ITE Recommended Practice:
Design Guidelines to Accommodate Pedestrians and Bicyclists at Interchanges

Presented to the ITE San Diego Section
Eddie Barrios, P.E.
Nathan Schmidt, AICP

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Outline

• Background
• Guiding Principles
• Crosswalk Treatments
• Interchange Cases
• Caltrans Best Practices & Local Projects Update
Background
Problem Statement

- Enhance pedestrian and bicycle safety
- Connect pedestrian and bicycle facilities efficiently with surrounding land uses
- Provide a consistent "message"
Where does the freeway end?
Guiding Principles

- Provide bicycles and pedestrian facilities
- Design ramp geometries to encourage slower vehicle speeds until past crosswalk
- Locate the crosswalk at the location with the best visibility and before the point where vehicles begin to accelerate
- Crosswalks should be as short as possible
Guiding Principles continued...

- Where bicyclists would travel between moving vehicles for more than 200 feet, install a buffer zone.
- Where bicyclists merge across a vehicle lane allow flexibility to transition when/where safe.
- Use the Crosswalk Tool to select appropriate crossing treatments.
High Speeds, Poor Visibility

Visibility problem at merging areas
Prefer Slow Speed
Right Angle Urban Designs
Positive example: reconfigured ramp terminus

Old ramp alignment

Flat Angle = wide crossing & high-speed turns
Tight angle = short crossing & slow speed turns
Design Assumptions

- 6’ Bike Lanes
- 6’ Sidewalks
- 5’ Landscape Buffers
- 12’ Lane Widths
- 8’ Right Shoulders
- AASHTO WB-62 Design Vehicle (69’ Truck with Trailer)
Determining Crosswalk Treatments
Interchange Cases

- On-Ramp Cases
- Off-Ramp Cases
- Single Point Urban Interchanges (SPUIs)
On-Ramps (4 Cases)

- Shared through/right-turn lane
- Short single right-turn lane
- Long single right-turn lane
- Long dual right-turn lanes
1. On-Ramp Entered from Shared Through Right Lane

- Dashed bike lane before on-ramp lane
- Directional curb ramps with truncated domes, high visibility striping provided for all crosswalks
- Landscape buffer provided between sidewalk and bike lanes, including on the structure as feasible
- Ramp geometrics minimize speed for vehicles leaving the arterial
- Optional “exit ramp” for bicyclists to use sidewalk
- Crosswalk located where speed is lowest and visibility is highest
- HOV Lane added downstream of crosswalk
2. On-Ramp Entered from Short, Single Right Lane
3. **On-Ramp Entered from Long, Single Right Lane**

Bike weaving zone provided through long on-ramp
4. On-Ramp Entered from Long, Dual Right Lane

- Raised (landscaped) buffer provided between bike lane and on-ramp lanes
- Advance yield limit line provided on dual lane crossing (advance stop bar if signalized). Bicyclists have option to use crosswalk (with ramps).
Off-Ramps
1a. Arterial Entered from Stop/Merge Off-Ramp (Split Ramps)
lb. Arterial Entered from Stop/Merge Off-Ramp (Combined Ramps)
2. Arterial Entered from Free Off-Ramp
Bike Lane Crossing

detail

off - ramps

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In this configuration, ramps should be signalized. Bicycle detection and optional ramps accommodate bikes at the crosswalk.
4. Arterial Entered from Two Lane Off-Ramp, Two Free Right Turns

To address the multiple threat concern at the crosswalk in this case, an advanced yield limit line is provided 20 to 30 feet before the crosswalk. This treatment increases the pedestrian’s visibility to motorists and reduces the number of vehicles encroaching on the crosswalk. Advanced devices such as PHBs and RRFB may also be installed based on the context.

Advance yield limit line is provided across dual lane ramp. Advance stop bar if signalized.
What's Missing?
Single Point Urban Interchanges (SPUIs)
With most SPUIs there is never a phase when pedestrians can cross the urban arterial without conflict.

**Solution:** Two-step crossing (one step during vehicle phase 2 and the other during vehicle phase 3)
SPUI 1. Two Stage Crossing

Bike lanes have skip striping through the complex intersection

Each stage is coordinated with the downstream signal in the same direction
Possible ped crosswalks
Vehicle phase 1
Vehicle phase 2
Vehicle phase 3

Peds with vehicle phase 2
Peds with vehicle
SPUI 2. **Advanced Crosswalk**

Advance crosswalk controlled with a signal or pedestrian hybrid beacon.
Recent Caltrans D11 Bike / Ped Projects
Caltrans Bike and Pedestrian Plan
Best Practices

North Coast Corridor: Bike/Ped Improvements

San Elijo Lagoon Bike/Ped Bridge

Batiquitos Lagoon Bike/Ped Bridge

North Coast Bike Trail

Coastal Access Improvements
Santa Fe Dr. Improvements
SR-15 Commuter Bikeway

Final construction wrapping up.
Will open end of Summer
Questions

N.Schmidt@fehrandpeers.com
E.Barrios@fehrandpeers.com