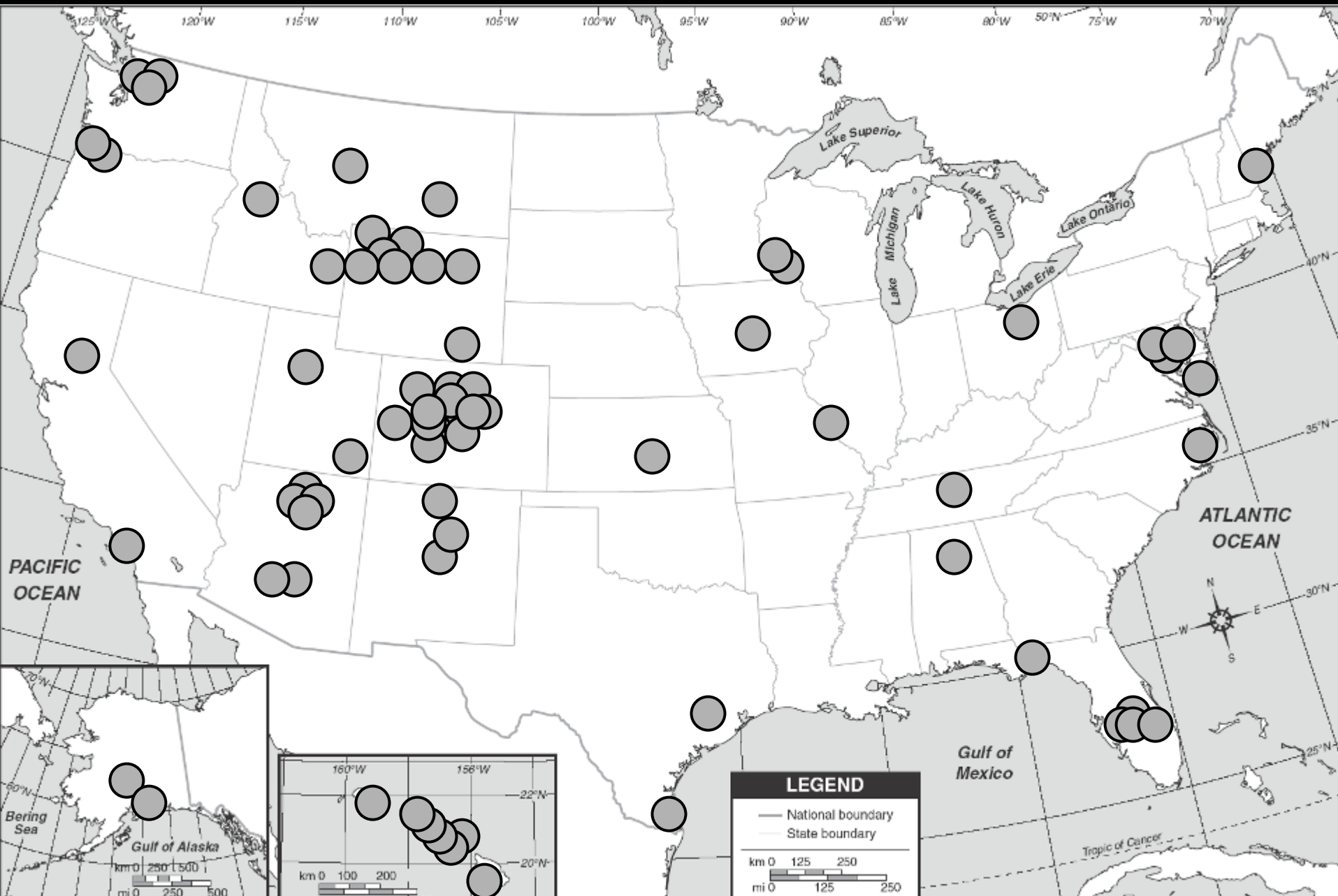




Transportation Planning??



Our Work





Five Practical Steps

To Healthy, Sustainable Mobility



Five Practical Steps

1. Pedestrian districts
2. Context-based pedestrian standards
3. Community transit networks
4. Spine non-motorized corridors
5. Connectivity Measures

But, first... some orientation

- “Mobility”
- Streets
- “Pedestrians”
- Pedestrian Environments
- Climate as Barrier to Walking & Biking
- Performance Monitoring
- Public Budgets

“Mobility”



Mobility Elements

Travel – Moving over distances

Circulation – Moving within areas

Access – Getting in the door

Facilities

Travel – Freeways, arterials, rail transit, express bus lanes

Circulation – Collectors, connectors, transit routes, bike trails and lanes

Access – Local streets, parking, sidewalks and crosswalks

Built for...



Seattle



Redmond

...travel

Built for...



Boulder



...travel

Built for...



Flagstaff

...circulation

Redmond

Portland

Built for...



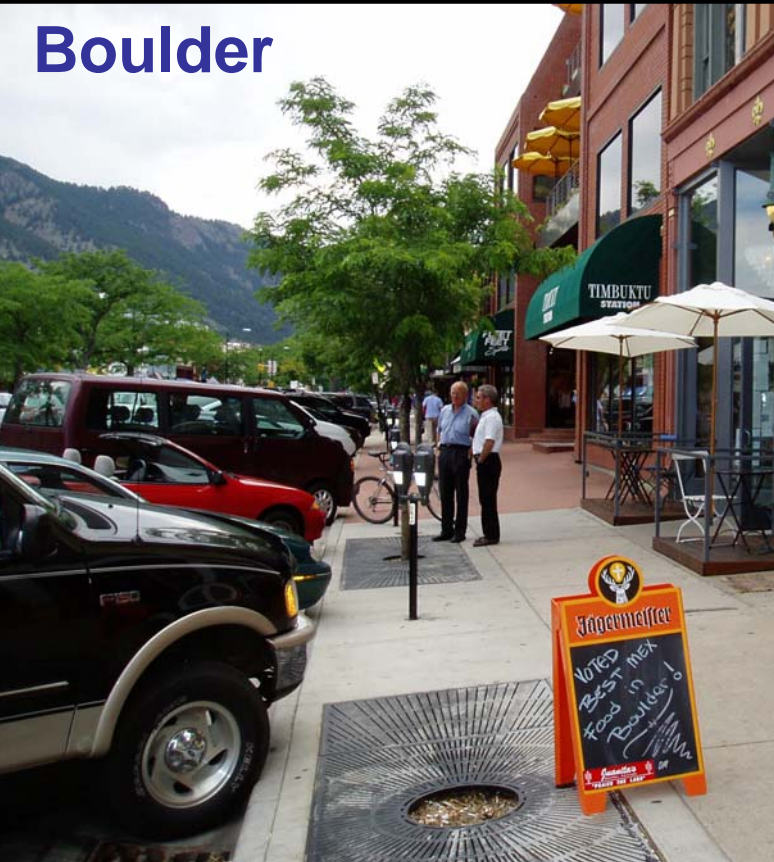
Boulder



...circulation

Built for...

Boulder



Winter Park, FL

...access



Circulation & access are much more important to **places** than travel



Streets



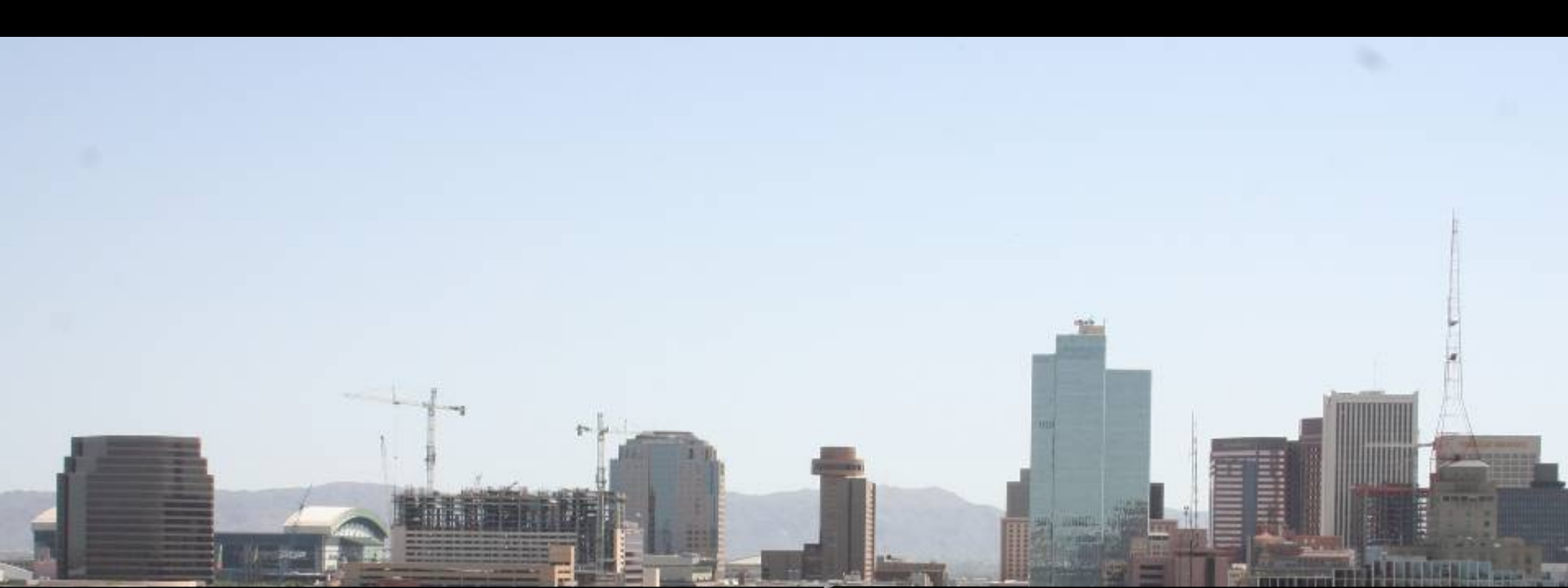
Neighborhood

**Abutting
Property**

**Abutting
Property**

Street





Neighborhood

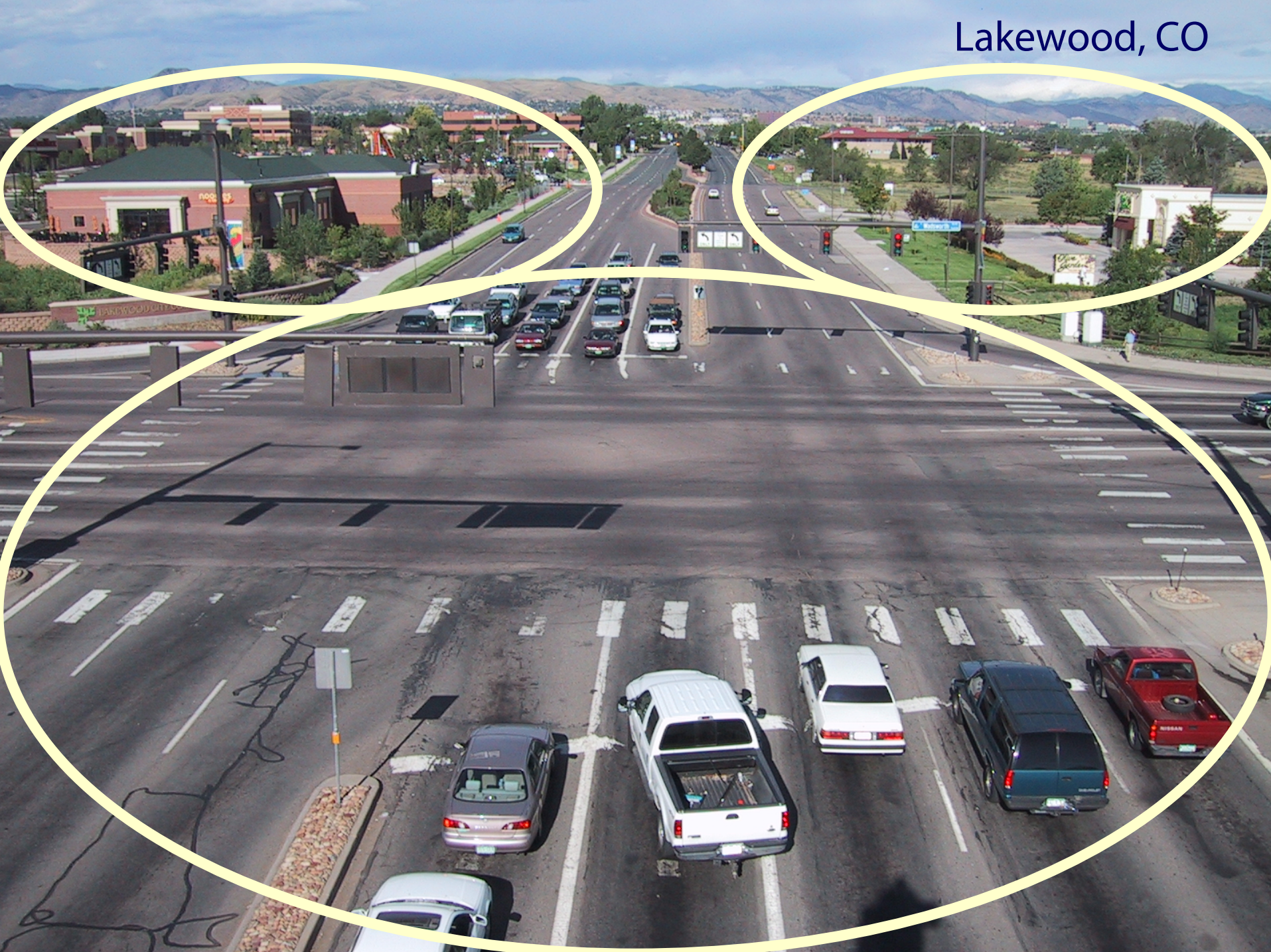


Street

Abutting Property









Longmont



Brooklyn



Portland

Prospect



You can't design a street like this...



Oahu

...and expect this to result.



Boulder

“Pedestrians”



Types of Walking

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

Rambling

Redmond



Rambling



Prospect

Upcountry
Maui



Rambling

Prospect



Rambling

Prospect



Rambling

Wailuku

Enter
←

First Hawaiian Bank

Utilitarian Walking



Kailua



Utilitarian Walking

A man in a blue t-shirt, light blue jeans, a white baseball cap, and a red backpack is walking on a paved sidewalk. He is holding a blue umbrella under his arm. The sidewalk is bordered by a grassy area and a wooden utility pole on the left. In the background, there is a multi-lane road with several vehicles, including a white SUV, a green pickup truck, and a black pickup truck. Traffic lights are visible above the road. The sky is overcast and grey.

Upcountry Maui Utilitarian Walking

Utilitarian Walking



Redmond

Boulder



Strolling, Lingerin

Winter Park, FL



Strolling, Linger

Pukalani



Strolling, Linger

Promenading



Boulder

Boulder



Special Events



Boulder

Special Events

“Pedestrian-Friendly”

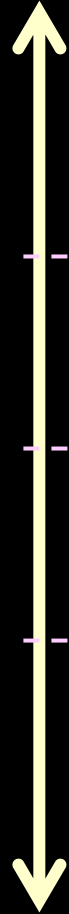


Pedestrian Environments

“Pedestrian Friendly”

Pedestrian Environment Continuum

Pedestrian Friendliness



Pedestrian Place/District

Pedestrian Supportive Environment

Pedestrian Tolerant Environment

Pedestrian Intolerant Environment

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 Place



Boulder

Miami Beach, FL



Pedestrian Place

Pedestrian Supportive

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

Redmond



Pedestrian Supportive

Mt. Vernon, IA

Pedestrian Supportive



Longmont



Pedestrian Supportive

Longmont - Prospect



Pedestrian Supportive

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

Redmond

Pedestrian Tolerant



Longmont



Pedestrian Tolerant

Pedestrian Tolerant

Maui



Maui



Pedestrian Tolerant

Pedestrian Tolerant



Pedestrian Intolerant

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

Longmont



Pedestrian Intolerant

Longmont

Pedestrian Intolerant



Maui



Pedestrian Intolerant

Jackson, WY



Pedestrian Intolerant

Maui



Pedestrian Intolerant

Flagstaff, AZ



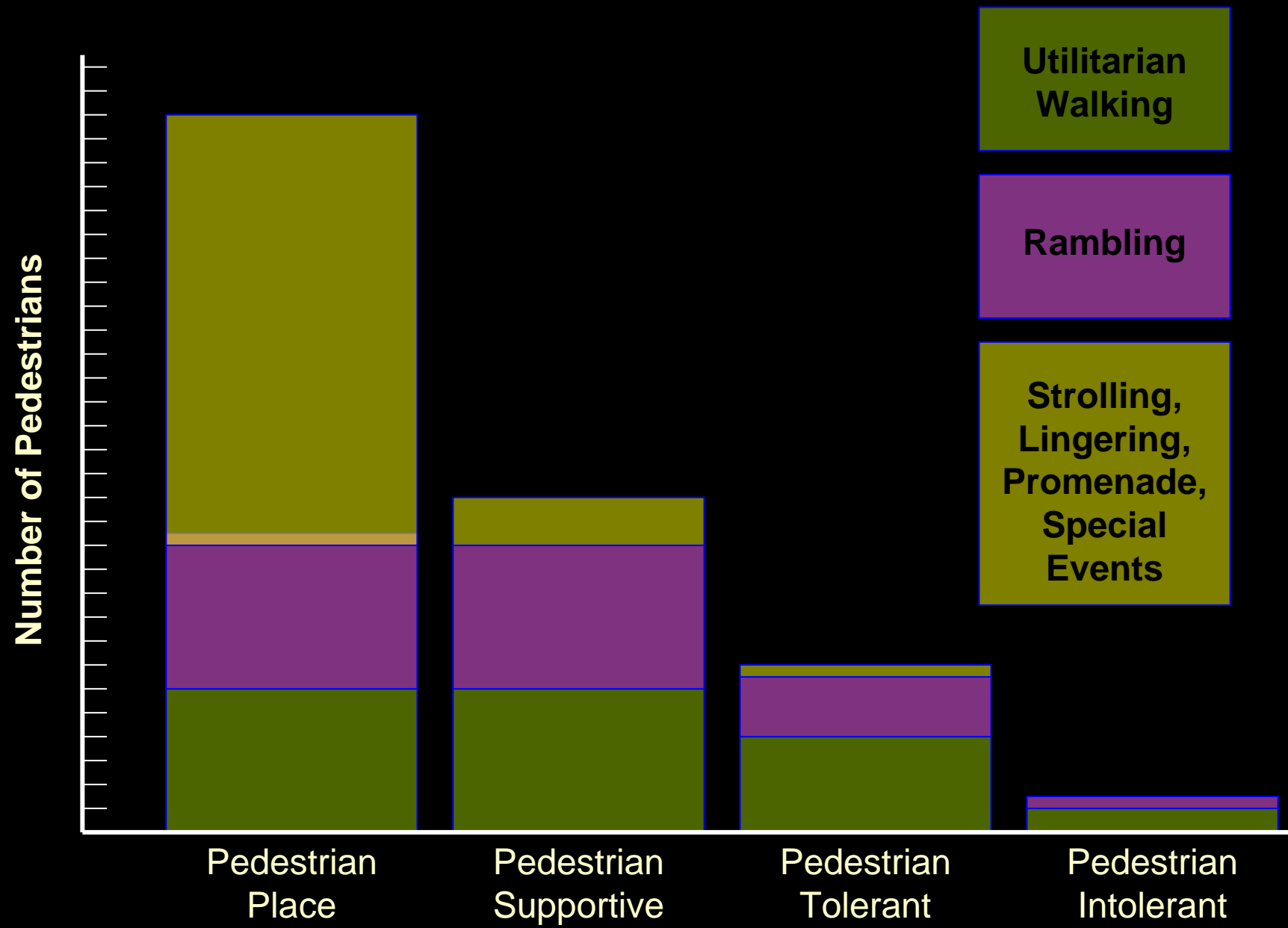
Pedestrian Tolerant

Pedestrian Intolerant



Flagstaff, AZ

Walk Environments and Types of Walking



Climate As Barrier to Walking & Bicycling

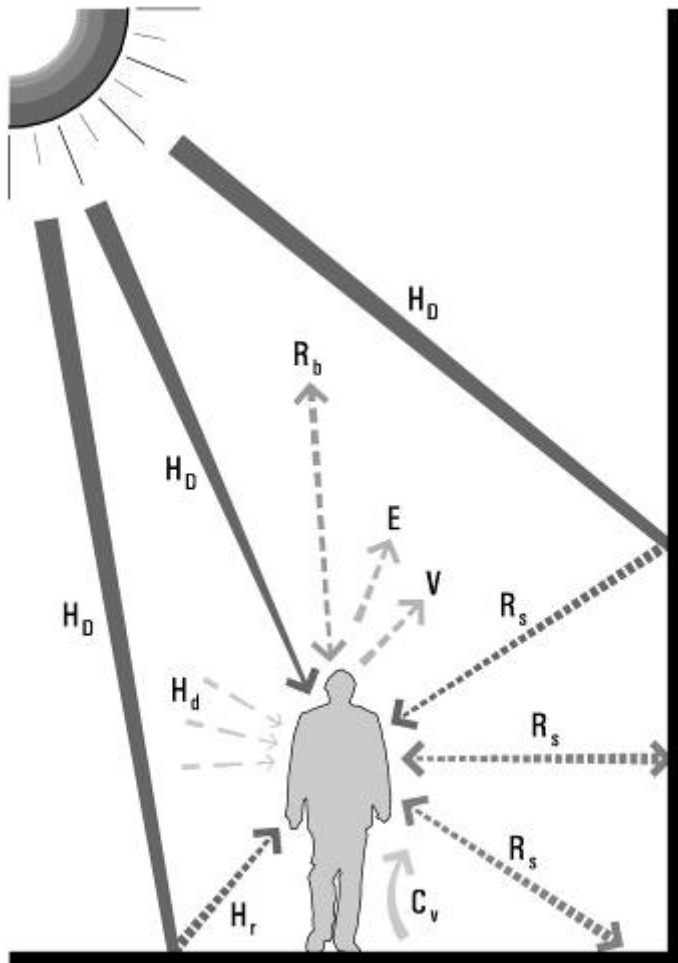




Girdwood, AK

OUTDOOR HEAT EXCHANGE

How the body adapts to the thermal environment



OUTDOOR THERMAL COMFORT DIAGRAM

H – Incident radiation

R – Long wave radiation between the body the surrounding surfaces and the sky

C – Convective interchange with the surrounding environment through air movement

V – Heat loss from the body from breathing

E – Heat loss through evaporation

VIEW LOOKING SOUTH ALONG --- FIRST STREET LINEAR PARK



TYPICAL STREET VIEW IN HIGH RISE DISTRICT

ASU/City of Phoenix



Potential Reduction in Perceived Ambient Temperature
for Pedestrians on Sidewalk = -12 degrees F

Performance Monitoring and Reporting

Modal Shift in the Boulder Valley

1990 to 2003



May 2004

Prepared for the
City of Boulder

by
National Research Center, Inc.

3005 30th Street
Boulder, CO 80301
(303) 444-7863
www.n-r-c.com

Performance Monitoring

Figure 4: Modal Split of Miles for Boulder Valley: 1990 to 2003

Travel Mode	Percent of Trips*						
	2003	2000	1998	1996	1994	1992	1990
Single-Occupancy Vehicle	44.0%	49.1%	48.1%	45.2%	46.2%	48.0%	50.0%
Multiple-Occupancy Vehicle	39.5%	35.9%	35.6%	41.3%	38.6%	37.3%	37.7%
Transit	5.5%	6.5%	7.0%	5.7%	6.4%	6.2%	4.1%
School Bus	0.2%	0.4%	0.6%	0.2%	0.2%	0.5%	0.2%
Bicycle	7.7%	4.7%	4.6%	4.3%	5.6%	5.4%	4.9%
Foot	3.0%	3.5%	4.1%	3.2%	2.9%	2.5%	3.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Number of Miles	31,248	28,689	25,562	30,042	30,300	29,761	29,634

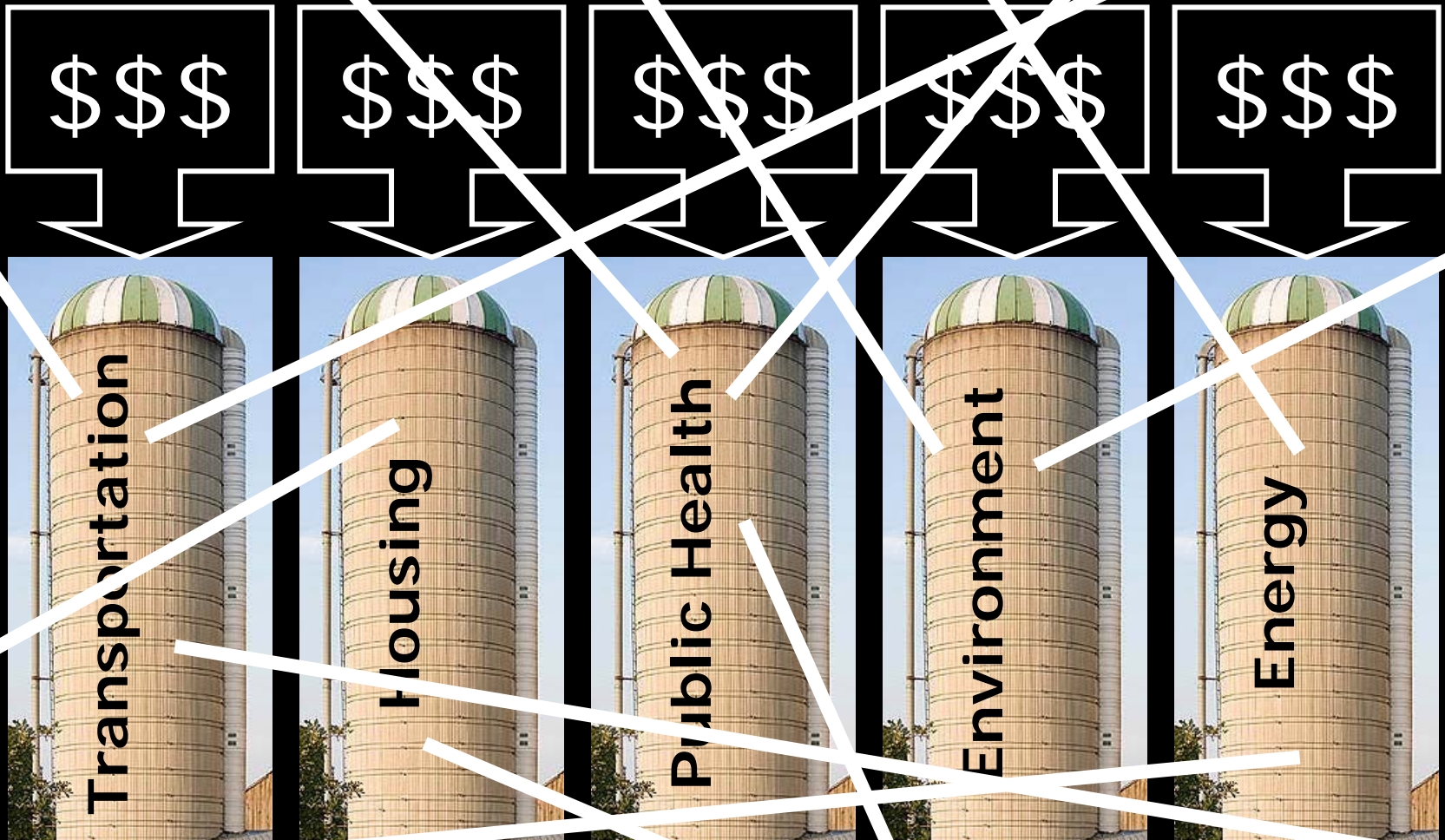
Modes with shifts that are statistically significantly different between 1990 and 2003 are bolded and shaded.

** These estimates have a margin of error of $\pm 1.3\%$ at a 95% confidence interval.*

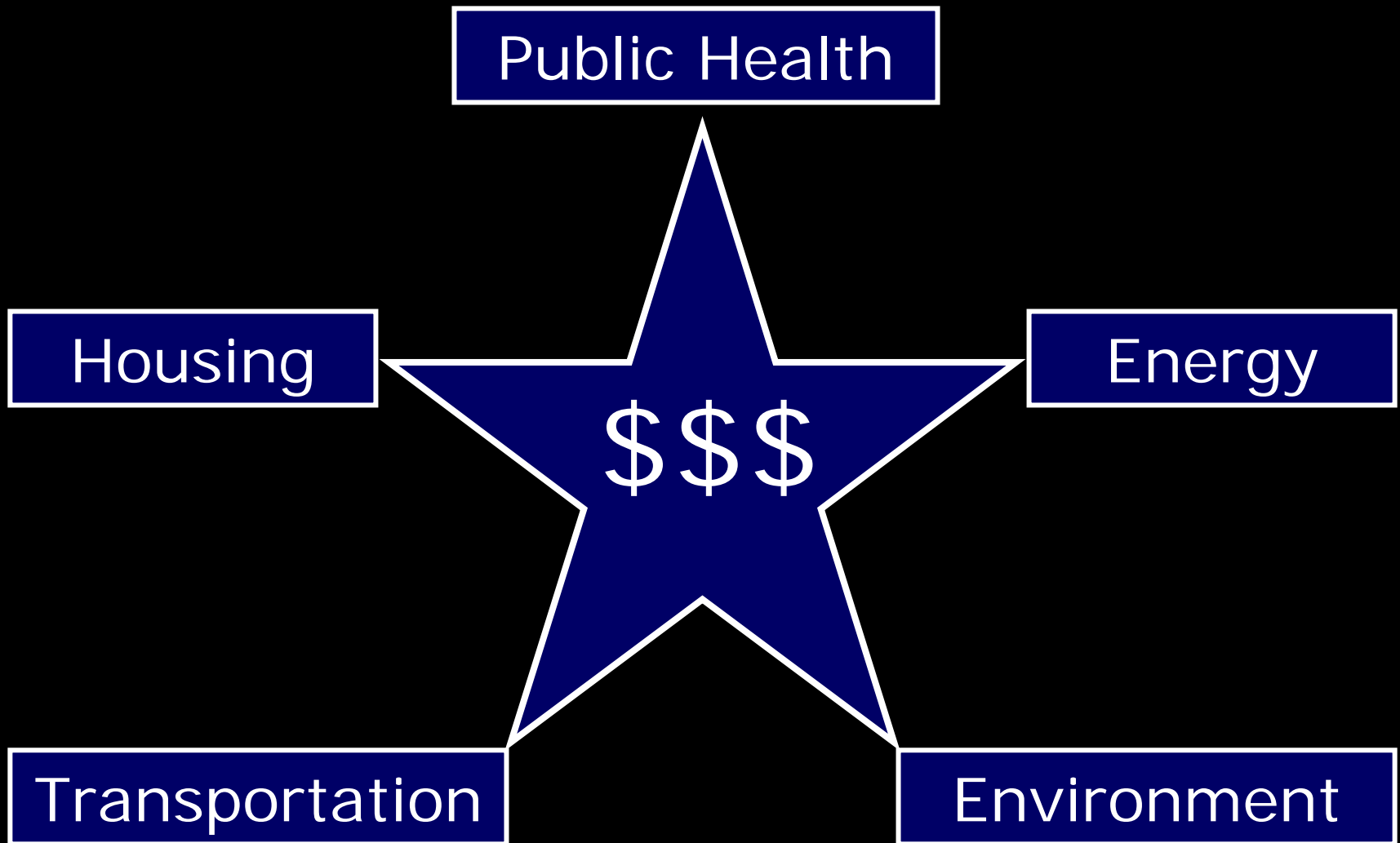
Public Budgets



Single Purpose Spending



Integrated, Strategic Investment



American Recovery and Reinvestment Act



American Recovery and Reinvestment Act



American Recovery and Reinvestment Act



American Recovery and Reinvestment Act



Five Practical Steps

To Healthy, Sustainable Mobility



Charlier Associates, Inc.

Five Practical Steps

1. Pedestrian districts
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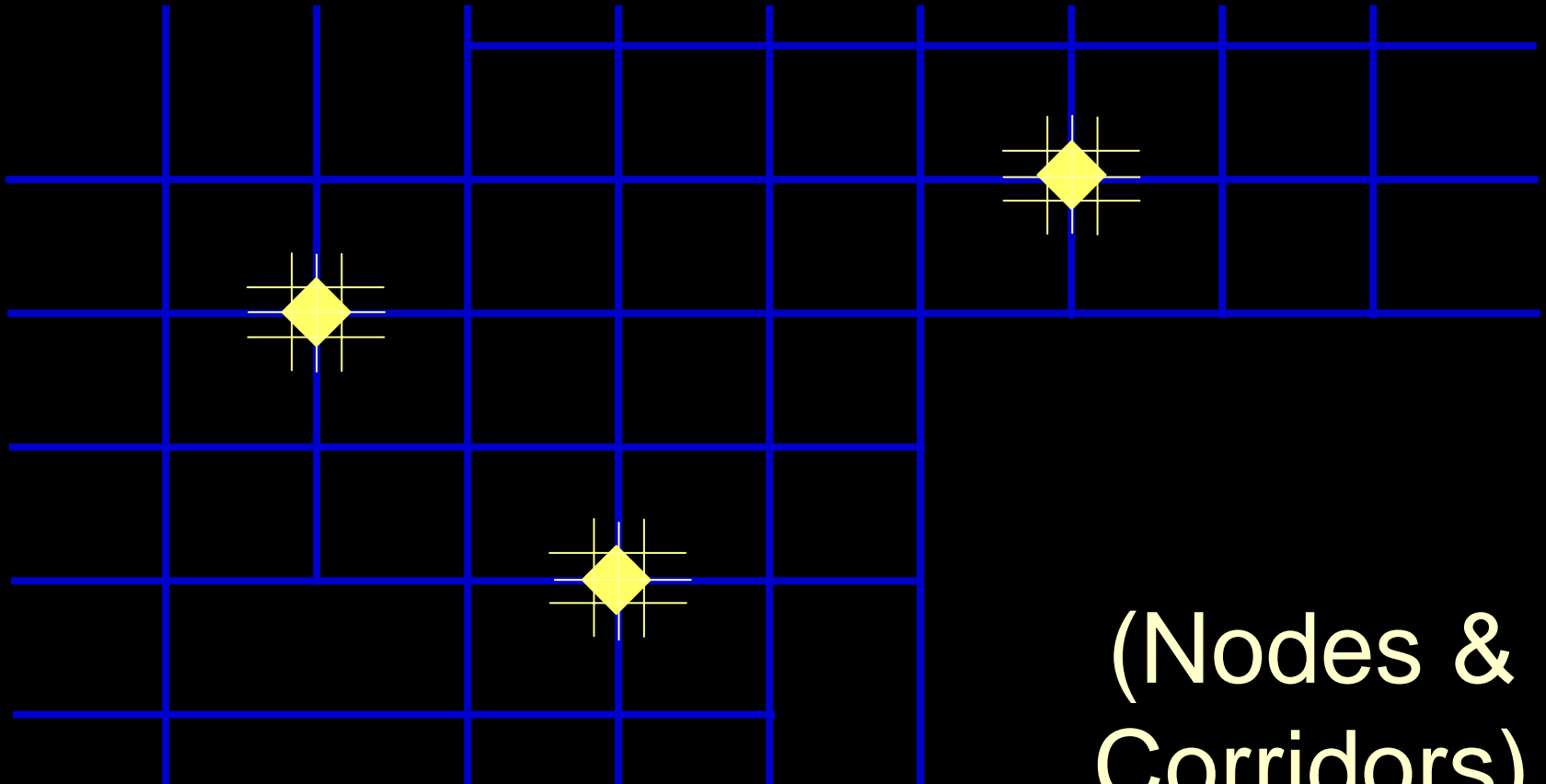


Boulder



Boulder

Strategic Approach to Pedestrian Environments

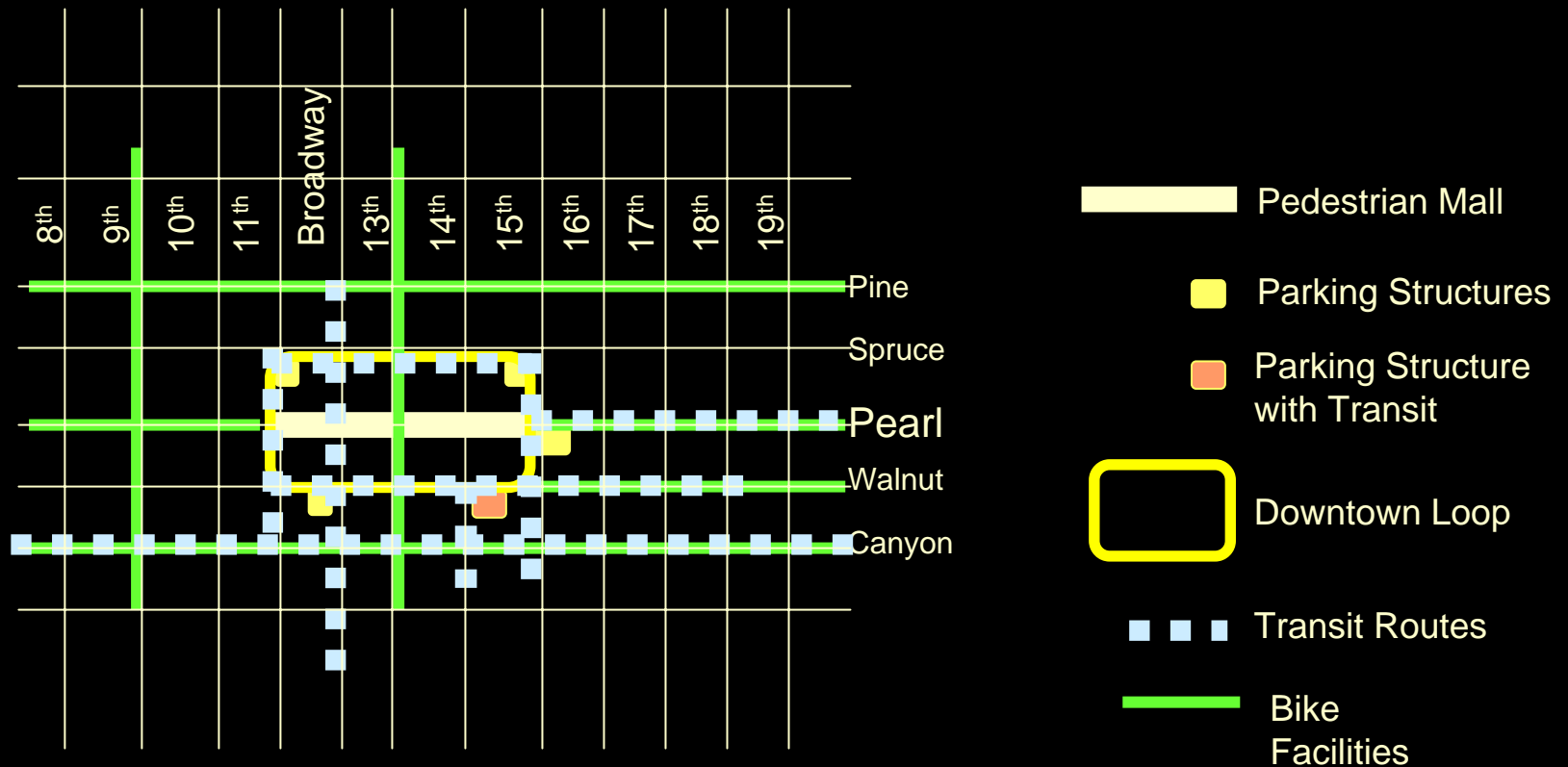


(Nodes &
Corridors)



Boulder

Pearl Street “Pedestrian Mall”





Boulder



Boulder



Boulder



Boulder



Boulder



Boulder



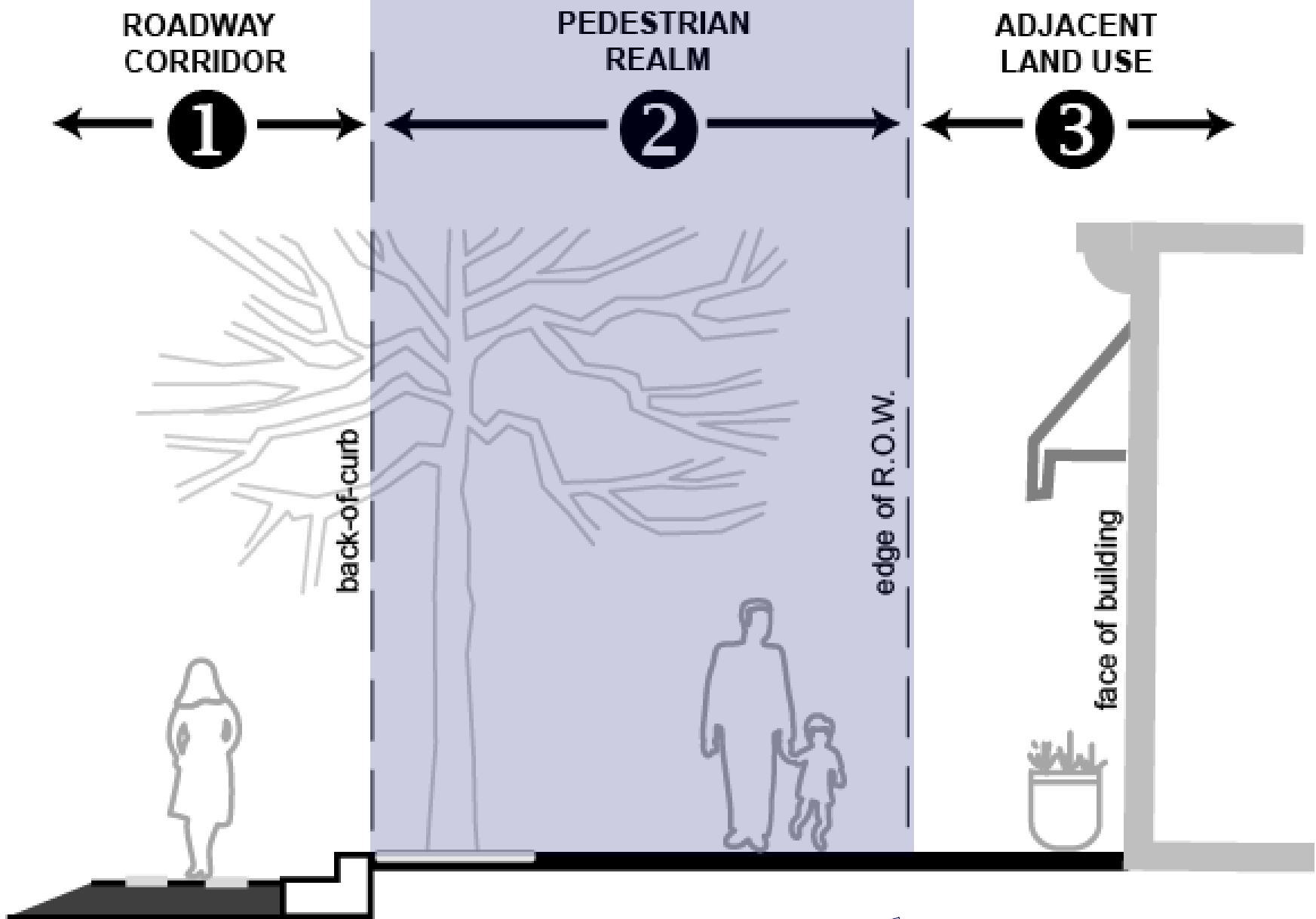
Boulder

Boulder's "pedestrian mall"
works because ...

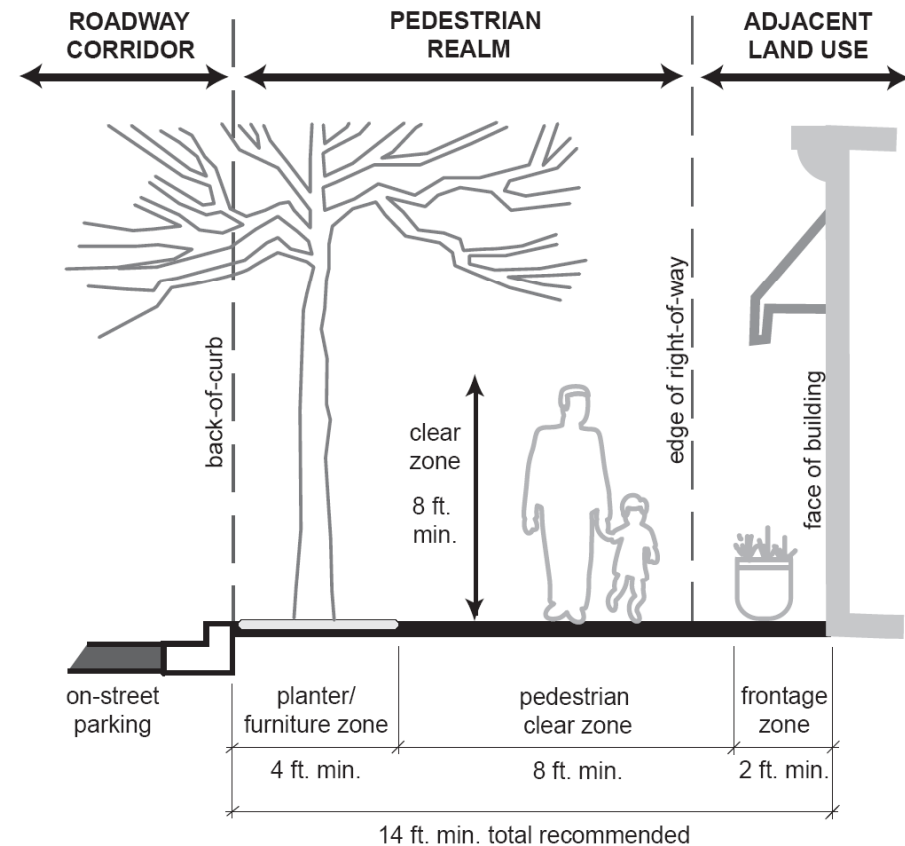
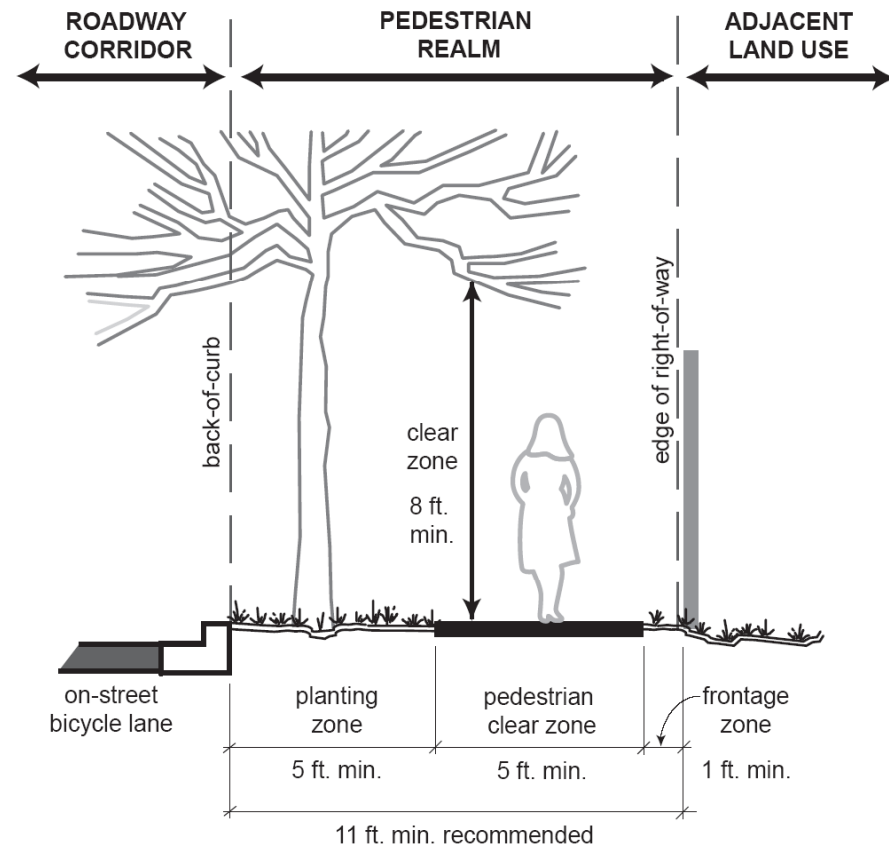
... it is an integral part of an
intermodal system

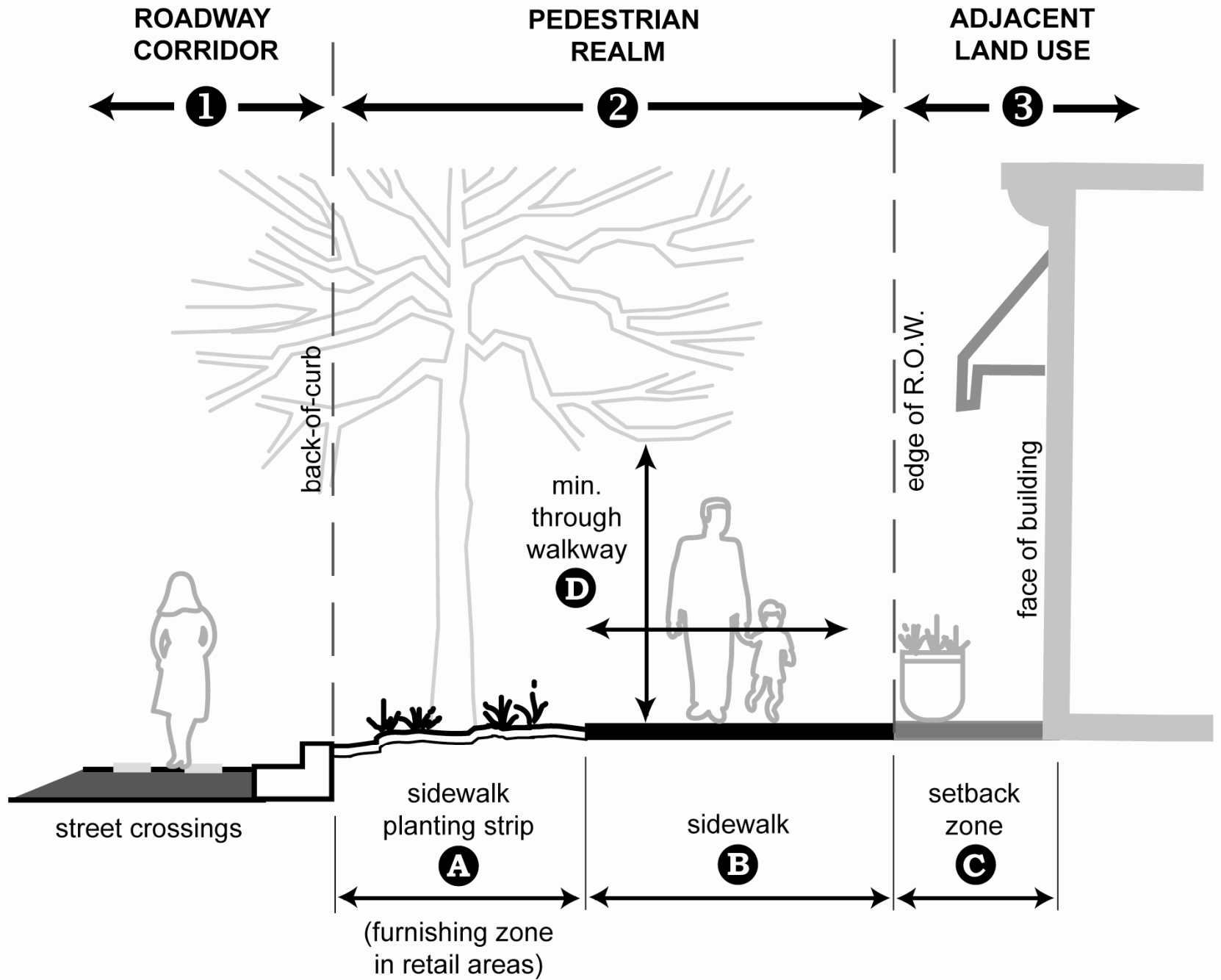
Five Practical Steps

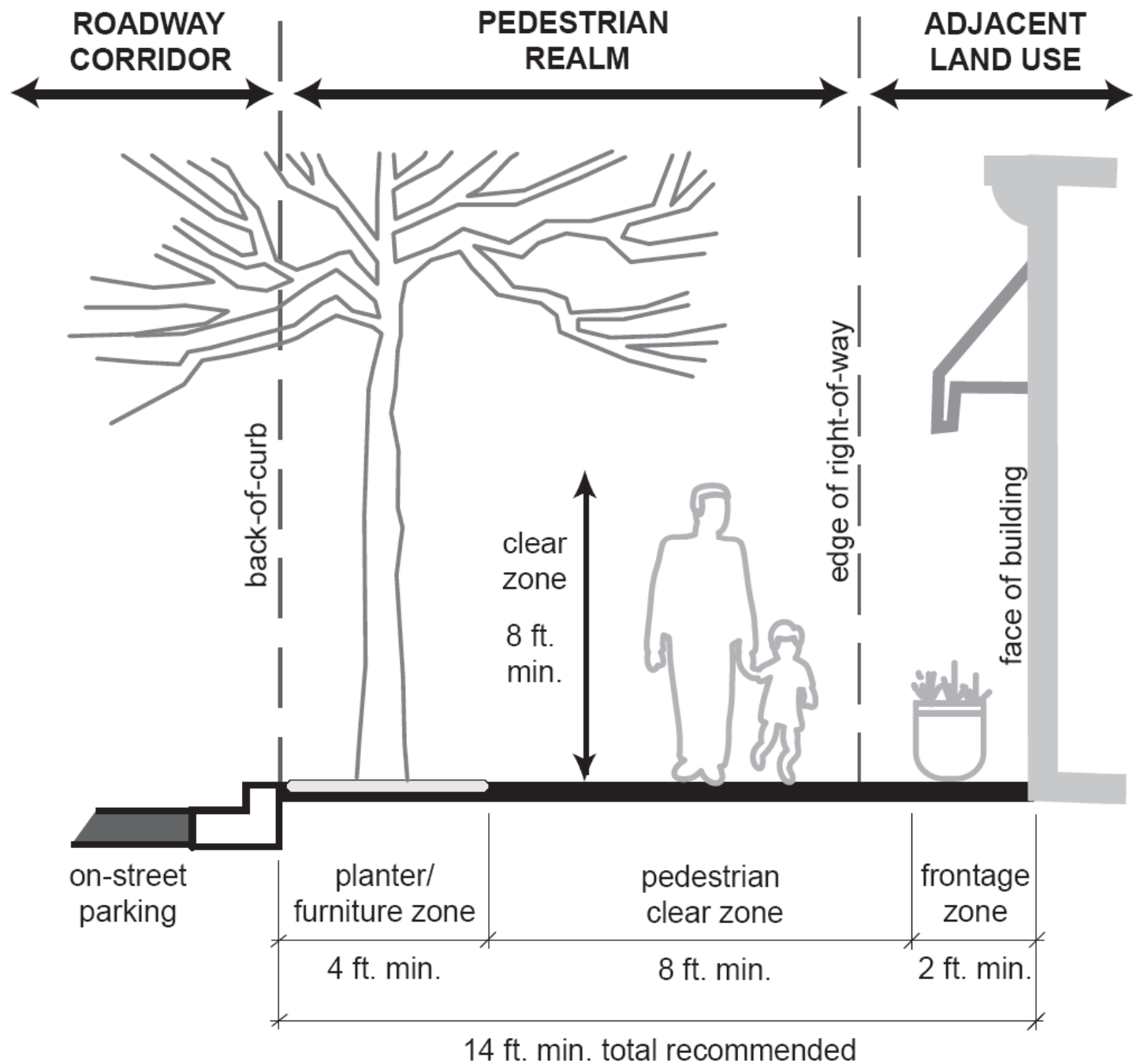
1. Pedestrian districts
2. Context-based pedestrian standards
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5. Connectivity Measures



Importance of Place Type









Boulde

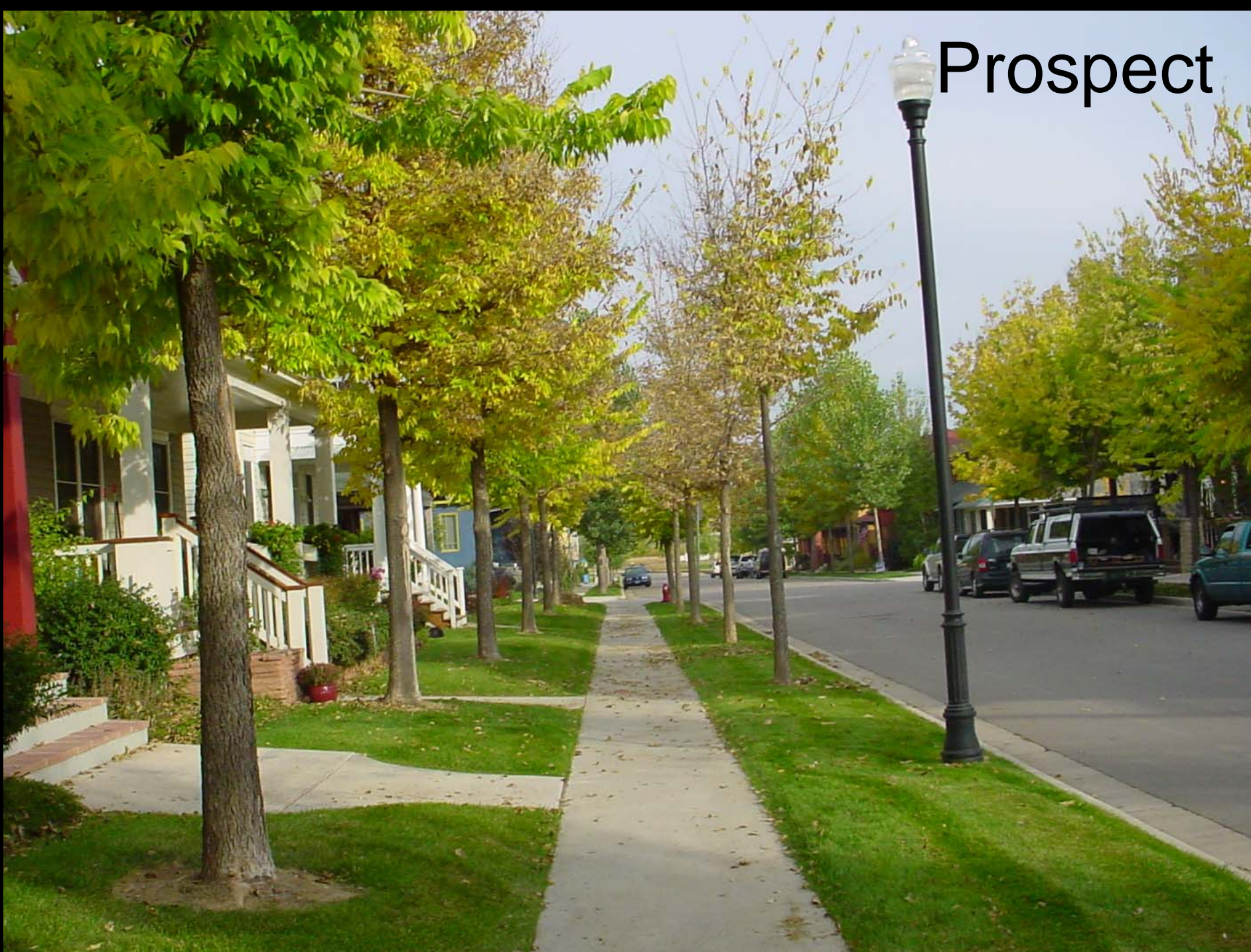
Kailua



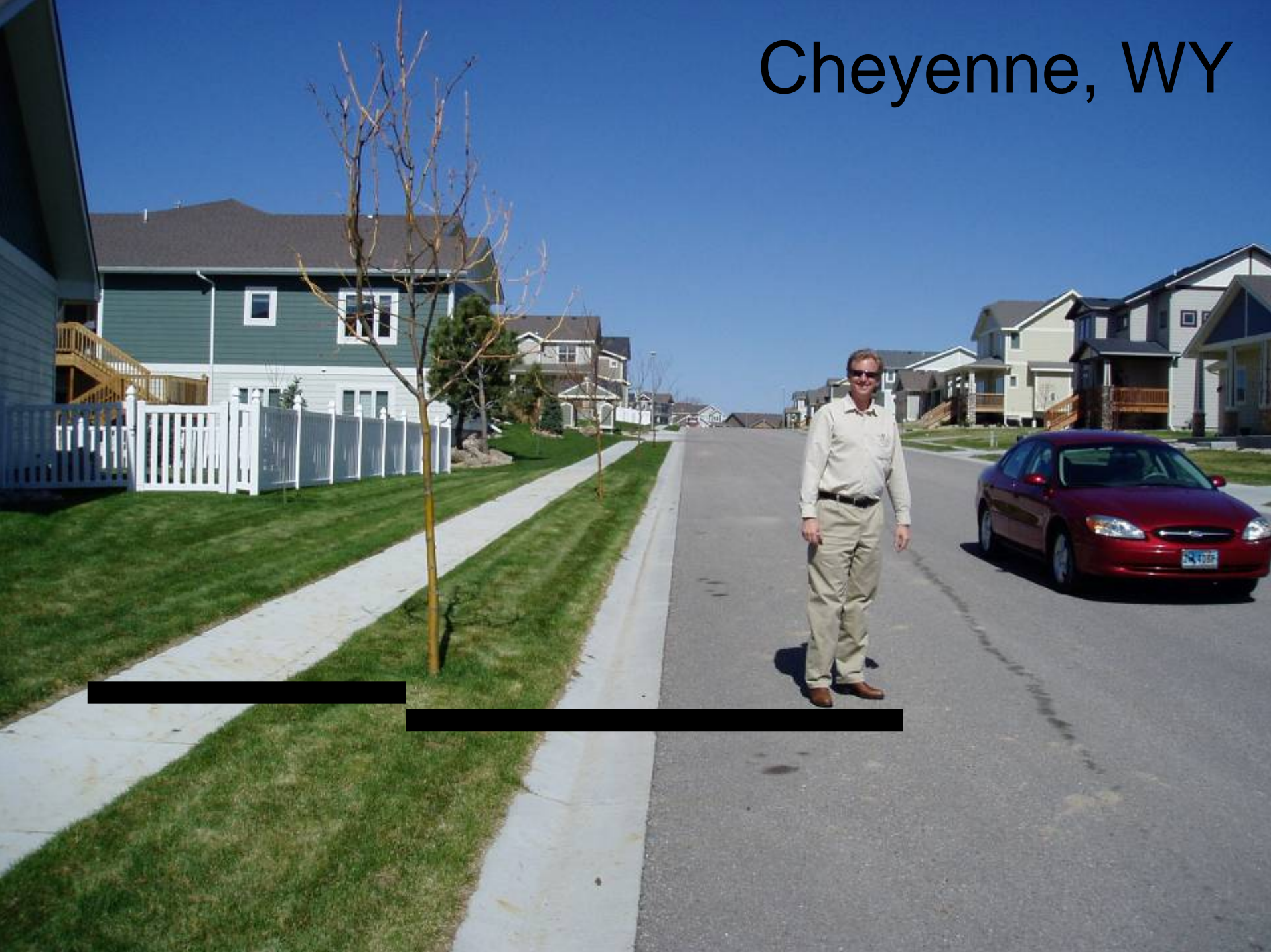
Kailua



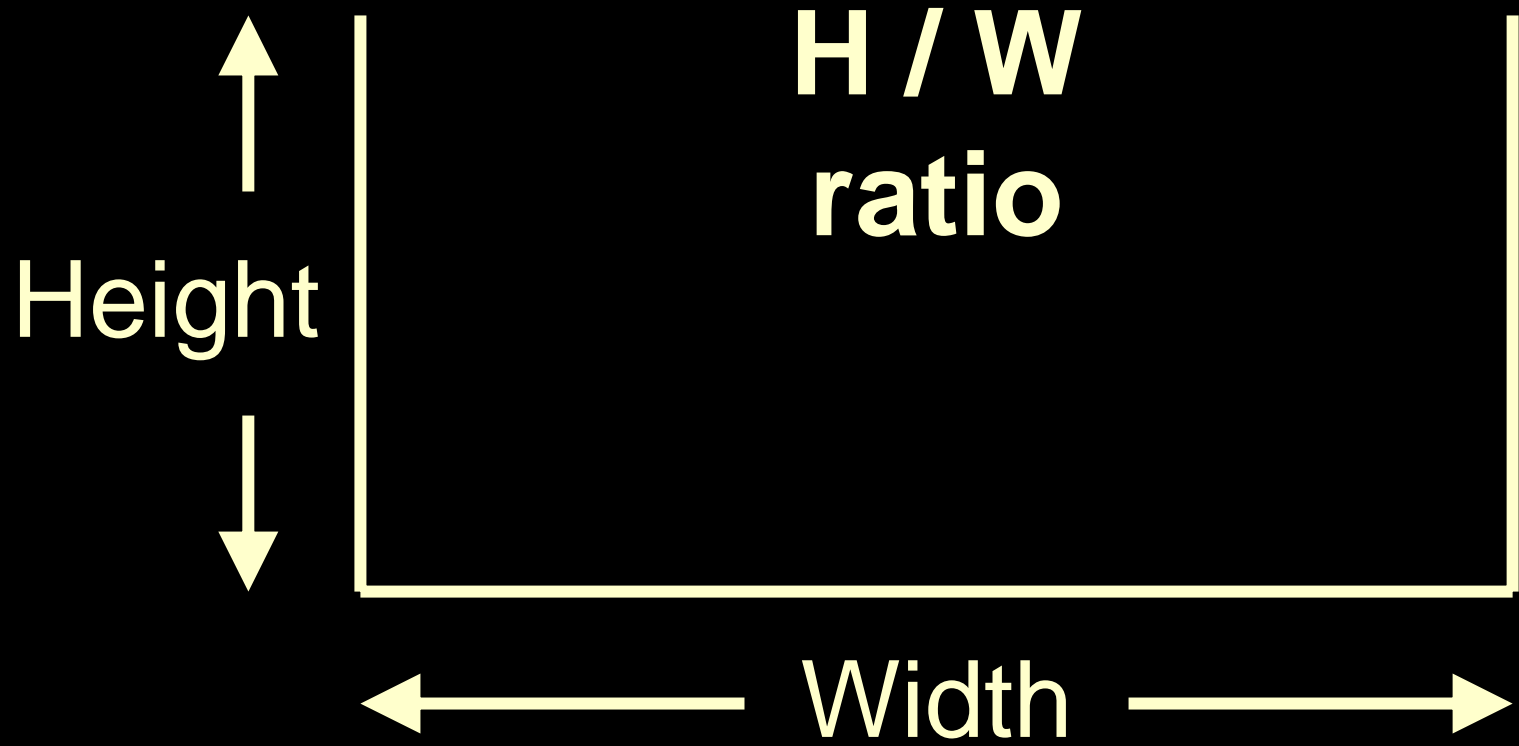
Prospect



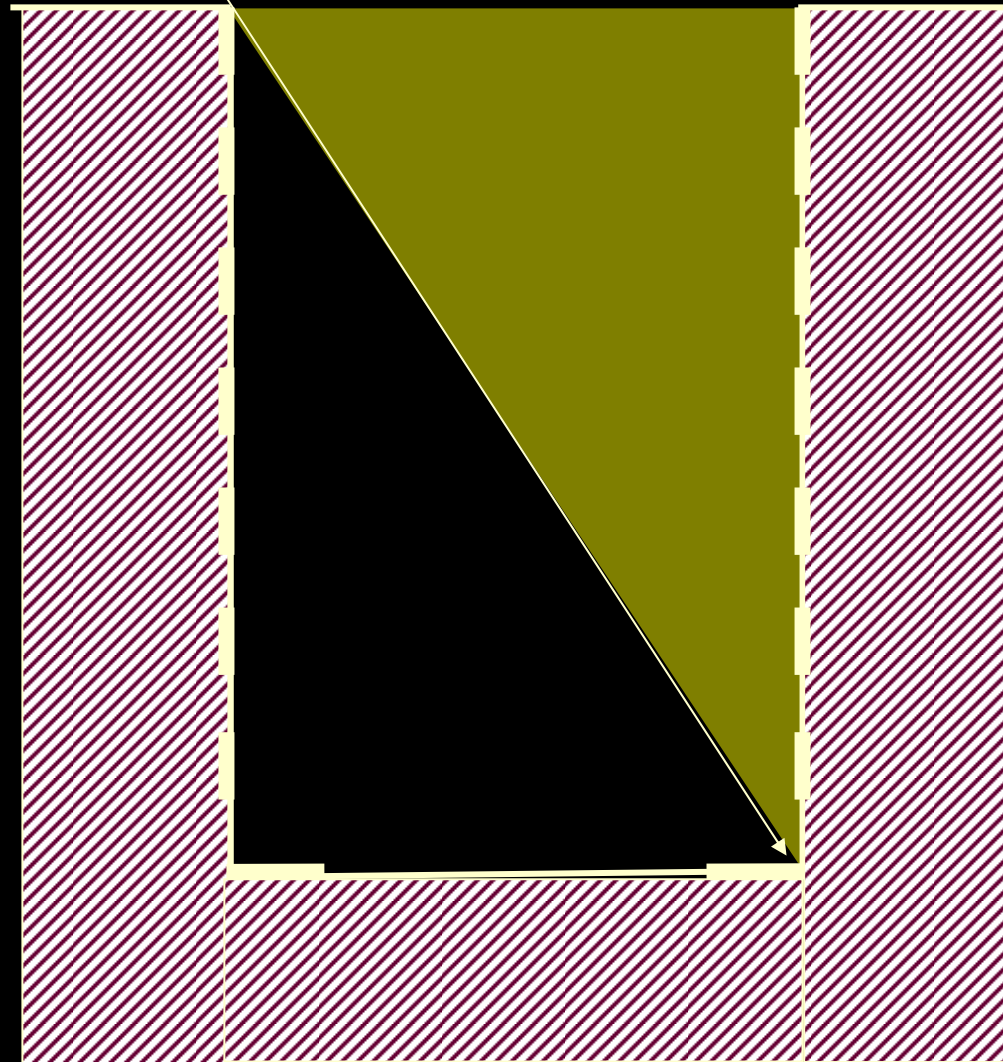
Cheyenne, WY



Urban Scale

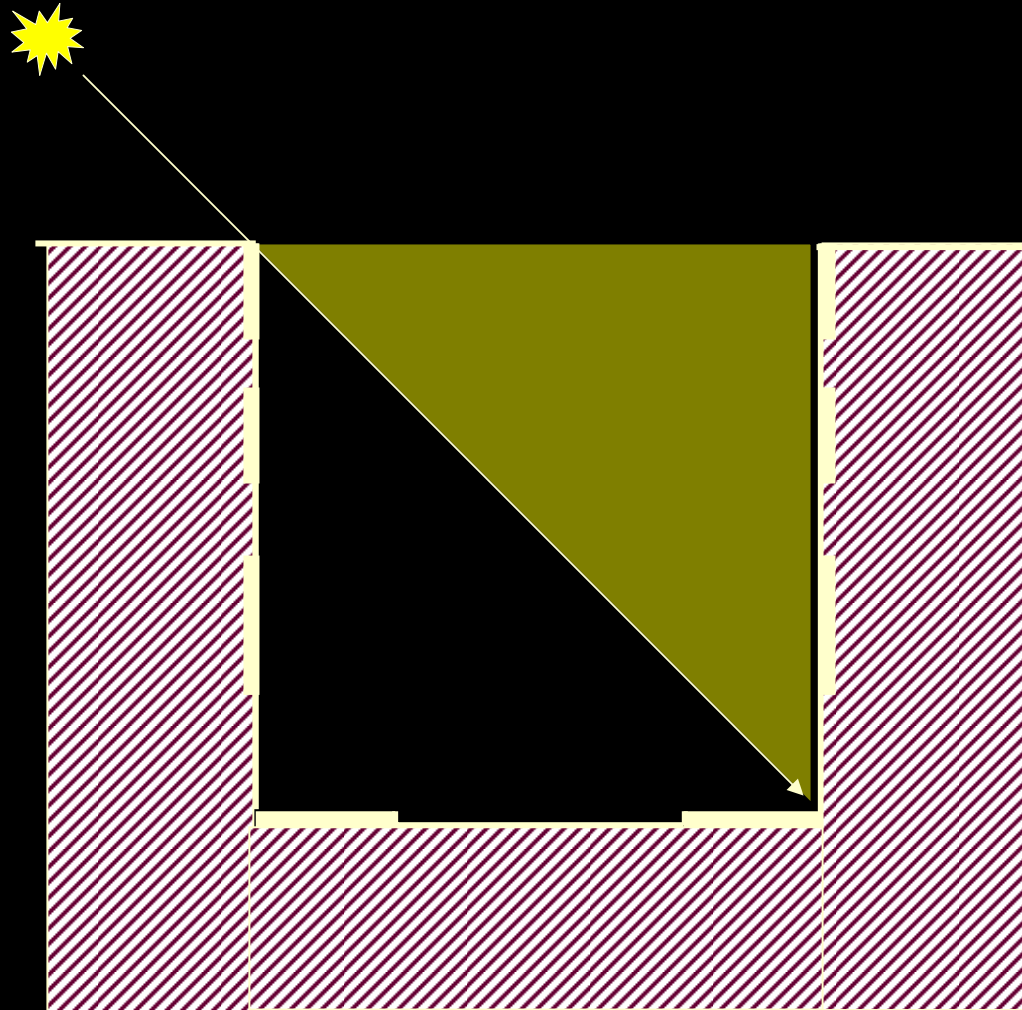


Urban Scale



3:2 Height to Width Ratio

Urban Scale



1:1 Height to Width Ratio

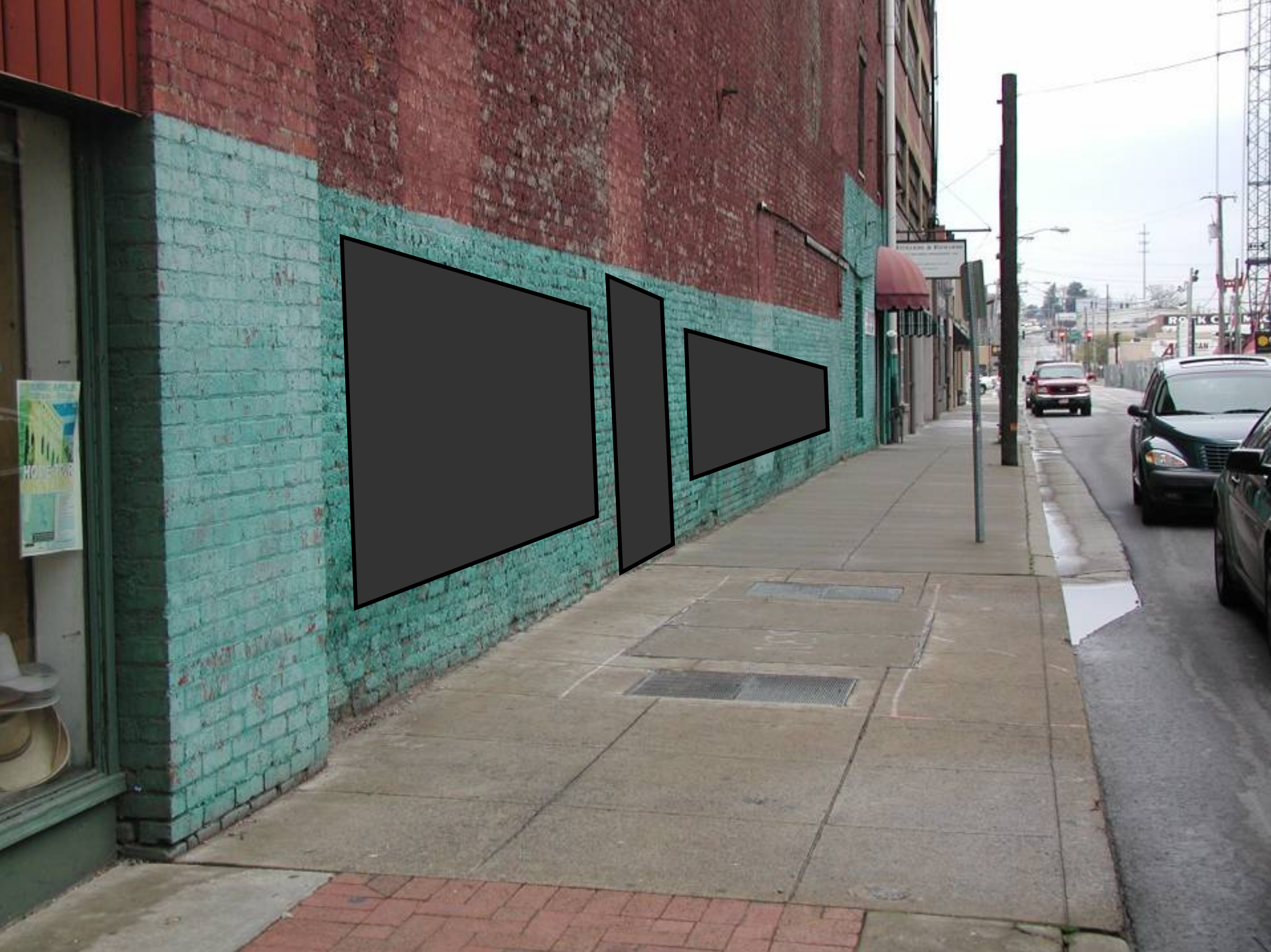
Urban Scale



1:4 Height to Width Ratio

Driggs, ID

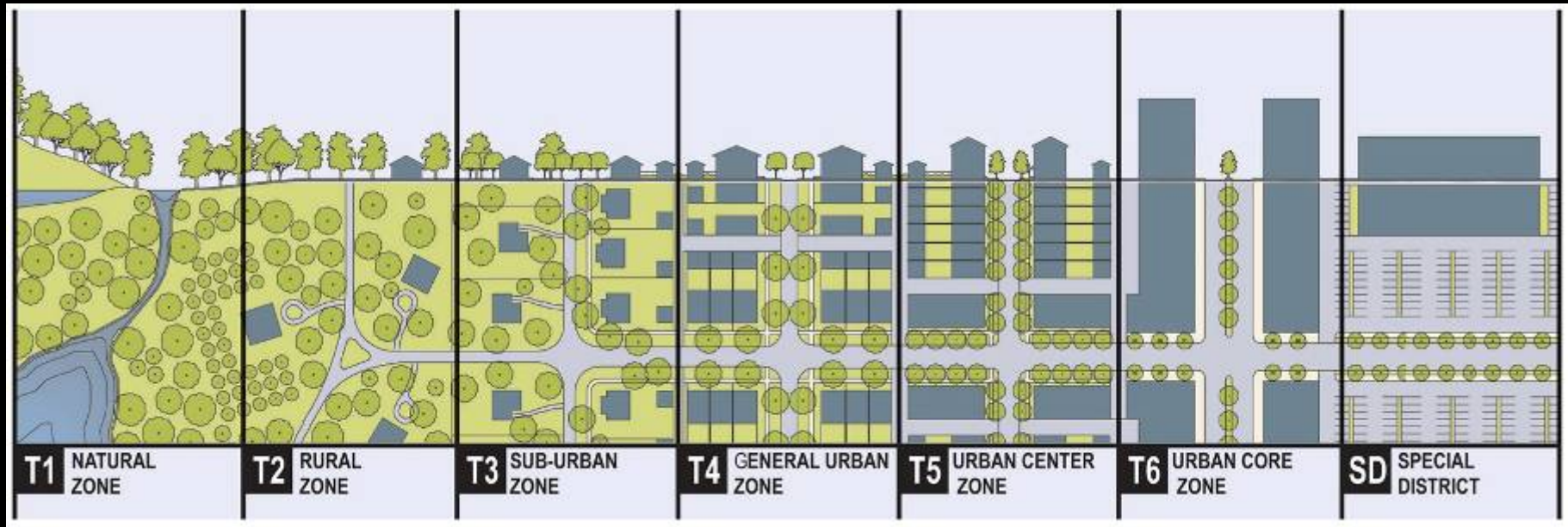






Longmont

Urban “Transect”



RURAL

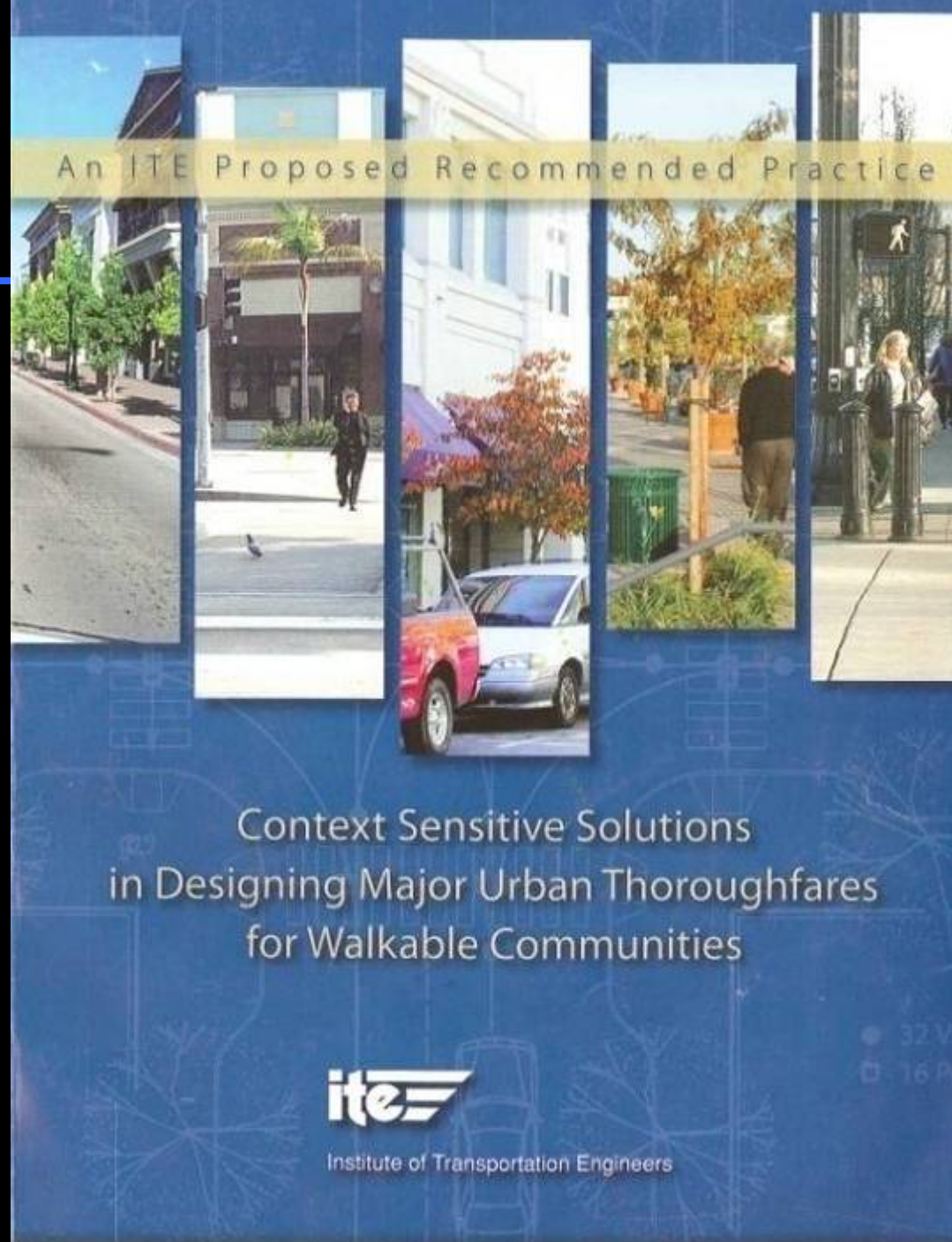


URBAN

Context

Underlying
Principle:

Design should
reflect context of
the service
environment





Pedestrian Intolerant



Pedestrian Tolerant



Pedestrian Supportive



Pedestrian Place

② Pedestrian Realm

Physical Characteristics	Sidewalk Presence	<ul style="list-style-type: none"> Local streets have no sidewalks. Arterial streets have sidewalks on only one side of street. 	<ul style="list-style-type: none"> Local streets have sidewalks on only one side of street. Arterial streets have sidewalks on both sides. 	<ul style="list-style-type: none"> All streets have sidewalks provided on both sides 	<ul style="list-style-type: none"> All streets have sidewalks provided on both sides with supplemental traffic-calming measures
	Sidewalk Location and Width	<ul style="list-style-type: none"> Sidewalks lacking, or provided immediately back of curb. Walkway width < 5' 	<ul style="list-style-type: none"> Sidewalks provided immediately back of curb. Walkway width 5' min. 	<ul style="list-style-type: none"> Walkway separated from vehicular traffic by a 5' sidewalk planting strip. Sidewalk 6'-8' wide to accommodate passing and pairs of pedestrians walking side by side. Next to transit stops, sidewalks are 10' wide and extend to street at boarding spot. 	<ul style="list-style-type: none"> The pedestrian realm includes a sidewalk planting strip/pedestrian furnishings zone next to street, a walk/talk zone, and a shy zone next to buildings. Through walkway space 8'-10' wide; overall sidewalk width 10'-30' to provide space for pedestrian amenities.
	Sidewalk Planting Strip	None.	None.	<ul style="list-style-type: none"> 5' minimum, ideally with overstory street trees 20'-30' on center, with clear sight distance triangles at intersections and crossings. 	<ul style="list-style-type: none"> 5' – 10' with overstory street trees in parkway planting strips, or none if tree wells and supplemental planters are provided within wide sidewalks, with clear sight distance triangles.
Pedestrian Amenities	Transit Stops	<ul style="list-style-type: none"> No furniture groupings provided. 	<ul style="list-style-type: none"> Benches provided at transit stops. 	<ul style="list-style-type: none"> Shelters, benches and trash receptacles provided at transit stops. 	<ul style="list-style-type: none"> Transit stops and amenities are integral in the design of pedestrian places.
	Pedestrian Furnishings	None.	<ul style="list-style-type: none"> No furnishings along streets not on transit routes. 	<ul style="list-style-type: none"> Pedestrian furniture groupings located intermittently along non-transit streets. Pedestrian wayfinding provided. 	<ul style="list-style-type: none"> Pedestrian furniture groupings, sculpture, drinking fountains, decorative fountains, wayfinding, etc. are located throughout.
	Lighting	None.	<ul style="list-style-type: none"> High angle highway lamps, such as cobra heads. 	Commercial districts have both: <ul style="list-style-type: none"> High angle lamps. Additional low angle street lamps for improved lighting at ground level. 	Pedestrian places have: <ul style="list-style-type: none"> Overall street lighting. Low placement of tungsten lamps. Additional light emitted from stores that line the street.

Five Practical Steps

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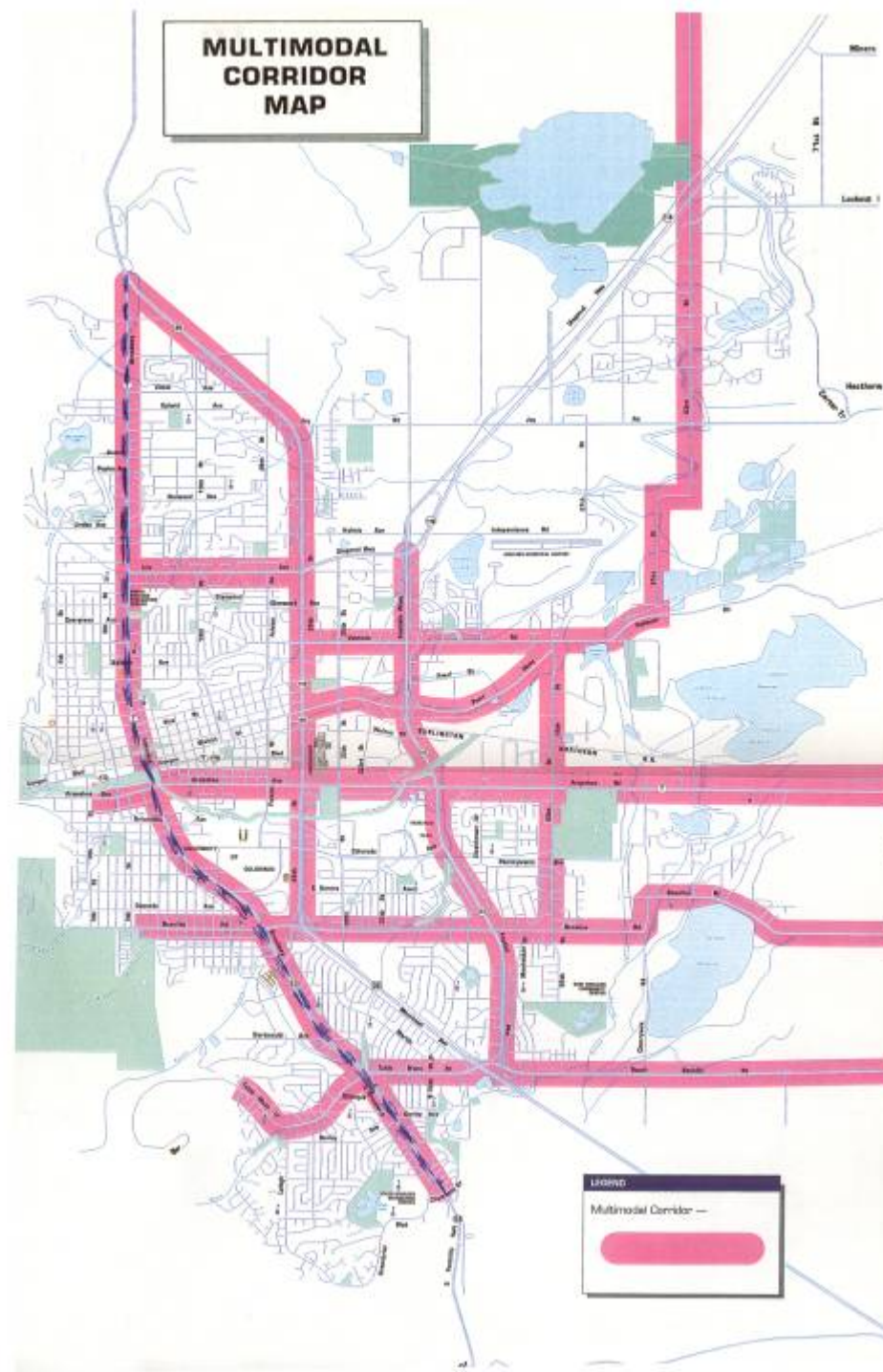
Boulder, CO

Multimodal Corridors



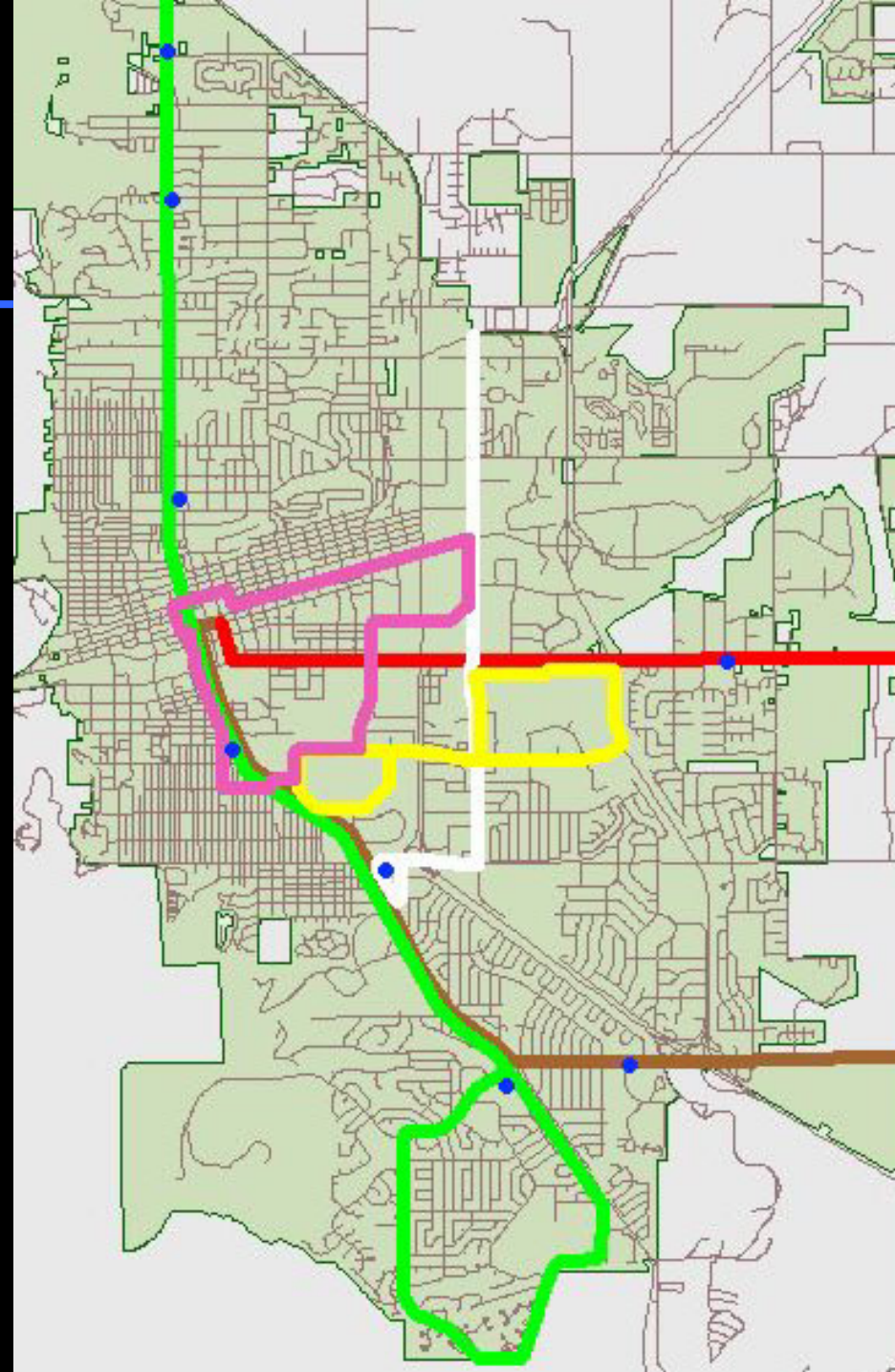
Multimodal Corridors

Original 1995
Concept

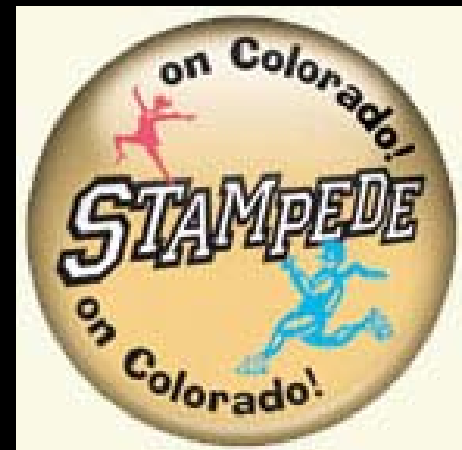


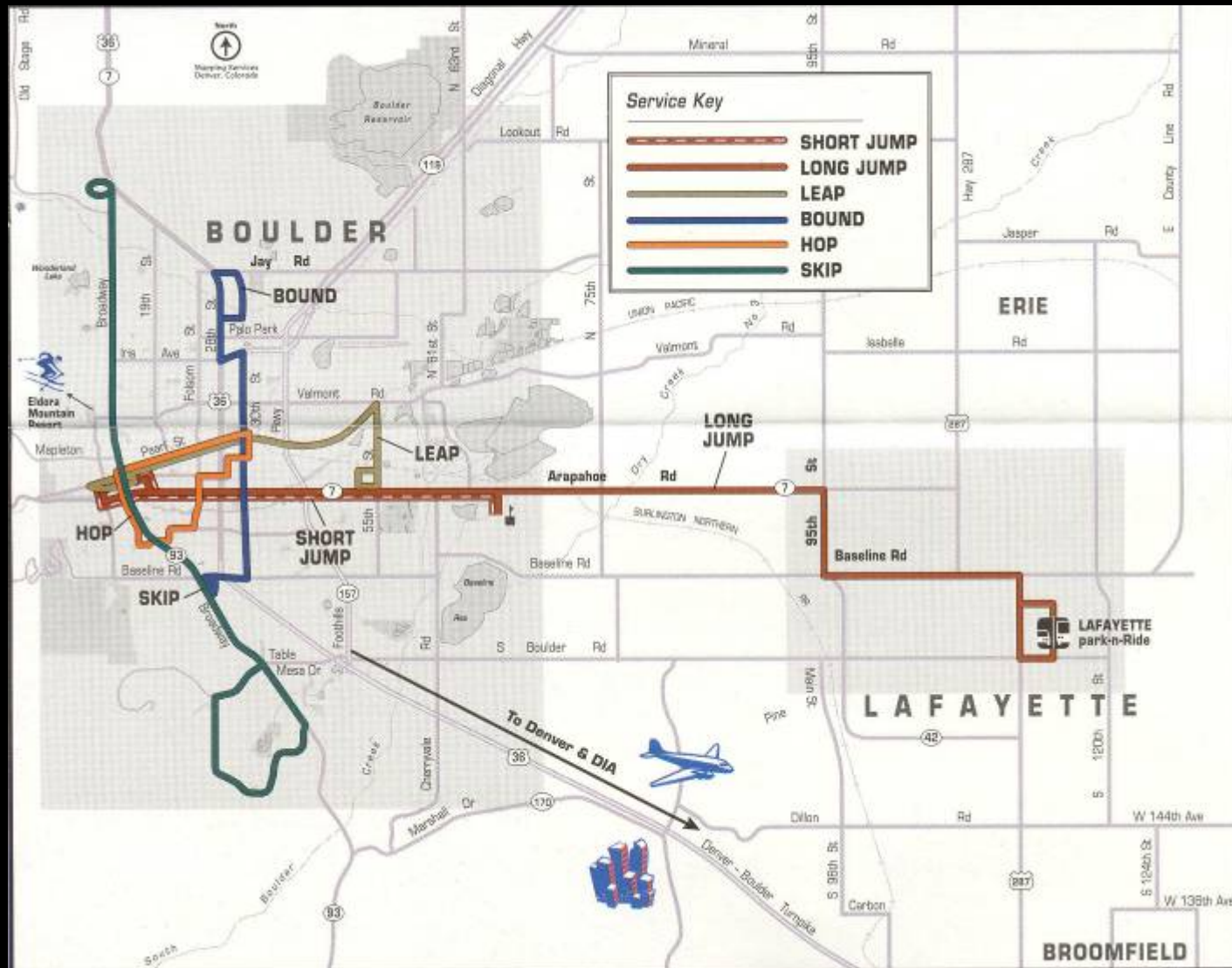
Boulder CTN

Original 1995 Concept



Community Transit Network





Boulder Transit Mode Share – All Trips

1990



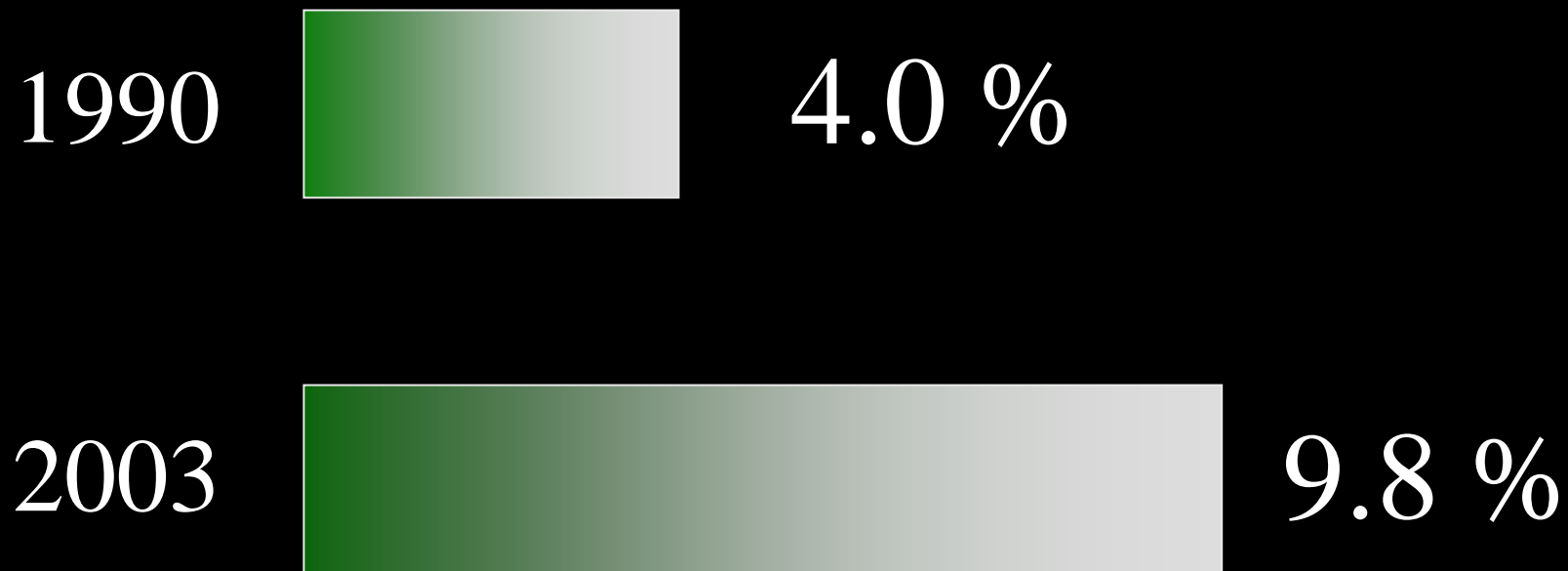
4.1 %

2003



5.5 %

Boulder Transit Mode Share – Commute Trips



Five Practical Steps

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The Boulder Creek Path

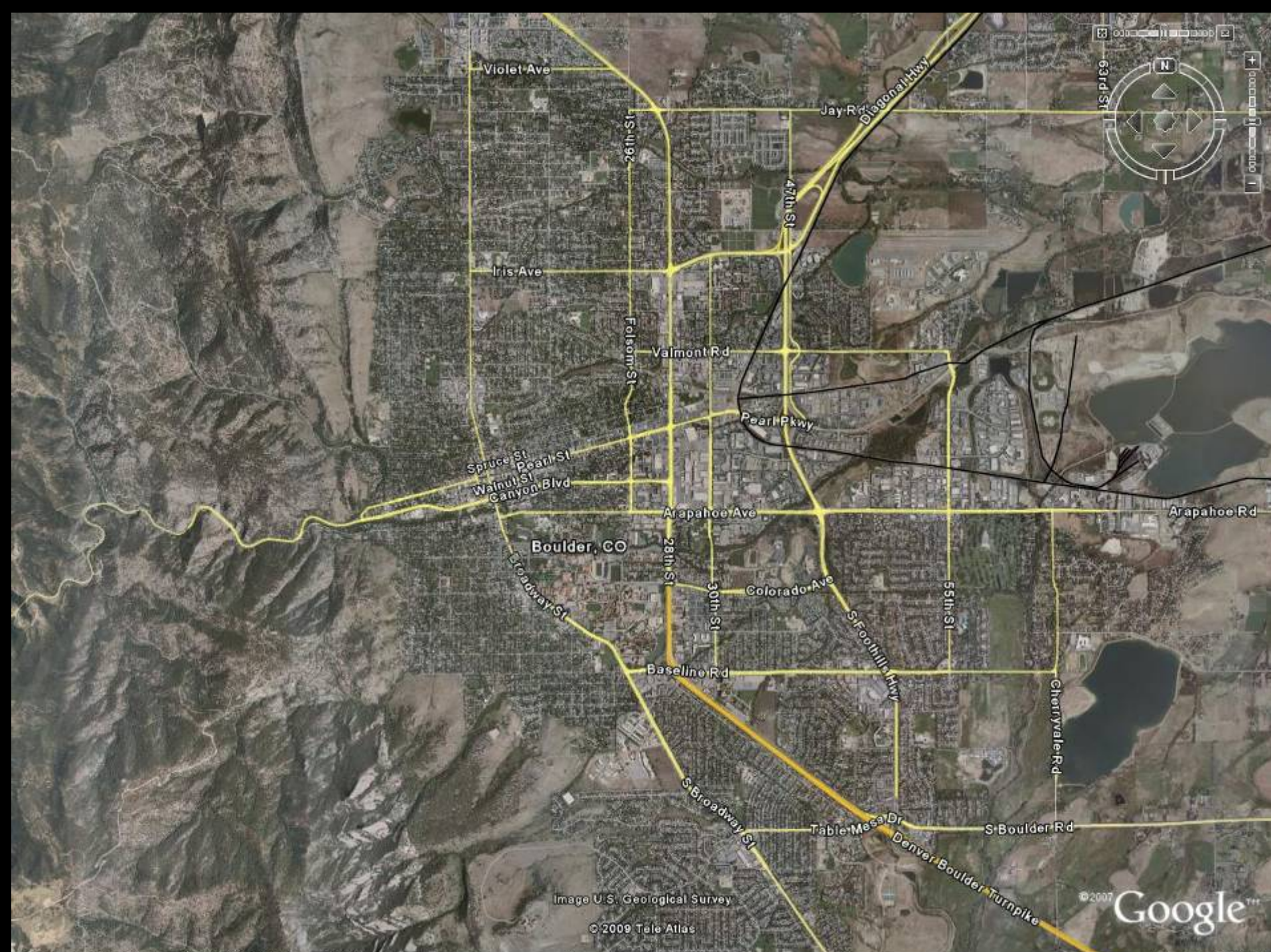
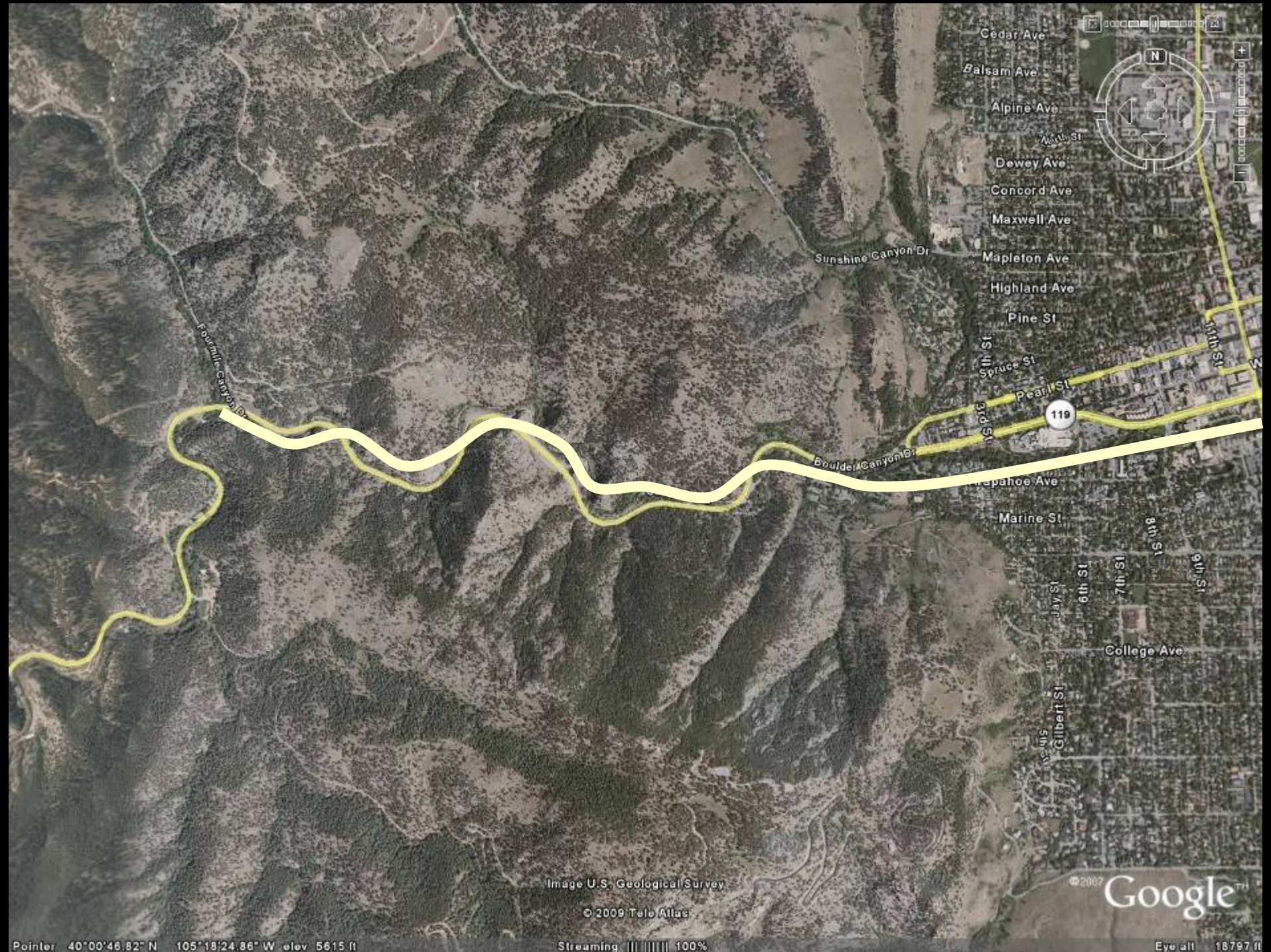


Image U.S. Geological Survey

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Google™



Cedar Ave
Balsam Ave
Alpine Ave
Wash St
Dewey Ave
Concord Ave
Maxwell Ave
Mapleton Ave
Highland Ave
Pine St
5th St
Spruce St
Pearl St
119
3rd St
Boulder Canyon Dr
Pahoe Ave
Marine St
8th St
6th St
7th St
9th St
College Ave
Gilbert St
4th St
5th St



Image U.S. Geological Survey

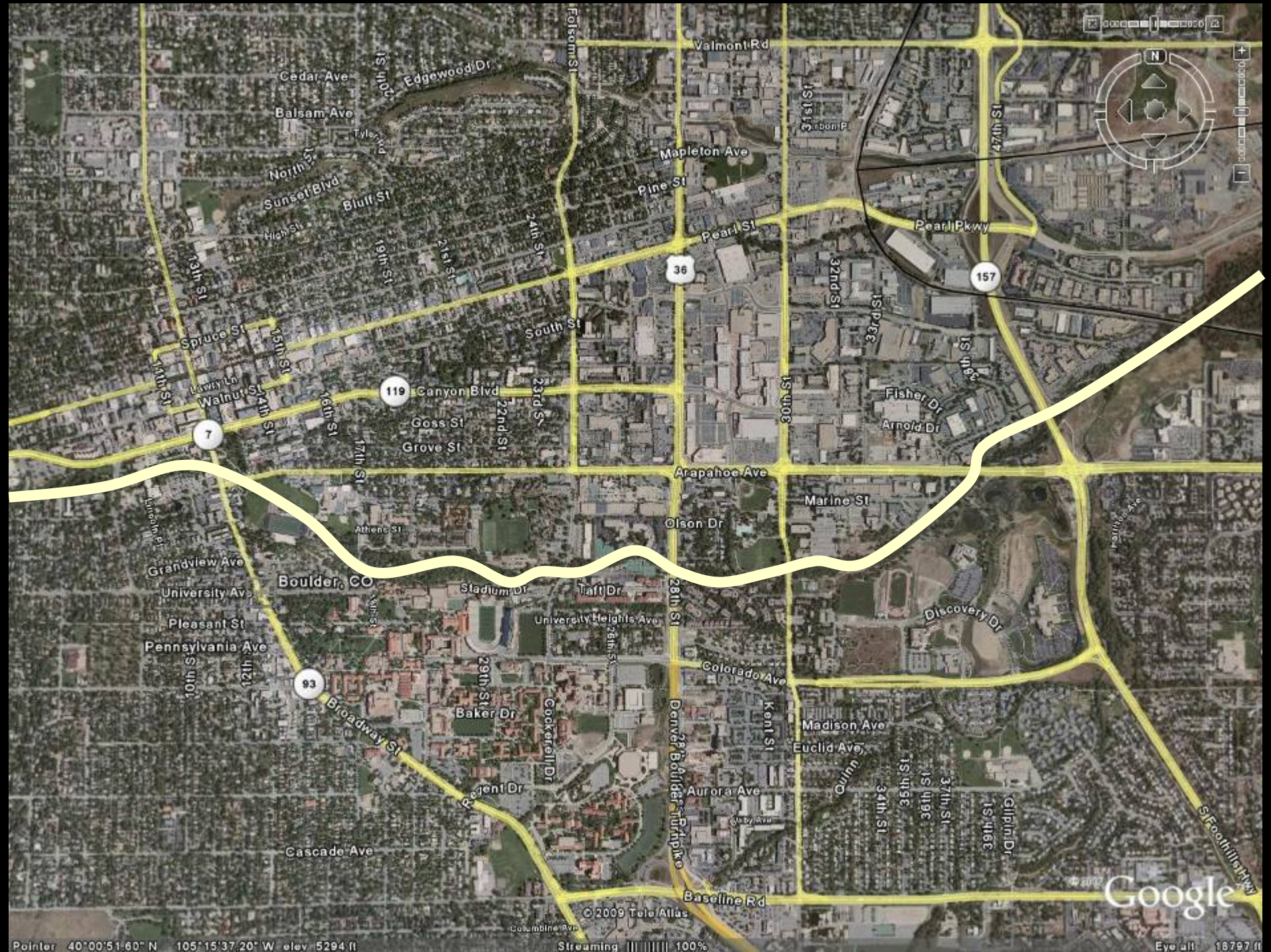
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Pointer 40°00'46.82" N 105°18'24.86" W elev 5615 ft

Streaming 100%

Eye all 18797 ft



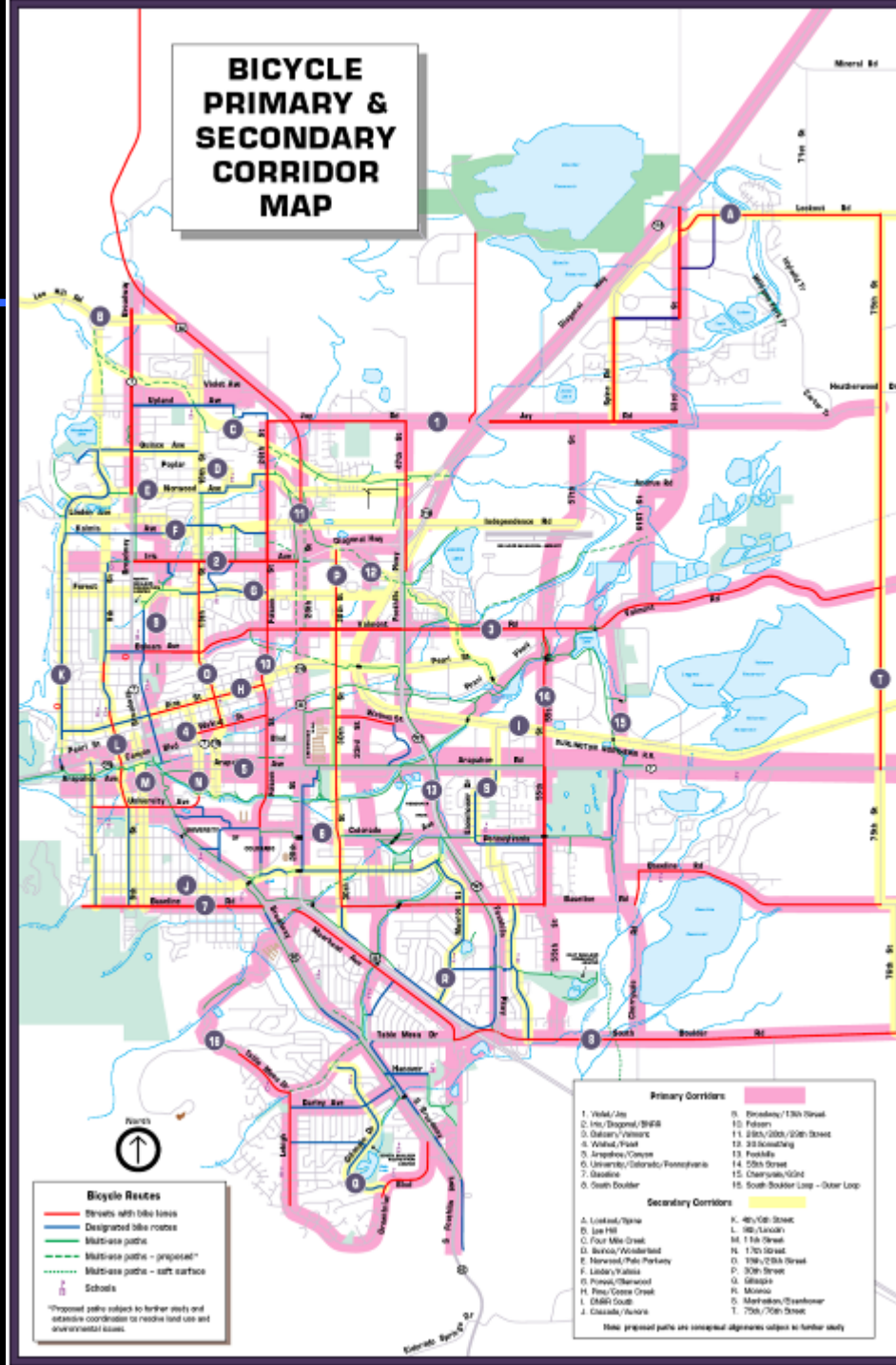
Boulder, CO

Google

© 2009 Tele Atlas

1995

Boulder Transportation Master Plan





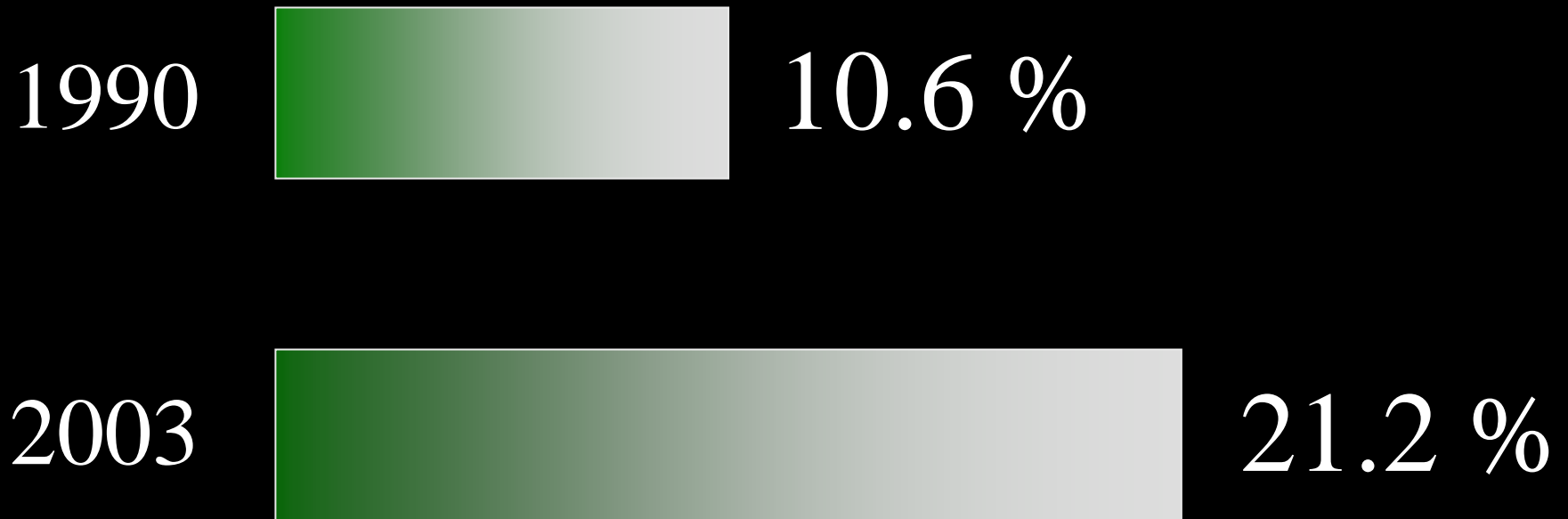


Boulder Bike Mode Share – All Trips

1990  4.9 %

2003  7.7 %

Boulder Bike Mode Share – Commute Trips



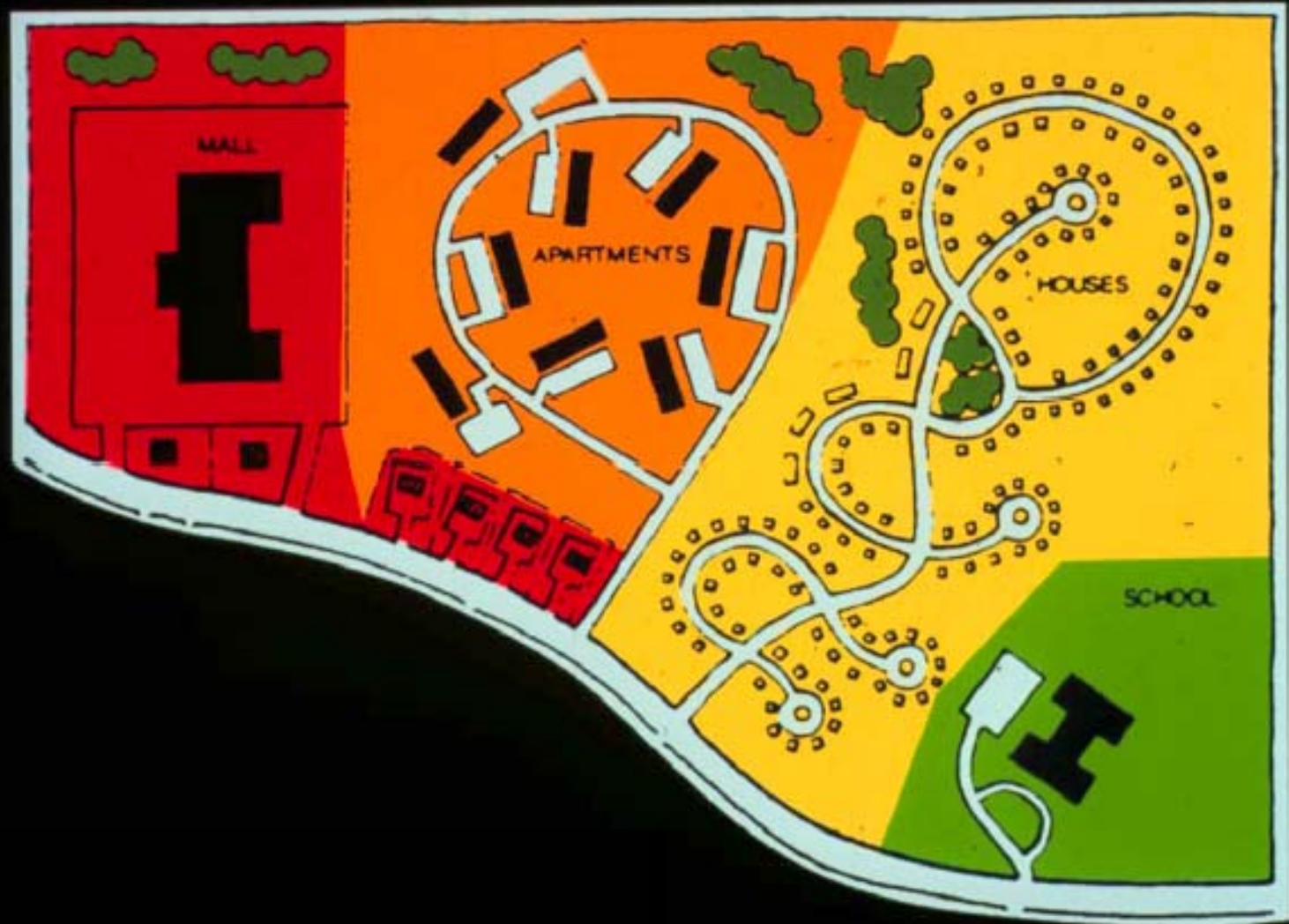
Five Practical Steps

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Traditional



Conventional

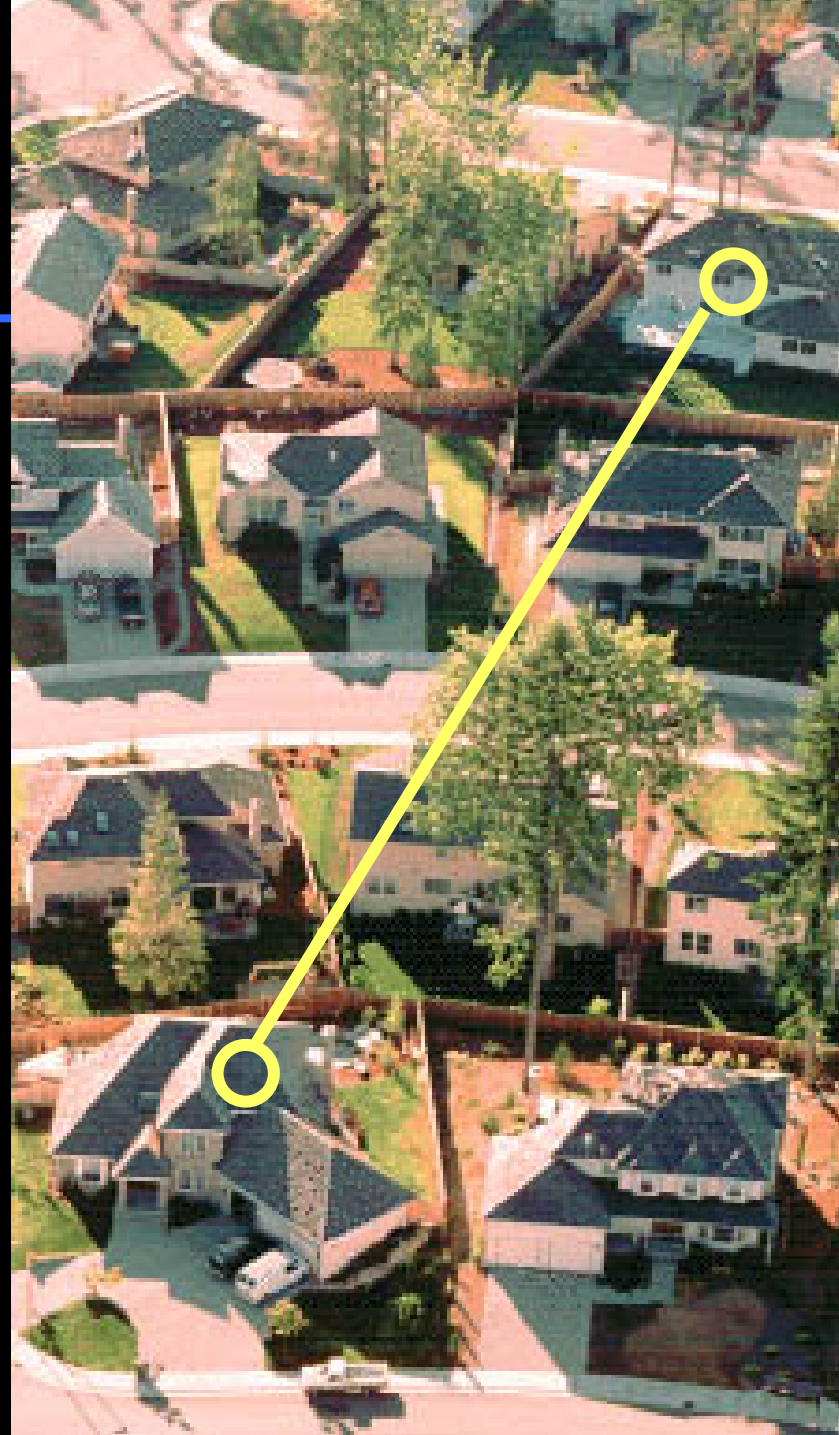


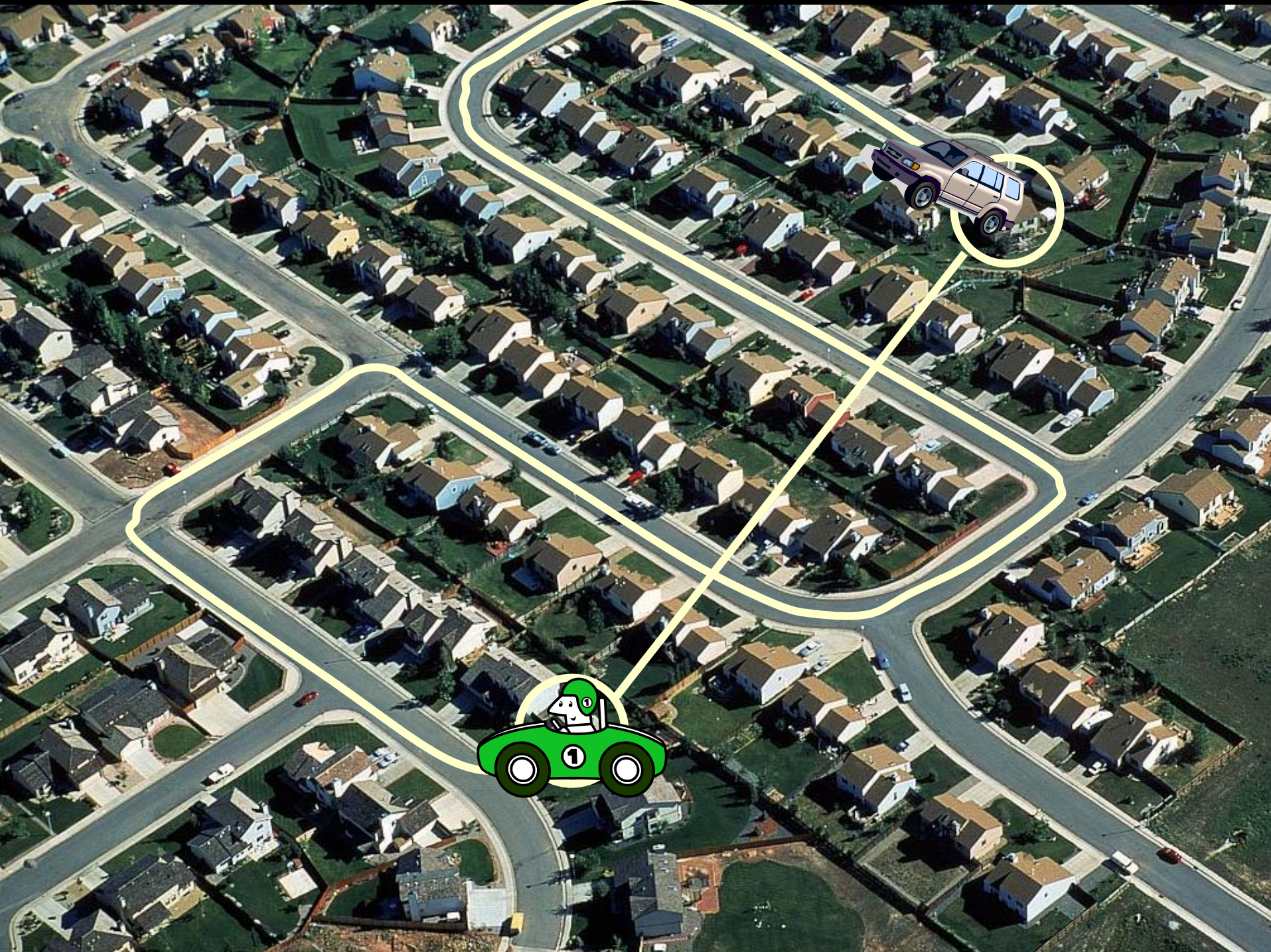


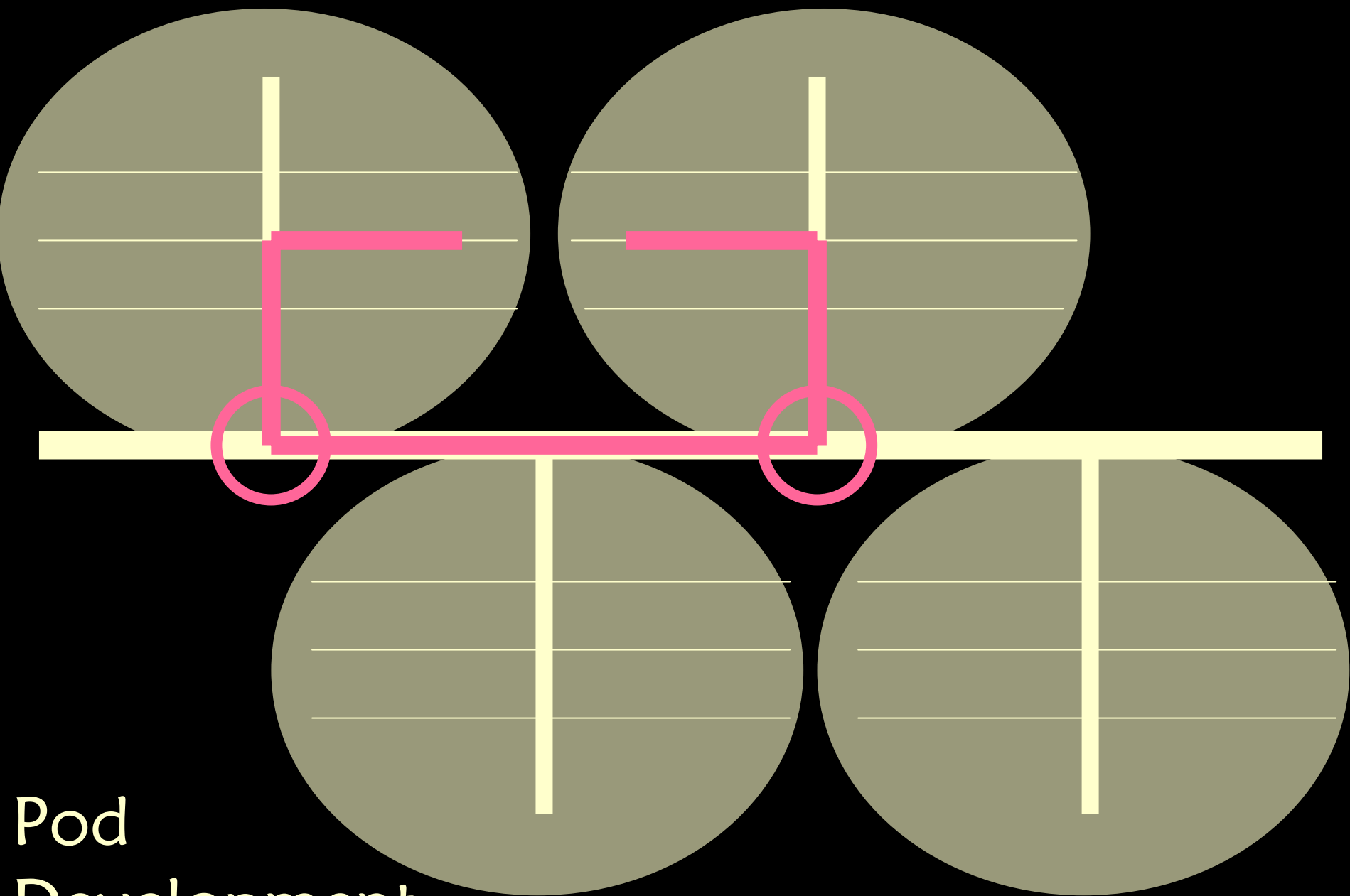
Poor Connectivity Means:

"You can't get
there from
here"

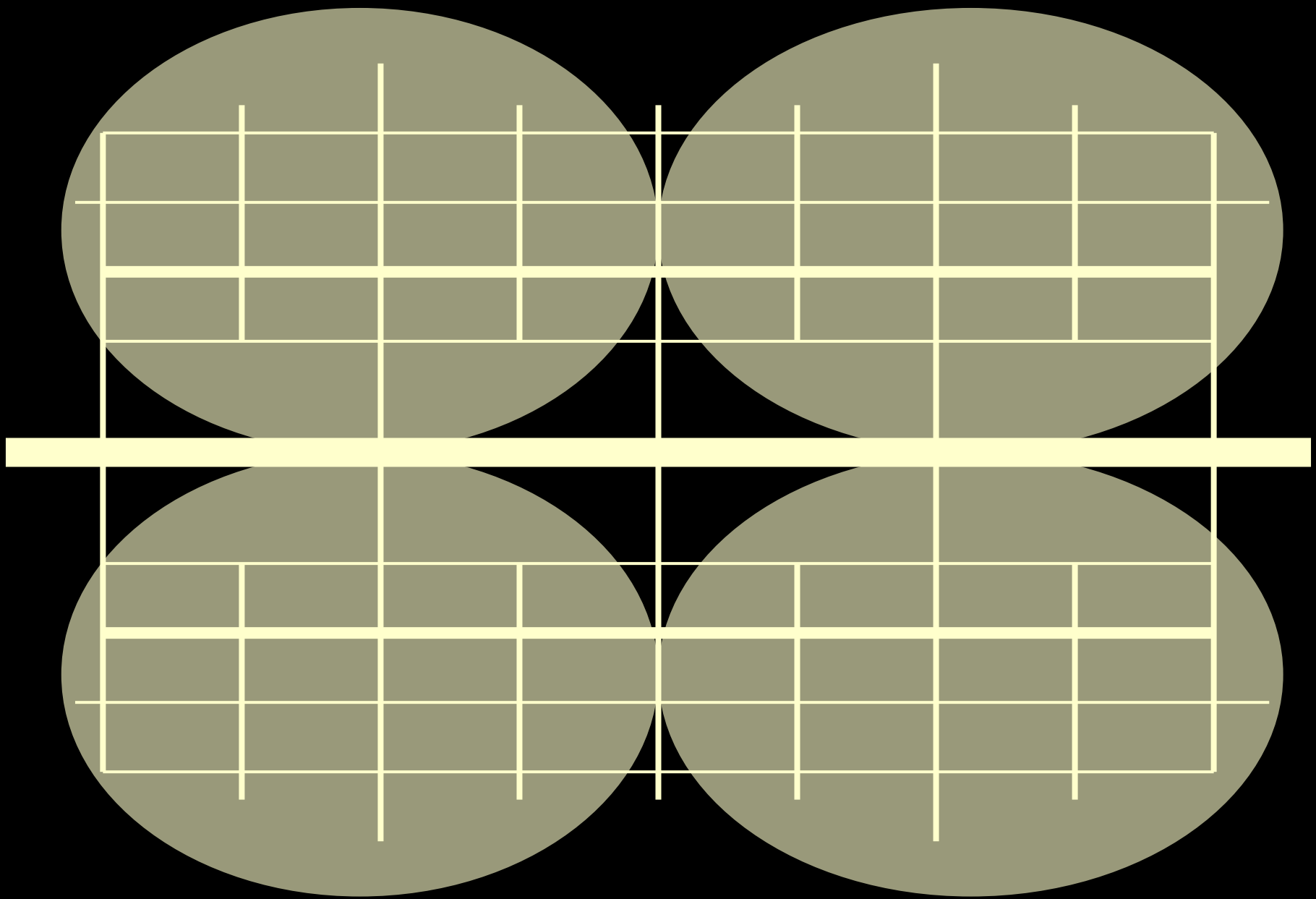
(without driving)

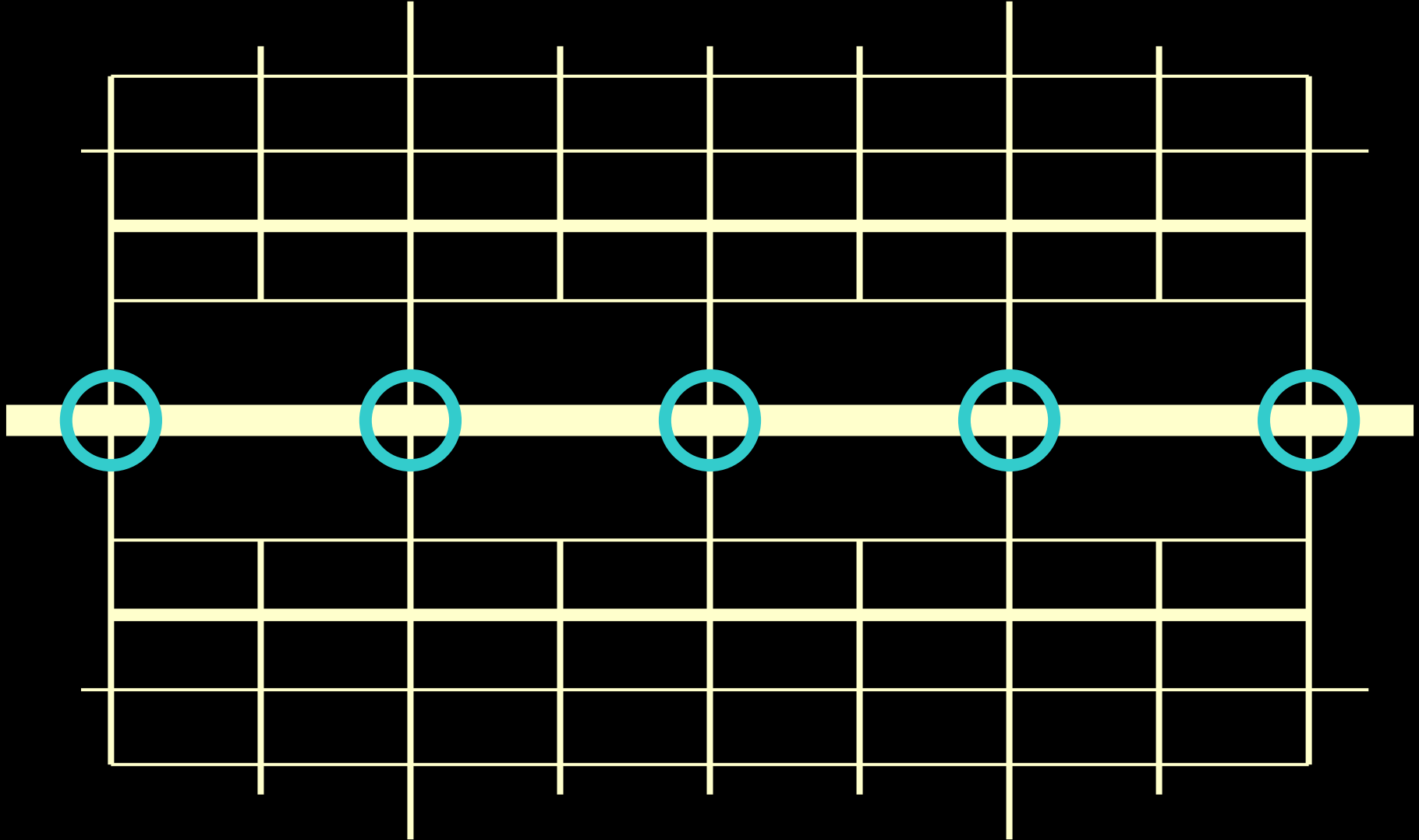


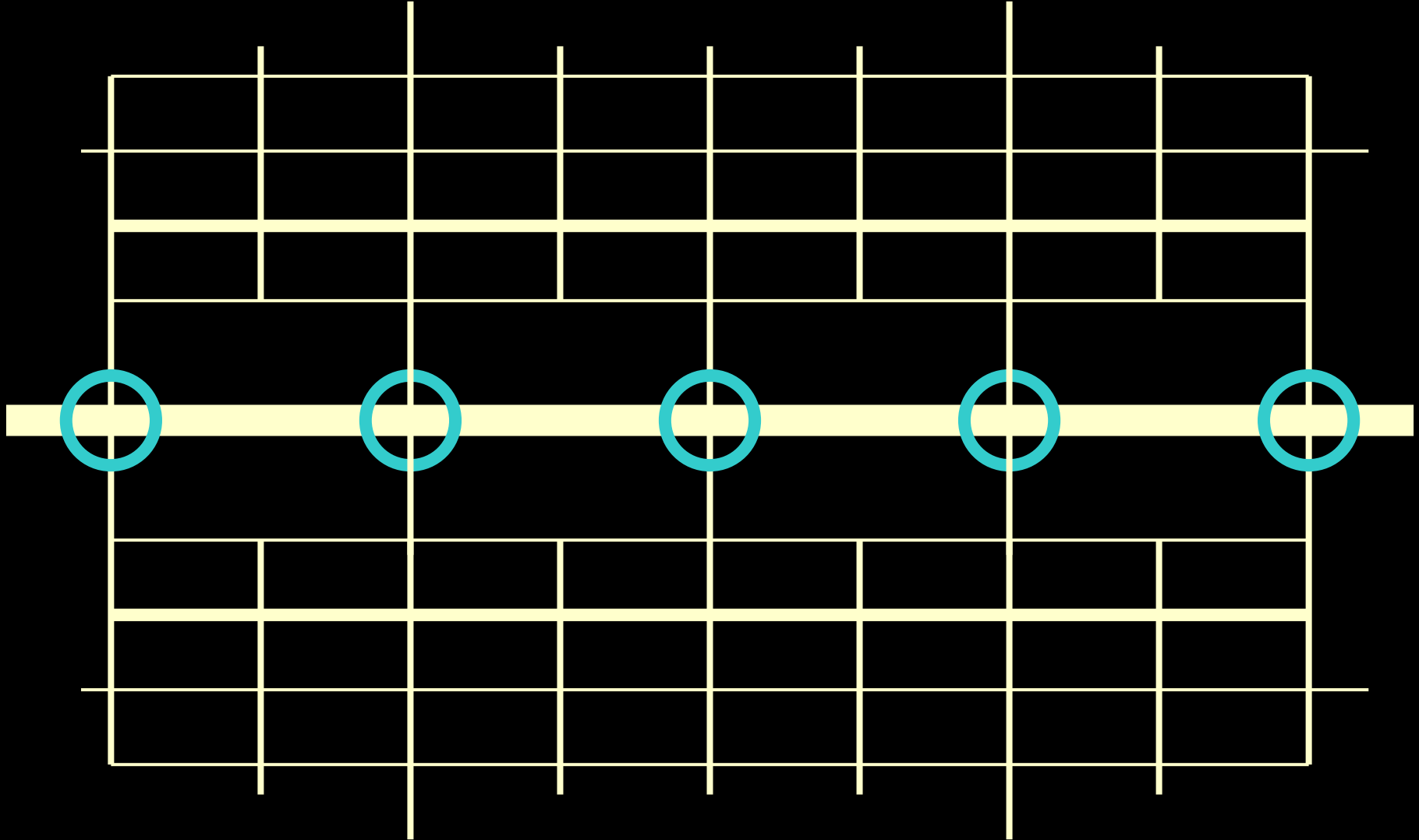




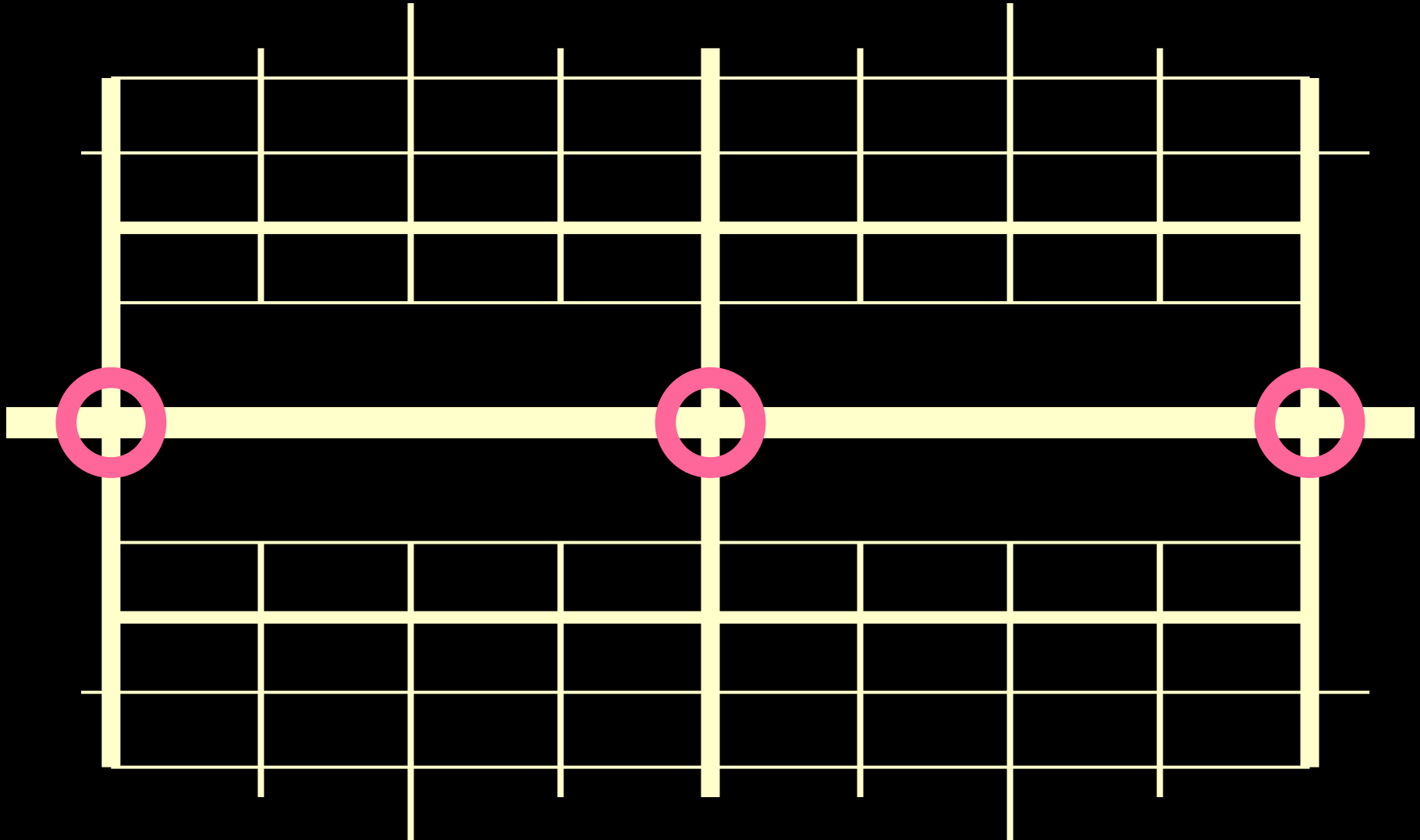
Pod
Development

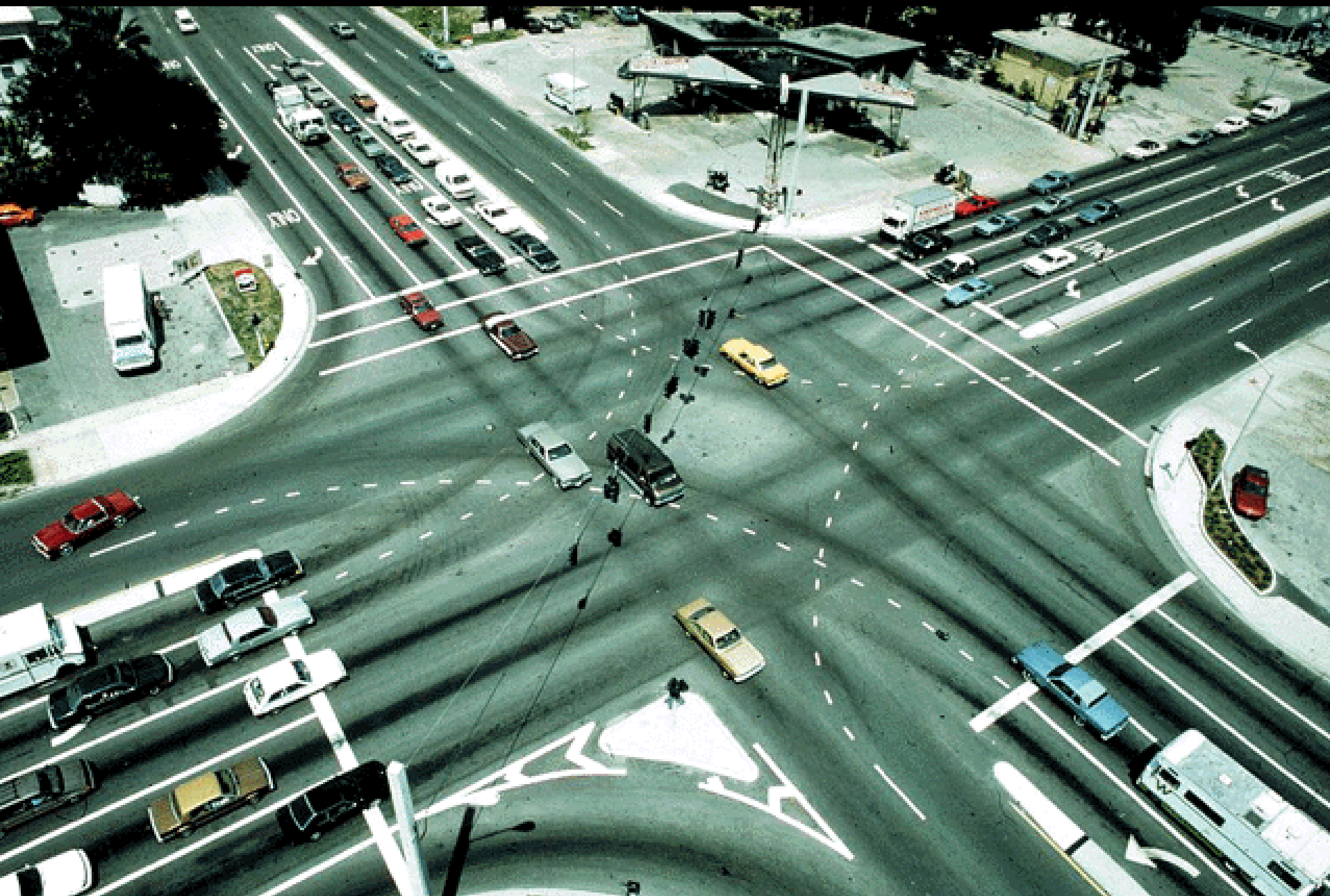






Built-In Inefficiency





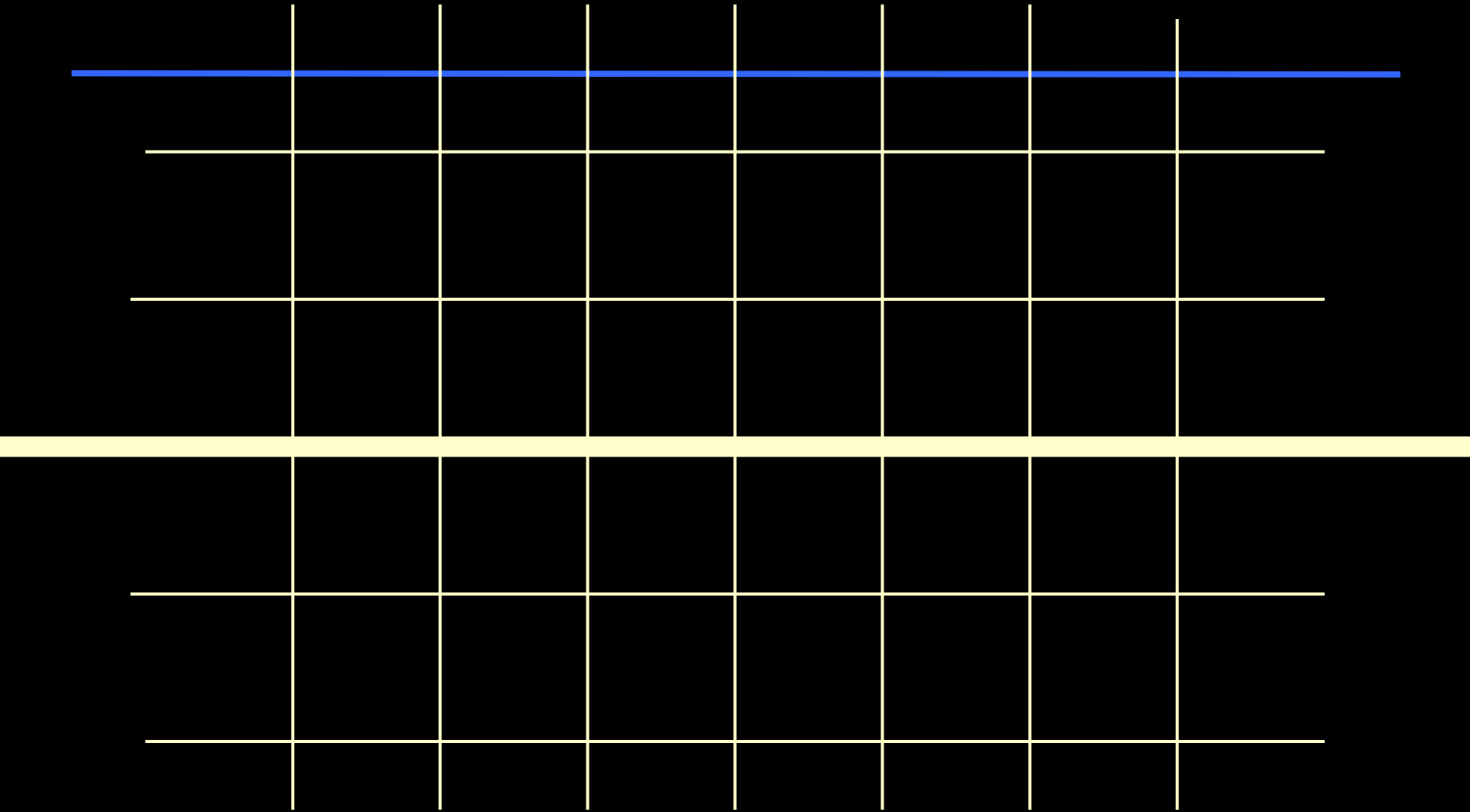
Network Traffic Capacity 101

A dense network of small streets is much safer and provides more capacity than a coarse network of large streets

Connectivity Standards

- Intersections/square mile (min 200)
- Maximum block perimeter (1400' – 1800')
- Block length (330' – 528')
- Links/nodes

Ideal Block Size for Efficient Flow

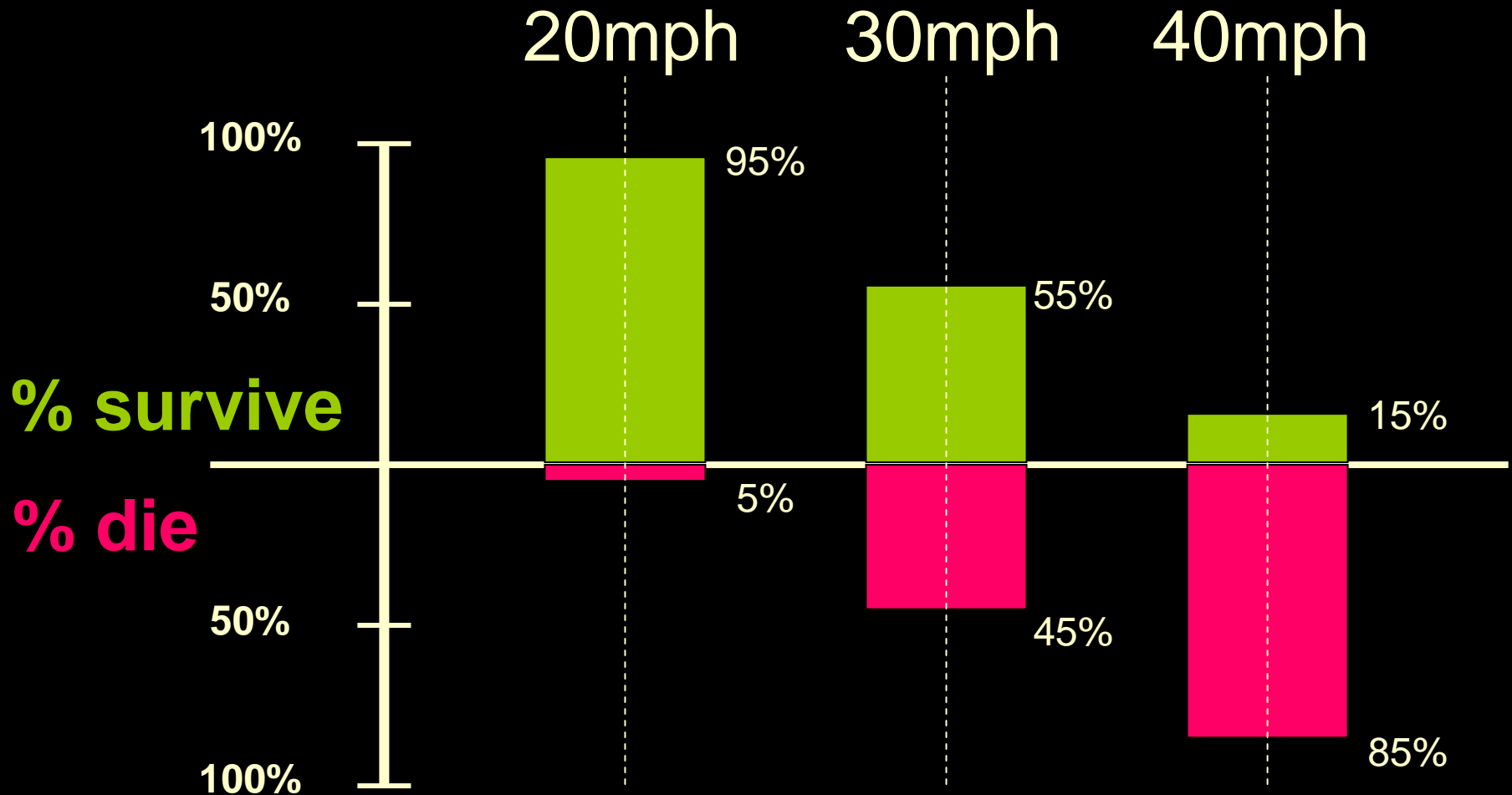


330' to 528'

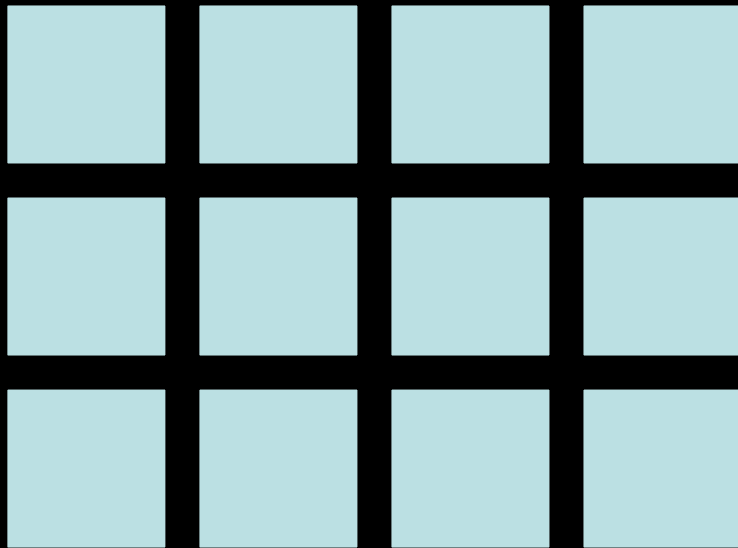


Aurora

Pedestrian Survival Rates – Vehicle Speeds



Pedestrian Networks



The ideal
pedestrian “grain”
is 250’ to 350’



Path Index

Shortest feasible route on street network

$$\frac{\circ}{\circ}$$

Straight line distance (as the crow flies)



2100 feet

300 feet

Path Index: 7.0

LOS A < 1.4

Impacts of Poor Connectivity

- Massive, congested arterials
- Increased driving/household
- Transit voids
- Inactive living
- Poor emergency service access
- **Reduced travel safety and convenience for pedestrians**

...wrapping up



Review: Orientation Topics

- Mobility
- Streets
- “Pedestrians”
- Climate as Barrier
- Performance Monitoring
- Public Budgets

Review: Five Practical Steps

1. Pedestrian districts
2. Context-based pedestrian standards
3. Community transit networks
4. Spine non-motorized corridors
5. Connectivity Measures

Finally, one last point...



Hundreds of Years:

200

400

600

800

1000

Transportation Corridors

Major Roads

Rail

Pathways

Architecture

Civic

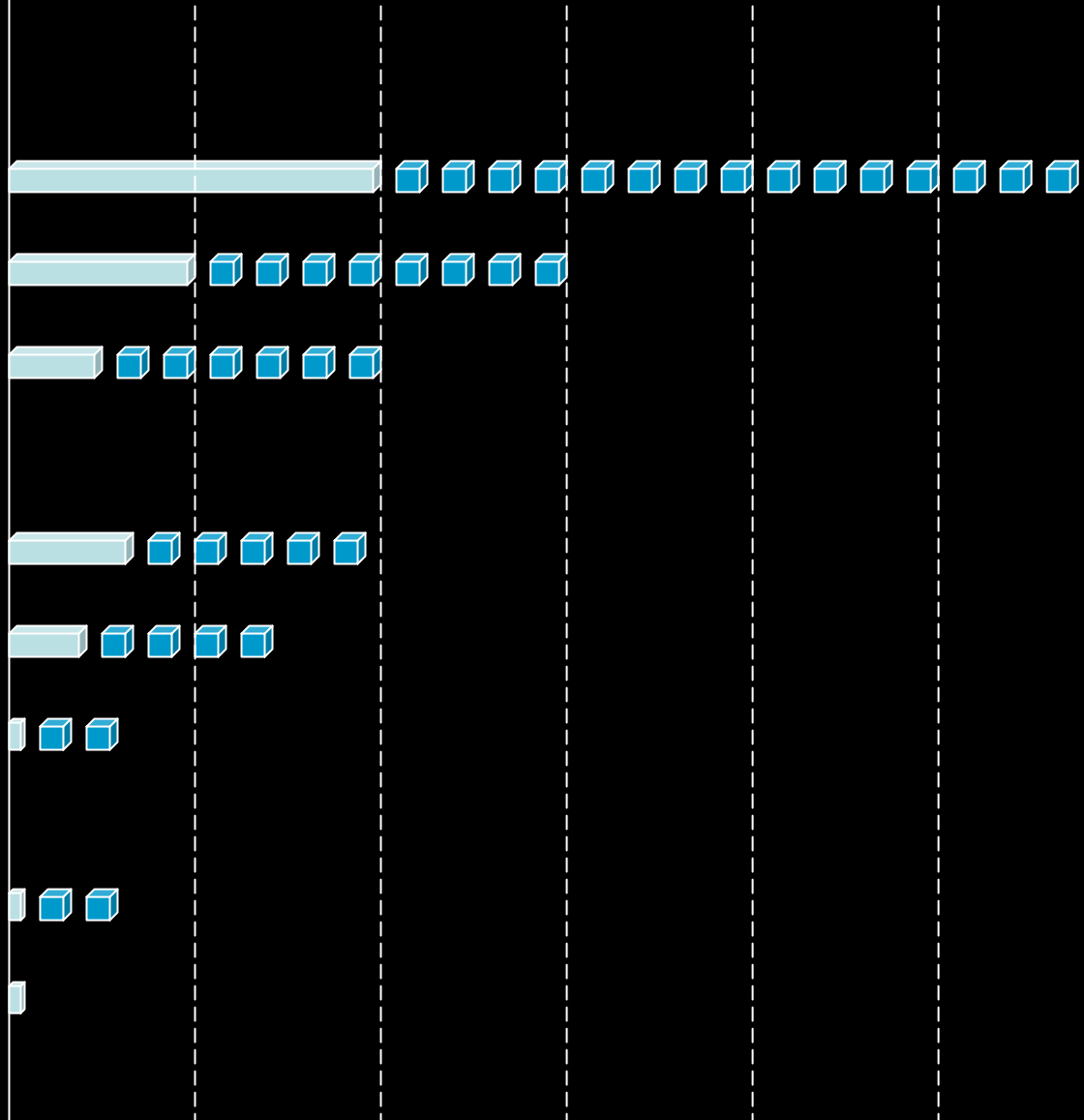
Residential

Commercial

Landscaping

Trees

Other Plantings



Thanking
You

