

To: Andrew Gottleib, head of Office of Commonwealth Development  
From: David Lee  
Subject: Massachusetts Avenue Redesign  
Date: 10/10/2006

## **Memo Summary**

Renovations to the streetscape of Central Square have been largely successful in improving the quality of its place while maintaining adequate road service for multi-modal transport. Similar measures can and should be applied to Massachusetts Ave south of Central Square up to Memorial Drive, though with certain modifications to account for unique travel patterns on this stretch of Mass Ave. Our priority should be to improve the pedestrian environment and facilitate multimodal transportation, and local community input can both inform our design choices and validate our overall goals to other vested interests.

## **I. Evaluating Central Square**

### ***Observations from a driver***

This is a pedestrian environment. Most of the street elements are devoted to pedestrian safety and comfort, and sidewalks take up at least as much space between building fronts as does the road. Crosswalks are frequent and well-used, and other traffic gives right of way to crossers and rarely speeds. The bike paths are also busy and probably well-appreciated by both bikers and pedestrians, who do not have to share a sidewalk. By contrast, traffic around Lafayette Square and South Mass Ave tends to move quite fast in absence of congestion, and there are narrower sidewalks and fewer safe crossings. That I, the driver, would perceive Central Square to be pedestrian-dominated is an important behavioral cue to adjust my driving accordingly.

Mass Ave along Central Square is generally clearly marked and features plenty of informative signage. Crosswalks, bike lanes, median markings, and signs explicitly demark each transportation mode's right-of-way. With many one-way streets entering and exiting the square, it is sometimes difficult to understand how one reaches their destination if it is outside the square, or where one parks their car if going somewhere inside the square. (On weekend nights, when the square becomes an entertainment destination, parking is quite scarce; I have often parked further south near MIT and walked the remaining distance. What happens when parking south of Central disappears?) Despite this, and a reduction to single-lane traffic near the square's busiest intersection, congestion is minimal and there are few delays from turning or loading vehicles. Loading zones, taxi stands, bus shelters, and turning lanes have been implemented optimally to minimize disruptions to through traffic.

The only automobile traffic problems I see are cars passing through the square from east to west or vice versa. Many cars enter the square only to continue west from Norfolk St to Pearl St, or to continue east from Brookline St (which connects to a major traffic rotary on Memorial Drive) to Douglass St. Because these pairs of streets are not aligned, the cross-traffic makes a zigzag course across Mass Ave, sometimes at relatively high speed, and presents a danger to bicyclists, pedestrians, and other motorists.

Improving east-west connections to the north or south may ultimately improve the traffic situation at Central Square, if these connections provide alternate access to the neighborhoods on either side of the square or Memorial Drive.

### ***Observations from a pedestrian***

Along a street like Mass Ave, wider sidewalks are nicer than narrower sidewalks. Not only do walkers have greater room to maneuver and avoid collisions, but they also have room to sit and enjoy the activity on the street. This can either be on public benches, which are well-distributed across the square and well-sheltered by trees, or on outside café seating by shrewd restaurants during good weather. These elements simply cannot fit on sidewalks south of Central Square without disrupting pedestrian traffic. Wider sidewalks also make the square more accessible to the elderly or mobility-challenged, who need space for walkers, wheelchairs, scooters, or simply room to walk more slowly than others.

Public transportation is prominent in Central Square, and the infrastructure is appropriate to the level of traffic. Many bus routes converge on the square, and the Boston T Red Line conveniently stops at the corner of Mass Ave and River St. Based on the success of businesses in the Central Square area, I would conjecture that easy access by public transportation offsets the negative impact of removing free or up-front parking.

The street is configured to allow buses to pull out of through lanes when stopping for passengers. These pull-out lanes often pull double-duty as right-turn lanes, truck loading zones, and taxi stands; these all help to reduce delays on the road. The lanes also provide a spatial barrier for pedestrians against faster-moving cars and bicycles, and on-street parking serves the same purpose where it exists.

In general, a good pedestrian environment also needs protection from other elements: sunlight (in the summer), wind, precipitation, dust, and automobile exhaust. Street trees and sheltered bus stops all help mitigate these elements, even though that is not their primary purpose, and give Central Square a unique character as well. Again, increasing the size of the sidewalk allows for more room for these features, which go a long way toward improving the pedestrian experience, make Mass Ave more attractive, and create a sense of place.

### ***Conclusions on Central Square***

I would conclude that the improvements made to Central Square have been successful in achieving similar goals to what we now seek in the southern part of Mass Ave. The incremental changes to street width or marking themselves did not make the project a success. These changes created a broader shift in perception in the nature of the place itself, that this area prioritizes safety and convenience for walkers, bikers, bus riders, the elderly, and local residents. This perception changes the behavior of drivers and makes street conditions safer and less erratic. Perhaps, it also blunts criticism that “improvements” to the street are intentionally making Mass Ave less efficient; if southern Mass Ave is viewed more as a place than as an obstacle, then expectations for the function of its design change as well, shifting away from “throughput” and towards “livability.”

## II. Evaluating South Massachusetts Avenue

### ***Problems***

Mass Ave between Central Square and Memorial Drive suffers from a complicated arrangement of intersections (several grid patterns collide and cross-streets rarely align at right angles) and automobile dominance. Its defining features are:

- Wide lanes with fast traffic
- Frequent delays from turning or stopping vehicles
- Narrow sidewalks with few amenities
- A general lack of readability or sense of place

Redesigning Mass Ave must address similar problems to those currently being tackled in the Lafayette Square project:

- Make intersections easier to navigate for automobiles.
- Provide safe pedestrian crossings.
- Facilitate bicycle safety and access.
- Make the streetscape more attractive.

However, because this project would be funded by federal and state money, and would impact both regional and local transportation, there are several caveats to consider:

- Acknowledge historic street patterns.
- Minimize impacts on parking and loading.
- Do not make the existing congestion too much worse.

### ***Major institutions and constituencies***

- Federal highway funding agencies
- The Commonwealth of Massachusetts, MassHighway (state)
- City of Cambridge, City of Boston, surrounding towns
- Neighborhoods: Cambridgeport, Area IV, Mid-Cambridge, Riverside
- MIT (the institution)
- MIT students
- Businesses along Mass Ave
- Other Cambridge residents
- The fire department, University Park developers

Of these institutions, the current reconstruction has the support of the City of Cambridge and MIT (the institution), and was strongly influenced by MassHighway. Citizen participation through public meeting and comments by phone or website shaped the Lafayette Square plan as well, but we have yet to actively engage them in the design of the rest of Mass Ave. We will have to work quickly to adequately address their concerns over the current reconstruction plan. We should also engage the businesses local to the construction, though I expect that they are already on board for the improvements. By consolidating support from these remaining groups and giving them

say in the final product, we should be able to deal with skepticism or opposition at the regional or federal level.

### ***Involving the “community”***

Involving Cambridge residents in the redesigning process is the most important form of community input. While there are regional traffic concerns to consider, those voices are already well-represented in the funding stage of the project. Extra attention must be paid to local residents who are often underrepresented in transportation decisions. Legitimacy in their eyes will greatly help secure political support and City of Cambridge funding (an increasingly important piece of the funding picture).

Speak to local residents in Cambridgeport and Area IV, the two major affected neighborhoods, using public feedback meetings. They should be shown the current plan (along with a review of existing conditions) and be asked to comment on improvements to the plan. As in the Lafayette Square renovation, it is important to translate community input into concrete changes and improvements to the original plan, or at the least, acknowledge that these concerns are being weighed against other factors.

This area in particular also houses many MIT students, as several graduate dorms, undergraduate dorms, and living groups are situated along Mass Ave. These students are perhaps most directly affected by changes in traffic patterns and the streetscape in their area, and their concerns are distinct from those of the MIT institution. They will likely have great interest in traffic calming, pedestrian amenities, and improving transport mix, and their support may prove to be an important counterweight to objection from the MIT institution.

### ***Lafayette Square***

I believe the plan for a pedestrian plaza and realigned intersection in Lafayette Square is reasonable and should be implemented. The current intersection is needlessly complex, equal weight is given to each of the three entering roads (Mass Ave, Main St, Columbia St) without any hierarchy of purpose. Approaching from Mass Ave, the intersection is merely an obstacle along a straight path, not a place in itself, and cars are encouraged to speed through. A lot of land is used up by the oblique angle at which Main St meets Mass Ave, as well as the necessary curved U-turn lane to travel back up Main St from Mass Ave. By comparison, there is little space for sidewalks and shelter, and without traffic lights the intersection would be quite dangerous to cross. The intersection also fails to align with Sidney St where it meets Mass Ave, and there is no clear path to that other side if one approaches from Main St or Columbia St.

The new plan obviously addresses most of these issues, transferring much of the road surface back to pedestrian-only open space while realigning the intersection to a right-angled, four way intersection that meets with Sidney St. Traffic counts made at Lafayette Square during peak and non-peak hours show that flow is heaviest along Mass Ave, in transferring between Mass Ave and Main St, and turning south onto Mass Ave from Columbia St. Accordingly, the plan devotes lanes to those routes and will presumably be timed to provide the same level of service as the current configuration. During peak hours, greater cycle time (or a shorter cycle period overall) should be devoted to cars entering the square from Main St or Columbia St, while during off-peak hours, straight traffic on Mass Ave should be prioritized.

The only awkward and potentially dangerous connection in this plan is when entering Columbia St from Mass Ave. However, the traffic counts show that few cars require that connection. It may be prudent to disallow that connection altogether.

### ***The rest of Mass Ave***

Analysis of traffic counts on Mass Ave at Memorial Drive, Vassar St, Albany St, and Main St reveals three important patterns:

1. The flow of cars traveling north-south along Mass Ave at peak hours is less than at off-peak or weekend hours. Traffic flows more smoothly at these off-peak hours, whereas congestion hinders traffic flow during peak hours even though more cars are trying to get through.
2. More cars are turning onto and away from Mass Ave at these peak hours. This implies that traffic approaching destinations in South Cambridge is competing with traffic simply passing through during these hours.
3. Many more buses, bicycles, and trucks pass through these intersections at peak hours. These tend to disrupt flows by their size, safety issues, and loading behavior.

What is the most important thing to take away from these numbers? Delays caused by loading and turning are major limits to road capacity during times of congestion. The goal should not be to allow for more cars to travel at full speed across Mass Ave; instead, we should concentrate on the delays that cause backups and produce erratic driving behavior. Proving that these delays (which are caused by insufficient street marking/signage, lack of bus shelters and turning lanes, and mixing of bike traffic into regular automobile lanes) are a greater factor in congestion than the number of lanes and allowed speed of traffic justifies a Central Square-like redesign. It means that we can offset the negative effects of narrowing the road by designing what road is left more efficiently.

What remains to be improved are turning lanes and pull-away lanes. We should add left turn lanes to Mass Ave at Vassar St and Albany St in order to separate them from through traffic on Mass Ave. Adding a left turn signal allows some flexibility as well: we can either make a dedicated left turn lane that always draws a short turn-signal period, or a hybrid lane with a left-turn signal active only during peak hours (otherwise it acts as a second through lane). The pull-away lanes for buses also should be more clearly delineated, and perhaps even lengthened, to accommodate multiple buses that may cluster in the area during peak hours.

I am generally satisfied by the current reconstruction plans for Mass Ave, and would advise you to intervene only to ensure broader political support by drawing on community feedback to improve the plan. I would also like the above minor additions to turning lanes and pull-away lanes to be added to the plan as well. The current reconstruction looks to address most of the problems we hoping to solve, and can do so without negatively impacting existing traffic patterns very much.