INNOVATIONS IN PROTECTED INTERSECTIONS

PURDUE ROAD SCHOOL TRANSPORTATION AND CONFERENCE AND EXPO

CONOR SEMLER
KITTELSON & ASSOCIATES, INC
BOSTON, MA
Recent Industry-Wide Bicycle Practice

Sidewalk Level Cycle Track

Protected Intersections

Federal Highway Administration
SEPARATED BIKE LANE
PLANNING AND DESIGN GUIDE

U.S. Department of Transportation
Federal Highway Administration
MAY 2015
Treating Bikes at Intersections

Figure 25

Bend-In

Figure 26

Bend-Out

NOT TO SCALE

20 ft - 40 ft
20 ft Minimum
40 ft - 60 ft

Alternative option to build raised curb extension.

Acceptable sidewalk width (corner overhang) must be maintained.

Ramp up to sidewalk level
Protected Intersections

Credit: Nels Nelson
BIKEWAY PLANNING CRITERIA AND GUIDELINES

April 1972

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Figure 3.8.14. Recommended Intersection Design for Intersecting Arterial Roads with Bikeways on Each Road. Intersection is Asymmetrically Designed to Provide Bicycle Queue Areas at the Entrance to the Crossings. (Reference 26, p. 23)
Offset Crossings -- Bicyclists are channeled onto the sidewalk area and to crossings of the intersecting streets just outside (farther from the center of the intersection) the normal pedestrian crosswalk area. In effect, a bikeway ring around the intersection is created.

1976 FHWA “Safety and Location Criteria for Bicycle Facilities”
9th Street/Division Street Protected Intersection

- Two-Way Street
- Pedestrian Safety Island
- Buffered Bike Lanes
- Division Street
- New Sidewalk
- Perpendicular Parking
- Raised Crossing
- Parking Protected Bikeway
- Painted Safety Zones
- Raised Crossing
- Corner Safety Island
- San Bruno Avenue
• Evaluation Areas
  — Vehicle Approach Speed
  — Conflict Behavior at Key Locations
  — Yielding Rates
  — Perception of Safety
Key Findings

- **Vehicle Approach Speeds**
  - **Target:** 25mph vehicle speeds
  - **Outcome:** 22mph average vehicle speeds

- **Vehicle Turning Speeds**
  - **Target:** 25mph turning speeds
  - **Outcome:** 98% of vehicles turn slower than 25mph
Key Findings

• Conflict Behavior
  — **Target:** Vehicle Angle of Approach for Bicyclist Crossing at or near 90%
  — **Outcome:** Most vehicles approach well below 90 degrees
Key Findings

• Yielding Behavior at Intersections
  — 96% of drivers yielded to bicyclists
  — Nearly 100% of drivers yielded to pedestrians
  — Pedestrians yielded to bicyclists most of the time (despite pedestrians having the right-of-way)
Key Findings

- Perception of Safety
  - Bicyclists and pedestrians felt increase in comfort and safety
  - Drivers felt increases to a lesser extent

**Figure 11: Survey Response from Bicyclists: Because of the changes to the intersection...**

185-186 Responses

- My comfort riding through the intersection has...
  - Decreased a lot: 2%
  - Decreased somewhat: 10%
  - Not changed: 34%
  - Increased somewhat: 43%

- I feel the safety of bicycling through the intersection has...
  - Decreased a lot: 2%
  - Decreased somewhat: 9%
  - Not changed: 31%
  - Increased somewhat: 53%
What's next?

- Protected space
- More students
- Opportunity
- Light weight
What’s next?

- Protected intersections can increase comfort and safety for all users
- More study needed (NCHRP 15-63)
- Opportunities exist within right-of-way
- Light-weight/tactical implementation

Thank you!

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