

APPENDIX A
TRAFFIC ANALYSIS

MEMORANDUM

Portland Office
February 18, 1998

To: Bruce Hyman

From: Tom Errico

Subject: College/Church/School - State/Maple/Saco - Main/State/South/School

1. State Street/Saco Road/Maple Street - This location appears to operate at an acceptable level of service. Previous work conducted by Eaton Traffic Engineering indicated traffic signals are not warranted. While not considered a High Accident Location, according to Maine Department of Transportation (MDOT) guidelines, the intersection experienced 14 accidents between 1993 and 1995. The most common accident pattern was rear-end collisions on the Saco Road approach. In general the intersection is large and can be confusing due to the channelized islands. Recommendations are summarized below:
 - To mitigate the rear-end accident problem and to better define the intersection, it is suggested that some or all of the channelization islands be removed and the intersection be reduced in size. The intersection should continue to provide a separate left-turn lane on State Street and separate left and right turn lanes on Saco Road. Additionally, the design must accommodate the significant truck volume traveling through the intersection. Although low/moderate in numbers (28 pedestrians over a 12-hour period), pedestrian crosswalks and signing should be provided on the Saco Road approach. The redesigned intersection will also be better suited for pedestrian crossings.
2. Main Street/State Street/South Street/School Street - Recommendations were identified for the State Street and School Street approaches and are generally based upon previous studies and are summarized below.
 - The traffic signal should be upgraded (MDOT is currently designing improvements) and consist of: provision of protected phases on both School Street and South Street. This will require installation of 5-section signal heads.
 - Eliminate the existing exclusive pedestrian phase and incorporate a concurrent pedestrians phase. In conjunction with this, curb extensions should be

considered to reduce pedestrian crossing distance's. These curb extension must be carefully designed so they do not negatively impact vehicle turning.

- Install signing to better defined the appropriate stopping locations.
- Improve pedestrian crosswalk visibility with thermo-plastic paint or other material.
- The utility pole on the northwest corner of the intersection should be relocated.

3. School Street/College Street/Church Street - This location is a High Accident Location according to MDOT data (10 accidents/Critical Rate Factor = 1.77). Although collision diagrams were not available, the safety problem is likely related to the limited sight distance for vehicles exiting Church Street. To correct this problem, three options were considered.

- The first option considered the relocation of Church Street opposite College Street. Based upon the need to demolish the existing USM Child Care Building, it is recommended that this option be eliminated for further consideration.
- The second option consists of converting College Street to a one-way street. While this action will alleviate the problem for exiting vehicles, it will in my opinion divert traffic to Main Street, in particular the deficient Main Street/Elm Street/Water Street, Main Street/South Street/School Street/State Street intersections, thereby exacerbating congestion and safety problems at these locations. Accordingly, this option should not be considered.
- The third option consists of the reconstruction of School Street. Specifically, this option consist of physically lowering the crest curve on School Street to improve the sight lines for vehicles exiting Church Street. It is suggested that this option be pursued further, to determine its feasibility.

TAE:

cc:

MEMORANDUM

*Portland Office
January 22, 1998*

To: Bruce Hyman

From: Tom Errico

Subject: Gorham - South Street

In response to your request, I have performed an evaluation of South Street between Main Street and Lincoln Street and offer the following comments. In general, my evaluation focused on the roadway cross-section, with the intent of identifying recommendations that modify the current pavement marking configuration for improved safety and operations.

- South Street between Main Street and Preble Street - In the northerly direction, two travel lanes are provided (an exclusive left-turn lane and a shared through/right lane) with perpendicular parking in front of the Community Center. In the southerly direction one travel lane is provided with parallel parking. Clearly the removal and/or conversion of the perpendicular parking area to parallel parking is recommended. Field measurement of the two northerly lanes indicated lane widths are 11 feet. Restriping South street to provide 12 foot approach lanes is recommended. According to accident data, a significant number of accidents involve vehicles entering or exiting Amato's Restaurant. These accidents appear to be related to the proximity of the driveway to the Main Street intersection, and likely occur during periods when queuing on South Street obstructs motorists sight.
- South Street /Preble Street/Green Street - Although not a problem at the time of my field visit, there are no on-street parking restrictions near intersections. During high parking demand periods, vehicles likely park near intersections, obstructing sight for motorists exiting minor streets. It is recommended that parking be prohibited within 25 feet of an intersection to ensue reasonable sight distance.
- South Street south of Green Street - One travel lane with parallel parking is provided in each direction. Based upon my review of traffic conditions, there were no obvious reasons to modify the current pavement markings. In cases where heavy left-turn volumes exist, elimination of on-street parking in order to provide a left-turn bay may be beneficial to through traffic mobility. However, traffic levels turning onto side streets are likely too low to warrant changes.

MEMORANDUM

*Portland Office
January 21, 1998*

To: Bruce Hyman

From: Tom Errico

Subject: Gorham - Preble Street Traffic Calming

The purpose of this memorandum is to present possible traffic calming strategies that are intended to mitigate deficiencies related to vehicular speeds and cut through traffic on Preble Street. The ultimate selection of a traffic calming plan should be based on engineering studies. Although a single technique may be considered, generally a combination of techniques is needed to address the problem comprehensively.

A field investigation of Preble Street was performed on Tuesday January 20, 1998. Several items were noted including: few cars were parked on the street producing the view of a very wide straight road; speed limit signs are not posted; the width of Preble Street is 28+/- feet, warning signs (e.g. slow pedestrians ahead) do not exist.

The following presents a list of possible traffic calming strategies aimed at addressing issues on Preble Street.

1. **Review Speed Limit** - Reducing the speed limit on a road can lead to a corresponding reduction in travel speed. However, numerous studies have shown that the speed of traffic is much more related to the driving conditions than the posted speed limit.

Advantages

- Reduces accident potential
- Reduces emissions
- Relatively inexpensive

Disadvantages

- Creates a false sense of security for the neighborhood
- A high level of enforcement is required to maintain a level of speed below what the physical conditions dictate.

Comment: Because speed limit signs are not present, installing signs may have a positive effect on speeding (supplemented with warning signs). However, considering the wide and straight configuration of Preble Street, excessive speeding would likely continue, unless an enforcement program were also included.

2. **Neighborhood Watch** - This is a public awareness program intended to make drivers aware of residents concerns regarding the impact of speeding on neighborhood safety and livability. This is accomplished by having residents/businesses record speeds and notify the Town of license plates and description of speeding. The Town then sends letters to the registered owners of vehicles noted by residents as speeding through a neighborhood.

Comment: Could have a positive effect, and therefore should be considered.

3. **Curb Extensions (neckdowns)** - Curb extensions are extension of curb toward or to the travelway. They are installed at intersections or mid block.

Advantages

- Reduces Pedestrian crossing time and distance
- Provides opportunity for visual enhancements
- May reduce speeds May reduce volume by eliminating cut-through traffic.

Disadvantages

- Removal of parking spaces
- Impact on drainage
- impact on bicyclists
- Relatively costly

- Winter Maintenance

Comment: Based upon the wide cross-section of the road, modifications that visually present a narrower road, like curb extensions, should be considered.

4. **Street Weaving** - Street weaving consists of introducing a horizontal curvature to a roadway to break up the runaway effect of wide straight streets.

Advantages

- Reduces speeds near the device

Disadvantages

- Parking Removal
- Impact on drainage
- Cost

Comment: Based upon the straight alignment of the road, modifications that incorporate horizontal curves, like street weaving, should be considered.

5. **Road Humps** - Road humps are less abrupt than road bumps and can have rounded or flat tops.

Advantages

- Effectively reduces travel speeds in the vicinity of the hump
- Relatively inexpensive
- Limited parking removal
- may reduce cut-through traffic

Disadvantages

- Increased noise from acceleration and deceleration

Comment: Noise could be a problem considering the residential land uses on Preble Street. Otherwise it should be considered.

6. **Colored and Textured Pavement** - A treatment of the pavement to create a different look to alert the driver that they are in a special place or pedestrian environment. May consist of colored pavement, textured paving or pavers.

Advantages:

- May reduce speeds
- can enhance the visual environment
- Poses no restrictions for roadway users
- Requires no parking removal

Disadvantages:

- Can be noisy
- Can be slippery
- Can be costly

Comment: Noise could be a problem considering the residential land uses on Preble Street. Otherwise it should be considered.

It should be noted that implementation of traffic calming strategies on Preble Street could negatively impact other streets or intersection in downtown Gorham. For example, traffic may divert from Preble Street to Elm Street and increase traffic at the deficient Main Street/Elm Street/Water Street intersection.

TAE:

cc:

MEMORANDUM

*Portland Office
January 14, 1998*

To: Bruce Hyman
From: Tom Emico
Subject: Gorham Accident Evaluation

The following summarizes the results of an evaluation of accident history at several locations in the downtown Gorham area.

- Main Street/Water Street/Elm Street

Between the years 1993 and 1995 14 accidents were reported resulting in a critical rate factor of 1.20. Twenty-eight percent of the accident were personal injury collisions. Of the 14 accidents, 8 were angle collisions, three were rear-end collisions, one was a sideswipe collision, one was a vehicle backing accident and one involved a hit bicyclist. Of the eight angle collisions, two patterns were evident. Three collisions involved vehicles turning left from Water Street, while two accidents involved vehicles turning left or through from Elm Street. Of the two accident involving Elm Street vehicles, one occurred at 9:00PM on snow covered pavement. The second accident occurred at 1:40PM under good weather conditions with the driver failing to yield the right of way. Of the three accidents involving Water Street vehicles, all three were caused by motorists failing to yield the right of way. One collision occurred on snow covered pavement, while the remaining two occurred under good weather conditions.

No obvious safety deficiency exists at this locations. It is likely that the angle collisions are caused by minor street vehicles having difficulty entering the Main Street traffic stream. The level of accidents is not sufficient to warrant the installation of a traffic signal per procedures contained in the Manual on Uniform Traffic Control Devices, Federal Highway Administration . If increased usage of Water Street and Elm Street is anticipated, increased accident rates are likely. Because of this, it is recommended that conditions be monitored in the future, as development activity occurs. It is likely that increased traffic on Water Street and Elm Street will result following the installation of a traffic signal. However, installation of a traffic signal at this location must consider the impact to mobility on Main Street, in particular traffic signal coordination at Portland Street and School Street/South Street.

- Main Street between Water Street/Elm Street and New Portland Road

Between October 13, 1995 and May 30, 1997 30 accidents were reported at this location. According to data for the period 1994-1996, 22 accidents were reported with a critical rate factor of 2.08 and a percent injury rate of over 50 percent.

According to the collision diagram, 7 accidents were rear-end collisions, 11 accidents were angle collisions, 10 accidents were turning collisions, one involved an out of control vehicle, and one was a sideswipe collision. Several of the accidents involved movements entering and exiting driveways. Four accident involved vehicles exiting the Mobil Gas Station, 5 accidents occurred at the Big Apple, 7 accidents at the Village Mall. In respect to time-of-day patterns, no clear pattern was evident. Accidents generally occurred during the alter morning, mid-day, and afternoon time periods.

- Main Street/Cross Street

Between October 13, 1995 and May 30, 1997 19 accidents were reported at this location. According to data for the period 1994-1996, 15 accidents were reported with a critical rate factor of 1.40 and a percent injury rate of 13 percent.

In reviewing the collision diagram for this location, the primary accident pattern consisted of angle collisions involving vehicles turning left from Cross Street with westbound Main Street vehicles. Many of these accident were caused by vision obscurement, which is likely related to vehicular queues from the intersection at School Street/South Street. In many cases, as two lanes of vehicle queues develop, the near side queued vehicle would permit traffic from Cross Street to exit, without considering the far side queued vehicles. This conclusion is also supported by the time-of-day data. Many of the reported accidents at this location occurred during the weekday afternoon period, when congestion is at its worst.

- Main Street between Cross Street and Water Street

Between the years 1993 and 1995 12 accidents were reported resulting in a critical rate factor of 1.02. Twenty-five percent of the accidents were personal injury collisions. Of the 12 accidents, 8 were rear-end collisions, and four were angle collisions. Three of the angle collision involved vehicles exiting Cook's Hardware, with the remaining one involving a vehicle exiting the Post Office.

- Main Street between School Street/South Street and Cross Street

Between the years 1993 and 1995 9 accidents were reported resulting in a critical rate factor of 1.72. Forty-four percent of the accidents were personal injury collisions. Of the 9 accidents, 5 were rear-end collisions, and two were turning collisions, one was a angle collision, and one involved a hit bicyclist. The two turning accidents and the one angle

MEMORANDUM

Portland Office
January 15, 1998

To: Bruce Hyman

From: Tom Emico

Subject: Gorham - Main Street/New Portland Street/Mechanic Street

The purpose of this memorandum is to summarize the results of an evaluation of proposed improvements at the Main Street/New Portland Road/Mechanic Street intersection. Based upon the conceptual plan dated 12/18/97, three improvement strategies are recommended. Each improvement recommendation is described below, with comments.

- **Eliminate Westbound Left-turn to New Portland Road Mechanic Street** - Based upon current traffic information, the volume for this movement ranges from 5 vehicles during the Mid-day and PM peak hours to 10 vehicles during the AM peak hour. Prohibiting this movement should not have a noticeable negative impact, and should help to improve mobility on Main Street. However, as development activity increases (e.g., relocation of Post Office) on Mechanic Street and Railroad Avenue, an increase in demand for this movement is likely. This increased demand could result in circuitous movements for motorist originating from the east, and increase traffic on Elm Street and Railroad Avenue.
- **Keep Mechanic Street in Signal System** - In the PACTS sponsored traffic study of the Main Street/New Portland Road/Mechanic Street intersection, recommendations were identified that restricted movements from Mechanic Street, thereby eliminating a separate signal phase. This action was intended to mitigate failing operating conditions, by improving the efficiency of the traffic signal. However subsequent analyses conducted by Eaton Traffic Engineering indicated acceptable operating condition can be provided at this location using current engineering methodologies, and if considered in isolation. Based upon this information, maintaining access to Mechanic Street is acceptable. However, if improvement in operating conditions are desired in the future, removal of the Mechanic Street phase from the signal system will improve the overall efficiency of the intersection. This improvement in operating conditions was well documented in the PACTS study where predicted failing conditions were improved to acceptable levels. In conjunction with this action, extension of Railroad Avenue to New Portland Road should be considered. This connection will help to maintain reasonable

access to and from Mechanic Street/Railroad Avenue properties and minimize traffic impacts to Elm Street.

- **Reconfigure Intersection To Improve Pedestrian Crossings and Enhance Aesthetics** - Two improvement modifications are proposed relative to pedestrian operation enhancements. The first consists of providing pedestrian crosswalks on all approaches at the intersection. Currently crosswalks are provided across the New Portland Road approach and across the easterly Main Street approach. Two additional crosswalks are proposed. One crosswalk will be located across Mechanic Street, and would be expected to operate acceptably. The second location is across the westerly Main Street approach. Providing a crosswalk at this location has some operational and safety implications. Pedestrian movements across this approach will likely occur when New Portland Road and/or Mechanic Street traffic has the green phase. During periods when pedestrians are crossing, traffic turning left from New Portland Road will by law be required to yield. If pedestrian demand is significant, the capacity of this movements may be reduced. Additionally, because the left-turn movement from New Portland Road is much greater than right-turn movements, a greater number of pedestrian/vehicle conflicts are likely. It should be noted that for all intersection crosswalks, pedestrian signal heads should be provided to assists pedestrians in their crossing maneuvers.

The second action consists of geometric modifications at the southwestern corner of the intersection, thereby reducing the distance crossing New Portland Road. This change has both positive and negative traffic impacts. By reducing the crossing distance on New Portland Road, pedestrian phase time requirements are reduced, which can improve the overall efficiency of an intersection. However, with reductions in the curb radius from Main Street onto New Portland Road, a reduction in capacity on the eastbound approach will result. The right-turn volume from Main Street onto New Portland Road is significant (e.g. 530 vehicles during the AM peak hour). An option would be to increase the radius, but this would also increase the pedestrian crossing distance. Some compromise is suggested.

In respect to the geometric modifications, the ability of trucks to turn onto New Portland Road, with the reduced radius should be reviewed.

TAE:

cc:

collision involved vehicles entering or exiting Christy's Market. Four of the five rear-end accidents occurred on the eastbound travel lane, although it is unclear what the contributing factor was, other than inattention or following too close.

- South Street between Main Street and Preble Street

Between 1994 and 1996 this location experienced 16 accidents resulting in a critical rate factor of 2.61 with 18 percent personal injury accidents. Review of specific collision information between 1992 and 1994 indicates the majority of accidents were turning collisions involving vehicles entering and exiting Amato's and Robbie Gym. Most of the turning accidents involved southbound left-turning vehicles, colliding with northbound through vehicles.

Expected Accident Reduction Following Implementation of Access Management Strategies

Following the implementation of access management strategies along Main Street between School Street/South Street and New Portland Road, a reduction in accidents can be expected. According to data contained in the publication, A Toolbox For Alleviating Traffic Congestion, Institute of Transportation Engineers, a relationship exists between the number of curb cuts and accident rates expected per mile. Based upon the phase I plan, the proposed reduction in curb cuts can be expected to result in a 15 percent reduction in accidents along Main Street.

Additional accident reduction benefits are also expected from specific driveway modifications. Although it is not well quantified, reduction in driveway widths should also help to reduce accident experience in the study area

TAE:

cc: