Appendix B

Crosswalk Policy

A. Crosswalk Fundamentals

The main functions of crosswalks are to improve safety by directing pedestrians to the safe crossing location and reinforce the legitimacy of pedestrian crossings.

Although vehicles are required to yield the right-of-way to pedestrians at all intersections where crossing is not prohibited (regardless of whether the crosswalk is marked), well-marked pedestrian crossings prepare drivers for the likelihood of encountering a pedestrian in the roadway. Well-marked crosswalks also improve walkability and pedestrian accessibility, as well as direct pedestrians toward the safest crossing locations.

While pedestrians and drivers have a shared responsibility to behave in accordance with the California Vehicle Code (CVC), planners and engineers also have a shared responsibility to design and implement a safe environment for pedestrians. This section outlines the types of crosswalks and where crossing the street is legal per the CVC.

A.1 Legal Crosswalks

The CVC defines where and how crossing the street is legal in California. A legal crosswalk exists where a sidewalk meets a street at an intersection, regardless of whether the crosswalk is marked with striping indicating its existence. Motorists must yield the right-of-way to pedestrians at these locations, as well as at marked mid-block crossings. Except for locations between immediately adjacent signalized crossings (where midblock crossing is prohibited), pedestrians may legally cross the street mid-block wherever a crossing is not expressly prohibited. However, pedestrians must yield the right-of-way to motorists at these unmarked mid-block crossings.

These legal statutes related to crosswalks are contained in the CVC, as follows:

Section 275 defines a legal crosswalk as:

- That portion of a roadway included within the prolongation or connection of the boundary lines of sidewalks at intersections where the intersecting roadways meet at approximately right angles, except the prolongation of such lines from an alley across a street.
- Any portion of a roadway distinctly indicated for pedestrian crossing by lines or other markings on the surface (such as a marked mid-block crossing).

Section 21950 describes right-of-way at a crosswalk:

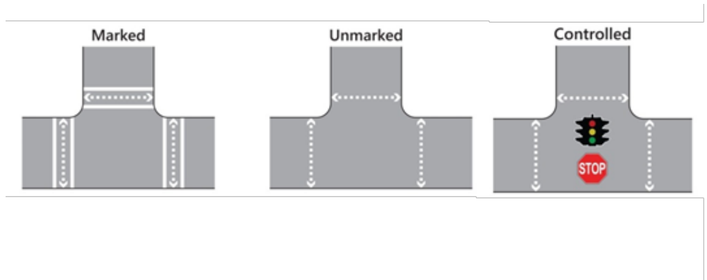
- The driver of a vehicle shall yield the right-of-way to a pedestrian crossing the roadway within any marked crosswalk or within any unmarked crosswalk at an intersection.

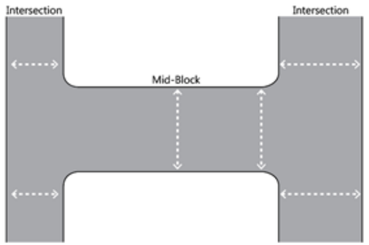
Section 21955 describes where pedestrians may not cross a street:

- Between adjacent intersections controlled by traffic control signal devices or by police officers, pedestrians shall not cross the roadway at any place except in a crosswalk.

A.2 Types of Crosswalks

Legal crosswalks are organized by three characteristics, as shown in the figures below:





1. **Presence of Striping (Marked vs. Unmarked):** The first characteristic is whether the legal crossing location is marked with striping on the street, or unmarked. Marked crosswalks reinforce the location and legitimacy of a pedestrian crossing. While marked crosswalks generally improve pedestrian safety, crosswalk marking should be guided by roadway characteristics and other safety considerations.
2. **Traffic Control Type (Controlled or Uncontrolled):** The second characteristic is whether the crosswalk is controlled (by a traffic signal or stop sign) or uncontrolled. Controlled crosswalks typically provide maximum safety benefit by requiring vehicles to stop for pedestrians. However, these treatments are not appropriate on all roadways. On some roadways, uncontrolled crosswalks can be safe and appropriate, though they typically require additional safety treatments, as drivers may not expect pedestrians crossing the roadway.
3. **Location (Intersection or Mid-block):** The third characteristic is whether the crosswalk is located at an intersection or mid-block between intersections. Mid-block crosswalks typically require additional safety treatments, as drivers may not expect pedestrians crossing the roadway, particularly outside of an intersection.

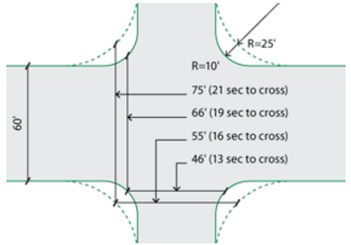
A.3 Common Geometric Considerations

Roadway geometry significantly affects pedestrian safety, and all crosswalk evaluations should begin with an assessment of potential geometric enhancements. Common geometric considerations include:

- Curb radii;
- Curb ramps;
- Curb extensions;
- Median refuges; and
- Lane reductions

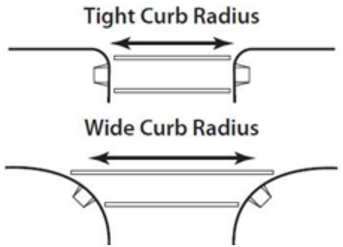
A.3.1 Curb Radii

Corner curb radii at intersections affect vehicle turning speeds and pedestrian crossing distances. A tighter curb radius creates a more compact intersection that forces vehicles to turn at slower speeds through the crosswalk. Tighter curb radii also shorten the crosswalk, reducing pedestrian crossing times and exposure to vehicles. For urban and suburban streets in Pittsburg, curb radii should generally be 10 to 15 feet, resulting in vehicles turning at 15 MPH or less, which are more appropriate speeds for pedestrian safety.



Larger curb radii may be considered on truck routes or school bus routes, though the smallest appropriate design vehicle shall be used to determine the curb radius. Generally, 30-foot trucks should be able to stay within their lane when making a turn while larger trucks should be allowed to encroach into the adjacent lanes when making a turn.

For sidewalk or intersection reconstruction projects and new roads, concrete should be used to provide tighter curb radii. However, striping and posts are acceptable for repaving or other similar retrofit projects. Repaving and other retrofit projects should construct intersection bulb-outs with striping and posts to reduce curb radii.



A.3.2 Curb Ramps

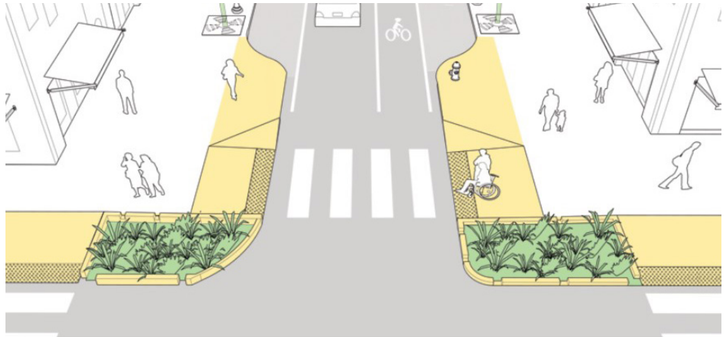
Tighter curb radii support better pedestrian ramp alignment. For sidewalk or intersection reconstruction and new roadway projects, two curb ramps should be provided per intersection corner at every intersection, with each curb ramp directing pedestrians into the marked crosswalk.

Directional curb ramps are critical to support those with mobility and visual impairments. These kind of ramps guide pedestrians directly into the crosswalk instead of into the middle of the intersection, as is common with diagonal ramps. This guidance is useful for all pedestrians but is particularly important for pedestrians in a wheelchair or similar assistive device who have more difficulty adjusting their direction of travel. Directional curb ramps aid pedestrians with visual impairments navigating the street environment with a cane and provide them with a physical cue directing them straight through the crosswalk.

Existing single diagonal curb ramps should be retained for repaving or other similar retrofit projects, but painted bulbs with landings should be provided to reduce speeds, provide shorter crossing distances, and direct pedestrians with disabilities into the crosswalk.

A.3.3 Curb Extensions

Curb extensions or "bulb-outs" expand the sidewalk and intersection to reduce crossing distances and increase the visibility of pedestrians waiting to cross the street. They can be constructed where there is excess street width at the intersection or to shadow on-street parking. Curb extensions also address motorists using shoulder space or excessively wide travel lanes to create de-facto right-turn pockets at intersections. Although these "squeeze-by" maneuvers may sometimes improve automobile traffic operations, they are not desirable from a pedestrian safety perspective and increase the risk of multiple-threat pedestrian collisions. A yielding vehicle in one lane may prevent a driver in the adjacent lane from seeing a crossing pedestrian.



B. Identification of Candidate Locations for New Marked Crosswalks

Both proactive and reactive approaches are needed to develop a comprehensive pedestrian crosswalk safety strategy. Proactive approaches include holistic assessments, walk audits, and systemic safety analyses to address potential safety issues that may not be evident in reported collision records or specific requests from the community. Proactive approaches will be particularly beneficial in Pittsburg where the sample size of collisions are relatively low. Reactive assessments, on the other hand, use collision data and community requests to identify potential needs for marked crosswalks and additional safety countermeasures.

B.1 Proactive Approaches

Chart B-1 describes how the City will assess whether to mark a crosswalk in situations where there are no recorded complaints or there is a lack of collision data. According to the FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing

Locations, proactive safety assessments typically include the following steps:

1. Collecting pedestrian crash data;
2. Reviewing transportation studies and documents for proposed projects;
3. Completing a pedestrian safety action plan with an analytical process to identify potential locations for safety improvements;
4. Documenting informal public comments, as the public has local knowledge of where additional crossing support is needed and where high-priority enhancement areas may beneficial;
5. Conducting walk audits to identify deficiencies and opportunities; and
6. Prioritizing the resulting project list.

The state-funded Systemic Safety Analysis Report (SSAR) program has bolstered the development of proactive safety assessments in California. This program provides funding for local agencies to perform collision analyses, identify safety issues on their roadway networks, and develop a list of systemic countermeasures that can be used to secure future Highway Safety Improvement Program (HSIP) funds.

Proactive approaches do not have to be limited to citywide assessments, as studies with smaller focus areas can also utilize a proactive approach. Complete streets corridor studies, for example, can provide a systemic safety assessment across the corridor and match issues with feasible countermeasures. Roadway repaving or slurry seal projects can also identify existing issues and replace old striping with new safety countermeasure striping.

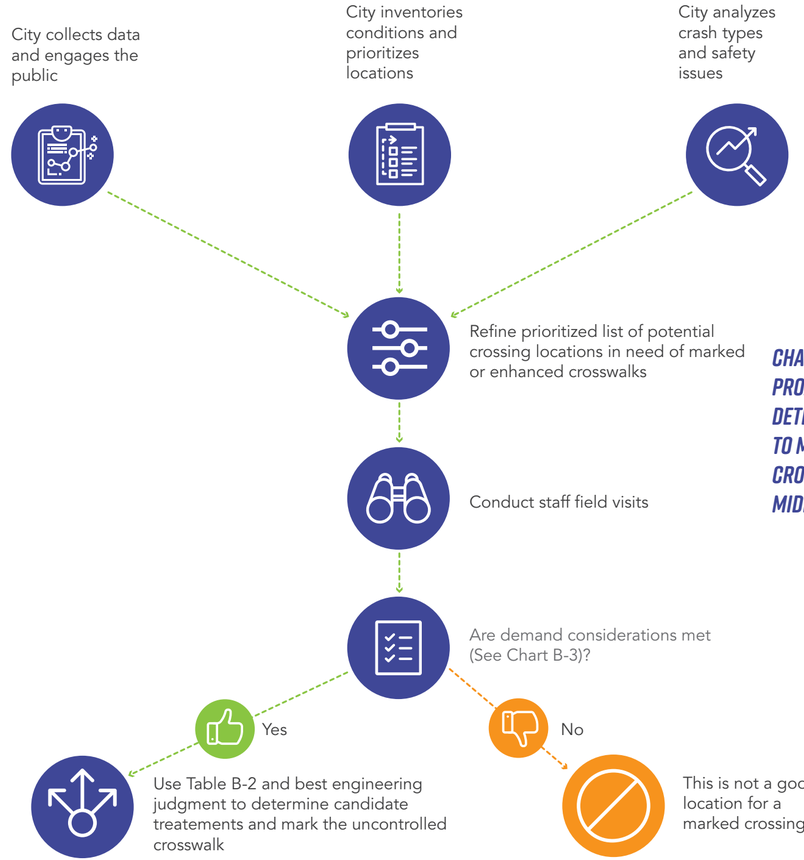


CHART B-1: PROACTIVE APPROACH FOR DETERMINING WHETHER TO MARK UNCONTROLLED CROSSWALKS AND MIDBLOCK CROSSWALKS

B.2 Reactive Approaches

The City will also use reactive approaches to improve safety at unmarked crosswalks. By analyzing collision data and addressing community requests, the City can ensure that crossings with demonstrated safety issues are addressed appropriately.

If the criteria in **Chart B-2** are met, and the decision is made to mark a crosswalk, the City will refer to **Table B-2** through **Table B-4** to determine if additional safety countermeasures are needed to mark the crosswalk based on existing or proposed roadway characteristics.

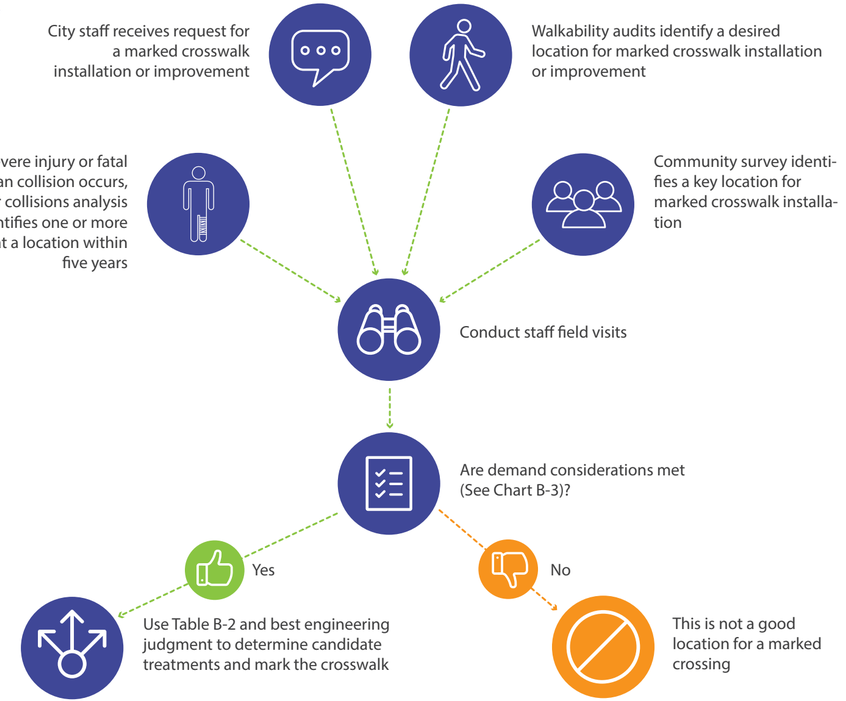
Chart B-2 describes how the City will process a request to mark a crosswalk from the moment staff receives the request from a resident or other stakeholder. This process should always include a staff field visit to understand the site and its engineering constraints. The ultimate determination of the need for a marked crosswalk should follow the process set out in subsequent sections of this Crosswalk Policy.

After the decision is made to mark a crosswalk, roadway characteristics should be run through several tables in **Section C** including:

- **Table B-2** – Recommended Countermeasure Enhancements at Uncontrolled Crosswalks;
- **Table B-3** – Potential Additional Countermeasure Enhancements at Uncontrolled Crosswalks; and
- **Table B-4** – Safety Issues Addressed by Each Countermeasure

These tables identify additional safety countermeasures that may be needed to mark the crosswalk safely. This is a critical step as, at higher speed and volume locations, marked crosswalks alone may not be considered safe. **Tables B-2** through **B-4** will assist the City in identifying additional countermeasures needed to safely mark the crosswalk.

CHART B- 2: REACTIVE PROCESS FOR DETERMINING WHETHER TO MARK UNCONTROLLED CROSSWALKS AND MIDBLOCK CROSSWALKS



C. Marking and Enhancing Uncontrolled Crosswalks

This section provides the City with guidance on when to mark and enhance crosswalks at uncontrolled intersections and mid-block locations. Uncontrolled crosswalks require additional consideration during planning and design because drivers are not consistently required to stop. Instead, drivers must recognize the presence of a pedestrian and yield accordingly. For this reason, improving the visibility and safety of pedestrians at uncontrolled locations is critical.

C.1 Benefits of Marked Crosswalks

Sidewalks and crosswalks are essential links within a pedestrian network. Whether commuting, running errands, exercising, or simply wandering, pedestrians need safe and convenient roadway crossings to reach their destinations. A marked crosswalk has three primary functions:

1. To create reasonable expectations for where pedestrians may cross a roadway;
2. To improve predictability of pedestrian actions and movement; and
3. To channel pedestrians to designated crossing locations, which are often selected for their optimal sight distance.

Marked crosswalks offer the following benefits:

- They help pedestrians find their way across complex intersections;
- They reassure pedestrians of their legal right to cross a roadway at an intersection or mid-block crossing; and
- They can designate the shortest path across a roadway.

As discussed earlier, the CVC gives the right-of-way to pedestrians at all marked or unmarked legal crosswalks. However, both drivers and pedestrians sometimes fail to obey the law or are simply unaware of who possesses the right-of-way, particularly at unmarked crossing locations. Drivers often fail to yield the right-of-way without the visual cue of a marked crosswalk, while pedestrians frequently wait for a large gap in traffic to attempt to cross.

C.2 When to Mark a Crosswalk

Identifying candidate locations for marked crosswalks involves two steps:

1. Identify where people would like to cross the street - these locations are called "pedestrian desire lines" as they represent the most desirable, and typically most direct, locations where people want to cross a street. Pedestrian desire lines are influenced by elements of the roadway network like transit stops, as well as nearby land uses. Information about nearby land uses and the roadway network help identify areas where pedestrian crossings may need to be improved. Specific crossings needing enhancement can then be identified through engineering studies, walk audits, City staff observations, or public feedback.
2. Identify where people can cross safely. The primary consideration in this step is providing adequate stopping sight distance. Pedestrians are at highest risk of injury in a collision because they are the least protected. The crosswalk safety treatment toolboxes in this Policy provide numerous options for enhancing pedestrian safety at uncontrolled and controlled crossings, with treatment selection based on the overall context of the crosswalk, including surrounding land uses, roadway characteristics, and user characteristics.

Once candidate locations are identified, an engineering evaluation should be conducted to determine if a marked crosswalk should be installed, and if so, what visibility enhancements should be included in the design.

Crosswalks should be marked where all the following conditions occur:

- Sufficient demand exists to justify the installation of a marked crosswalk (see **Chart B-3**);
- The location has sufficient sight distance, and/or sight distance will be improved prior to marking the crosswalk; and
- Other safety considerations do not preclude marking the crosswalk.

Existing pedestrian volumes, the number of pedestrian-vehicle collisions, community surveys, resident requests, and walking audits should be used to assess whether sufficient demand exists to justify a marked crosswalk.

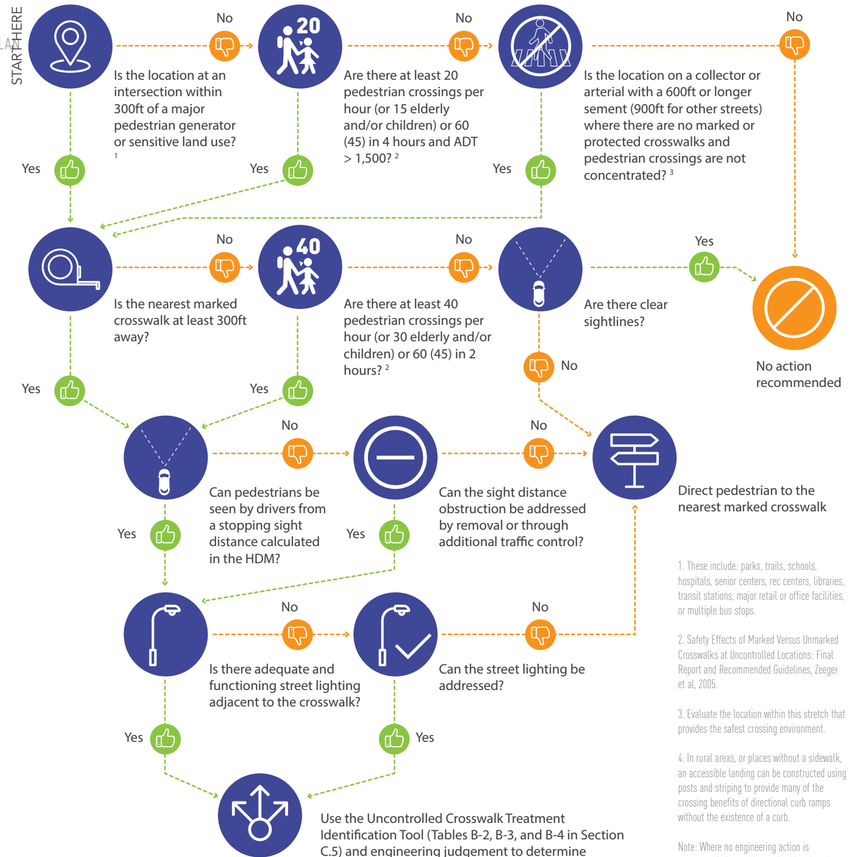
At uncontrolled intersections (i.e. side-street stops) where there are desire lines on both crosswalk legs, run each location through **Chart B-3**.

Safety considerations that might preclude a marked crosswalk include high travel speeds, heavy traffic volumes, wide, multi-lane roads, and sight distance issues caused by topography or building lines. Sight distance issues caused by parked vehicles should be addressed by providing red curb parking-restricted areas on either side of the crosswalk, and issues caused by vegetation may be addressed by trimming or modifying landscaping.

After a decision is made to mark a crosswalk, **Table B-2** should be used to identify necessary safety countermeasures. Removing crosswalks or otherwise failing to provide adequately enhanced crosswalks are not acceptable outcomes under this Crosswalk Policy.

Chart B-3 describes the process that should be used to determine the need for marking a new uncontrolled crosswalk, using pedestrian demand, crosswalk frequency, and pedestrian visibility as a basis. It should be noted that the thresholds in **Chart B-3** are appropriate for urban and suburban communities. As a suburban community, Pittsburg may consider reducing pedestrian volume or collision requirements. When marking crosswalks at intersections, each approach should be assessed using this **Chart B-3** to determine whether one or two crosswalks should be marked.

CHART B-3: FEASIBILITY ANALYSIS FOR TREATMENTS AT UNCONTROLLED LOCATIONS



1. These include: parks, trails, schools, hospitals, senior centers, rec centers, libraries, transit stations, major retail or office facilities, or multiple bus stops.

2. Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations: Final Report and Recommended Guidelines, Zeeger et al, 2005.

3. Evaluate the location within this stretch that provides the safest crossing environment.

4. In rural areas, or places without a sidewalk, an accessible landing can be constructed using posts and striping to provide many of the crossing benefits of directional curb ramps without the existence of a curb.

Note: Where no engineering action is recommended, consider applicable education and enforcement efforts.

C.3 Safety Countermeasures for Uncontrolled Crosswalks

Once a decision to mark a crosswalk has been made based on **Chart B-3**, City staff must assess whether additional countermeasures are necessary or recommended to safely mark the crosswalk. Countermeasure identification should first be based on roadway characteristics, with ultimate suitability determined by site context and the City's best engineering judgment. If there are reported collisions at a location, installing safety countermeasures that address or correct the safety issue is essential.

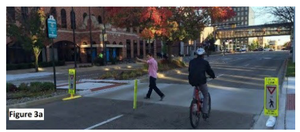
C.3.1 Potential Safety Countermeasures for Uncontrolled Crosswalks

Table B-1 lists 12 effective countermeasures[4] that are appropriate in specific roadway contexts. Three of these tools—high-visibility crosswalk markings, parking restrictions at crosswalk approach, and adequate nighttime lighting levels—should be used at all uncontrolled crosswalks.

4 Based on the FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations. Four of the elements are combined into a "baseline" for uncontrolled crosswalks: high-visibility markings, parking restrictions, and nighttime lighting into one countermeasure.

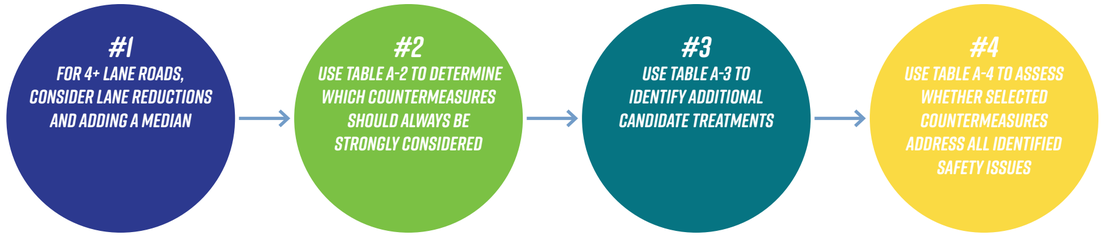
Table B-1: Safety Countermeasures for Uncontrolled Crosswalk Enhancement

Counter-measure No.	Safety Countermeasure	Use	Example Image
Countermeasures to Be Used at All Uncontrolled Crosswalks			
1A	**High-Visibility Crosswalk Markings**	This is a standard countermeasure to consider at all existing uncontrolled crosswalks. Crosswalks should be marked as close to 90 degrees and designed as short as possible.	 Source: SF Better Streets
1B	**Parking Restrictions at Crosswalk Approaches and Removal of Other Sight Distance Obstructions**	This is a standard countermeasure to consider at all existing uncontrolled crosswalks. A minimum 10-foot red curb should be marked ahead of the crosswalk.	 Source: Google
1C	**Adequate Nighttime Lighting**	This is a standard countermeasure to consider at all existing uncontrolled crosswalks. All marked crosswalks should be provided with lighting and the average illumination level in the crosswalk area should be at least equal to that provided at the intersection of two major streets (around 34 lux). The uniformity ratio should be no more than 3:1.	 Source: FHWA

Counter-measure No.	Safety Countermeasure	Use	Example Image
Additional Countermeasures – Determine Use Based on Tables B-2 and B-3			
2	**Raised Crosswalk**	This is a countermeasure that may be considered where the roadway speed is 30 mph or less and there are three or fewer travel lanes.	 Source: Google
3	**Advanced Yield to Pedestrians Markings and Signage**	This is a countermeasure that is strongly recommended on all roadways with four or more lanes and speeds over 35 mph.	 Source: SRTS Guide
4	**In-Street Pedestrian Crossing Signage**	This is a countermeasure that should be considered on roadways with three or fewer travel lanes and speeds under 30 mph.	 Source: User Guide for R1-6 Gateway Treatment for Pedestrian Crossings report

Counter-measure No.	Safety Countermeasure	Use	Example Image
5	**Curb Extensions**	This is a countermeasure that may be implemented at any location where space is available, such as streets with parking lanes.	 Source: FHWA
6	**Median Refuge Island**	This is a countermeasure that is strongly recommended on all roadways with three or more lanes and no raised medians. Median refuges should be a minimum of six feet in width with truncated domes. The refuge island should be designed so that the pedestrian is encouraged to make eye contact with oncoming traffic.	 Source: PedBike Images/Lyubov Zuyeva
7	**Rectangular Rapid-Flashing Beacon (RRFB)**	This is a countermeasure that is recommended at locations with higher speeds, higher ADT, and higher number of traffic lanes.	 Source: FHWA
8	**Pedestrian Hybrid Beacon (PHB)**	This is a countermeasure that should be considered for roadways with the highest speeds, highest ADT, and highest number of travel lanes when MUTCD warrants are met. PHBs should be designed to include Advanced Yield to Pedestrian Markings.	 Source: FHWA

Source: Table adapted from FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations (draft July 2019).



C.3.2 When to Enhance with Safety Countermeasures

Determining which safety countermeasures to install at uncontrolled crosswalks should be conducted in four steps as shown above. First, lane reductions and median installations should be considered on roadways with four or more lanes. Next, roadway characteristics should be referenced with **Table B-2** to identify countermeasures that should be considered at uncontrolled crossings of that roadway type. **Table B-3** should then be used to identify additional candidate treatments that may also be appropriate, depending on the specific context of the intersection. Finally, once treatments have been selected using those two tables, **Table B-4** should be used to assess whether they address all identified safety issues. If they do not, additional candidate treatments that do address those issues should also be included.

Table B-2 identifies whether additional countermeasures may be needed to provide a safe uncontrolled crosswalk based on average daily traffic (ADT), posted or observed speeds, the number of travel lanes, and the presence of a median. Per the FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations, the enhancements listed in **Table B-2** represent safety countermeasures that should be strongly considered at uncontrolled crosswalks across roadways with the given roadway characteristics.

Recommendations are organized into four levels of enhancement:

- **Level A:** This level consists of the most basic improvements that should be implemented at all uncontrolled crosswalks, regardless of roadway characteristics. They include High-Visibility Crosswalk Markings, Parking Restrictions at Crosswalk Approaches, Adequate Nighttime Lighting, and the Removal of Sight Distance Obstructions. Directional curb ramps and tight curb radii should also be implemented if the crosswalk is at an intersection.
- **Level B:** This level includes all Level A countermeasures, plus Advanced Yield to Pedestrians Markings and Signage.
- **Level C:** This level includes all Level A and B countermeasures, plus Rectangular Rapid Flashing Beacons (RRFBs) or Pedestrian Hybrid Beacon (PHBs). The City will decide between RRFBs and PHBs based on: (1) MUTCD PHB guidelines; and (2) rates of drivers yielding to pedestrians. The MUTCD PHB guidelines should be consulted to determine if a PHB is appropriate. If not, the rate of drivers yielding to pedestrians should be reviewed. If it is low, the City should use PHBs, as the higher safety efficacy device; otherwise, it should use RRFBs. The City should use either device in conjunction with Level A and B enhancements. At Level C, crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.
- **Level D:** This level includes all Level A and B countermeasures, plus PHBs. PHBs are stronger traffic control devices that are needed on wider roadways with higher speeds and greater ADT. Pedestrian signals should be considered as an alternative to PHBs where warrants are met. At this level, crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.

Table B-3 identifies additional countermeasures that may be appropriate, based on roadway characteristics. Each numbered countermeasure in **Table B-2** and **Table B-3** corresponds to a countermeasure in **Table B-4**. The reported and near-miss collisions documented at the crosswalk should also be compared against **Table B-4** to determine if the proposed countermeasures would address those collision trends. If they do not, **Table B-3** and **Table B-4** should be used to identify potential additional treatments to address the documented safety record. **Figure B-1** and **Figure B-2** illustrate the warrant criteria for installing Pedestrian Hybrid Beacons (PHBs) in low-speed and high-speed roadways, respectively.

C.4 Documenting Process

Brief technical documentation should be created for all crosswalks that have been identified as candidates for markings or other countermeasures. The documentation should outline the process used by the City to identify the countermeasures considered to improve pedestrian safety at the crosswalk. It should also document the existing roadway characteristics and provide a brief site analysis justifying the inclusion or exclusion of countermeasures based on this Crosswalk Policy and outside factors like funding constraints.

C.5 Requests for Additional Enhancements

Community members might request additional enhancements even after the City has installed new countermeasure improvements. In general, requests should not be used to supplant the recommendations set forth in this Crosswalk Policy. When a community request is made to further enhance a crosswalk that has already been improved in accordance with this Crosswalk Policy, the technical documentation should be consulted to ensure that any issues raised in the request were considered during the assessment process. If no new information is provided that significantly alters the conditions used to select the appropriate countermeasure, then no further action is needed. However, if additional information is provided that might substantially affect the recommendations from this Crosswalk Policy, then it is strongly recommended that a reassessment be performed.

Table B-2: Recommended Countermeasure Enhancements at Uncontrolled Crosswalks

Roadway Type	Vehicle ADT ≤ 9,000			9,000 < Vehicle ADT ≤ 15,000			Vehicle ADT ≥ 15,000		
	≤30 mph	31-39 mph	≥40 mph	≤30 mph	31-39 mph	≥40 mph	≤30 mph	31-39 mph	≥40 mph
	Recommended Level:			Recommended Level:			Recommended Level:		
2 Lanes without Raised Median	A	A	C	A	A	C	A	A[1]	D
3 Lanes with Raised Median	A	B	C	A[1]	C	C	B[1]	C	D
3 Lanes without Raised Median	A	B	D	A[1]	C	D	B[1]	D	D
4+ Lanes with Raised Median	B	B	D	B[1]	C	D	C	D	D
4+ Lanes without Raised Median	B	B[1]	D[1]	B[1]	C [1]	D[1]	C[1]	D[1]	D[1]

Notes:

Level A: High-visibility crosswalk markings, parking restriction on crosswalk approach, adequate nighttime lighting levels, and removal of sight-distance obstructions (Countermeasure No. 1).

Level B: All Level A countermeasures, plus advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line (Countermeasure No. 3).

Level C: All Level A and Level B countermeasures, plus RRFB (Countermeasure No. 7) or PHB (Countermeasure No. 8). First, consider MUTCD PHB installation guidelines and assume 10% background growth and/or future demand. Second, if guidelines are not met and driver yielding is high, install RRFBs. Otherwise, install a PHB. If vehicle speeds are a primary issue, consider using PHBs instead of RRFBs. See NCHRP 562: Improving Pedestrian Safety at Unsignalized Crossings worksheets for more information.

Level D: All Level A and Level B countermeasures, plus PHB (Countermeasure No. 8). Assume 10% background growth and/or future demand in assessing MUTCD PHB installation guidelines. If thresholds are not met, consider directing pedestrians to the nearest enhanced or controlled crosswalk.

1. Always consider pedestrian refuge island (Countermeasure No. 6) as baseline countermeasure recommendation.

Source: Table adapted from FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations (July 2018).

Table B-3: Potential Additional Countermeasure Enhancements at Uncontrolled Crosswalks

Roadway Type	Vehicle ADT ≤ 9,000			9,000 < Vehicle ADT ≤ 15,000			Vehicle ADT ≥ 15,000		
	≤30 mph	31-39 mph	≥40 mph	≤30 mph	31-39 mph	≥40 mph	≤30 mph	31-39 mph	≥40 mph
	Recommended Countermeasure Nos.			Recommended Countermeasure Nos.			Recommended Countermeasure Nos.		
2 Lanes[1]	2, 3, 4, 5, 6	3, 5, 6, 7, 8	3, 5, 6	3, 4, 5, 6	3, 5, 6, 7, 8	3, 5, 6	3, 4, 5, 6, 7, 8	3, 5, 6, 7, 8	3, 5, 6
3 Lanes with Raised Median	2, 3, 4, 5	5, 7, 8	5	3, 4, 5, 7, 8	5	5	4, 5, 7, 8	5	5
3 Lanes without Raised Median	2, 3, 4, 5, 6, 7, 8	5, 6, 7, 8	5, 6	3, 4, 5, 6, 7, 8	5, 6	5, 6	4, 5, 6, 7, 8	5, 6	5, 6
4+ Lanes with Raised Median	5, 7, 8	5, 7, 8	5	5, 7, 8	5	5	5	5	5
4+ Lanes without Raised Median	5, 6, 7, 8	5, 7, 8	5	5, 7, 8	5	5	5	5	5

Notes:

- PHBs (Countermeasure No. 8) and RRFBs (Countermeasure No. 7) should be strongly considered where driver compliance and yielding rates to pedestrians are low.
- Median refuge islands (Countermeasure No. 6) are part of the baseline recommendation on streets with multilane approaches without raised median AND with speeds over 35MPH and/or ADT over 9,000.

1. Advanced yield markings (Countermeasure No. 3) can be considered on two-lane roadways where there are driver encroachment issues, or other issues with motorist compliance.

Source: Table adapted from FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations (July 2018).

Table B-4: Safety Issues Addressed by Each Countermeasure

Counter-Measure ID	Countermeasure	Reported, Near-Miss, or Observed Collision Trends				
		Conflicts at crossing locations	Excessive vehicle speed	Inadequate conspicuity/ visibility	Drivers not yielding to pedestrians in crosswalks	Insufficient separation from traffic
1A	High-Visibility Crosswalk Markings	✓		✓	✓	
1B	Parking Restrictions at Crosswalk Approaches and Removal of Other Sight Distance Obstructions	✓		✓	✓	
1C	Adequate Nighttime Lighting	✓		✓		
2	Raised Crosswalk	✓	✓	✓	✓	
3	Advanced Yield to Pedestrians Markings and Signage	✓		✓	✓	✓
4	In-Street Pedestrian Crossing Signage	✓	✓	✓	✓	
5	Curb Extensions	✓	✓	✓		✓
6	Median Refuge Island	✓	✓	✓		✓
7	Rectangular Rapid-Flashing Beacon (RRFB)	✓			✓	
8	Pedestrian Hybrid Beacon (PHB)	✓			✓	

Source: Table adapted from FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations (July 2018).

C.6 MUTCD Guidelines for PHB Installation

Enhancement Levels C and D both recommend PHB installations. The California MUTCD provides some PHB guidance based on pedestrian volumes, vehicle volumes, crosswalk lengths, and vehicle speeds. See the **Figures B-1** and **B-2** at right for the PHB curves for slow speed and high-speed roads, respectively.

PHBs should be considered in places where the roadway characteristics meet the guidelines. Assume pedestrian and/or auto volume growth of 10% if close to threshold. If driver compliance is low, consider installation even if the guideline is not met.

FIGURE B-1
MUTCD (FIGURE 4F-1). GUIDELINES FOR INSTALLATION OF PEDESTRIAN HYBRID BEACONS ON LOW-SPEED ROADWAYS

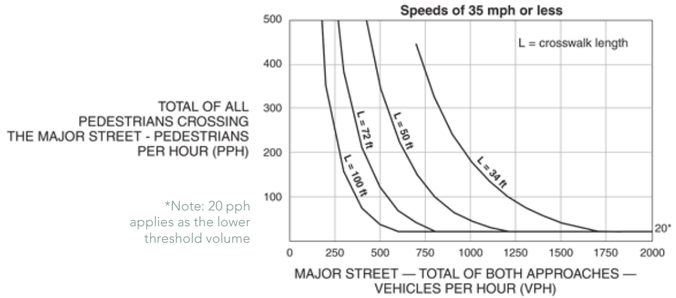
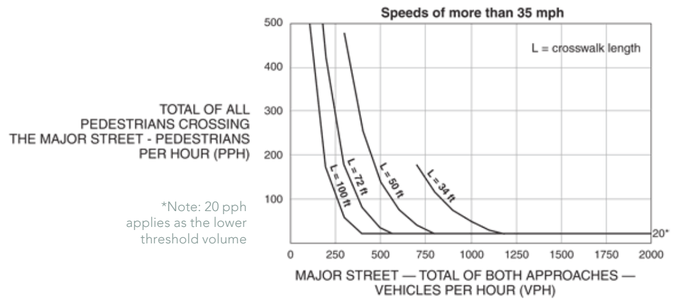


FIGURE B-2
MUTCD (FIGURE 4F-2). GUIDELINES FOR INSTALLATION OF PEDESTRIAN HYBRID BEACONS ON HIGH-SPEED ROADWAYS



D. Countermeasures for Controlled Crosswalks

Controlled crosswalks are those where vehicles are typically required to come to a complete stop due to a stop sign, traffic signal, or other yield control. These crossings may not need enhancement beyond standard crosswalk markings because stop signs and traffic signals explicitly allocate right-of-way to users and typically have a high rate of motorist compliance. However, even with these control devices in place, consideration should be given to implementation of certain countermeasures at intersections with frequent pedestrian-auto conflicts, pedestrian collisions, or low rates of compliance, as well as near schools or at skewed intersections.

This section discusses the potential countermeasures that the City will consider to further enhance safety at controlled crosswalks. The countermeasures are intended to improve visibility, clarify who has the right-of-way, and reduce vehicular speeds.

The section is organized into four parts:

- Baseline Controlled Crosswalk Countermeasures
- Stop-Controlled Crosswalk Countermeasures;
- Yield-Controlled Crosswalk Countermeasures; and
- Signal-Controlled Crosswalk Countermeasures.

It should be noted that all the countermeasures discussed in this section are required or allowed by the standards and specifications in the California MUTCD.

D.1 Baseline Controlled Crosswalk Countermeasures

Certain controlled crosswalk countermeasures are considered to be "baseline" as they are needed at all stop-controlled and signalized intersections.[5] These baseline measures should be integrated into the design of all new controlled intersections. Existing controlled crosswalks may require retrofits, which can be phased in over time. Baseline controlled crosswalk countermeasures consist of crosswalk striping, geometric improvements, sight-line improvements, and accessibility improvements. These countermeasures are listed below with additional guidance for each measure.

Crosswalk Striping

- Mark crosswalks as close to 90 degrees as possible to minimize crossing distances, provide opportunities to reduce curb radii and create curb extensions, and make the street environment more predictable for those with visual impairments.[6]
- Provide high-visibility continental crosswalk striping where driver compliance with the existing stop or signal controls is low.
- Install advanced stop bars to avoid driver encroachment to indicate where drivers should stop and wait for pedestrians in the crosswalk.[7] These function similarly to advance yield markings (also known as "shark teeth") but are only used a stop-controlled crosswalks.

5 See America Walks Signalized Intersection Enhancements that Benefit Pedestrians http://americawalks.org/wp-content/upload/America-Walks-Signalized-Intersection-Enhancement-Report-Updated-8.16.2012.pdf (2012).

6 See FHWA https://www.fhwa.dot.gov/publications/research/safety/humanfac/01103/ch1.cfm

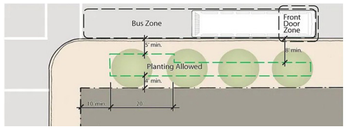
7 Exception occurs when advanced stop bar would impact sight lines because vehicles stop too far back from the intersection.

Geometric Improvements

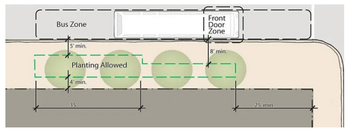
- Where street width and turning movements allow for a six-foot median, provide a median refuge island with thumbnails. The "thumbnail" is a median island that protects the pedestrian crossing space and creates a full refuge in the street.
- Remove slip lanes unless pedestrians benefit from the existing channelization; otherwise, provide raised crosswalks or protected right turns to increase visibility and reduce speeds.
- Tighten curb radii to reduce turning vehicle speeds.
- Install curb extensions to improve sight lines between autos and pedestrians and reduce overall crossing distance.
- Consider lane reductions and/or narrowed lane widths to reduce speeds and collision risk.

Sight Line Improvements

- Restrict parking at intersection approaches to improve sight lines.
- Provide adequate nighttime lighting to ensure crosswalk safety.



Far-Side Bus Stop

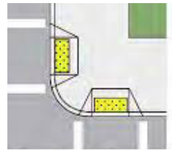


Near-Side Bus Stop

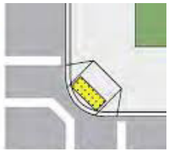
- Install curb extensions to improve sight lines between autos and pedestrians and reduce the overall crossing distance.
- Remove sign clutter, vegetation, and/or other obstructions that may limit visibility.
- Favor far side bus stop designs which encourage pedestrians to walk behind stopped buses and promote better visibility between pedestrians and drivers.

Accessibility Improvements

- For new construction or major reconstruction projects, provide tighter curb radii and two directional curb ramps per corner. For repaving or other retrofit projects, retain the single diagonal curb ramp, but install painted bulbs with landings.



Directional Curb Ramps
Best practice



Diagonal Curb Ramp
Not best practice

D.1.1 Stop-Controlled Crosswalk Countermeasures

Stop-controlled crosswalks are located at intersections controlled by stop signs. Stop-controlled crosswalks in low-volume, low-speed areas do not need to be marked. On busier roadways, however, crosswalks at stop-controlled intersections should be marked if any of the following conditions apply:

- The crosswalk is within 1/8 mile of a school;
- Elderly or disabled pedestrian volumes of 15 or more are expected during the peak hour of pedestrian demand;
- Overall pedestrian volumes of 20 or more are expected during the peak hour of pedestrian demand, with

ADT volumes of 6,000 or higher;

- Pedestrians should be directed to a particular leg of the intersection for safety or efficiency reasons; or
- The crosswalk serves an intersection of one or more collector/arterial streets.

D.1.2 Yield-Controlled Crosswalk Countermeasures

Signal-controlled crosswalks are located at intersections controlled by yield signs. Yield-controlled crosswalks are less effective at controlling vehicle movements and protecting crossing pedestrians, as drivers may reduce speed but expect to travel fast through the crosswalk location. For this reason, yield control is most appropriate in contexts with low vehicle speeds and long sight distances, which allow drivers ample time to identify crossing pedestrians and come to a stop. The baseline countermeasures described in **Section D.1** are therefore particularly important to keep speeds low and establish good visibility between drivers and pedestrians. Yield-controlled crosswalks should be marked similarly to stop-controlled crosswalks, as described in **Section D.2**, and should have high-visibility continental crosswalk striping.

D.1.3 Signal-Controlled Crosswalk Countermeasures

Signal-controlled crosswalks are located at intersections controlled by a traffic signal. Traffic signals are either "actuated", meaning that pedestrians must be detected or activate the pedestrian phase by pressing a push button, or are "pre-timed", meaning that the pedestrians are served in each signal cycle and do not need to request to cross the street. While traffic signals generally are the strongest traffic control device for a crosswalk, conflicts between turning vehicles and pedestrians in the crosswalk can still cause pedestrian safety issues. For this reason, signal-controlled intersections may require geometric improvements to reduce speeds and traffic signal phasing solutions to address pedestrian-auto conflicts.

Marked crosswalks should generally be provided on all legs of signalized intersections. However, intersections with double left or double right turns must protect those turns to safely mark the conflicting crosswalk. Intersections with double right turns must have a "No Right Turn on Red" restriction or black out sign that is actuated when the conflicting pedestrian crossing phase is actuated.

The process outlined below should be used to identify potential countermeasures for use at signal-controlled crosswalks. It first outlines general safety improvements that should be considered at all signalized intersections. The process also provides guidance for additional signal phasing enhancements to remove or mitigate potential conflicts between pedestrians and turning vehicles, consisting of four flow charts that use inputs available from a typical field survey to identify potential countermeasures appropriate for the given context. These flow charts should be supplemented with the City's best engineering judgment.

D.1.4 Universal Safety Countermeasures

The safety countermeasures in this section represent improvements that should be considered whenever new or modified signals are studied and include operational, pedestrian access, and geometric enhancements.

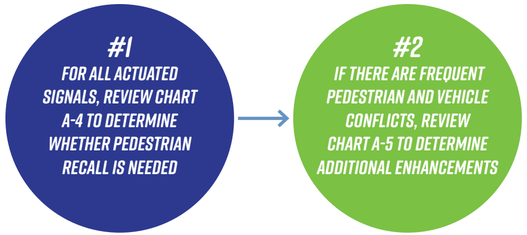
Universal traffic signal improvements include shortening cycle lengths, prioritizing multimodal travel, minimizing the number of signal phases, setting slow progression speeds, adjusting timing for off-peak hours, and considering fixed signal timing, among others. These universal operational improvements are detailed in **Table B-5.**

D.2 Additional Signal Enhancements

Not all pedestrian/vehicle conflicts are addressed by the universal considerations for signal-controlled crosswalks, and additional safety needs at signalized intersections depend on intersection operations and design, roadway characteristics, and pedestrian volumes. After assessing the suitability of each of the universal considerations, additional signal enhancements should be considered for projects involving major signal modifications, corridor studies, traffic studies, or safety studies and where reported, near-miss, or observed conflicts between pedestrians and autos occur. First, review **Chart B-4** to determine if pedestrian recall is needed, and then review **Chart B-5** to identify which signal enhancements should be considered.

Intersections with frequent pedestrian and vehicle conflicts will return more substantive recommendations. Intersections with few pedestrian and vehicle conflicts will return treatments that require less-intensive signal modifications or even no changes.

Where LPIs are recommended, pedestrians



should be given a minimum of three-to-seven seconds head start, depending on pedestrian volumes, turning vehicle volumes, and roadway characteristics. At intersections with particularly high potential for conflicts or long crossing distances, LPIs of up to ten seconds May be appropriate. Longer LPIs give pedestrians more time to cross before the start of a green signal in the same travel direction, increasing visibility to turning vehicles and reinforcing pedestrian right-of-way, though they also increase intersection delay.[8]

Table B-5 summarizes the pedestrian access modifications that should be universally considered at signal-controlled crosswalks. Accessible pedestrian signals should be installed at all intersections to improve pedestrian accessibility. These signals provide audible and vibrotactile information to improve accessibility for disabled pedestrians. Push buttons should also be mounted in medians six-feet or wider. When retrofitting existing medians less than six feet wide, the median should be widened with concrete or with striping and plastic posts to retain pedestrian push buttons and upgrade for ADA accessibility. If the median cannot be widened, any existing push buttons should be removed.

For all thresholds included in **Charts B-4** through **B-8**, if volumes are within 10% of a threshold, roundup to account for future demand and background growth in pedestrian and/or vehicle volumes.

8 FHWA Signalized Intersections: Informational Guide. Publication Number FHWA-HRT-04-091. August 2004.

Table B-5: Universal Safety Countermeasures for Signal-Controlled Crosswalks

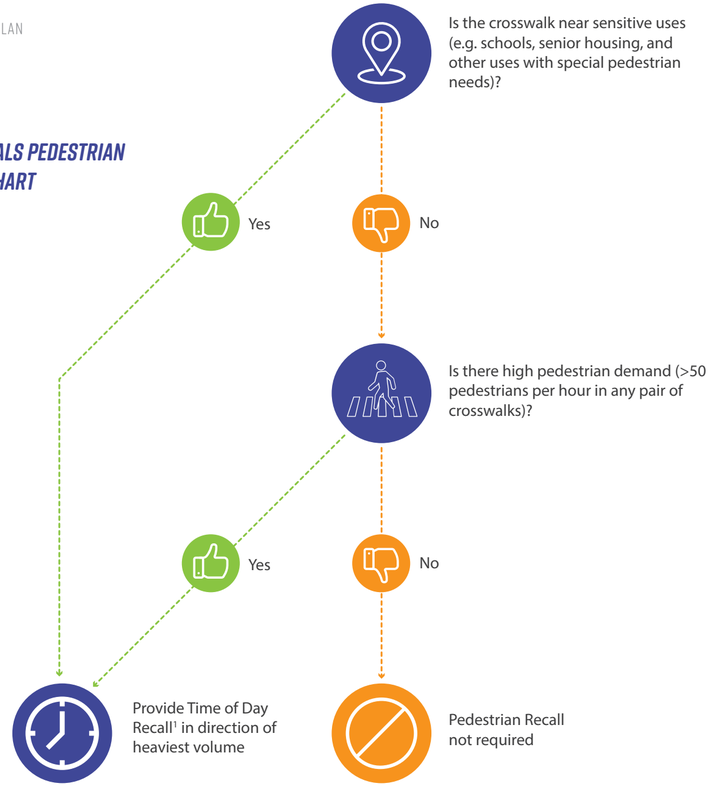
Counter-measure	Description	Applicable to Which Projects?				
		New Signals/ Major Signal Modifications	Minor Signal Modifications	Signal Retiming	All Other Projects	Studies, Safety Issues
Accessible Pedestrian Signals	Accessible pedestrian signals (APS) communicate audible and vibrotactile information about the crossing to people who are blind or have low vision. They are typically activated with a push button with a large raised arrow.	✓			✓	✓
Pedestrian Countdown Signals	During the "Flash Don't Walk" (i.e. flashing red hand) phase, a countdown timer should appear next to the flashing red hand. The timer shows how many seconds are remaining for pedestrians to cross the street before opposing traffic receives a green light. This is a safety countermeasure and is California requirement.	✓				✓
Adequate Minimum Walk Time	California has standards how long to give the pedestrian phase. The "Flash Don't Walk" should provide enough time to cross the street based on a maximum walking speed of 3.5 feet per second. Slower speeds should be considered near sensitive uses, such as senior centers and schools.	✓	✓	✓		✓
Pedestrian Signals that "Rest in Walk"	On streets with coordinated traffic signals, the pedestrian crossing of the side street should always give pedestrians the walk phase (i.e. it should "Rest in Walk"), so that they do not have to push a button to get the walk phase.	✓	✓	✓		✓
Pedestrian Phase Actuation Extension	When pedestrians arrive at a crosswalk close to the signal changing to green or as the signal changes green for cars traveling in the same direction and press the push button, they typically do not receive a walk phase. The signal is programmed ("the actuation window") to think the pedestrian is too late, and they have to wait a full signal cycle to get the walk phase. Instead, the actuation window can get extra time, so that pedestrians who arrive near the beginning of the vehicle green phase can still get the walk phase, without waiting a full signal cycle.	✓	✓			✓
Pedestrian Recall	At many signals, pedestrians push a button to receive the walk phase. When a signal is on "pedestrian recall", the walk phase is displayed each signal cycle, without pedestrians needing to push the button. This makes walking more convenient and reduces the amount of time pedestrians must wait ("pedestrian delay").	✓	✓	✓		✓
Cycle Length Minimization	"Cycle length" is the amount of time it takes for every movement (e.g. northbound left turn, west crosswalk, etc) to receive a green light. This can range from 60-90 seconds or even several minutes, depending on how a signal is timed and the amount of traffic that is expected to move through it. Keeping cycle lengths short (i.e. closer to 60 seconds) means that pedestrians do not have to wait as long to receive a green light. When pedestrian delay is high, people may be more likely to cross against the light.	✓	✓	✓		✓
No Right Turn on Red	In California, drivers can turn right after stopping at a red light. This means they must look for a gap in traffic and for pedestrians who have the walk phase before proceeding. Red turn on red can be prohibited either all the time or at specific times (e.g. when the pedestrian walk phase is on or near bell times at a school) to enhance crosswalk safety. Right turn on red should always be prohibited for the inside turn lane when there is more than one right turn lane.	✓	✓	✓	✓	✓
Additional Signal Enhancements	Charts B-4 through B-7 assess the suitability of additional signal enhancements like leading pedestrian intervals, protected turn signals, and pedestrian scrambles. They should always be used to identify additional potential safety enhancements.	✓				✓

Source: Adapted from City of Oakland Great Streets Design Guidelines.

Table B-6: Guide to Using Flow Charts for Additional Signal Enhancements

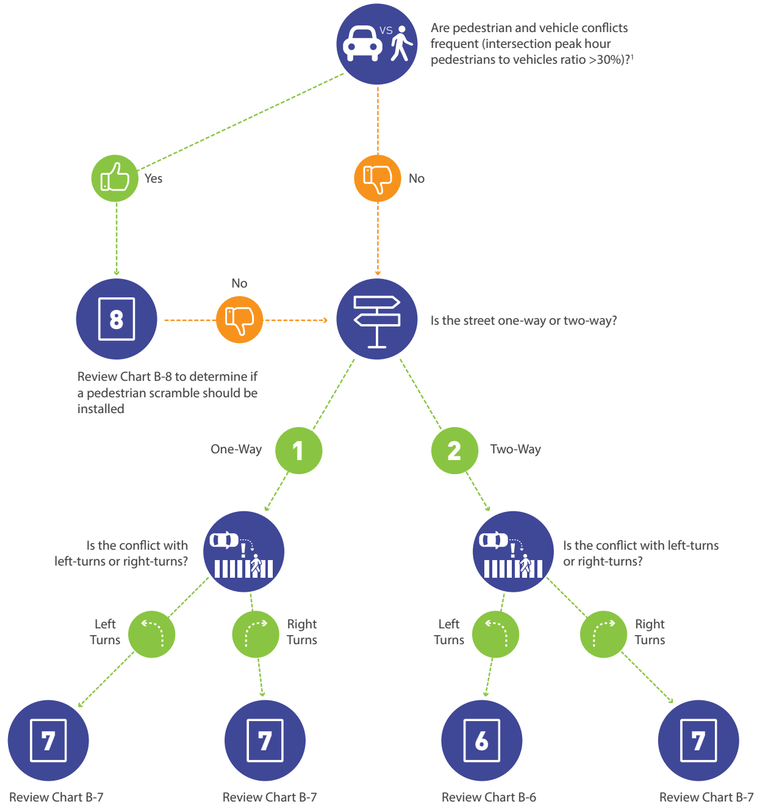
Tool	Description	Step 1: Review Charts B-4 and B-5		Step 2: If identified by Chart B-5, determine additional signal enhancements based on Charts B-6, B-7, and B-8		
		Chart B-4: Actuated Signals	Chart B-5: Pedestrian and Vehicle Conflicts	Chart B-6: Left Turns on Two-Way Streets	Chart B-7: Right Turns on Two-Way Streets or Left Turns on One-Way Streets	Chart B-8: Pedestrian Scrambles
Time of Day Recall in Direction of Heavy Volume	City creates signal timings for different times in the day. Near bell times, peak periods, or relevant times of days, pedestrian always receive the walk phase and do not need to press the push button.	✓	Chart B-5 determines the use of Charts B-6, B-7, and B-8			
Pedestrian Scramble	Pedestrian Scramble: Provide a dedicated pedestrian phase, during which pedestrians can cross in any direction, including diagonally.			✓		✓
All-Pedestrian Phase	All Pedestrian Phase: Pedestrian have a dedicated pedestrian phase where they can cross in any crosswalk. Diagonally crossing is not allowed.			✓		✓
Protected Turn	If a turn is currently allowed (i.e. typical green ball signal, no green arrow), add a protected left-turn (i.e. green arrow) to separate the pedestrian phase from the conflicting vehicle turning movement.			✓	✓	
Leading Pedestrian Interval (LPI)	LPIs give pedestrians a 3-7 second "head start" before cars traveling in the same direction get the green signal. By the time the cars get the green light, sight lines between drivers and pedestrian are better or the pedestrian have finished crossing that part of the street.				✓	
LPI with No Right Turn on Red	These are the same as above with either a static (i.e. metal sign) or dynamic (i.e. a digital sign with a changing message) right-turn on red (RTOR) restriction. Prohibiting RTOR means that that a car can't make a right turn when the LPI is on.		Chart B-5 determines the use of Charts B-6, B-7, and B-8		✓	
"Turning Vehicles Yield to Pedestrians" Sign	This is a static sign that can be posted at an intersection to try to increase driver awareness of pedestrian conflicts, but the potential for conflict still occurs.			✓	✓	
Split Phase	Typically, two directions of traffic get the green light at the same time (e.g. northbound and southbound through cars and east and west crosswalks). With a split phase, only one direction of traffic gets a green light, which can remove the conflicts between turning drivers and the adjacent crosswalks, for example. It also increases the cycle length and increases the amount everyone must wait at the intersections.			✓		
No Action Required	Conflicts are generally managed or limited, the set of tools are not appropriate, and/ or further action may not be needed.	✓	✓	✓	✓	✓

CHART B-4: ACTUATED SIGNALS PEDESTRIAN OPTION FLOW CHART



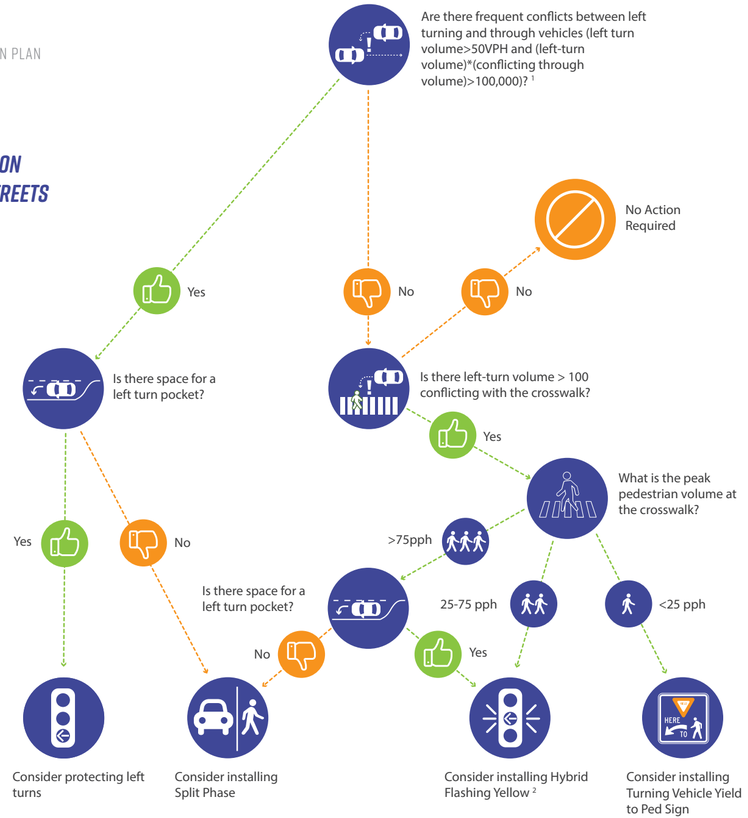
1. Recall should be provided any time there is high demand and/or during peak hours of use from sensitive uses.

CHART B-5: PEDESTRIAN AND VEHICLE CONFLICTS



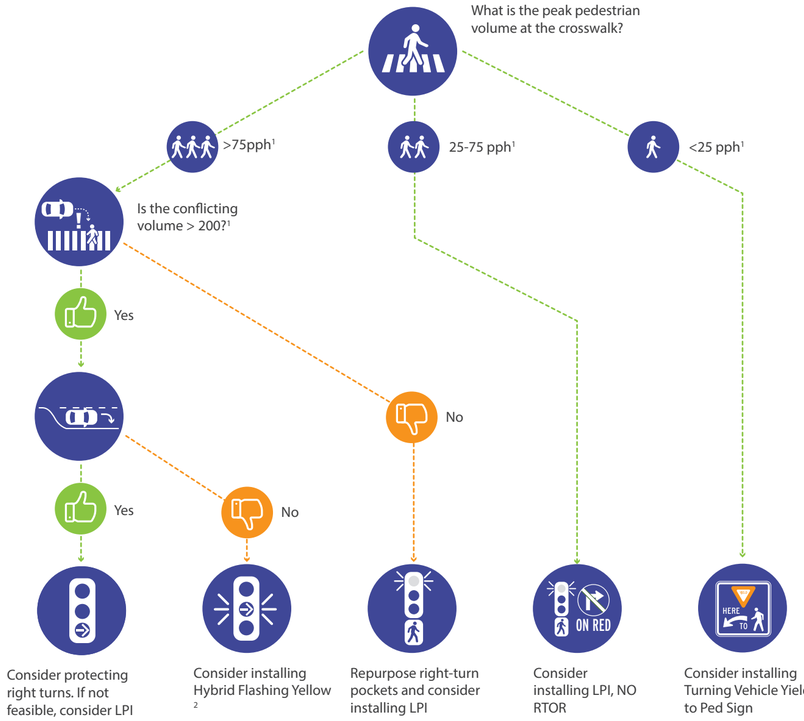
1. If volume(s) are within 10% of the threshold, roundup to account for background growth and future demand.

CHART B-6: LEFT-TURNS ON TWO-WAY STREETS



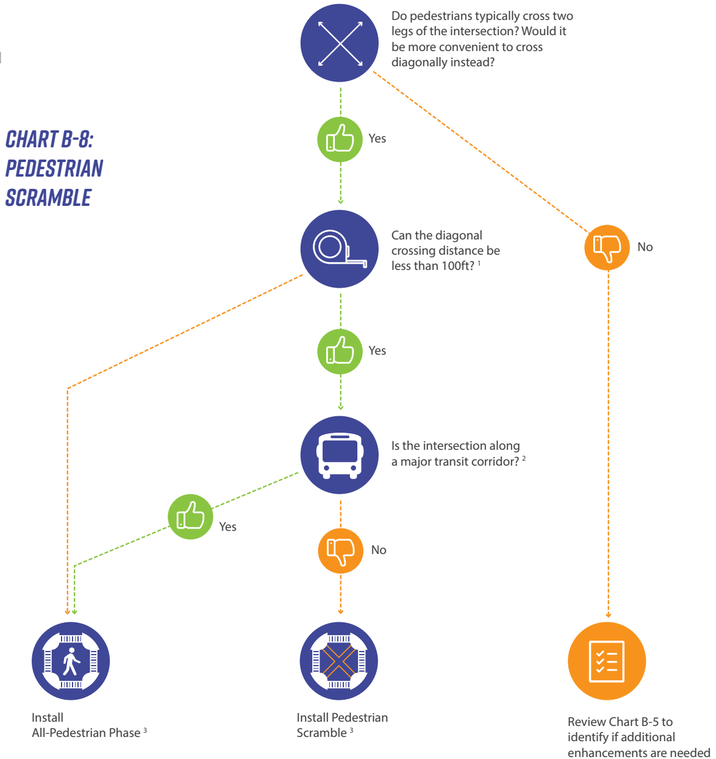
1. If volume(s) are within 10% of the threshold, roundup to account for background growth and future demand.
2. Protected turn when pedestrian phase is called. Otherwise, green ball with yellow flashing arrow.

CHART B-7: RIGHT TURNS ON TWO-WAY STREETS AND LEFT TURNS ON ONE-WAY STREETS



1. If volume(s) are within 10% of the threshold, roundup to account for background growth and future demand.
2. Protected turn when pedestrian phase is called. Otherwise, green ball with yellow flashing arrow.

CHART B-8: PEDESTRIAN SCRAMBLE



1. Less than 100 feet after bulb-outs and other enhancements to shorten crossing distances have been implemented
2. If additional transit operations enhancements present (e.g. transit signal priority), still consider installing the scramble if it benefits access to transit.
3. For more information on these tools see Appendix C Safety Countermeasure Toolbox

Crosswalk Worksheet

This worksheet may be completed to outline the process used by staff to identify the countermeasures considered to improve pedestrian safety at any given crosswalk.

Major Road: _____

Minor Road or Location: _____

Date of Review: _____

Reviewer: _____

Peak Hour Observed: _____

FIELD VISIT AND BACKGROUND INFORMATION

CRITICAL ROADWAY CHARACTERISTICS

Site Distance Issues (circle driver or pedestrian as applicable):

1. Parked cars (driver/ped)
2. Moving traffic obscures vision during crossing (driver/ped)
3. Roadway curvature (driver/ped)
4. Terrain (driver/ped)
5. Vegetation (driver/ped)
6. Significant sun glare (driver/ped)
7. Insufficient building setback (driver/ped)
8. Moveable roadside items, e.g., street furniture (driver/ped)
9. Fixed roadside items, e.g., signal control boxes, signs (driver/ped)
10. Inadequate roadway lighting (driver/ped)
11. Poor signal visibility (driver/ped)

Sight distance is generally acceptable if the pedestrian can easily be seen from a distance of 10x the speed limit or 250 feet. See Caltrans Highway Design Manual Chapter 400 for more information on calculating sight distance.

Sight Distance Mitigations

If any of the above issues are circled for the driver or pedestrian, can these issues be mitigated? If no, direct pedestrians to the nearest marked crosswalk (stop field view here) or consider installing a pedestrian signal or grade separation (continue below to collect data for warrant analysis). If yes, make note of mitigation options and continue below.

_____

_____

_____

_____

_____

_____

_____

_____

GENERAL PEDESTRIAN CHARACTERISTICS

1. Is the crossing along a direct route to a major pedestrian attractor/ generator? Circle: yes/no
2. Peak Hour Pedestrian Volume (total crossing major road): _____ pedestrians/hour
3. Pedestrian Crossing Distance, curb to curb: _____ feet
4. Distance to nearest marked crosswalk: _____ feet.
   Is the crossing signalized? Circle: yes/no
5. Pedestrian Walking Speed (average): _____ ft/sec
6. Pedestrian Start-up and End Clearance Time: _____ sec
7. Existing Pedestrian Signal Timing (crossing major road): _____ sec
8. Existing Pedestrian Signal Provisions (count down/ push button/ scramble/ other/ none – circle all that apply)
9. Other Existing Pedestrian Accommodations (e.g., signage, crosswalk striping) – list here and include on diagram:

   a. _____

   _____

   b. _____

   _____

GENERAL VEHICLE/ ROADWAY CHARACTERISTICS

1. Major Road Traffic Speed (posted/ statutory/ 85th Percentile – circle one):
   a. _____ MPH
2. Major Road Traffic Volume (total of both approaches during peak hour):
   a. _____ vehicles/hour
3. Average Daily Traffic Volume
   a. _____ vehicles/day
4. Number of Lanes on Major Road: _____ and on Minor Road: _____
5. Is a median present? Circle: Yes/no.
6. Typical Motorist Compliance at Pedestrian Crossings in Region: low/ medium/ high (circle one)

BEHAVIORAL INDICATORS

Check all that apply:

1. Inadequate pedestrian search (pedestrians enter roadway without searching): _____
2. Inadequate driver search (drivers proceed without searching): _____
3. Aborted crossing (return to curb after both feet in roadway): _____
4. Crossing against light (entry and exit from roadway against signal): _____
5. Small gaps (accepting gaps which require rapid crossings): _____
6. Leaving crosswalk (crossing starts or ends outside of an available crosswalk): _____
7. Crossing in front of a bus: _____
8. Vehicle overtaking (ped crosses in front of stopped traffic – Multiple Threat): _____
9. Running (entry or crossing while running or moving fast): _____
10. Short time exposure (e.g., appearance from behind parked car): _____
11. Retreat (momentary reversal in pedestrian direction of travel): _____

ADDITIONAL INFORMATION

Community Characteristics:

1. Population: _____ people
2. Distance to major transit hub: _____ feet or miles (circle one)
3. Average age in Census Block: _____ years versus citywide average of: _____ years

Potential Risk Factors:

1. Have pedestrian collisions occurred at this location in the past 5 years? Circle: yes/no
   a. Number of injuries: _____ people
   b. Number of fatalities: _____ people
2. Potential or Observed Conflicts (circle observed or potential as applicable):
   a. Pedestrian walks too close to a vehicle – NEAR SIDE OF CROSSING (observed/ potential)
   b. Pedestrian walks too close to a vehicle – FAR SIDE (observed/ potential)
   c. Right turn vehicle (on green) too close to pedestrian (observed/ potential)
   d. Left turn vehicle too close to pedestrian (observed/ potential)
   e. Right turn on red vehicle too close to pedestrian (observed/ potential)
3. Other Risk Factors (check all that apply):
   a. Poor crossing surface: _____
   b. Faded roadway striping (e.g. crosswalk striping): _____
   c. High crime area/ personal safety concerns: _____
   d. Businesses selling alcohol near study location: _____
   e. School near study location: _____
   f. Senior facility near study location: _____

Observations or suggestions for appropriate education or enforcement measures based on this field view:

_____

_____

_____

_____

_____

_____

_____

FINDINGS

MARKING UNCONTROLLED CROSSWALKS

Does **Chart B-3** recommend considering a marked crosswalk? Circle: yes/no.

If no, what were the limiting factors (list all that apply)?

_____

_____

_____

_____

ENHANCING UNCONTROLLED CROSSWALK

1a. Can a road diet be completed? Circle: yes/no

If no, what were the limiting factors (list all that apply, include consideration of ADT and prevailing speeds)?

_____

_____

_____

_____

1b. Can a median or median refuge be installed? Circle: yes/no

If no, what were the limiting factors (list all that apply, include discussion of roadway width, narrowed travel lanes, and road diet)?

2. What Level of Enhancement Does Recommend? Circle: A, B, C, or D.

Are there any barriers or contextual issues with installing that recommendation?

3. What Additional Candidate Treatments Does **Table B-3** Suggest? Circle all that apply: 1, 2, 3, 4, 5, 6, 7, 8, 9.

Which countermeasures are contextually appropriate for the site and will be included in the project? Include all countermeasures circled above and note why they were or were not included in the project.

4. Review reported collisions and reported community safety concerns and then review **Table B-4**: Do the proposed countermeasures in Step #2 and #3 address all the reported issues? Circle: yes/no.

If no, which safety issues are not addressed? Which additional countermeasures or enhancements can be incorporated to address the safety issues?

CONTROLLED CROSSWALKS

1. What is the intersection control type: Circle: signalized, strop-controlled, or yield-controlled (if at roundabout, refer to Uncontrolled Crosswalk section).

2. Review **Section D.1** and identify all baseline improvements to be incorporated into the project. Identify which elements are and are not incorporated into the project. Identify the engineering constraints for baseline conditions not incorporated into the project.

3a. For signals, review **Section D.1.3** and identify which elements are and are not incorporated into the project. Identify the engineering constraints for universal conditions not incorporated into the project.

3b. If an actuated signal, review **Chart B-4**. Is pedestrian recall needed? Circle: yes/no

3c. Review **Chart B-5** and, if appropriate, review **Charts B-6** through **B-8**. Record the results and identify if engineering constraints apply:

Chart B-5:

Chart B-6:

Chart B-7:

Chart B-8:

4. For stop-control review **Section D.1.1** and for yield-control review **Section D.1.2**, should crosswalks be marked? Circle: yes/no.