



## Abstract

Walking and biking are low-cost transportation modes that produce zero in-use air pollution and contribute to a healthy lifestyle. Despite the many benefits of biking and walking, however, NHTS household survey data (2009) shows that only 1.8% of all trips in the U.S. are completed by bike, and 10.9% by walking. The lack of safe biking and walking facilities is one of the major reasons cited for such low rates. Despite the need for information on infrastructure improvements, the Highway Safety Manual (2010) indicates that no data is available for developing Crash Modification Factors for specific treatments such as pedestrian overpasses and underpasses, crosswalk markings at uncontrolled locations, and alternative crosswalk markings at mid-block crossings. This research proposes to synthesize existing practice and current research on the impacts of bicycle and pedestrian facilities on bicycle and pedestrian volumes, crash frequency, crash severity, and other factors that measure the system usability of these modes. The final goal is to develop design guidance for constructing new bicycle and pedestrian facilities in Georgia that are efficient and cost effective and will encourage more people to adopt these alternative and sustainable modes of transportation.

## Example 1: HAWK Beacon

The HAWK (High-intensity Activated crossWalk) beacon is dark until activated by a pedestrian. After activation, a sequence of yellow and red indications alert drivers to the presence of pedestrians and signal drivers to stop while they cross. Pedestrians are guided by standard "walk" and "don't walk" indication icons.

HAWK beacons have high driver yielding rates, even on higher-speed and multi-lane roads. Their unique signal head configuration is intended to prevent drivers from confusing them with dark traffic signals.

**Safety benefits:** 9% Reduction in ped crashes; 98-100% driver yielding rate

**Average cost:** \$58,000

**Recommended application:** high-speed, high-volume, and multi-lane mid-block crossings



## Example 2: Raised Median Island

Raised median islands are short, localized median areas that provide pedestrians with a protected waiting area between opposing directions of traffic. This treatment allows pedestrians to stagger their crossing by first crossing one direction of traffic during an acceptable gap then waiting in the island for an acceptable gap to complete the crossing.

Raised median islands prevent pedestrians from becoming stranded in the middle of the street in unprotected areas during a multi-stage crossing, and they can also minimize difficult decisions about what constitutes an acceptable gap across many lanes of traffic.

**Safety benefits:** 50-65% Reduction in pedestrian crashes

**Average cost:** \$13,500 ea. or \$10/ft<sup>2</sup>

**Recommended application:** high-volume and multi-lane roads



## Goals

- Conduct a literature review on the effectiveness of bicycle and pedestrian facilities in reducing crash frequency and severity and in encouraging use (*in progress*)
- Survey DOTs and MPOs across the country for their design policies (*in progress*)
- Analyze data for developing a base crash rate and crash modification factors (CMFs) (*in progress*)
- Develop project planning level tool for assessing effectiveness of facilities
- Final report

## More to come...

### Pedestrian treatments:

- Curb extensions
- Advance stop bars
- "Yield to peds" sign in street
- Pedestrian-activated flashing beacons
- In-pavement warning lights
- Traffic calming
- Roundabout installation

### Bicycle treatments:

- Conventional bike lanes
- Two-way cycle tracks
- Two-stage turn queue boxes
- Bicycle signal detection
- Shared lane markings ("sharrows")
- Bicycle boulevards
- Roundabout installation

## Example 3: Bike Box

Bike boxes, also known as advance stop lines, are marked areas between a crosswalk and stop bar for bicyclists to queue at a red light. Drivers are required to stop before the box at their own stop bar. Bike boxes are designed to allow bicyclists to position themselves for their next maneuver during a red light and to make queuing bicyclists more visible to queuing drivers and prevent "right hook" conflicts.

**Safety benefits:** 400-500% Increase in drivers who yield to cyclists (partly due to overall increase in volumes of drivers and cyclists)

**Average cost:** \$320 ea. or \$10/ft<sup>2</sup>

**Recommended application:** signalized intersections with high bicycle traffic volumes, where bicyclists turn or cross over lanes often



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