Central Vermont Regional Planning Commission
Town of East Montpelier
Intersection Design Feasibility Study

Alternatives

Submitted by:
Lamoureux & Dickinson Consulting Engineers

In conjunction with
Broadreach Planning & Design
Heritage Landscapes LLC
University of Vermont Consulting Archaeology Program

October 10, 2017
This report has been formatted for double-sided printing.
Blank pages are intentional, so that the beginning of the report and the appendices can start on an odd numbered, right-side page.
A. INTRODUCTION

1. OVERVIEW

This study is examining the most appropriate ways to increase safety for motorist, bicyclists, and walkers at the intersection of Gallison Hill Road and Brazier Road with Towne Hill Road in the Town of East Montpelier, Vermont. The project is being funded and supported by the Central Vermont Regional Planning Commission.

To begin the project, the Town of East Montpelier, with assistance from the Central Vermont Regional Planning Commission (CVRPC) created a Steering Committee to guide the development of the project. CVRPC also contracted with the consultant team of Lamoureux & Dickinson, Broadreach Planning & Design, Heritage Landscapes, and the University of Vermont Consulting Archaeology Program (the L&D Team). Together, the Steering Committee and the L&D Team examined the existing conditions around the intersection. The Existing Conditions Summary in the Study Area was the first product of the Steering Committee.

2. PURPOSE AND NEED

The purpose of the intersection improvement project examined in this study is to improve conditions on the roadway that will slow motorists moving through the intersection; create longer sight lines for the north, east and south approaches to the intersection; and provide improved facilities for walkers and bicyclists in and near the intersection.

Needs for the improvements result from:

- High traffic volumes passing through the intersection during peak periods, particularly the morning peak hour;
- Minimal shoulder widths on each roadway approaching the intersection;
- The presence of U-32, a regional middle and high school, on Gallison Hill Rd about ½ mile south of the intersection;
- A high number of young and inexperienced drivers that pass through the intersection on their way to or from U-32;
- The number of unreported crashes and near misses reported by local residents and Town staff that have occurred at the intersection;
Pedestrians, joggers and athletic teams on training runs coming from nearby residences and U-32 crossing Towne Hill Road at the intersection; and

Restrictions to sight lines caused by the hills on Town Hill and Gallison Hill Roads as well as by turning buses and trucks at the intersection.

3. ALTERNATIVE DEVELOPMENT

The L&D Team assisted the Steering Committee and the CVRPC in the development of over 30 different alternative actions that might address the purpose and need of this project. To create an organized way to consider and present and compare the alternatives, the Steering Committee initially divided them into four categories:

- Actual improvements to Towne Hill Road that would require some change to the pavement of the roadway itself;
- Enhancements to Towne Hill Road that would add features but not change the roadway itself;
- Improvements or changes to Gallison Hill Road; and
- Other types of improvements that would not create direct, permanent changes to the roads.

Together, they did an initial analysis of the different alternatives and eliminated those that did not have the potential to adequately address the purpose. The L&D Team then conducted additional analysis and refined the alternatives to only those that are included in Section B of this report. They worked with the Steering Committee to expand the analysis and prepare this report to assist the Town and local residents in reviewing the alternatives and selecting those that appear to be most appropriate.

Table B-1 presents all of the alternatives initially developed by the Steering Committee and the disposition of each. Tables B-2 and B-3 present the more detailed analysis of the remaining alternatives.

4. USE OF THIS REPORT & NEXT STEPS

This report is meant to serve as a guide to the alternatives under consideration for improving driving, walking, and bicycling conditions at and near the intersection of Towne Hill Road and Gallison Hill and Brazier Roads. It presents this information for public review. Figure B-1 in this report presents most of the alternatives that are currently under consideration on one map so that they can
be examined and evaluated together. The Figure does not imply that all of the alternatives are meant to be developed. None of the alternatives are recommended at this point in the project.

The alternatives will be considered at a public work session on October 16, 2017, during which the attendees will have a chance to express their opinions on which alternative, or group of alternatives, would make the most sense to pursue. By the end of the public work session, the L&D team and Steering Committee hope that consensus on the preferred alternatives will emerge.

The Steering Committee will review the results of the public work session and will make a draft set of final recommendations for one final public review before the study is finished. They will prepare a draft final report for the project, which will outline the preferred alternative(s). It will include both the Existing Conditions report and this Alternatives report.

B. ALTERNATIVES

1. OVERVIEW

After completing the analysis of the alternatives, the Steering Committee found that it would be better to present and compare the alternatives according to the issues they were meant to address. Thus, for this report, the Steering Committee divided the remaining alternatives into four new categories, organized around the intent of the alternative:

- Improvements meant to increase sight distances on Towne Hill Road to the east of the intersection;
- Improvements meant to lower motor vehicle speeds on Town Hill Road;
- Improvements meant to increase driver awareness of potential challenges at the intersection; and
- Improvements meant to create better conditions for walkers and bicyclists near the intersection.

Most of the alternatives that are meant to increase driver awareness of the potential challenges at the intersection would also aid in reducing driving speeds for motorists approaching the intersection.
In addition to these potential improvements identified by the Steering Committee, taking no action also remains as one of the potential alternatives. The NO ACTION alternative is included in each of the alternative analysis tables so that it can be easily compared to the other alternatives.

2. INCREASE SIGHT DISTANCE

a. *Reduce grade on Towne Hill Road east of the intersection to create longer sight distances.* This Alternative would regrade approximately 350 linear feet of Towne Hill Road to reduce the crest in the grade east of the intersection. Lowering the crest would increase sight distances to the east on Towne Hill Road from Gallison Hill Road approximately 600 feet.

b. *Increase summer and winter roadside maintenance.* Alternative 2b would include more frequent mowing of the vegetation in the right-of-way in the summer and plowing the snow further away from the edges of the pavement in the winter near the intersection.

3. LOWER TRAVEL SPEEDS

a. *Narrow the roadway width on Town Hill Road near the intersection.* This alternative would include a slight narrowing of the shoulders either by the installation of curbs, the placement of removable planters along the sides of the road, or some other method acceptable to the Town (a neckdown). It might alternately add center medians created from a different pavement material and just slightly raised over the existing roadway elevation.

b. *Construct a raised table intersection.* Alternative 2b would modify the intersection of Towne Hill Road with Gallison Hill and Brazier Roads to raise the entire center square of the intersection by between two and three inches, with ramps on each of the approaches. This feature would heighten motorists’ awareness of the intersection each time they pass through it. It would also lower motorists speeds at the intersection.
c. **Lower the speed limit on Towne Hill Road to 35 MPH.** This alternative would reduce the posted speed limit on Towne Hill Road east and west of the Gallison Hill Road/Brazier Road intersection. It would include the installation of flashing advanced warning signs of the reduced speed limit before the posted change on both the eastbound and westbound sides of the intersection.

d. **Install Radar Speed Feedback Signs on Town Hill Road.** This alternative would add speed feedback signs for both directions of travel on Towne Hill Road east and west of the intersection. The signs would flash either the speed or a slow down warning when a vehicle’s speed exceeds the posted speed limit, and would flash a “Thank You” when a vehicle’s speed is at or below the posted speed limit.

e. **Increase police patrols along Towne Hill Road near the intersection.** This alternative would have the Town of East Montpelier contract for more than 40 hours of monthly patrols by the State Police in East Montpelier with a focus of the extra hours on Towne Hill Road near the intersection.

4. **HEIGHTEN DRIVER AWARENESS**

a. **Install rumble strips on Towne Hill Road.** The focus of this alternative would be the addition of transverse rumble strips across Towne Hill Road in the westbound lane and possibly the east bound lane on either side of the Gallison Hill Road intersection. The rumble strips would alert motorists to the approaching intersection and would also encourage compliance with the posted speed limit.

b. **Update existing and/or add additional signage.** This alternative would update the regulatory and warning signs along Towne Hill Road, Gallison Hill Road, and Brazier Road to minimize the number of signs and make the remaining signs more effective and code compliant.

c. **Install new “Be Prepared to Stop” blinker warning signs on Towne Hill Road.** This alternative would replace the existing intersection warning
signs on both approaches to the Gallison Hill Road intersection with a “Be Prepared Stop” warning sign and a “When Flashing” plaque, along with vehicle detection on Gallison Hill and Towne Hill Roads. The blinker signs would be activated when traffic would be stopped on Towne Hill Road waiting to turn and/or when there would be a queue on Gallison Hill Road waiting to turn left or right onto Towne Hill Road that exceeds two or three vehicles.

d. **Add curbs on Gallison Hill with a sidewalk.** Alternative 4d would create the feeling of a narrower road with minimal shoulders on Gallison Hill Road by the addition of curbs close to the intersection. The curbs would keep motorists from unsafely passing vehicles waiting to turn left or right onto Towne Hill Road. A sidewalk would be added on the east side of Gallison Hill Road behind the curb, either directly adjacent to the curb or separated by a green strip.

e. **Add a blinking “Be Prepared to Stop” warning sign on Gallison Hill Road.** This alternative would add a warning sign on Gallison Hill Road south of the intersection that would include a flashing blinker that would be activated during the morning and afternoon peak hours and potentially activated at other times by motorists on the road approaching the intersection.

5. IMPROVE BICYCLING AND WALKING CONDITIONS

a. **Add properly signed GMT bus stop.** Alternative 5a would add a bus stop sign at a minimum on both the eastbound and westbound departures from the intersection on Towne Hill Road.

b. **Add a painted crosswalk with RRFB on Towne Hill Road.** This alternative would add a crosswalk on Towne Hill Road. Crosswalks would also be added on Gallison Hill and Brazier Roads to allow pedestrians to easily access the single crosswalk over Towne Hill Road. Additional protection for pedestrians crossing Towne Hill Road could be provided by installing rectangular rapid flashing beacons (RRFB) to accompany one of the
crosswalks. The RRFB would provide unique pedestrian activated flashing warning beacons on both sides of the crosswalk. They would heighten motorist awareness that a pedestrian would be present and improve compliance with the required yield to a pedestrian in a designated crosswalk. The beacons would flash for just the amount of time that it would take a typical pedestrian to cross the road and then go dark until they would be activated again.

c.  *Increase shoulder widths on Towne Hill Road.* Alternative 5c would add three-foot wide shoulders on both sides of Towne Hill Road to create a better place for bicyclists and pedestrians using the road.

### C. ALTERNATIVE ANALYSIS

#### 1. OVERVIEW

*Tables B-2 and B-3* provide a concise analysis of the alternatives based on the criteria listed in the following sections. Not all of the criteria are listed in each of the tables. Those that showed the same impacts for each of the alternatives were sometimes eliminated to make the *Tables* easier to understand. For instance, if each of the alternatives for enhancements to Towne Hill Road showed that there would be no impacts to adjacent trees, then the line discussing this impact was removed. Similarly, descriptive elements, described in Section 2 below, were also removed if that particular element was not relevant to all of the alternatives being compared in the table.

#### 2. PROJECT DESCRIPTION

- Additional Right-of-Way Needed
- Amount of New Paving Installed
- Number of New Signs Installed
- Number of Permanent Easements Needed
- Number of Construction Easements Needed
- Significant Physical Constraints
3. ATTRIBUTES

- Addresses Purpose and Need
- Creates Longer Sight Distances
- Benefits Motorists, Bicyclists, and Pedestrians
- Reduces Crash Potential
- Induces Higher Travel Speeds
- Encourages Slower Travel Speeds
- Requires Additional Town Maintenance Efforts and/or Costs
- Requires Power
- Creates Angry Drivers
- Is Conducive to Future Growth
- Order of Magnitude Cost (For Comparison Purposes Only)

4. ENVIRONMENTAL AND CULTURAL IMPACTS

- Wetland Impacts
- Wetland Buffer Impacts
- Tree Removal
- Steep Slope Disturbance
- Adverse Historic Resource Impacts
- Utility Pole Disturbance
- Stormwater System Disturbance
- Stormwater Quantity or Quality Impacts
- Residential Impacts
- Traffic Increases on Nearby Roads
- Potential for Future Walking & Bicycling Improvements
- Other Potential Impacts
<table>
<thead>
<tr>
<th>ALTERNATIVE</th>
<th>DESCRIPTION</th>
<th>FINAL DESIGNATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alt 3a</td>
<td>Increase the number of contracted hours of State police patrol along Towne Hill Road near the intersection</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 3b</td>
<td>Work with U-32 to get more students to use the bus to reduce the number of vehicles moving through the intersection</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 3c</td>
<td>Narrow the roadway width on Towne Hill Road near the intersection</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 3d</td>
<td>Add a crosswalk on Towne Hill Road that is at least 3 inches higher than the rest of the pavement</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 3e</td>
<td>Narrow the roadway edge of the pavement to reduce the likelihood of vehicles stacking on Gallison Hill Road or Towne Hill Road</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 4a</td>
<td>Add sidewalks near the intersection</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 4b</td>
<td>Add street lights to existing utility poles</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 4c</td>
<td>Narrow lane widths on Towne Hill Road to nine-feet wide</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 4d</td>
<td>Install multi-way stop signs on Towne Hill Road</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 4e</td>
<td>Install vehicle-activated blinker signs on Towne Hill Road</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 5a</td>
<td>Cut vegetation along the side of the road</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 5b</td>
<td>Add a separate lane that would allow motorists to queue outside of the main travel lane</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 5c</td>
<td>Create a new lane to allow left turning vehicles to queue outside of the main travel lane</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 5d</td>
<td>Add a full traffic signal at the intersection, with the time of operation to be determined</td>
<td>Kept</td>
</tr>
<tr>
<td>Alt 5e</td>
<td>Install an &quot;Intersection Ahead&quot; sign with flashing beacon on Gallison Hill Road</td>
<td>Kept</td>
</tr>
</tbody>
</table>

**TOWN OF EAST MONTPELIER**

**INTERSECTION DESIGN FEASIBILITY STUDY**

October 10, 2017
<table>
<thead>
<tr>
<th>No Action</th>
<th>INCREASE SIGHT DISTANCE</th>
<th>No Action</th>
<th>IMPROVE BICYCLING AND WALKING CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2a: Reduced High Point on Towne Hill Road</td>
<td>2b: Increased Summer &amp; Winter Maintenance near Intersection</td>
<td>5a: GMT Bus Stop Signs on Towne Hill Road</td>
<td>5b: Crosswalk with RRFB on Towne Hill Road</td>
</tr>
</tbody>
</table>

**Project Description**

<table>
<thead>
<tr>
<th>Amount of New or Replacement Paving</th>
<th>0</th>
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<th>0</th>
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<tr>
<td>Additional R/R/R Needed</td>
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<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Permanent Easements</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Construction Easements</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Number of New Signs</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>6 Minimum</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Significant Physical Constraints</td>
<td>None</td>
<td>None</td>
<td>Side ditches, Space for snow storage</td>
<td>None</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

**Environmental/Cultural Constraints**

| Tree Disturbance | No | Unknown | Possible | No | No | Yes |
| Wetland or Buffer Disturbance | No | No | No | No | No | No |
| Steep Slope Disturbance | No | Yes | - Steep side slope would need to be cut | No | No | No | Yes | - Steep side slope would need to be cut |
| Historic Resources Impacts | No | No | No | No | No | No | No |
| Utility Disturbance | No | No | No | No | No | No | No | Possible relocation of one utility pole |
| Storm Sewer Disturbance | No | Modification to drainage ditches | No | No | No | No | Modification to drainage ditches |
| Stormwater Impacts | No | No | No | No | No | No | No | Increased impervious surface - treatment probably needed |
| Residential Impacts | Yes | - Continued problems | No | No | Yes | - Continued problems | No | Yes | - Possible night time light impacts if sign activated after dark |
| Adjacent Roadway Impacts | Yes | - Continued bypass vehicles on Schoolhouse Road continue | No | No | Yes | - Continued bypass vehicles on Schoolhouse Road continue | No | No | Yes | - Reduced area to orient vehicle perpendicular to road for driveway east on south side |
| Other Impacts | No | No | No | No | No | No | No | No | No | No | No | No |

**Attributes**

| Addressed Purpose and Need | No | Yes | Yes | No | No | No | No | No | No | No |
| Creates Longer Sight Distances | No | Yes | Yes | No | No | No | No | No | No | No | No |
| Benefits All Users | No | Yes | Yes | No | No | No | No | Yes | Yes | Yes | Yes | Yes |
| Reduces Crash Potential | No | Yes | Yes | No | No | No | No | Yes | Yes | Yes | Yes | Yes |
| Encourages Higher Speed | No | Yes | Yes | No | No | No | No | Yes | Yes | Yes | Yes | Yes |
| Encourages Lower Speed | No | No | No | No | No | No | No | Yes | Yes | Yes | Yes | Yes |
| Increases Town Maintenance | No | Yes | Yes | No | No | No | No | Yes | Yes | Yes | Yes | Yes |
|3rd party drivers | No | No | No | No | No | No | No | No | No | No | No | No |
| Order of Magnitude Cost | No | No | No | No | No | No | No | No | No | No | No | No |

**TABLE B-2 Sight Distance / Bicycling & Walking Improvements**

Town of East Montpelier
Intersection Design Feasibility Study
October 10, 2017

INCREASE SIGHT DISTANCE
IMPROVE BICYCLING AND WALKING CONDITIONS
<table>
<thead>
<tr>
<th></th>
<th>ACTION</th>
<th>LOWER TRAVEL SPEEDS</th>
<th>SPEED IMPACTS / OTHER CONSIDERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3a</td>
<td>Neckdowns at Intersection on Towne Hill Road</td>
<td>No Action</td>
<td></td>
</tr>
<tr>
<td>3b</td>
<td>Raised Table Intersection on Towne Hill Road</td>
<td>No Action</td>
<td></td>
</tr>
<tr>
<td>3c</td>
<td>Reduced Speed Limits on Towne Hill Road</td>
<td>No Action</td>
<td></td>
</tr>
<tr>
<td>3d</td>
<td>Radar Speed Feedback Signs on Towne Hill Road</td>
<td>No Action</td>
<td></td>
</tr>
<tr>
<td>3e</td>
<td>Increased Police Patrols near Intersection</td>
<td>No Action</td>
<td></td>
</tr>
<tr>
<td>4a</td>
<td>Rumble Strips on Towne Hill Road</td>
<td>No Action</td>
<td></td>
</tr>
<tr>
<td>4b</td>
<td>Additional or Updated Signs</td>
<td>No Action</td>
<td></td>
</tr>
<tr>
<td>4c</td>
<td>Vehicle Activated &quot;Be Prepared to Stop&quot; Blinking Sign on Towne Hill Road</td>
<td>No Action</td>
<td></td>
</tr>
<tr>
<td>4d</td>
<td>Flashing Warning Sign on Gallison Hill Road</td>
<td>No Action</td>
<td></td>
</tr>
</tbody>
</table>

**Project Overview**

- **Neighborhood:** East Montpelier
- **Roadway:** Towne Hill Road
- **Purpose:** Improve safety and connectivity.
- **Scope:** From Schoolhouse Road to Gallison Hill Road.
- **Timeline:** October 10, 2017

**Table B-3 Speed Reduction / Heightened Awareness Alternatives**

<table>
<thead>
<tr>
<th></th>
<th>TABLE B-3 Speed Reduction / Heightened Awareness Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>No Action</strong></td>
</tr>
<tr>
<td>2</td>
<td><strong>3a: Neckdowns at Intersection on Towne Hill Road</strong></td>
</tr>
<tr>
<td>3</td>
<td><strong>3b: Raised Table Intersection on Towne Hill Road</strong></td>
</tr>
<tr>
<td>4</td>
<td><strong>3c: Reduced Speed Limits on Towne Hill Road</strong></td>
</tr>
<tr>
<td>5</td>
<td><strong>3d: Radar Speed Feedback Signs on Towne Hill Road</strong></td>
</tr>
<tr>
<td>6</td>
<td><strong>3e: Increased Police Patrols near Intersection</strong></td>
</tr>
<tr>
<td>7</td>
<td><strong>4a: Rumble Strips on Towne Hill Road</strong></td>
</tr>
<tr>
<td>8</td>
<td><strong>4b: Additional or Updated Signs</strong></td>
</tr>
<tr>
<td>9</td>
<td><strong>4c: Vehicle Activated &quot;Be Prepared to Stop&quot; Blinking Sign on Towne Hill Road</strong></td>
</tr>
<tr>
<td>10</td>
<td><strong>4d: Flashing Warning Sign on Gallison Hill Road</strong></td>
</tr>
</tbody>
</table>

**Key Considerations**

- **Environmental/Cultural:**
  - **Historic Resources:**
  - **Adjacent Roadway Impacts:**
  - **Residential Impacts:**
  - **Stormwater Impacts:**
  - **Other Impacts:**

**Other Constraints**

- **Number of New Signs:**
  - **No:**
  - **Yes:**

**Stormwater Impacts**

- **Yes - Increased noise near historic house:**
- **No:**

**Environmental/Cultural Impacts**

- **Yes:**
- **No:**

**Project Description**

- **Traffic Flow:**
  - **Benefits:**
  - **Costs:**

**Summary**

- **No Action:**
- **3a: Neckdowns at Intersection on Towne Hill Road:**
- **3b: Raised Table Intersection on Towne Hill Road:**
- **3c: Reduced Speed Limits on Towne Hill Road:**
- **3d: Radar Speed Feedback Signs on Towne Hill Road:**
- **3e: Increased Police Patrols near Intersection:**
- **4a: Rumble Strips on Towne Hill Road:**
- **4b: Additional or Updated Signs:**
- **4c: Vehicle Activated "Be Prepared to Stop" Blinking Sign on Towne Hill Road:**
- **4d: Flashing Warning Sign on Gallison Hill Road:**

**Findings**

- **No Action:**
- **3a: Neckdowns at Intersection on Towne Hill Road:**
- **3b: Raised Table Intersection on Towne Hill Road:**
- **3c: Reduced Speed Limits on Towne Hill Road:**
- **3d: Radar Speed Feedback Signs on Towne Hill Road:**
- **3e: Increased Police Patrols near Intersection:**
- **4a: Rumble Strips on Towne Hill Road:**
- **4b: Additional or Updated Signs:**
- **4c: Vehicle Activated "Be Prepared to Stop" Blinking Sign on Towne Hill Road:**
- **4d: Flashing Warning Sign on Gallison Hill Road:**

**Implementation Considerations**

- **Yes:**
- **No:**

**Critical Path Analysis**

- **Yes:**
- **No:**

**Budget Considerations**

- **Yes:**
- **No:**