
MEMORANDUM

**TO: Dan Beagan, Director
Bureau of Transportation Planning and Development**

August 12, 1996

FROM: Alicia Powell Wilson *apw*

RE: Route 2 Long-Range Feasibility Study in Acton, Concord and Lincoln

INTRODUCTION

Route 2 is a major regional east-west arterial that extends from the city of Cambridge to the New York state line and beyond. The arterial serves many, sometimes competing, purposes, among which are local access, commuting to and from Boston and the Route 128 corridor, and access for long-distance travel into and out of the region.

During the past several years, the Massachusetts Highway Department (MHD) has actively pursued improvements to the highway (i.e., bridge reconstruction, short-term intersection improvements and median barrier installations) in the towns of Lincoln and Concord. At present, MHD is pursuing the environmental analysis and design of a grade separation at Crosby's Corner (Route 2 at Cambridge Turnpike).

However, in addition, MHD and the communities of Acton, Concord and Lincoln continue to be committed to evaluating other potential long-range improvements in the Route 2 corridor. In light of this commitment, MHD requested CTPS to:

- Assist in identifying existing and future traffic operational deficiencies on Route 2
- Develop potential long-range improvements to address those deficiencies
- Complete a preliminary assessment of the feasibility, efficacy and impacts of those potential improvements.

Beginning in 1993, CTPS met quarterly with the Route 2 Citizens' Advisory Committee (CAC)¹ to discuss operational difficulties in the corridor and to solicit the committee's inputs on how the

¹The Route 2 Citizens' Advisory Committee is composed of representatives of the towns of Acton, Concord and Lincoln. Other meeting participants included representatives from MHD District 4, MHD, Boston Traffic Engineering, Louis Berger & Associates (MHD consultant for the Crosby Corner DEIR) and CTPS. The Committee is chaired by Dan Beagan, Director of the Bureau of Transportation Planning and Development and Chairman of the Boston Metropolitan Planning Organization (MPO).

problems could be resolved in ways that are mutually agreeable to the towns and MHD. Based on these meetings and the CAC's concerns regarding congestion and safety issues along Route 2, CTPS developed and evaluated five alternative packages, which consist of combinations of grade-separation improvements and service roads at intersections along the corridor. These are described below, following a listing of the CAC's concerns and improvement goals for the Route 2 corridor. A detailed description of the traffic forecasting methods and assumptions for the analysis of existing, future No-Build and future Build conditions provided in Appendix 1. Appendix 2 contains relevant memos; Appendix 3, selected traffic counts; Appendix 4, a letter from the CAC.

ISSUES OF CONCERN TO THE ROUTE 2 CAC

In its quarterly CAC meetings, town representatives expressed concerns regarding various issues related to Route 2, including safety, traffic congestion, traffic diversions and intratown circulation. These issues and the committee's position on each are explained below:

1. **Safety** - Reduce potential for accidents, particularly those that result in death or personal injury. Of particular concern were the Concord Rotary and segments of Route 2 where opposing traffic flows are insufficiently protected.
2. **Traffic Capacity** - Increase the capacity of Route 2 to meet peak traffic demands, but not by transferring existing traffic congestion problems to the local street system. Capacity constraints along Route 2 are caused by signalized intersections.
3. **Keep Through Traffic on Route 2** - Avoid changes that encourage the use of local streets by commuters.
4. **Minimize Barrier Effects** - Remove both physical and psychological barrier conditions associated with Route 2 and restore means for safe passage across its corridor. For example, the towns of Acton and Concord seek improved connections for emergency vehicle and recreational use, between the parts of each town which are divided by Route 2.
5. **Preserve Access To Existing Businesses and Institutions** - Provide sound, functional means for reaching activities served by the highway; for example, Emerson Hospital.
6. **Devise a Low-Impact Takings Program** - To the extent possible, develop long-range options which are constrained to the available right-of-way. For example, the areas surrounding Walden Pond and Emerson Hospital are particularly sensitive to takings.
7. **Minimize Environmental Impacts to Abutters** - Consider in particular noise, sensitive natural resources, and aesthetic impact. Where at all possible, Route 2 should be depressed as the lower of the roadways at grade-separated crossings.

Some of these issues (e.g., Route 2 capacity improvements and north-south accessibility improvements) were taken into consideration when the Route 2 CAC helped to develop a set of

five highway improvement packages. Others, such as right-of-way issues could not be addressed in this analysis.

Summaries of the alternatives and their traffic impacts during the 2020² AM peak hour are presented in the following discussion. Note that the summaries of impacts compare the alternatives' volumes, traffic patterns, etc. to those of the 2020 No-Build Alternative (Figure 1). No actual traffic volumes or changes in volumes are displayed on the alternative maps. At this point, local committees should focus on trends rather than on specific traffic volume numbers.

ALTERNATIVES DESCRIPTION AND ANALYSIS

Alternative I

Currently, only right turns in and right turns out are allowed at the intersection of Route 2 and School Street in Acton. There is no direct north/south access. Local traffic, mixed with through commuter traffic, has to traverse the Concord rotary to arrive at the south side of the town.

Alternative I provides direct north/south access by joining School Street via a bridge over Route 2. In addition, Route 2 and the Concord rotary are grade-separated, with the highway depressed³ under the rotary. Local access to and from Route 2 is provided via the rotary and ramps (see Figure 2).

Analysis indicates that this alternative induces fairly localized changes in traffic patterns, with no significant changes in volumes found east of the rotary. Volumes on the new School Street increase because of the direct connection. Increased volumes on Great Road can also be attributed to this connection. Meanwhile, volumes decrease on previously roundabout north/south routes such as Route 27 northbound in Acton and Route 62 in Concord. Increases in Route 27 southbound volumes south of Route 2 and a modest decrease in eastbound Route 2 volumes between Piper Road and School Street are partly attributable to the elimination of right turns at School Street. Grade separation of Route 2 at the rotary does not attract significant additional traffic to Route 2; however, it does provide for safer operations.⁴

Alternative II

Currently, all moves are allowed at the signalized intersection of Route 2 and Taylor Road/Piper Street in Acton. Only right turns in and right turns out are allowed at the Route 2/Hosmer Street intersection.

Under Alternative II, Taylor and Piper Roads and Hosmer Street terminate at local service roads that are parallel with Route 2, eliminating all direct access to and from Route 2 at these points.

²Note that CTPS developed forecasts for the years 2000 and 2020. However, the CAC felt that, considering the long-range nature of the five alternative grade-separation packages, only the 2020 traffic forecasts would be relevant.

³Note that, for modeling purposes, it is irrelevant whether Route 2 is assumed to be over or under the rotary.

⁴Although an operational analysis has not been done, this statement is believed to be accurate based on CTPS analysts' experience.

The eastbound and westbound service roads are connected by a short north-south connector road (bridge) just west of Hosmer Street, which continues to have no direct access across Route 2 other than through the new service roads. Access from Massachusetts Avenue to Route 2 eastbound is replaced by access via the southside service road. In addition, Alternative II includes all the improvement elements of Alternative I. See Figure 3.

Analysis indicates that, as with Alternative I, changes in traffic patterns created by this alternative are localized in nature. Route 2 volumes decrease west of Piper/Taylor Roads to just east of Hosmer Street, primarily because of the elimination of direct access to and from the aforementioned streets. With a few exceptions, volumes also decrease on north-south routes from Route 27 to Hosmer. Many of the diverted trips reappear on School Street and Route 2A. Traffic patterns east of the Concord rotary do not appear to be affected significantly.

Alternative III

There are currently three traffic signals located in the approximately one-mile section of Route 2 between Route 62 and Sudbury Road in Concord. This alternative attempts to consolidate two of them: the Route 2/Route 62 and the Route 2/Old Road to Nine Acre Corner (ORNAC) intersections are combined, creating a single grade-separated crossing (split diamond). See Figure 4. Movements to and from Route 62 and Nine Acre Road are made from two parallel service roads. A half-diamond interchange at Sudbury Road allows movements to and from Route 2. Route 2 is depressed at this location with, Sudbury Road passing overhead, but at grade. The changes at School Street and the rotary (which makeup Alternatives I and form part of II) are also included in this alternative.

Volumes on Route 62 north of Route 2 and on Nine Acre Corner Road do not change. However, volumes do decrease somewhat on Route 62 south of Route 2, because of lower turning-movement traffic from/to Route 2.

Alternative IV

This alternative includes the treatments at Piper and Taylor Roads and Hosmer Street, at School Street, and at the rotary, and the split diamond at Route 62 and ORNAC. In addition, Sudbury Road is treated with a modified diamond interchange in which the westbound entry and exit from Route 2 are provided via the existing ramps at Fairhaven Road just east of Sudbury Road rather than through Sudbury Road. As in Alternative III, Route 2 is depressed, with Sudbury Road passing overhead at grade. Baker Avenue is joined via a bridge over Route 2, with access to and from Route 2 and the service roads connecting with the rotary provided through a diamond interchange. All direct access to and from Route 2 westbound is eliminated. The on- and off-ramps west of Baker Avenue join with the local service roads east of the rotary. See Figure 5.

Traffic increases on Fairhaven Road as well as on Sudbury Road north of Route 2, while it decreases on Sudbury Road south of Route 2. Volumes on Baker Road decrease, presumably because of the more circuitous movements (use of ramps) to and from Route 2. All other patterns observed in previous alternatives also prevail in this option.

Alternative V

This alternative is the most comprehensive of the five alternatives analyzed. Route 2 is grade separated between Piper Road in Acton and Bedford Road in Lincoln. See Figure 6. With the exception of Sandy Pond Road, every intersection in this approximately eight-mile long section of Route 2 is redesigned. Local access is provided through a series of service roads, diamond interchanges, and modified diamond interchanges. Unique to this alternative are the elimination of access from Route 2 to Baker Street northbound in Concord and the full diamond interchange at Route 126 in Lincoln.

Volumes on Baker Street decrease because of the change in access. No overall changes in volumes occur on Route 126. However, unlike in Alternative IV, volumes on Route 62 increase north of Route 2. Changes in traffic patterns seen in other alternatives are also present here in the relevant locations. Again, the changes are fairly localized around given improvements. This alternative improves north-south access within the communities and provides safer traffic operations along Route 2 and at intersections. *No significant additional traffic is attracted to Route 2.*

SUMMARY OF ANALYSIS

The alternatives were primarily intended to facilitate north-south access within communities, to improve operational safety along the Route 2 corridor and to divert traffic from local streets to Route 2. Analysis indicates that the principal advantages of the various alternatives are that they are safer operationally⁵ for through and turning Route 2 traffic and that they provide easier and safer north-south access within local communities. All changes in traffic patterns are fairly localized. Even though the improvements separate through and local traffic, thereby improving traffic flow on Route 2, they attract no significant additional traffic from local streets to Route 2. In fact, a significant finding of this study which confirms conclusions of previous CTPS analyses is that traffic through the center of Concord can not benefit from Route 2 improvements because it is not destined to employment centers served by Route 2 (Boston, Cambridge, Route 128). This traffic is most likely destined for Bedford, Burlington and other towns northeast of Concord which can be more directly accessed via other roads (e.g., Route 62).

NEXT STEPS

The results of the alternatives analysis were presented orally to the Route 2 Citizens' Advisory Committee (CAC) on May 5, 1996, and again to a group of selectmen and various other community representatives on July 9, 1996. Now that the CAC hopefully understands the overall effects of each alternative, they may want to decide which elements best meet their objectives. In the opinion of CTPS, the committee should focus on that alternative or those elements of an alternative which, when constructed, will deliver the highest safety benefit to all concerned and will potentially be the least controversial environmentally and socially. For example, CTPS sees

⁵Although an operational analysis has not been done, this statement is believed to be accurate, based on CTPS analysts' experience.

the reconstruction of the Concord Rotary as potentially such a project. Other grade separations may be ranked and presented to community residents to make sure there is local concurrence. The communities can then submit a prioritized list of desired improvements to MHD.

cc: Robert McDonald, MHD District 4

Jack Wood, MHD District 4

Harri Vohra, MHD Traffic Engineering

Route 2 CAC Representatives from Acton, Concord and Lincoln