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# Road Safety Audit

## NH 10/Manning Hill Road Winchester, NH

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# **Road Safety Audit NH 10/Manning Hill Road, Winchester, NH**

## **1.0 Introduction**

### **1.1 Scope and purpose of Road Safety Audit**

A Road Safety Audit (RSA) is a formal, proactive safety performance examination of a roadway or intersection by an audit team. It is a qualitative assessment that reports on potential safety issues and identifies opportunities for improvements in safety for all types of road users.

The audit team assembled for a RSA is independent of a highway design team and it is multidisciplinary in order to provide a variety of perspectives that inform the future safety design considerations by a design team. The RSA team assembled for this project is composed of local people that contribute valuable “context-sensitive” information and observations that are not ordinarily available to a highway design team through data sets, maps and other standard tools and resources ordinarily used to inform highway project designs.

Road Safety Audits are not meant to be a checklist of compliance with design standards and they are not meant to be a crash investigation or crash data analysis, although the crash history of an existing road is reviewed to make sure that previous crash patterns have been addressed.

The RSA process used for this particular project involved the following steps:

1. Identification of a project to be audited.
2. Selection of a RSA team and NHDOT designated liaison(s).
3. Meeting with the RSA team to review the RSA process and review project information.
4. Field observations and documentation of findings.
5. Analysis of findings and preparation of an RSA report.

Upon completion of the *Road Safety Audit for the NH 10/Manning Hill Road, Winchester, NH*, the Southwest Region Planning Commission (SWRPC) and the Road Safety Audit Team will present the audit findings to the NHDOT designated liaison(s) and request a formal response to the findings and suggestions in the Report. The Report shall be used as a tool to incorporate findings into the project when appropriate.

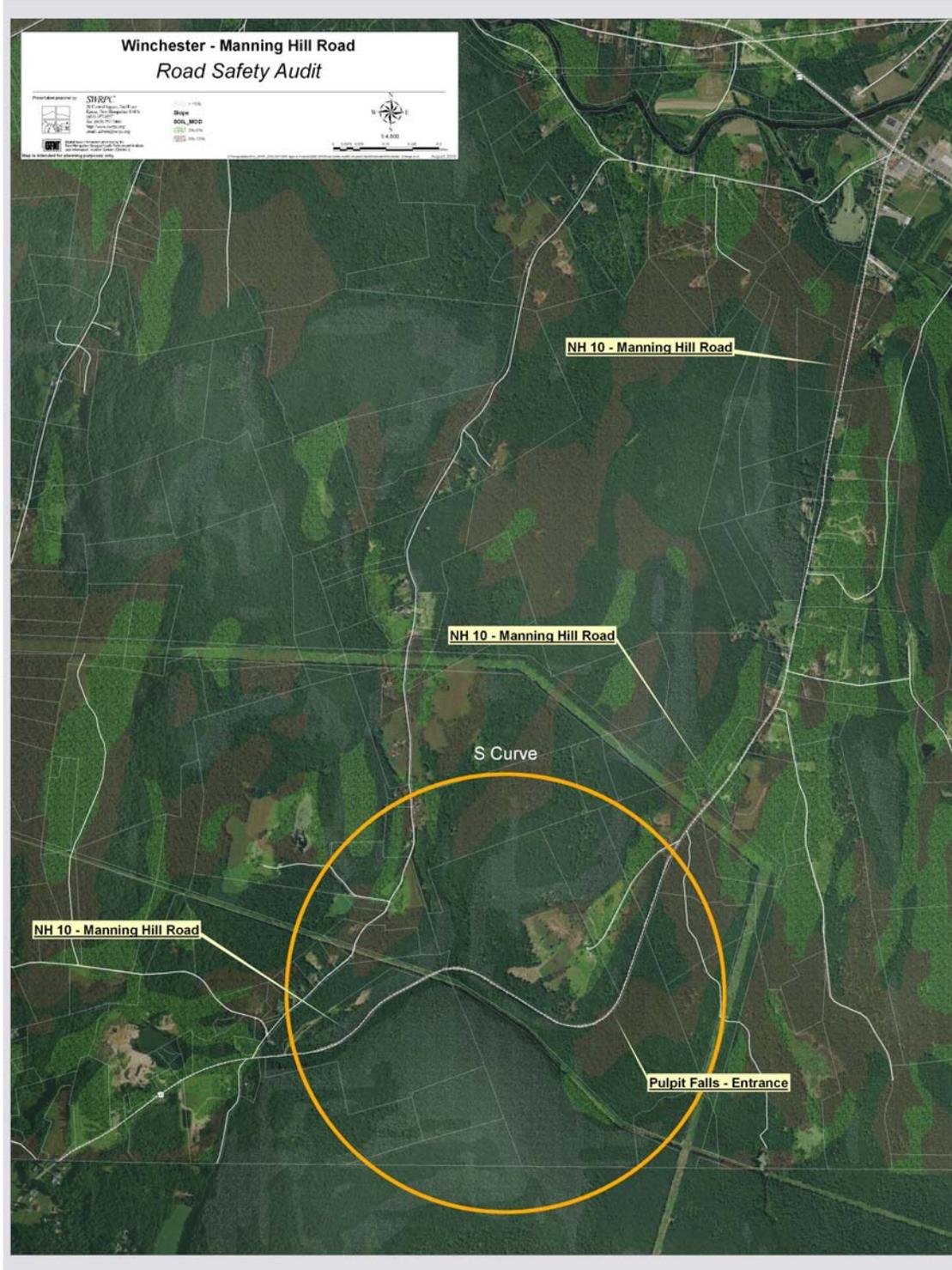
### **1.2 Identification of project**

This RSA Report describes a safety evaluation of NH 10/Manning Hill Road in Winchester, NH. The project was identified as a candidate for an RSA for several reasons. The roadway has been identified as a high-profile safety concern by the Town of Winchester and SWRPC’s Transportation Advisory Committee for a number of years. Although the roadway was programmed as a 5.1 mile reconstruction/rehabilitation effort in the 2007-2016 New Hampshire Ten Year Transportation Improvement Plan (TIP) at a cost of \$13.35 million, the project was later deferred in the 2009-2018 TIP. The project’s deferral was a result of the limited transportation funds available to the State of NH. The RSA was identified as a positive step toward proactively seeking ways that the State, Town, intersection abutters and other interested parties can make the road safer by offering short-term as well as long-term-low cost as well as higher cost improvements that can be implemented at various stages into the future.

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## 1.3 Project limits

This RSA focuses on the safety of NH 10/Manning Hill Road. Factors such as grade, driver speeding, signage, sight distance and other factors were the kinds of variables used to determine the project limits of the approaches to the intersection. The S curve was a focus of the project.



August 31, 2009

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**2.0 Background**

**2.1 Audit team, affiliation and qualifications**

The RSA team assembled for this audit has qualifications and expertise in public safety, emergency management, road maintenance, planning and insurance issues as well as a rich local knowledge on the historic performance of the intersection. Participants on the RSA Team include the following people:

- Kenneth Gardner, Winchester Select Board
- John Gomarolo, SWRPC Board of Directors, Winchester
- John Harrison, Former Winchester Police Chief
- Larry Hill, SWRPC Transportation Advisory Committee
- Gus Ruth, Winchester Select Board
- Margaret Sharra, Winchester Land Use Planning Assistant

Other participants from Winchester included Dale Gray, Winchester Highway Superintendent; and Barry Kellom; Winchester Fire Chief. Winchester Police Chief Gary Phillips provided assistance with crash data assembled for this RSA.

NHDOT's Bureau of Traffic provided direct support for this RSA process. NHDOT liaisons involved in the RSA included:

- Doug Graham, District 4 Engineer
- John Kallfelz, Assistant District 4 Engineer
- William Lambert, Administrator of Bureau of Traffic

Other NHDOT personnel used as resources to investigate the intersection included Craig Green and Stuart Thompson from the Bureau of Highway Design.

SWRPC transportation planning staff facilitating the RSA included:

- J. B. Mack, Senior Planner
- Neel Patel, Planning Technician

**2.2 Data and information received from NH DOT and other sources**

The following existing data and information was collected and reviewed for this RSA:

- NH DOT available crash data from 1995 to 2007
- NH DOT available average annual daily traffic (AADT) for NH 10 (Manning Hill Road).
- Aerial photos, parcel data, topographical contours and zoning information

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Additional information collected by SWRPC for this project included:

- Winchester Police Department crash reports from 2006 to present-2009
- AM and PM peak hour turning movement counts for the intersection of NH 119, NH 78 and NH 10 from 2000
- Photo inventory

Key data used for this audit are available at [ftp.swrpc.org](http://ftp.swrpc.org). The case sensitive username and password for the data is "RoadSafetyAudit" and "safety4u!!" respectively. Additional information cited above is available from SWRPC upon request.

### **2.3 Key observations from data and information**

Recent crash data from January 2006 to April 2009 showed a total of 26 crashes, including 2 resulting in injury, and one fatality. Since 1995, crashes were distributed fairly evenly throughout the year with the most crashes occurring in March, November and December. Roughly half of the crashes occurring on Manning Hill during this time involved running off the road and crashing into an object. More than half of the accidents recorded during this period occurred during rain, sleet or snow conditions. Based on available data, about half of the accidents occurred in the dark in the absence of street lights.

The RSA Team also collected and examined slope and grade information for the stretch of road as well as a preliminary analysis of the number of parcel owners that might be approached to discuss trimming additional brush. As is noted on a drive through Manning Hill, the most extreme slopes on the roadway itself occur in the "S" curve area and there are large parcels with wide frontage abutting the "S" curve section.

A third key observation made by the RSA Team is that the Town of Winchester has been approached by a number of private venture companies over recent years interested in locating in the Town, many of which would create substantial truck traffic through Manning Hill. One example is an application that will likely be coming before the Town to build a large biomass plant which is expected to generate a high volume of truck traffic on Manning Hill Road.

### **2.4 Observations regarding site visit**

The RSA team performed a site visit at the intersection which included driving the highway from all approaches as well as observing other road users on the "S" curve where it was safe to pull over. The RSA team used a prompt list and followed Federal Highway Administration (FHWA) recommendations to observe the site using the GORE prompt method. GORE stands for Geometry, Operations, Road users and Environment. The following observations were made:

#### Geometry:

- Several pull offs have been constructed which can be used during emergencies.
- Some bank stabilization work has been performed in the last few years but other areas appear to remain unstable.
- Some drainage work has been improved over the last few years but some areas need additional work.
- The highway's Right of Way is expected to be fairly narrow. NHDOT estimates that it is 3 rods on Manning Hill Road (+/- 50 ft).

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- The highway shoulders are unpaved and very narrow along most of the roadway.
- There is very little clear zone on most stretches of the highway and shoulders often meet steep ditching or granite hill with little to no clear zone.
- There is a combination of horizontal curvature and steep grades on the roadway including an area known as the “S” curve which is on the steep grade on the “back side” (Northfield side) of Manning Hill.
- The steep grade on both sides of Manning Hill slows uphill traffic (especially trucks).
- Horizontal and vertical curvature on various parts of the highway create sight line issues.

#### Operations:

- There are a number of new guardrails on the highway as well as signage near the S curve area.
- Chevrons, curve signs and reflective road edge delineators have been placed in most important areas
- Some signs are in need of an upgrade. Several signs are showing age and excessively cracking and/or losing reflectivity.
- No steep grade/truck signs are on the Northfield, MA side of the hill.
- There is a cluster of driveways at the top of the hill. Some cars park on the road where there is already a limited shoulder and clear zone.
- Driveways on the Winchester side of the hill approach Route 10 on a steep grade. Driveways are known to wash out in the middle of the road and some do not have culverts. It is unclear if sight distance is compromised for these driveways, although there is a good deal of vegetation around the driveways.
- The passing lane on the northern end of Manning Hill may encourage higher risk passing by impatient drivers.
- Motorists can travel through the corridor comfortably at 50-55 mph.
- Some older guardrails seem to be losing ground stabilization.
- The center yellow lines on the highway are fading.

#### Road Users:

- Locals note that trucks (including overlimit trucks) utilize Route 10 to enter the Monadnock Region and bypass I-91 in Vermont.
- Tractor trailer trucks using the road often have difficulty going around curves in the winter. Several accidents have occurred on the hill but have not been recorded.
- NH 10 is noted as a favorite road for motorcyclists.
- A new favorite destination in S-curve area is Pulpit Falls where there is a recreational trail to a local waterfall. Parking for Pulpit Falls is on opposite side of road on a horizontal curve.
- The RSA team noted that workers doing brush work or other highway work on Manning Hill Road have limited space to accomplish work.

#### Environment:

- The RSA team noted that NHDOT Maintenance has stepped up attention on winter maintenance over the last few years which has improved roadway conditions.
- There is a lack of drainage in some areas including driveways accessing Manning Hill Road.

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- A canopy cover south of Old Manning Hill Road prevents the sun from hitting the road and melting snow and ice.
- Frequent hilltop fog limits sight lines on the highway.
- Nighttime driving through the area is extremely dark. Trees block out moonlight as well. Reflectivity is seen as very important for signs, guardrails, and highway edge delineation for Manning Hill Road. There are a number of gaps in highway edge delineation markers on the “S” curve and the white shoulder pavement markings are losing reflectivity during the night.

### 3.0 Priority Issues and RSA Team Suggestions

The RSA team identified three theme-related issues as well as suggestions that should improve safety at this intersection. The bullet lists of suggestions under each issue are in an order that is meant to reflect short term less expensive measures before long term improvements.

**Issue 1:** Environmental conditions including snow, sleet, fog, rain and darkness compromise the ability of cars and trucks to safely traverse up and down Manning Hill.

- Consider posting advisory signage on either end of NH 10/Manning Hill Road encouraging traffic to turn on headlights and to warn them of potentially hazardous weather conditions during daytime through this section.
- Evaluate the safety and the effectiveness of adding sand barrels in clear zones that will assist vehicles that are stuck in snow/ice to move their vehicles, and/or as a means to alert drivers of sharp curves.
- The Town of Winchester should work with abutters and NHDOT District 4 to improve drainage issues of existing driveways as well as ensure new driveways meet “low impact development” storm water management standards.
- Explore the installation of an Intelligent Transportation System (ITS) sign with flashing beacon (or series of signs) that warns motorists to proceed carefully on Manning Hill during inclement weather. The sign would be operated manually during inclement weather by the Town of Winchester and/or NHDOT District 4. Assess the ability to use solar power due to the lack of power lines on some parts of the hill. However, this may prove difficult given the excessive vegetative shading on the highway.
- The Town and NHDOT should approach the parcel owners along Manning Hill Road to foster an agreement that allows them to cut back trees and other vegetation at a reasonable distance to mitigate shading, icing and extreme darkness caused by a “tunnel” effect of the thick tree canopy on either side of the highway. If this is not possible, explore working with utility companies or purchasing additional right-of-way in key areas to clear vegetation.
- Widen shoulders and create clear zones wherever possible as funding becomes available with priority focus on the “S” curve area.
- Examine opportunities for creating truck lanes on either side of Manning Hill as well as improving curvature and slopes on the highway. The RSA Team recognizes that truck users are an important user group to accommodate on Manning Hill.

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**Issue 2:** RSA Team observations suggest that improvements can be made to enhance the readability of road curves and the nonexistence of shoulder and clear zones on the curves. This issue is especially prominent at night or during conditions of clouds, fog, rain, or snow at dawn and dusk.

- Repaint and improve the reflectivity of the white pavement markings indicating the shoulder areas on Manning Hill Road.
- Replace existing signage that is aging, cracking and losing reflectivity.
- Add additional chevrons to current curves, as well as to curves that do not currently have chevrons, and enhance reflectivity for improved visual quality during the daylight and evening hours.
- Evaluate gaps in highway edge reflective delineators along the shoulder and on guardrails. Due to the narrowness of the road, its curvature, the extreme darkness and the lack of shoulders and clear zones, consider installing reflective highway edge delineators on both sides of the road so that motorists can see the delineation of both sides of the road—not just the right hand side of the road.

**Issue 3:** Speeding is an issue on much of Manning Hill’s curves, most prominently in the areas of the ‘S’ curve, south of Old Manning Hill Road, and on the steep downhill slope, north of Old Manning Hill Road on the approach to the intersection of NH 119, NH 78 and NH 10.

- Evaluate the safety of existing passing areas on Manning Hill Road in order to discourage drivers from taking risky passing maneuvers on the road especially during poor weather conditions.
- Consider installing two truck/hill signs showing grade of hill on the Northfield side of the hill for southbound traffic on the top side of the hill and for northbound traffic on the bottom side of the hill below the “S” curve. Evaluate the effectiveness of adding a flashing yellow beacon to a speed limit sign for the downhill approach.
- Explore pavement applications that warn drivers to slow down along steep curves and grades. Pavement applications may also provide useful traction during inclement weather for motorists having difficulty traversing up and down hills.
- Assess ways to create a safer parking area for Pulpit Falls visitors.
- Increase law enforcement presence and speed patrol in the vicinity and along NH 10/Manning Hill Road.

## **4.0 Contact Information**

Southwest Region Planning Commission has agreed to be the principal contact for any questions or comments relating to this Road Safety Audit report. Please contact SWRPC for any explanation of data or field reviews used during this report or if clarification is required for project development purposes on NH 10/Manning Hill Road.

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