Practical Implementation Strategies

Local Planning & Design for Active Transportation

Outline

- Introduction
- Local Planning
  - ✓ Pedestrian Environments
  - ✓ Bicycling & Non-Motorized Systems
- "Intermodal" Examples

3 Popular Planning Myths

…and how to dispel them

We don't have time to do it right.

(But we will have time to do it over.)

Planning Myths

We need to finish this plan once and for all.

Planning Myths

Planning is iterative…

…it is never finished or complete.

Charlier Associates, Inc.

Never start planning or design until you know for sure you have the money to build the project.

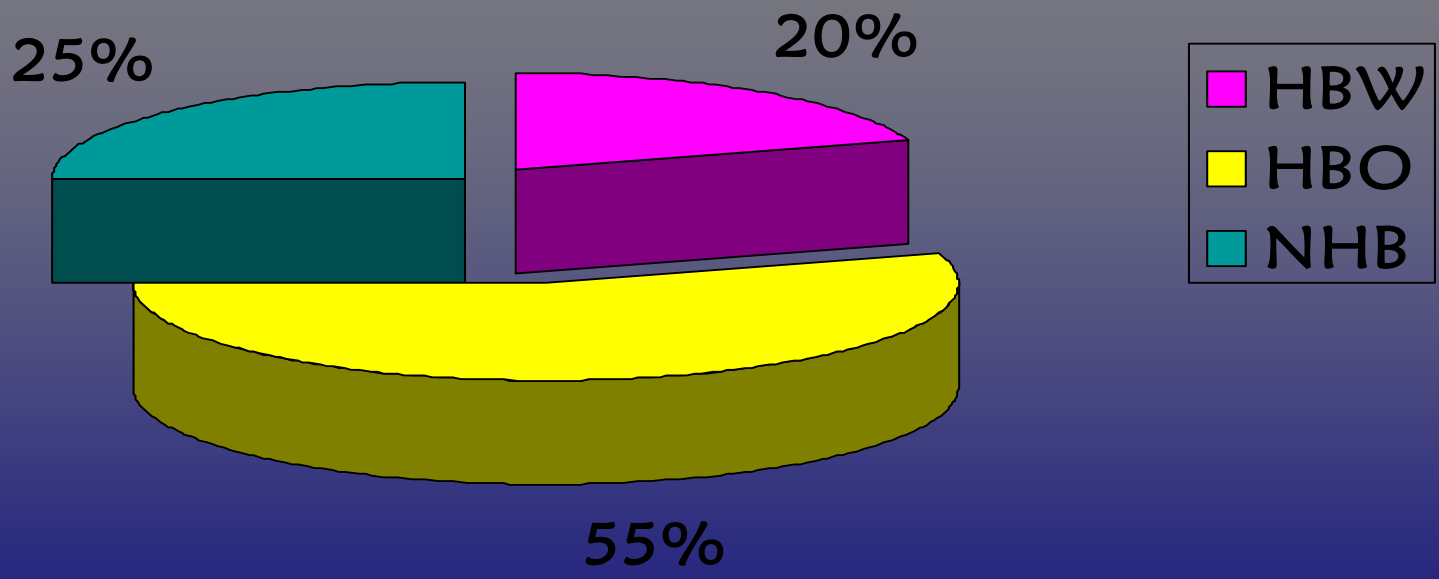
Money comes to plans…

…much faster than plans come to money.

Terms and Concepts

- Trip purpose
- Travel mode

Typical Urban Trip Purpose Distribution

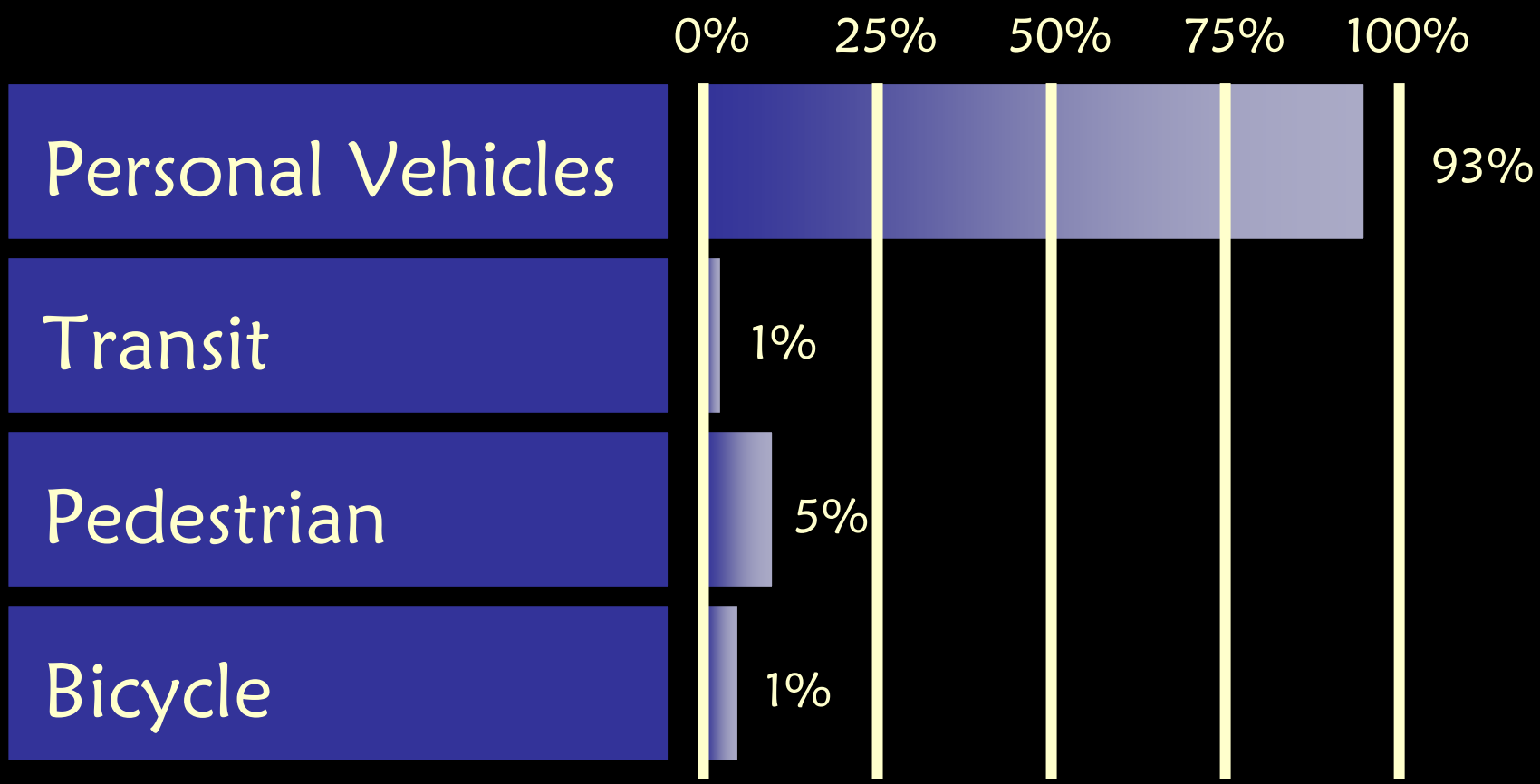


HBW = Home-Based Work (Commuting)

HBO = Home-Based Other (Shopping, Recreation, “Mommy 500”)

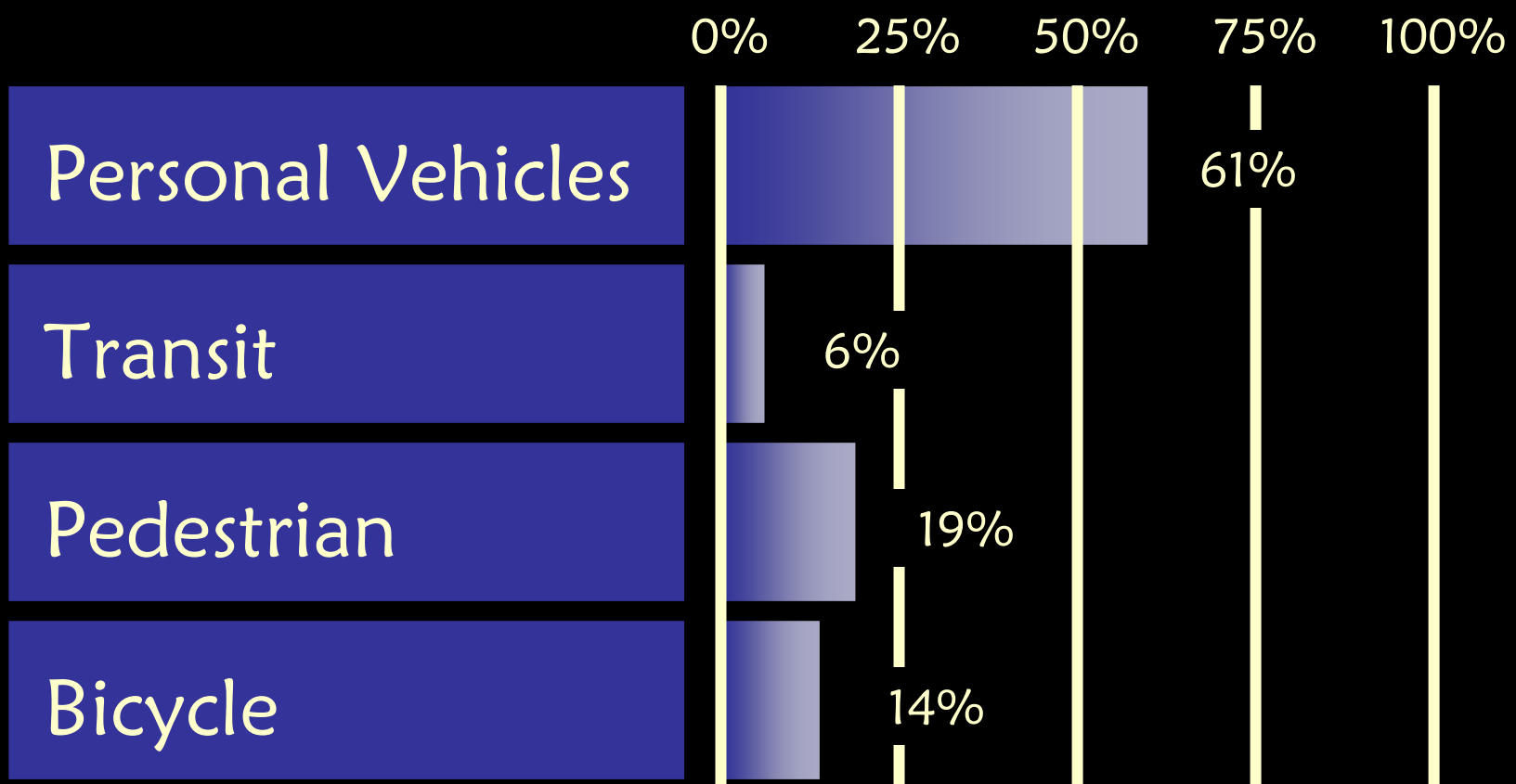
NHB = Mid-Day Trips, Deliveries, Work Trips, Other

Mode Share* – Typical Small City



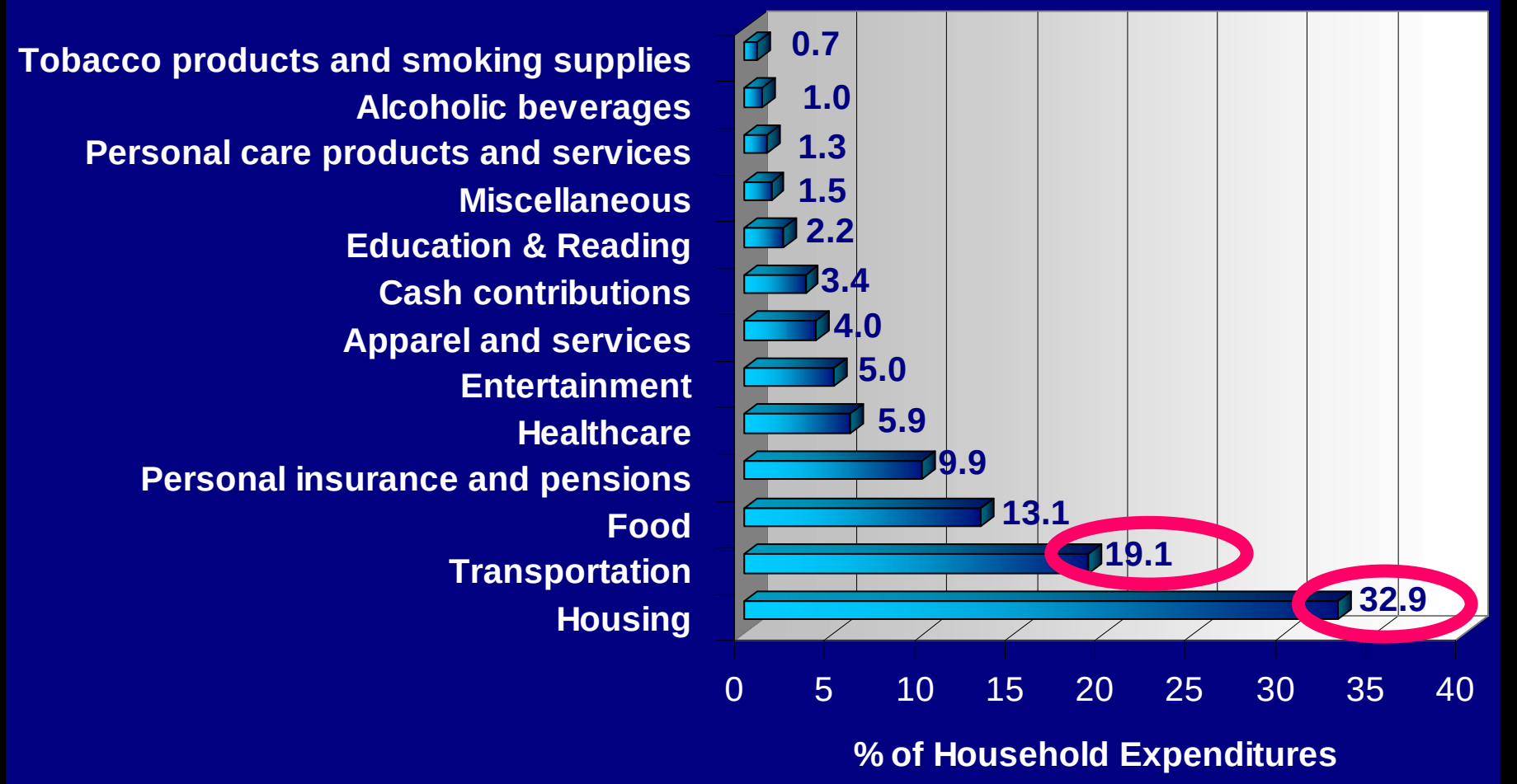
* % of trips

Mode Share* – Boulder



* % of trips

Household Expenditures



Three Car Family

	Mom	Dad	Daughter
Monday	SOV	SOV	SOV
Tuesday	SOV	SOV	SOV
Wednesday	SOV	SOV	SOV
Thursday	SOV	SOV	SOV
Friday	SOV	SOV	SOV
Saturday	--	SOV	--
Sunday	varies	varies	varies

Two Car Family

	Mom	Dad	Daughter
Monday	SOV	Transit	SOV
Tuesday	SOV	SOV	Bike
Wednesday	SOV	Transit	SOV
Thursday	SOV	SOV	Bike
Friday	Bike	Transit	SOV
Saturday	--	SOV	--
Sunday	varies	varies	varies

Local Planning

- Pedestrian Environments
- Bicycle & Non-Motorized Networks

Pedestrian Environments

- What are pedestrians?
- Types of pedestrians
- Types of pedestrian environments
- Setting clear priorities
- Distinguishing urban from suburban design
- Understanding the crossings challenge
- Safe routes to school

Types of Walking

- Rambling
- Utilitarian Walking
- Strolling, Lingering
- Promenading
- Special Events

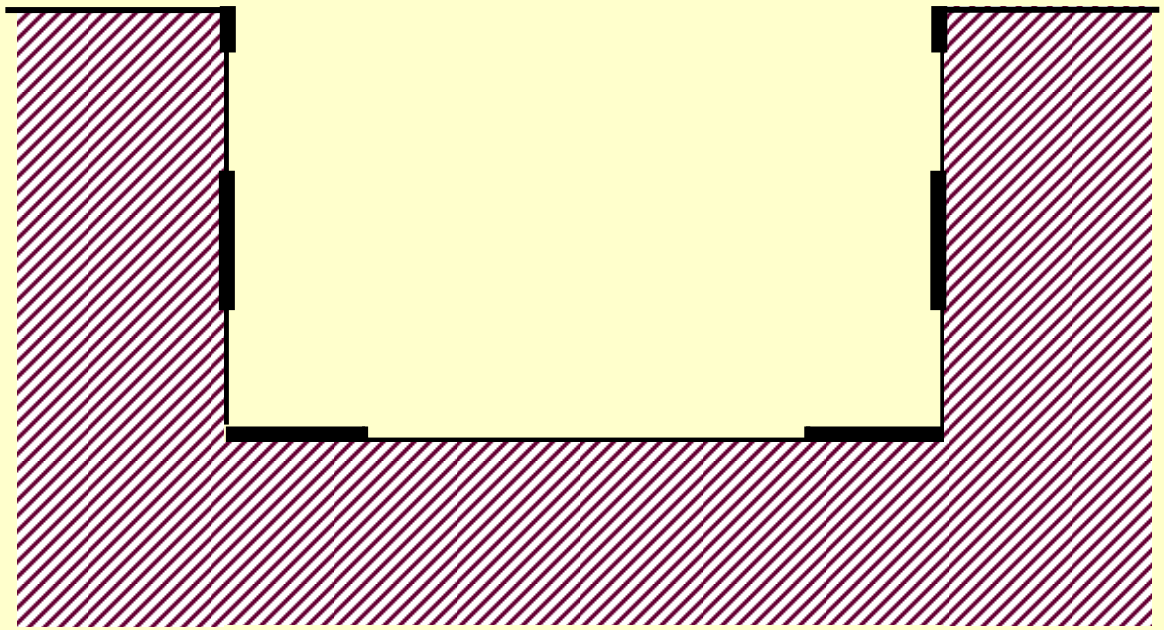
The Pedestrian Environment

The Street Room


Shoes
Club 21
Club 21
MILK
NO PARKING
ASSOCIATES

Elements of the Street

1. Street Wall
2. Pedestrian Realm
3. Overhead Area
4. Vehicle Realm
5. Subsurface Area



Elements of the Street

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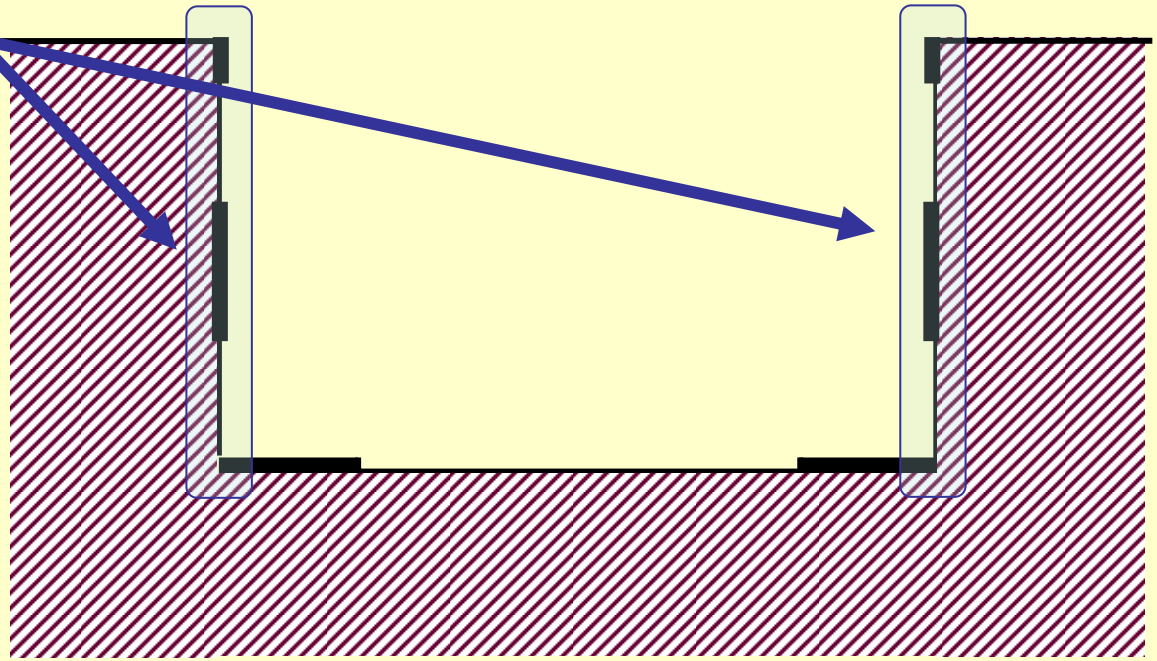

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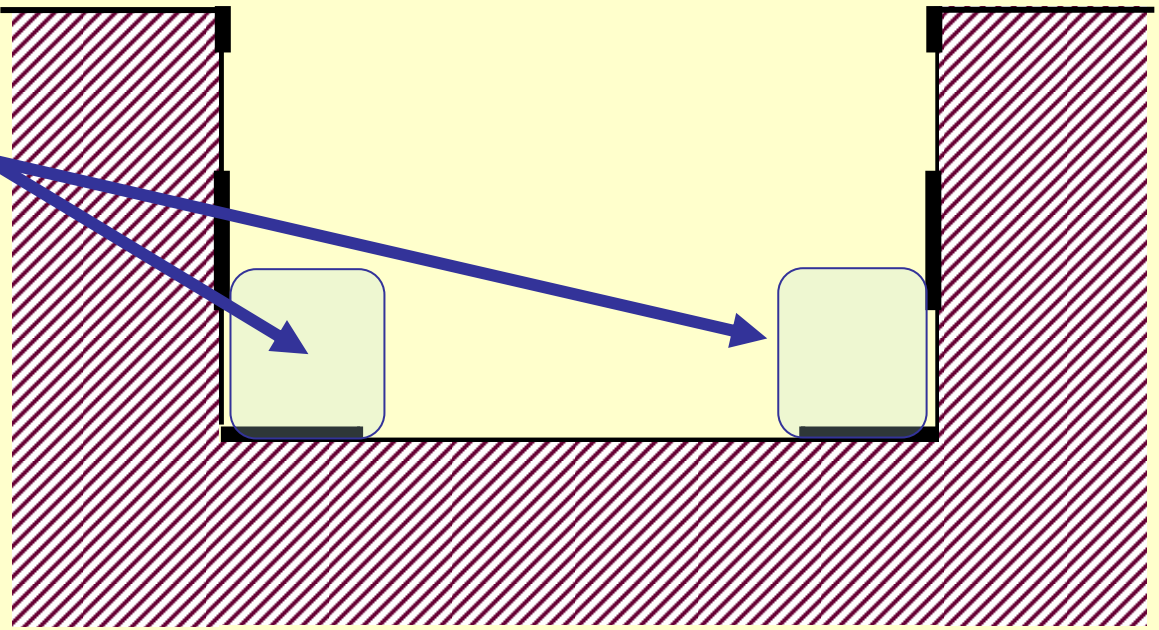

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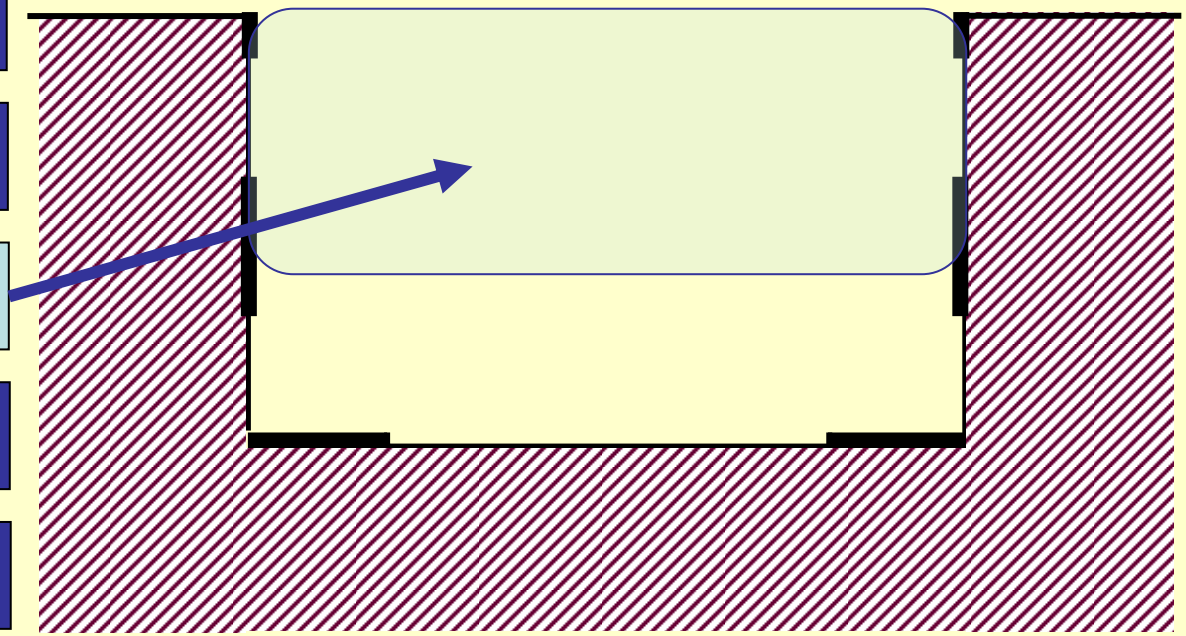

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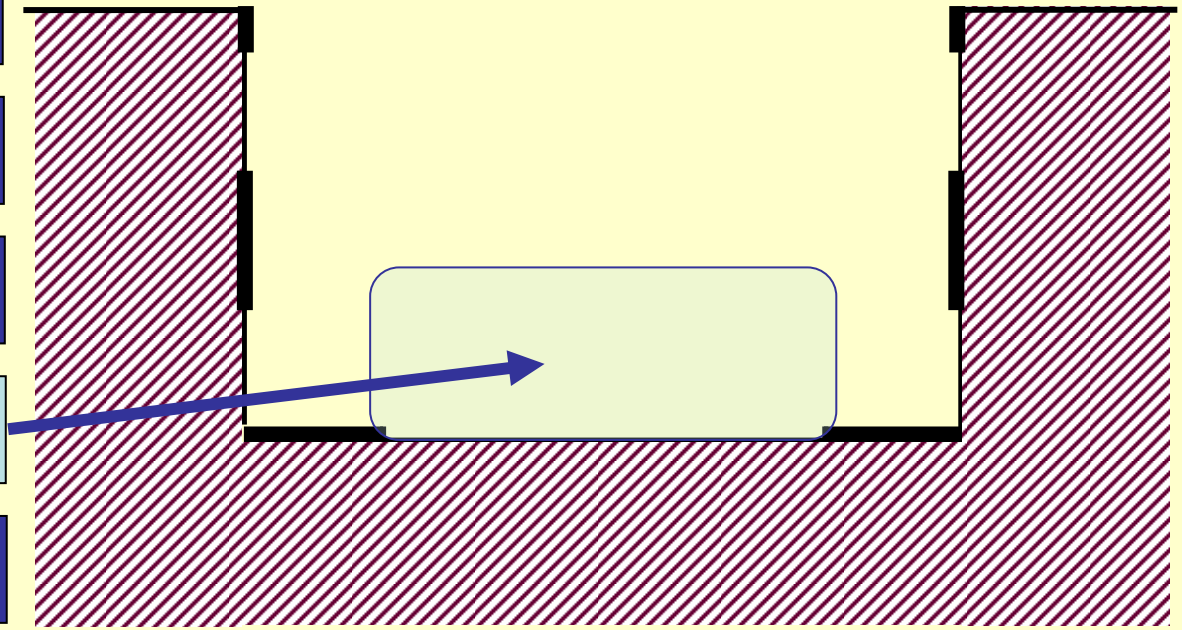

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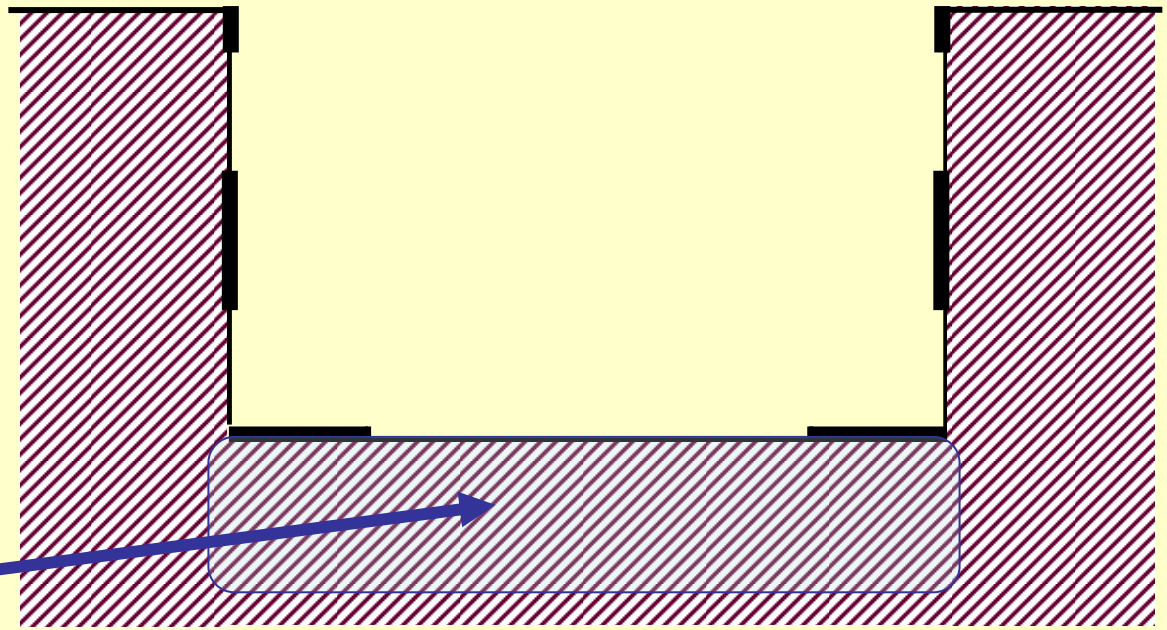
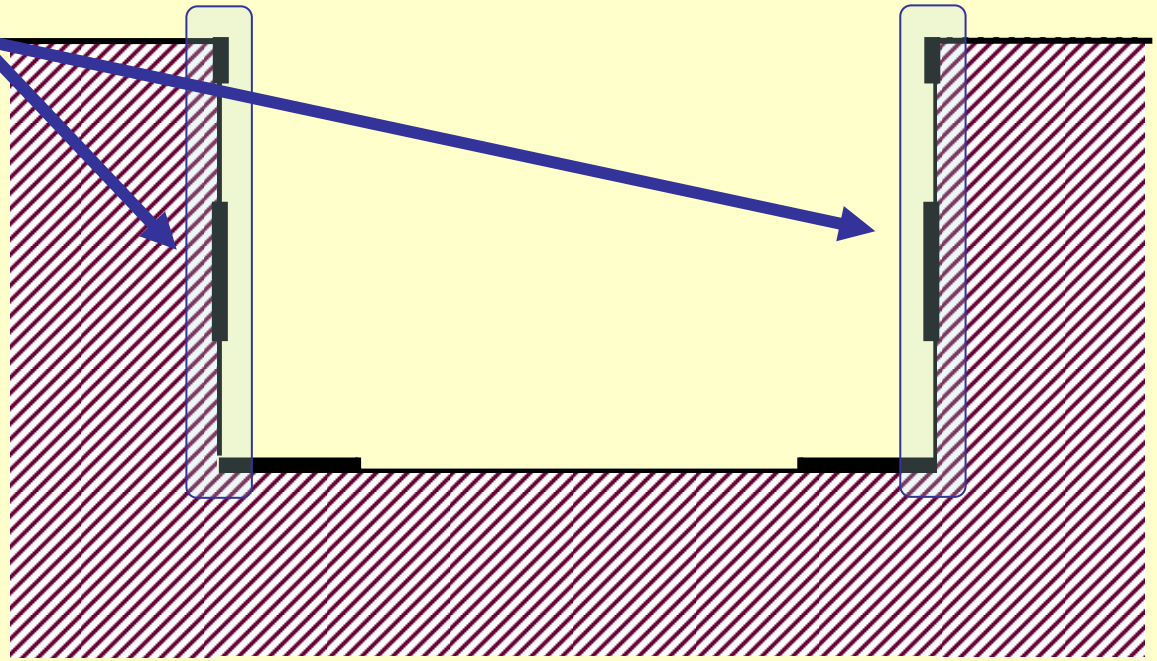


Characteristics of Street Elements

1. Street Wall

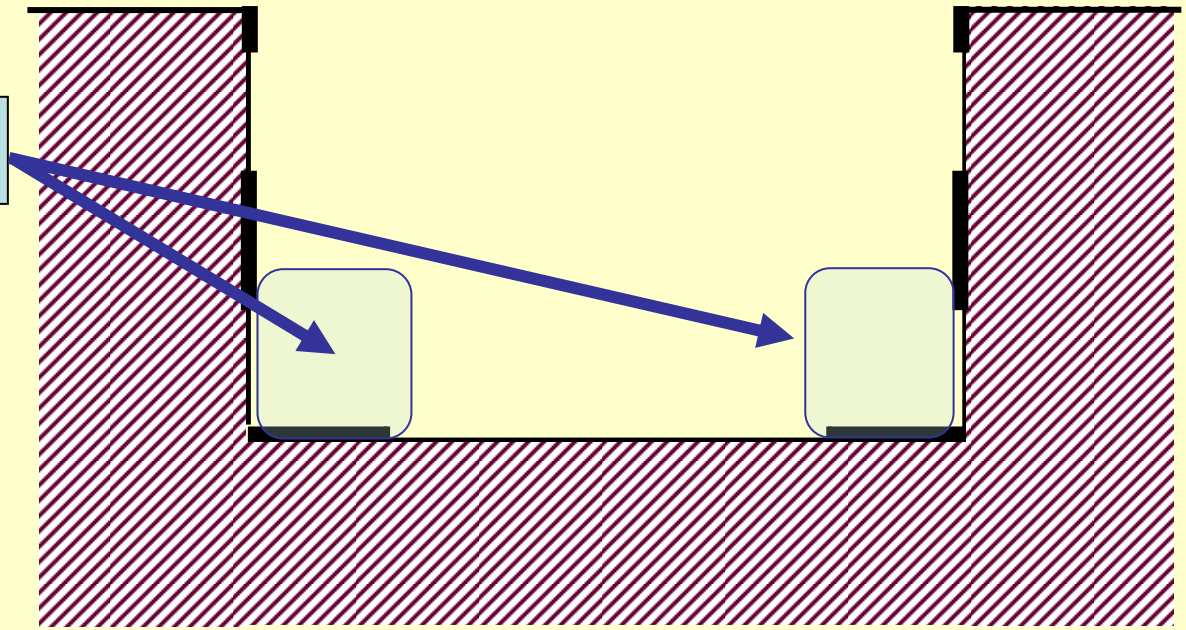


Characteristics:

Height	Building Articulation	Entry Frequency
Urban Scale	Transparency/Glazing	Canopies & Arcades

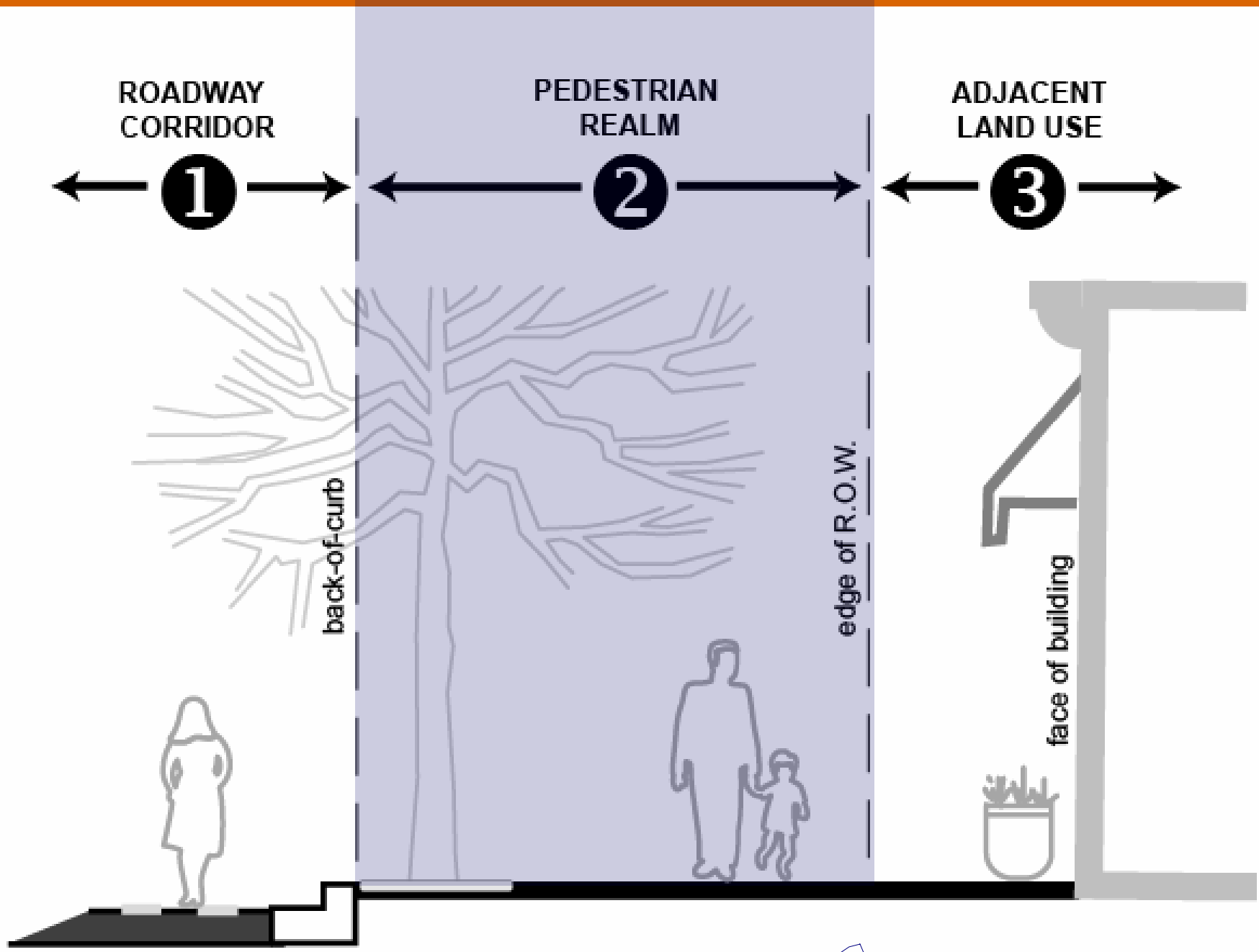
Characteristics of Street Elements

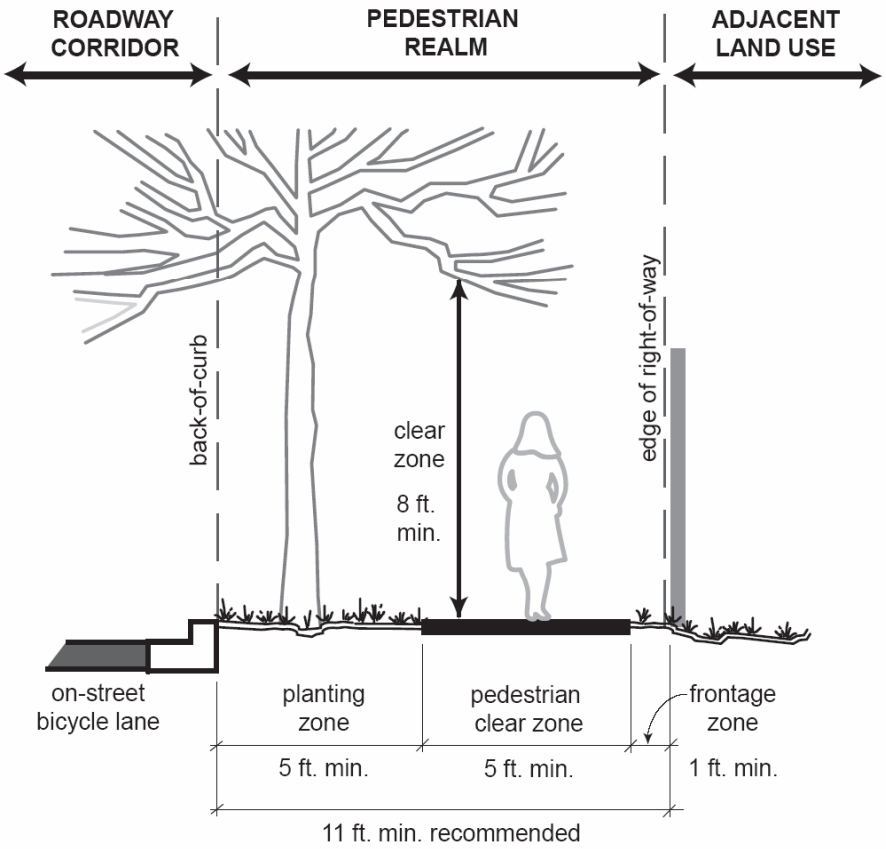
2. Pedestrian Realm

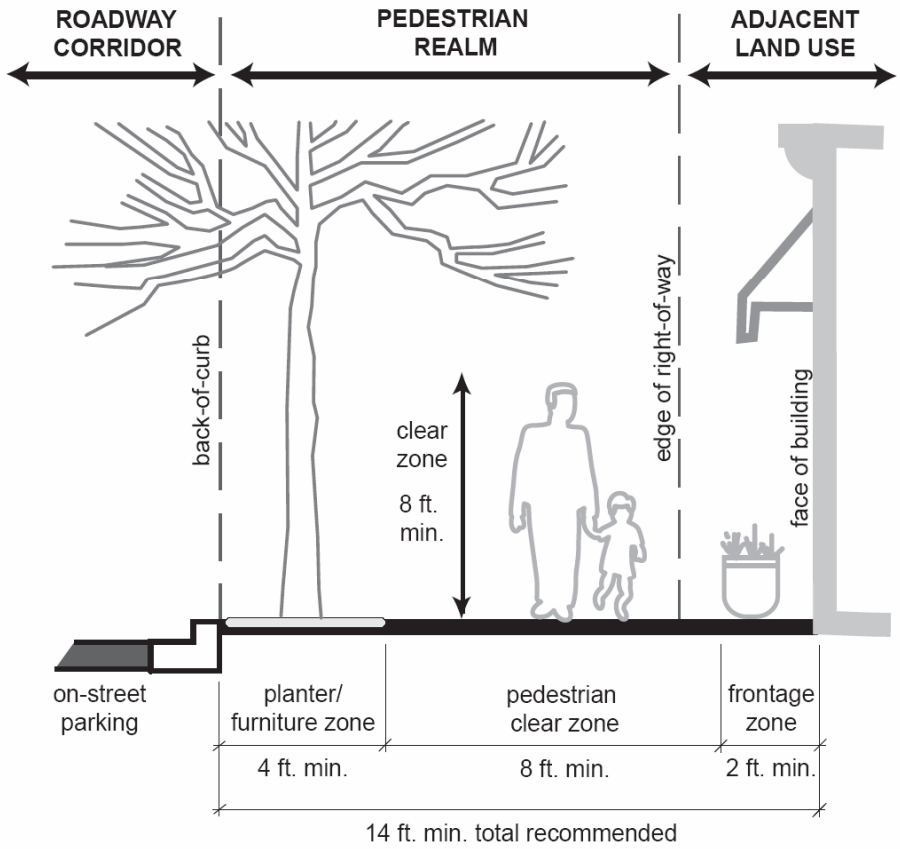


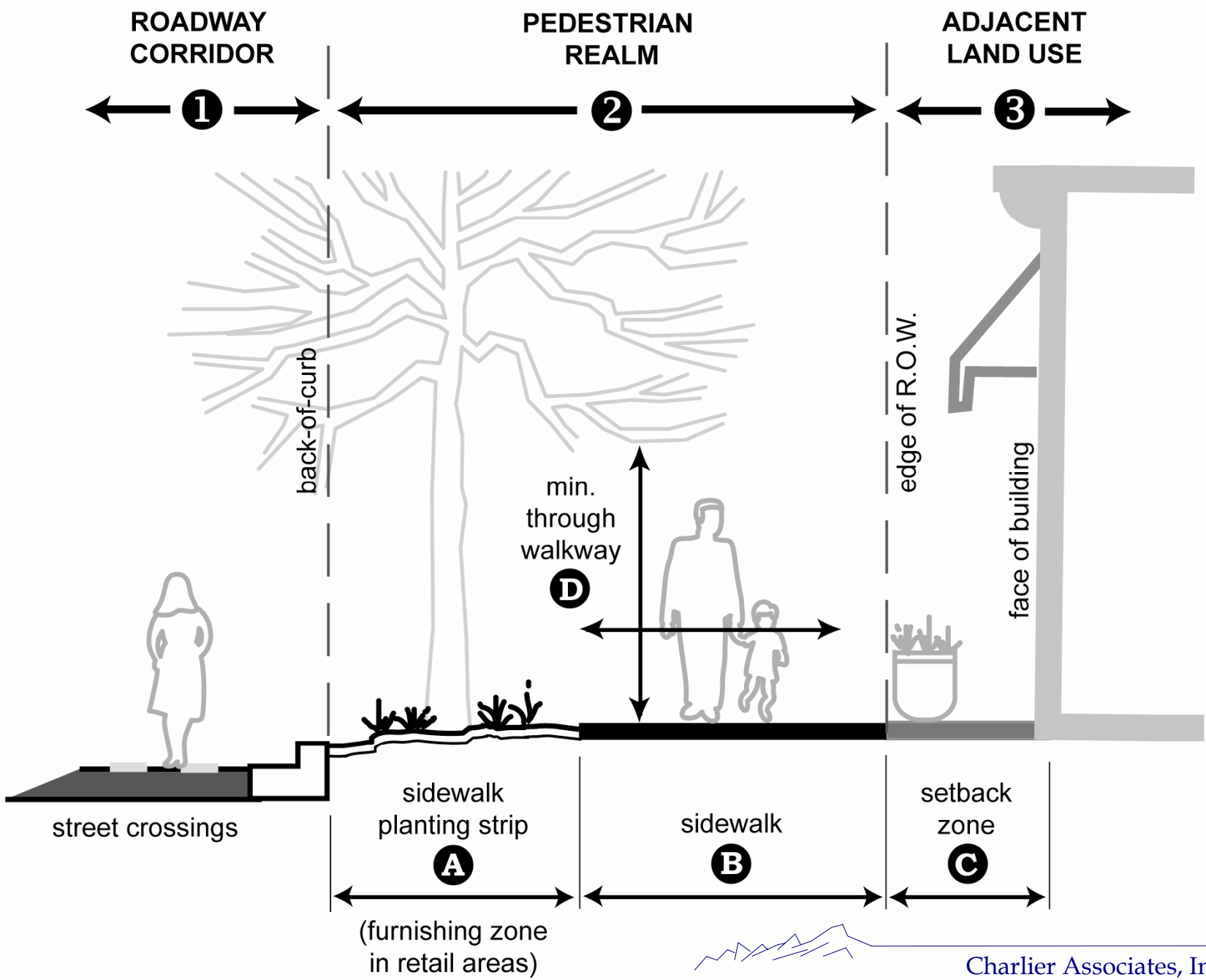
Characteristics:

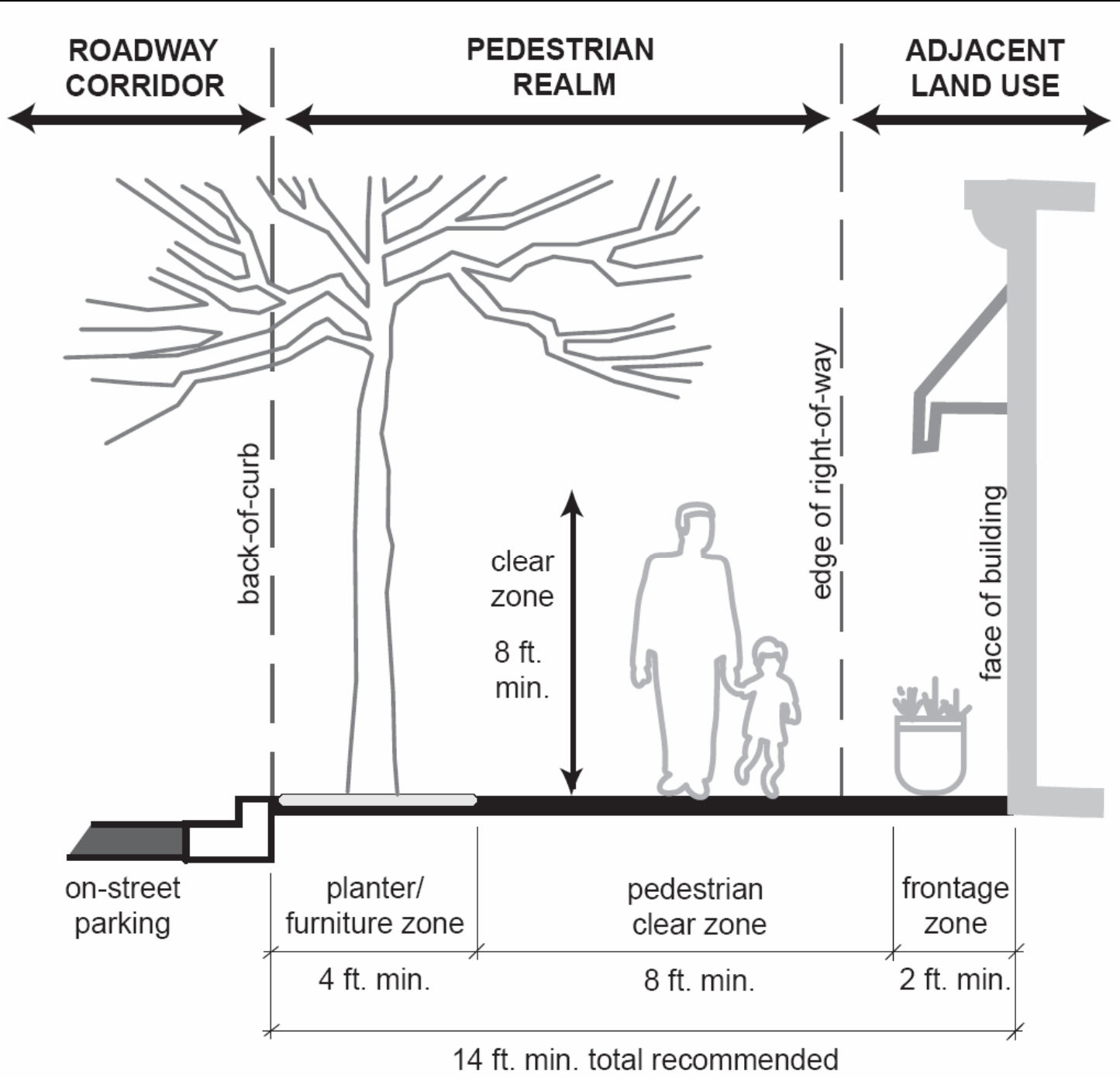
Cross Section	Amenities	Street Trees
Canopies & Arcades	Crosswalks	


ROADWAY CORRIDOR
1
PEDESTRIAN REALM
2
ADJACENT LAND USE
3
back-of-curb
edge of R.O.W.
face of building


ROADWAY CORRIDOR
PEDESTRIAN REALM
ADJACENT LAND USE
back-of-curb
clear zone
8 ft. min.
edge of right-of-way
on-street bicycle lane
planting zone
pedestrian clear zone
frontage zone
5 ft. min.
5 ft. min.
1 ft. min.
11 ft. min. recommended

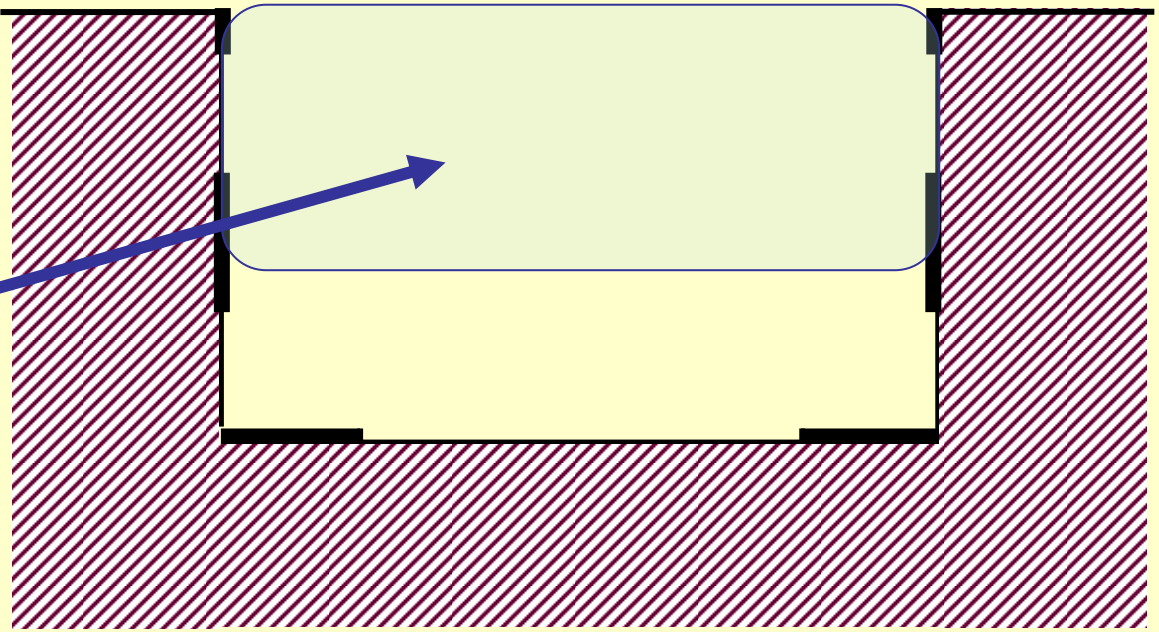

ROADWAY CORRIDOR
PEDESTRIAN REALM
ADJACENT LAND USE
back-of-curb
clear zone
8 ft. min.
edge of right-of-way
face of building
on-street parking
planter/ furniture zone
pedestrian clear zone
frontage zone
4 ft. min.
8 ft. min.
2 ft. min.
14 ft. min. total recommended


ROADWAY CORRIDOR
1
PEDESTRIAN REALM
2
ADJACENT LAND USE
3
back-of-curb
edge of R.O.W.
face of building
min. through walkway
D
street crossings
sidewalk planting strip
A
(furnishing zone in retail areas)
sidewalk
B
setback zone
C


ROADWAY CORRIDOR
PEDESTRIAN REALM
ADJACENT LAND USE
back-of-curb
clear zone
8 ft. min.
edge of right-of-way
face of building
on-street parking
planter/ furniture zone
pedestrian clear zone
frontage zone
4 ft. min.
8 ft. min.
2 ft. min.
14 ft. min. total recommended

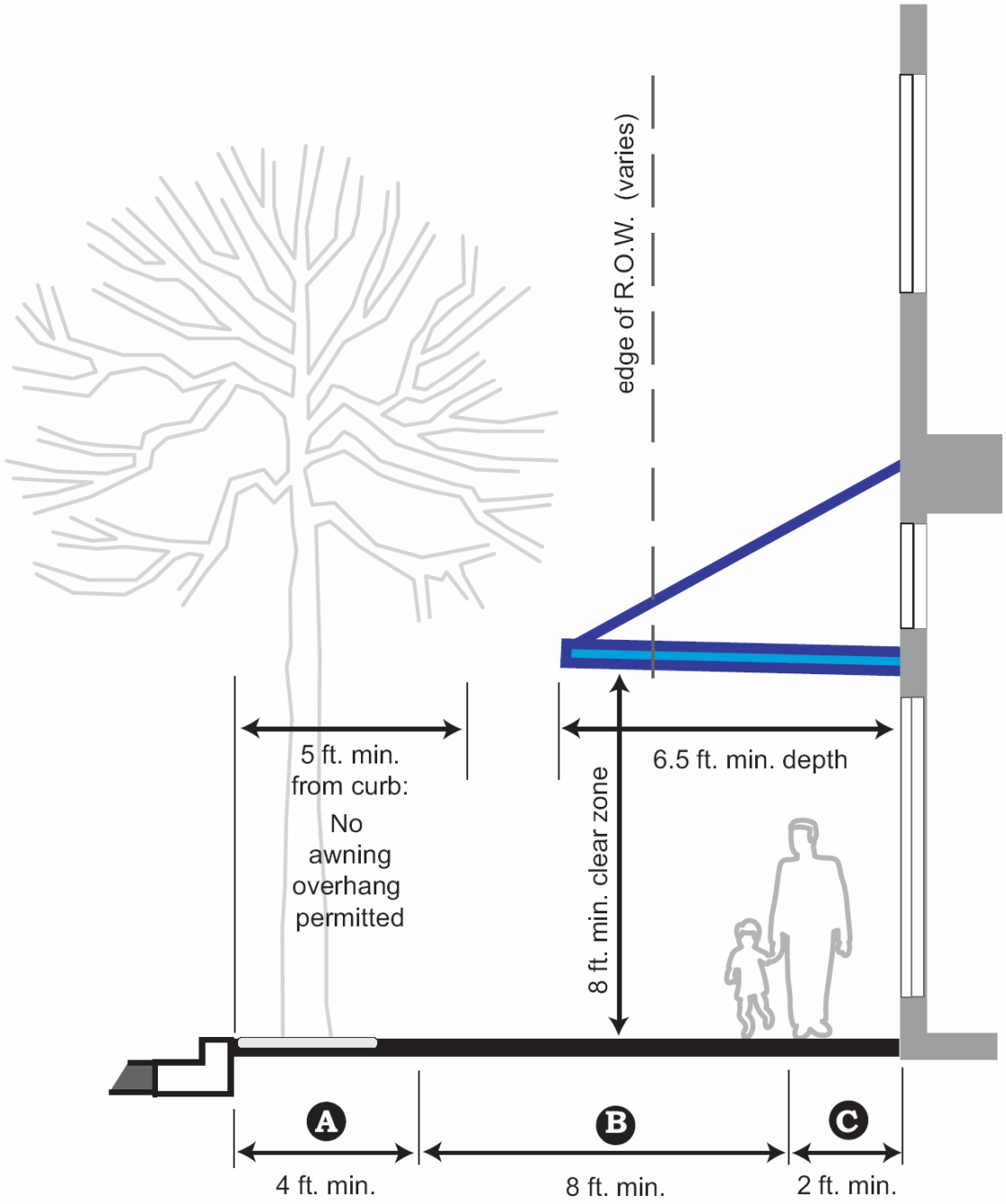
Characteristics of Street Elements

3. Overhead Area

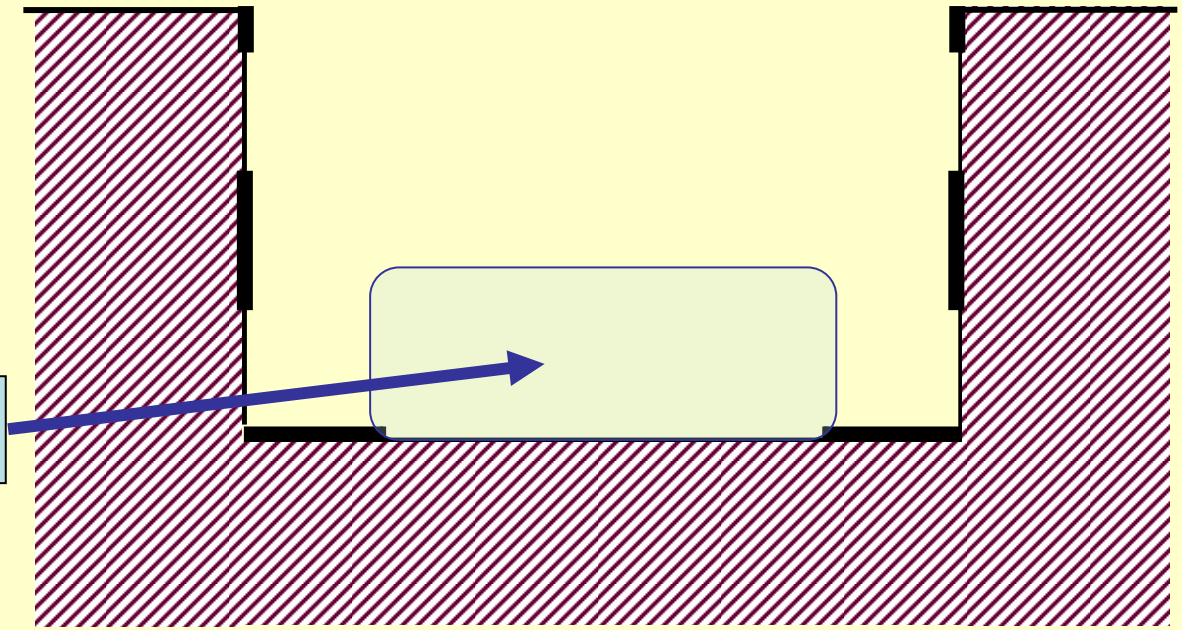


Characteristics:

- Utilities
- Street Trees
- Lighting
- Canopies & Arcades


edge of R.O.W. (varies)
5 ft. min.
from curb:
No
awning
overhang
permitted
6.5 ft. min. depth
8 ft. min. clear zone
A
B
C
4 ft. min.
8 ft. min.
2 ft. min.

Characteristics of Street Elements

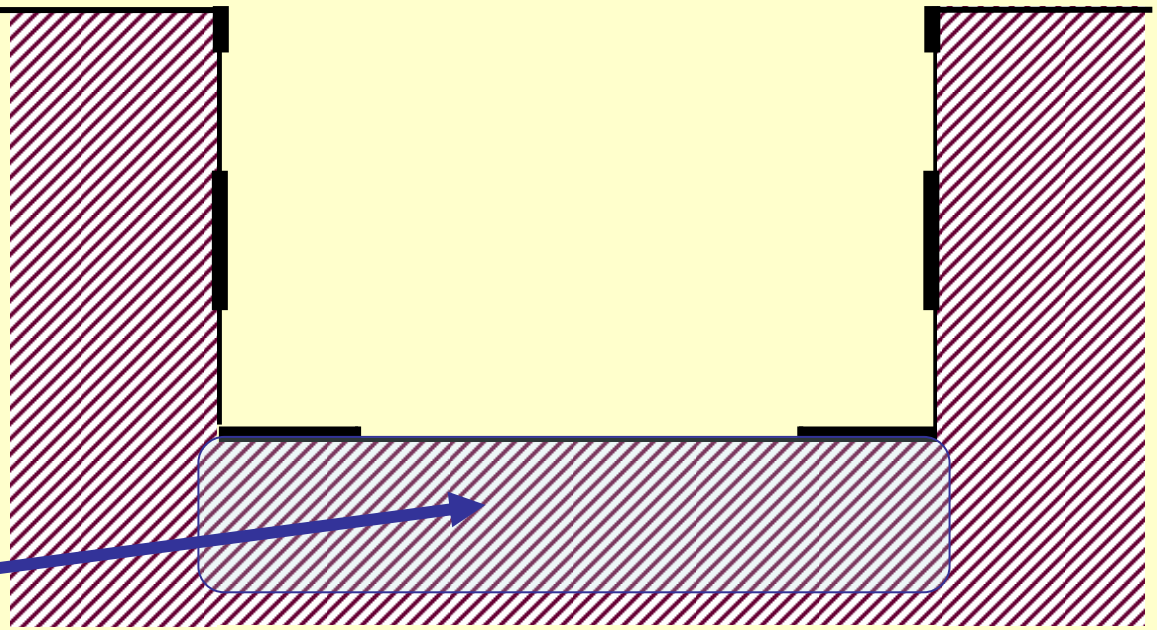


4. Vehicle Realm

Characteristics:

Number of Lanes	On-Street Parking	Traffic Volume
Lane Width	Traffic Speed	Traffic Control Systems

Characteristics of Street Elements



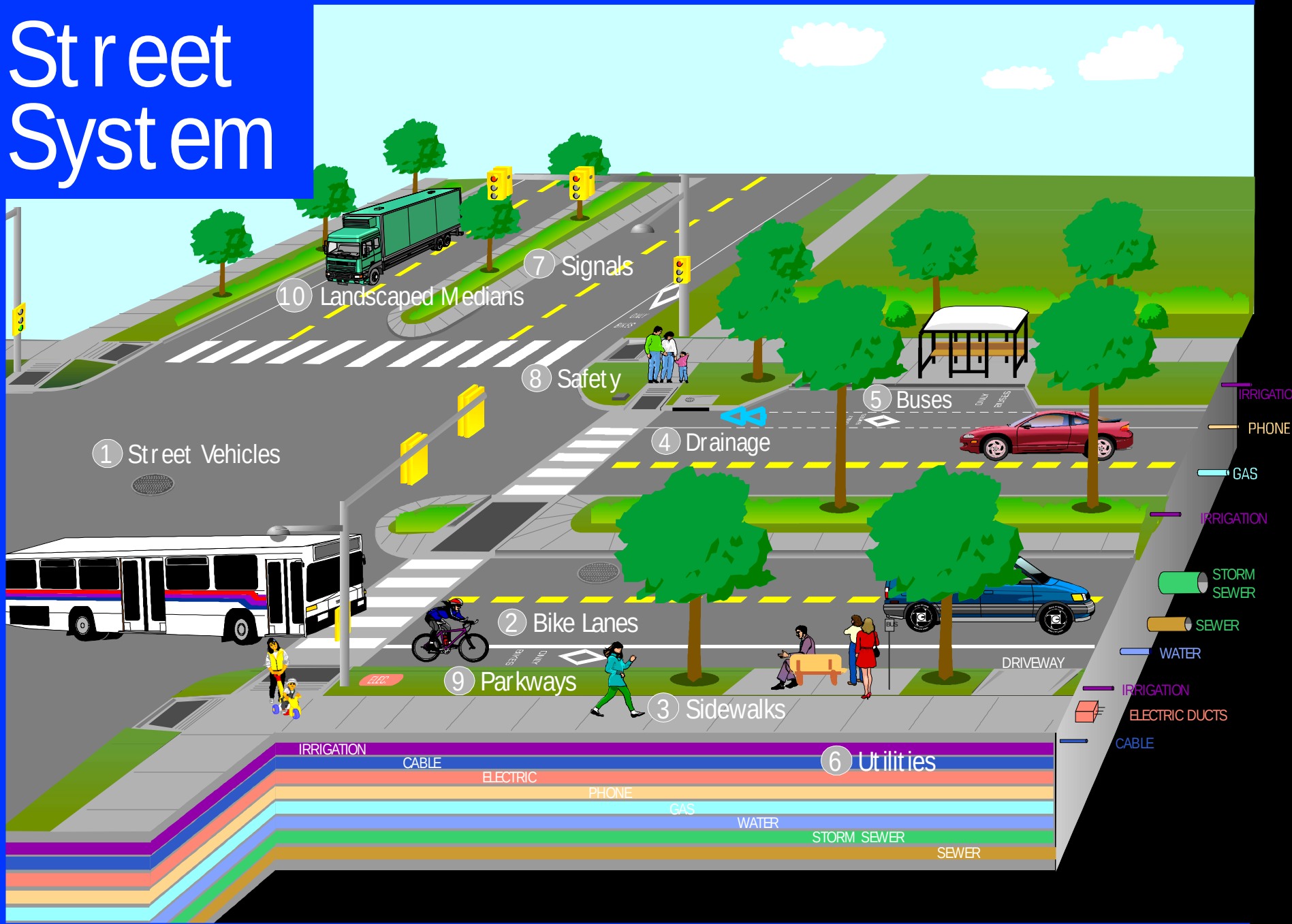
5. Subsurface Area

Characteristics:

Storm Water Drainage

Utilities

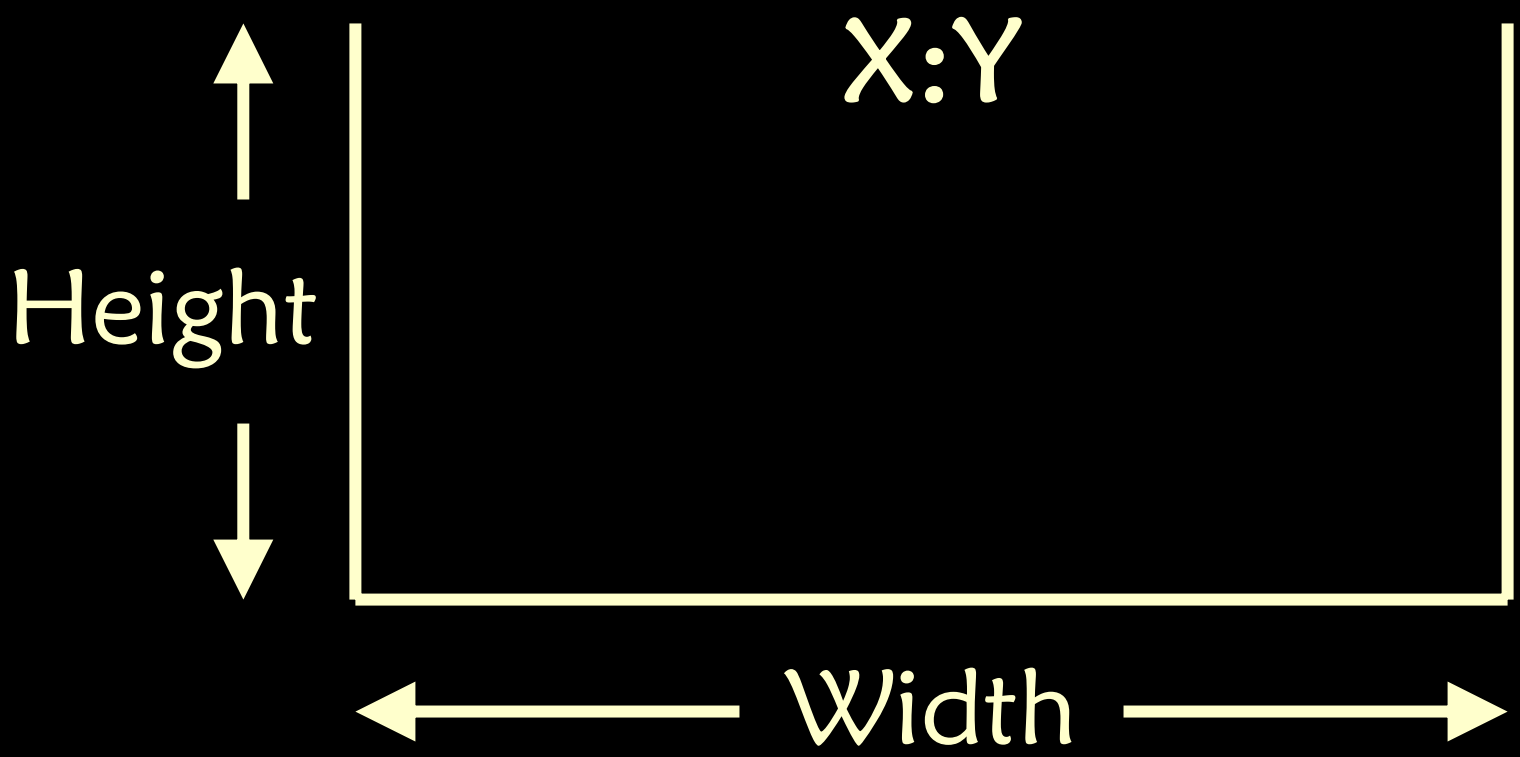
Street System



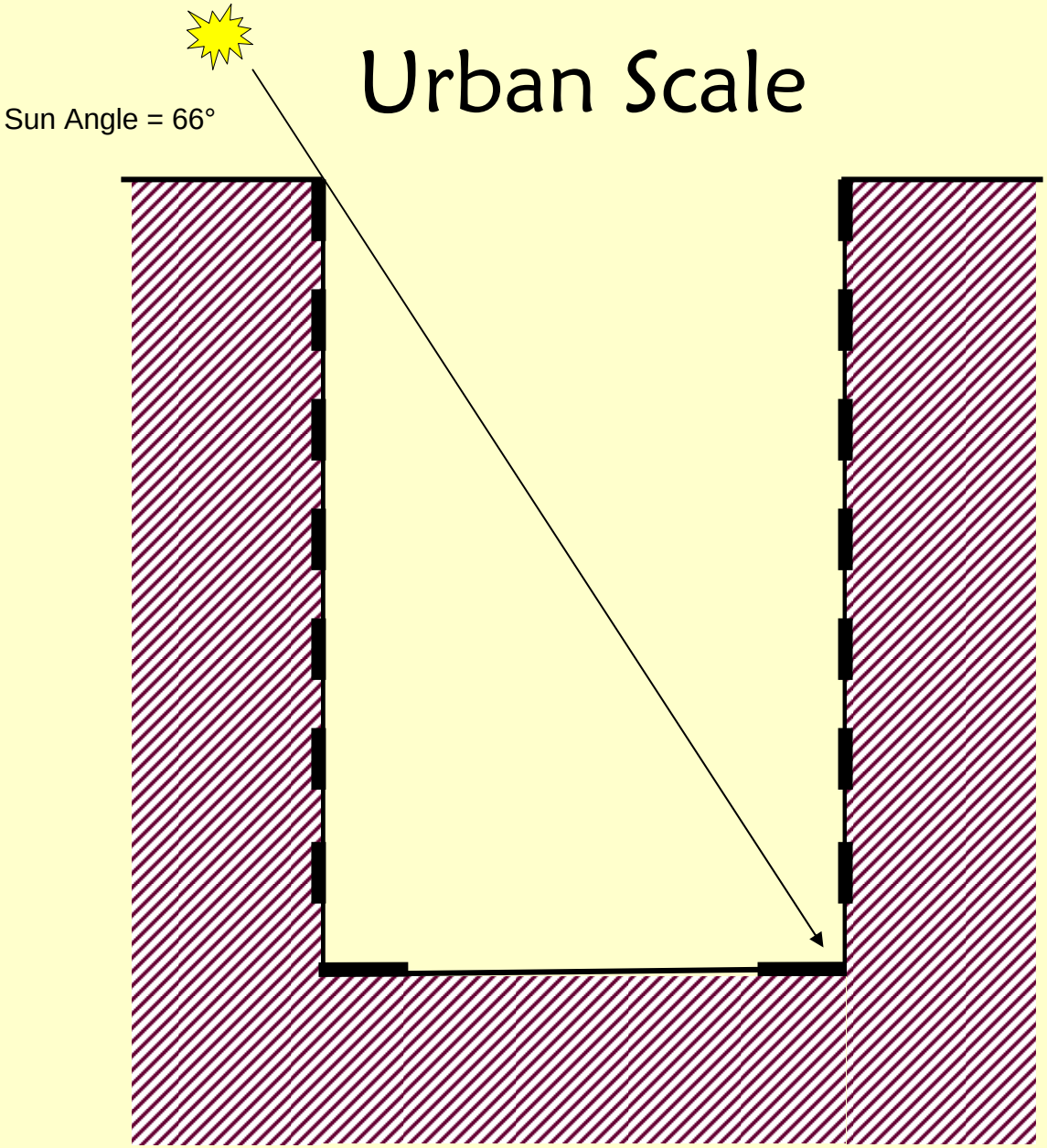
Urban Scale

Urban Design Concepts

Height to Width Ratio

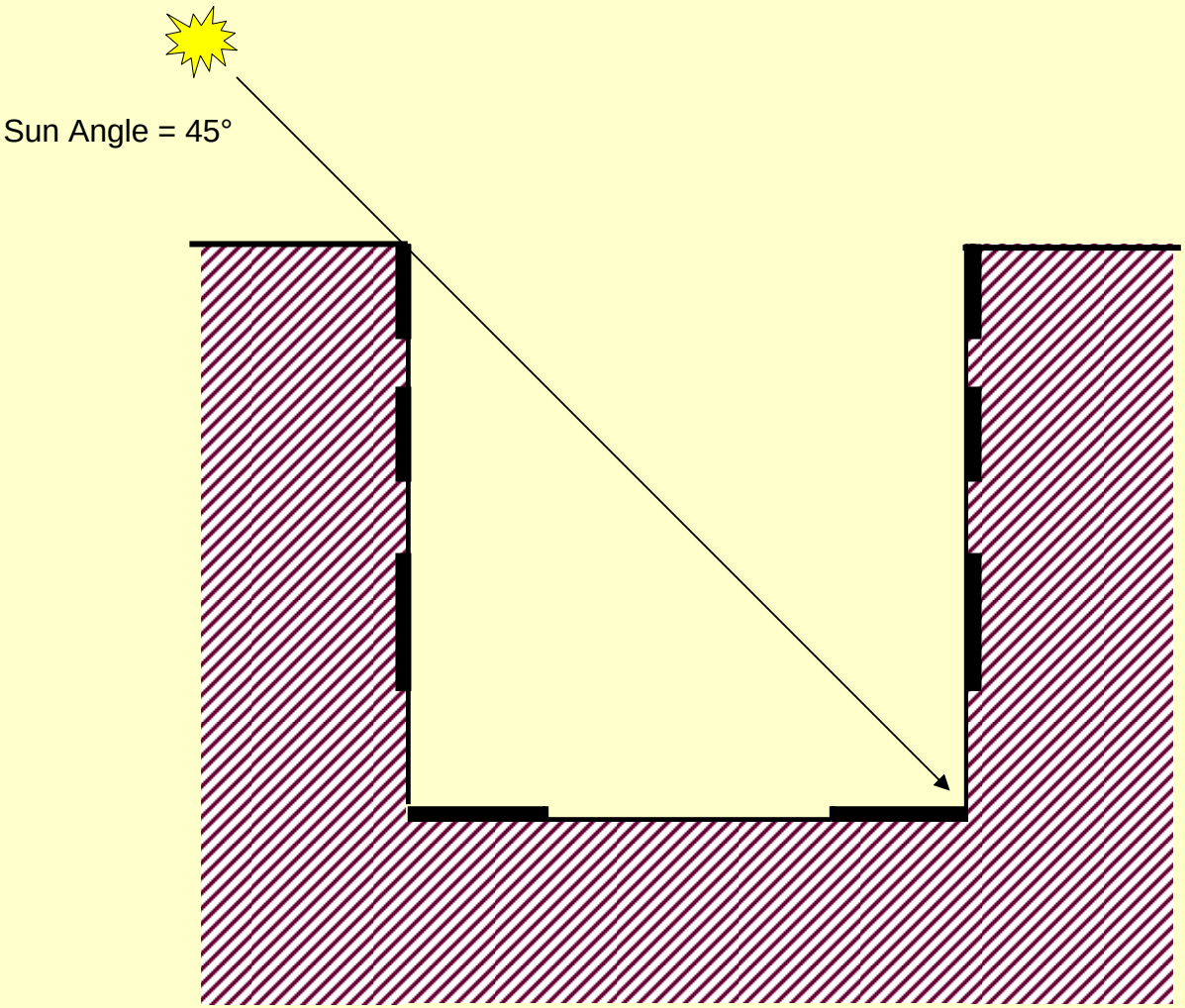


Urban Scale



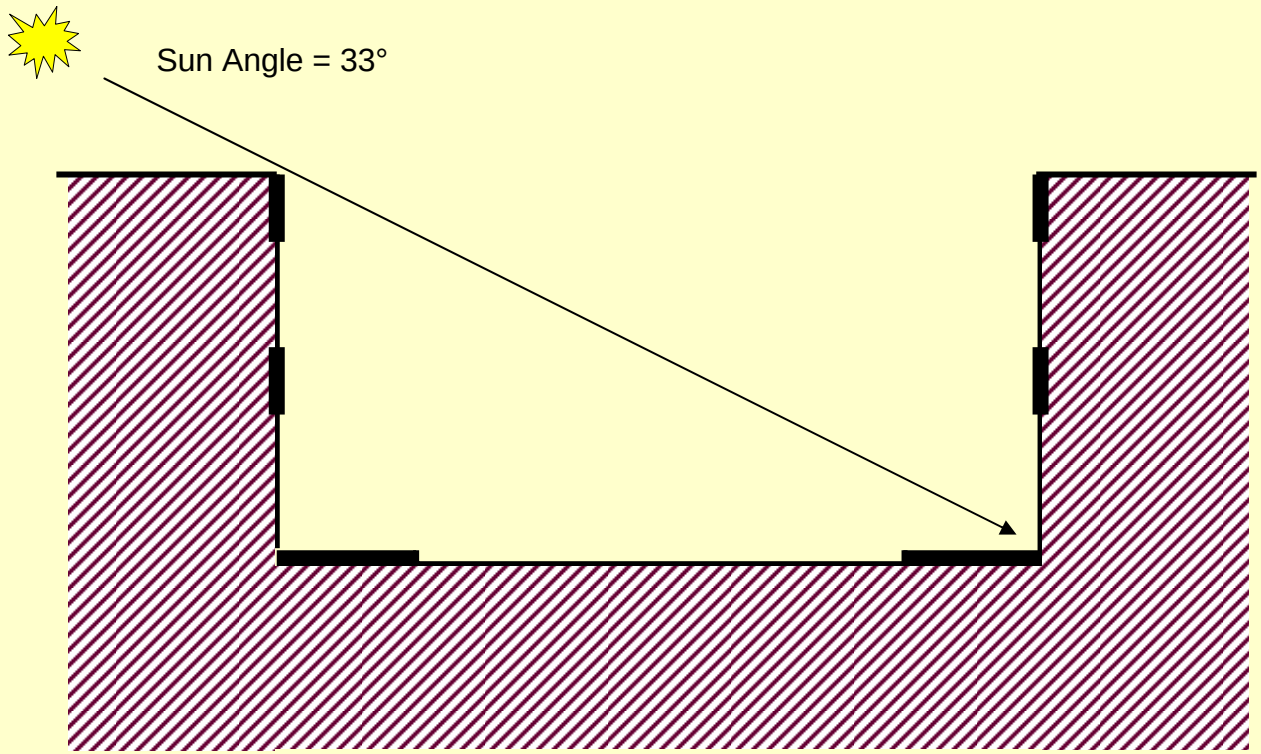
3:2 Height to Width Ratio

Urban Scale



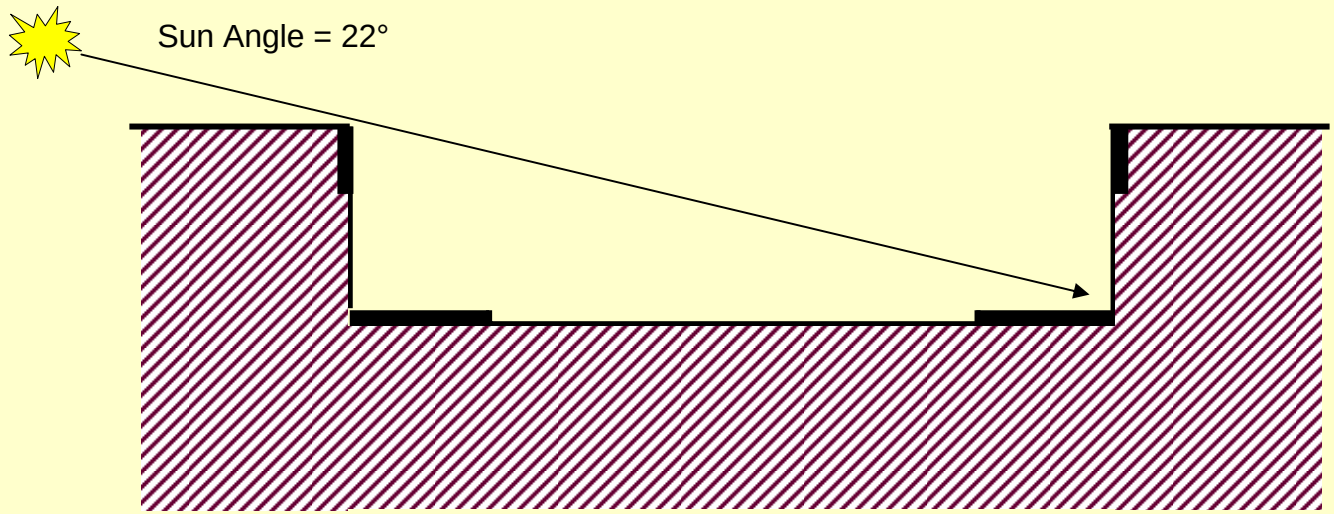
1:1 Height to Width Ratio

Urban Scale



1:2 Height to Width Ratio

Urban Scale

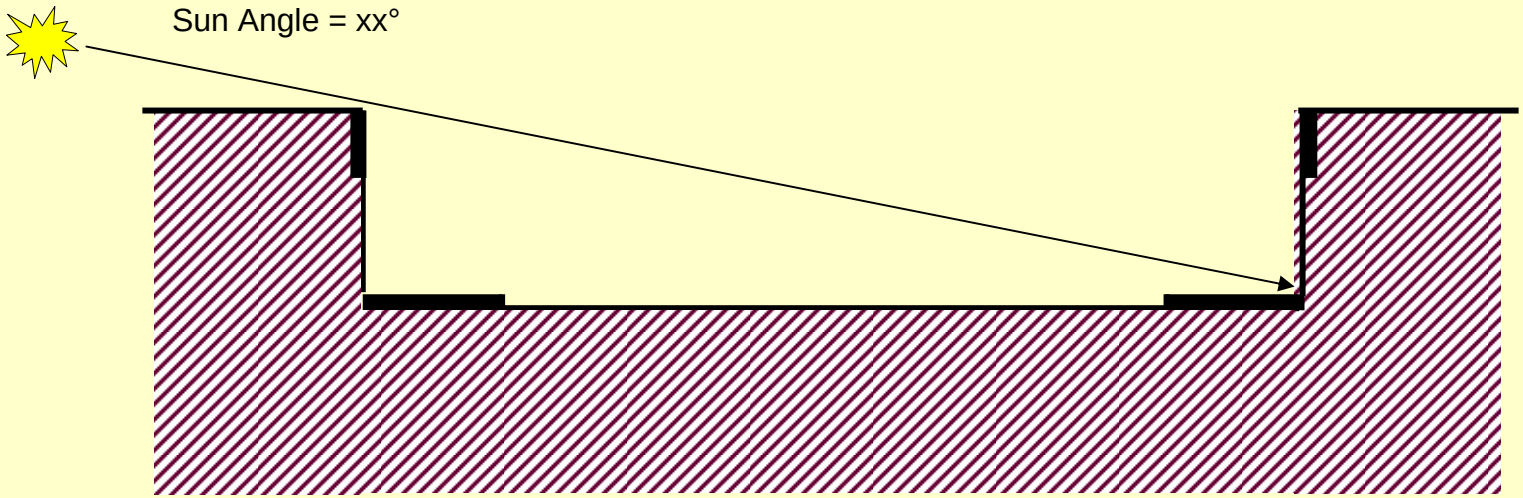


1:4 Height to Width Ratio


Christesen's
STOP


Christesen's
STOP

Urban Scale



1:5 Height to Width Ratio


meijer
30

Pedestrian Environments

“Pedestrian Friendly”

Pedestrian Environment Continuum

Pedestrian Place/District

- Mixed use with retail
- Gathering place – identifiable as a PLACE
- Significant pedestrian presence
- Motor vehicles present, do not dominate
- Supportive transportation required (parking, transit, bike)

Pedestrian Supportive

- Mixed use including residential
- May include gathering PLACES
- Pedestrians present at busy times
- Motor vehicles present, do not dominate

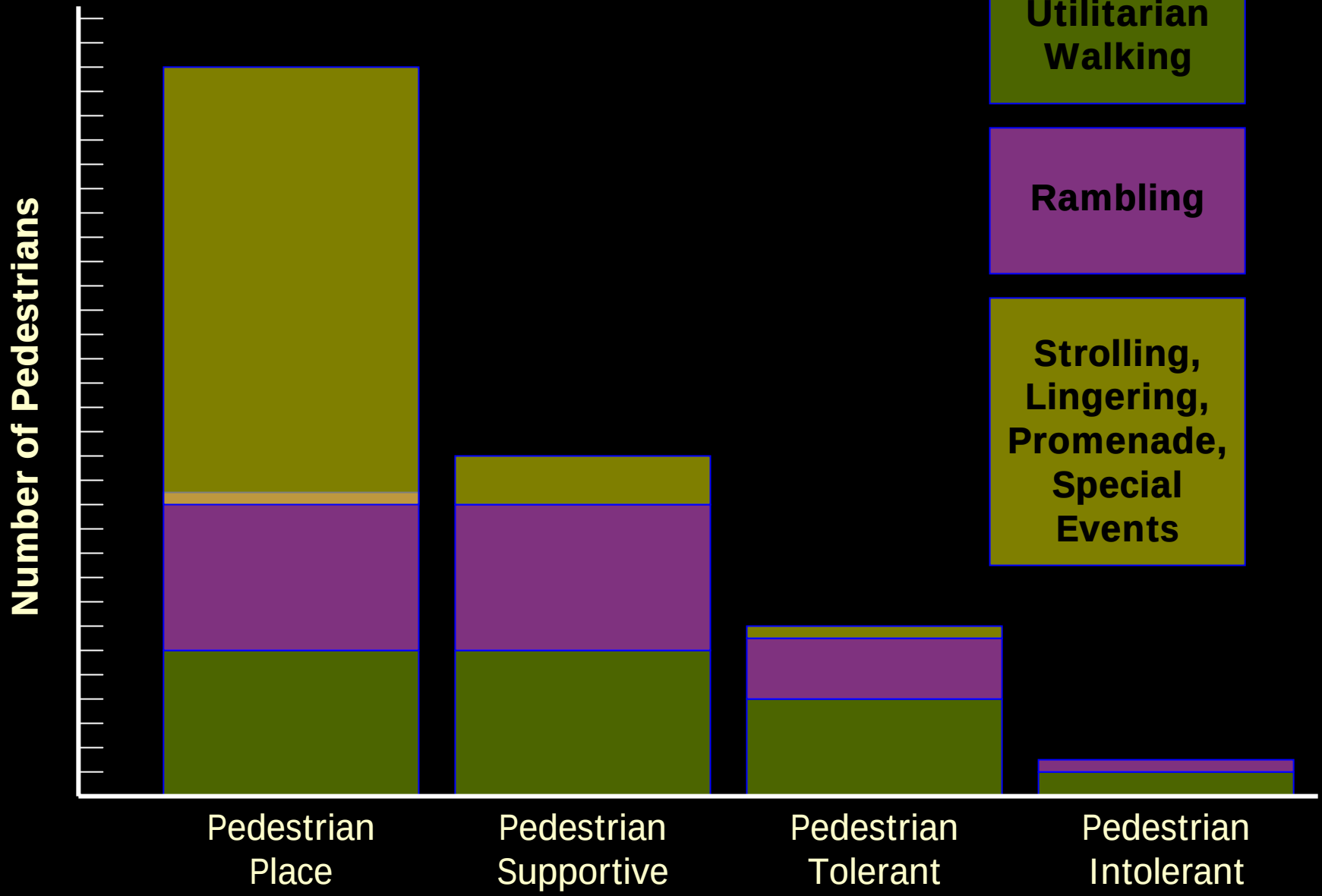
Pedestrian Tolerant

- All land uses except freeway & certain special uses (airport runway, garbage dump, etc.)
- Utilitarian walking & rambling only
- Motor vehicles present, may tend to dominate

Pedestrian Intolerant

- Any land use
- Little or no walking
- Motor vehicles dominate
- Unsafe, unpleasant

Walk Environments and Types of Walking



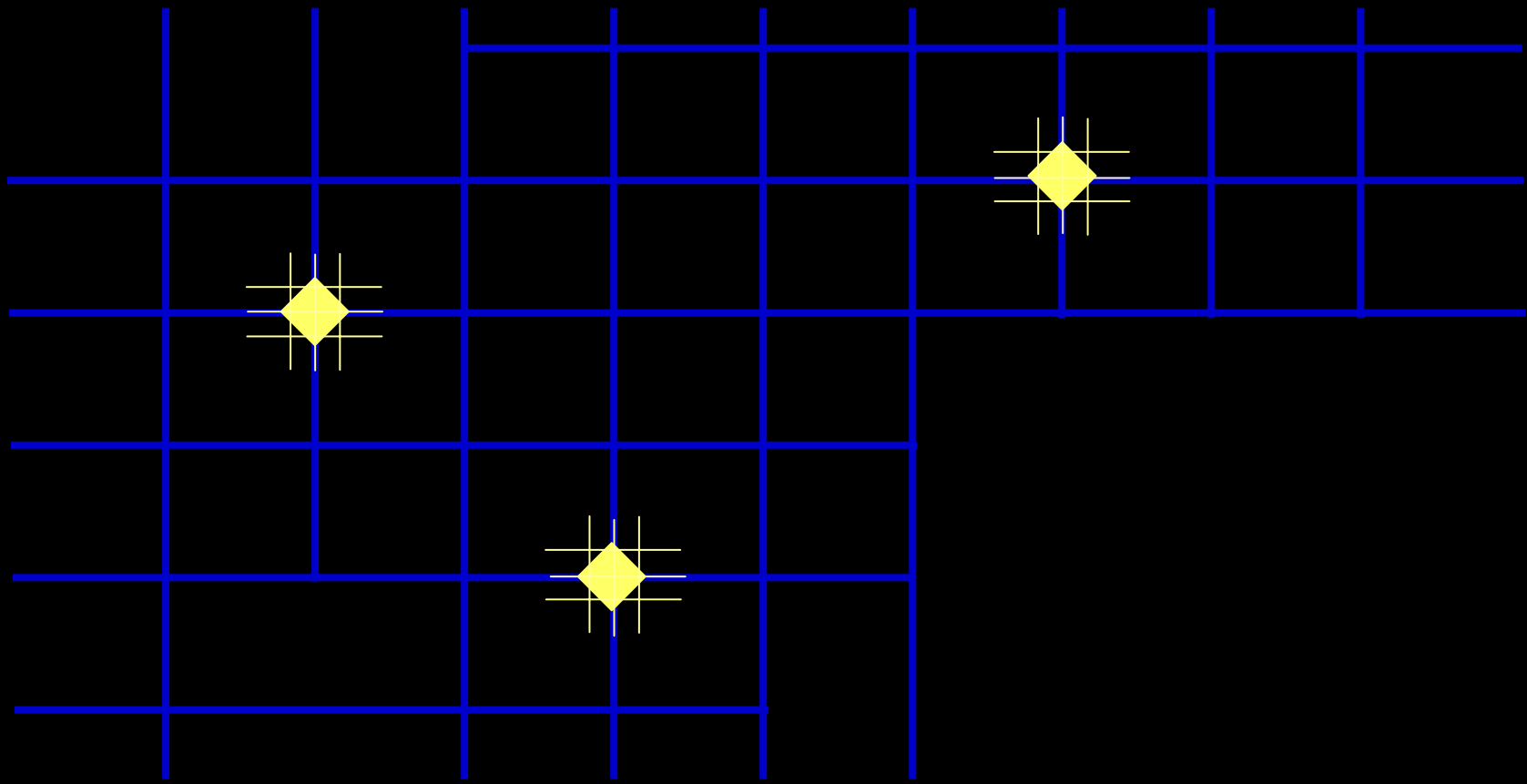
Practical Pedestrian Strategies

- Adopt "complete streets" design standards
  - Private development
  - Public works projects (context sensitive)
- Apply concurrency/adequate public facility requirements to development projects
- Designate "safe routes to school"
- Focus public investment in high priority pedestrian districts and school routes
- Get serious about maintenance

Setting Priorities

Practical Implementation Strategies

Real-World Pedestrian Structure
(Nodes and Corridors)

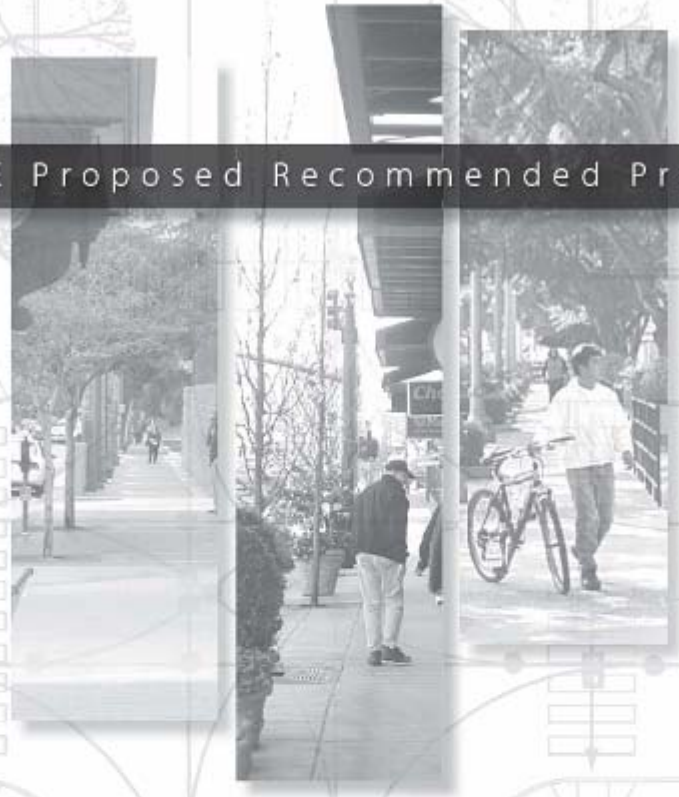


Complete Streets – Design Standards

Practical Implementation Strategies

Charlier Associates, Inc.

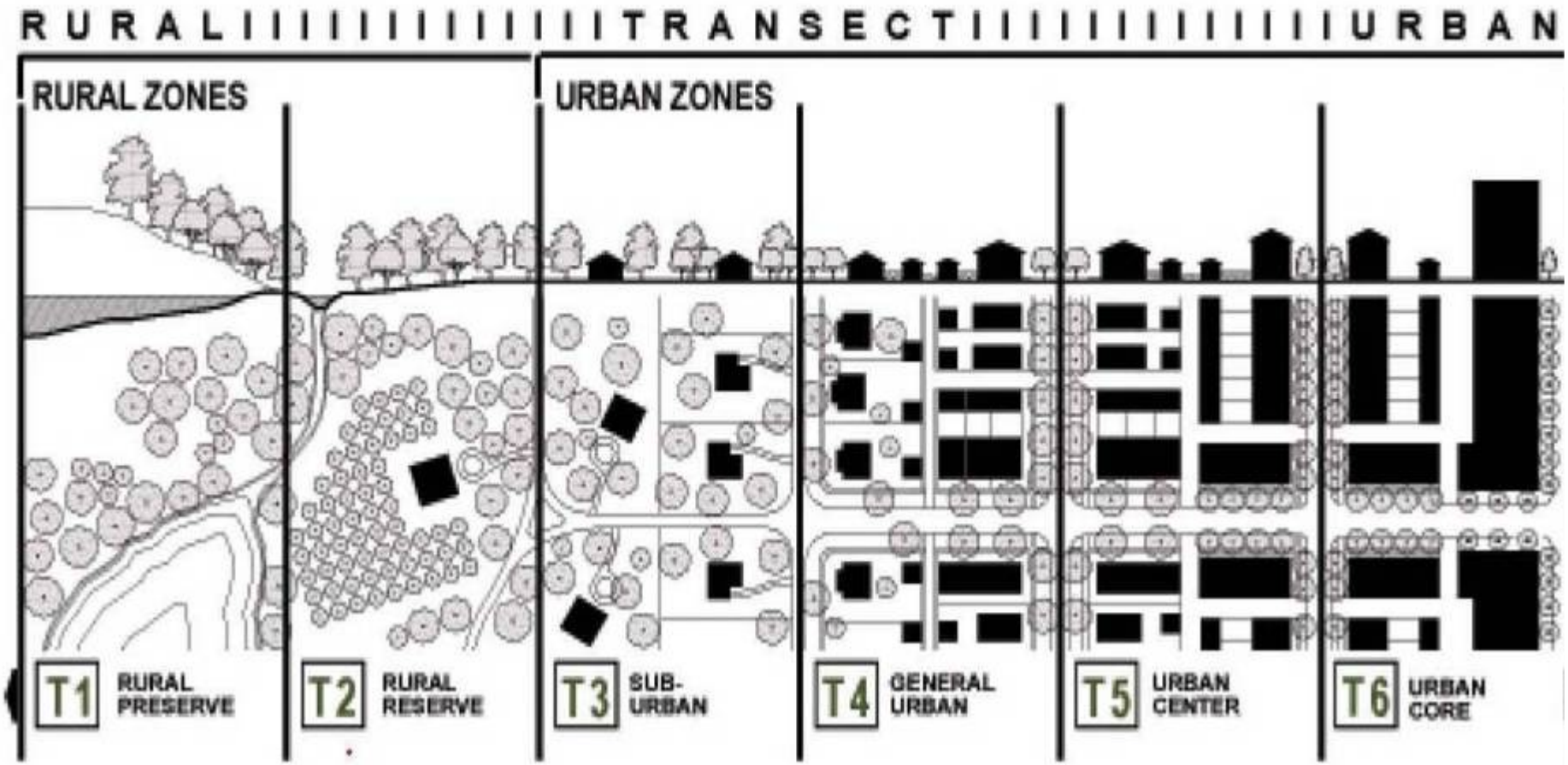
An ITE Proposed Recommended Practice



Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities

Institute of Transportation Engineers

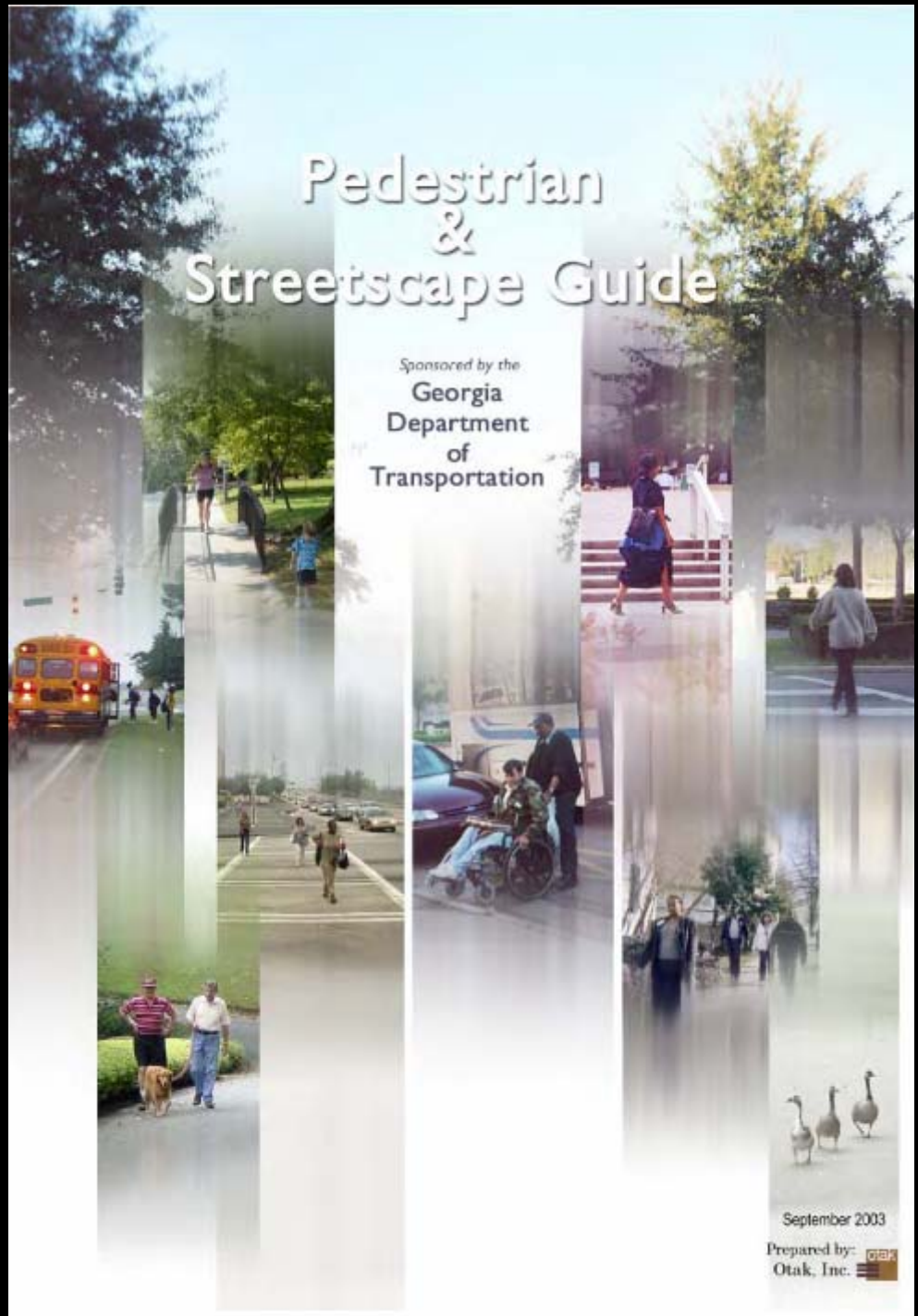
Design Reflecting Context



Pedestrian & Streetscape Guide

Sponsored by the

Georgia Department of Transportation



September 2003

Prepared by:
Otak, Inc.

Top 3 Pedestrian Design Issues

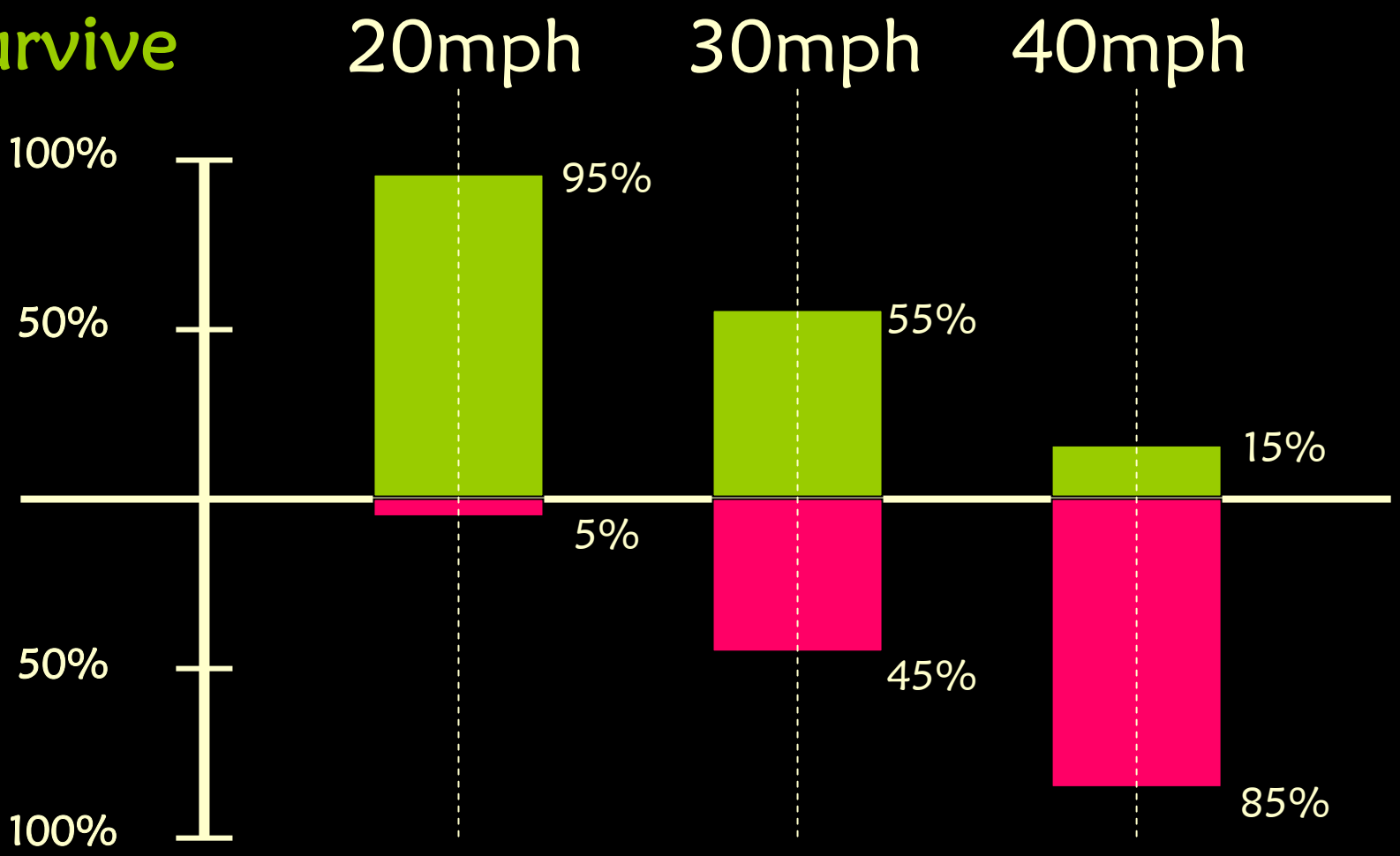
1. Continuous sidewalks – both sides of street
2. Street crossings
    - Shorten crossings
    - Slow traffic
3. Modern curb ramps

1. Continuous Sidewalks

Sidewalks should be on both sides of the street and continuous

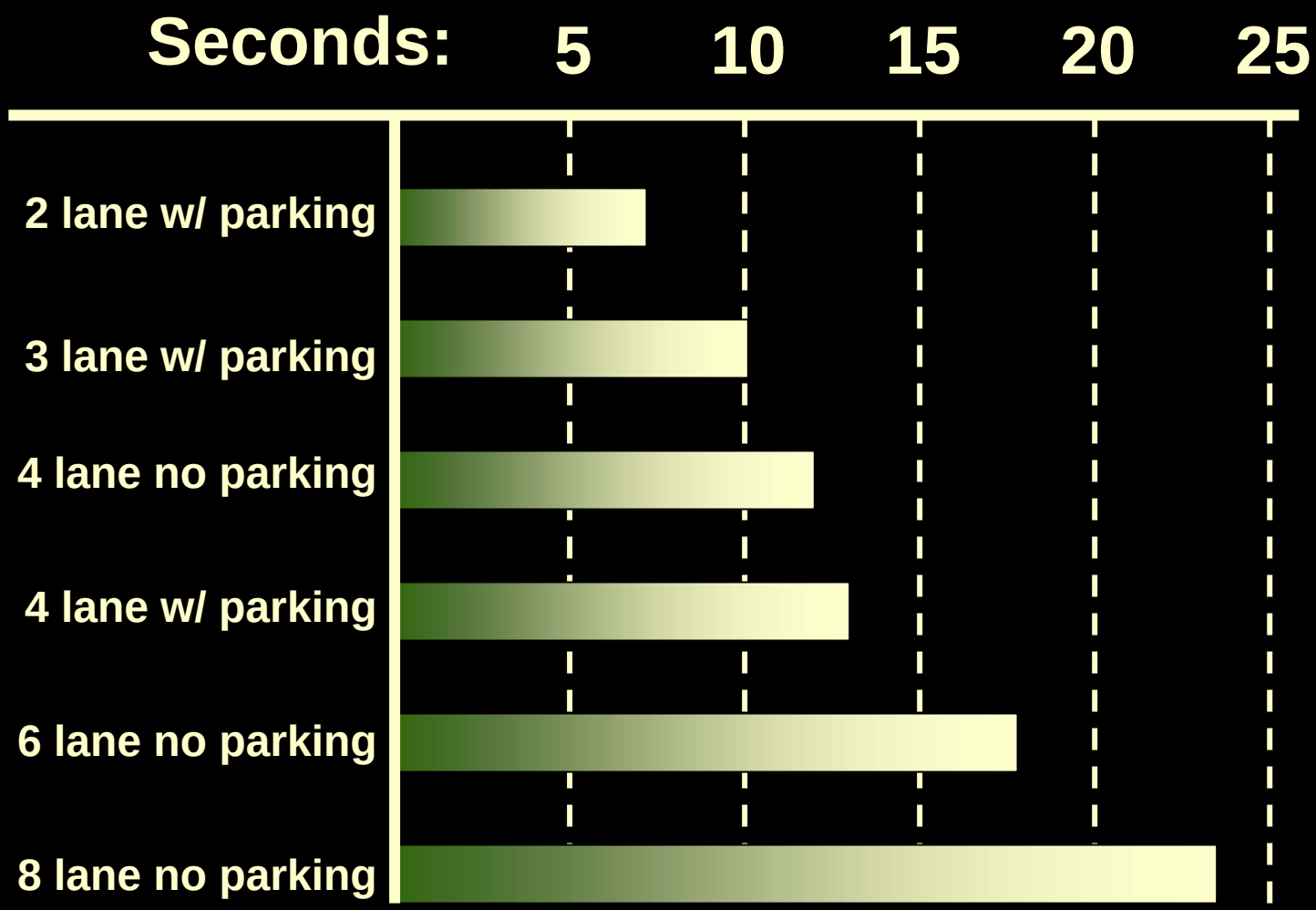
2. Street Crossings

Pedestrian Survival Rates – Vehicle Speeds

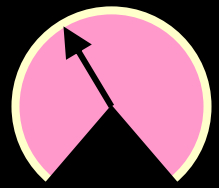


Pedestrian Crossing Time

Curb Extensions: YES | **Lane Width: 12 ft** | **Walk Speed: 250 fpm**



Vehicle Approach Time



25 mph

Feet: 200 400 600 800 1000 1200 1400

2 lane w/ parking

3 lane w/ parking

4 lane no parking

4 lane w/ parking

6 lane no parking

8 lane no parking

Vehicle Approach Time

45 mph

Feet: 200 400 600 800 1000 1200 1400

2 lane w/ parking

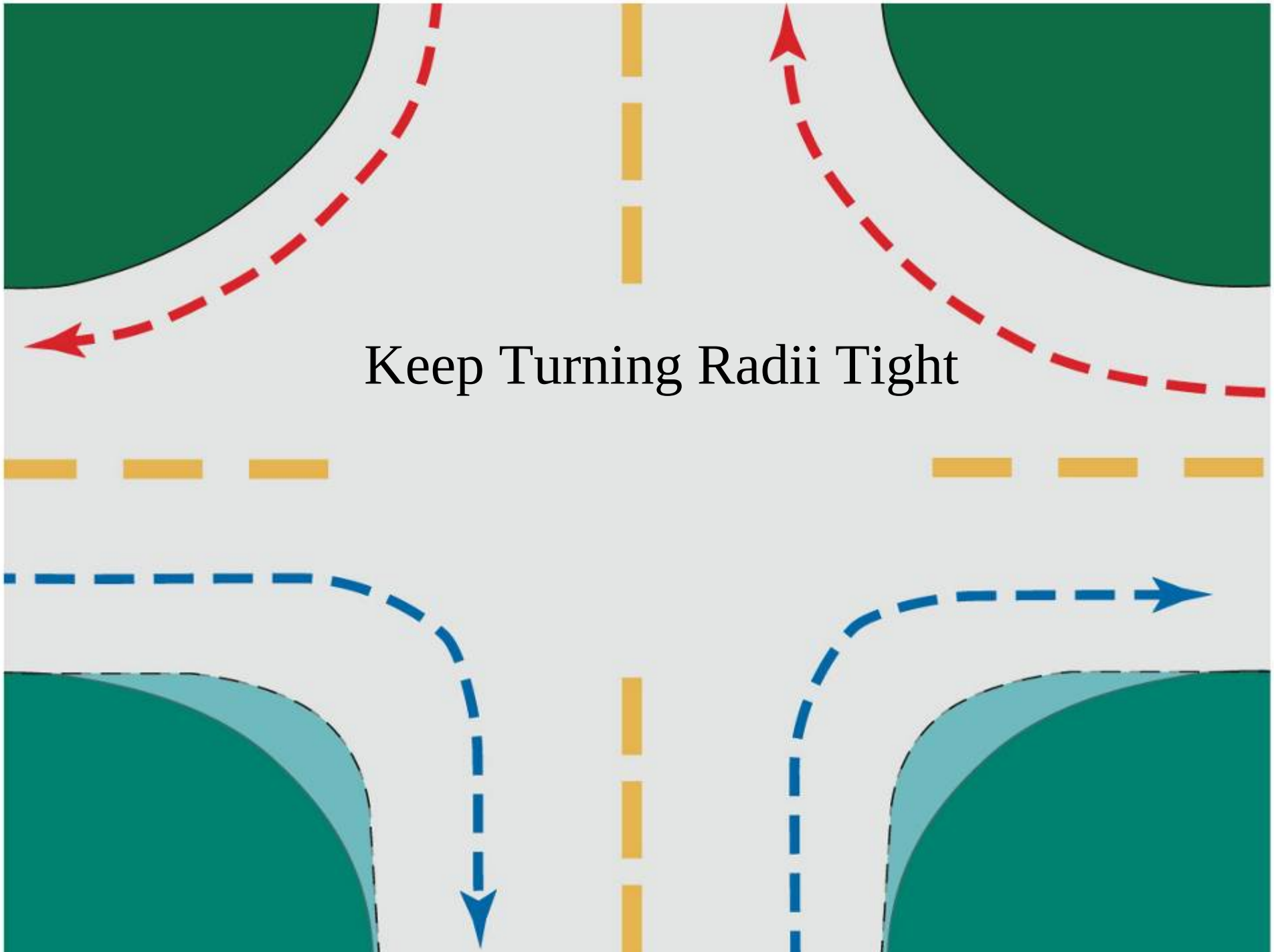
3 lane w/ parking

4 lane no parking

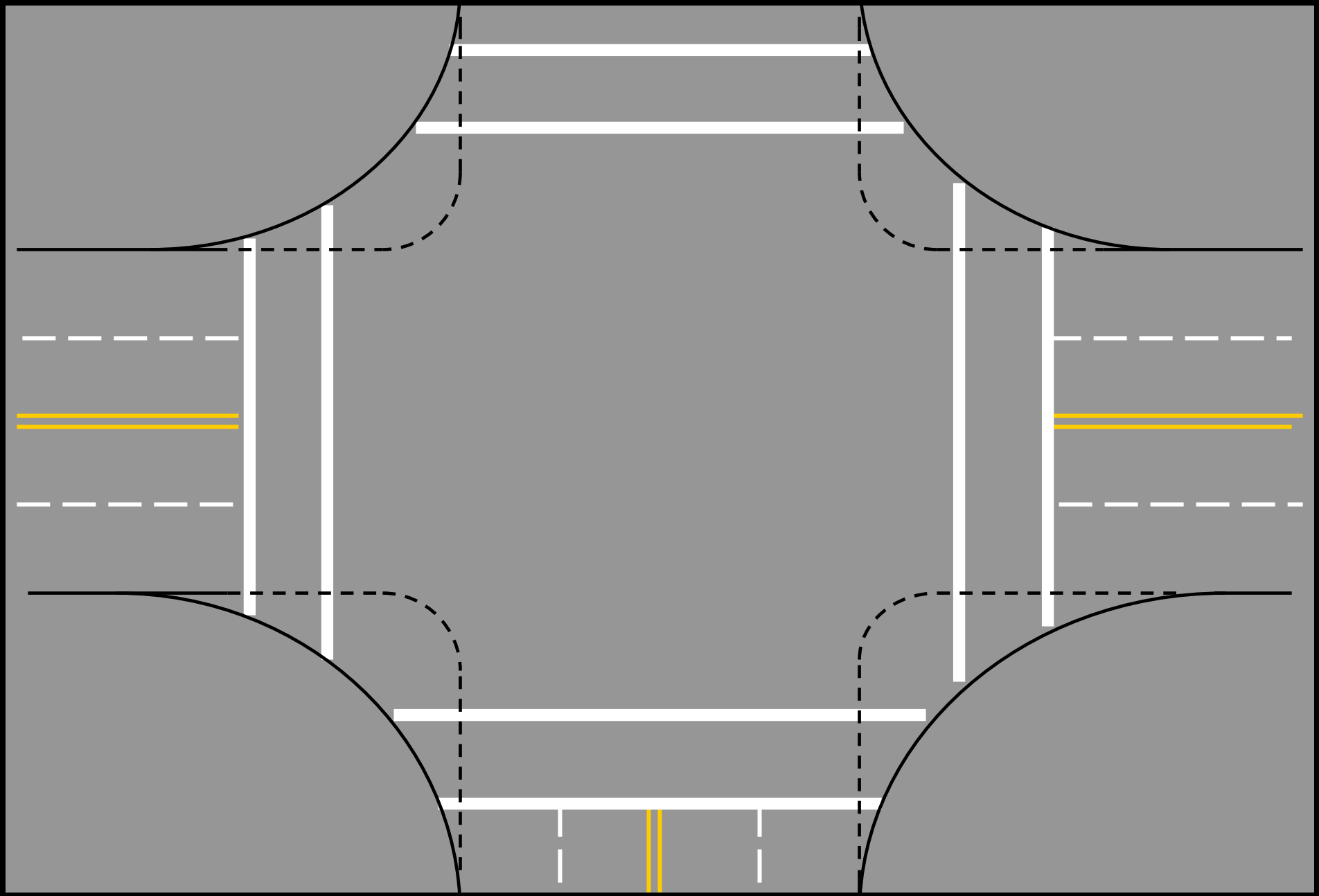
4 lane w/ parking

6 lane no parking

8 lane no parking

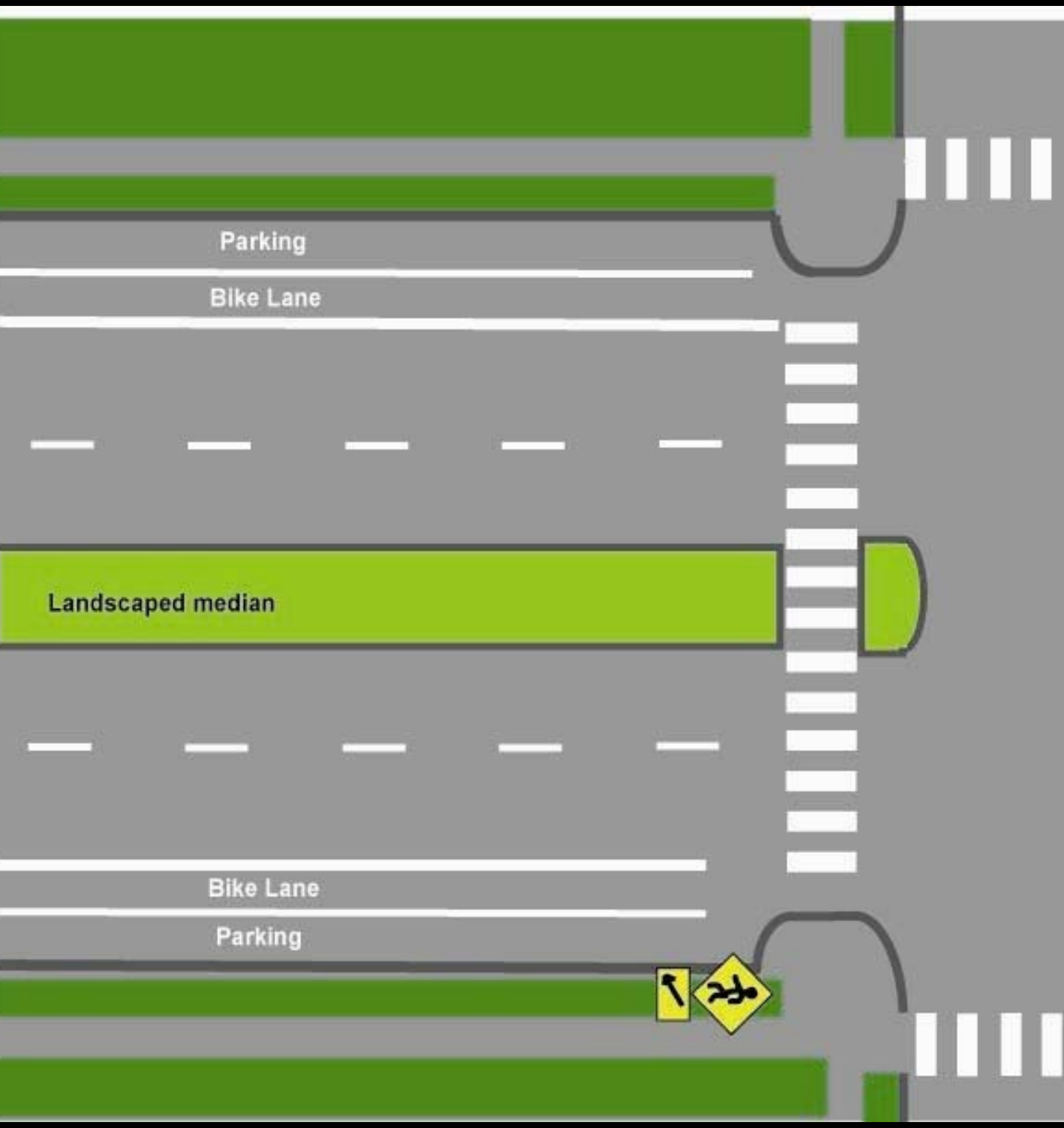

Keep Turning Radii Tight

Crosswalks are pushed back



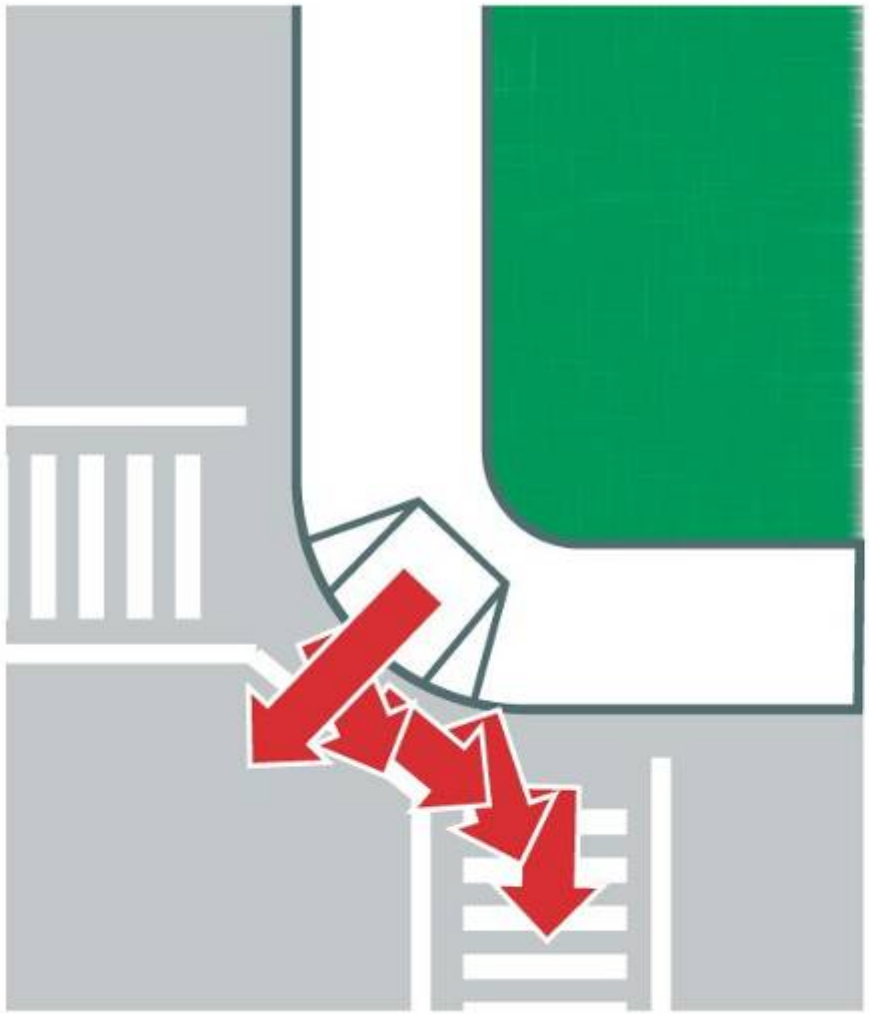
Effect of large radius on crosswalk:

Bend OR

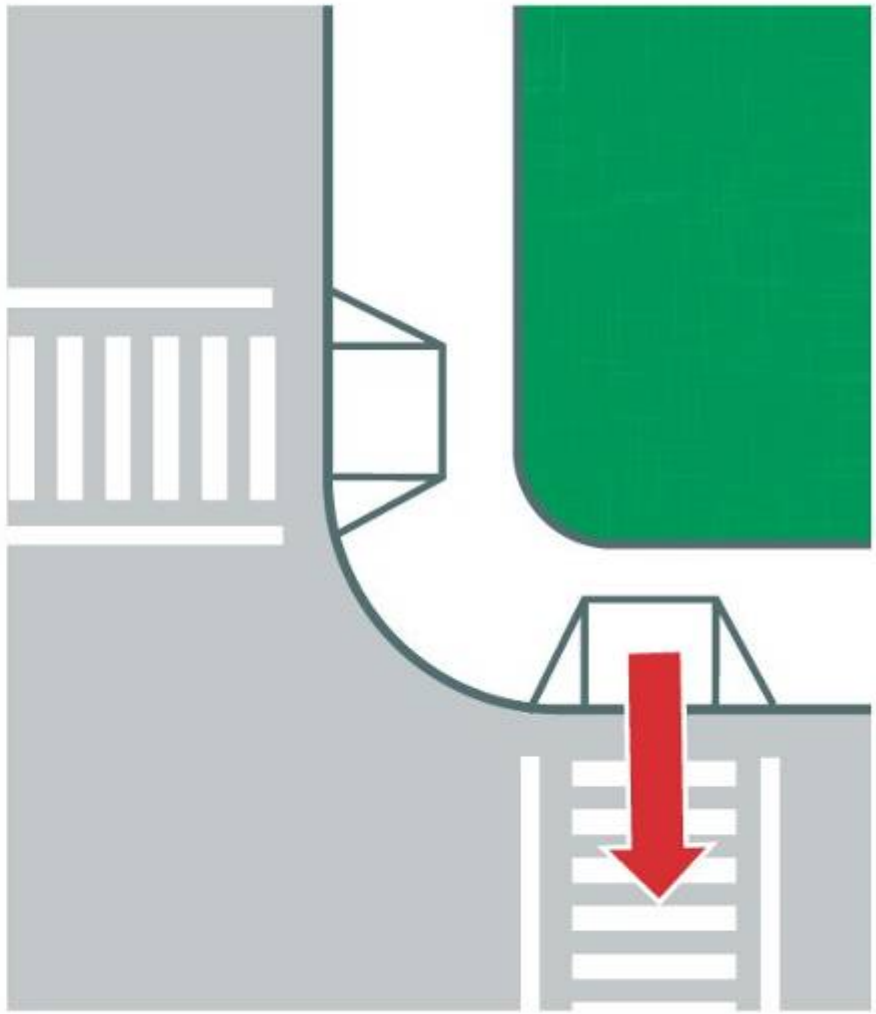

Parking
Bike Lane
Landscaped median
Bike Lane
Parking

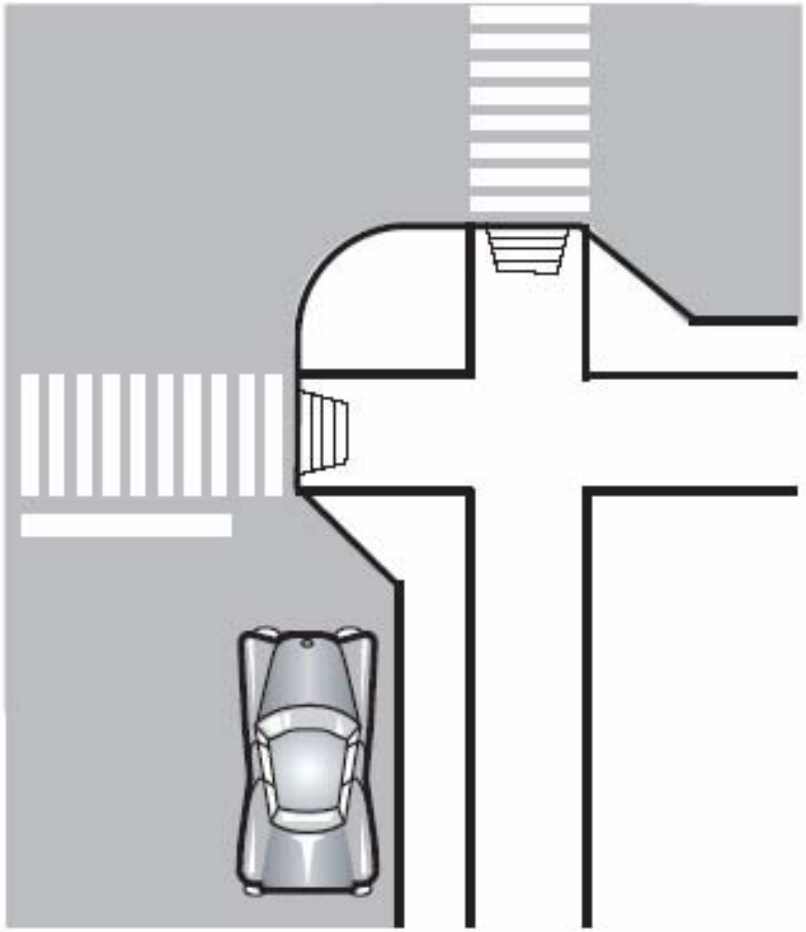
3. Modern Curb Ramps

Diagnoal Curb Ramp

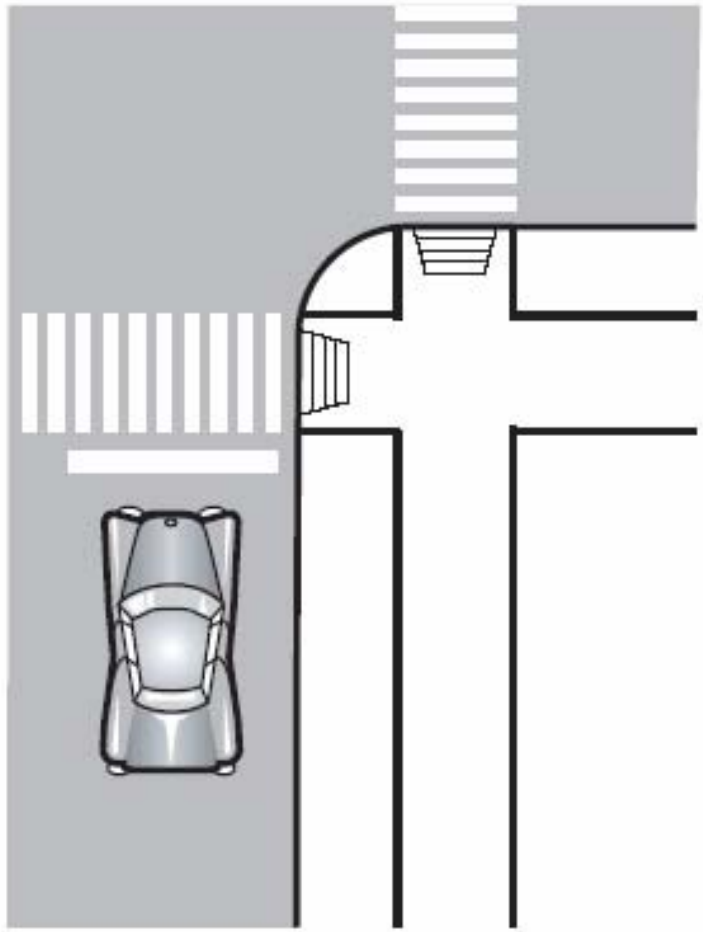


Perpendicular Curb Ramp





Pair of perpendicular curb ramps with curb extensions and on-street parking



Pair of perpendicular curb ramps aligning with crosswalks

Bicycle & Non-Motorized Systems

Practical Implementation Strategies

Practical Non-Motorized Strategies

- Build a spine route – an iconic corridor
- Formally approve parallel redundancy
- Designate primary & secondary bike corridors and prioritize public spending
- Map missing links
- Create route IDs for primary corridors
- Take advantage of modern design
- Consider road diets
- Get serious about maintenance
- Use the Web to map/promote bicycling

Build a Spine Route (Iconic Corridor)

Practical Implementation Strategies

Formally Approve Parallel Redundancy

Practical Implementation Strategies

“Type A” Cyclist:

- comfortable in traffic
- prefers direct but safe routes
- rides with or without bicycle facilities present

“Type B/C” Cyclist:

- less skilled adults and children
- intimidated by traffic
- prefer designated facilities (bike lanes and multi-use paths)

Designate Primary & Secondary Corridors & Prioritize Funding

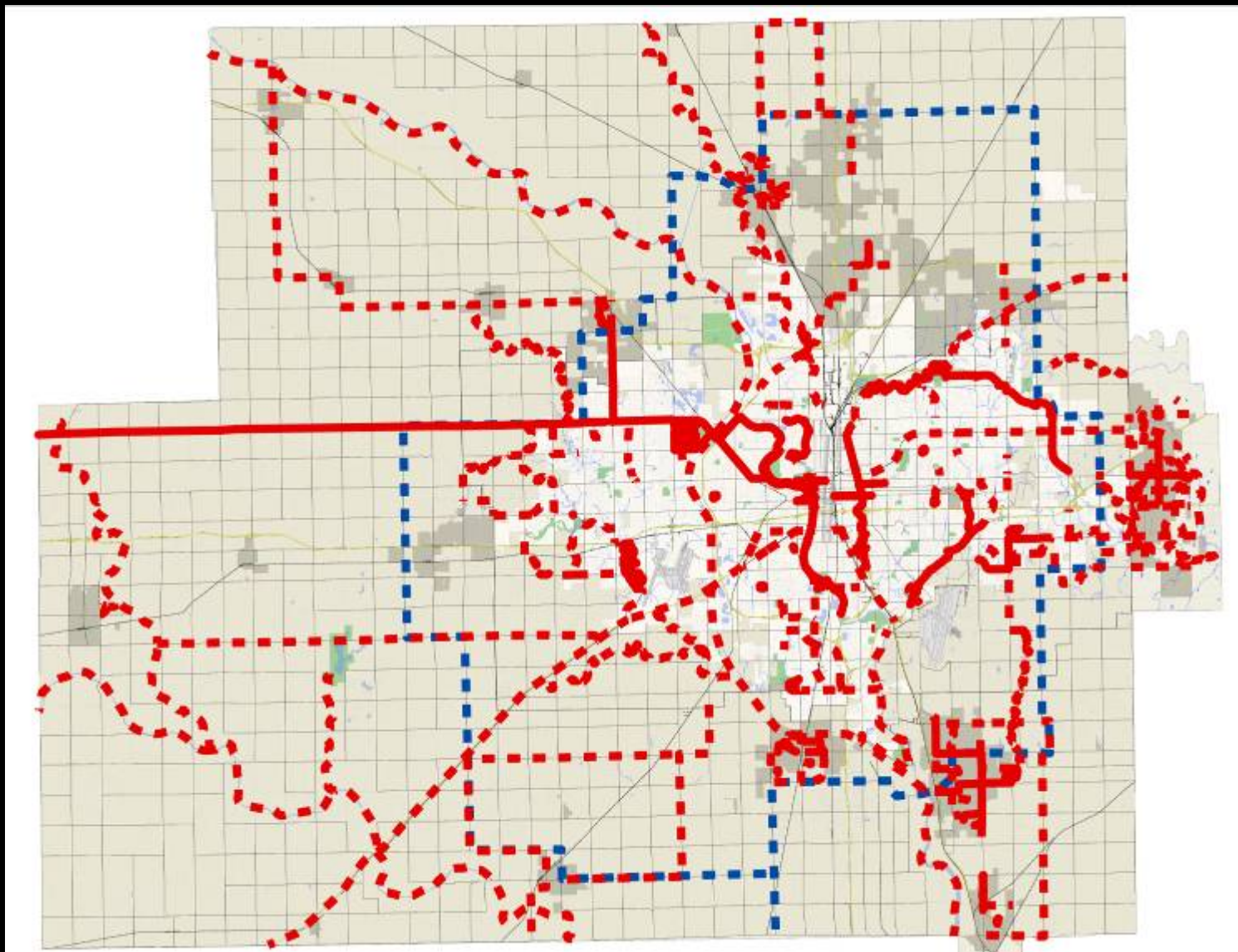
Practical Implementation Strategies

Boulder Transportation Master Plan

Previously Proposed Facilities

Wichita

- 421 miles off-road paths
- 0 miles on-street bicycle lanes
- 0 miles paved shoulders



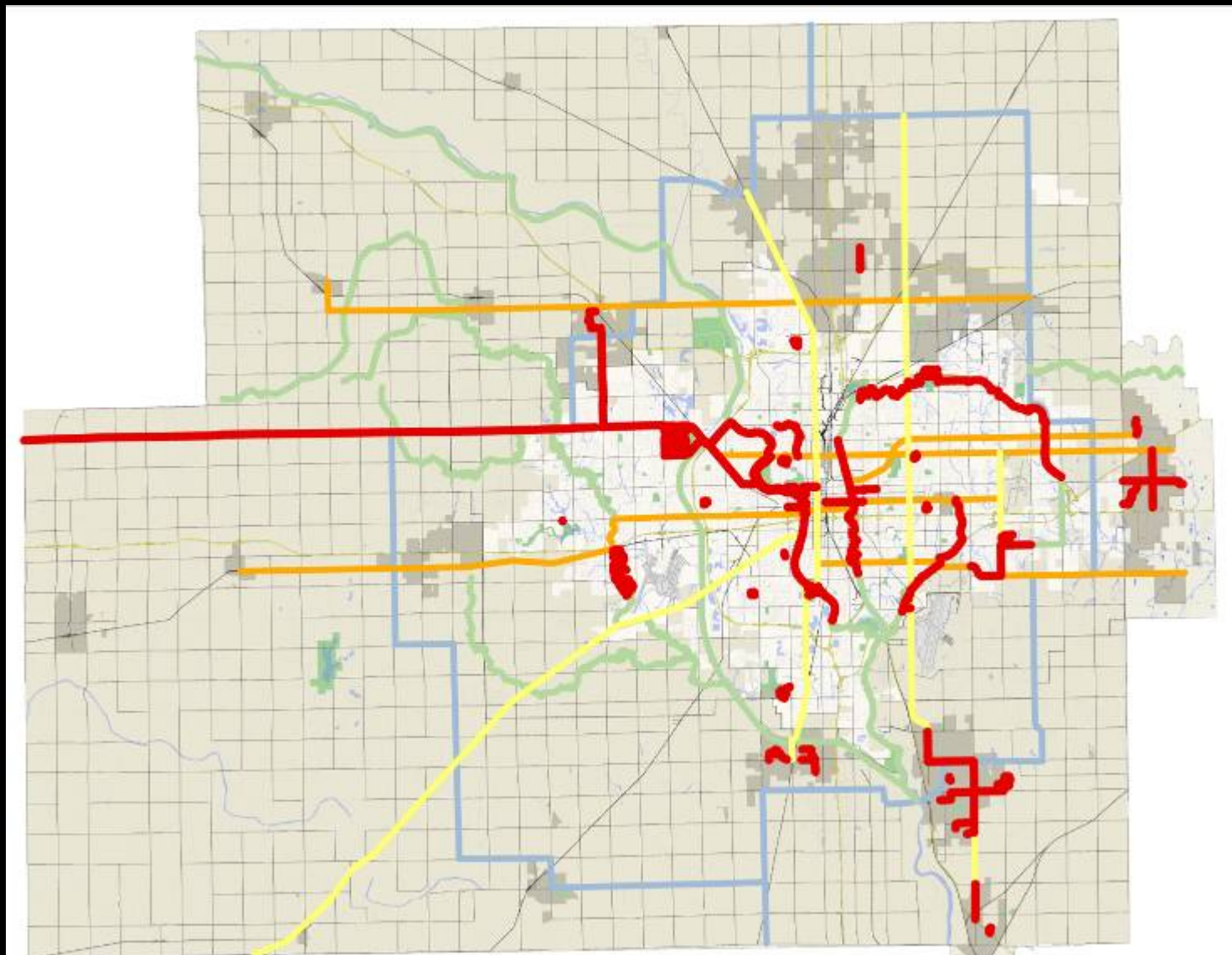
Importance of Network Connectivity:

- distance and safety impediments are the major obstacles to overcome
- facility type may change based upon context
- transitions need to be seamless

Primary Corridor System

Wichita

- 164 miles off-road paths
- 67 miles on-street bicycle lanes
- 18 miles paved shoulders

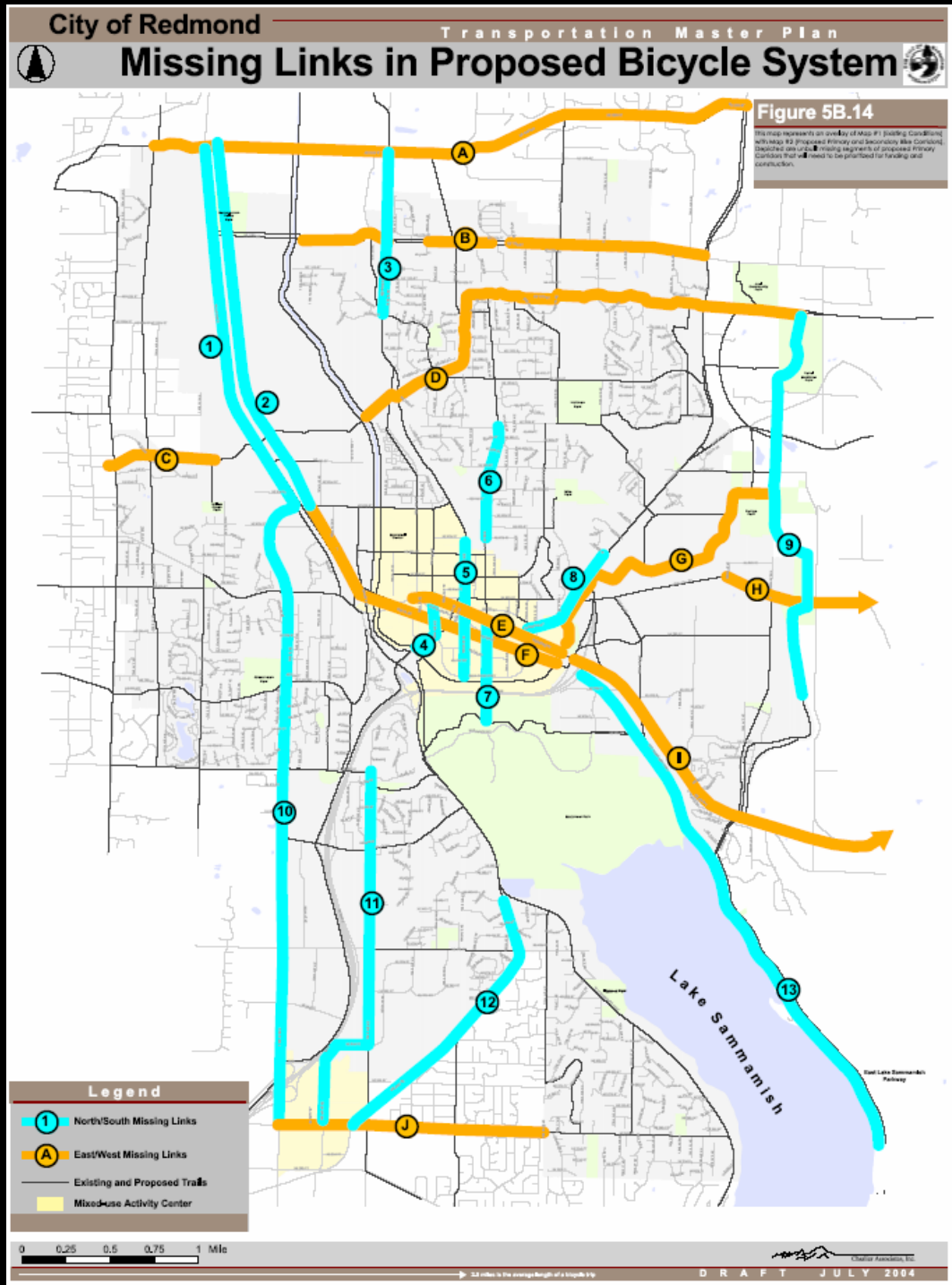


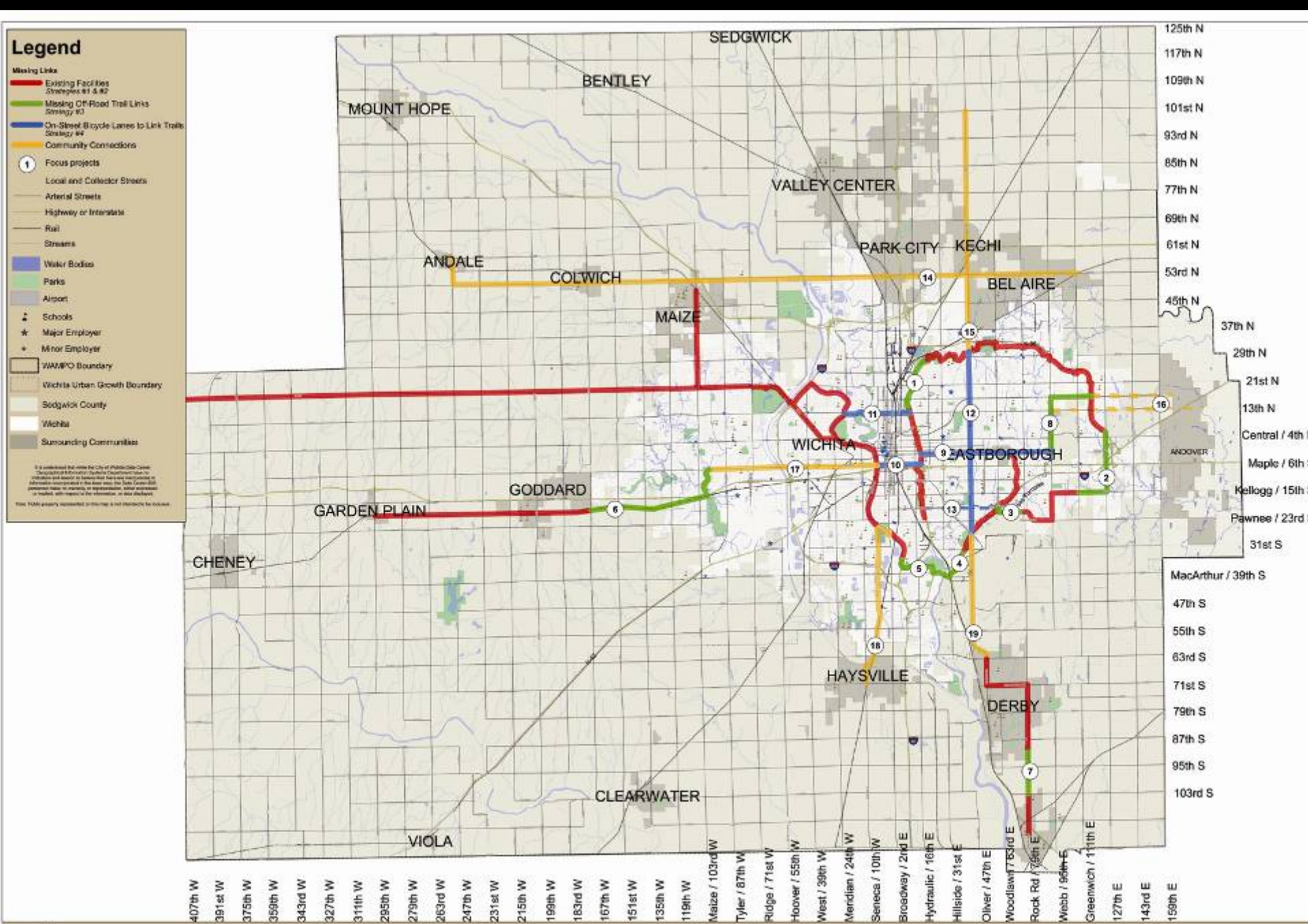
Map Missing Links

Practical Implementation Strategies

pathway users focus group

Boulder Transportation Master Plan




Legend
Missing Links
Existing Facilities
Strategies #1 & #2
Missing Off-Road Trail Links
Strategy #3
On-Street Bicycle Lanes to Link Trails
Strategy #4
Community Connections
Focus projects
Local and Collector Streets
Arterial Streets
Highway or Interstate
Rail
Streams
Water Bodies
Parks
Airport
Schools
Major Employer
Minor Employer
WAMPO Boundary
Wichita Urban Growth Boundary
Sedgwick County
Wichita
Surrounding Communities
SEDGWICK
BENTLEY
MOUNT HOPE
VALLEY CENTER
PARK CITY
KECHI
ANDALE
COLWICH
BEL AIRE
MAIZE
WICHITA
EASTBOROUGH
ANDOVER
GODDARD
GARDEN PLAIN
CHENEY
HAYSVILLE
DERBY
CLEARWATER
VIOLA
125th N
117th N
109th N
101st N
93rd N
85th N
77th N
69th N
61st N
53rd N
45th N
37th N
29th N
21st N
13th N
Central / 4th
Maple / 6th
Kellogg / 15th
Pawnee / 23rd
31st S
MacArthur / 39th S
47th S
55th S
63rd S
71st S
79th S
87th S
95th S
103rd S
407th W
391st W
375th W
359th W
343rd W
327th W
311th W
295th W
279th W
263rd W
247th W
231st W
215th W
199th W
183rd W
167th W
151st W
135th W
119th W
Maize / 103rd W
Tyler / 87th W
Ridge / 71st W
Hoover / 55th W
West / 39th W
Meridian / 24th W
Seneca / 10th W
Broadway / 2nd E
Hydraulic / 16th E
Hillside / 31st E
Oliver / 47th E
Woodlawn / 63rd E
Rock Rd / 79th E
Webb / 95th E
Greenwich / 111th E
127th E
143rd E
159th E
N
W
E
S
0
2
4
8
Miles
Missing Links Map
Prepared by
February 2, 2007
WAMPO

Create IDs for Primary Corridors

Practical Implementation Strategies


BROADWAY
BOOGIE
BEAR CREEK
TRAIL

Apply Modern Design

Practical Implementation Strategies

Paved Shoulders, Pathways or Bike Lanes?

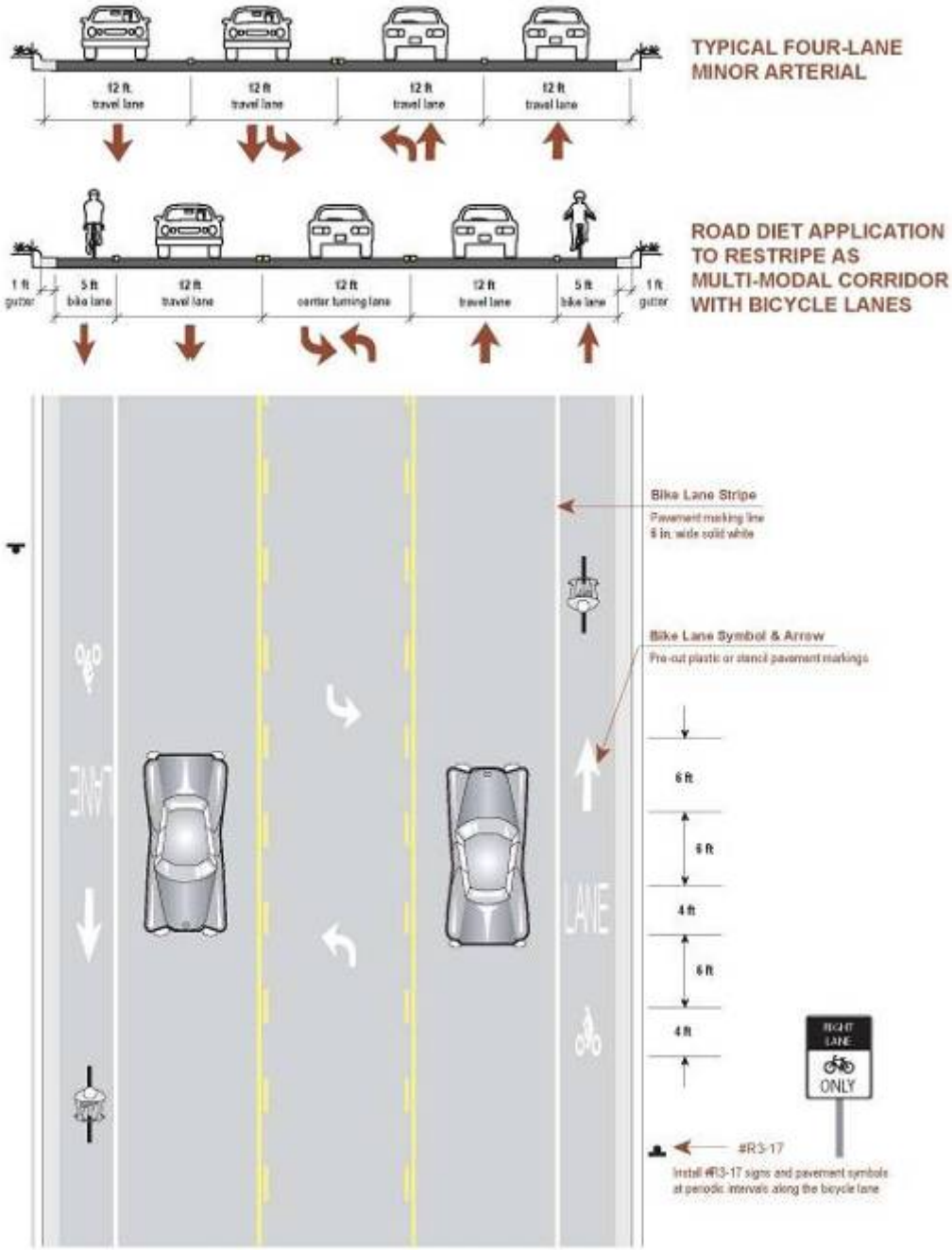
- AASHTO & MUTCD guidelines
- Drop or dash bike lane striping in advance of intersections
- Position bike lanes to left of right-turning vehicular lanes

Consider Road Diets

Practical Implementation Strategies

“Road Diet”

Crash Studies: Vehicle-Vehicle



U.S.DOT FHWA

Highway Safety Information System -- Before and After Testing

Crash frequency	Road diets: 6% lower
Crash severity	No difference
Crash type	➢ Road diets had a higher percentage of angle crashes ➢ Road diets had a lower percentage of rear-end crashes

Source: HSIS, FHWA

University Place, WA

Bridgeport Way: 5-lane to 4-lane

before

after

Results

The City has analyzed speed, accident, and economic development data collected before and after the construction of the Bridgeport Way improvements between 35th and 40th Streets. The project's traffic calming features reduced speeds and crashes while increasing business activity. Average speed decreased by 13 percent and traffic accidents were reduced by 60 percent (see table below).

Safety Measures	Before	After	Change
Posted Speed Limit	6 km/h (35 mi/h)	56 km/h (35 mi/h)	Same
Average Actual Speed	1 km/h (37.6 mi/h)	52 km/h (32.6 mi/h)	–13 %
Average Annual Crashes	19	8 (first year)	–60 %

Table 1. Data from before and after the Bridgeport Way redesign.

Source: PEDSAFE

"Road Diets" Capacity Comparisons

Lane Reductions of Select Street Conversions-- Volume Changes

Roadway Section	Change	ADT (Before)	(After)	Notes
1. Lake Washington Blvd., Kirkland, Washington South of 83	4 lanes to 2 + TWLTL + bike lanes	23,000	25,913	
2. Lake Washington Blvd, Kirkland, Washington Near downtown	4 lanes to 2+ TWLTL + bike lanes	11,000	12,610	
3. Electric Avenue, Lewistown, Pennsylvania	4 lanes to 2 + TWLTL + bike lanes	13,000	14,500	
4. Burcham Road, East Lansing, Michigan	4 lanes to 2 + TWLTL + bike lanes	11-14,000	11-14,000	
5. Grand River Boulevard, East Lansing, Michigan	4 lanes to 2 + TWLTL + bike lanes	23,000	23,000	
6. St. George Street, Toronto, Ontario, Canada	4 lanes to 2 + bike lanes + wide sidewalks	15,000	15,000	
7. 120th Avenue, NE Bellevue, Washington	4 lanes to 2 + TWLTL	16,900	16,900	
8. Montana (commecial street) Bellevue, Washington	4 lanes to 2 lanes + TWLTL 4 lanes to 2 + median + bike lanes	18,500	18,500	
9. Main Street Santa Monica, California	4 lanes to 2 lanes + TWLTL 4 lanes to 2 + median + bike lanes	20,000	18,000	

Source: Walkable Communities Inc.

Iowa DOT

4-lane to 3-lane Conversions

Roads with less than 20,000 vehicles per day:

- 20%-30% reduction in crashes (due to reduced conflict points and improved sight distance)
- More user friendly to elderly drivers
- LOS remained the same (intersection delay increased from 6.2 sec/veh to 6.7 sec/veh)
- Improved emergency response time
- Improved pedestrian safety

Source: Transportation Research Board

Get Serious About Maintenance

Practical Implementation Strategies

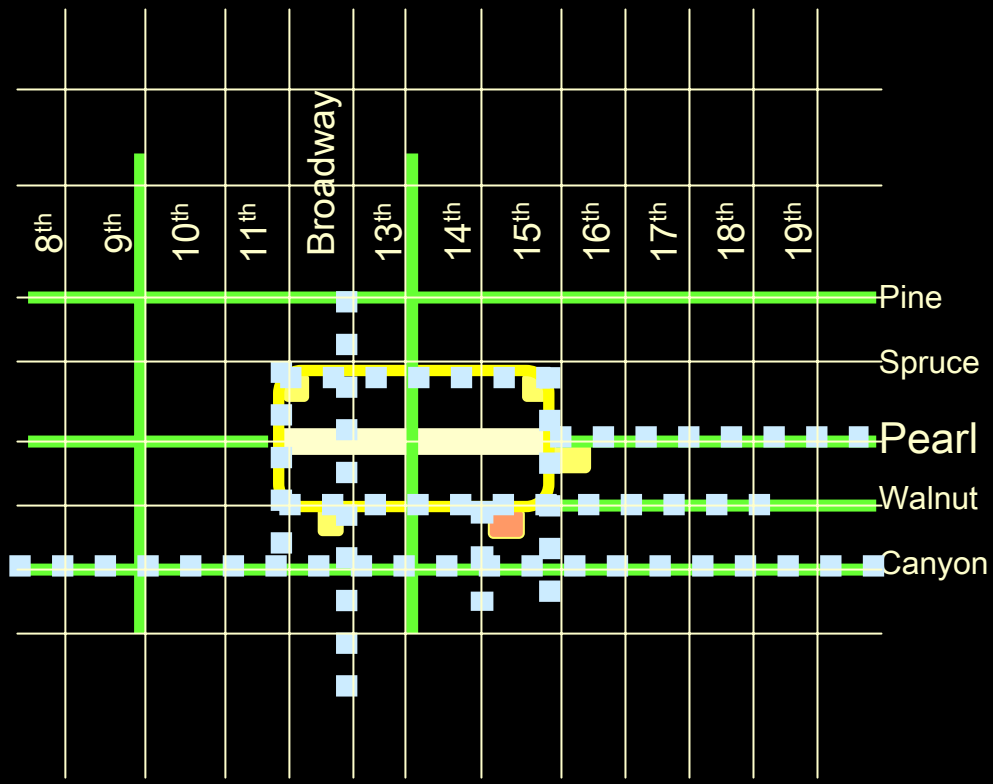
Maintenance

- Spot improvement program
  - Standard reporting and responsibility assignment
- On-street facility maintenance
  - Sweep right hand edges
  - Maintain drainage grates
- Off-street facility maintenance
  - Remove loose material from pathway surface
  - Fix rough surfaces and post warning signs
- Prioritize snow removal

An "Intermodal" Example

Practical Implementation Strategies

Pearl Street "Pedestrian Mall"



Pedestrian Mall

Parking Structures

Parking Structure with Transit

Downtown Loop

Transit Routes

Bike Facilities

Boulder's
"pedestrian mall"
works because …

... it is an integral part of an intermodal system