Side Street Crossing Tables on Western Avenue – Cambridge, MA

Site and Treatment Description

Western Avenue is a one-way westbound major collector in Cambridge, MA, with two travel lanes passing through a residential area with dense housing. It has the statutory speed limit for densely settled areas, which was 30 mph before reconstruction and 25 mph after. The street was redesigned and reconstructed between 2012 and 2016 to replace the sewer. The new design has narrower travel lanes, a sidewalk-level cycle track on one side of the street, and side street crossing tables (SSCTs) that carry the sidewalk and cycle track over side streets.

The SSCT treatment means that at every unsignalized intersection, crosswalks across the side streets are at sidewalk level, meaning vehicles entering or leaving the side street have to ramp up and down to pass over the crossing table. On the side of Western Avenue with the cycle track, the bicycle crossing is likewise raised, adjacent to the crosswalk.

Side Street Crossing Tables (SSCTs) make pedestrians and cyclists more prominent and reinforce pedestrian priority. Unlike at a raised crossing placed across the main road, they don't affect the speed of major streets thru traffic. The only vehicles crossing a SSCT are all going slow already – those approaching on the side street are coming to a stop because of the Stop sign, and the rest are turning from the main street onto a narrow side street. If a SSCT has steep ramps, they will further slow vehicles passing over them, as in the Netherlands where the SSCT ramp slopes range from 12.5 to 25%; however, those in Cambridge have a gentle slope (5% or less) that probably does little to further slow crossing traffic.

SSCTs were installed only at unsignalized intersections, because at signalized intersections, the signals help protect crossing pedestrians and cyclists, and because SSCTs would disrupt discharge flow during the side street phase.

Emergency Response and Snow Removal Impacts

The slope of the SSCTs implemented in side streets at Western Avenue are gentle enough that they do not impede snowplows or heavy vehicles such as fire trucks. Not surprisingly, no opposition or complaint has come from the Fire or Public Works Departments.

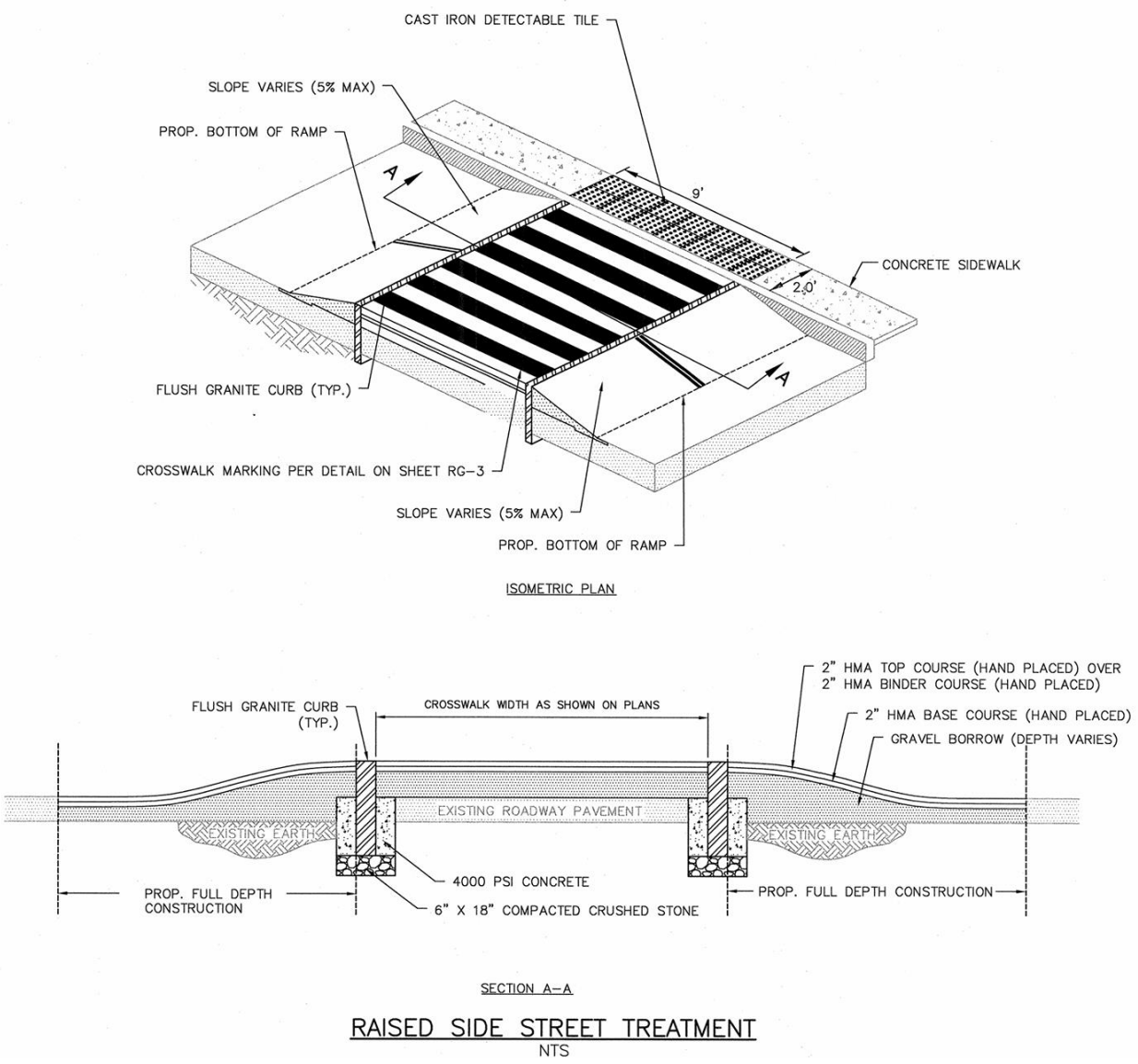
Safety Impacts

The SSCTs on Western Avenue are one of several features of Western Avenue's reconstruction, and so it is difficult to isolate their impact from the impact of the other treatments (narrower lanes, cycle track). Nevertheless, reported crash data indicates that total crashes in comparable periods of time increased from 40 to 48, while crashes that required emergency medical services decreased from 12 to 7. Notably, the pedestrian and cyclist volume along Western Avenue increased from 270 to 390 people at peak hour, which may reflect a greater feeling of comfort and safety on the part of vulnerable road users.

Design Specs and Cost

The figure below shows the specs for a typical SSCT. (A full set of bid set plans and specifications can be found using this link.) The side street crossing tables are 9 ft wide on the side of the street where there carries only a sidewalk, and 15 ft wide on the side with a cycle track and sidewalk. (The cycle track width is 6 ft.)

The SSCTs are as high as the curb reveal, typically 5 or 6 inches. They are constructed of hot mix asphalt, just like the street pavement; to reinforce their shape, they are bounded on each side by flush granite curbs running across the street. The ramps have a gradual slope, specified to be 5% or less.



Support Story

Although the chief purpose of Western Avenue reconstruction was to replace sewers, there was broad consensus to use the opportunity to convert it from its previous highway-like appearance to something more appropriate for an urban street – aiming for less speed, easier to cross, and with protected bike lanes. At the time, SSCTs were a treatment barely known in the US, but well known in the Netherlands and Sweden as a safety measure for bicycle crossings across minor streets at unsignalized intersections. A large study in the Netherlands (Schepers et al., 2011) found that SSCTs, also called "exit construction," reduce cyclist crash risk at unsignalized intersections by 50%. In the Netherlands, SSCTs also carry the pedestrian crossing, even where there is no bike lane or the bike lane is at street level; while the safety impact on pedestrians has not been studied, they are generally recognized as something that improves pedestrian safety and comfort. Based on

this Dutch experience, SSCTs were included in the project not only on the side of the street with the cycle track, but also on the side with a sidewalk only.

A few features of Dutch SSCTs can be contrasted with those installed in Cambridge. Dutch SSCT ramps are built of precast concrete blocks that serve to anchor the roadway material at both the top and bottom of the ramp, whereas the flush granite curbing in Cambridge anchors only the top of the ramp. Second, Dutch SSCT's have much steeper ramps than those in Cambridge, though they also have less rise. Typical of many Dutch cities, the Hague specifies SSCT ramps that rise 8 cm (3.15 inches) at a slope of 1:9 or 11.1%. These sharper ramps are more like speed bumps than speed humps, and are effective in getting drivers to slow to less than 5 mph when crossing them. Third, Dutch SSCTs are paved with sidewalk material (and, at the bicycle crossing, with cycle track material), which makes the crossing look like vehicles are passing over a sidewalk, rather than pedestrians passing over a street. Paving the crossing platform with sidewalk and cycle track material helps reinforce the idea that pedestrians and cyclists have priority, and that drivers should behave as guests in pedestrian territory.

References

J.P. Schepers, P.A. Kroeze, W. Sweers, J.C. Wüst (2011). "Road factors and bicycle–motor vehicle crashes at unsignalized priority intersections." *Accident Analysis & Prevention* 43.3, 853-861. https://doi.org/10.1016/j.aap.2010.11.005.