

WTS Colorado

Great Streets

Beyond Traffic Capacity



Charlier Associates, Inc.

St. Louis Region



St. Louis Region



Tusayan, AZ





Newbury, Boston

Why are so many streets not great?



An aerial photograph of a residential neighborhood with a grid of streets and houses. A central vertical strip is highlighted in green, representing a street. This green strip is flanked by two trapezoidal areas, also in green, which represent the 'Abutting Property' on either side. A thin yellow line runs down the center of the green strip, representing the 'Street'. The word 'Neighborhood' is written in large black letters in the top left. The word 'Street' is written in black letters at the bottom center of the green strip. The words 'Abutting Property' are written in black letters on each of the green trapezoidal areas. A compass rose is in the top right corner, and the Google logo is in the bottom right corner.

Neighborhood

**Abutting
Property**

**Abutting
Property**

Street

Google



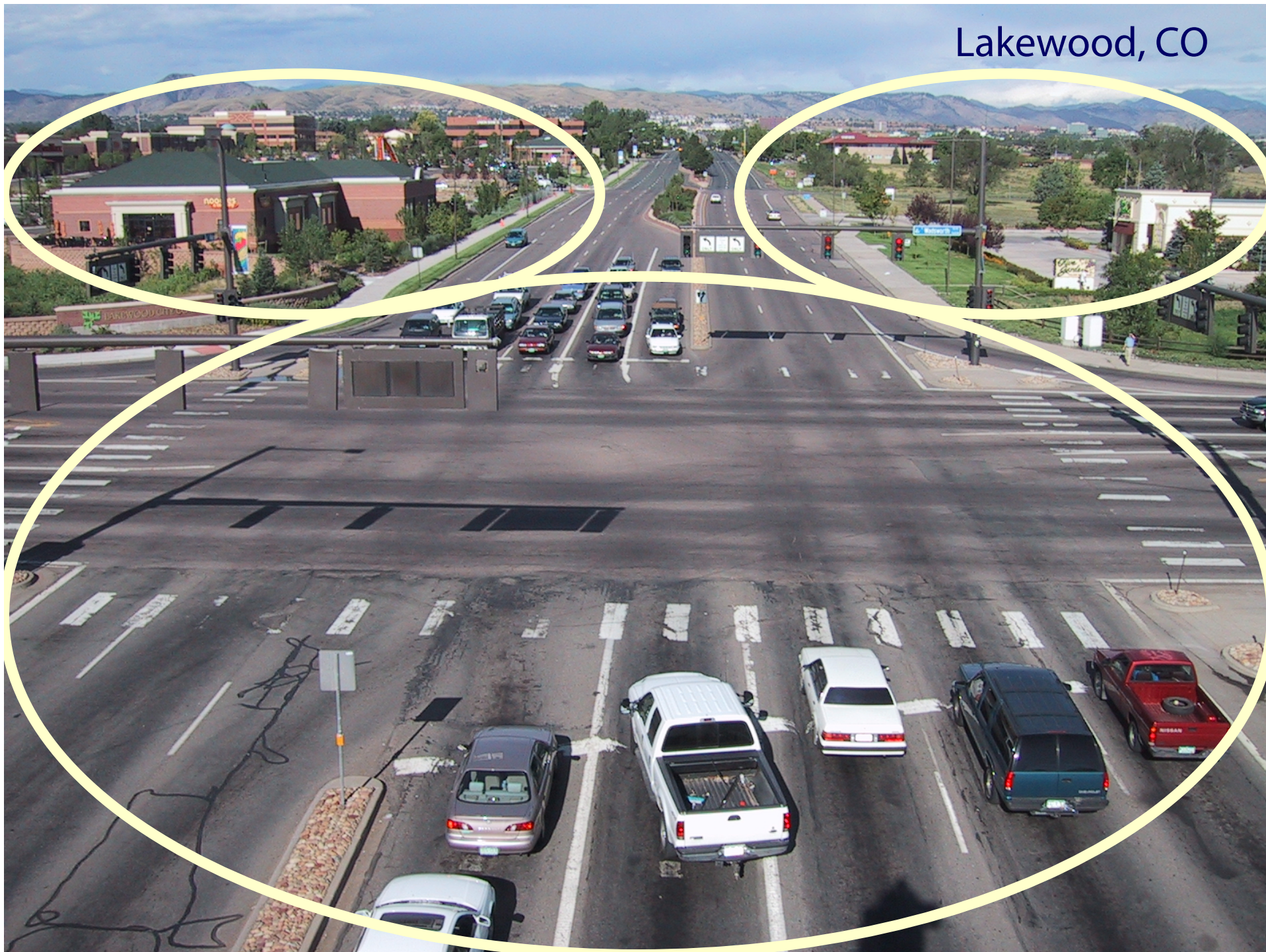
Lakewood, CO







Lakewood, CO

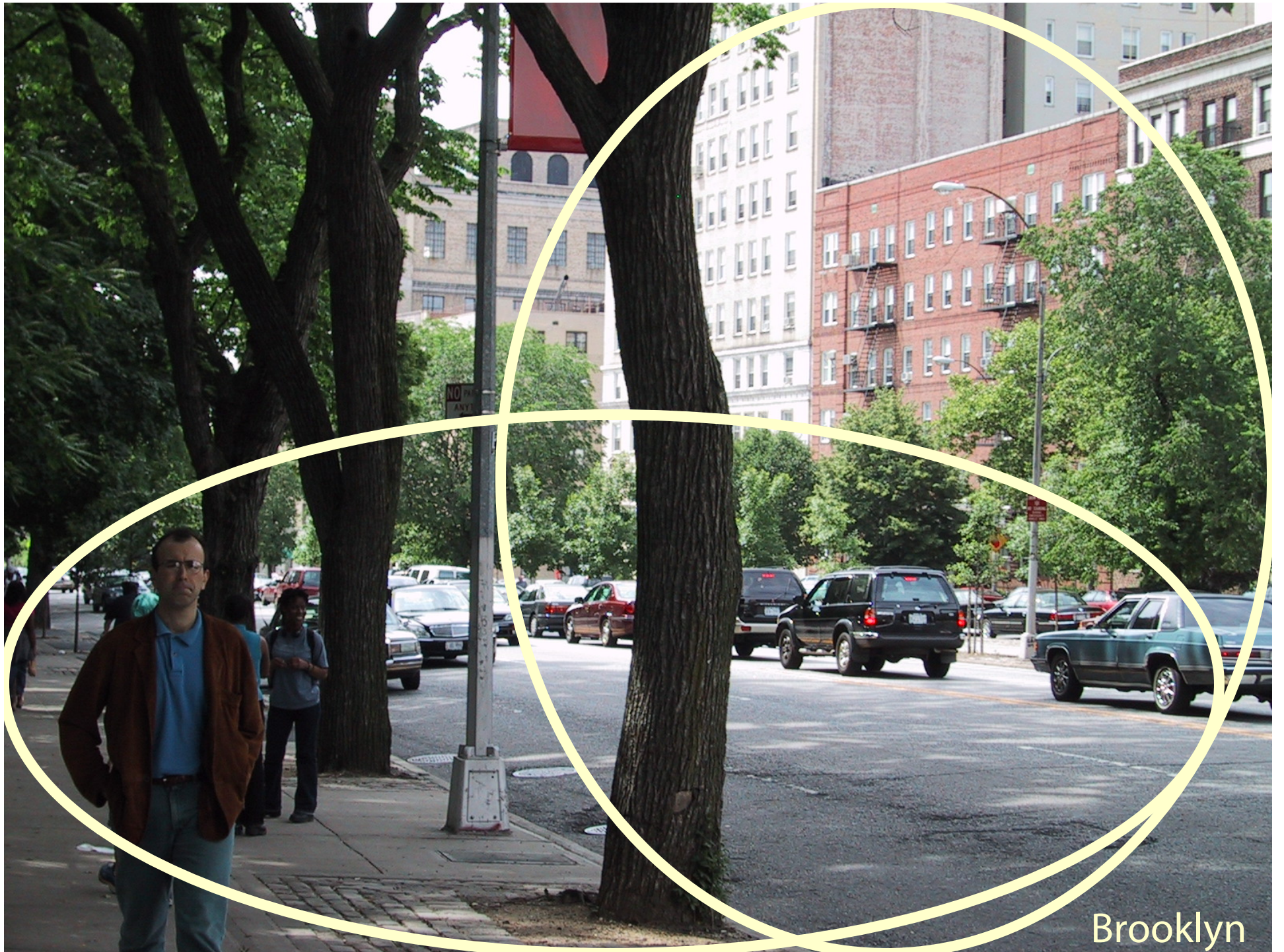




Boulder



Longmont



Brooklyn



Portland

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



Oahu

...and expect this to result.



Boulder

WTS Colorado

Elements of the Street



Charlier Associates, Inc.

Elements of the Street

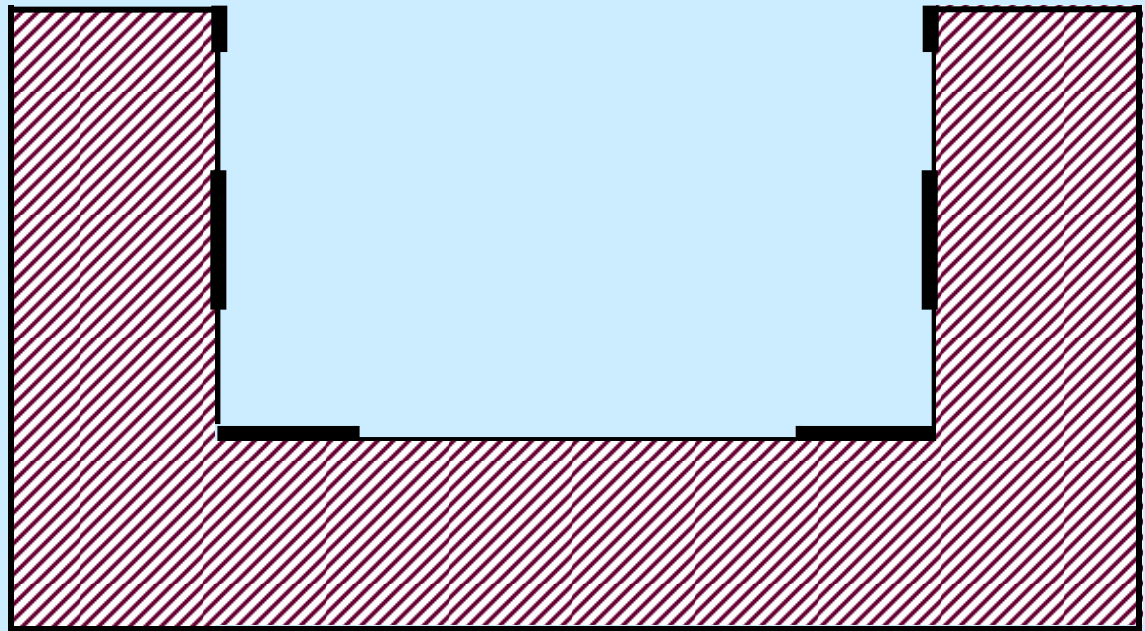
1. Street Wall

2. Pedestrian Realm

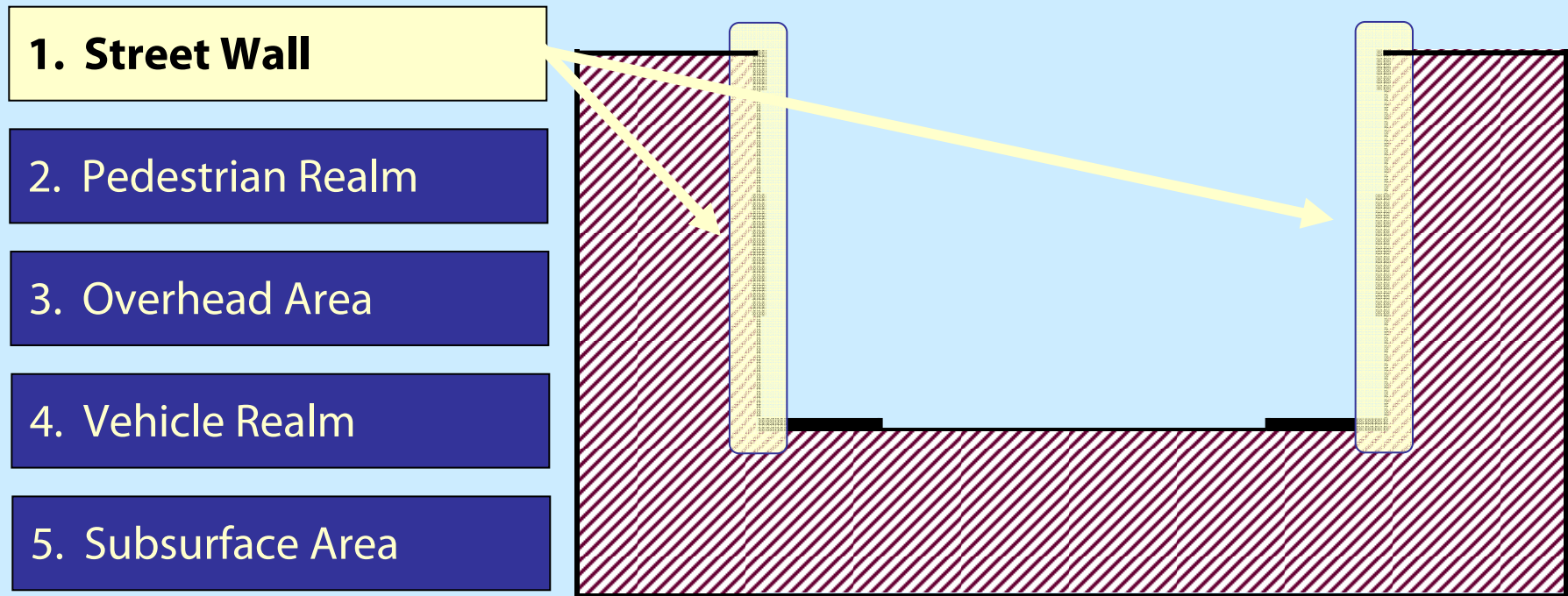
3. Overhead Area

4. Vehicle Realm

5. Subsurface Area



Elements of the Street



Elements of the Street

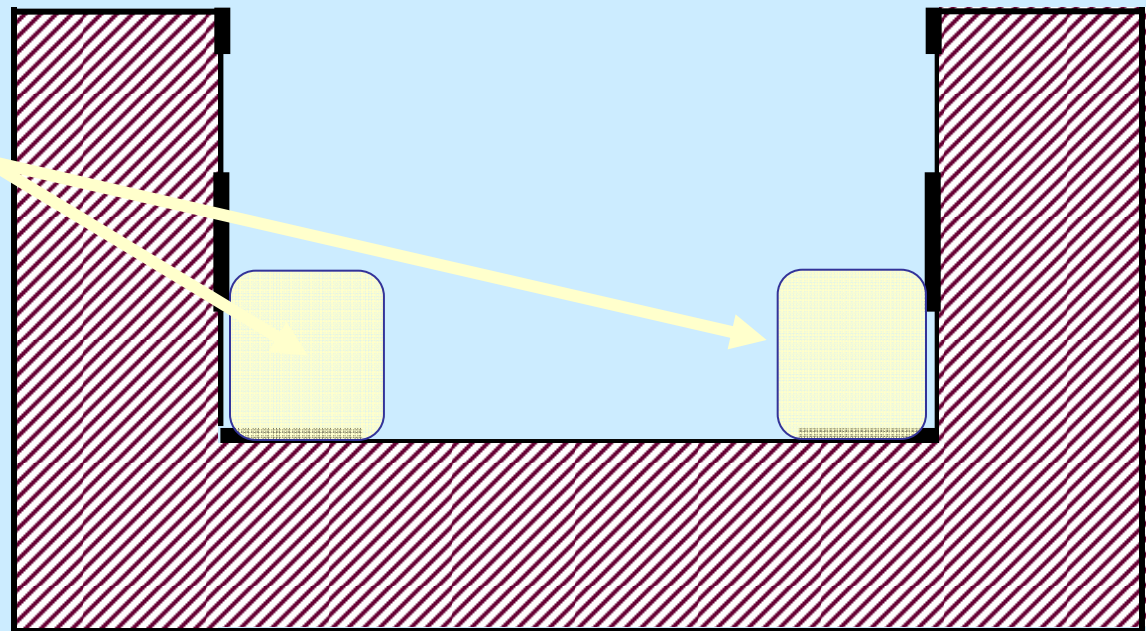
1. Street Wall

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Elements of the Street

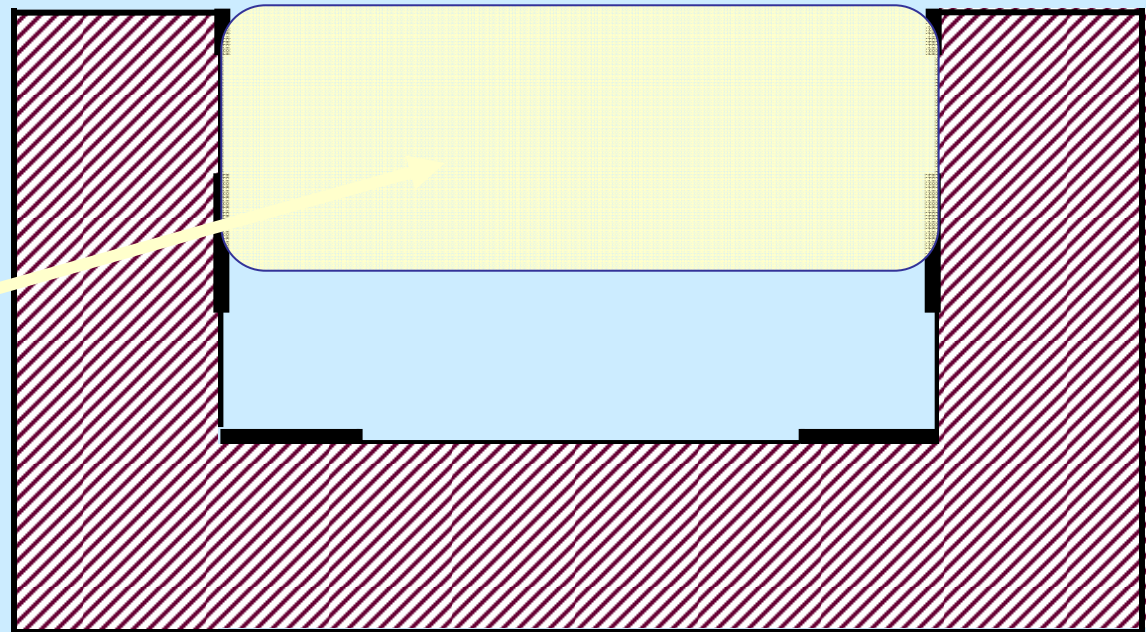
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5. Subsurface Area



Elements of the Street

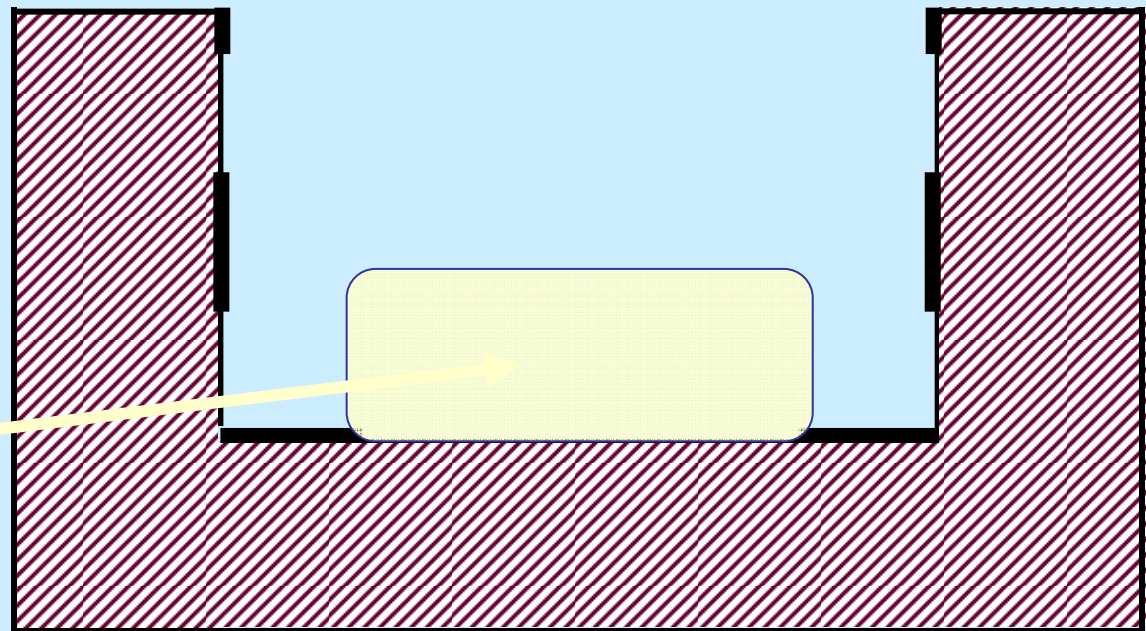
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Elements of the Street

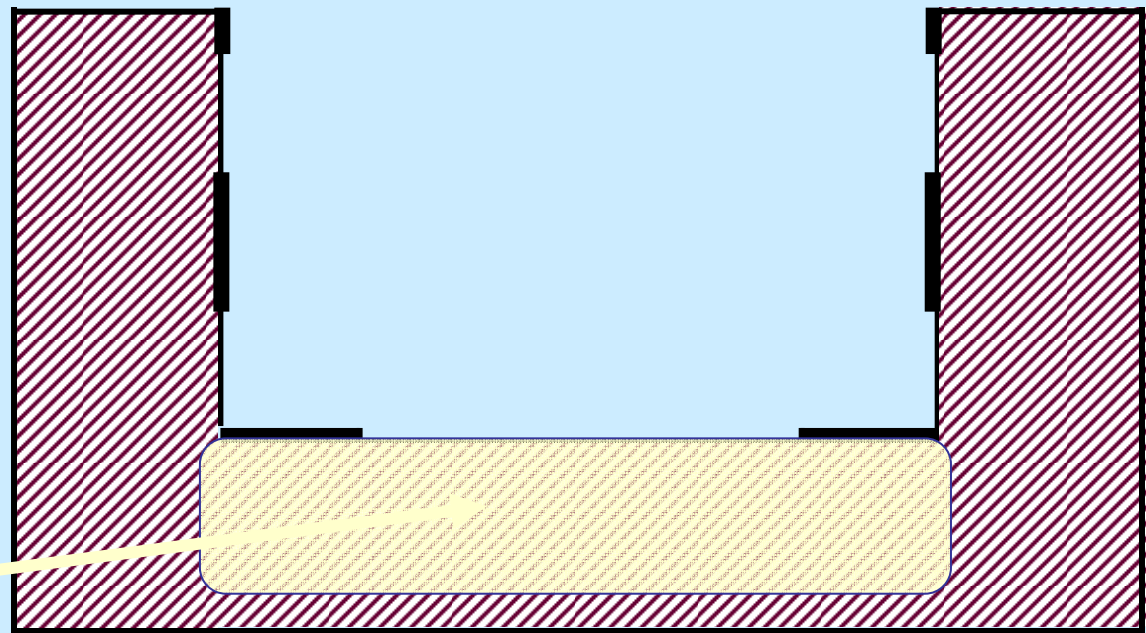
1. Street Wall

2. Pedestrian Realm

3. Overhead Area

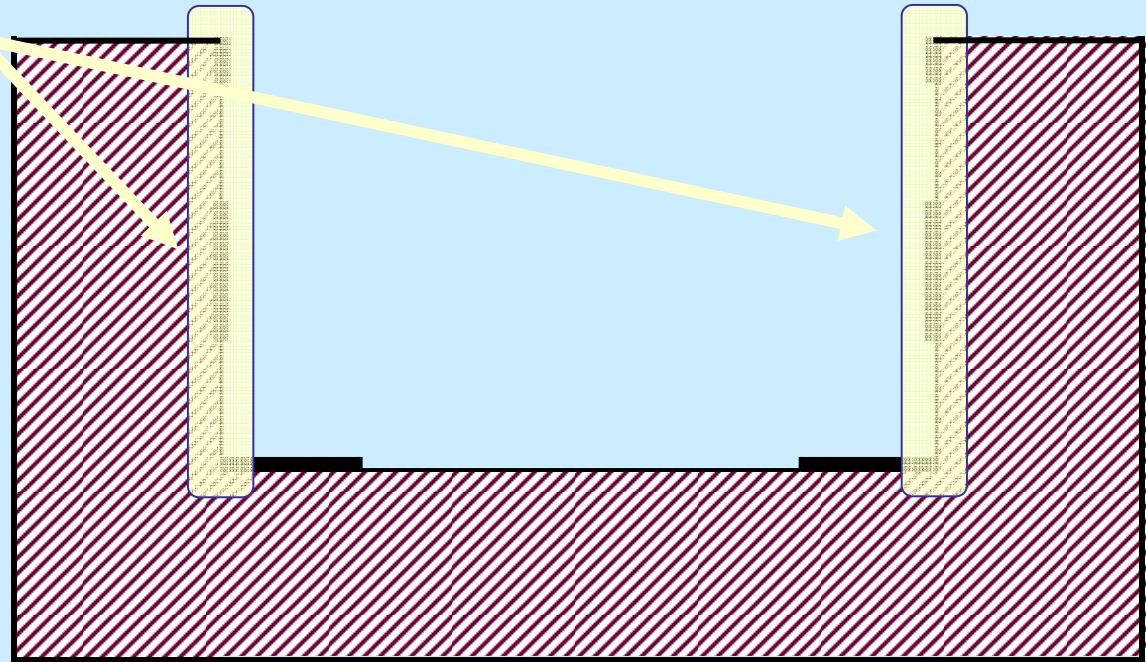
4. Vehicle Realm

5. Subsurface Area



Characteristics of Street Elements

1. Street Wall



Characteristics:

Height

Building Articulation

Entry Frequency

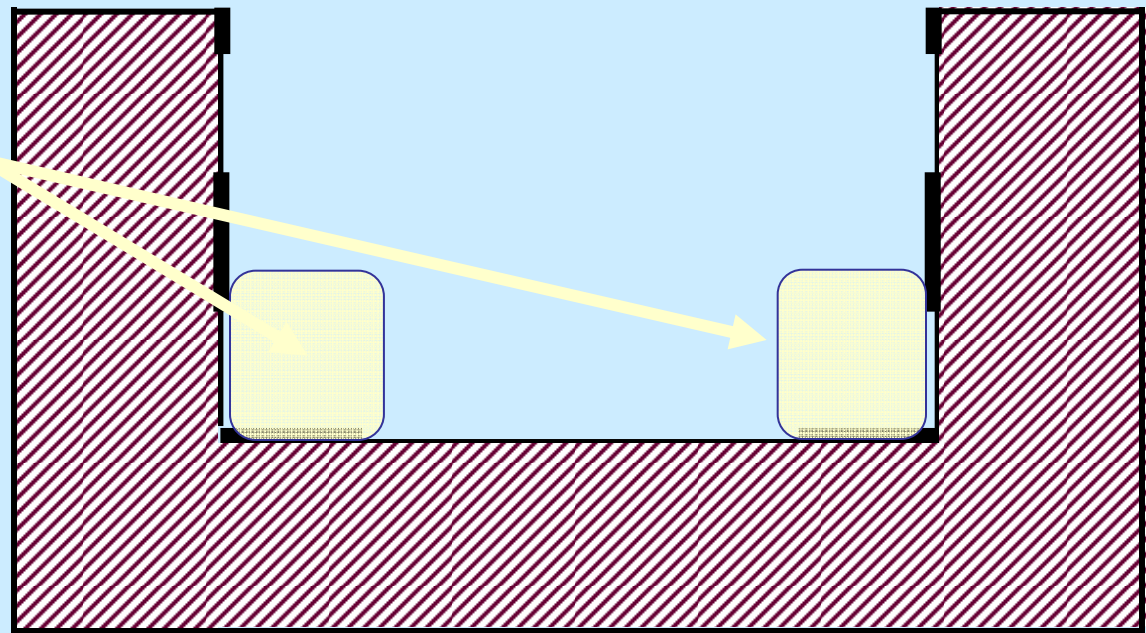
Urban Scale

Transparency/Glazing

Canopies & Arcades

Characteristics of Street Elements

2. Pedestrian Realm



Characteristics:

Cross Section

Amenities

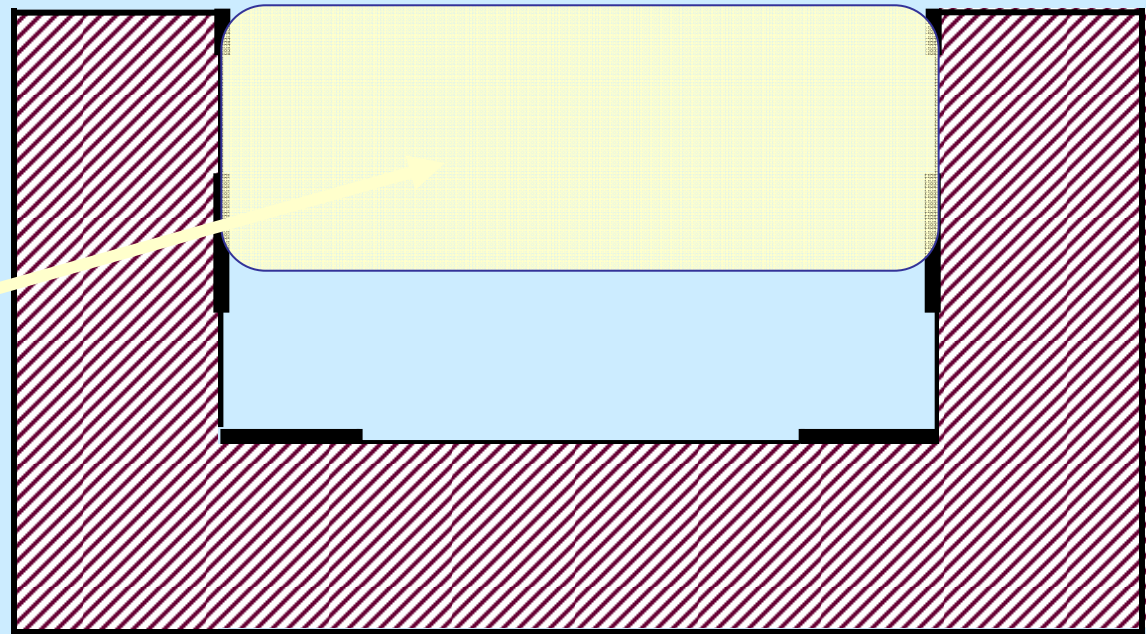
Street Trees

Canopies & Arcades

Crosswalks

Characteristics of Street Elements

3. Overhead Area



Characteristics:

Utilities

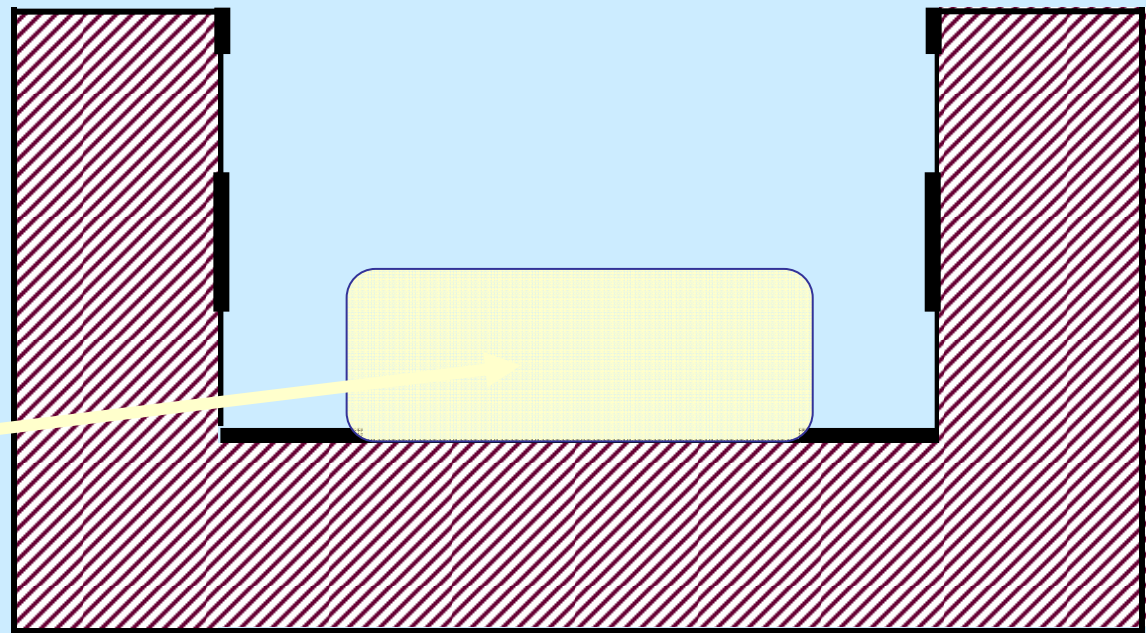
Street Trees

Lighting

Canopies & Arcades

Characteristics of Street Elements

4. Vehicle Realm



Characteristics:

Number of Lanes

On-Street Parking

Traffic Volume

Lane Width

Traffic Speed

**Traffic Control
Systems**

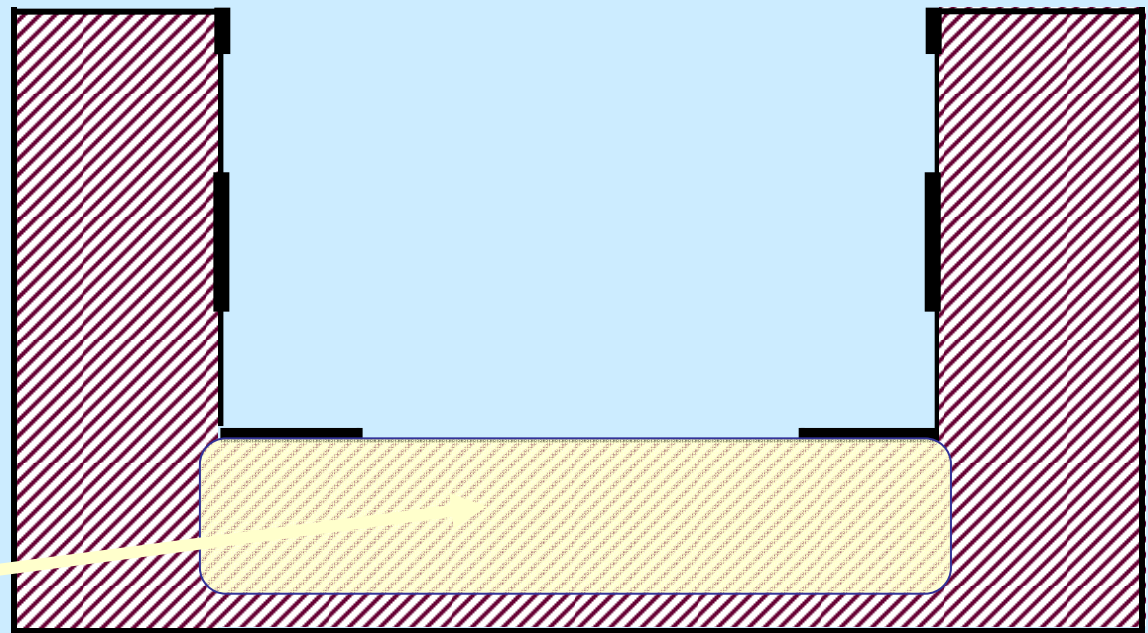
Characteristics of Street Elements

5. Subsurface Area

Characteristics:

Storm Water Drainage

Utilities





Newbury, Boston



St. Louis region

What is great about great streets?

(why care?)



Great Streets...

1. Are representative of their places
2. Allow people to walk comfortably & safely
3. Contribute to economic vitality
4. Are functionally complete
5. Provide good access and circulation
6. Facilitate placemaking
7. Are green

1. Great Streets are representative of their places



Great Streets are representative of their places



Chico, CA

Great Streets are representative of their places



Chico, CA

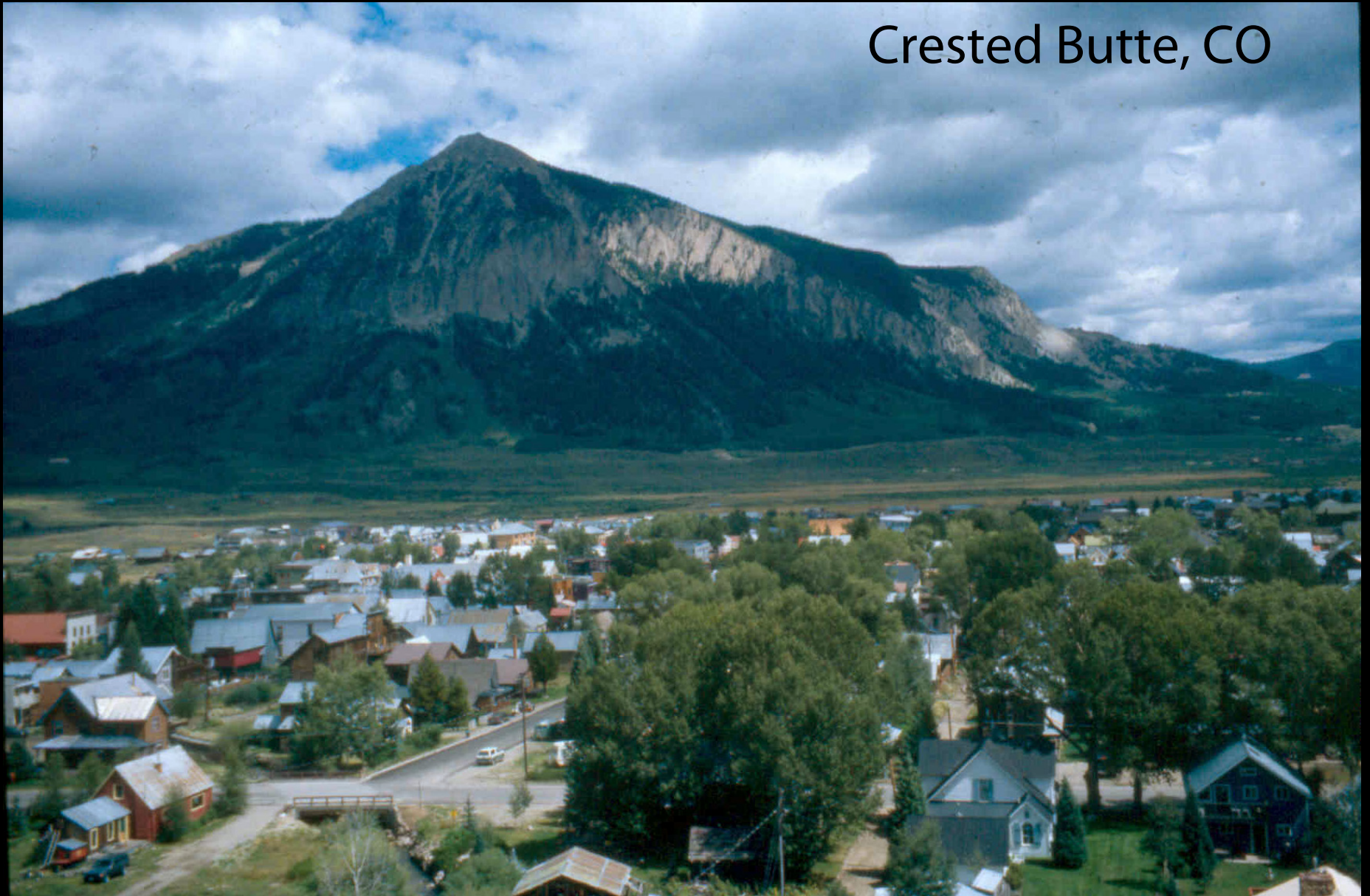
Great Streets are representative of their places



Chico, CA

Great Streets are representative of their places

Crested Butte, CO



Great Streets are representative of their places

Crested Butte, CO



Great Streets are representative of their places



Crested Butte, CO

Great Streets are representative of their places



Crested Butte, CO

Great Streets are representative of their places



Puerto Vallarta, Mex

Great Streets are representative of their places



Puerto Vallarta, Mex

2. Great Streets allow people to walk comfortably and safely



Great Streets allow people to walk comfortably & safely



Pasadena, CA

Great Streets allow people to walk comfortably & safely

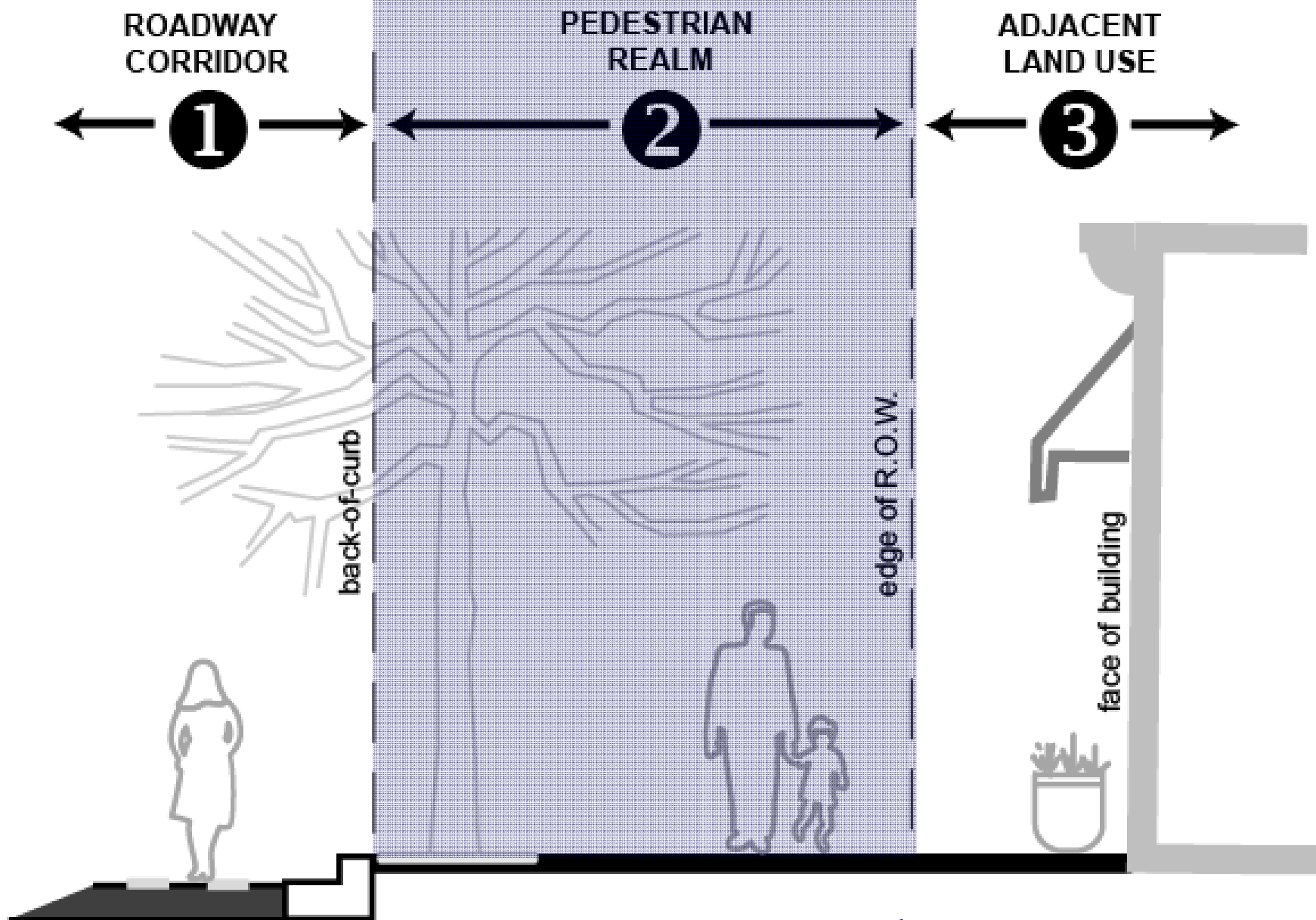


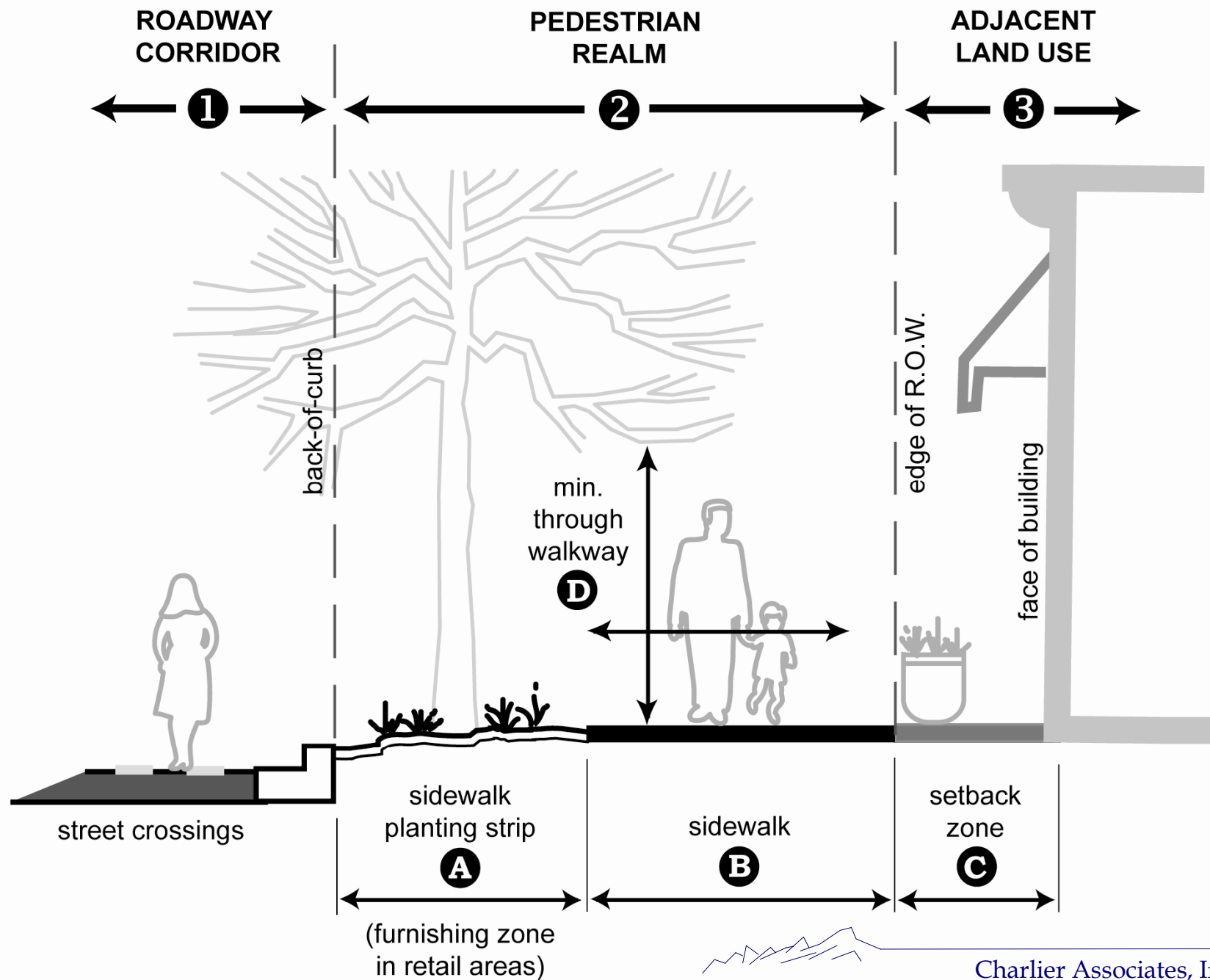
Brooklyn, NY

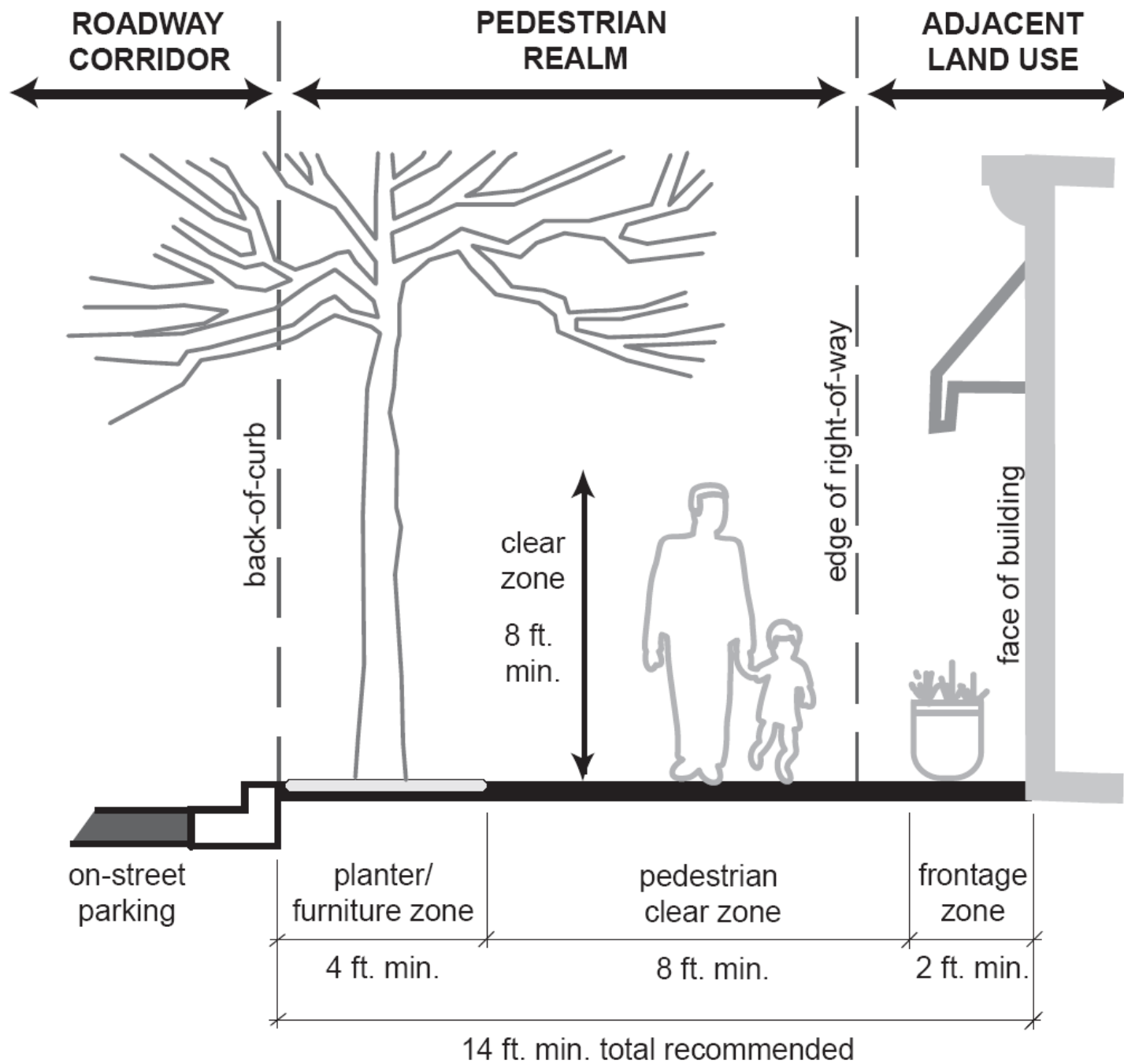
Great Streets allow people to walk comfortably & safely



Winter Park, FL









Boulder

3. Great Streets contribute to economic vitality



Great Streets contribute to economic vitality



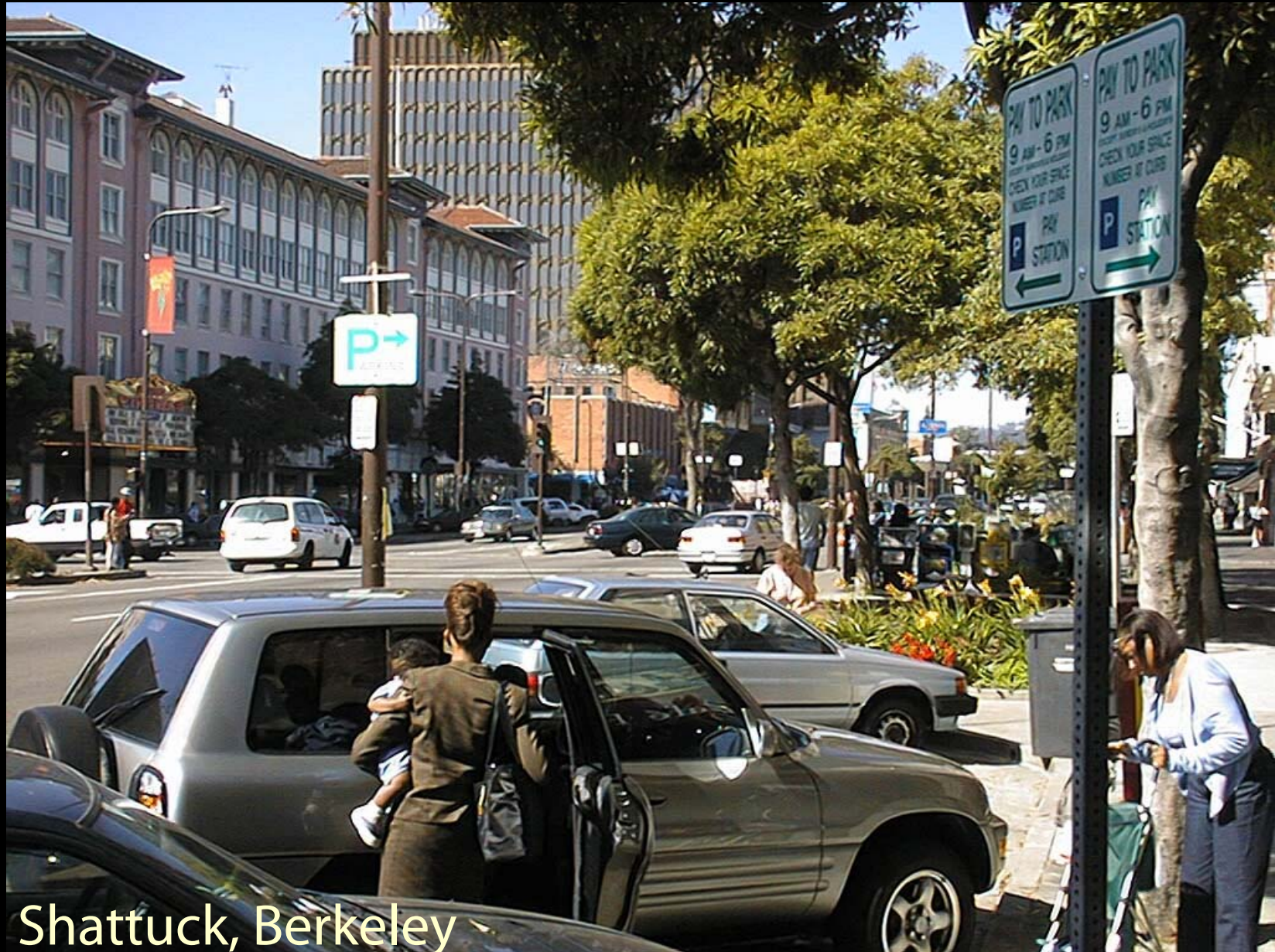
Bainbridge Island, WA

Great Streets contribute to economic vitality



Longmont, CO

Great Streets contribute to economic vitality

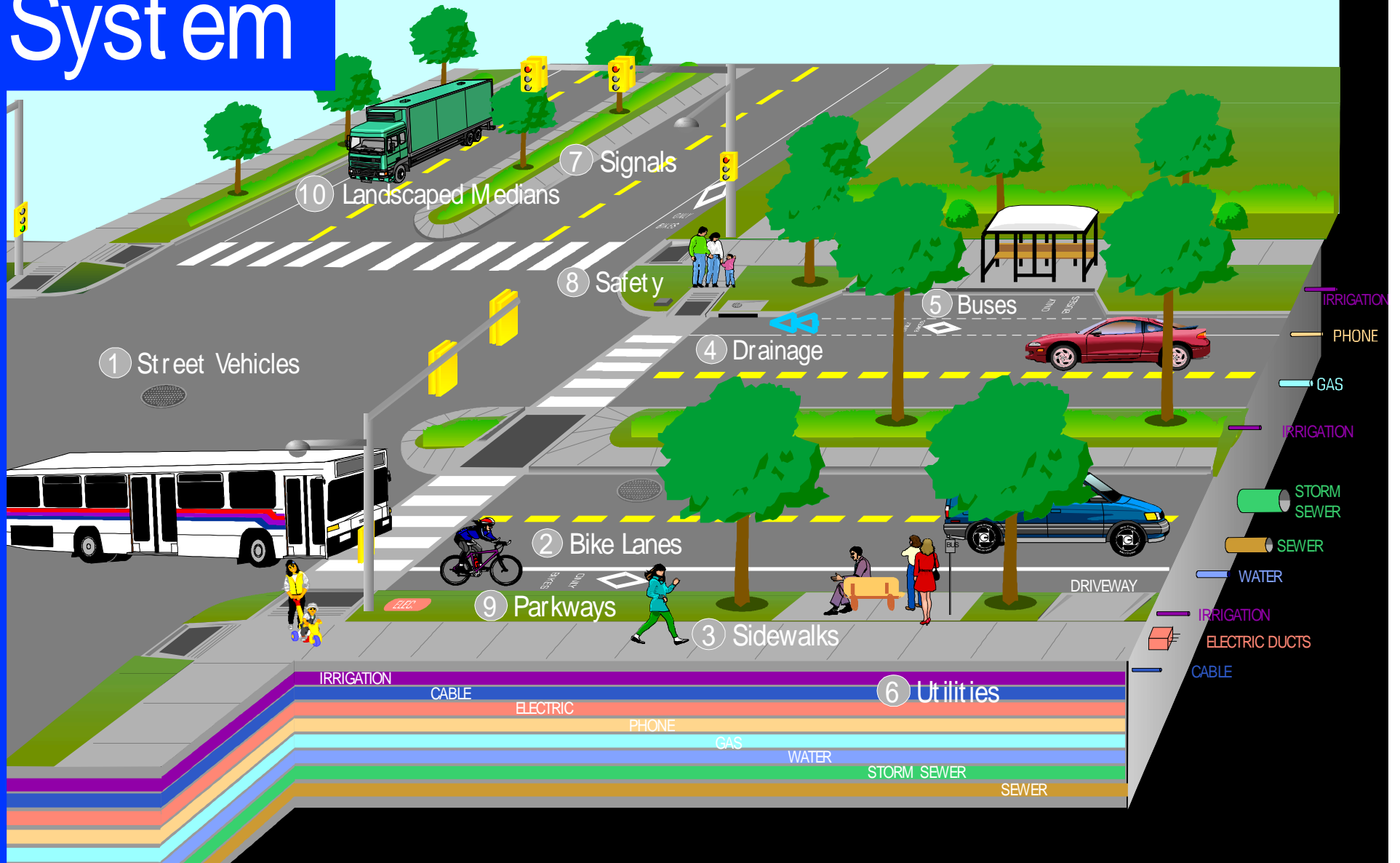


Shattuck, Berkeley

4. Great Streets are functionally complete



Street System



Great Streets are functionally complete



Boulder, CO

Great Streets are functionally complete

Boulder, CO



Great Streets are functionally complete

Boulder, CO



Great Streets are functionally complete



Longmont, CO

Redmond, WA





St. Louis region

5. Great Streets provide good access and circulation



Great Streets provide good access and circulation



Newbury, Boston

Great Streets provide good access and circulation



Great Streets provide good access and circulation



Eastern Parkway, Brooklyn

Great Streets provide good access and circulation



Eastern Parkway, Brooklyn

Great Streets provide good access and circulation



East Pearl, Boulder

Great Streets provide good access and circulation



East Pearl, Boulder

6. Great Streets facilitate placemaking



Great Streets facilitate place making



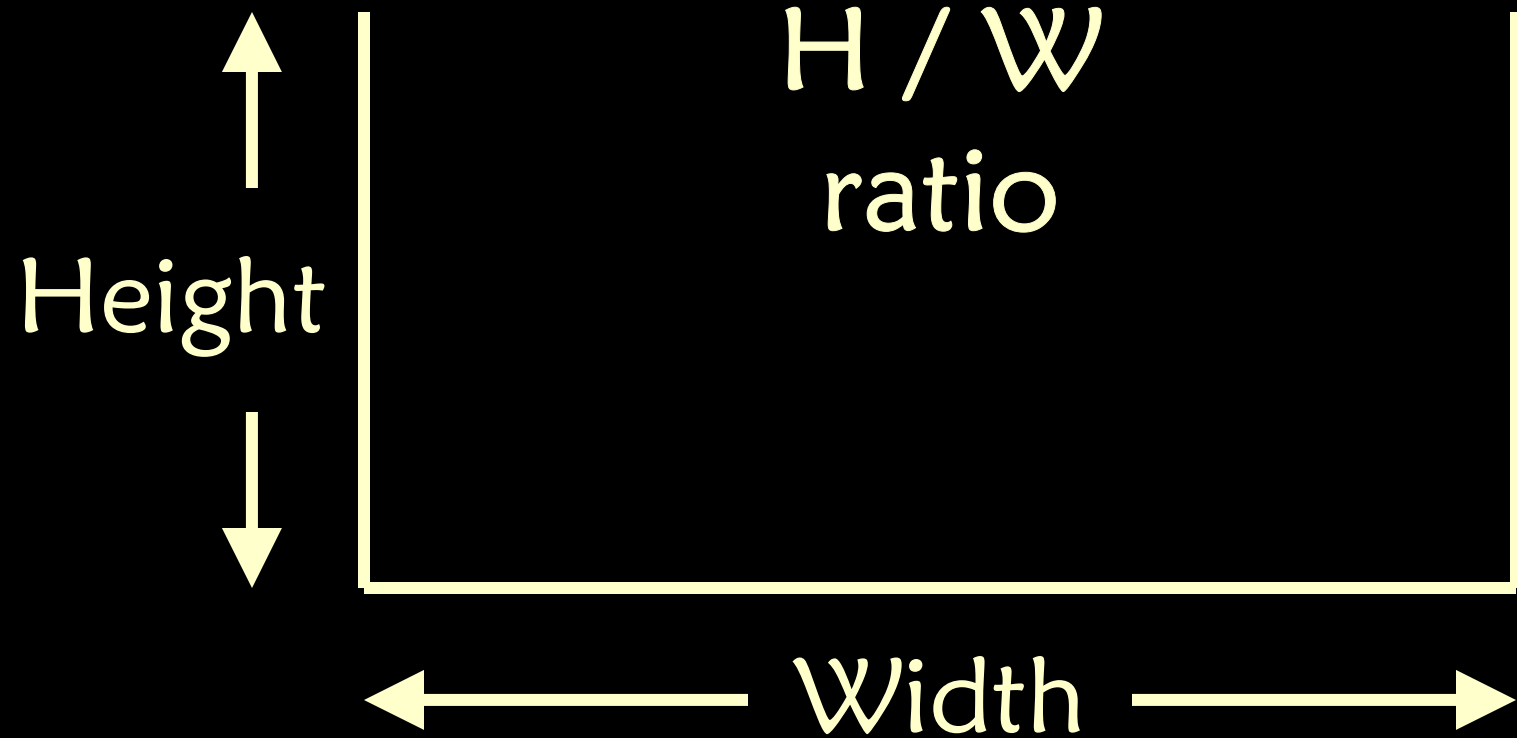
Miami Beach

Great Streets facilitate place making

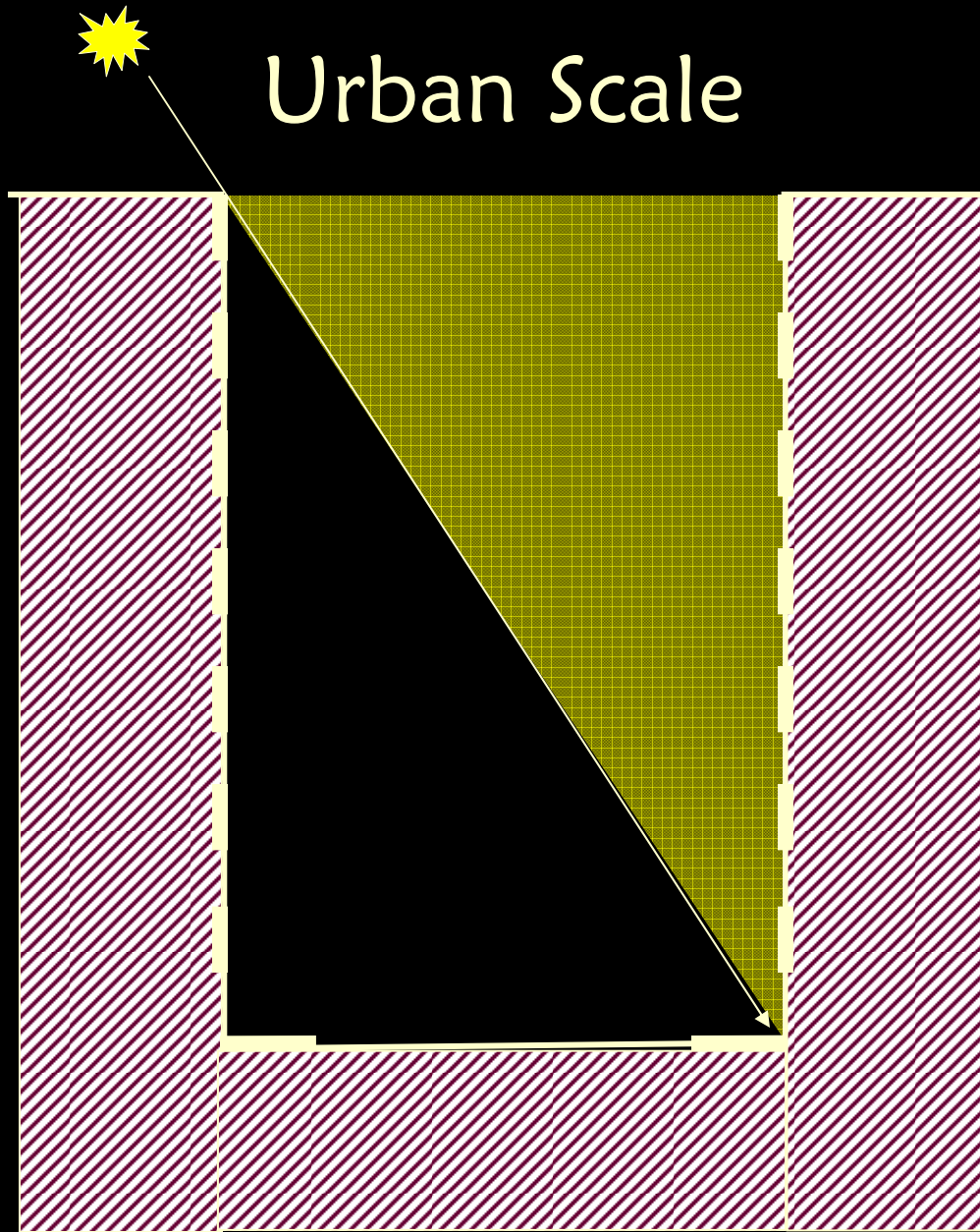


Winter Park, FL

Urban Scale



Urban Scale

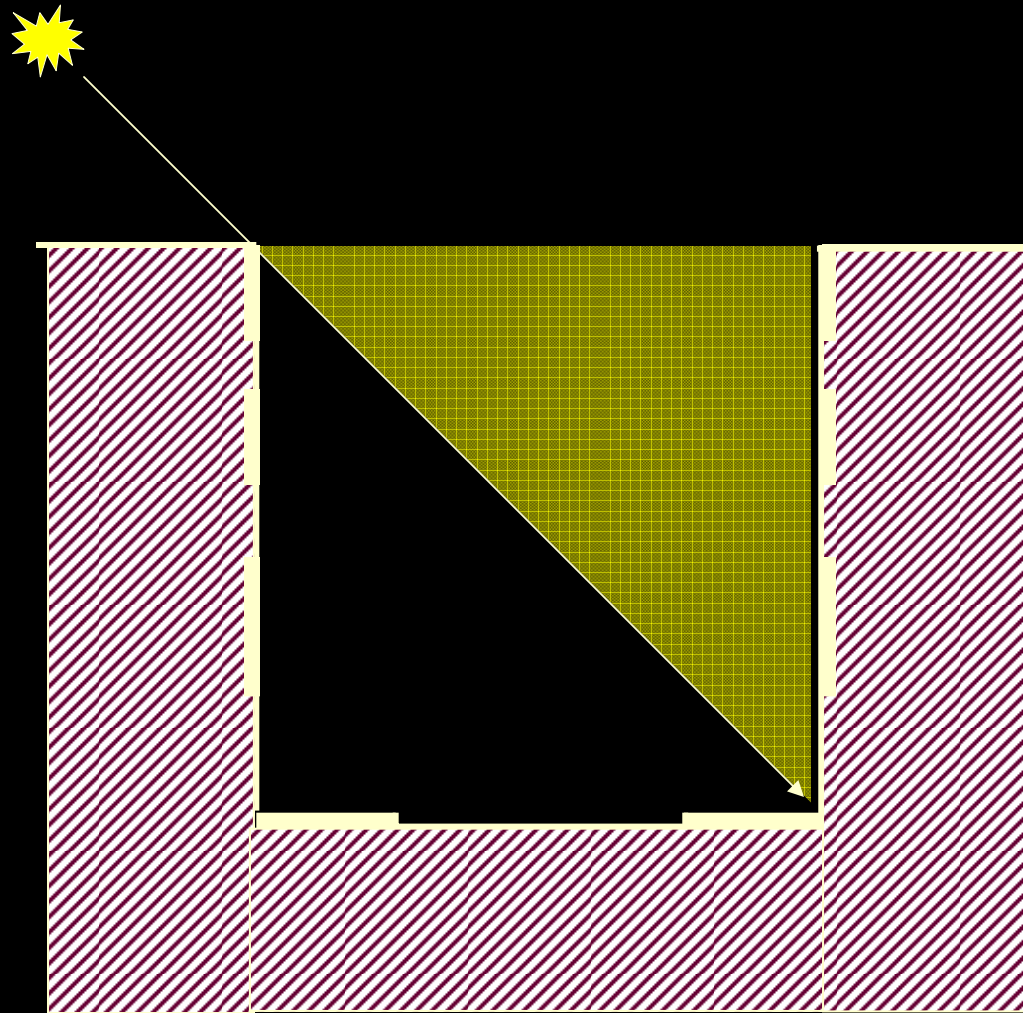


3:2 Height to Width Ratio



Houston, TX

Urban Scale

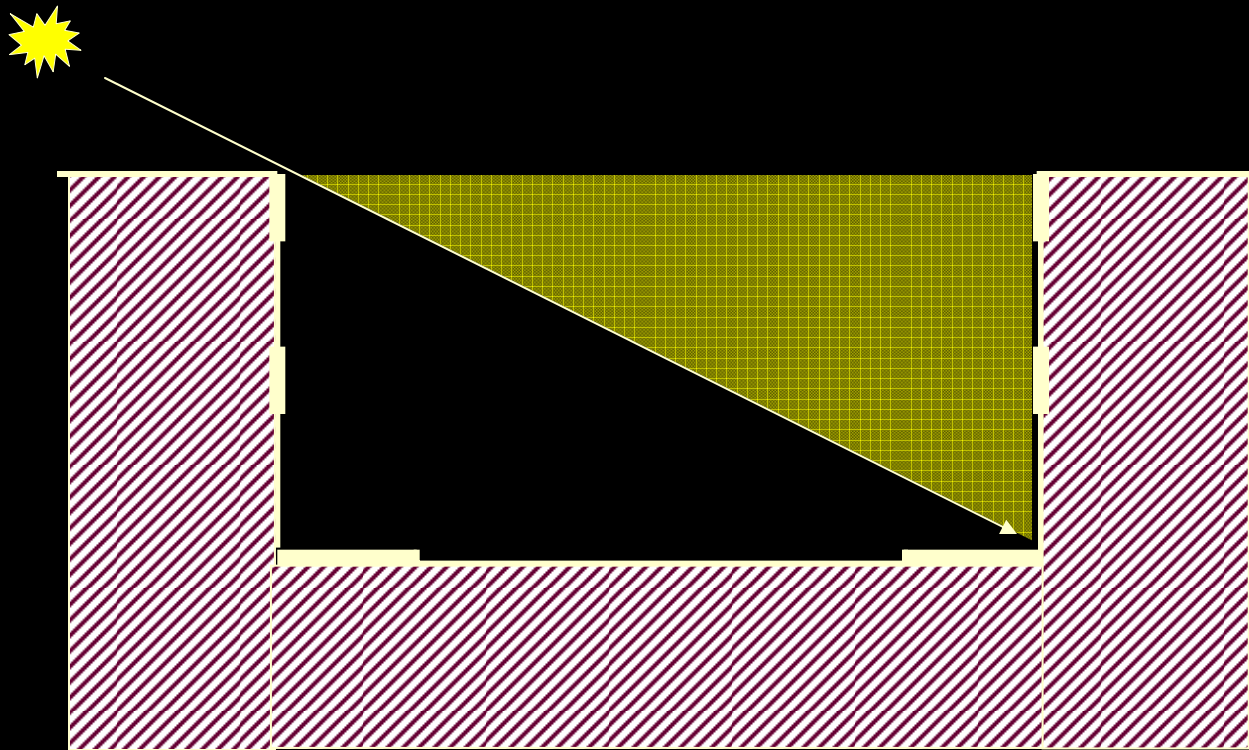


1:1 Height to Width Ratio



Portland, ME

Urban Scale



1:2 Height to Width Ratio

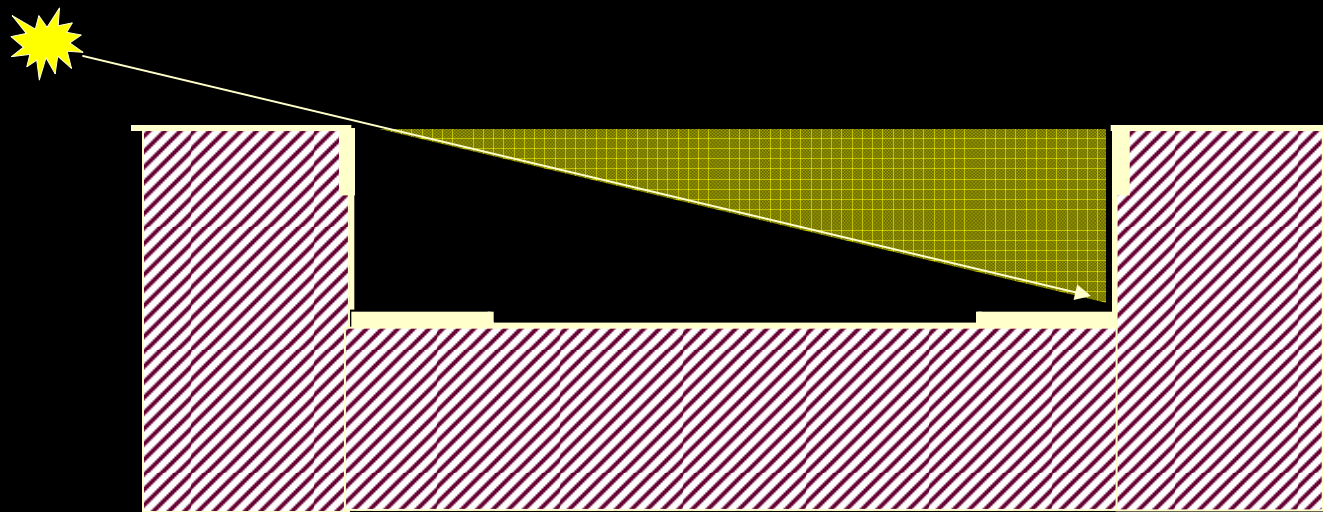


Santa Cruz, CA



Flagstaff, AZ

Urban Scale



1:4 Height to Width Ratio



Boulder, CO



Boulder, CO

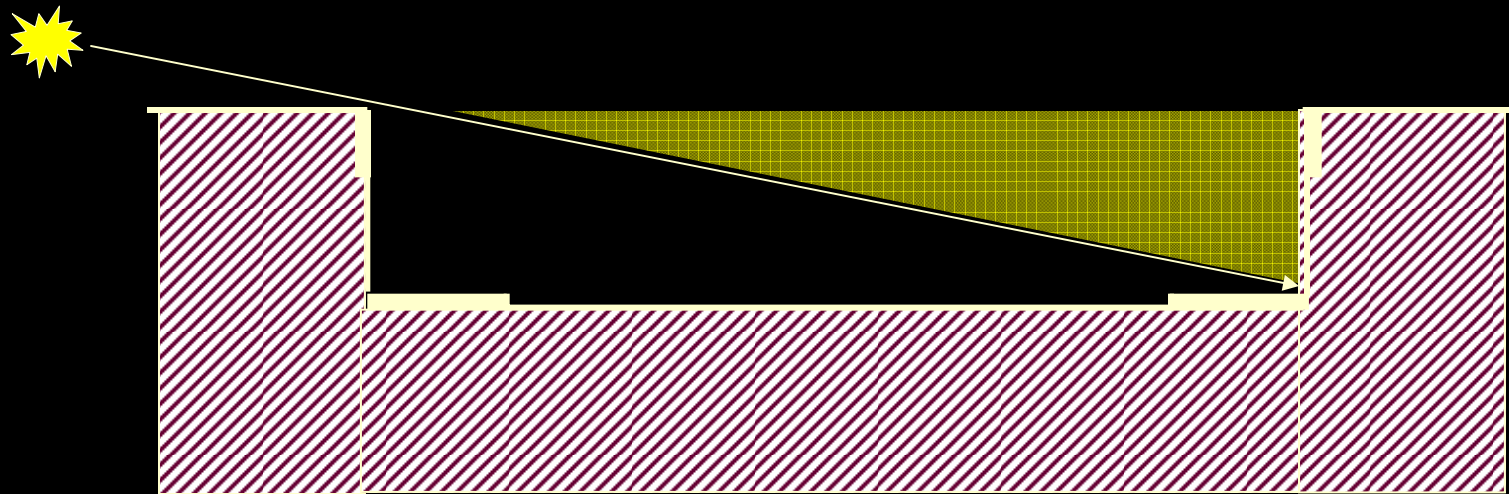


Pleasanton, CA



Pleasanton, CA

Urban Scale



1:5 Height to Width Ratio



Aurora, CO

7. Great Streets are green



Great Streets are green



Chico, CA

Great Streets are green



Denver, CO

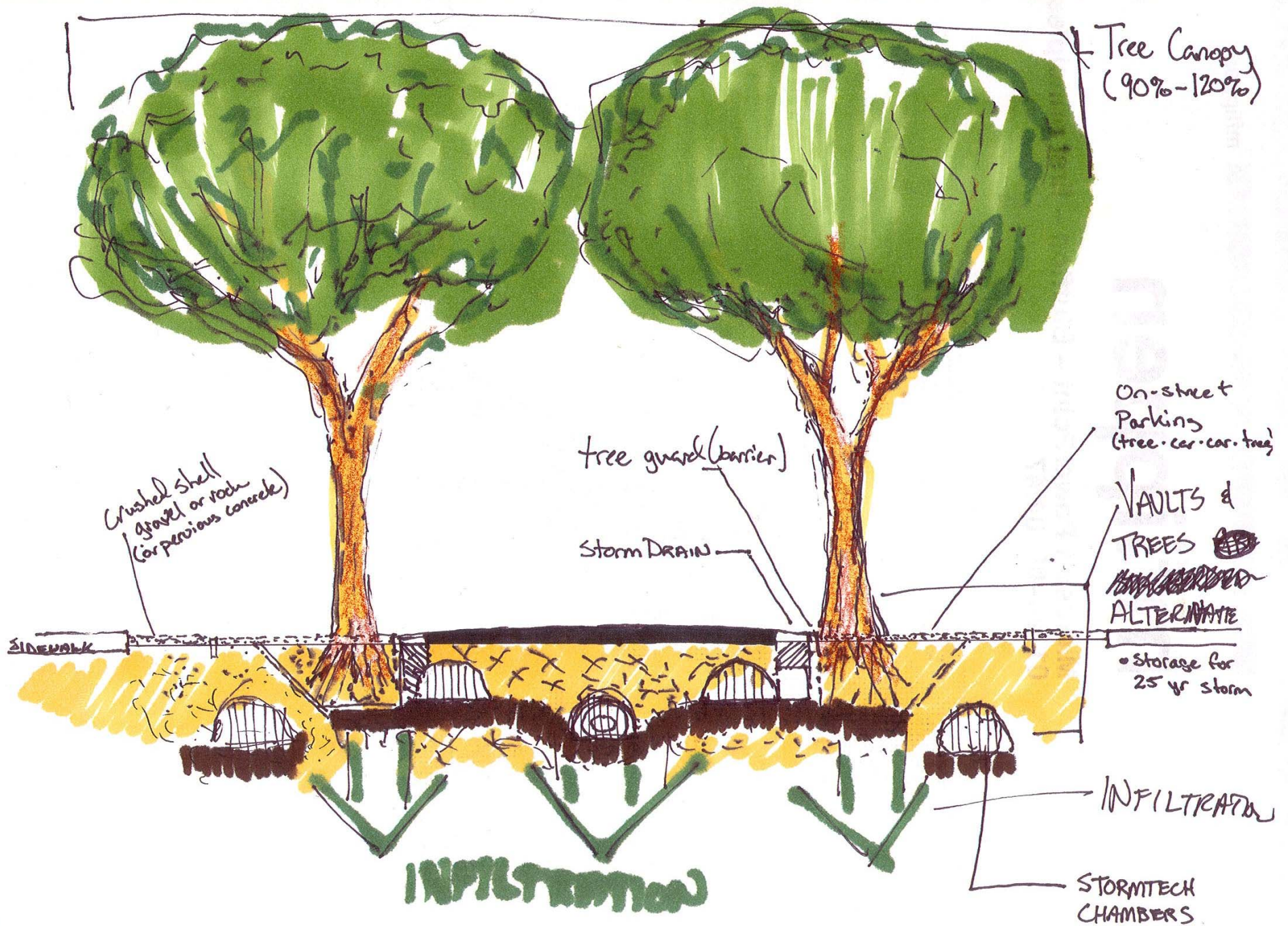
Great Streets are green

Kailua, Oahu



Great Streets are green

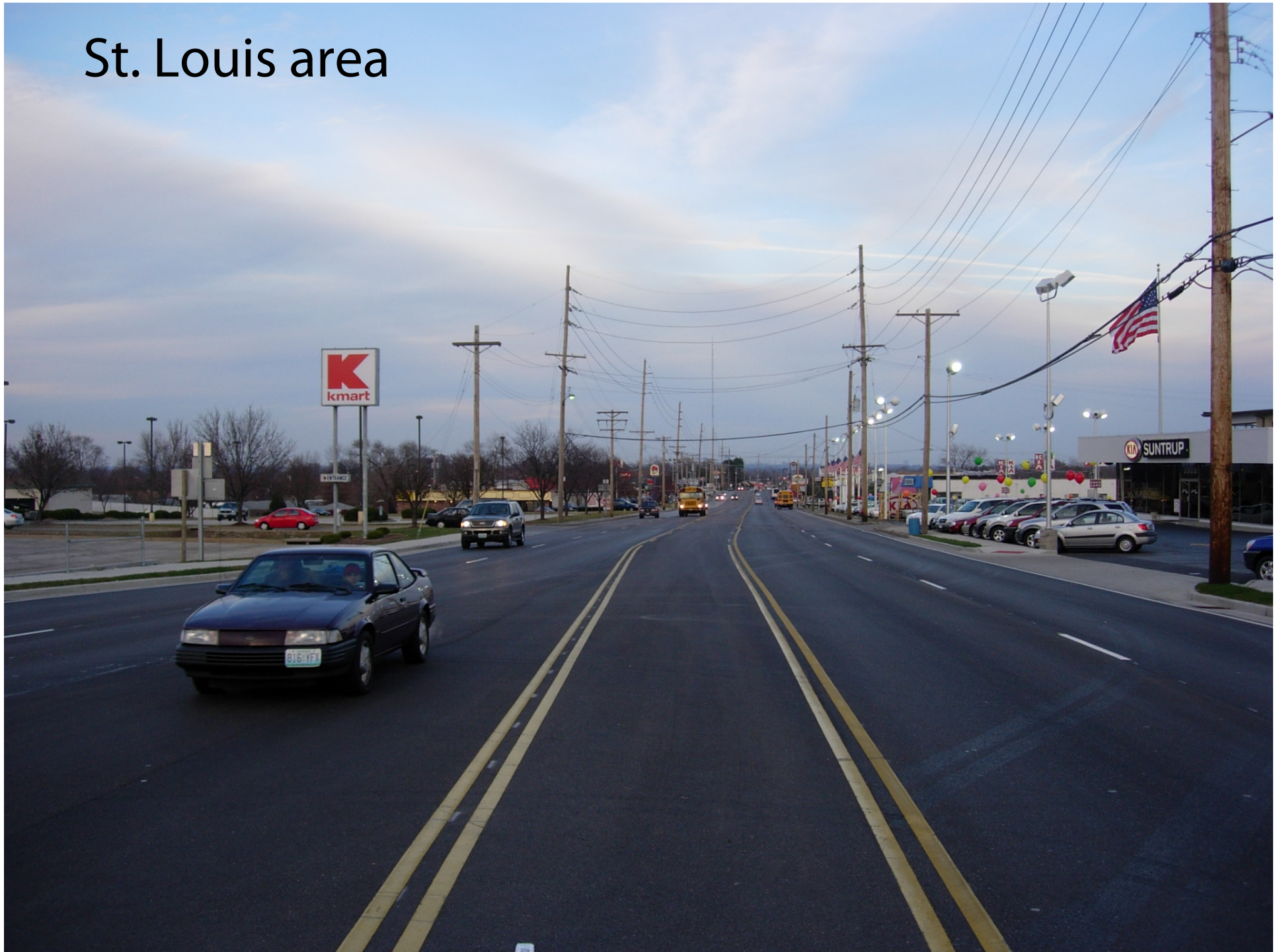






Portland, OR

St. Louis area



WTS Colorado

Example



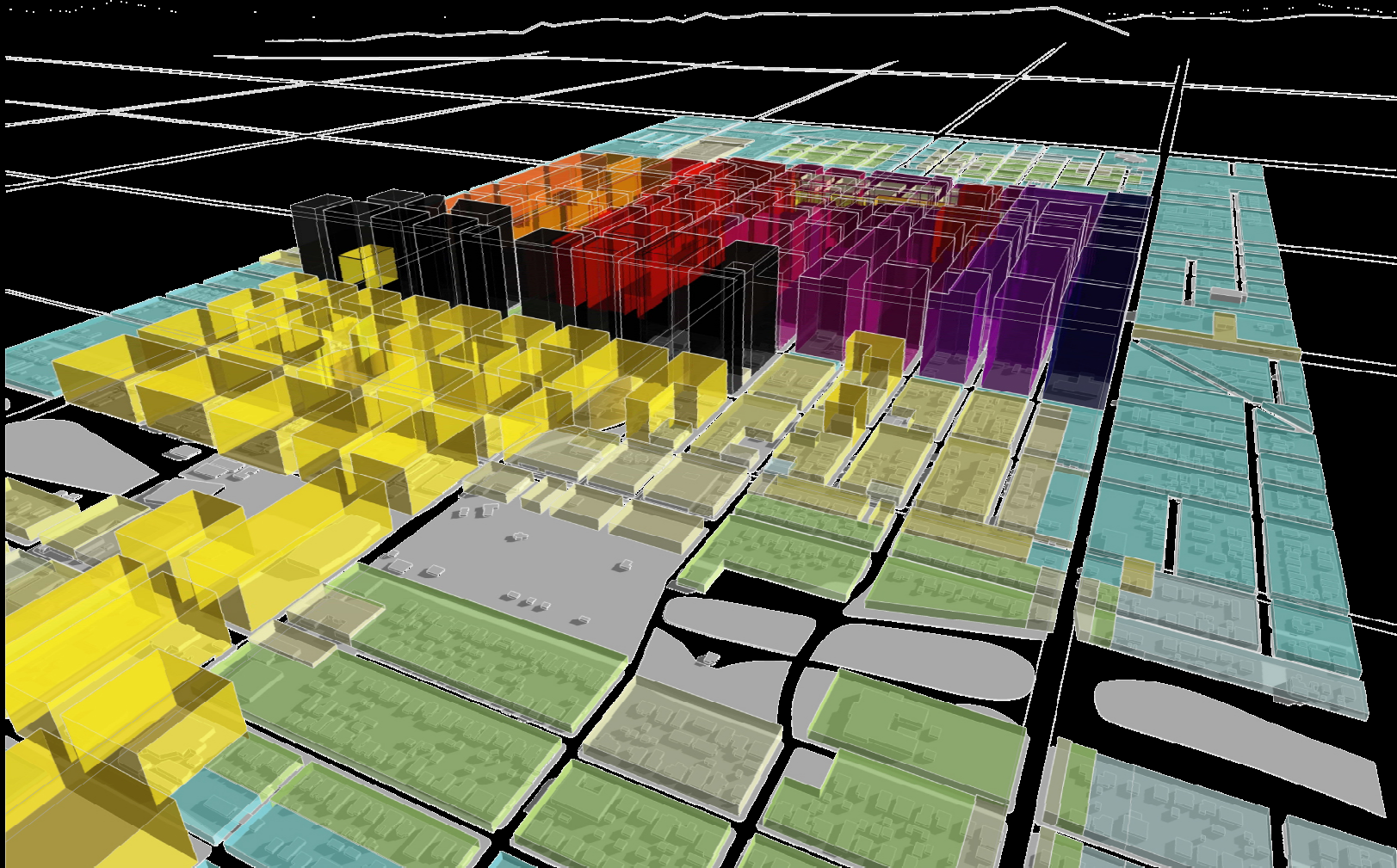
Charlier Associates, Inc.

WTS Colorado

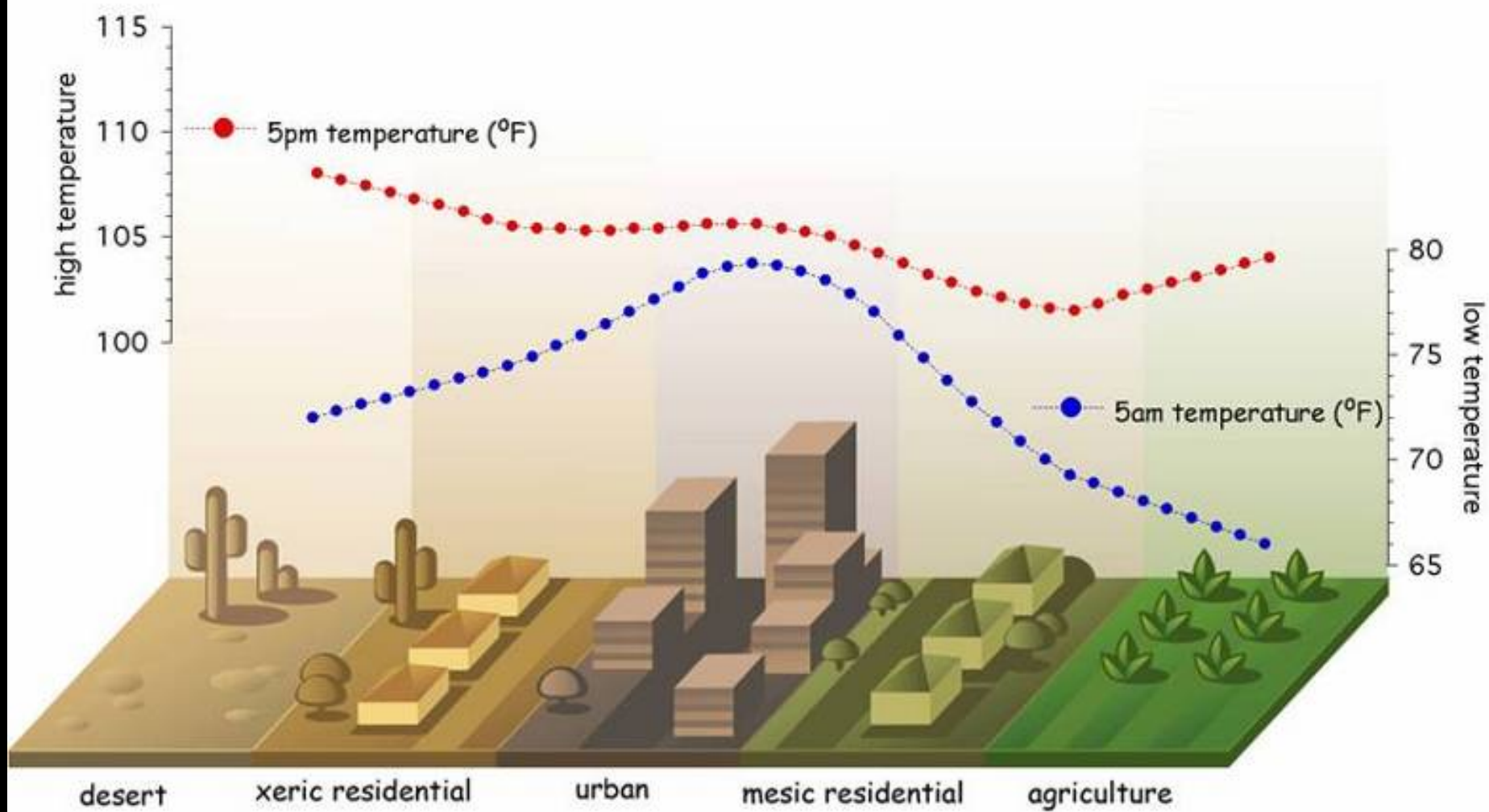
Phoenix, AZ



EXISTING ZONING HEIGHTS

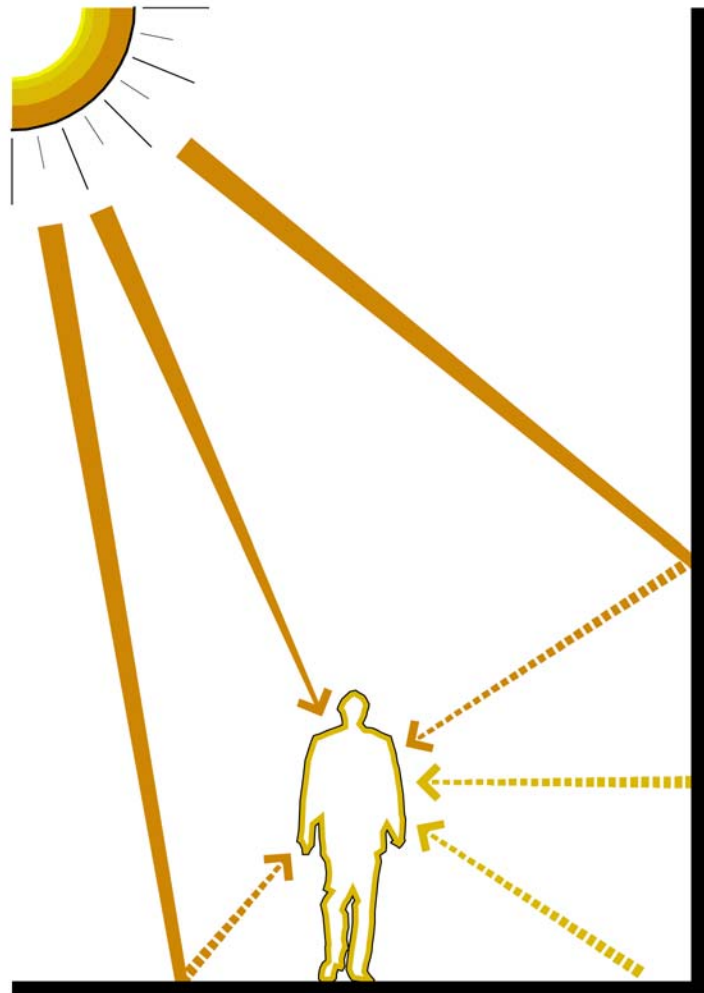


URBAN HEAT ISLAND



OUTDOOR HEAT EXCHANGE

How the body reacts to excessive heat

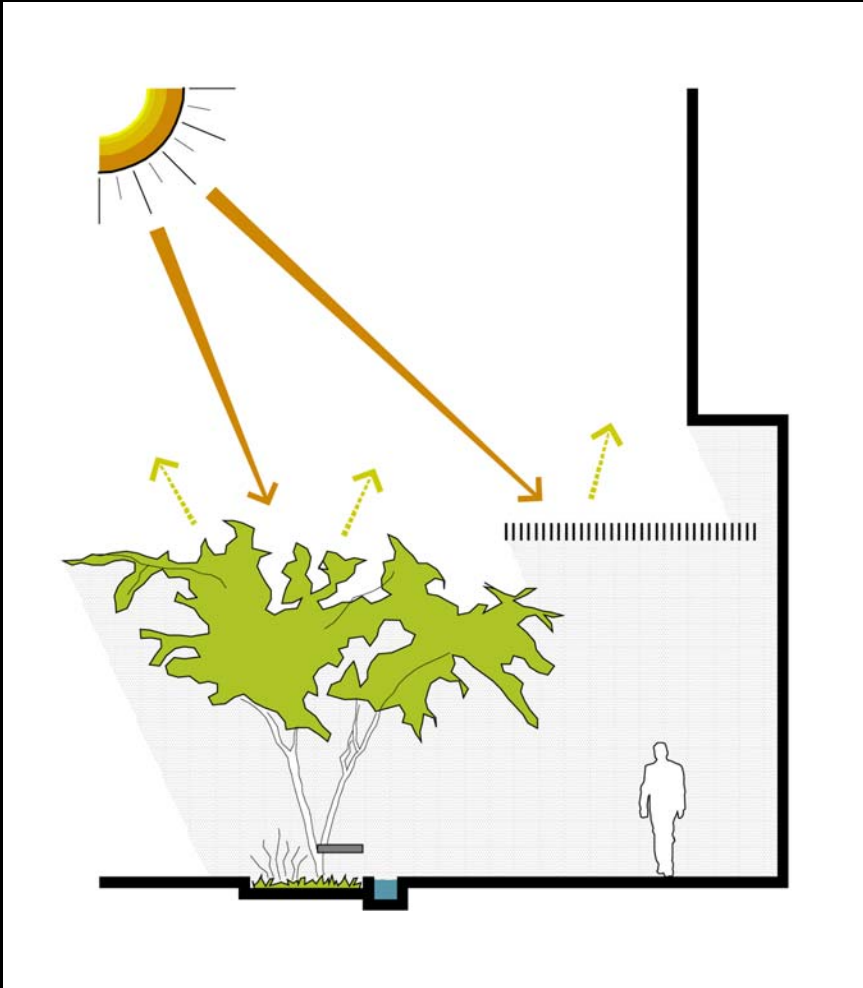


OUTDOOR THERMAL COMFORT DIAGRAM

- During the summer months hard surfaces such as pavement and building walls are heated by the sun and air to temperatures higher than the body.
- This excess heat is transferred to the body through long wave radiation.
- The body removes this excess heat by allowing blood to flow near the surface of the skin, through breathing and through evaporation.
- Choice of clothing and activity levels are also significant types of adaptation.

PSYCHOLOGICAL FACTORS

How the body adapts to excessive heat



- Studies indicate that up to 15% of perceived comfort level in outdoor environments are due to psychological factors
- For example, a space with a SET temperature of 100°F can be perceived as 7.5°F cooler or 7.5°F warmer
- Major factors include the following
- The ability to make choices of how one moves through a space
- The presence of spaces with different perceived temperatures
- The presence of nature in the form of trees or planting
- The presence of water – actual or virtual

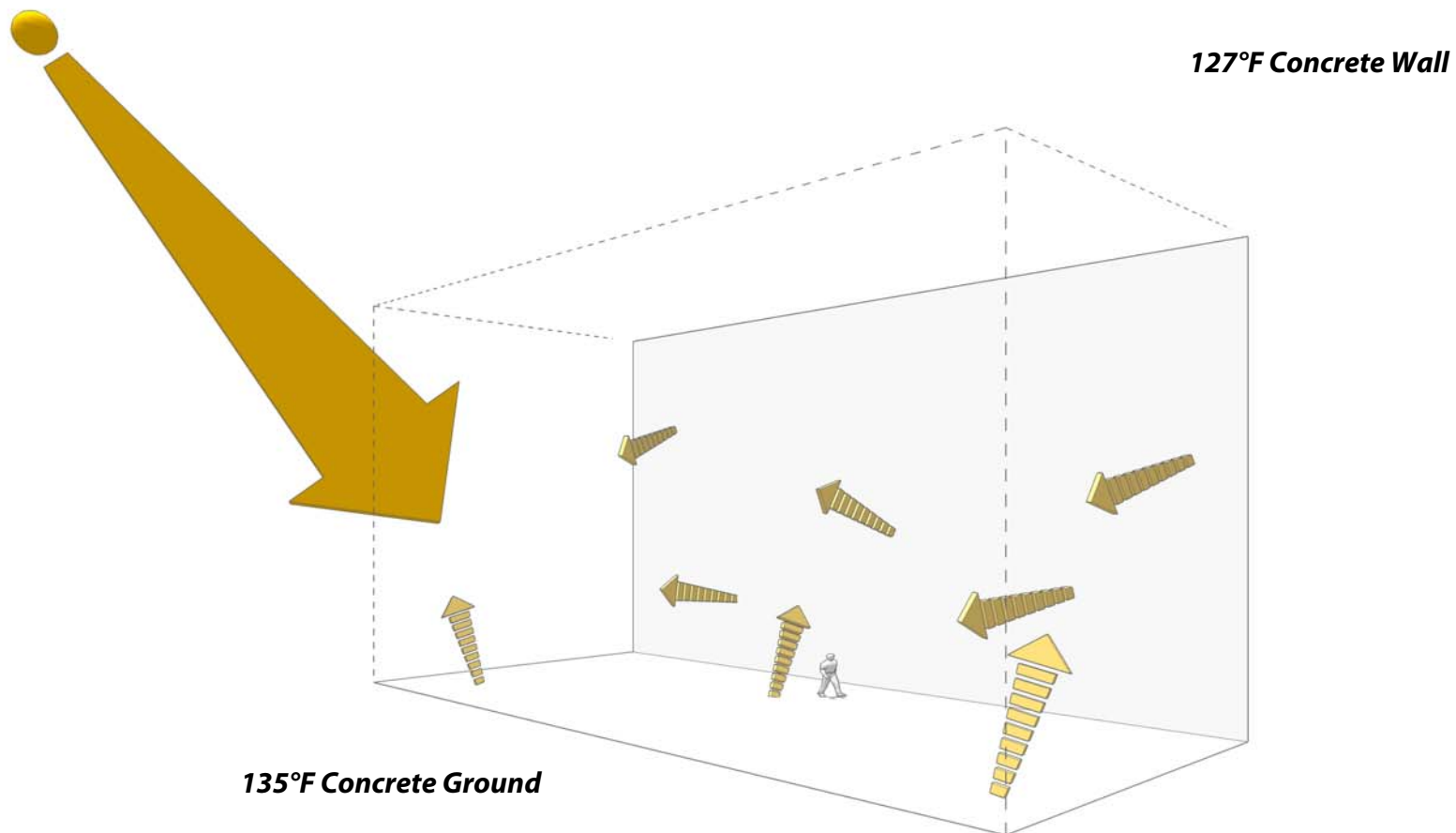
PSYCHOLOGICAL FACTORS

Sidewalk at Kierland – An example of choice, variation and the presence of nature in a street environment



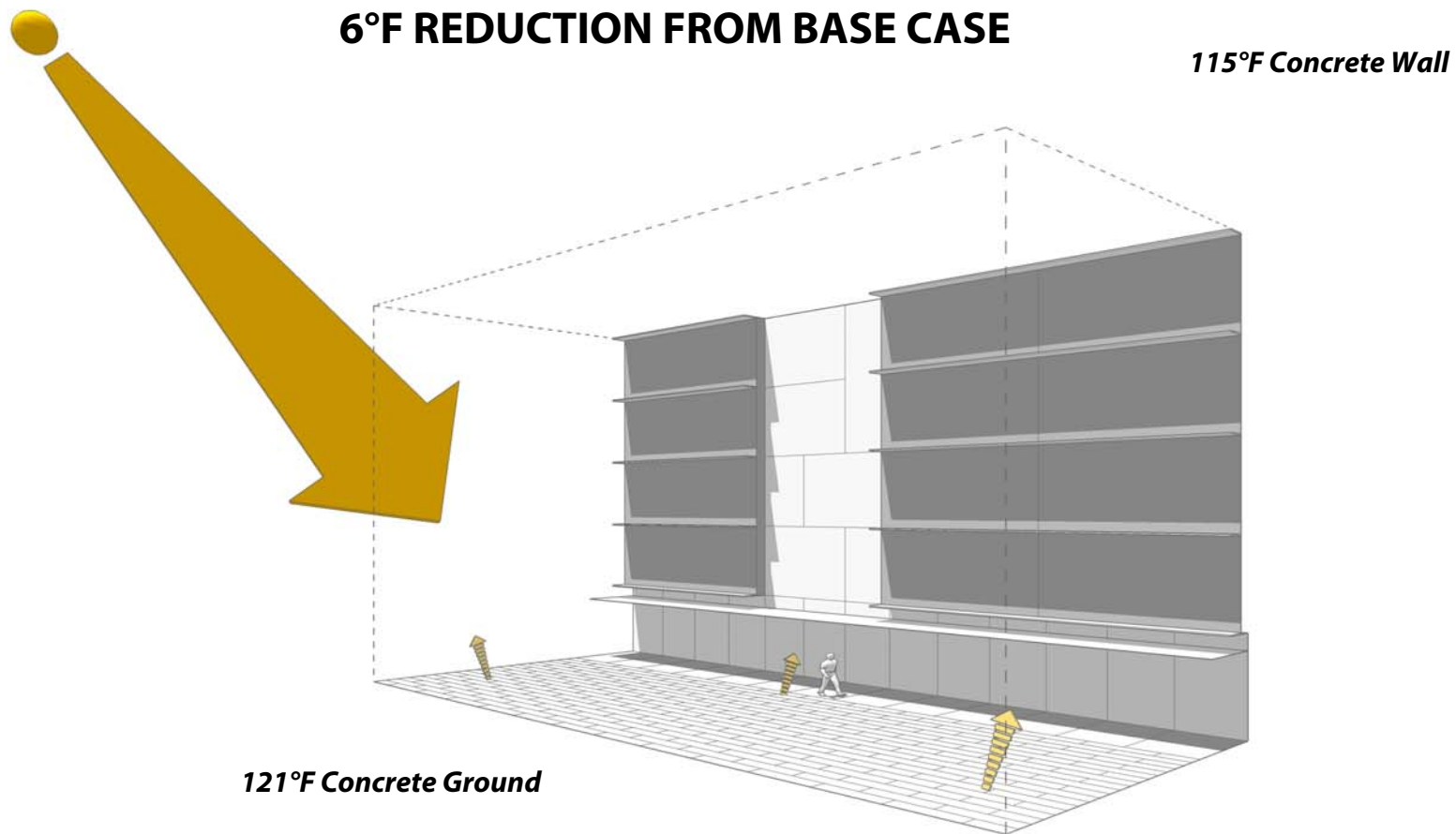
THERMAL COMFORT DESIGN STRATEGIES

Base Case – No Strategies Employed



THERMAL COMFORT DESIGN STRATEGIES

Pedestrian Shade Canopy and Building Shades



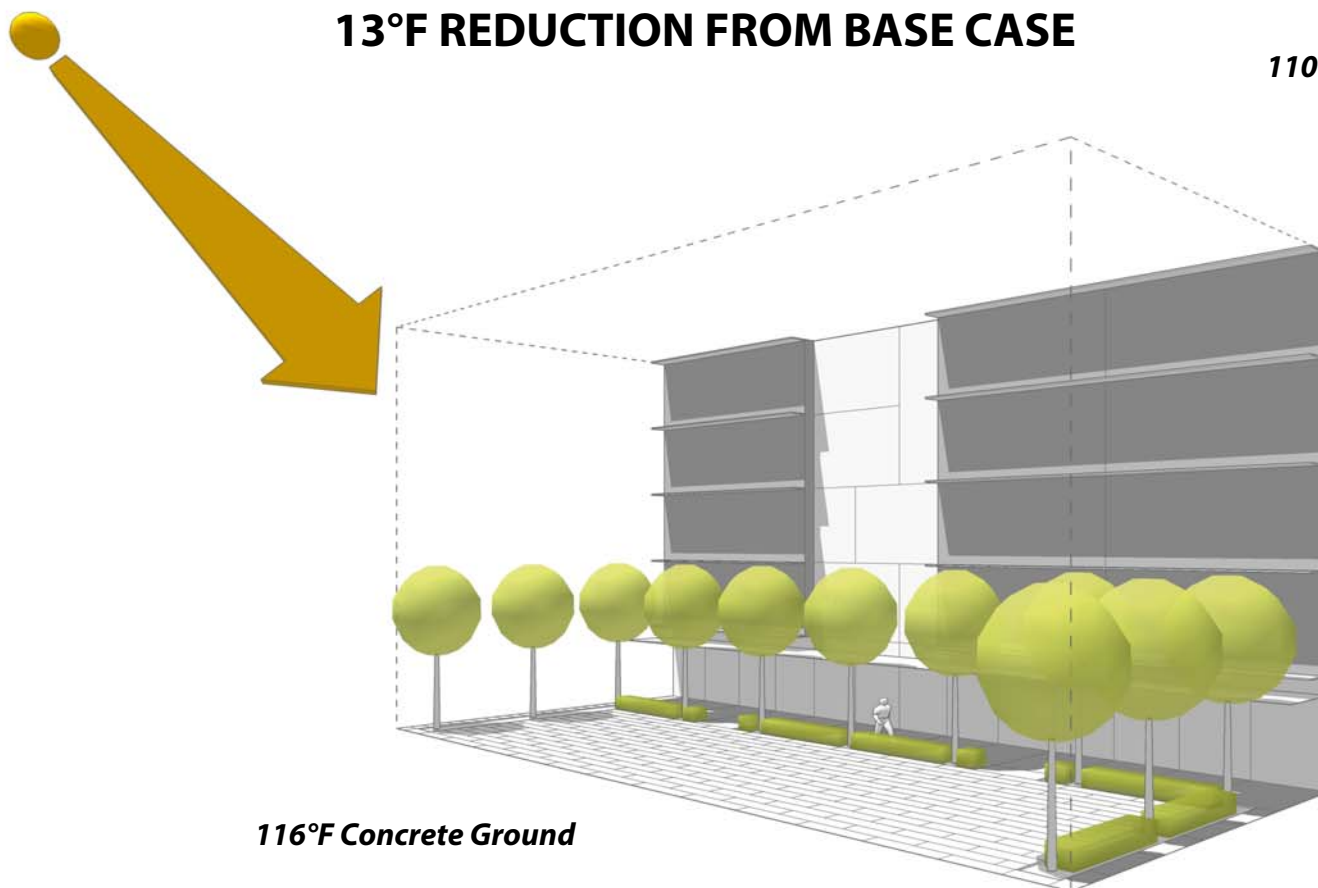
THERMAL COMFORT DESIGN STRATEGIES

Urban Forestry

13°F REDUCTION FROM BASE CASE

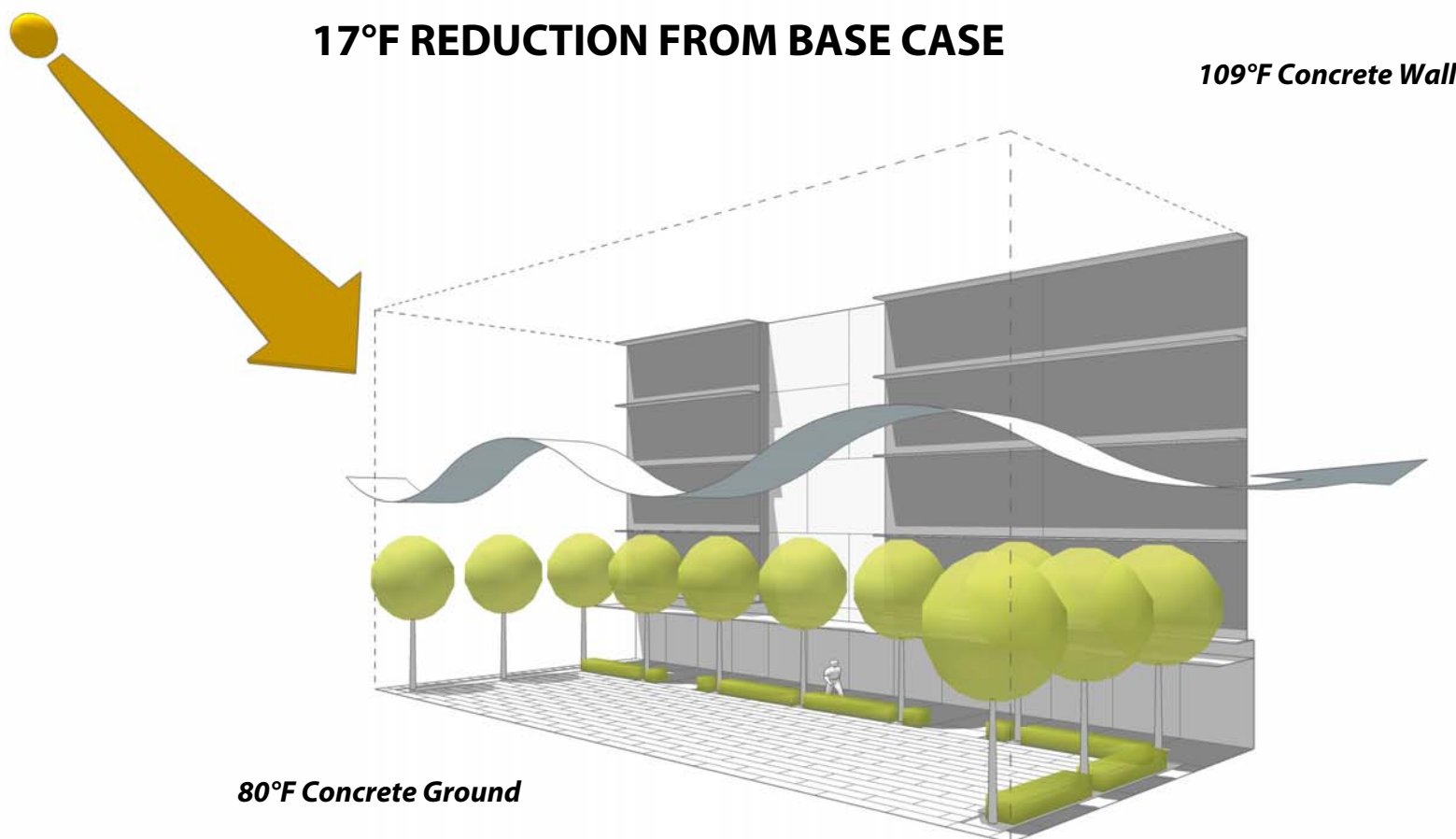
110°F Concrete Wall

116°F Concrete Ground



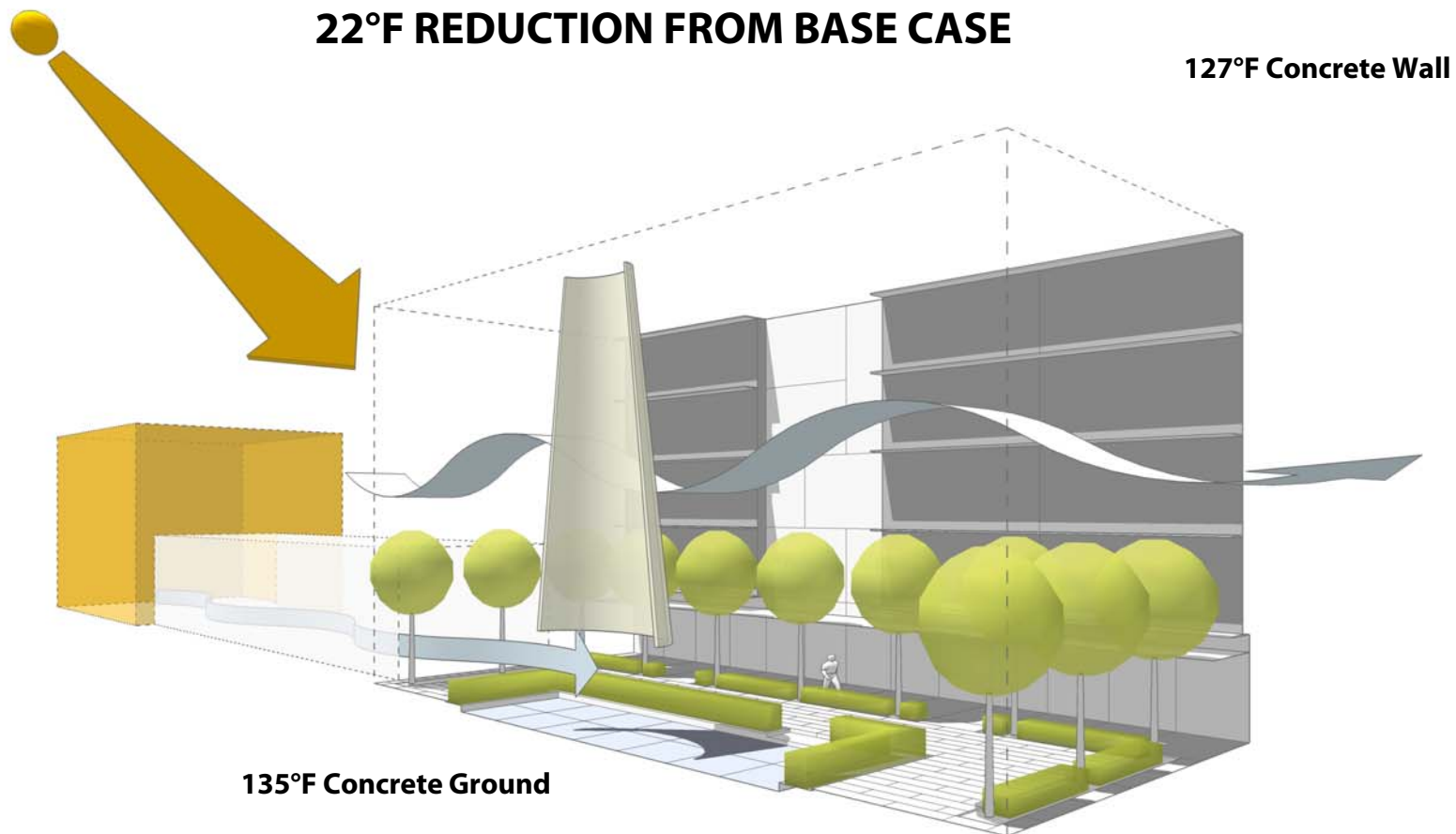
THERMAL COMFORT DESIGN STRATEGIES

4mph Convective Air Flow



THERMAL COMFORT DESIGN STRATEGIES

Water and Summary of Design Responses



URBAN HEAT ISLAND



Building Form

- Buildings and structures that provide shade yet are open to the night sky reduces heat build-up

Materials

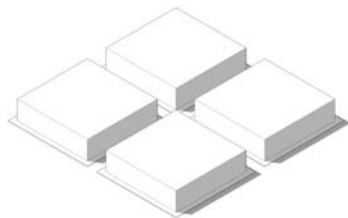
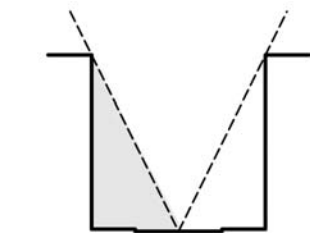
- Light colored materials reflect the heat of the sun back to the atmosphere resulting in lower surface temperatures
- Low density materials store less heat, reducing the thermal lag during evening hours

Planting

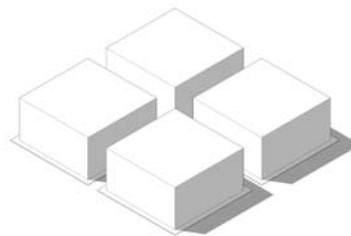
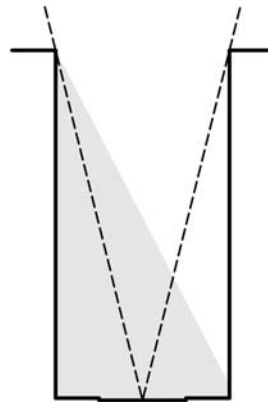
- Plants provide shading and introduce moisture into the atmosphere for cooling

COMPARISON OF STREET CANYON PROPORTIONS

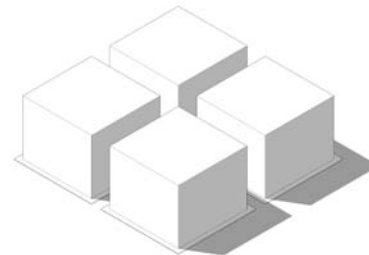
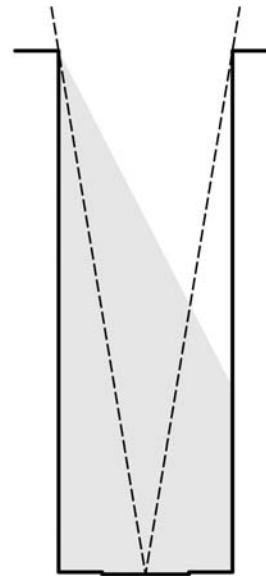
Sky View versus Shading



1:1



1:2



1:3

BENEFICIAL EFFECTS OF AIR MOVEMENT

Regional Effects

Air movement over 6.2 miles an hour can diminish UHI on a regional scale

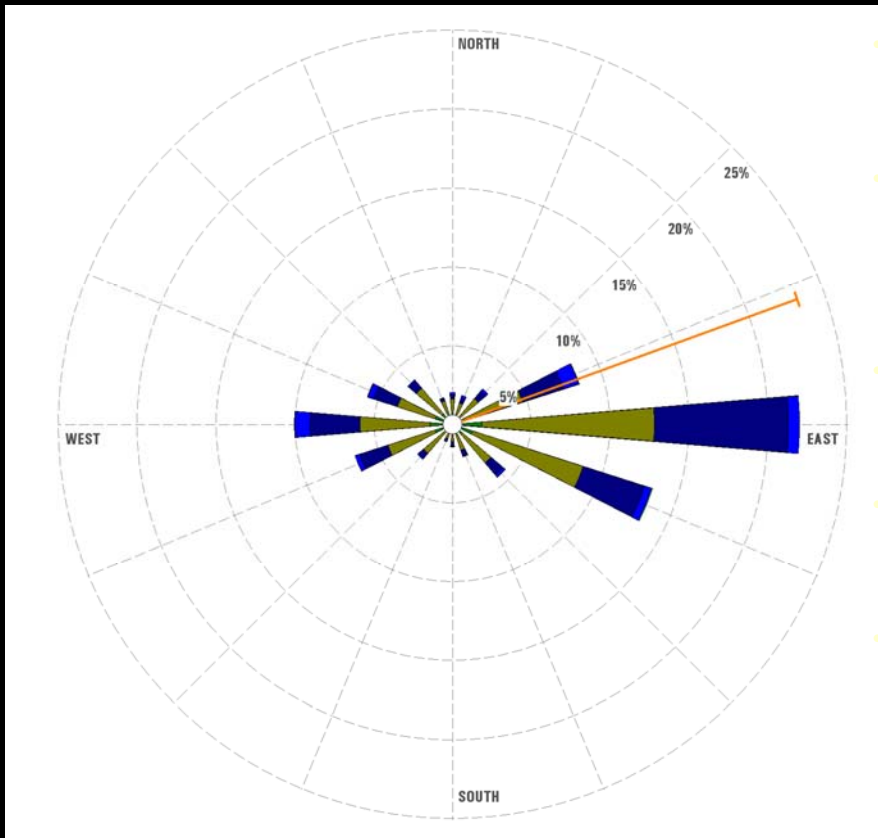
Air movement due to wind can “flush out” excess heat in the street canyon

Local Effects

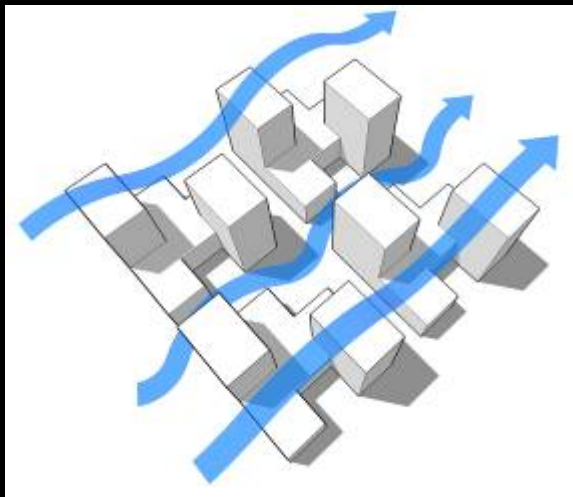
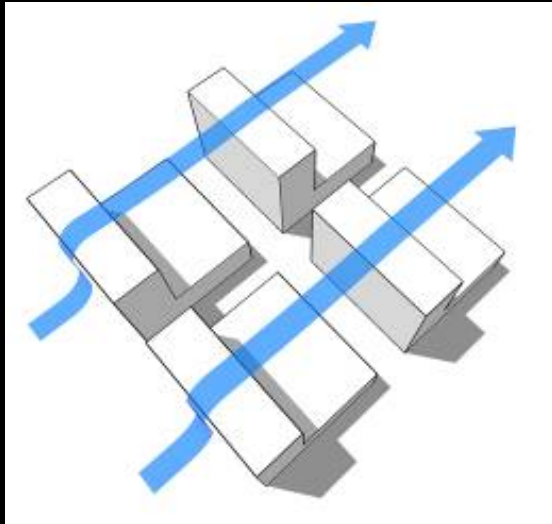
Air movement due to wind can remove pollutants that build up in the street canyons

Air movement can flush out daytime heat build-up in appropriately designed buildings

Small amounts of airflow induces evaporative cooling on the skin



DESIGNING FOR WIND FLOW AND AIR MOVEMENT



Phoenix Wind Flow

- Wind flow in the Phoenix valley is predominately from the south-east and south-west
- Although it is at relatively low speeds, wind flow is adequate for cooling except during July and August when ambient air temperatures are too high

Optimizing Wind Flow

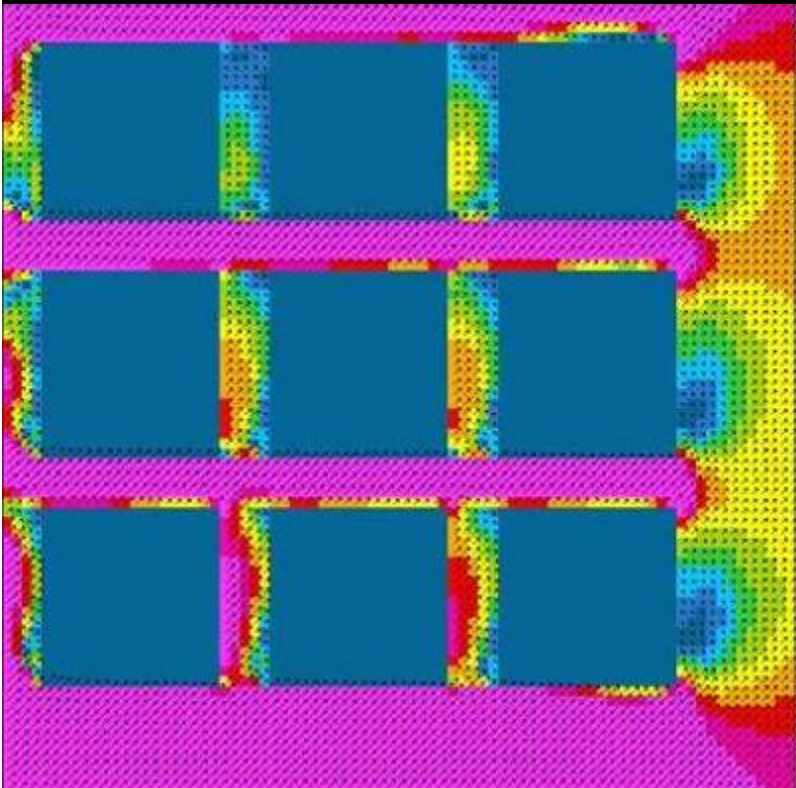
- Building form can have a significant effect on air movement
- A 1:1 street proportion is at the lower end of effectiveness for air movement in the urban canopy layer
- Appropriately located towers and open areas can increase local turbulence, allowing for air flow in smaller spaces

DESIGNING FOR WIND FLOW AND AIR MOVEMENT

Uniform Block Configuration

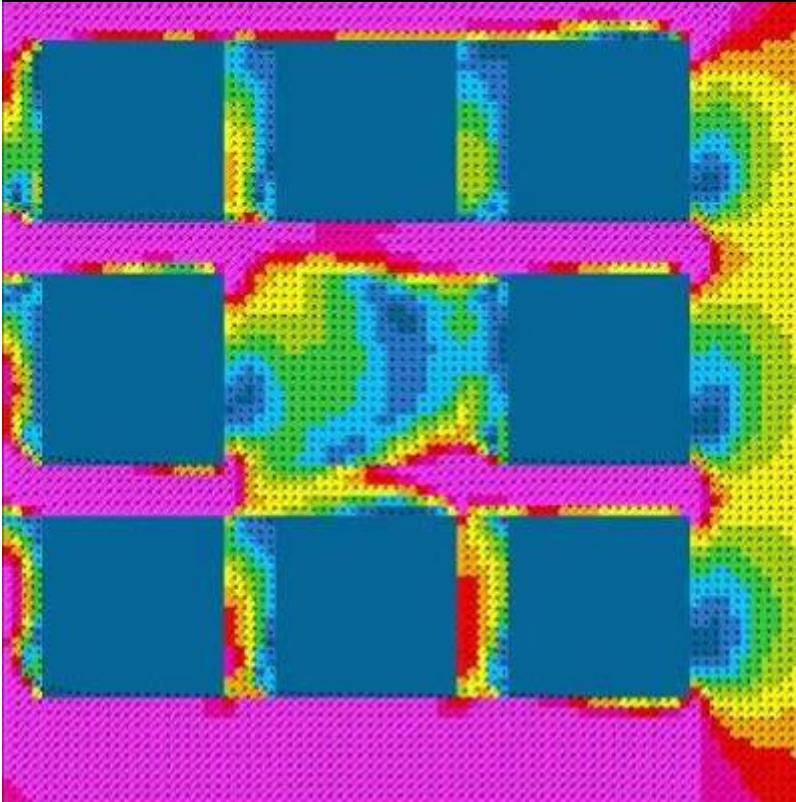
ENVIT-MET CFD SIMULATION

- The adjacent image is from an computation fluid dynamics simulation of air moving through an urban canopy layer. The blocks are similar in proportion to those found in Downtown Phoenix.
- The street canyon has a 1:1 proportion
- Air movement is from the south-west at 10 mph (north is up on the image)



DESIGNING FOR WIND FLOW AND AIR MOVEMENT

Uniform Block with Gap

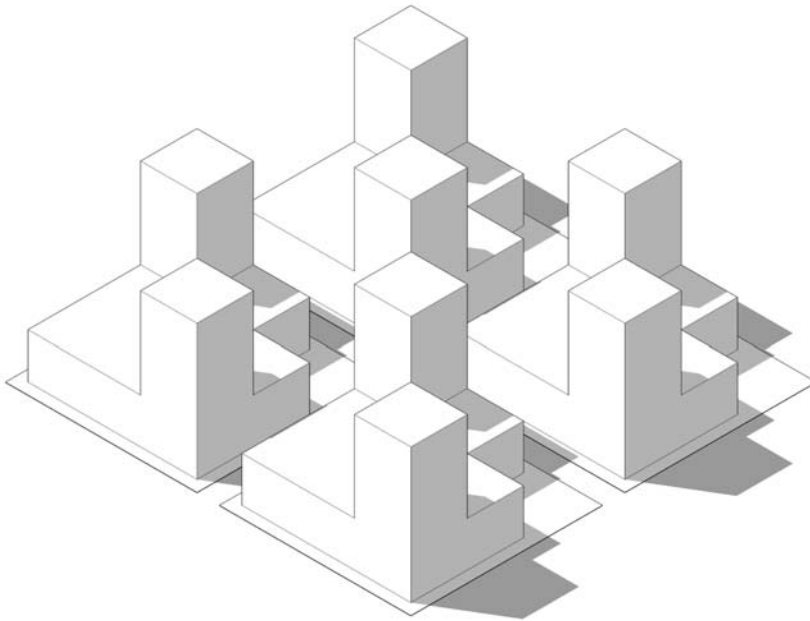


ENVIT-MET CFD SIMULATION

- **Removing a block produces a “roughened” texture in the urban canopy layer, permitting greater levels of air circulation**
- **When planted with trees and ground cover, open areas such as these can create cooling in downwind areas up to 300’ away**

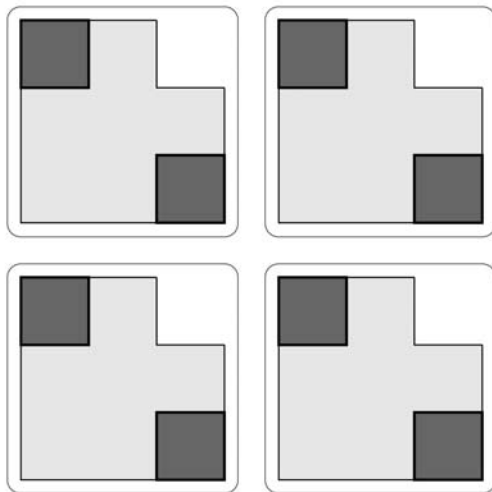
SUSTAINABLE BUILDING FORM RESPONSE

Optimizing for thermal performance and air movement

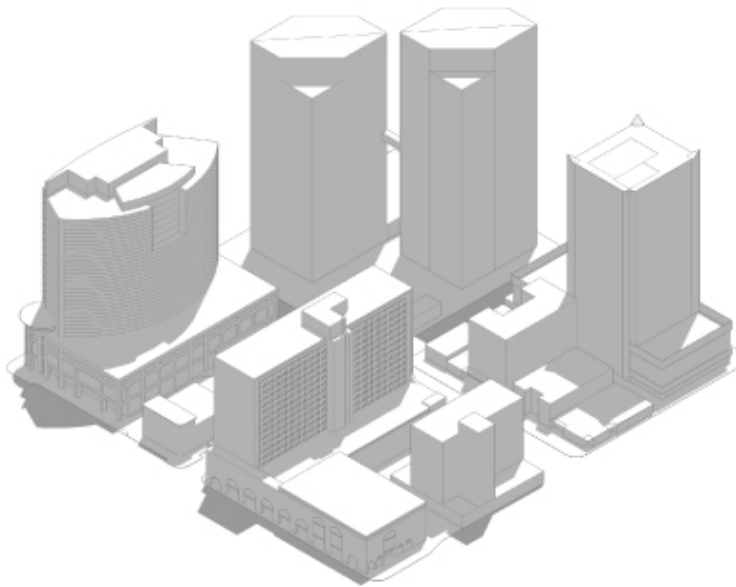


“Checker Board” Scheme

- **Tower and notches enhance air movement**
- **Towers placed at corners of block for optimal shading**
- **Towers offset to allow wind movement**
- **Notches located in northeast corner for protection against west sun**
- **Combination of tower and base produces effective street canyon proportion of 1:2**

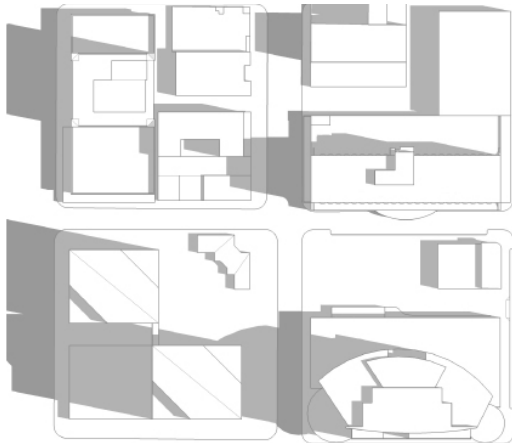


OPTIMIZED BUILDING FORM PRECEDENT

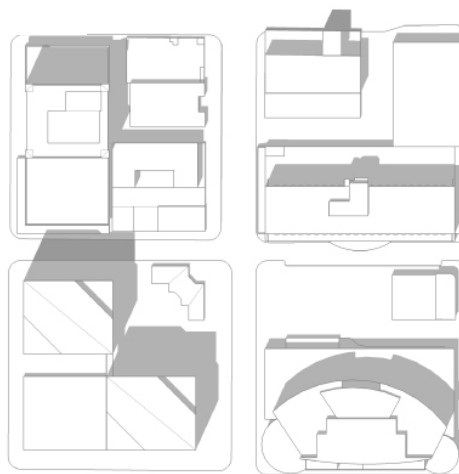


Intersection of Central and Adams, Downtown Phoenix

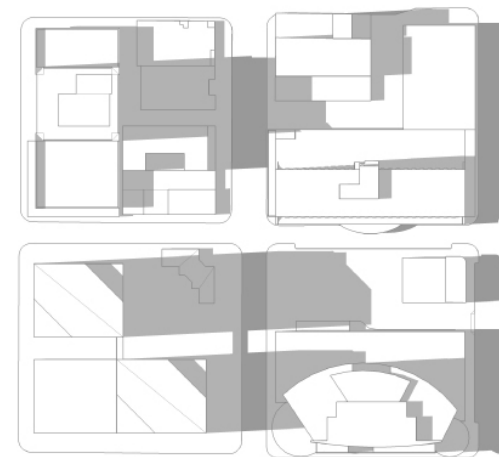
- Note shading of corner “notch” in the afternoon hours
- North east location of notch permits morning sun and prevents afternoon sun



JUNE 22 @ 10AM

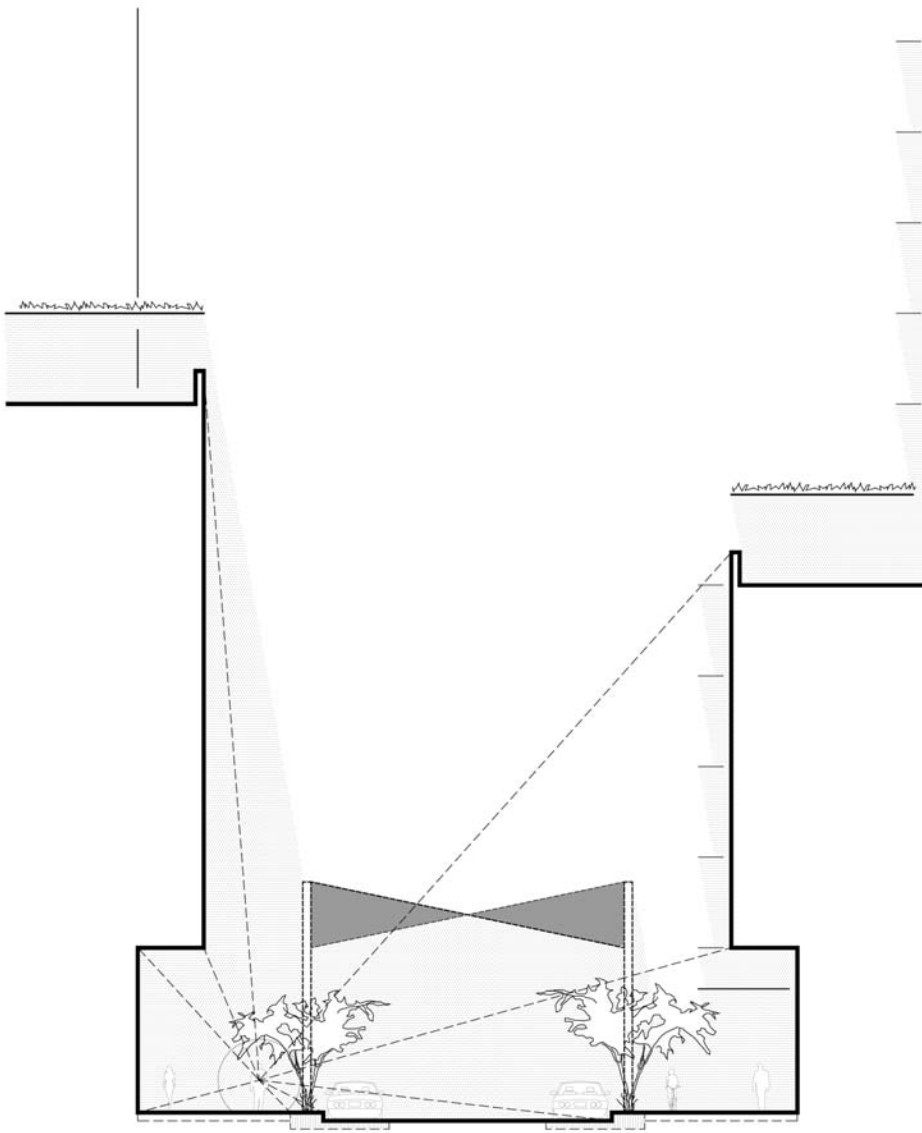


@ 1PM

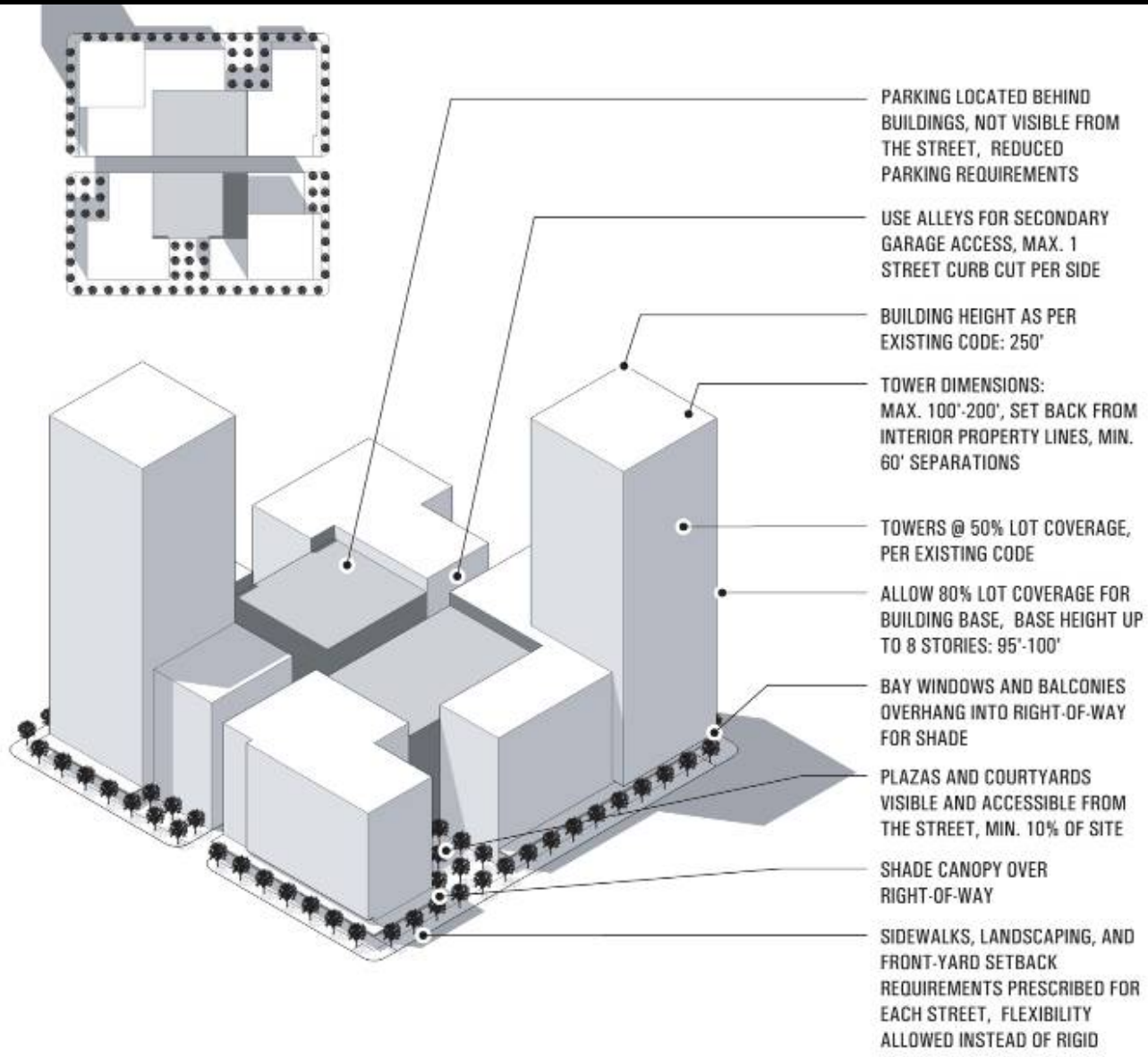


@ 4PM

PROPOSED STREET EAST-WEST STREET SECTION



URBAN FORM STANDARDS FOR HIGH RISE MIXED USE





Nicollet, Minneapolis

WTS Colorado

Thank You



Charlier Associates, Inc.

Great Streets – Resources

- Book: “Great Streets” by Alan Jacobs
- Web Sites:
 - St. Louis (East-West Gateway COG)
www.greatstreetsstlouis.net
 - APA
www.planning.org/greatplaces/streets/index.htm
 - Great Streets
<http://www.greatstreets.org/>
 - Our site
www.charlier.org

*G*REAT *S*TREETS



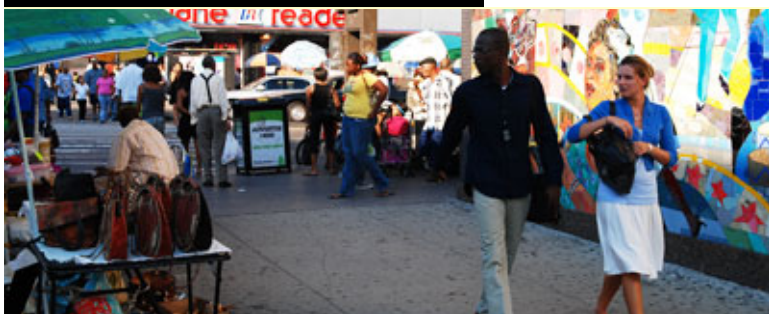
ALLAN B. JACOBS



Savannah



Miami Beach



New York



PLACES IN AMERICA
STREETS
Northampton



Planning Association celebrates excellence
Santa Fe



Chicago



St. Louis



Richmond



[Home](#)

Choose a Place Type

[Home](#)
[Downtown Main Street](#)
[Mixed-Use District](#)
[Small Town Downtown](#)
[Residential Neighborhood](#)
[Office Employment Area](#)
[Civic/Educational Corridor](#)
[Neighborhood Shops](#)
[Commercial/Service Corridor](#)

Resources

[Document Library](#)
[Design Tutorial](#)
[Related Events](#)
[Demonstration Projects](#)
[Why Great Streets?](#)
[Glossary](#)
[Site Map](#)
[Credits](#)

What is the St. Louis Great Streets Initiative?

East-West Gateway launched the St. Louis Great Streets Initiative in early 2006 to expand the way communities think of their streets. Rather than viewing a roadway project as solely a way to move more cars and trucks faster, the goal of the St. Louis Great Streets Initiative is to trigger economic and social benefits by centering communities around interesting, lively and attractive streets that serve all modes of transportation. [Learn More <>](#)



EAST-WEST GATEWAY
 Council of Governments

 [What is a Place Type? Click Here to Learn More!](#)

How to Use this Guide -



Design Tutorial -



The Design Tutorial is a Flash based guide to help users understand the many elements of the street and provide direct links to related articles for all eight place types

Why Great Streets?

