to speed:	Motorists driving at excessive speeds along curves can pose safety hazard
Average Daily Traffic (Vehicles per Day)	Location A: 1,232 ADT (06/16/17 – 06/22/17) Location B: 1,195 ADT (06/30/17 – 07/06/17)
Town Highway and Functional Classification	Class II Town Highway - Rural Major Collector
Road Surface	Paved
Road Width	Varies between 20 and 24 ft.
Shoulder Surface	Paved/Gravel
Shoulder Width	Varies between 0.5 and 1.5 ft.
Parking	No Parking
Pedestrian/Bicycles	No marked bike lanes
Adjacent Land use	Residential and Agricultural

Conclusion and Recommendations

Pleasant Valley Road along the study area is fairly a straight section with wide curves and steep grades. As per the observed bidirectional 85th percentile speed data, majority of drivers are traveling at or below 50 mph speed. While considering the roadway characteristics, road side development and land use, crash history, pedestrian activity and recommendation from the web based tool, USLIMITS2, **it is recommended to continue to maintain the 45 mph speed limit for the study area as per the Town's speed control ordinance.**

It is recommended the Town should consider implementing traffic calming measures such as speed feedback radar signs on poles and optical speed bars at appropriate locations to warn and slow motorists traveling on Pleasant Valley Road. Optical speed bars are a series of white rectangular pavement markings typically 1 foot wide placed just inside both edges of the lane and spaced progressively closer to create an illusion of traveling faster as well as the impression of narrower lane. See picture in Appendix B.

In addition, the Town should consider developing on-street bicyclist and pedestrian facilities such as widened shoulders along Pleasant Valley Road to facilitate occasional bicyclists and pedestrians.

Appendix A

USLIMITS2 Speed Zoning Report

Project Name: Pleasant Valley Rd-Speed Study

Analyst: Sai Sarepalli

Date: 10-16-2017

Basic Project Information

Project Number: 20171710_Underhill
Route Name: Pleasant Valley Road
From: Mountain Road
To: Harvey Road
State: Vermont
County: Chittenden County
City: Rural/Other
Route Type: Road Section in Developed Area
Route Status: Existing

Roadway Information

Section Length: 1.06 mile(s)
Statutory Speed Limit: 45 mph
Adverse Alignment: No
One-Way Street: No
Divided/Undivided: Undivided
Number of Through Lanes: 2
Area Type: Residential-Collector
Number of Driveways: 13
Number of Signals: 0

Crash Data Information

Crash Data Years: 5.00
Crash AADT: 1230 veh/day
Total Number of Crashes: 2
Total Number of Injury Crashes: 0
Section Crash Rate: 84 per 100 MVM
Section Injury Crash Rate: 0 per 100 MVM
Crash Rate Average for Similar Roads: 366
Injury Rate Average for Similar Roads: 101

Traffic Information

85th Percentile Speed: 50 mph
50th Percentile Speed: 44 mph
AADT: 1232 veh/day
On Street Parking and Usage: Not High
Pedestrian / Bicyclist Activity: Not High

Project Description: Validate posted speed limit for Pleasant Valley Road between Mountain Road and Harvey Road in Underhill.

Recommended Speed Limit:



Note: The final recommended speed limit is higher than the statutory speed limit of **45 mph** for this type of road. An engineering study such as the one carried out with USLIMITS is usually required to set a speed limit above the statutory limit.

Appendix B – Traffic Calming Measures



Sample of Optical Speed Bars

Photo Courtesy: usatoday30.usatoday.com



Sample of Speed Feedback Radar Sign

Photo Courtesy: www.radarsign.com