SOMERVILLE NEIGHBORWAYS: Finding ways in GIS to operationalize the idea of Shared Streets in Somerville, MA

DEFINITION

Neighborways are residential streets that are designed especially for low volumes and speeds for auto traffic. They intend to facilitate children playing on the streets, allowing them to bike and walk to school more safely and enhance the interconnectivity between destinations in the neighborhood that could easily be reached by biking or walking.

APPROACH

My goal was to determine which areas in Somerville should have a priority in initiating Neighborways. I came up with two different approaches on how to make use of GIS in order to operationalize this idea.

1) Focus on walkability around schools, hereby taking into account crash data on pedestrian accidents in these areas.
2) Focus on the feasibility aspects of Neighborways in Somerville, hereby taking into account criteria such as one-way streets and sidewalks’ width.

The two approaches can be distinguished by looking at either the social necessity or the infrastructural potentiality. Which analysis to follow is also a question of either concentrating on certain areas where, from a socio-demographic point of view, shared streets are most needed or, more easily, reaping some of the low-hanging fruits of the existing infrastructure.

DATA

The layer ‘EOT_Roads,’ (MassDOT) yielded most of the data I used for my analysis. Its most recent version (2012) conveys an abundance of information on, amongst others, width of sidewalks, curbs, functional classification or road constitution (for a more detailed description: http://www.massdot.state.ma.us/planning/Main/MapsDataandReports/Data/GISData/Roadinventory.aspx). Other data layers such as schools stemmed from MassGIS; socio-demographic information was either from Census or ACS 2010. Projection: NAD_1983_StatePlane_Massachusetts_Mainland_FIPS_2001 Lambert_Conformal_Conic

CHILDREN DENSITY AS A STARTING POINT

In order to get an initial idea of where children and families, the potential users of Neighborways, actually live, I mapped the City of Somerville with respect to children density. Hereby I got the clear impression that most children seem to live in East Somerville with a much higher density than in West Somerville.

(1) SCHOOLS - WALKABILITY

Neighborways serve as connectors between neighborhoods and important children’s destinations. Making routes to schools safer should thus be the top priority when looking for the potentiality of Neighborways. By making use of the ‘Network Analyst’ tool and following the analysis on “School site and the potential to walk to school” done by Giles-Corti et al., I created Pedsheds around school areas (1) and measured the vehicular traffic exposure within these (2). To give my analysis on walkability a more qualitative dimension of a walking experience and also cover a safety-dimension, I decided to add information on sidewalk width in proportion to the right-of-way (3) and car accidents that involved pedestrians (4). Adding up this information I created an index on walkability in school areas that can be seen on the left. There is a clear East/ West pattern visible in Somerville that sheds light on potential equity issues.

(2) EXISTING INFRASTRUCTURE

By looking at the existing infrastructure I wanted to figure out which areas are most unpleasant for pedestrians and most feasible to be converted into Neighborways. I followed a trial-and-error approach intending to continuously reduce my data. The criteria that proved successful, were:

I. Only Local Streets
II. Only One-Way Streets
III. Only Certain Right-Of-Way

The first two criteria worked well in reducing the given data to some extent. However, only the last criterion that I used helped reduce the data in a way that it could be dealt with more appropriately. When street width decreased below 40 feet of right-of-way (which is probably the norm for residential streets), it was not the roadways but instead sidewalks that became increasingly smaller. Since some were less than five feet wide, I deemed them to create an unpleasant walking environment. I proved this by selecting some exemplary streets and looking at them on Google Street View (pictures provided below). Generally when reaching a certain narrowness, the sidewalks automatically get crammed with electric poles, garbage cans, parked cars, etc. Hence, my rule of thumb is:

CONCLUSION

Each method displayed, by following separate goals, where to initiate Neighborways. Analyzing the walkability in school areas (1), it became obvious that there is a clear discrepancy in the level of children density and the location of walkable school areas. By looking at the feasibility dimension of Neighborways (2), the outcome was that narrow rights-of-way can be a good indicator of bad walking conditions, since they turn them into unused parts of the street. Thus a redesign of these streets as Neighborways could be promising.

References

