

2.0 QUANTIFICATION OF BENEFITS

Pedestrian mobility is an important element to all forms of transportation, including walking to and from public transit. The widespread absence of pedestrian accommodations, particularly sidewalks, is well known and agencies at all levels of government are recognizing the need to improve conditions. Accommodations for pedestrians and bicyclists along existing roads have wide-range impacts on whether public transportation services are used. In addition, walking is frequently not a choice, but a pedestrian's only option of mobility. With the almost exclusive reliance on the automobile for decades, pedestrian accommodations were not given a high priority. Sidewalks were not included on many arterial, collector, or even local roads. These and other factors resulted in lack of pedestrian spaces on a large portion of the road networks. In cases where sidewalks are present, the segments are often not connected, leaving a fragmented sidewalk network for pedestrians to navigate.

The demand for constructing missing sidewalks often exceeds available funding. Therefore, it is important for agencies to demonstrate, and quantify where practical, the benefits of sidewalk retrofit projects. Traditionally, benefits associated with highway-related improvements are quantified through a benefit-cost analysis. This approach is not appropriate to evaluate the effectiveness of pedestrian improvements, particularly when missing sidewalks is the prevailing issue. The absence of sidewalks, in most cases, results in unsafe walking conditions and people, if able, avoid exposure to a potentially unsafe environment. This has limited the number of before and after studies conducted on pedestrian engineering treatments; therefore, leaving transportation agencies without a consistent, established methodology to define the benefits of retrofitted sidewalks.

Instead transportation agencies have defined a variety of benefit categories associated with the provision of sidewalks and enhanced roadway crossings. Three categories are considered in this report: (1) enhanced safety for pedestrians, (2) increased ridership on the fixed route bus service, and (3) the value that personal mobility adds to a rider's personal economics, health and well-being.

2.1 ENHANCED SAFETY FOR PEDESTRIANS

Sidewalks and enhanced street crossings can reduce the potential for serious motor vehicle crashes with pedestrians by keeping the pedestrians out of the street and controlling driver behaviors at the street crossings. National statistics, maintained by the Federal Highway Administration, indicate an approximate social value to the various types of crashes as follows:

- \$6.2 million per fatality (AIS Level 6 – Unsurvivable) (2011 value)
- \$651,000 for incapacitating injuries (AIS Level 3 – Serious) (2011 value)
- \$18,600 for non-incapacitating and possible injury values (AIS Level 1) (2011 value)

The following are estimates of the generalized benefits of sidewalks and enhanced street crossings, assuming various net improvements in exposure to crashes with motor vehicles.

- **HAWK Pedestrian Signals** – The purpose of a HAWK beacon is to allow protected pedestrian crossings, while stopping road traffic only as needed. Research has shown motorists' compliance with the HAWK beacon at up to 97%, higher than with traditional un-signalized crossings. Considering the potential severity of a motor vehicle hitting a pedestrian crossing the street and estimating that at least one unsurvivable crash could be avoided by providing a HAWK signal within a 20-year life of the signal, that HAWK signal could be assigned a benefits value of about \$6.2 million. At an average implementation cost of about \$200,000, this treatment would have a safety benefit-cost ratio of about 30:1.
- **Sidewalks and Ramps** – The extent to which an individual would walk in the grass or dirt, versus on the actual roadway pavement, depends upon the roadside versus roadway conditions and the perceived safety difference between the two. Slope and width constraints put many pedestrians into the street or deter them from walking at all. For mobility impaired pedestrians, a sidewalk without ramp access can sometimes be like not having a sidewalk at all. Considering there are existing pedestrian volumes and at least one incapacitating injury could be avoided by providing a segment of sidewalk with ramps within a 20-year life of the sidewalk pavement, that segment of sidewalk could be assigned a benefits value of \$651,000. The value could be much higher depending upon the severity of the roadway traffic conditions. At an average implementation cost of about \$30,000, this treatment would have a safety benefit-cost ratio of about 20:1.
- **Crosswalks and Other Minor Improvements** – The marking of crosswalks, placement of signage, flashing beacons, and other minor treatments can also improve the safety for pedestrians crossing minor street segments where the risk of injury would be expected to be less serious. Considering there are existing pedestrian volumes at the proposed minor improvement location and at least one non-incapacitating injury could be avoided by providing a particular treatment within a 5-year life of the treatment, that particular treatment could be assigned a benefits value of \$18,600. At an average implementation cost of less than \$1,000, this treatment would have a safety benefit-cost ratio of about 20:1 or more.

2.2 INCREASED FIXED ROUTE TRANSIT RIDERSHIP

In addition to the safety benefits related to the pedestrian access improvements, benefits to the transit agency would exist as well.

2.2.1 New Ridership, Facilitated by Improved Access to Transit

The provision of sidewalks and ramps not only increases the safety, comfort and convenience to pedestrians, but also increases the attractiveness of using transit. Even for captive riders (those without access to personal vehicles), the improved pedestrian access to and from their origins and destinations can be expected to increase ridership activity of current riders and potentially attract new riders of transit. Considering that for every new segment of sidewalk access to transit, at least ten additional round trips per day could be generated by providing that connection, it can be estimated that the increased ridership for that one sidewalk access way could generate additional revenue of \$5,000 or more per year for the same service already provided.

2.2.2 Ridership Shifted from Paratransit

Many current users of the paratransit service do so because of the lack of accessible sidewalks to and from the fixed bus service. According to statistics published by the American Public Transportation Association (APTA), the cost to a transit agency to provide a paratransit ride is some 10 to 20 times higher than the cost of a fixed route rider. By providing a particular segment of sidewalk with access to a bus stop, Longview Transit could shift one or more passengers per week from a paratransit trip to a fixed route trip. The cost savings to the transit department may be \$50 per week or more, or over \$2,500 per year. The cost savings were conservatively defined by reviewing Longview Transit's service provider costs.

2.3 PERSONAL ECONOMICS, HEALTH AND WELL-BEING

The improvements also result in benefits to the individual transit rider.

2.3.1 Personal Economics

The enhanced pedestrian access to transit services will increase the personal mobility of those who use that particular sidewalk or crossing enhancement.

- This betterment may be realized in terms of time savings across the total trip length, facilitated by making the more direct route paved and safer. FHWA Cost and Benefit Analysis Guidelines suggest using a value of \$15.00 per hour for the value of non-business personal time. If the provision of a sidewalk or HAWK signal were to save an individual transit user just two minutes one way on their journey, the \$1.00 daily savings in personal time could add up to over \$200 per year.

- If, however, the provided access to transit allows for the elimination of some other more costly form of transportation arrangement, such as a for hire arrangement, the personal cost savings benefit could be even greater.
- Also, in a 2009 study of the relationship between walkability and real estate values, evidence shows an increase in assessed value of \$700 to \$3,000 for every one-point increase in Walk Score. A point on the 1 to 100 Walk Score scale can be gained for every key destination within a reasonable walking distance.
- The *2012 Benchmarking Report on Bicycling and Walking in the U.S.* found that bicycling and walking projects create 11-14 jobs per \$1 million spent, compared to just 7 jobs created per \$1 million spent on highway projects. It also reported that if just one out of every ten adults started a regular walking program, the U.S. could save \$5.6 billion in health care costs—enough to pay for the college tuition of one million students.

2.3.2 Personal Health and Well-Being

The facilitation of healthy walking to the bus stop by the provision of sidewalks can help with the promotion of an active lifestyle, benefiting personal health and reducing medical expenses. The enhanced safety of walking to the bus and crossing streets can reduce stress levels associated with the necessary regular and special purpose commutes.