

APPENDIX F
PEDESTRIAN IMPROVEMENT STRATEGIES

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The following is based on information from the *Oregon Bicycle and Pedestrian Plan*

A. IMPROVING PEDESTRIAN CROSSING OPPORTUNITIES

To increase pedestrian crossing opportunities and safety in Philomath, two approaches can be considered:

1. Designing roads that allow crossings to occur safely by incorporating design features, such as raised medians or signal timing that creates gaps in traffic; or,
2. Constructing actual pedestrian crossings with pedestrian activated signals, mid-block curb extensions, marked crosswalks, etc.

A.1. ISSUES

Safe and convenient pedestrian crossings must be considered when planning and designing roadways. The following issues should be addressed when seeking solutions to specific problems:

A.1.a. Level of Service (LOS) and Design Standards

Appropriate design standards take into account the needs of all users. Pedestrian access and mobility should be considered when determining the desirable LOS for a roadway. In some areas, pedestrian needs should be elevated above the needs of motorized traffic (e.g., near the schools). Pedestrians are less visible and less protected than motorists; well-designed roads take this into account.

In general, there is an inverse relationship between traffic volumes or speeds and the ease of pedestrian crossing, which can lead to conflicting goals when determining priorities for a roadway:

- Some motor vehicle designs may reduce pedestrian crossing safety (e.g., a number of wide travel lanes increases the distance a pedestrian must cross);
- Some designs that facilitate pedestrian crossings may reduce capacity (e.g., pedestrian signals); and,
- Other design features benefit all users (e.g., improved sight distance at intersections and raised medians).

In some cases, actual travel speeds may be higher than is appropriate for the adjacent land use, and improvements that facilitate crossing may be useful in reducing traffic speeds to desirable and legal limits. Minor collectors and residential streets often carry more fast-moving traffic than the street is designed to carry. The design of a road should not encourage

excessive speeds; even a major arterial such as US20/OR34, can be treated for pedestrian safety without significantly degrading capacity.

As the number and density of pedestrian-accessible origin and destination points increase, so does the demand for pedestrian crossings. On corridors with scattered development and residences, it is difficult to predict where crossings may occur. On corridors with concentrated nodes of activity (such as US 20/OR 34 and collector streets), special crossing treatments are easier to justify at locations where crossings will likely occur (shopping areas, apartment complexes, schools, parks, and public and institutional uses). These and similar types of land uses are sometimes referred to as “pedestrian generating uses”.

A.1.b. Land Use

Land use planning and transportation engineering must work together to ensure that land use is compatible with the roadway design, and vice versa.

A.1.c. Access Management

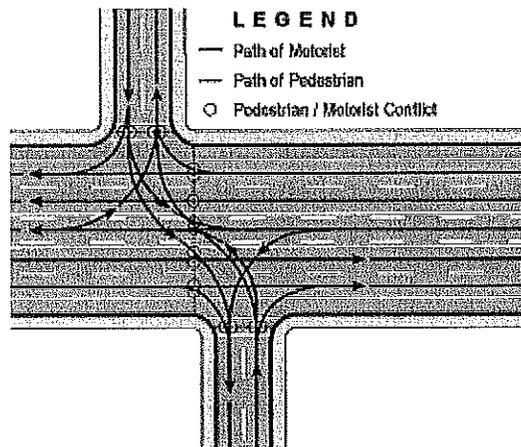


Figure F-1: Accesses create additional conflicts for crossing pedestrians

Many uncontrolled accesses to a busy road decrease pedestrian crossing opportunities; when a gap is created in the traffic stream, motorists entering the road fill the gap. Pedestrians seeking refuge in a center turn lane are unprotected. One access management tool benefits pedestrian crossing: well-designed raised center medians provide a refuge for pedestrians, so they can cross one direction of traffic at a time.

However, eliminating road connections and signals also eliminates potential pedestrian crossing opportunities. Creating an urban freeway can increase traffic speeds and volumes. Concrete barriers placed down the middle of the road (rather than a raised median) effectively prohibit pedestrian crossings.

A.1.d. Perception of Safety at Crosswalks

Some studies have indicated that pedestrians may develop a "false sense of security" when crossing a road in marked crosswalks. Other studies have indicated that motorists are more likely to stop for pedestrians in marked crosswalks, especially where the right-of-way laws are enforced. Proper design makes it clear who has the right-of-way.

A.1.e. Maintenance

The effectiveness of a design will be lost if maintenance is excessively difficult or expensive. Forethought must be given to the practicality of future maintenance. Facilities will be effective over time only if they are in good condition. Examples of design features to be avoided include:

- Blind corners that can accumulate debris;
- Restricted areas that cannot accommodate sweepers or other power equipment; and,
- Remote areas requiring hand maintenance, such as sweeping.

A.2. SOLUTIONS

No one solution is applicable in all situations as the issues will usually overlap on any given section of road. In most cases, a combination of measures will be needed to improve pedestrian crossing opportunities and safety.

A.2.a. Raised Medians

These benefit pedestrians on two-way, multi-lane streets, as they allow pedestrians to cross only one direction of traffic at a time; it takes much longer to cross four lanes of traffic than two. Where raised medians are used for access management, they should be constructed so they provide a pedestrian refuge.

Where it is not possible to provide a continuous raised median, island refuges can be created between intersections and other accesses. These should be located across from high pedestrian generators, such as schools, parks, municipal buildings, parking lots, etc.

In most instances, the width of the raised median is the width of the center turn-lane, minus the necessary shy distance on each side. Ideally, raised medians should be constructed with a smooth surface, such as brick pavers. Medians should be landscaped with the plants low enough so that they do not obstruct visibility, and spaced far enough apart to allow passage by pedestrians.

A.2.b. Curb Extensions

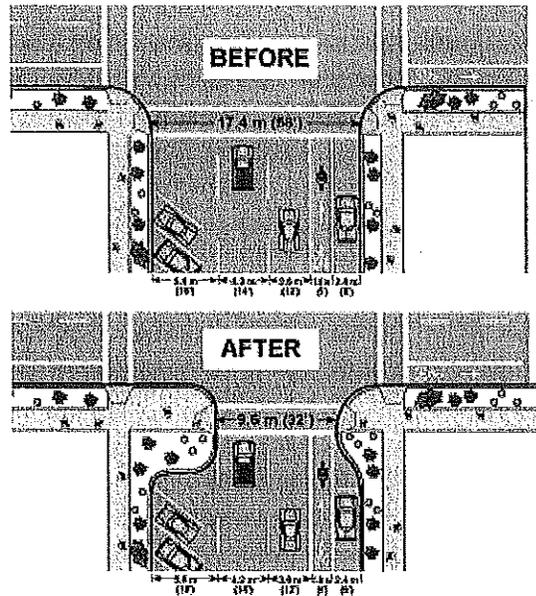


Figure F-2: Curb extensions reduce crossing distance

Curb extensions, also known as bulbouts, neckdowns, flares or chokers, reduce the pedestrian crossing distance and improve the visibility of pedestrians by motorists. Curb extensions should be considered at all intersections where on-street parking is allowed. The crossing distance savings are greatest when used on streets with diagonal parking. On arterials and collectors, space should be provided for existing or planned bike lanes.

Reducing pedestrian crossing distance improves signal timing if the pedestrian-crossing phase controls the signal. The speed normally used for calculating pedestrian crossing time is 1.2 m (4 ft)/sec., or less where many older pedestrians are expected. The time saved is substantial when two corners can be treated with curb extensions.

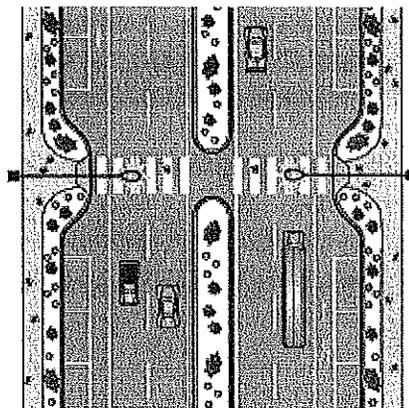


Figure F-3: Mid-block curb extension with median and illumination

Non-signalized intersections also benefit from curb extensions; reducing the time pedestrians are in a crosswalk improves pedestrian safety and vehicle movement.

Mid-block crossing curb extensions should be considered where there are current or anticipated pedestrian-generating land uses on both sides of the road (see section A.1.b. Land Use).

A.2.c. Illumination

Providing illumination or improving existing lighting can increase nighttime safety at many locations, especially at mid-block crossings, which are often not expected by motorists.

A.2.d. Crosswalks

Marked crosswalks are generally located at all open legs of signalized intersections. They may also be considered at other locations. Combined with curb extensions, illumination and signage, marked crosswalks can improve the visibility of pedestrian crossings. Crosswalks send the message to motorists that they are encroaching on a pedestrian area, rather than the reverse, which is often the common assumption.

If a crosswalk is not working, some possible problems include:

Enforcement — more rigorous enforcement of traffic laws is needed for motorists to understand that it is their duty to yield to pedestrians in a crosswalk, marked or unmarked;

Location — marked crosswalks must be placed in locations where they are visible and where obstructions such as parked cars and signs do not affect sight lines;

Traffic movement — many turning vehicles at nearby intersections or driveways can compromise the crosswalk; and

Users — Some people need extra help crossing a street and crosswalks alone may not be sufficient; for example, young children lack judgement and may need the positive control given by signals.

The above factors (combined with a traffic study if possible) should be considered to determine if a marked crosswalk will enhance pedestrian safety for a particular area. This is usually in locations that are likely to receive high use, based on proposed adjacent land use.

Crosswalks should be 3 m (10 ft) wide, or the width of the approaching sidewalk if it is greater. Two techniques to increase the visibility and effectiveness of crosswalks are:

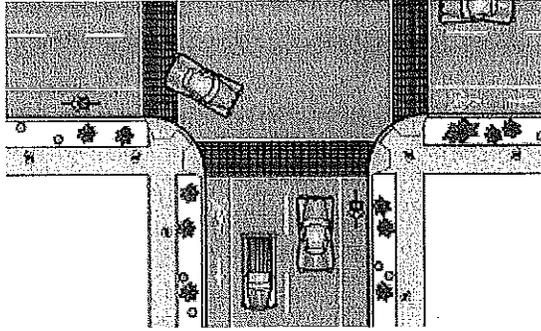


Figure F-4: Colored and textured crosswalks

- Striped (or "zebra") markings, which are more visible than double lines; and
- Textured crossings, using non-slip bricks or pavers, which raise a driver's awareness through increased noise and vibration. Colored pavers increase the visibility of the crosswalk.

A.2.e. Islands and Refuges

At wide intersections, such as those connecting US20/OR34, there is a triangular area between a through lane and a turn lane unused by motor vehicle traffic. Placing a raised island in this area benefits pedestrians by:

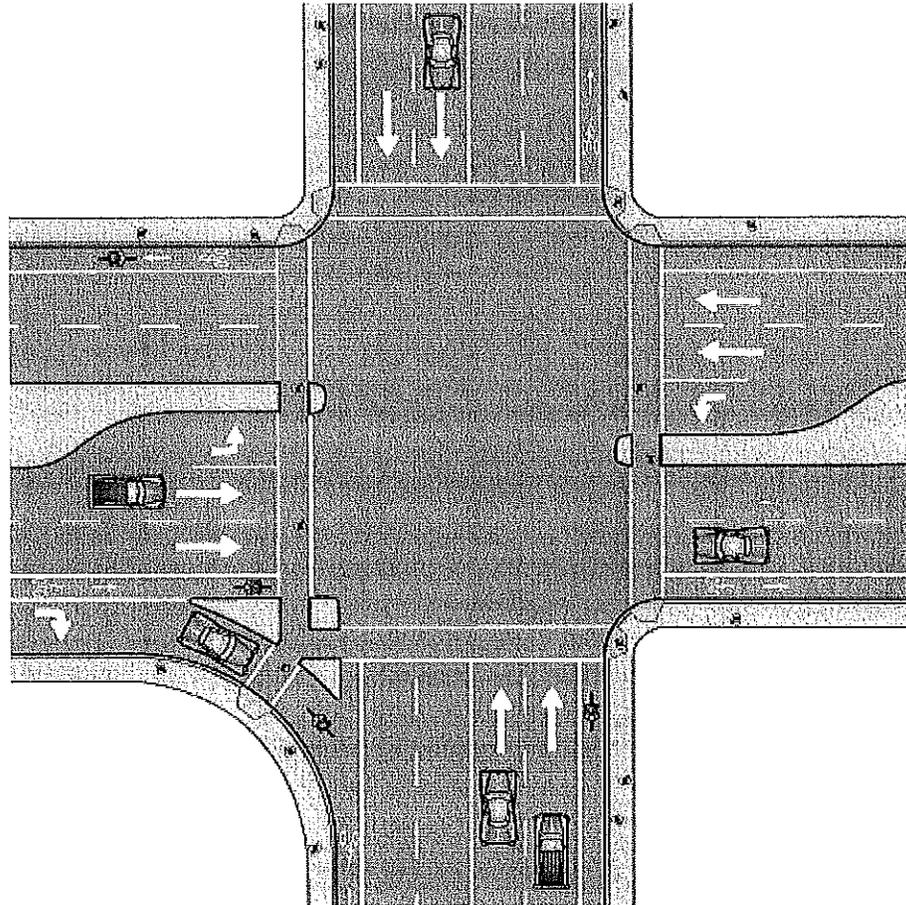


Figure F-5: Raised islands at intersections

- Allowing pedestrians to cross fewer lanes at a time, and to judge conflicts separately;
- Providing a refuge so that slower pedestrians can wait for a break in the traffic stream;
- Reducing the total crossing distance (which provides signal timing benefits); and,
- Providing an opportunity to place easily accessible pedestrian push-buttons.

An island can also be provided in the middle of an intersection. An island must be a minimum of 1.2 m (4 ft) wide, preferably 2.4 m (8 ft) or more.

Islands must be large enough to provide refuge for several pedestrians waiting at once. For wheelchair accessibility, it is preferable to provide at-grade cuts rather than ramps. Poles must be mounted away from curb cuts and out of the pedestrian path.

A.2.f. Pedestrian Signals

A pedestrian activated signal may be warranted where the expected number of people needing to cross a roadway at a particular location is significant. Anticipated use must be high enough for motorists to get used to stopping frequently for a red light (a light that is rarely activated may be ignored when in use). Refer to the *Manual on Uniform Traffic*

Control Devices, approved by the Federal Highway Administration for pedestrian signal warrants.

Sight-distance must be adequate to ensure that motorists will see the light in time to stop. Warning signs should be installed on the approaching roadway.

Pedestrian signals may be combined with curb extensions, raised medians, and refuges.

A.2.g. Signing

Recommended signs include both advance warning signs and pedestrian crossing signs at the crossing itself, and regulatory signs at intersections to reinforce the message that motorists must yield to pedestrians. These signs should only be placed at warranted locations, because excessive signage leads to signs being missed or ignored.

B. OTHER INNOVATIVE DESIGNS

These concepts are presented as information to help the city to develop effective solutions to existing and future street-crossing problems.

B.1. Raised Crosswalks

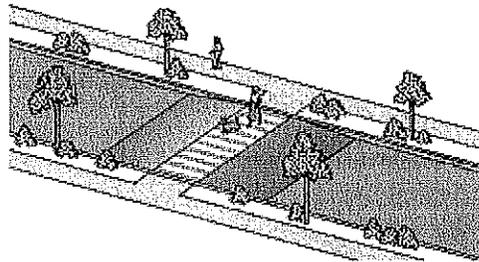


Figure F-6: Raised crosswalk acts as hump on local street

Raised crosswalks, especially if textured and colored, are more visible. They also act as speed humps and may be used in areas where excessive speeds are a problem. (See page 160 of the *Oregon Bicycle and Pedestrian Plan* for a discussion on the design and applicability of speed humps.)

B.2. Raised Intersections

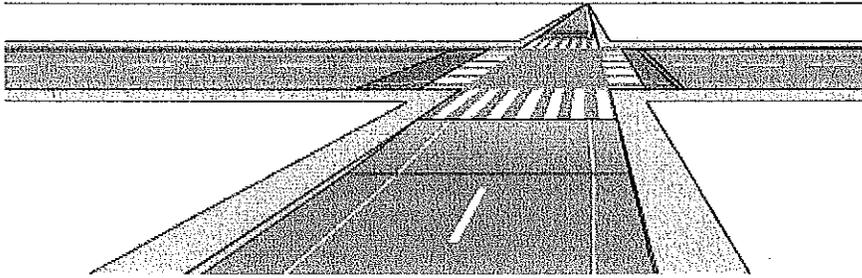


Figure F-7: Raised intersection

Raised intersections take this concept further: motorists see that the area is not designed for rapid through movement - it is an area where pedestrians are to be expected. The driver must be cautious in approaching the intersection and be ready to yield the right-of-way to pedestrians.

Raised crosswalks and intersections have additional advantages:

- It is easier to meet certain ADA requirements, as the crosswalk is a natural extension of the sidewalk with no change in grade, but they require special treatment to be detected by the visually-impaired; and,
- Raised intersections can simplify drainage inlet placement, as all surface water will drain away from the intersection.

These methods should be considered along with other methods in any future couplet design to control traffic speed and create safe and effective pedestrian conditions.