

Pedestrian Mobility and Safety Audit **Phoenix, AZ, USA**

Executive Summary

AARP and the Institute of Transportation Engineers (ITE) joined together in a pilot project to evaluate the accessibility and safety of five intersections in Phoenix, AZ, USA. The audit, which took place on May 13, 2008, brought together traffic engineers, AARP staff and four AARP members, who live in Phoenix and routinely use the city's streets to get to where they need to go.

The primary goal of the AARP/ITE pedestrian mobility and safety audit focuses on elevating the importance of incorporating older driver and pedestrian safety needs into traffic operations and transportation planning work. It also stresses the mobility and safety needs of seniors in their communities. The joint relationship hopes to synergize and elevate specific goals within the respective organizations by:

1. Increasing the level of awareness for transportation planning/engineering professionals in addressing older persons' mobility issues and challenges.
2. Assisting AARP members in making their case to local transportation professionals and policy-makers when identifying their transportation needs through involvement and advocacy.
3. Establishing relationships between AARP volunteers and ITE professionals who can provide technical information needed to make community pedestrian and transportation improvements.

DEMOGRAPHY OF THE UNITED STATES SENIOR POPULATION

In 2005, 12 percent of the U.S. population was 65 or older. The U.S. Census estimates that by 2025 the number of seniors will increase by 79 percent and an estimated 18 percent of the population (62 million people) will be 65 or older. Many of those over age 65 will be very advanced in age—over age 80–85. In 26 states, more than 20 percent—one in five residents—will be over the age of 65. By 2030, one in eight of those over 65 will also be over 85 (NHSTA 2005). The population 65 and over will increase from 35 million in 2000 to 71.5 million in 2030 (an increase to approximately 20 percent of the population) (Administration on Aging 2005).

In total, people aged 65 and older will account for 25 percent of U.S. drivers (AAA Foundation for Traffic Safety, 2008). Older pedestrians also face high risks when navigating streets primarily designed for cars. In 2005, older adults accounted for 15 percent of all traffic fatalities, 14 percent of all vehicle occupant fatalities and 20 percent of all pedestrian fatalities (Traffic Safety Facts 2003, 2004). Because older persons consist of approximately 12 percent of the U.S. population, there is a proportional overrepresentation of older adult traffic, vehicle occupant and pedestrian fatalities.

Having few opportunities to walk on a daily basis can make it more difficult for older adults to remain active, and having to give up driving puts a great strain on their ability to live

independently. Consequently, walking safely in a neighborhood and on a local street network is critical to maintaining mobility, livability and independent living.

The goal of this audit was to test a number of factors including pedestrian and vehicle traffic, crosswalk signage and the overall condition of sidewalks and streets, and to identify positive aspects and recommend improvements at each sample intersection. The transportation audit was initially conceived for older adults; however, the results demonstrate that safe sidewalks and intersections are critical for all community residents.

MARICOPA COUNTY POPULATION AND AGE DEMOGRAPHICS

The population of Phoenix is approximately 1.4 million, with 7.8 percent of the population over age 65. The Maricopa County age 65+ population is 11.1 percent.

The following data is from the *City of Phoenix Street Traffic Department's 2006 Pedestrian Collision Summary*:

- There were 580 pedestrian-related crashes involving 617 pedestrians. This is a 6 percent decrease in reported crashes from 2005 and a 12 percent decline from crashes reported in 2004.
- There were 51 pedestrians killed and 540 pedestrians injured.
- There were 137 hit-and-run pedestrian crashes where the driver fled the scene after impact; in 37 percent of these crashes the pedestrian was killed or seriously injured.
- 28 percent of all pedestrians involved in crashes were children below the age of 18. The single largest age group of pedestrians involved in crashes was children between the ages of 12 and 17.
- 63 school-age pedestrians (5 to 17 years old) were hit during school days (Monday–Friday, 7:00 a.m.–4:00 p.m.) but none were hit in school crosswalks with a crossing guard present.
- 36 percent of all pedestrian crashes occurred at night, but 73 percent of all pedestrian fatalities occurred at night.
- Pedestrian crashes occurred more frequently between 6:00 p.m. and 9:00 p.m.
- Pedestrian crashes occurred more often on Friday (18 percent) than any other day of the week.
- The month of December had the highest number of pedestrian crashes (67).
- In 55 percent of the crashes, the pedestrian was crossing a street outside the crosswalk.
- 33 percent of all crashes occurred at traffic signals.
- 29 percent of the pedestrian fatalities involved adults between the ages of 46 and 55.
- While pedestrians constitute 1.6 percent of the total crashes citywide, they comprise 2.8 percent of the total injuries and 25.5 percent of the total traffic fatalities.

Below are several excerpts from the article “Focusing on Pedestrian Safety” from the 2008 May/June issue of FHWA’s *Public Roads*. Michael Cynecki, traffic engineer, from the city of Phoenix was interviewed for the article.

...Driver hit and run, speeding, and obscured vision were major contributing factors in Phoenix. The majority of the fatal crashes occurred on urban other principal arterials; at non-junction locations; on roads with two-way continuous, left-turn lanes; and in dark but lighted conditions.

“Our wide streets, heavy traffic, and good traffic flow [in Phoenix] often result in motorists driving too fast for conditions” says Cynecki. “The wide streets and typically higher speeds make it difficult for pedestrians to cross, often resulting in barriers to the community or pedestrians taking chances while crossing.”

“Ironically, the downtown [Phoenix] area is not where we are experiencing the most crashes despite the fact that this is the area with the highest number of pedestrians. The higher speed suburban arterial streets are where the majority of our pedestrian crashes occur, where it is more difficult to cross. Higher speeds also result in more severe injuries.”

Phoenix is no longer building arterial streets with sidewalks immediately adjacent to the travel lanes, Cynecki says. All new arterial streets have landscaped buffer areas between pedestrians and traffic to improve safety and enhance the walking experience. On-street bike lanes provide an additional buffer for pedestrian safety.”¹

INTERSECTION SELECTION

Edward Stollof, ITE safety program senior director met with Jenny L. Grote, traffic engineering supervisor, street transportation department, traffic operations division, city of Phoenix, met for a pre-audit meeting on March 11, 2008, in order to select the intersections and locations for the AARP/ITE Pedestrian Mobility and Safety Audit. In addition, Mr. Stollof met with the following individuals: Kerry Wilcoxin, P.E., safety and neighborhood traffic section, street transportation department; Madhuri Uddaraju, traffic engineer II, safety and neighborhood traffic section, street transportation department; and Michael J. Cynecki, P.E., street transportation department.

The criteria that were used to select the audit locations included the following:

- Evidence of pedestrians aged 50 and older in the area (where there may be adult/retirement housing);
- Walkability areas perhaps between governmental complexes and parking lots/structures, restaurants, grocery stores and entertainment venues;
- Multimodal transportation (e.g. transit stops and buses, bicycles, pedestrians of all ages);
- Traffic signals, sidewalks, or other aspects of the intersection that might be in need of repair or improvement;
- Diversity of land uses in the area surrounding the intersection (e.g. residential, commercial/industrial, institutional); and
- Accessibility and connectivity to pharmacies and grocery stores, doctor offices and hospitals and other medical facilities, banks and other destinations that an older adult might walk to from their home.

The following four intersections were selected for the audit:

- 3200 to 3300 West Van Buren Street Pedestrian Crossings
- 4400 West Thomas Road Pedestrian Crossing
- 2000 West Indian School Road Pedestrian Crossing (between 20th Avenue and 19th Avenue)
- North 7th Street and East Camelback Road

During the pre-audit meeting field reconnaissance was conducted at the intersection locations listed above. The pre-audit reconnaissance is a critical and necessary step in gaining valuable information to provide to the audit participants. Digital photographs of the intersection locations were taken. In addition, the time it takes to travel from one location to another is estimated, along with other logistical requirements for the audit day. Special situations were noted for discussions that would take place in briefings on the day of the audit.

1. Kar, Kohinoor and Sreelatha Gajula. “Focusing on Pedestrian Safety.” *Public Roads*. Washington, DC: FHWA, 2008, Volume 71. No. 6.

INTERSECTION/LOCATION ASSESSMENT

3200 to 3300 West Van Buren Street Pedestrian Crossings

“A two-stage crosswalk consisting of a fenced center pedestrian safety Island with ladder design crosswalks on either side and advanced stop bars on approaches is provided near Van Buren Street and 32nd Avenue. This design forces the pedestrians to face oncoming traffic before crossing the second half of the street. The stagger always has to be in the right direction so the pedestrian turns to the right before crossing the second half of the street. Pedestrians wishing to cross the street at this location need to watch only one approach of traffic and enter the median island, which provides refuge before the pedestrian can safely watch and cross the other half of the street.”²



Example of a two-stage crosswalk.

The crosswalks are offset from each other requiring the pedestrian to look towards oncoming traffic before beginning the second stage of their crossing.

One issue with this design is the amount of sand, dirt and other fine debris that gets trapped in the median island. City staff acknowledged the difficulty in keeping the refuge area free of such material.

In the short-term, the following recommendations should be considered to improve the safety of the intersection:



Debris build-up in median area.



Safety and environmental comfort issues present themselves with multiple driveway accesses along sidewalks.



Sidewalk in need of repair.

2. *A Guide to Developing a Pedestrian Safety Action Plan. An Arizona Supplement to the National “How to Develop a Pedestrian Safety Action Plan.”* Phoenix, AZ: Arizona Department of Transportation Highway Enhancements for Safety, 2007.

- **Increase** the visibility of the crossing by installing overhead signs at the crosswalk location.
- **Remove** debris regularly from the median island.
- **Improve** sidewalk locations, where needed.
- **Fix** the light pole turned the wrong way. Lamp/pole needs to be turned toward the road.
- **Consolidate** multiple driveway accesses along the sidewalk, when feasible.

Longer-term solutions may include the following:

- **Improve** the design of the median island so debris does to accumulate.
- **Install** detectable warning surfaces to enhance the safety for visually-impaired pedestrians.



Light pole turned the wrong way.

4400 West Thomas Road Pedestrian Crossing

This location is also a two-stage unsignalized intersection crossing. It is much closer to a signalized intersection than the previous location. The crossing is augmented by a large overhead rectangular PEDESTRIAN CROSSING sign on each approach, in order to improve the visibility of the crossing. The review team felt that this location seemed safer than the first. Driver compliance with yielding to pedestrians appeared to be good. Debris also accumulated in the median island of this crossing. The pattern used for the crosswalk is a high-visibility “ladder” style design. It was somewhat faded, but did appear as if it was being regularly maintained.



Overhead sign designating the crosswalk location.

In the short-term, the following recommendations should be considered to improve the safety of the



Pedestrian waiting to cross the “second stage” of the West Thomas Road arterial.



City of Phoenix transportation engineer, Kerry Wilcoxin (shown in middle) advising volunteer pedestrian auditors on the nuances of traffic safety engineering.

intersection:

- **Remove** debris regularly from the median island.

Longer-term solutions may include the following:

- **Install** detectable warning surfaces to enhance the safety for visually-impaired pedestrians.
- **Improve** the design of the median island so debris does to accumulate.

2000 West Indian School Road Pedestrian Crossing

This location is also a two-stage unsignalized intersection crossing. The long distance between stop lights permits cars to gain speed (eastbound) when approaching the crosswalk.

Like the West Thomas Road location, it is also near a signalized intersection. Each approach at this location is augmented by two overhead and one pole-mounted PEDESTRIAN CROSSING warning signs on each approach, in order to improve the visibility of the crossing. As with the other two locations, debris in the median refuge island was a problem. There was some feeling among the review team that with the close proximity of the traffic signal at 19th Avenue and Indian School Road, drivers were less prone to stop for a pedestrian once they had reached their cruising speed.

In the short-term, the following recommendations should be considered to improve the safety of the intersection:

- **Remove** debris regularly from the median island.

Longer-term solutions may include the following:

- **Install** detectable warning surfaces to enhance the safety for visually-impaired pedestrians.
- **Improve** the design of the median island so debris does to accumulate.



Overhead and side-mounted signs designating the crosswalk location.



West Indian School Road has substantial pedestrian-transit interaction.

There appears to be little buffer between the sidewalk, parking lot, bus pull-in and the roadway on the north side of West Indian School Road at 19th Avenue. The landscaping, plantings and bus shelter amenities are quite nice; however, the proximity of the traffic to the pedestrians and transit patrons is a negative from an environmental comfort standpoint. It would probably be very difficult to have the shopping center operator eliminate parking spaces to provide a buffer strip for the north side sidewalk. If the area redevelops at some point, this could be a potential.

North 7th Street and East Camelback Road

This location is a typical 4-leg signalized intersection in the Phoenix metropolitan area. Traffic volumes are very heavy at this intersection throughout the day. There are no median refuge areas within the intersection for pedestrians to use. However, there is adequate time for pedestrians to cross on a single cycle.

Numerous red-light violations were observed by the team during the safety review of the intersection. Several of the pedestrian signal indications were in poor shape and should be replaced.

The traffic operations are somewhat unique at this location, being that 7th Street has a reversible lane during the morning rush hour that is used exclusively for inbound traffic; and in the evening rush hour for outbound traffic. Left turns are not permitted from this lane during these times. At all other times of day, the lane is a more typical two-way (or continuous) left-turn lane without restrictions at the major intersections. This type of operation has been in use for many years. However, the city is reevaluating the corridor to see if such an operation is still necessary.

In the short-term, the following recommendations should be considered to improve the safety of the intersection:

- **Replace** the existing incandescent pedestrian signal indications with LED countdown signal indications.
- **Trim** landscaping on the southwest corner that is encroaching into the sidewalk area.

Longer-term solutions may include the following:

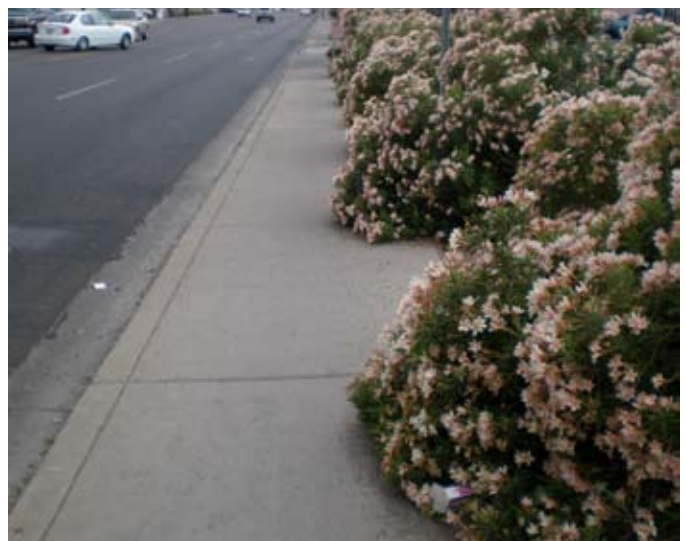
- **Install** detectable warning surfaces to enhance the safety for visually-impaired pedestrians.
- **Remove** other obstructions that impede pedestrian traffic.



AARP Volunteer Irene Lopez attempts to negotiate the crosswalk at North 7th Street and East Camelback Road.



Pedestrian crossing signal requiring replacement.



Landscaping encroaching onto the sidewalk.

CONCLUSIONS

The audit involved the following steps:

- Pre-audit reconnaissance and intersection study;
- Identification of audit participants;
- Pre-audit logistics;
- Development of briefing books and briefing materials for audit participants;
- Development of a PowerPoint presentation for a briefing on the day of the audit;
- Conduct of the audit; and
- Audit debriefing.



Notice the extensive landscaping and buffering adjacent to the sidewalk; this adds to the environment comfort for walking.

The city of Phoenix has experimented significantly with two-stage unsignalized pedestrian crossings. Three of the four intersections reviewed were this style. Each has had some unique characteristic(s) to distinguish itself from the others and appears to work extremely well. In addition, the city of Phoenix attempts to build into its sidewalk projects landscaped sidewalk buffers to increase environmental comfort and safety for pedestrians. The city of Phoenix's pedestrian and bicycle data collection, analysis and countermeasure program is one of the best programs in the United States. The program links aerial photography with database counts of pedestrian and bicycle historical injuries and fatalities, causes, factors and demographics.

Another significant conclusion from the Phoenix audit is that there was significant participation from the city's street transportation department. From the outset, Jenny Grote, Kerry Wilcoxin, Madhuri Uddaraju and Michael J. Cynecki must be thanked for their tremendous support. Another lesson learned is that the pedestrian safety and mobility audit team should have an enforcement representative. The audit team would like to thank officer Terry Sills with City of Phoenix Police Department, for his attendance and support.

The ITE professionals and AARP volunteers were able to forge relationships that did not previously exist. The ITE transportation professionals learned that many older volunteers were highly educated retirees who lived in their respective communities for many years. Each individual participated in the pedestrian audits as a way to have a greater voice in making their community, neighborhood and local streets more livable and safe for all users of the roadway.

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