Introduction
Pedestrian ramps, sidewalks, and roadway crossing facilities are critical to providing safe and efficient mobility for the residents of Harris County who may travel on foot. Several types of crosswalk treatments are available at a given location. This document provides Harris County with guidance to determine whether a specific location meets the criteria for installing specific pedestrian crossing improvements or if alternative forms of pedestrian facilities should be considered.

The guidance document is based on the understanding that Harris County will utilize the document as a tool when presented with public requests for crosswalks. All recommendations presented in the toolbox are expected to follow the current guidelines of the Texas Manual of Uniform Traffic Control Devices (TMUTCD). No matter the recommendations made from the forthcoming flowchart and toolbox, engineering judgement should prevail and conform with the TMUTCD and all relevant governing regulations.

This guidance document is based on existing best practices, existing policy and/or guidance developed by other agencies across that nation to suit Harris County conditions.

Background
The population of Harris County is growing, and this growth has brought with it an increased interest in alternative modes of transportation. Walking and the act of being a pedestrian is a form of transportation where safety is of the utmost importance. This document and forthcoming recommendations will provide a common methodology across all four Harris County precincts in the attempt to make pedestrian crossings as safe and uniform as possible.

Glossary
The following is a guide of terms used in the flowchart and toolbox of recommendations:

**All-Way Stop** – The presence of stop signs at all approaches of a given intersection.

**Controlled Pedestrian Crossing Location** – A location where pedestrians cross (or may potentially cross) the roadway with help from a traffic signal, pedestrian signal, stop signs, or grade-separated crossings.

**Traffic Device** – A traffic device is any actuated control device used to stop traffic and allow pedestrians to cross safely. The purpose of a traffic device is to allow protected pedestrian crossings, stopping road traffic only as needed.

**Grade Separated Crossing** – Any pedestrian crossing where the pedestrian is vertically separated from the roadway or intersection, and no vehicular-pedestrian conflicts exist.
Protected Pedestrian Crossing – A pedestrian crosswalk that is marked and has its own protected signal timing phase, either from a standard traffic signal or from a pedestrian signal/HAWK/pedestrian hybrid beacon signal.

School Crossing - A crossing location where ten or more student pedestrians per hour are crossing

School Zone - A segment of street or highway that abuts school grounds where children have access to the roadway or where a school crossing is in place.

Shared Use Path – Includes locations where a multi-use path crosses a roadway. A shared use path is a trail or sidewalk that can be used by both pedestrians and bicyclists.

Vehicles per Day (VPD) - The amount of vehicles traveling in both directions in a given 24-hour period.

Uncontrolled Pedestrian Crossing Location – A location where pedestrians cross (or may potentially cross) the roadway without help from a traffic signal, pedestrian signal, stop signs, or grade-separated crossings.

Unmarked Pedestrian Crossing Facility - Any treatment that improves a pedestrian’s ability to cross a roadway. Installation of this type of pedestrian facilitation is subject to engineering judgment and may include curb ramps and/or a raised median refuge. However, no effort is made to attract pedestrians or recommend that pedestrians cross at this location. The treatments simply provide an improvement for a low volume pedestrian crossing where pedestrians are already crossing and will likely continue to cross.

Proposed Implementation Guidance
Currently, Harris County Engineering Department utilizes a variety of informal guidance and methods to determine the appropriate course of action for crosswalk requests. No standardized method has been adopted by Harris County. The guidance presented in this document is based upon relevant research and state of the practice methodology from other agencies, both in the State of Texas and nationwide. This guidance document did not collect, analyze, and study research data collected by the Consultant, but rather relies upon data available from reliable and trustworthy sources. The guidance identified below is recommended because of its uniform and flexible nature.
Evaluation Criteria
Several criteria exist that help determine where the installation of a pedestrian crossing facility (either at a controlled or uncontrolled location) would be beneficial to the public. These high-level factors include:

- Vehicles per day of the roadway being crossed,
- Existing pedestrian counts near the location to be crossed,
- Location of the crossing relative to schools, shopping centers, hospitals, etc,
- Transit availability,
- Adequate stopping sight distance for vehicles,
- Cross-section of the roadway being crossed,
- Vehicular speeds of the roadway being crossed,
- Presence of nearby marked or protected pedestrian crossings, and
- Presence of ADA compliant curb ramps.

The flowchart shown in Figure 1 can be used to assist in the determination of a pedestrian facility at uncontrolled crossing locations. The criteria used to determine the appropriate pedestrian facility are explicitly identified in the various boxes of the flow chart.

Table 1 provides a toolbox of appropriate pedestrian crossing treatments based on the guidance from Figure 1 for uncontrolled crossing locations.

Figure 2 provides guidance for pedestrian crossing treatments at controlled crossing locations.

The prescribed pedestrian crossing treatments, whether from Figure 1, Table 1, or Figure 2, are all subject to engineering judgment as well as TMUTCD compliance.
Is the location within 1/4 mile of a School Crossing*, School Zone**, shopping center, or hospital?

- No action recommended

Does the crossing serve a transit stop or other noticeable, defined and regular crossing?

- Consider installing “unmarked pedestrian crossing facilities” (5)

Does the crossing meet the minimum pedestrian volume thresholds? (2)

- Is the nearest marked or protected crossing ≥ 300’ away? (4)

- Direct pedestrians to nearest marked or protected crossing

Is the location within 1/4 miles of a park?

- Is the crossing for a shared use path (6’ min. width)?

- Is there adequate stopping sight distance?

- Go to Table 1

- Direct pedestrians to nearest marked or protected crossing (existing or proposed) or consider pedestrian signal, traffic signal or grade separated crossing

Is the crossing for a shared use path (6’ min. width)?

- Direct pedestrians to nearest marked or protected crossing

Is removal of sight distance obstructions or implementation of a lower speed limit feasible?

- Is there adequate stopping sight distance?

- Go to Table 1

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(1) Exception to the 1,000 vpd min. roadway volume threshold may be made for School Crossings* where the peak hour traffic exceeds 10% of the daily traffic

(2) Minimum Pedestrian Volume Thresholds:
- 20 peds per hour in any one hour, or
- 18 peds per hour in any two hours in a 24-hour period, or
- 15 peds per hour in any three hours in a 24-hour period.

* School Crossing defined as a crossing location where ten or more student pedestrians cross in the peak hour

** School Zone defined as a segment of street or highway that abuts school grounds where children have access to the roadway or where a school crossing is in place

(3) Refer to note 2 for guidance on reasonable volume thresholds

(4) Distance to the nearest marked or protected crossing may be reduced to 200’ in urban conditions, subject to County Engineer’s approval, where crossing treatments and crossing activity would not create undue restrictions to vehicular traffic operations

(5) An “unmarked pedestrian crossing facility” is any treatment that improves a pedestrian’s ability to cross a roadway, short of the marked, signed and enhanced crossings detailed in Table 1. Installation of this type of pedestrian facilitation is subject to County Engineer’s approval and may include curb ramps and/or a raised median refuge. However, no effort is made to attract pedestrians or recommend that pedestrians cross at this location. The treatments simply provide an improvement for a low volume pedestrian crossing where pedestrians are already crossing and will likely continue to cross.
### Harris County Engineering Department- Pedestrian Crossing Guidelines

#### Table 1. Decision Guide for Uncontrolled Crossing Treatments

<table>
<thead>
<tr>
<th>Roadway Configuration</th>
<th>Number of lanes crossed to reach a refuge</th>
<th>Number of multiple threat lanes per crossing</th>
<th>Roadway VPD and Observed 85th Percentile Speed</th>
<th>1,000-9,000 vpd (3)</th>
<th>9,000-12,000 vpd</th>
<th>12,000-15,000 vpd</th>
<th>&gt; 15,000 vpd</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Lanes (one way street)</td>
<td>2</td>
<td>1</td>
<td>A A B</td>
<td>A A B</td>
<td>A A B</td>
<td>A A B</td>
<td>B B</td>
</tr>
<tr>
<td>2 Lanes (two way street with no median)</td>
<td>2</td>
<td>0</td>
<td>A A B</td>
<td>A A B</td>
<td>A A B</td>
<td>A A B</td>
<td>A B B</td>
</tr>
<tr>
<td>3 Lanes (with raised median)</td>
<td>1 or 2</td>
<td>0 or 1</td>
<td>A A C</td>
<td>A B C</td>
<td>A C C</td>
<td>B C C</td>
<td>C C</td>
</tr>
<tr>
<td>3 Lanes (with striped median)</td>
<td>3</td>
<td>0 or 1</td>
<td>B B C</td>
<td>B B C</td>
<td>B B D</td>
<td>B B D</td>
<td>B C D</td>
</tr>
<tr>
<td>4 Lanes (two way street with no median)</td>
<td>4</td>
<td>2</td>
<td>A C C</td>
<td>A C C</td>
<td>A C D</td>
<td>A C D</td>
<td>D C C</td>
</tr>
<tr>
<td>4 Lanes (two way street with median)</td>
<td>4</td>
<td>2</td>
<td>A B C</td>
<td>B B C</td>
<td>B C B</td>
<td>C C C</td>
<td>C C D</td>
</tr>
<tr>
<td>5 Lanes (with raised median)</td>
<td>2 or 3</td>
<td>2</td>
<td>A A C</td>
<td>A B C</td>
<td>A C A</td>
<td>B D B</td>
<td>B B D</td>
</tr>
<tr>
<td>5 Lanes (with striped median)</td>
<td>5</td>
<td>2</td>
<td>C C C</td>
<td>C C C</td>
<td>C C D</td>
<td>C C D</td>
<td>C C D</td>
</tr>
<tr>
<td>6 Lanes (two way street with or without median)</td>
<td>3 to 6</td>
<td>4</td>
<td>D D D</td>
<td>D D D</td>
<td>D D D</td>
<td>D D D</td>
<td>D D D</td>
</tr>
</tbody>
</table>

Notes:
1. Painted medians can never be considered a refuge for a crossing pedestrian. Similarly, a 4 foot wide raised median next to a left turn lane can only be considered a refuge for pedestrians if the left turning volume is less than 20 vehicles per hour (meaning that in most cases the left turn lane is not occupied while the pedestrian is crossing).
2. A multiple threat lane is defined as a through lane where it is possible for a pedestrian to step out from in front of a stopped vehicle in the adjacent travel lane (either through or turn lane).
3. Additional treatments may be considered if suitable gaps in traffic for safe crossing are not available.
4. If 85th percentile speeds are not known, posted speed limits may be utilized.
5. Continental crosswalks should be installed for school zones and areas with high pedestrian volumes to increase driver awareness of the crossing.
6. Crossing guards should be utilized at marked crossings within school zones.
7. In compliance with the Americans with Disabilities Act (ADA), crosswalks may not be installed unless accessible curb ramps are provided to directly access the crossing.

#### Toolbox of Recommended Treatments

**A**

Install marked crosswalk with signs or other geometric improvements

*Specific Guidance:* Install marked crosswalk with signs mounted on the side of the roadway (W11-2 and W16-7P) with standard (W11-2) advance pedestrian warning signs; use S1-1 signs for School Crossing locations. If within 1/4 mile of a school, a crossing guard shall be provided.

**B**

Install marked crosswalk with signs or other geometric improvements to increase pedestrian visibility and reduce exposure

*Specific Guidance:* For 2-lane roadways, install marked crosswalk with signs mounted on the side of the roadway (W11-2 and W16-7P); use standard (W11-2) advance pedestrian warning signs; use S1-1 signs for School Crossing locations. Curb extensions (concrete, paint, flexible delineators) or median refuge islands may be evaluated to shorten the pedestrian crossing distance and increase pedestrian visibility to motorists.

For 3+ lane roadways, install marked crosswalk with W11-2 and W16-7P signs mounted at the crossing location on the side of the roadway; use standard (W11-2) advance pedestrian warning signs; use S1-1 signs for School Crossing locations. Add curb extensions or median refuge islands to shorten the pedestrian crossing distance and increase pedestrian visibility to motorists.

**C**

It is probable to install a marked crosswalk and additional signage or to make other geometric improvements; however, additional analysis may be required to determine appropriate markings, signs, and/or traffic control devices.

**D**

Do not install marked crosswalk at uncontrolled crossing. Consider pedestrian signals, pedestrian traffic signal, or grade-separated crossing

*Specific Guidance:* Consider pedestrian traffic signal or grade-separated crossing; application of these treatments will consider corridor signal progression, existing grades, physical constraints, and other engineering factors.
Start Here

- Is the intersection controlled by an all-way stop or by a traffic signal? (Signal)
  - N: Install marked crosswalk
  - Y: Is a school crossing present at the intersection?*

- Signal
  - Y: Install marked continental crosswalk with school crossing signs (S1-1)
  - N: No action recommended

- Is there an existing marked crosswalk? Y
  - Y: Has Harris County Engineering received feedback concerning driver compliance at crosswalk?
    - Y: Consider additional signs to increase driver awareness of pedestrians. Curb bulb outs and median refuges may be evaluated but require county approval.
    - N: Install marked crosswalk with advance pedestrian signs (W11-2)
  - N: No action recommended

- Does the crossing meet minimum pedestrian volume thresholds? (2)
  - Y: Install marked crosswalk with advance pedestrian signs (W11-2)
  - N: No action recommended

- Is it a shared use path? Y
  - Y: Install marked crosswalk with advance pedestrian signs (W11-2)
  - N: No action recommended

- Is the VPD ≥ 1,000 on the street being crossed? Y
  - Y: Install marked crosswalk with advance pedestrian signs (W11-2)
  - N: No action recommended

- Is the intersection controlled by an all-way stop or by a traffic signal? (Signal)
  - Y: Install marked crosswalk with school crossing sign (S1-1) and down arrow (16-7p) at crosswalk plus advance (S1-1) signs
  - N: No action recommended

* Is a school crossing present at the intersection?*

Install marked crosswalk with advance pedestrian signs (W11-2)

Consider additional signs to increase driver awareness of pedestrians. Curb bulb outs and median refuges may be evaluated but require county approval.