Crosswalk Design Guidelines Project
Public meeting: December 8, 2016
Agenda

- Welcome and introductions (20 min.)
- Table activity (45 min.)
- Discussion (45 min.)
- Next steps (10 min.)
Crosswalks are inconsistent

Why?

1. Changing regulations
2. Evolution of design practices
3. Individual variance of traffic engineers
4. Resource limitations
Desired outcomes of project

1. Consistent, recognizable look/feel for all crosswalks throughout Ann Arbor
   - One size will not fit all

2. Help create clear, shared understanding among all crosswalk users
Design guidelines: Source data

1. Prevailing research and best practices
3. North American City Transportation Officials (NACTO) guidelines
4. Examples from peer communities
### Draft format: Ann Arbor guidelines

<table>
<thead>
<tr>
<th>Road type</th>
<th>Treatment categories</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard</td>
</tr>
<tr>
<td>Local</td>
<td></td>
</tr>
<tr>
<td>Collector</td>
<td></td>
</tr>
<tr>
<td>Arterial ≤ 3 lanes</td>
<td></td>
</tr>
<tr>
<td>Arterial &gt; 3 lanes</td>
<td></td>
</tr>
</tbody>
</table>
Design guidelines in practice

- Example: State St. between N. & S. University
Design guidelines in practice

• Example: State St. between N. & S. University
  – Road Width: 40’
  – Roadway Speed: 25 mph
  – Yielding Compliance: High
  – Peak Hour: Mid Afternoon
  – Pedestrian Volume: 250 / hour
  – Vehicular Volume: 300 / hour
  – Road Classification: Minor Arterial
### Design guidelines in practice

#### Guidelines for Pedestrian Crossing Treatments

This spreadsheet combines Worksheet 1 and Worksheet 2 (Appendix A, pages 63-70 of TCPIE Report 112/NCCHP Report 562) (Improving Pedestrian Safety at Unsignalized Intersections) into an electronic format. This spreadsheet should be used in conjunction with, and not independent of, Appendix A documentation.

**Key**
- Blue fields contain descriptive information.
- Green fields are required and must be completed.
- Tan fields are adjustments that are filled out only under certain conditions (follow instructions to the left of the cell).
- Gray fields are automatically calculated and should not be edited.

### Analyst and Site Information

<table>
<thead>
<tr>
<th>Analyst</th>
<th>C.A.</th>
<th>Major Street</th>
<th>State St.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N &amp; S. University Ave</td>
<td></td>
</tr>
<tr>
<td>Data Collection Date</td>
<td>NA</td>
<td>Minor Street or Location</td>
<td>Peak Hour</td>
</tr>
</tbody>
</table>

### Step 1: Select worksheet:

- Posted or statutory speed limit (or 85th percentile speed) on the major street (mph): 25
- Is the population of the surrounding area <10,000? (enter YES or NO): No

### Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?

| Peak-hour pedestrian volume (ped/h), $V_p$ | 300 |

### Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?

- Major road volume, total of both approaches during peak hour (vahh), $V_{maj}$: 300
- [Calculated automatically]: Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant: 300
- [Calculated automatically]: Minimum required peak hour pedestrian volume to meet traffic signal warrant: 708
- Is 15th percentile crossing speed of pedestrians less than 3.5 fps (11 mph)? (enter YES or NO): No
- If 15th percentile crossing speed of pedestrians is less than 3.5 fps (11 mph), then reduce $V_p$ by up to 50%; Reduced value of $V_p$: 708

### Result: The signal warrant is not met. Go to step 4.

### Step 4: Estimate pedestrian delay.

| Pedestrian crossing distance, about to curb (ft), $d_p$ | 40 |
| Pedestrian walking speed (ft/s), $V_p$ (suggested speed = 3.5 fps) | 3 |
| Pedestrian start-up time and end clearance time (s), $t_{start}$ (suggested start-up time = 3 sec) | 3 |
| Major road volume, total of both approaches (vahh), $V_{maj}$ | 300 |
| Major road flow rate (vph), $v$ | 0.3 |
| Average pedestrian delay (s), $d_p$ | 11 |
| Total pedestrian delay, $(d_p + V_p)$ | 1.7 |

The value in the calculated estimated delay for all pedestrians crossing a major roadway without a crossing warning (assumes DQ compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in line 4 replace the calculated value in line 4.
Design guidelines in practice

Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.

Expected motorist compliance at pedestrian crossings in region: enter **HIGH** for high compliance or **LOW** for low compliance.

Treatment Category: **ACTIVE OR ENHANCED**

Pedestrian Volume Crossing Major Road

Major Road Volume (veh/h)

This graph is based on data in Step 4

- No Treatment
- Crosswalk
- Active/Enhanced
- Red
- Signal (proposed)
Design guidelines in practice

- **Example:** State St. between N. & S. University

<table>
<thead>
<tr>
<th>Street Type</th>
<th>Standard</th>
<th>Design Options Standard+</th>
<th>High Risk Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor &amp; Major Arterials ≤ 3 Lanes</td>
<td>High Visibility Markings</td>
<td>Pedestrian Warning Series (W11-2) or School Warning Series (S1-1)</td>
<td>Rectangular Rapid Flashing Beacon (RRFB)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R1-6a Signs In-Lane or on Island</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bright Sides</td>
<td>Pedestrian Hybrid Beacon (PHB)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stop Here for Ped. (R1-5b) Signs w/ Stop Bar on Multilane Approach</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pedestrian Islands or Bump Outs</td>
<td>Lighting Review</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lighting Review</td>
<td></td>
</tr>
</tbody>
</table>
Design guidelines in practice

- Example: State St. between N. & S. University
Table exercise: Introduction

- Improvements have been requested at three mid-block crossings in a fictitious community

- Your objective is to select appropriate crossing treatment(s) for each location
  - Data input complete; category identified

- Total available budget (all 3 locations combined) is $72,000
Table exercise: Assumptions

- None of the 3 locations have ANY treatment; you are starting from scratch

- Engineering analysis is complete, accurate

- Traffic calming (adding stop signs or speed bumps; lowering speed limit) is NOT part of this exercise

- It is NOT possible to exceed the budget
Table exercise: Instructions

1. Conduct a round of introductions
2. Designate a reporter to post your results
3. Review map, data sheets
4. Identify an appropriate treatment(s) for each crosswalk location; place tokens on map
5. Post results on the flip-charts provided

Be prepared to discuss:
- How did you arrive at your decisions?
- What did you learn in the process?
Discussion

What do you observe about the decisions that were made in different groups?

What could we learn from this exercise?

How could/should the results inform the City’s process of refining the draft guidelines?
Immediate next steps

- Continue stakeholder engagement
- Refine preliminary guidelines
- Prepare, refine implementation plan
Contact information

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