

February 14, 2013

Thomas F. Broderick, P.E.,
Chief Engineer, MassDOT,
10 Park Plaza,
Boston, MA 02116,
Attention: Project Management Section,
Project File No. 607209



John S. Allen
7 University Park
Waltham, MA 02453-1523
jsallen@bikexpert.com
(781) 891-9307 voice/fax

- Technical writing, translation
- Mechanical design, acoustics
- Consultant on bicycling
- Effective Cycling instructor

Dear Mr. Broderick:

I speak as a cycling advocate of 35 years standing in the Boston area.

Some other cyclists will comment on the Beacon street project in favor of “cycle tracks” – barrier-separated bikeways in the street corridor. My impression is that a goal of this advocacy is to gain acceptance and official sanction for the concept of “cycle tracks”, to get a “foot in the door”, so to speak – while neglecting to examine whether these actually are practical and safe at this location.

A stated goal of this advocacy is to attract novice and child cyclists to ride on Beacon Street. That would be a laudable goal if it could be achieved safely, but it cannot – and it leads to serious problems for all other users of the corridor, including the bulk of the cycling population. This goal plays on the widespread belief that safety can be increased by removing cyclists from the Beacon Street roadway; and on the misconception that rear-end collisions are the most common and serious car-bike crash problem. Neither of these beliefs is accurate.

Also, some political leaders appear to believe that the proposed design is innovative and forward-looking and will resound to their credit.

My approach to the Beacon Street project, as to others, is to examine technical details, consult the research literature, and take designs on a case-by-case basis. You may find my positive comments online about separate bikeways in the street corridor on 9th Avenue, in New York City, which has a traffic signal at every intersection and no driveway crossings, and on University Avenue in Madison, Wisconsin, where a contraflow on-street bikeway serves cyclists at the University of Wisconsin. On the other hand, I opposed the design implemented on Concord Avenue in Cambridge, but I proposed a different design which also would have a separate bikeway in the street corridor -- entirely on the south side, with one signalized crossing rather than there also being a bikeway on the north side, where it crosses 24 driveways and 8 streets in 3000 feet.

I agree with proponents of the cycle tracks that Beacon Street is not very good for bicycling at this time. The deteriorated road surface is one serious problem, worsened by delay in reconstruction. Bike lanes in the door zone of parked cars, on this roadway of marginal width, are another problem, and intersections pose yet a third.

The fundamental issue with the reconstruction is how to address these problems to serve the needs of all users of Beacon Street as optimally as possible.

My preference

There are far better solutions than the proposed cycle tracks. As a cyclist, my preference is to widen the traveled area of the street. I know of two ways to do that:

- The one I most like was put forward by David Olmsted, and would narrow the sidewalks to 7 feet -- still ample -- in order to widen the roadway and allow bike lanes to be safely outside the door zone of parked cars. As Olmsted has suggested, bump-outs around utility poles would avoid the need to move most of them. This solution would entail little or no reduction in the on-street parking which is important to residents and businesses along Beacon Street. This option also would allow improvement east of Washington Street, where parking demand is high and the proposed design would make no improvement. I am pleased to hear that the design consultant considers Mr. Olmsted's option to be feasible.
- Another option would remove parking on one side of the street, as already proposed in the current plan, so a bike lane on the other side can be placed safely clear of parked vehicles.

As a bicyclist, I'd be happy with either of these options, or a combination of them. I understand that parking removal is not popular with residents, but on the other hand, it is already under discussion, and with bicyclists on the widened roadway rather than behind parked cars, safety is better than with the proposed cycle tracks. Far fewer parking spaces need be removed, because blind conflicts would not occur between bicyclists and turning motorists at driveways. (I'll have more to say about that later).

Also, attention needs to be paid to intersections so that cyclists have a clear line of travel through them, and so motorists are directed to merge across cyclists' line of travel when preparing right turns. This can be accomplished by removing a few parking spaces before major intersections, so as to create right-turn pockets.

Other desirable amenities would include bicycle parking, and speed tables at crosswalks so as to control motorists' speed. Traffic-law enforcement and signal timing also can help with this. An educational campaign would inform travelers as to how to use the corridor safely and efficiently. Parking management could lead to more efficient and convenient use of available parking resources, to the advantage of residents and businesses.

I also note that a bikeway in the unused width of the Fitchburg Line rail corridor has been proposed, and this would provide a nearby parallel route suitable for timid or child cyclists. This possibility has already been discussed by the City of Cambridge.

The proposed design

The proposed design would have a sidepath ("cycle track") behind parked cars over much of the southwest side of Beacon Street, and a bike lane behind a mountable curb (also called a "cycle track", though it would function as a bike lane) on much of the northeast side. In the section from Museum Street to Park Street, parking would be removed on the south side, and a sidewalk would be added there. This segment would have bike lanes on both sides, but due to the narrowing of the roadway, the one on the north side would be in the door zone of parked cars, as at present. East of Washington Street, there would be no change from the present configuration, with parking on both sides, and bike lanes in the door zone.

Technical issues

Let me now describe some technical problems with the proposed design, in detail:

A primary one is that the Beacon Street corridor is not wide enough to accommodate the sections with cycle tracks without very serious impairment of traffic flow. The reduction of on-street parking would inevitably result in a major increase in illegal parking and standing, as has been at least indirectly acknowledged by the Mayor of Somerville (in a letter to Beacon Street business owner Domenic Ruccio):

...fuel deliveries will occur as they have always occurred – and at the same locations. Either the trucks will cross the mountable curb of the cycle track to enter the driveways they currently use or, as in the case of the photograph you sent in, they will park in front of the abutter. They would do this in the new design by mounting the cycle track and blocking it for the limited time needed to deliver the fuel.

In other words, fuel trucks will do what they have always done: single-park or double-park in front of the delivery location and obstruct traffic flow (bicycle or auto) until the delivery is complete.”

But it isn’t the same, because, without parking, the fuel trucks and other delivery vehicles on the side without parking will have to stop in the cycle track rather than in the parking lane; and parking spaces on the other side will be more heavily occupied.

There are other technical issues.

- Most car-bicycle collisions occur due to crossing and turning movements. “Right hook” and “left cross” collisions are the most common types and the most common causes of fatalities to cyclists in urban areas. Beacon Street has dozens of residential and commercial driveways, and several street entrances and crossings. Cycle tracks behind parking trap bicyclists where they are hidden from crossing and turning motorists. Lacking parking setbacks at every intersection *and driveway*, cycle tracks force motorists to turn across the path of bicyclists they cannot see.

In that context, here is another quote, from Somerville Planning Director Hayes Morrison:

“Neither the AASHTO green book nor the MUTCD have any parking restrictions at driveways. At these locations, parking restrictions will be consistent with the [Somerville] April 2011 Traffic Regulations, which state that parking is prohibited ‘in front of any driveway, including 2 feet in either direction from the driveway.’

No current legal spaces at either side of driveways on the southbound/even side of the street will be eliminated.”

A 2-foot clear zone to parking either side of a driveway may be sufficient for safety of pedestrians on a sidewalk, but it by no means provides adequate sight triangles between motorists entering driveways, and bicyclists traveling at speeds up to and beyond 20 miles per hour, concealed behind a line of parked motor vehicles. Furthermore, the AASHTO Green Book is not AASHTO’s reference on bikeway design. That is the AASHTO Guide for the Development of Bicycle Facilities, which includes numerous warnings about the hazards of bikeways behind parking and which cross driveways.

- Motorists who are aware of the driveway crossing hazard will slow to a crawl, blocking traffic in the street. The motorists are supposed to yield to bicyclists, but because of the protruding hoods of their vehicles, they can't see the bicyclists, and the bicyclists will have to yield. Safe bicycle speed also, then, is very slow.
- A bikeway behind parking designated for one-way travel also promotes two-way travel, leading to greatly increased risks, because motorists and cyclists converge on each other from unexpected directions.
- Dividing up the width of a road corridor reduces the usable width due to the increasing number of buffers required. Specifically, the proposed design trades a left-side door zone for a right-side door zone. And, then with the "reveal" (low curb) on the sidewalk side of the bikeway, only about 4 feet of its width will be clear of these hazards. Motorists will open their doors on the street side, no longer in conflict with bicyclists, but instead in conflict with motor traffic.
- The ability to overtake on cycle tracks is limited by their width, and as the one behind parking reaches capacity, all bicyclists will be limited to the speed of the slowest.
- Over the years, the traffic mix is going to change in unpredictable ways, with different types of vehicles of different widths, and which travel at different speeds. A single, wide roadway can adapt dynamically to different traffic mixes and can be restriped if needed. The unchangeable, literally cast-in-stone reconfiguration proposed for this street offers no such flexibility. Cycle track Installations in other cities are typically implemented using striping, traffic islands and removable barriers, retaining flexibility for reconfiguration without full-depth reconstruction. Cambridge, and now Somerville, are unique in grasping the opportunity presented by full-depth reconstruction to narrow roadways irrevocably.
- Where would residents put out trash barrels? Answer: on the cycle track, if Concord Avenue in Cambridge offers any example.
- Pedestrian-bicycle conflicts increase, and particularly at intersections and bus stops.
- Cycle tracks are difficult to keep clear of snow, ice and trash. That is particularly true of the proposed design. A snowplow truck would have to keep clear of the mountable curb on the northeast side, or risk damaging it. The gutter at the foot of the mountable curb is a conduit for stormwater, and at a time of melting and freezing, it becomes a sheet of ice. Keeping a cycle track between parking and a sidewalk clear of snow and ice so that it is rideable is very difficult. By way of contrast, a conventional, crowned street profile carries meltwater away to the curbs.

The research literature

Repeated claims of safety for cyclists have been made for the proposed design, backed up by erroneous and selective interpretations of research literature.

The Design Exception Report for the project cites a Montreal study which claims a 28% reduction in crashes on cycle tracks, compared with streets. That study lacks credibility, because it makes invalid comparisons, and also

fails to count injuries to pedestrians. A careful analysis of that study is available here: <http://john-s-allen.com/montreal-kary.html>.

The Design Exception Report also cites the large and careful 2007 Copenhagen study. That report shows that the overall crash rate increased by 10% and the crash rate for cyclists, by 30%. The conclusions are unequivocal, see <http://www.facebook.com/media/set/?set=a.1422969945625.54796.1574017310&l=6d6baf5bf4>. This is despite the much smaller number of driveways on the Copenhagen installations. The design of the Copenhagen installations is much more ample and forgiving than that of the proposed Somerville installation. The Design Exception Report has turned the Copenhagen report on its head, claiming that it actually shows a reduction in the crash rate.

European practice is often held up as a model for Americans to follow, but it should be noted that there has been much opposition to underdesigned bikeways in Europe, and particularly in Germany. Here, for example, is a quote from Tilman Bracher of the German Cycling Federation, commenting in 2007 about a study of bicycle crashes in Berlin conducted by that city's police department:

The problems with sidepath placement leading to crashes at intersections and driveways are known to police and planners in Berlin, and the knowledge has spread... Bikeways are now, as a rule, planned as bike lanes on the roadway, or bicyclists ride in mixed traffic. Many sidepaths have been removed. We are on the way to make the new planning that started with the police study mainstream.

This quote and other documents illustrating the same point may be found linked at <http://www.bikexpert.com/bikepol/facil/sidepath/index.htm>

The example which I think is most relevant to the proposed design is from Davis, California, where one of three designs tried in the 1970s was bikeways behind parked vehicles, a design quickly abandoned due to hazards recognized by bicycling advocates of all shades of opinion, in a community with heavy bicycle use and a climate of strong support for bicycling. A summary of the Davis experience, with links to documentation, is here: <http://john-s-allen.com/blog/?p=1927>

Project documentation, and what it shows:

Plans for all MassDOT projects are supposed to be posted online at 25 percent design review, along with a basic project checklist that includes measures of pedestrian and bicycle accommodation.

Overhead views were hung on the walls and placed on tables at a January 28 public meeting so meeting attendees could write suggestions on them, and then these were withdrawn for review by the consultant. Plans were not online as of the February 4 public hearing. The only engineering drawings online were three cross-section drawings. The available documentation did not show anything, for example, about traffic signal timing, construction phases, or utility connections. The overhead views showed only the proposed treatment, without reference to existing conditions. The overhead views were not dimensioned. Similar drawings were posted at the February 4 meetings, and again, these did not qualify as engineering documents.

In reply to a request for the plans from a Somerville resident between the times of the two meetings, the City sent an e-mail with the same watercolor paintings of conceptual street views which were already available in

the Design Exception Report. Just looking at them, it is obvious that they are inaccurate; for example, the cycle track on the side with the mountable curb is shown much wider than the 6 feet described in the cross-section.

Some highly unfortunate design elements also are shown. The mountable curb is of brick. Does anyone involved in the design of this project understand what it is like to ride a bicycle over a brick surface with a side slope? One of the paintings shows a series of traffic islands with plantings, which do not correspond to any of the described cross sections. These , and a traffic island in another drawing, force motorists to make wide right turns from the left of the island, with cyclists to its right. It's bad enough to require motorists to turn right from the left side of bicyclists, but thanks to the width of the island, bicyclists often will be outside the scope of the motorists' right-side rear view mirrors.

All of the watercolors represent daytime lighting conditions, but they show astonishingly low levels of traffic of all kinds, -- bicycle, motor and pedestrian, a traffic volume which might be expected at 3 AM on a Sunday morning. One drawing shows a cyclist riding the wrong way on a cycle track. No directional markings are shown.

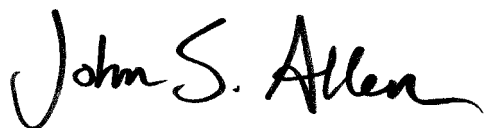
At the February 4 public hearing, the design consultant described a new design element: a 3-inch "reveal" between the cycle track and sidewalk. This is another name for a low curb, a longitudinal step. It would sweep the front wheel of a bicycle aside, preventing balancing the bicycle and resulting in a hard fall. It would also complicate snow clearance.

These issues do not promote confidence in the functionality of the design, or in the public process.

Summary

To summarize: I strongly advise that the Beacon Street reconstruction be configured to provide more travel width in the roadway, so that bicyclists and motorists can share it safely and amicably; that intersection design reflect best practices of traffic flow, and particularly, destination positioning so that drivers merge before turning rather than turning abruptly across the line of travel of cyclists; that motorist speed be controlled through speed tables, signal timing and traffic law enforcement; that education and parking management be part of the planning for the project; and that alternate, truly safe and separate routes be developed for cyclists who are uncomfortable with riding on an improved Beacon Street.

Very truly yours,

A handwritten signature in black ink that reads "John S. Allen". The signature is written in a cursive, flowing style.

cc:

Luciano Rabito, MassDOT

Shawn Holland, MassDOT

Senator Patricia Jehlen

Janice Delory, City of Somerville

Hayes Morrison, City of Somerville.