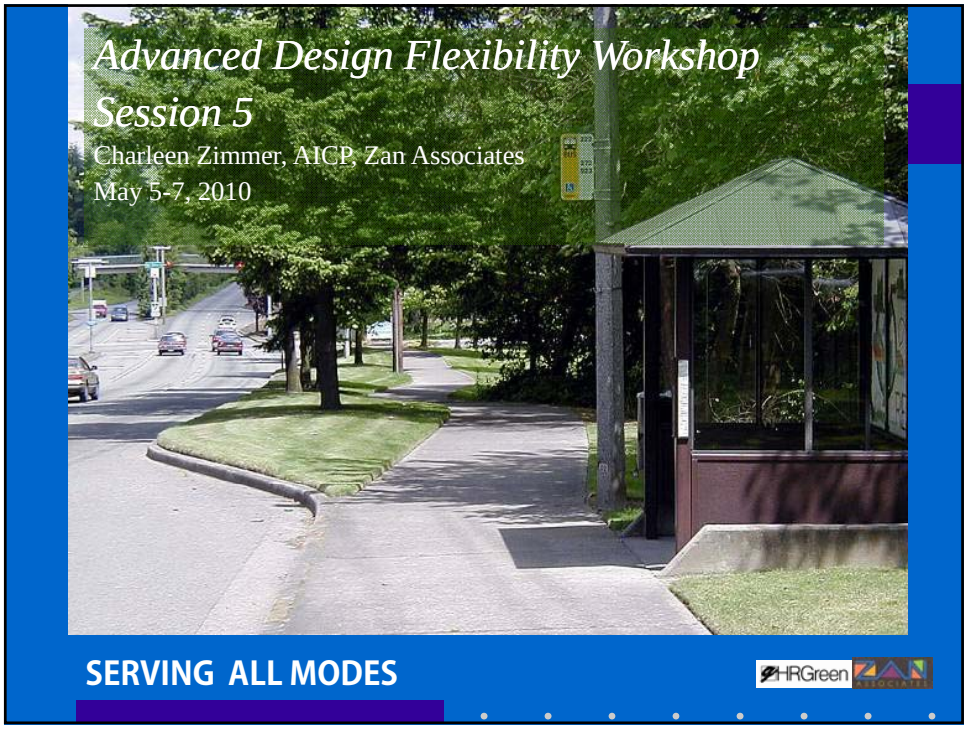

Advanced Design Flexibility Workshop
Session 5
Charleen Zimmer, AICP, Zan Associates
May 5-7, 2010
SERVING ALL MODES
HRGreen


What Is a Complete Street?

Not a Complete Street

More of a Complete Street

Benefits of Complete Streets

- Safety for all modes
- Mobility and access
- Health
- Transportation capacity
- Economic activity and property values
- Quality of life

National Complete Streets Status

2000 US DOT Guidance:

Bicycling and walking facilities will be incorporated into all transportation projects unless exceptional circumstances exist

Few jurisdictions embrace or follow this guidance

Complete Streets Status in Minnesota

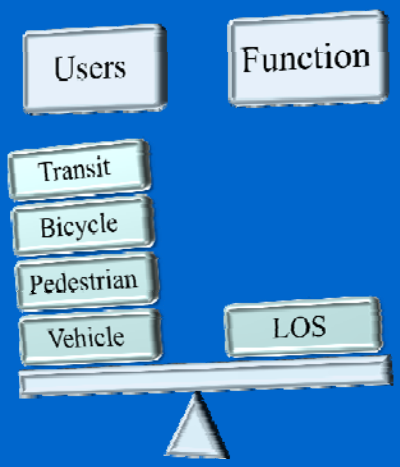
- HF 3800 passed in May 2008
- Feasibility and cost-benefit
- Mn/DOT report to Legislature in December 2009
- Legislation currently pending
- Hennepin, Ramsey and Carver Counties and cities of Rochester and Duluth have developed formal policies

Accommodating All Modes

- All users should receive attention in the design process for all projects
- Many decisions must be made early in the planning and design process
- But, many detailed design issues arise later in the design process

Consider Level of Service for All

- Pedestrians
- Bicyclists
- Vehicles
  - Trucks
  - Cars
  - Transit Vehicles
- Transit Users
- Parking



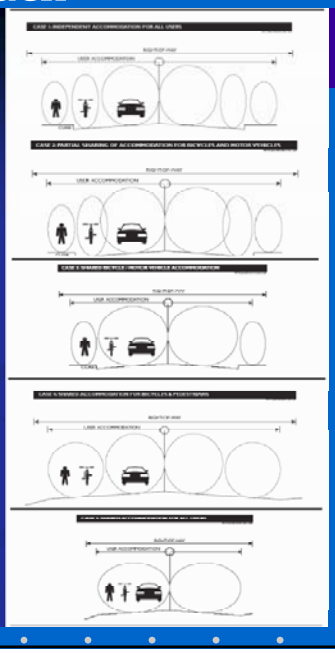
Same Needs – Different Solutions

	Interstate	Rural Highway	Urban Arterial	Local Road
				
	Peak Period LOS	Mobility	Mobility and Peak Period LOS	Local Access
	Overpass Crossings	Shoulder Operations	Sidewalks and Crosswalks	Sidewalks
	Shoulder Operations	Park-n-Ride Lots	Bus Shelter	Bus Stop
	Overpass Crossings	Shoulder Operations or Trail	On-Street Bike Lanes or Multi-Use Trail	Share the Road
	Grade Separation	At- Grade or Grade Separation	At- Grade or Grade Separation	At- Grade

Massachusetts Approach

Chapter 5 Cross-Section: Flexible Multimodal Accommodation Approaches

- Descriptions have been developed for the cases :
  - Case 1: Independent Accommodation
  - Case 2: Partial Bicycle/MV Sharing
  - Case 3: Bicycle/MV Sharing
  - Case 4: Pedestrian/Bicycle Sharing
  - Case 5: Shared by All Users



Be Aware Of:

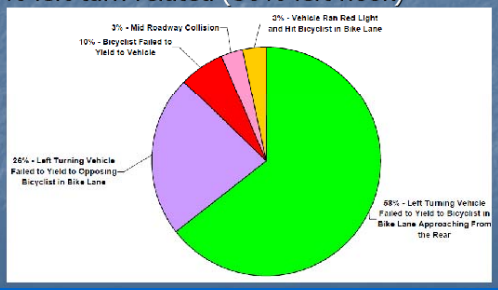
- ADA requirements
- Modal priorities and space allocation
- Pedestrian and/or bicycle crashes
- Access to transit
- Modal conflicts
- Pedestrian/bicycle volumes
- Quality of walking environment

Hennepin Avenue – Before

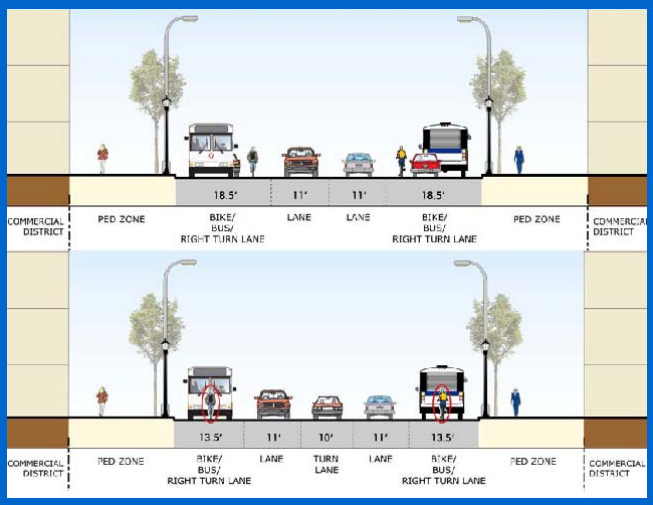
Hennepin Ave – crash data

Safety – Existing Crash Data

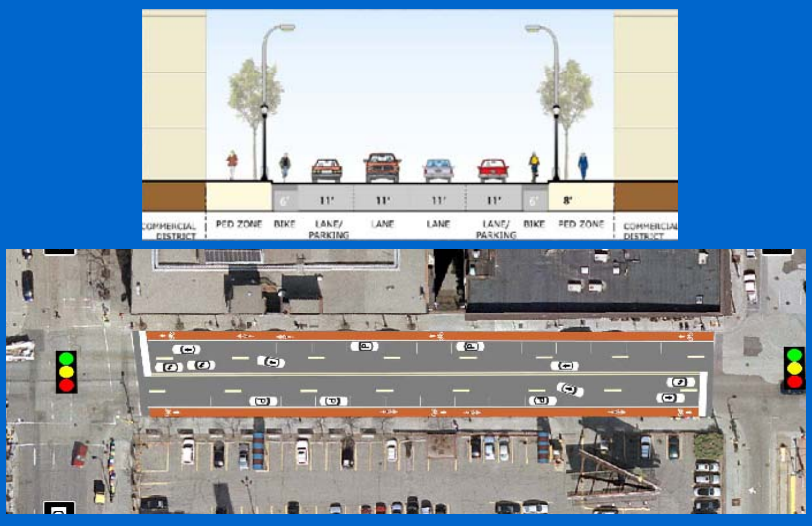
- 31 of 38 recorded bicycle crashes located between 12th St and 1st St
- 84% left turn related (56% left hook)



Hennepin Avenue - After



1st Avenue - After



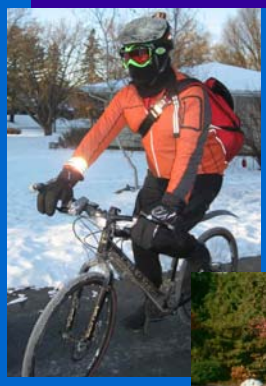
1st Avenue - Bike Boxes

Transit Characteristics

- Frequency/loadings
- Pedestrian & bicycle access
- Safety and personal security
- Lighting
- Near and farside stops
- Signal preemption
- Shelter design and maintenance

Snow Removal Is a Big Issue

Bicyclist Characteristics



Urban Bikeway Design

Table 4-1: Bikeway Design Selection for Urban (Curb and Gutter) Cross Section – English Units

Motor Vehicle ADT (2 Lane)		<500	500-1,000	1,000-2,000	2,000-5,000	5,000-10,000	>10,000
Motor Vehicle ADT (4 Lane)		N/A	N/A	2,000-4,000	4,000-10,000	10,000-20,000	>20,000
Motor Vehicle Speed	25 mph	SL	WOL	WOL	WOL	BL = 5 ft	Not Applicable
	30 mph	SL with sign	WOL	BL = 5 ft	BL = 5 ft	BL = 6 ft	BL = 6 ft
	35 - 40 mph	WOL	BL = 5 ft	BL = 5 ft	BL = 6 ft	BL = 6 ft	BL = 6 ft or PS = 8 ft
	45 mph and greater	BL = 5 ft	BL = 5 ft	BL = 6 ft	BL = 6 ft	BL = 6 ft or PS = 8 ft	SUP or PS= 10 ft

BL = Bicycle Lane, SL = Shared Lane, WOL = Wide Outside Lane, SUP = Shared-Use Path, PS = Paved Shoulder

Source: Mn/DOT Bikeway Facility Design Manual

Snow Removal

Pedestrian Characteristics

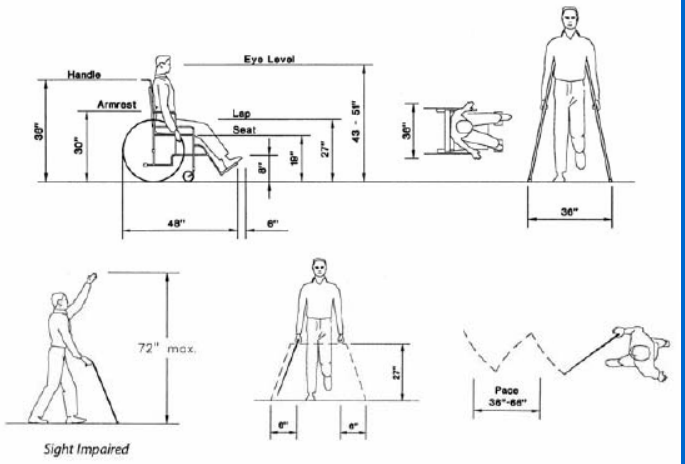


Figure 5. Spatial dimensions for people with disabilities (4).

Pedestrians with Walking Difficulty

- Older people
- Children
- Persons with disabilities
  - Physical
    - Wheelchair (manual, motorized or scooters)
    - Walkers, crutches, canes
  - Visual
    - Low vision
    - Blind (cane or guide dog)
  - Hearing
  - Cognitive

Pedestrian Networks: Common Problems

- Missing sidewalks
- Unusually long blocks
- Natural barriers
- Freeways
- Other barriers

Pedestrian Networks: Best Practices

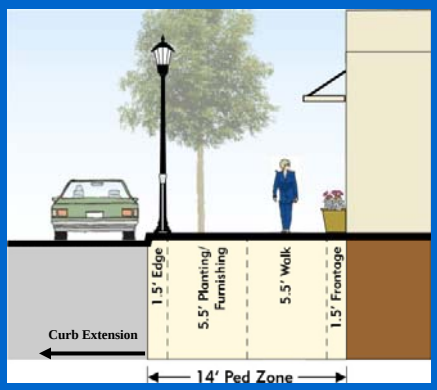
- Sidewalks on both sides of every street
- Pedestrian “short-cuts” through unusually long blocks
- Small blocks where new streets are constructed
- Maintaining the street grid across barriers
- Bridges

Sidewalk Corridors: Common Problems

- Insufficient width for people and all the other "stuff"
- Too close to moving traffic for comfort
- No space for trees and street furniture
- Street furniture obstructs direct walking path
- Narrow corridors are even narrower with snow

Sidewalks: Best Practices

- Zone system with minimum widths

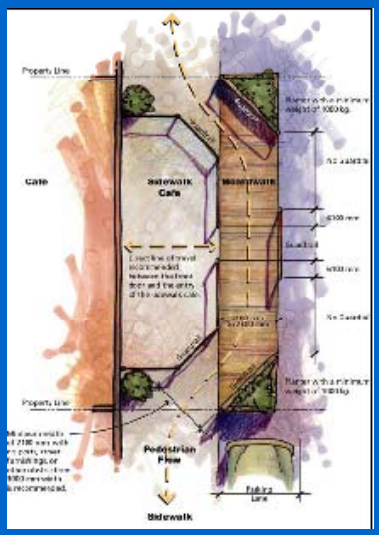


Minimum acceptable width: 12 feet

Best practices: Curb extensions

- Use curb extension to maximize space for desired elements
- Especially where sidewalk corridor is less than 12 feet
- Transit shelters

Creative Uses of Parking Lane



Bridges: Common Problems

- Narrow sidewalks
- Sidewalk on only one side
- Next to moving traffic (often higher speed)
- No adjacent land uses
- No “escape route”
- Matching into adjoining facilities
- Expensive to build and to modify

Bridges (and under): Best Practices

- Use same zone philosophy as for sidewalks
- Sufficient space for snow clearance equipment (jeep)
- On bridges connecting to off-street trails, sidewalks should be sufficiently wide to accommodate both pedestrians and bicycles
- Bridges should have pedestrian-scale lighting

Street Corners: Common Problems

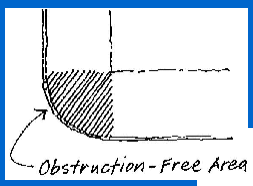
- Insufficient space for people, curb ramps and other "stuff"
- Curb ramp condition, placement and design
- Lack of obstruction-free area

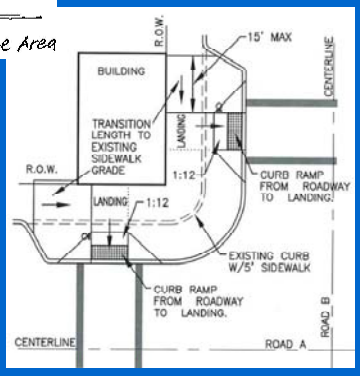
Curb Ramp Problems




Best Practice: Clear Corner Zones

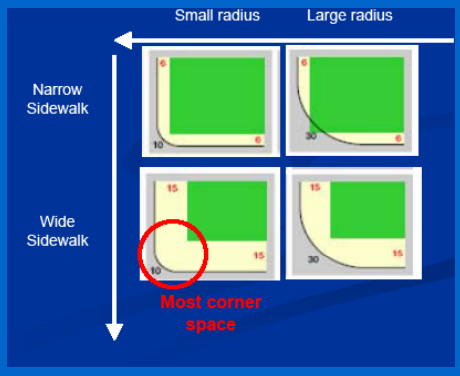
- No obstructions
  - Street furniture
  - Vegetation
  - Utilities
- Priority use: accessible ramps and pedestrian call buttons at signals





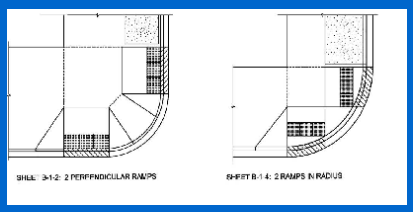
Best Practice: Small Corner Radius

- Particularly on narrow sidewalks
- More space for two perpendicular curb ramps
- Better aligns sidewalk, curb ramp and crosswalk
- Slows the speed of turning vehicles
- Shortens crossing



Best Practice: Curb Ramp Design

- 2 ramps per corner
- Avoid diagonal ramps
- No steep slopes
- Align with sidewalk and crosswalk, while maintaining level landing
- Option – returned edge next to planted boulevard
- Easier for snow removal



Street Crossings: Common Problems

- Wide crossings
- Poor visibility
- Turning vehicle conflicts
- Speeding vehicles
- Faded crosswalk markings

Lane Width Trade-Offs

- Wider lanes:
  - allow for higher speeds
  - reduce lane departure crashes
- Narrower lanes:
  - reduce right-of-way needs
  - lessen pedestrian crossing time

Best Practices: Crosswalks

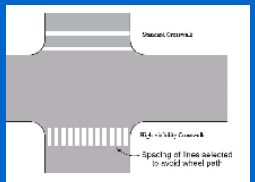


Figure 10.5.2: Standard (Transverse) and High-visibility (Longitudinal) crosswalks

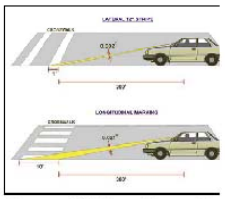


Figure 10.5.3: Crosswalk Visibility for Drivers.

Best Practices: Refuge Islands

- Provides space to enable pedestrian crossings one direction at a time
- Reduces vehicle speeds
- Provides better placement for signal poles

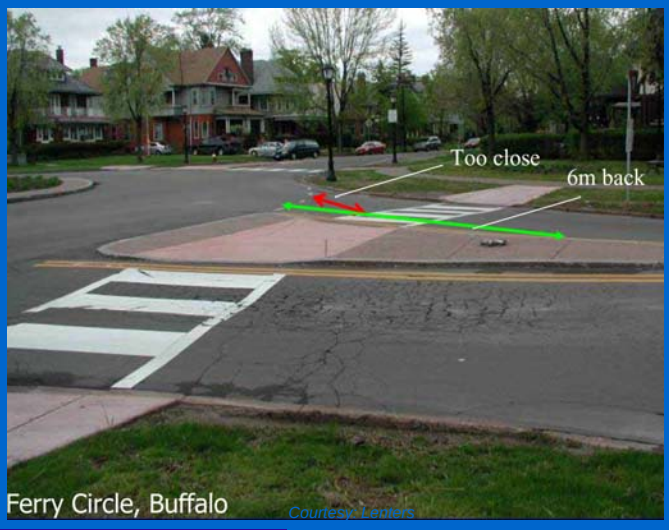
Figure 10.5.12: Median island with angled path to steer pedestrians toward oncoming traffic. *Source: Guide for the Planning, Design, and Operation of Pedestrian Facilities, AASHTO.*

Best Practices: Pedestrian Signals

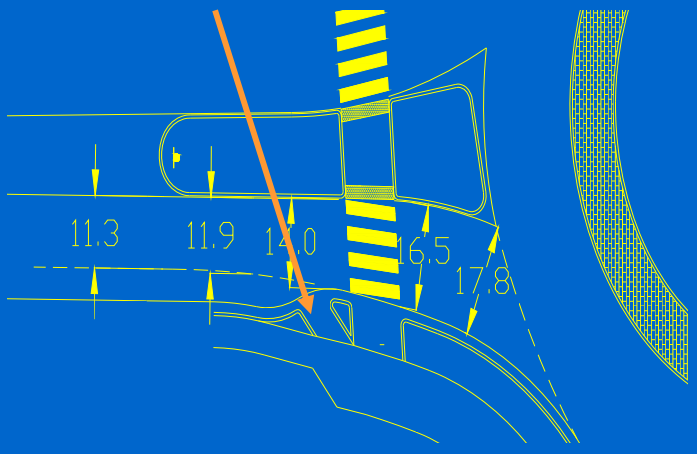
- Designs that clearly communicate available crossing time
- Accessible push buttons with clear indication of crossing direction
- Mn/DOT policy – APS on all new signals

Roundabouts – Ped/Bike Challenge

Cross Walk Location



Bike Ramp Design



45° angle; short taper, located in taper

Cyclists Can Choose

Example: Excelsior Blvd.

- 11 foot lanes – no shoulders
- 35 mph
- Turn lanes store 2 vehicles
- Tapers 10:1 on turn lanes; 5:1 for parking bays
- Crash reduction over 55%

Example: Excelsior Blvd.

- Landscaped median
- Access management
- Pedestrian amenities
- Transit oriented development

Example: Excelsior Blvd.

- Curb extensions for ped crossings
- 8 foot parking bays
- Mix of near side and far side transit stops
- Wider boulevards

Exercise