

November 6, 2008

Mr. Kevin Winn, P.E., Commissioner  
Department of Public Works  
301 Adam Street  
Bedford Hills, NY 10507

Re: McLain Street Traffic Calming and Accident Reduction  
Town of Bedford, New York

Dear Mr Winn:

**Adler Consulting** has conducted an extensive evaluation of traffic conditions, performed a safety analysis and identified potential traffic calming measures on McLain Street from South Bedford Road (NY Route 172) to West Patent Road, in the Town of Bedford, New York. Based on this study, specific measures have been identified which may be used to address identified geometric or operational concerns and provide an overall safer environment on the roadway and one perceived to be "calmer."

#### A. PROJECT DESCRIPTION

McLain Street is a collector roadway, as described in the Town of Bedford Comprehensive Plan. It is a two-lane, asphalt roadway in a rolling terrain, varying in width from 20 to 25 feet with no shoulder. Double yellow lines prohibit passing along its entire length. McLain Street parallels NY Route 117 on the east side of Mount Kisco. It has offset intersections with Guard Hill Road and Knowlton Avenue where the priority is assigned to McLain Street traffic through two sharp curves. Further to the north, there is another sharp curve as the roadway changes in orientation from north/south to east/west. Data provided by the Town of Bedford Police Department indicated that, in August 2004, that the roadway might benefit from traffic calming measures. In addition, accident reports were also obtained from the Town of Bedford Police Department for the years 2003 to 2007. When

compared to the statewide average for two-lane roadways the accident rate in the study area was higher than that for similar roadways, at four (4) locations, namely, the intersections of McLain Street with NY Route 172, Barker Street, Guard Hill Road and Green Lane. At these locations, each of the individual accident reports was reviewed for location, type of accident, accident severity and contributory factors to determine whether there were specific conditions or features which were linked to the occurrence of accidents and, if so, appropriate corrective measures could be identified.

In evaluating traffic conditions on McLain Street, **Adler Consulting** conducted an extensive field investigation during which the roadway alignment, grades, widths, sightlines, clearances, signage and general operating conditions were all reviewed.

### B. EXISTING GEOMETRIC CONDITIONS

The American Association of State Highway and Transportation Officials' (AASHTO) *Policy on the Geometric Design of Highways and Streets* (the "AASHTO Policy") promotes the most widely accepted guidelines for the design of new roadways or where major upgrades of older facilities are proposed. First published in the 1950's, the 2004 version of the document provides the most current recommended guidelines. The 2004 AASHTO Policy specifically states (on page xliii) that "the fact that new design values are presented herein does not imply that existing streets and highways are unsafe." It is noted that many of the design criteria are properly based on wet-weather conditions as they account for wet-condition friction between the tires and the roadway surface.

The studied portion of McLain Street is characterized by winding curves, moderate to steep grades, a narrow roadway width and limited sightlines. It is subject to the Town-wide general speed limit of 30 mph. Exhibit 3-1 of the AASHTO Policy indicates that 200 feet of sight distance is the minimum recommended value for a 30-mph roadway. The 85<sup>th</sup> percentile speed recorded on McLain Street (by definition, the roadways operating speed) in 2004 was 41 mph, requiring a stopping distance of 315 feet. An inspection of the roadway revealed that this minimum sight distance is not present at a number of locations (the majority of which are private driveways) due to either the vertical or horizontal alignment of the road as it negotiates the terrain. The numerous instances of limited sight distance and the roadway's 41-mph operating speed support the applicable 30 mph speed limit and the need for traffic calming measures.

Measurements at various locations along the roadway revealed the width to vary from 20 to 25 feet (average width 22') with virtually no shoulder provided. For existing roadway conditions, exhibit 5-5 of the AASHTO Policy indicates that a 22-foot wide roadway is recommended to accommodate current traffic volumes. Widening the narrower sections of the roadway to 22 feet would provide a more forgiving driving environment, although it would do little to calm traffic.

Based on a review of the AASHTO recommendations, it is concluded that for the subject roadway, it would be desirable to have no objects closer than 18 inches from the edge of the road at grade level (that is, open swales or curbs) and five (5) feet from the edge of the road at a height of two feet above grade (rock outcrops and utility poles). This would also provide a safer driving environment, but would similarly do little to calm traffic.

### C. EXISTING OPERATING CONDITIONS

A review of the Automatic Traffic Recorders (ATR) data provided by the Bedford Police Department indicated a daily, two-way, weekday traffic volume of 2,183 vehicles at an unnamed section of McLain Street in August of 2004. The recorded peak-hour volume was 223 vehicles from 4:00 to 5:00 p.m. (the a.m. peak-hour volume, which occurred from 8:00 to 9:00 a.m. was 175 vehicles). The average speed of vehicles on McLain Street was 36 mph and the 85<sup>th</sup> percentile speed (the speed below which 85 percent of motorists were observed to drive, also known as the operating speed) was 41 mph.

The Automatic Traffic Recorder (ATR) data were collected prior to the opening of the Target shopping center. A review of traffic volume information for McLain Street just north of NY Route 172 contained in the traffic impact study prepared for the Bedford park South development reveals a peak-hour traffic volume of 610 vehicles on that portion of McLain Street in 2008 with an estimated daily traffic volume of 6,800 vehicles. Thus, it is apparent that traffic has increased considerably in recent years, although it is likely that the operating speed has remained unchanged or even fallen slightly, as faster driving motorists encounter more slower moving vehicles at busy times.

D. EXISTING SIGNAGE

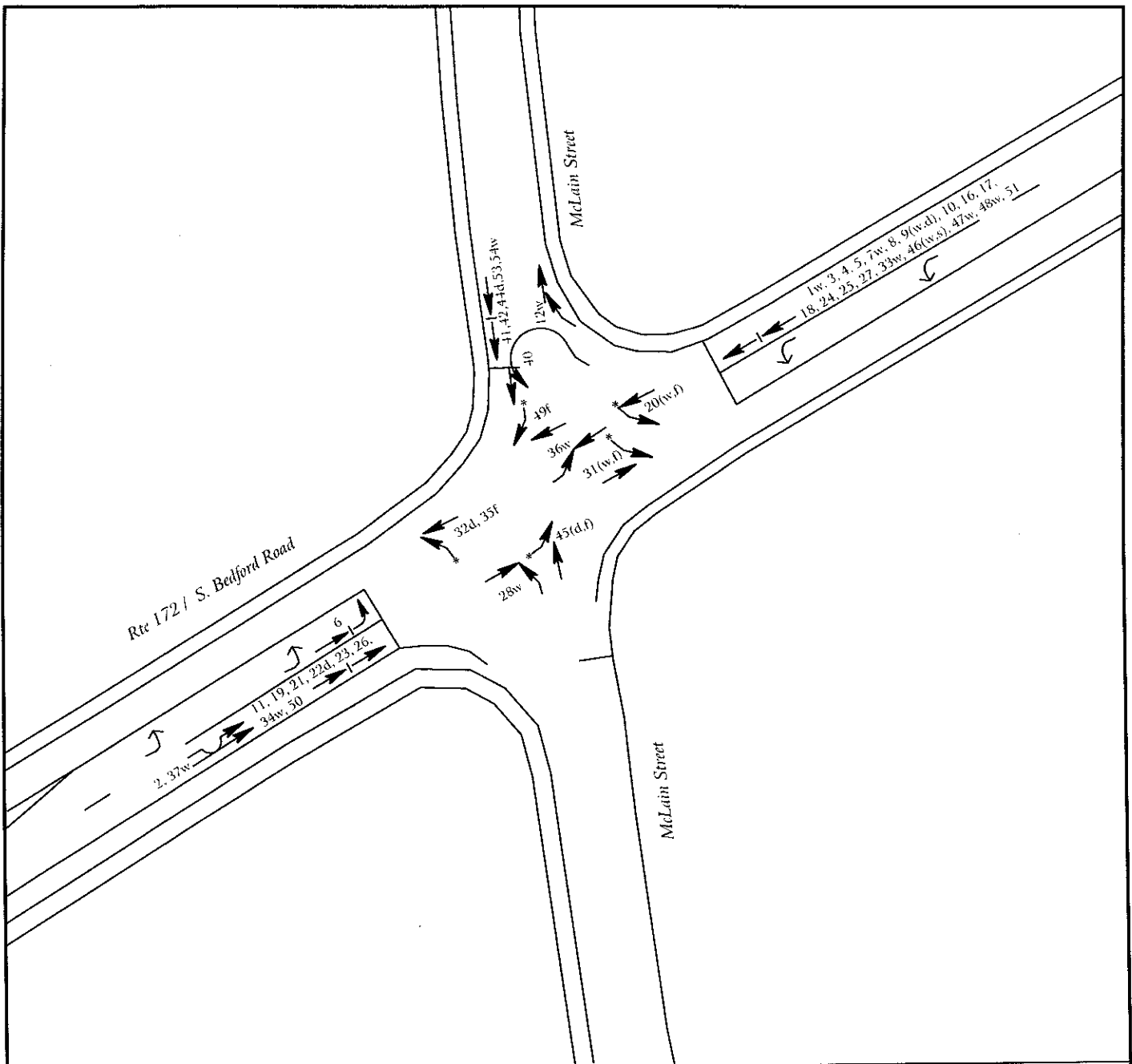
The current signage was appropriately placed but supplemental signage, either in the form of additional signs or signs that are more attention-getting would be beneficial, particularly north of Green Lane, which has a higher accident rate. Also, supplemental electronic signing of the posted speed limit (that is signs which flash the passing motorist's speed) would help reduce the operating speed of the roadway below 41 mph.

E. ACCIDENT HISTORY

Individual accident reports dating from January 2003 to December 2007 were obtained from the Town of Bedford Police Department. A review of these data indicated that there were a total of 99 accidents in the five (5) years for which data was available.

A review of the individual accident reports at the intersection of McLain Street with NY Route 172 is presented in Figure 1. There were no fatalities reported along the McLain Street corridor during the study period . Of the 45 intersection-related incidents at the signalized intersection of South Bedford Road and McLain Street, 33 were rear-end related and occurred mostly along the South Bedford Road as can be seen in the Figure 1. There were a total of seven (7) left-turn related incidents at this intersection and all of them involved vehicles either entering or exiting McLain Street. Frequently, rear-end incidents and left-turn incidents are related to insufficient signal clearance time at an intersection. The 12-inch signal lens provided at this intersection are clearly visible to a distance of 250 feet in all the directions. The signage provided is also adequate. Since there were a total of 15 wet-weather related incidents, predominantly in westbound direction, it is recommended that the State be requested to repair westbound approach with skid resistant pavement. It is also recommended that the signal clearance intervals be checked by the New York State Department of Transportation.

At the intersection of Barker Street with McLain Street, five (5) incidents occurred, one of which involved an animal, two (2) ran the Barker Street STOP sign and struck the guard rail and two (2) failed to yield to other motorist at the all-way STOP sign. It is noted that the visibility of the STOP signs is acceptable. It is however, recommended that a double arrow sign (W1-7) be installed on McLain Street, across from Barker Street.



Legend:

- Angle
- Head-on Opposite Direction
- Fixed Object
- Turning Movement Intersecting Path
- Pedestrian Involved
- Backing
- Rear End
- Turning Movement Same Direction
- Side Swipe Same Direction
- w - Wet Surface
- s - Snow or Ice
- d - Dark
- f - Failure to Yield Right Of Way

Project:  
**McLain Street Traffic Calming**  
 Town of Bedford, NY

Title:  
**Collision Diagram**  
**McLain Street and**  
**S. Bedford Road (Rt 172)**

Prepared By:  
**Adler Consulting, White Plains, NY**  
 Transportation Planning & Traffic Engineering, PLLC

**Figure 1**

At the intersection of Guard Hill Road with McLain Street, three (3) incidents occurred one of which involved a deer, one (1) vehicle crashed due to icy conditions and one (1) vehicle due to a sight-distance issue around the curve.

At the intersection of Green Lane with McLain Street, three (3) incidents occurred of which one (1) involved a motorist passing out, one (1) rear-end collision occurred due to driver inattention and one (1) occurred when a motorist crossed the double yellow line while making the turn and clipped another stopped vehicle. No action is required at this intersection.

There were two (2) incidents at the intersection of W. Patent Road and McLain Street. Both incidents were sight-distance related involving vehicles turning left out of West Patent Road at Broad Brook Road/McLain Street. The sight-distance limitations of this intersection could be eliminated by the installation of an all-way STOP at this intersection.

Along the McLain Street corridor, nine (9) incidents occurred between South Bedford Road and Penwood Road, five (5) incidents occurred between Penwood Road and Barker Street, two (2) incidents occurred between Barker Street and Knowlton Avenue, six (6) incidents occurred between Green Lane and the "Curve," ten (10) incidents occurred in the "Curve" and five (5) incidents occurred between the "Curve" and Springhurst Road.

There were a total of 18 incidents related to sideswiping of vehicles along with 19 fixed-object-related incidents, suggesting possible speeding and narrow-lane issues. A detailed review of crash reports revealed that a total of 19 incidents occurred in curved sections of the roadway, 15 of which involved single vehicles, suggesting possible speeding, sight distance, signage and narrow-lane issues. Also in the corridor, eight (8) incidents occurred involving vehicles turning into or out of driveways or streets of which, two (2) occurred at W. Patent Road, two (2) at the Barker Street intersection, one (1) at the Knowlton Avenue intersection and one (1) at Guard Hill Road. These incidents indicate that there are sight-distance limitations at certain of these intersections. Along the corridor, a total of eight (8) incidents involved an animal.

While it is difficult to specifically address the underlying cause of such accidents, the probability of their occurrence or the severity of these accidents would be reduced if the prevailing vehicles' speeds on McLain Street could be reduced.

The *Accident Reduction Factors* published by the Traffic Engineering and Safety Division of the NYSDOT indicates that, for every lane with less than 5000 vehicle Annual Average Daily Traffic:

1. Widening the travel way from 10 feet would reduce accidents by 37%
2. Installing/improving advance curve warning flashers would reduce accidents by 54%
3. Installing/improving other signs would reduce accidents by 34%
4. Protection and removal of fixed objects would reduce accidents by 18%
5. Road edge re-striping would reduce accidents by 44%
6. Delineation of curves (reflectors) would reduce accidents by 30%
7. Roadway lighting installation (spot locations only) would reduce accidents by 36%

The Town may wish to consider implementing some combination of these safety measures along appropriate sections of McLain Street, although it is noted that not all of the measures will necessarily result in traffic calming.

## F. CONSIDERATION OF TRAFFIC CALMING MEASURES

Each of the measures identified in the traffic calming section of the Federal Highway Administration's publication, *FHWA-SA-04-003 Pedestrian Safety Guide and Countermeasure Selection System*, was evaluated relative to its application on McLain Street. Recommendations were then made as to whether or not a measure was suitable for use on McLain Street and reasons detailing why were noted. The evaluations and recommendations are attached in the appendix in a tabular form.

### **F-1. SPEED-REDUCTION MEASURES**

A review of the speed-survey data and the accident-report descriptions indicates that motorists are driving significantly faster than the applicable speed limit, which, in turn, is greater than the tolerances of certain portions of the road, particularly during inclement weather. Based on an inspection of the roadway and a thorough consideration of the findings presented heretofore, it is concluded that the most effective way to improve safety in the study area is to lower the operating speed of the roadway closer to the regulatory signage provided. A three-fold program, beginning with an education program, followed by additional enforcement together with the implementation of specific engineered measures are expected to produce positive results in improving the corridor.

**a. Education**

It is, therefore, recommended that, upon acceptance of this report, the Town consider preparing a one-page public information bulletin summarizing its conclusions regarding speed and safety on McLain Street (namely: a. that the roadway has an accident frequency that is greater than the statewide average; b. that most motorists who use the roadway are frequent travelers thereon; c. that speed appears to have played a contributory role in a number of the accidents; d. that the 85<sup>th</sup> percentile speed on the roadway is 41 miles per hour; and, e. that the roadway geometry, especially during inclement weather, is more appropriate for travel at 30 mph or less. The bulletin should also advise the public of the Town's intention to have enforcement increased on the roadway. The Town could then identify a suitable way of distributing the information bulletin to motorists who use the road so that, armed with this knowledge, they will hopefully modify their driving habits appropriately or at least be aware of pending increased enforcement.

**b. Enforcement**

If not already undertaken, it is further recommended that, after the acceptance of this report by the Town and following a public education program, the Police Department consider directing the Department should periodically set up additional enforcement on McLain Street. McLain Street users should be cognizant of the importance of this step in speed reduction.

**c. Engineering**

It is recommended that the Town consider implementing some combination of the following measures:

**1. Speed Boards**

It is further recommended that the Town increase its deployment of the Town's "Speed Boards", portable machines which display a motorist's speed below the posted limit, on a periodic basis at suitable locations on the roadway.

**2. Real-Time Speed Signs**

The Town should consider permanently installing real-time speed signs, which display the speed at which motorists are traveling below the legally permissible speed limit. Given the abundance of signage in the vicinity of the curves on the roadway, it is suggested that should such signs are to be installed, they be placed 1000 feet north of Guard Hill Road for northbound and southbound



directions since this section of the roadway has exhibited a statistically elevated accident history. Since the operating speed of the roadway is more than the desirable operating speed, the Town may wish to consider other traffic calming measures, such as speed humps, at these locations to reduce speed.

### 3. Speed Humps

Provide speed humps with "SPEED HUMPS (W17-1) signs (suitably located), along McLain Street corridor at 1) south of # 60 driveway, 2) 100 feet south of # 126 driveway, 3) south of # 194 driveway, 4) north of # 238 driveway, 5) north of # 326 driveway and 6) east of # 368 driveway.

Should the Town pursue this option, it is recommended that a temporary speed hump be installed at each of the identified location prior to installation of a permanent speed hump to gauge its effectiveness. The speed humps could be installed in sequence with the temporary hump moved from one location to the next as the sequence proceeds.

In its publication, Guidelines for the Application and Design of Speed Humps (2007), the Institute of Transportation Engineers (ITE) recommends the development of appropriate policies, regulations and ordinances before initiating a speed hump installation program to ensure consistent application and design.

It is noted that speed humps may appreciably impact response times of emergency service providers, particularly if there are numerous speed humps on a route. Further more, speed humps could interfere with the ability of emergency service technicians to administer care while an ambulance is passing over a speed hump. These factors should be considered when evaluating the need for speed humps.

## **F-2. ADDITIONAL TRAFFIC CALMING MEASURES**

Aside from the hazards associated with the noted elevated operating speed, the road is also unforgiving at certain locations if motorists let their attention to the task of driving slip. To address this condition, it is recommended that the Town consider installing the following specific measures:

1. Install yellow reflectors at 20-foot intervals along the centerline and white reflectors along the edgelines of McLain Street at 20-foot intervals along the curved sections of roadway.
2. Install “No-Passing Zone” (W14-3) warning signs on the left side and “Do Not Pass” (R4-1) regulatory sign on the right side, 200 feet north of South Bedford Road and 200 west of Springhurst Road.
3. Install a “Reverse Curve” (W1-4) warning sign 150 feet before driveway # 42 in northbound direction.
4. Construct closed drainage with storm water grates for the open culvert protruding into the southbound McLain Street at the driveway # 126 and # 128.
5. Install “STOP Ahead” (W3-1) signs 200 feet before the stop bar at the Barker Street intersection along McLain Street in both the directions.
6. Cut back the rock face from within five feet of the edge of the roadway on the west side of McLain Street, 150 feet south of Green Lane.
7. Cut back the rock face and a single large tree from within five feet of the edge of the roadway on the west side of McLain Street approximately 50 feet north of Green Lane and 250 feet north of Green Lane.
8. Install “Reverse Curve” (W1-4) warning signs 400 feet south of the “Curve” for the southbound direction and 150 feet north of Green Lane for northbound direction.
9. Cut back the vegetation approximately five feet from the edge of the roadway on the south side of McLain Street, 275 feet east of the curve.
10. Install “Reverse Curve” (W1-4) warning sign 150 feet before driveway # 373 in the westbound direction and 250 feet before driveway # 352 in the eastbound direction.
11. Install “Side Road” (W2-2) warning sign 200 feet west of Springhurst Road.


12. Install an all-way STOP condition at the intersection of McLain Street with West Patent Road

G. CONCLUSION

Our study indicates that a safer driving experience could be provided on the McLain Street corridor through the implementation of certain improvement measures and programs. In addition, sections of the roadway are experiencing speeds in excess of the speed limit. It is the considered professional opinion of **Adler Consulting** that, upon implementation of an appropriate combination of the measures identified above, a safer and calmer driving experience will be enjoyed by all those traveling on McLain Street.

We trust that this information will assist you in your review of this issue.

Respectfully submitted,  
**Adler Consulting,**  
**Transportation Planning & Traffic Engineering, PLLC**



Bernard Adler, P.E.  
President  
New York Professional Engineer 048373



John Canning, P.E., P.T.O.E.  
Senior Associate