

Sustainable Communities Building Blocks

EPA Office of Sustainable Communities

Practical Approaches to Sustainable Streets

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June 29th, 2012

Overview

8:45 – 9:30am	Introductions and Overview
9:30 – 10:00am	Project Planning and Design
10:00 – 10:30am	Design Standards / Guidelines
10:30 - 10:45am	Break
10:45 – 11:00am	Policies and Plans
11:00 – Noon	Small Group Discussions
Noon – 12:15pm	Report-out from Groups
12:15 – 12:30pm	Closing Remarks

Sustainable Streets and the Triple Bottom Line

Supporting Personal Mobility and Business Productivity

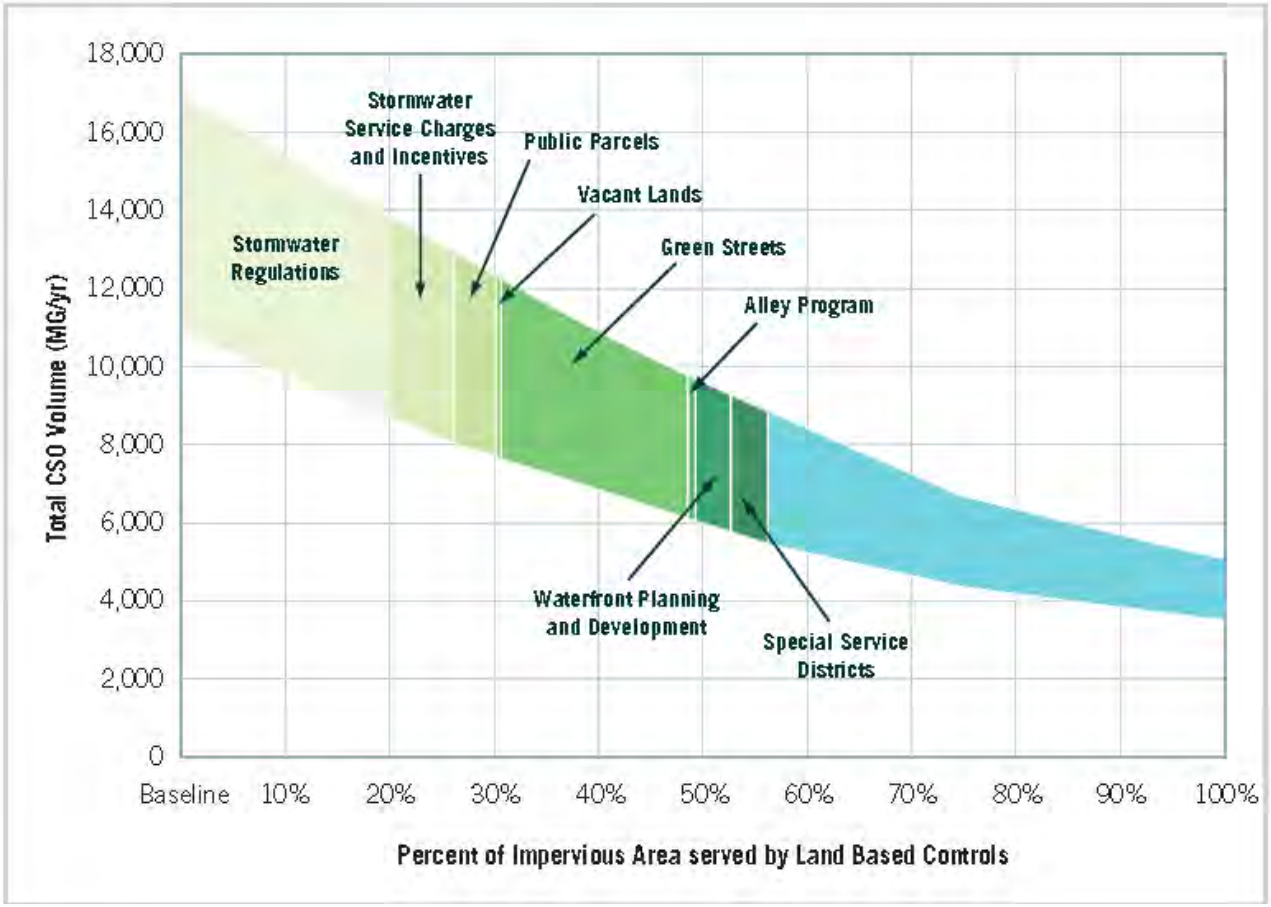
Supporting Retail and Service Sector Businesses

- Foot traffic can be critical to getting customers in the door
- On street parking can improve pedestrian environment and increase access to retail and service businesses

Strategic Public Investments Can Save Money

- Build street improvements that also manage stormwater
- New schools that can double as community parks
- Renovate civic buildings per LEED certification can reduce public energy costs
- Locate new development near transit can reduce parking demand, saving $20,000 or more per garage space, reducing construction costs and improving feasibility

Cost Effective Stormwater Management



- Philadelphia saved $170 M in stormwater management costs with green infrastructure strategies

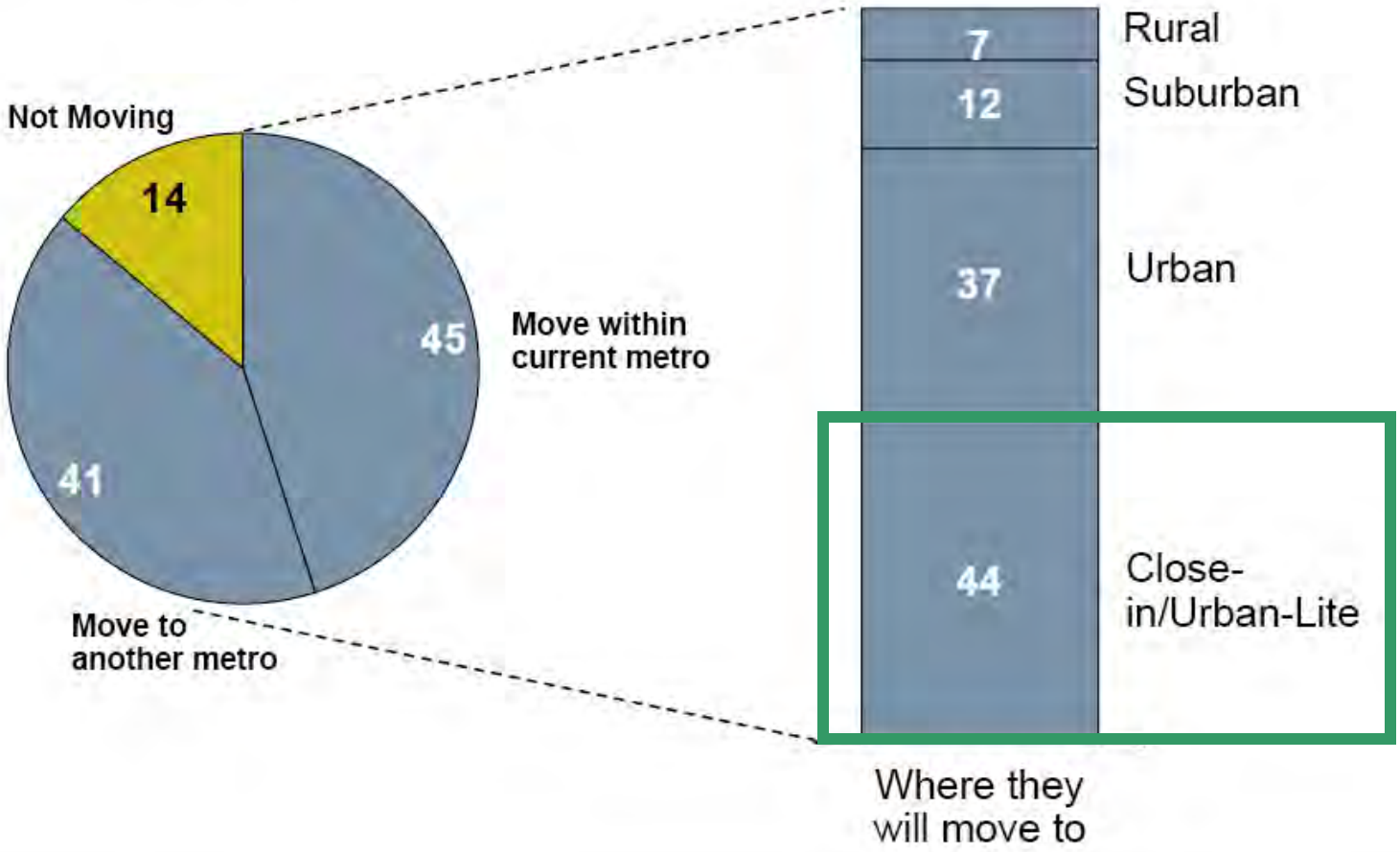
Meeting the Demand for Walkable Neighborhoods

- Rice University's *Houston Area Survey*
  - (1999) City residents were two times more likely to say they wanted to move to the suburbs than suburbanites were to express a preference for moving to the city
  - (2012) Trend has reversed
    - More suburbanites now say they'd be interested in moving to the city than city dwellers who say they want to move to the suburbs
    - Share preferring a traditional house with a yard in the suburbs has dropped from 59% four years ago to 47% today.
    - Share who'd like a smaller home in a more walkable neighborhood has risen over the same period of time — from about a third, to more than half.

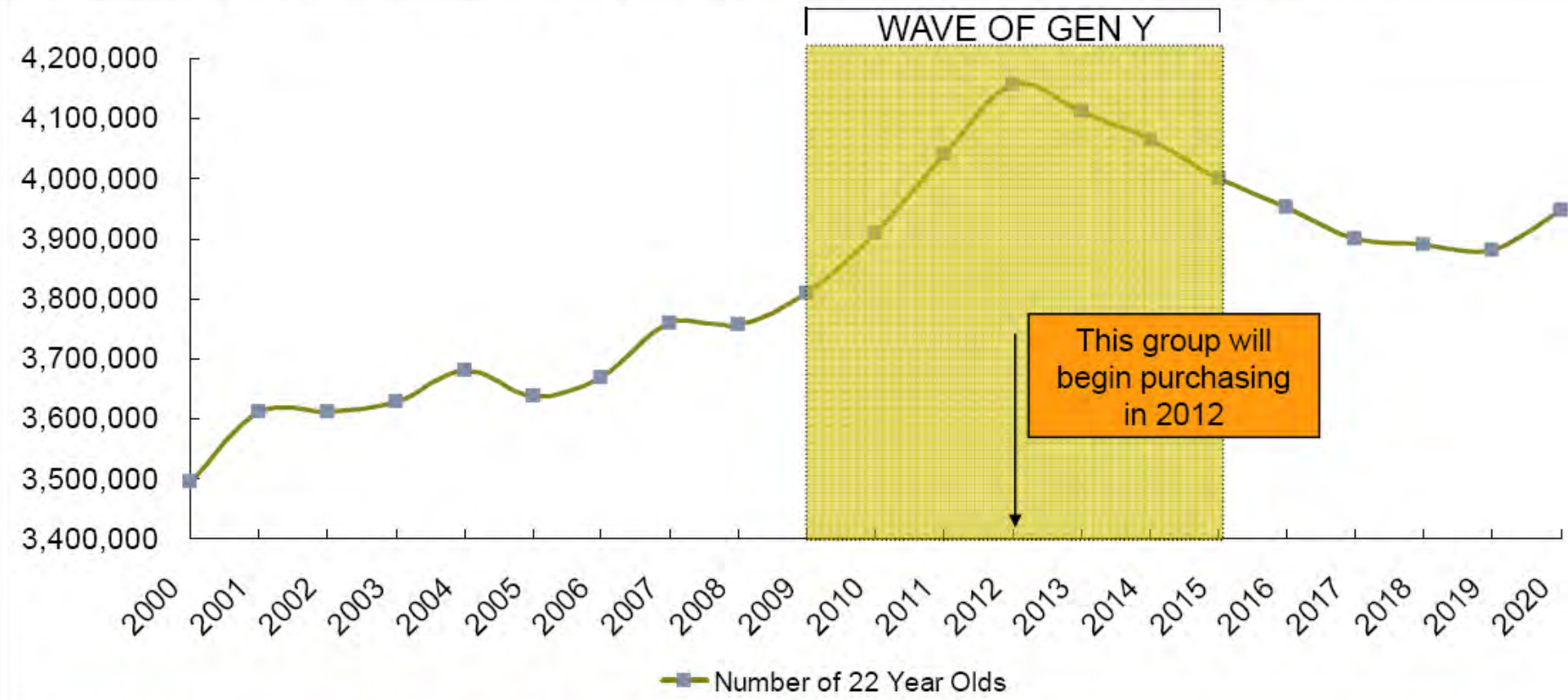
Source: 2012 Houston Area Survey, http://has.rice.edu/

88% OF GEN Y RENTERS ARE MOVING
MOSTLY GOING TO URBAN-LIKE LOCATIONS

Movement of Gen Y Renters (%)



IN 2009, THE UP TICK OF GRADUATES ENTERING THE RENTAL MARKET WILL BEGIN; THEY WILL BEGIN BUYING IN 2012



RCLCO Consumer Research shows:

- 41% of Generation Y plan to rent for at least three years
- 77% of Generation Y plan to live in an Urban Core

NOTE: Number of 22-year olds is based upon birth rate and does not factor in death rates and migration.

SOURCE: U.S. Centers for Disease Control and Prevention

Source: Shyam Kannan, RCLCO

Effective Transportation Choices

The tremendous potential

Of all trips:

- 50% are under 3 miles
- 28% are 1 mile or less
- 72% of trips 1 mile or less are driven

Economic Benefits of Walkable Neighborhoods

- "58% of homebuyers surveyed prefer mixed-use neighborhoods where one can easily walk to stores and other businesses."
  - National Association of Realtors, "The 2011 Community Preference Survey: What Americans are Looking for When Deciding Where to Live," Washington, 2011
- "Demand for walkable places may outpace its supply."
  - Jonathan Levine, Aseem Inam, and Gwo-Wei Torng, "A Choice-Based Rationale for Land Use and Transportation Alternatives: Evidence from Boston and Atlanta," *Journal of Planning Educating and Research*, 2005
- "Homes in neighborhoods with high levels of walkability command price premiums of $4,000 to $34,000 above average neighborhoods. Real estate listings such as Zillow now assign 'Walkscores' to their properties, signaling the growing interest of consumers."
  - Joe Cortright, "Walking the Walk: How Walkability Raises Home Values in U.S. Cities," Chicago: CEOs for Cities, 2009

Existing Houston Area Examples

- Downtown-Midtown street reconstruction
- West Gray Street
- Uptown Houston
- Other examples

Downtown-Midtown

Downtown-Midtown

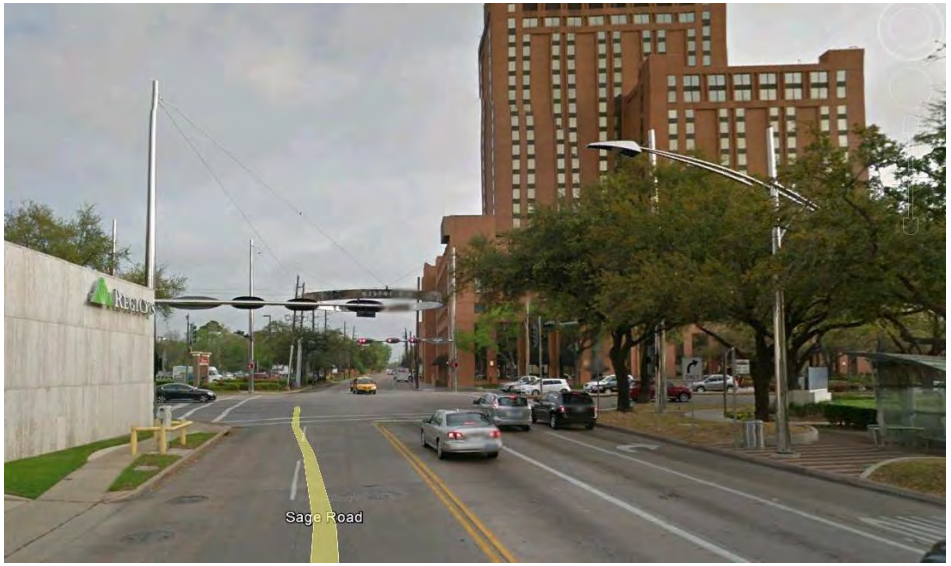
Downtown-Midtown

West Gray Street

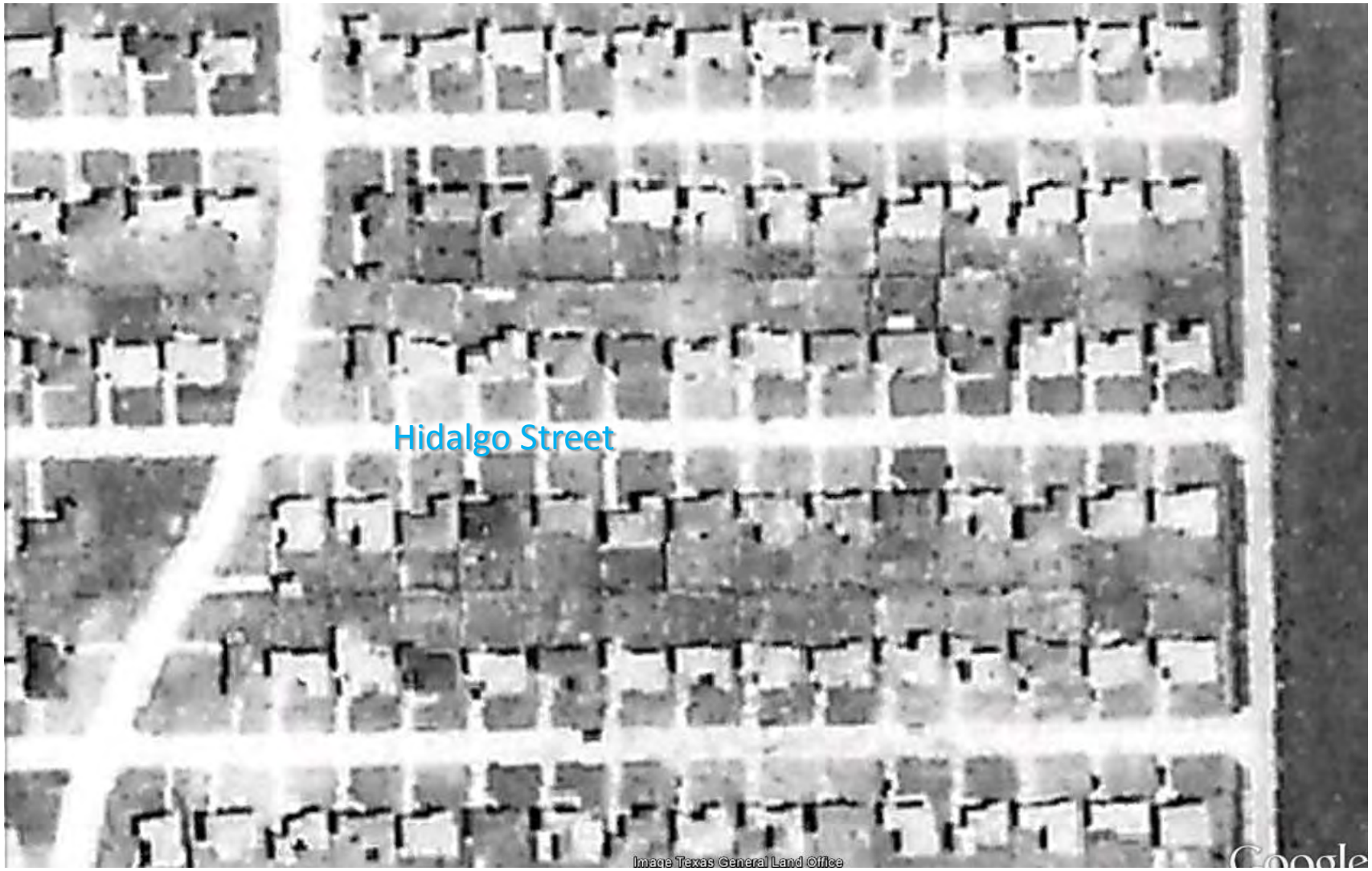
West Gray Street

West Gray Street

Uptown

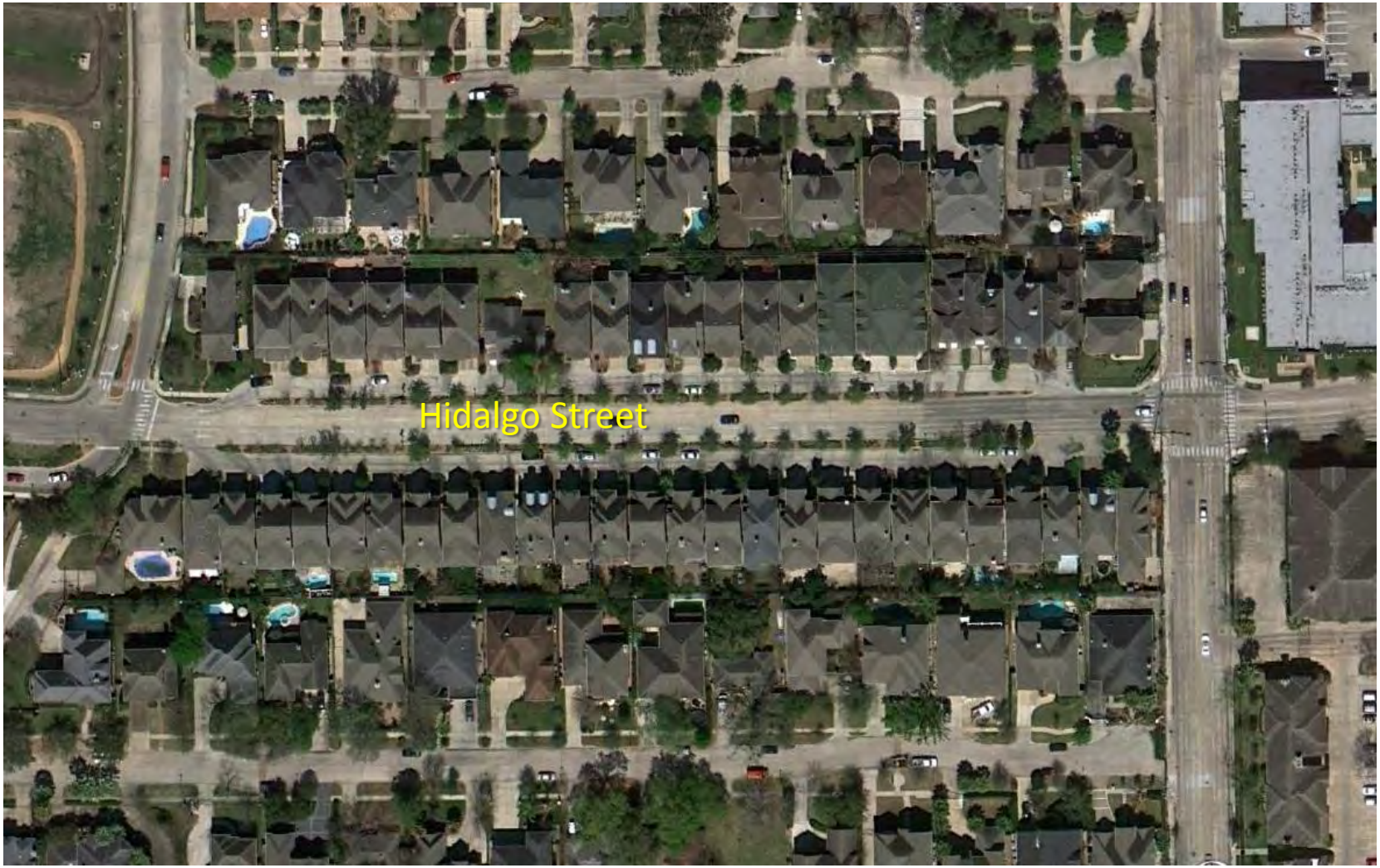


Uptown



Google Earth from Texas General Land Office,1953

Uptown



Google Earth, 2011

Uptown

Fort Worth

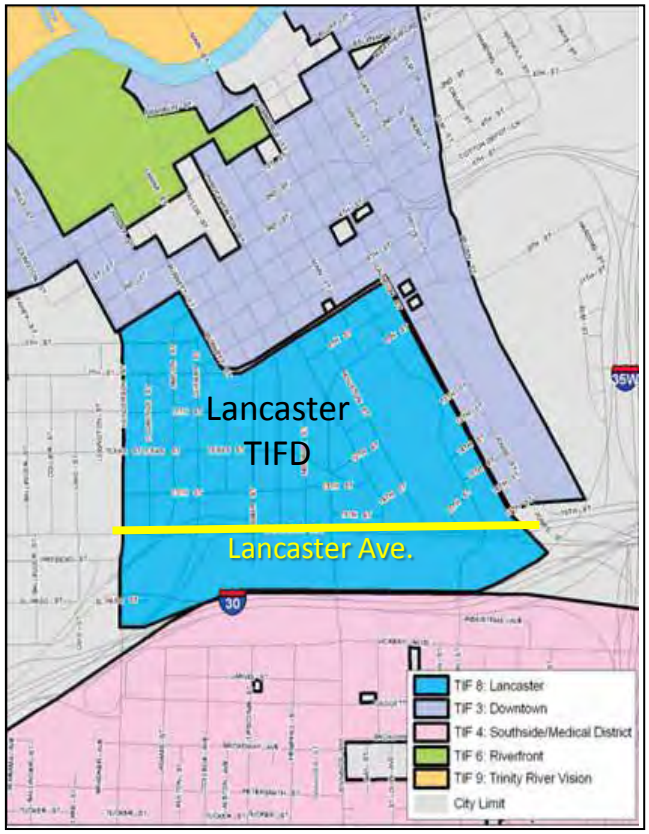
Source: University of Texas at Arlington Libraries

Fort Worth

Fort Worth

Fort Worth

- Lancaster TIFD
  - Established December 2003
  - Base taxable value - $179 million
  - 2009 taxable value - $409 million
  - Increased taxable value – $230 million



Map Source: City of Ft. Worth

San Antonio

San Antonio

Alignment of old acequia which carried water to the area. (Source: Ben Brewer)

Culver City

Culver City

Google Earth from USGS, 1989

Culver City

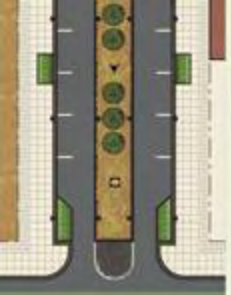
Culver City

Story Told by Examples

- Achieved economic development
- Streets support multiple objectives
  - Economic development
  - Livability
  - Sustainability
- Flexible design
  - Design criteria
  - Approach
  - Context sensitive

Incremental Approaches to Street Redesign

Corridor Revitalization



Oakland, California

Existing conditions

UrbanAdvantage

Oakland, California

Building facelifts, restoration of ground floor retail, infill development

UrbanAdvantage

Oakland, California

Street resurfaced

UrbanAdvantage

Oakland, California

Street trees, street lamps

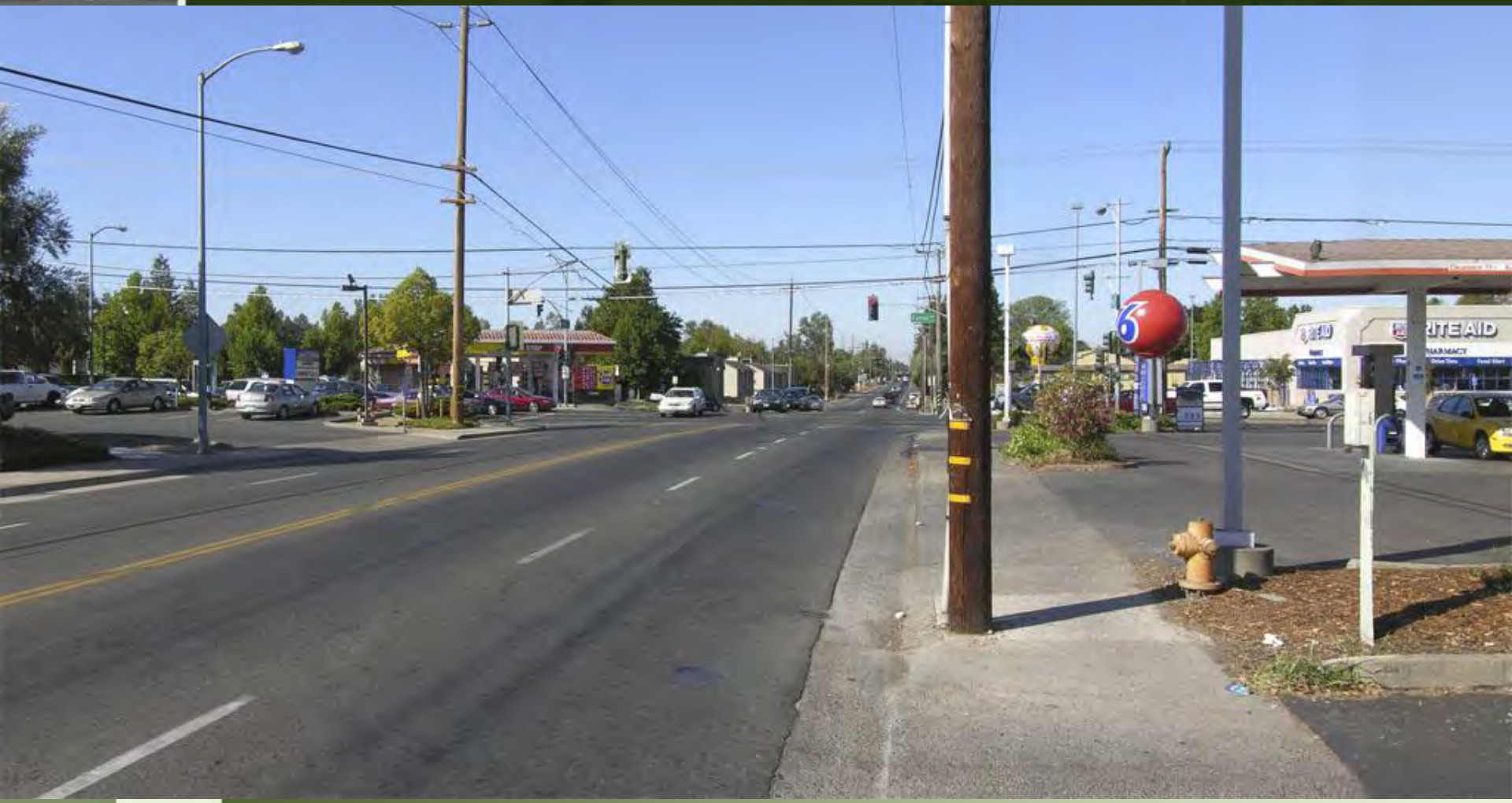
UrbanAdvantage

Oakland, California

Open businesses, patrons

UrbanAdvantage

Sacramento County, California



Existing conditions

Urban Advantage

Sacramento County, California

Wider sidewalks, street lamps, sharrow lanes (shared travel), roundabout

Sacramento County, California

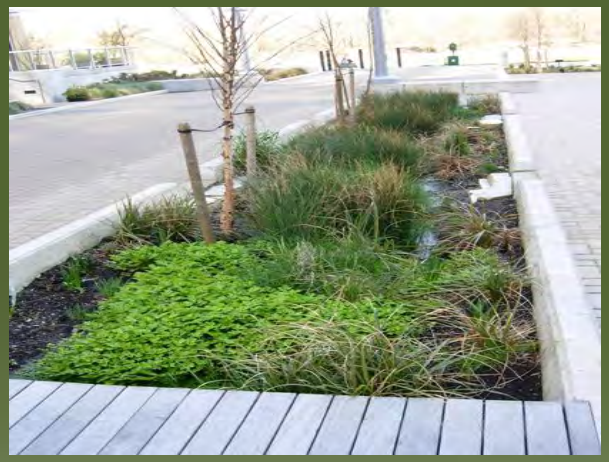
Street trees

Sacramento County, California

Infill development built to sidewalk

UrbanAdvantage

Green Streets Examples



Source: Downloaded from www.lisatown.com on 3.8.2012

Reduce Stormwater Flow

- Reduce impervious surfaces
- Retain/plant new trees
- Promote infiltration/peak flow attenuation
  - Enhanced vegetation and landscaping strategies
  - Engineered bioretention soil mixes designed to promote infiltration and water quality treatment
  - Roughen flow path with plantings and rock to attenuate runoff velocities and provide additional infiltration, decreasing the volume of discharge through pipes to nearby water bodies

Source: Downloaded from www.wordpress.com on 3.8.2012

Source: Downloaded from www.wilkeseastna.org on 3.19.2012

Improve Water Quality

- Reduce pollution-generating impervious surfaces
- Retain trees
- Remove pollutants
  - Settling
  - Filtration
  - Infiltration
  - Plant uptake

Source: Downloaded from www.portlandonline.com on 3.8.2012

Reduce Urban Heating

- Decrease impermeable surfaces areas and augment vegetative cover
  - Lessen the amount of radiation absorbed by the surface
  - Decrease ambient air temperature
  - Lower energy demands needed to cool urban areas

Source: Downloaded from www.myballard.org on 3.7.2012

Enhance Pedestrian Safety

- Alternative street designs
  - Calm traffic
  - Provide alternative commuting options
  - Enhance walkability and aesthetics for pedestrians

Source: Downloaded from www.blogspot.com on 3.7.2012

Source: Downloaded from www.transitmiami.com on 3.19.2012

Improve Quality of Transportation Options

- Encourage a shift in the way people choose to commute through:
  - Safer pedestrian environments
  - Bike lanes
  - Beautified streetscape

Source: Downloaded from www.cbtrust.org on 3.8.2012

Source: Downloaded from www.sws-sssd.org on 3.19.2012

Beautify Neighborhoods

- Increase amount and variety of vegetation
- Introduce alternative materials and orientation for roads and sidewalks
- Improve pedestrian experience
- Enhance the character of the community

Green Streets Design Concepts

- Bioretention Curb Extensions
- Sidewalk Planters
- Permeable Pavement
- Sidewalk Trees and Tree Boxes
- Narrower Street Widths

Local Example – San Felipe

Innovative Performance Measures

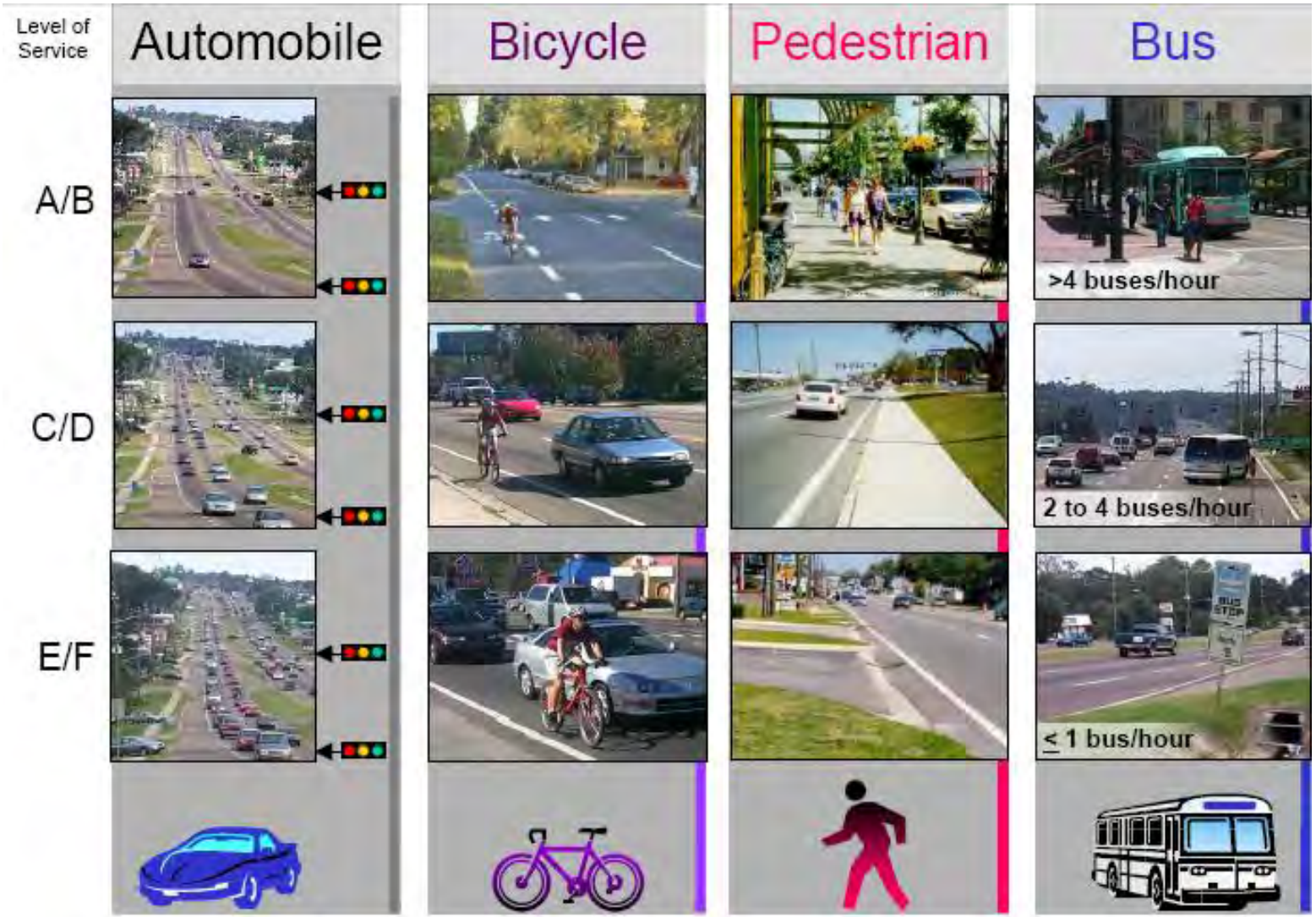

Can your community pass the Beatles Test?

Would the Beatles feel comfortable crossing here?

Midblock Crossing on an Arterial

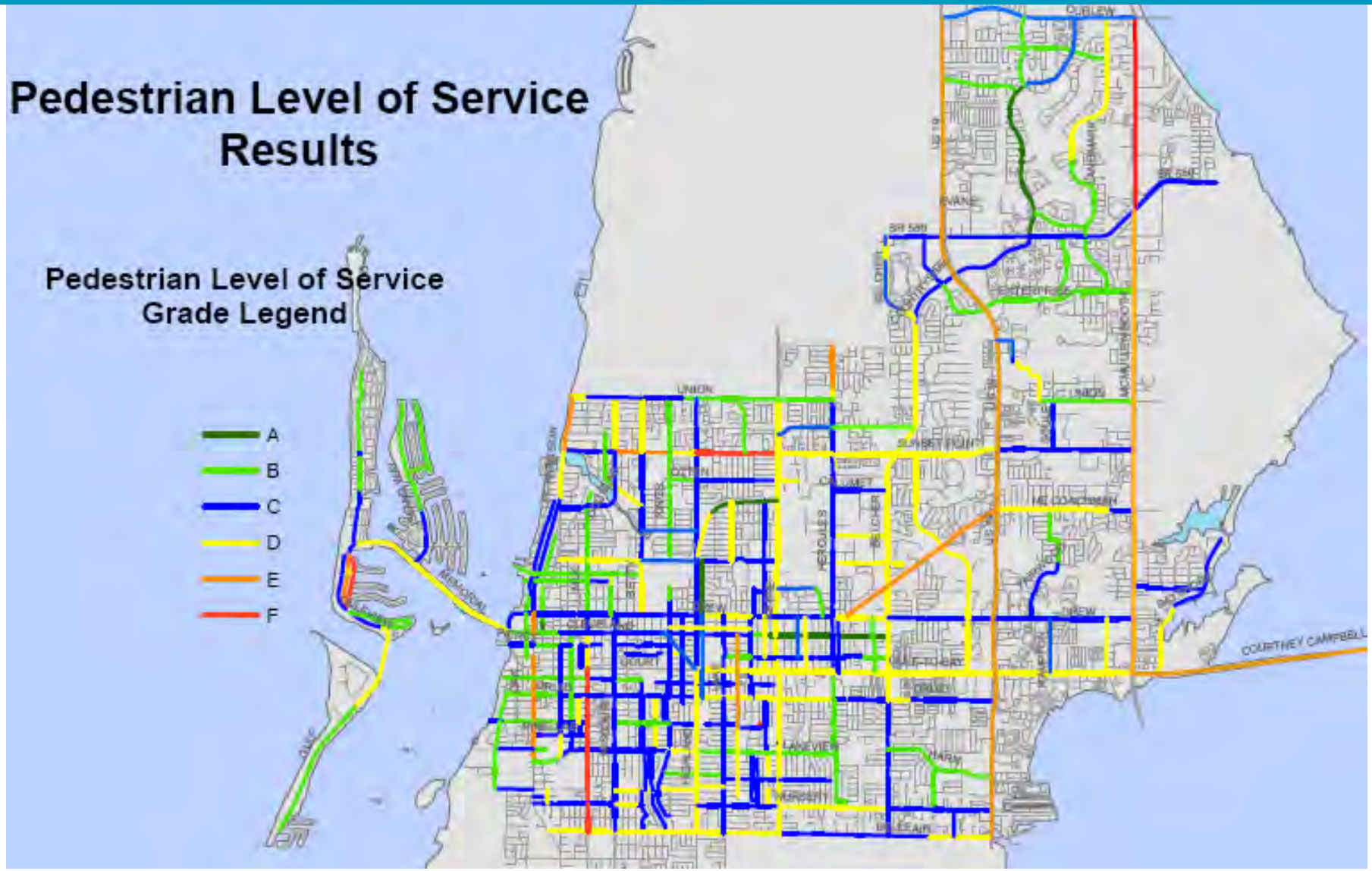
...OR here?

Florida DOT: Multi-modal Level of Service



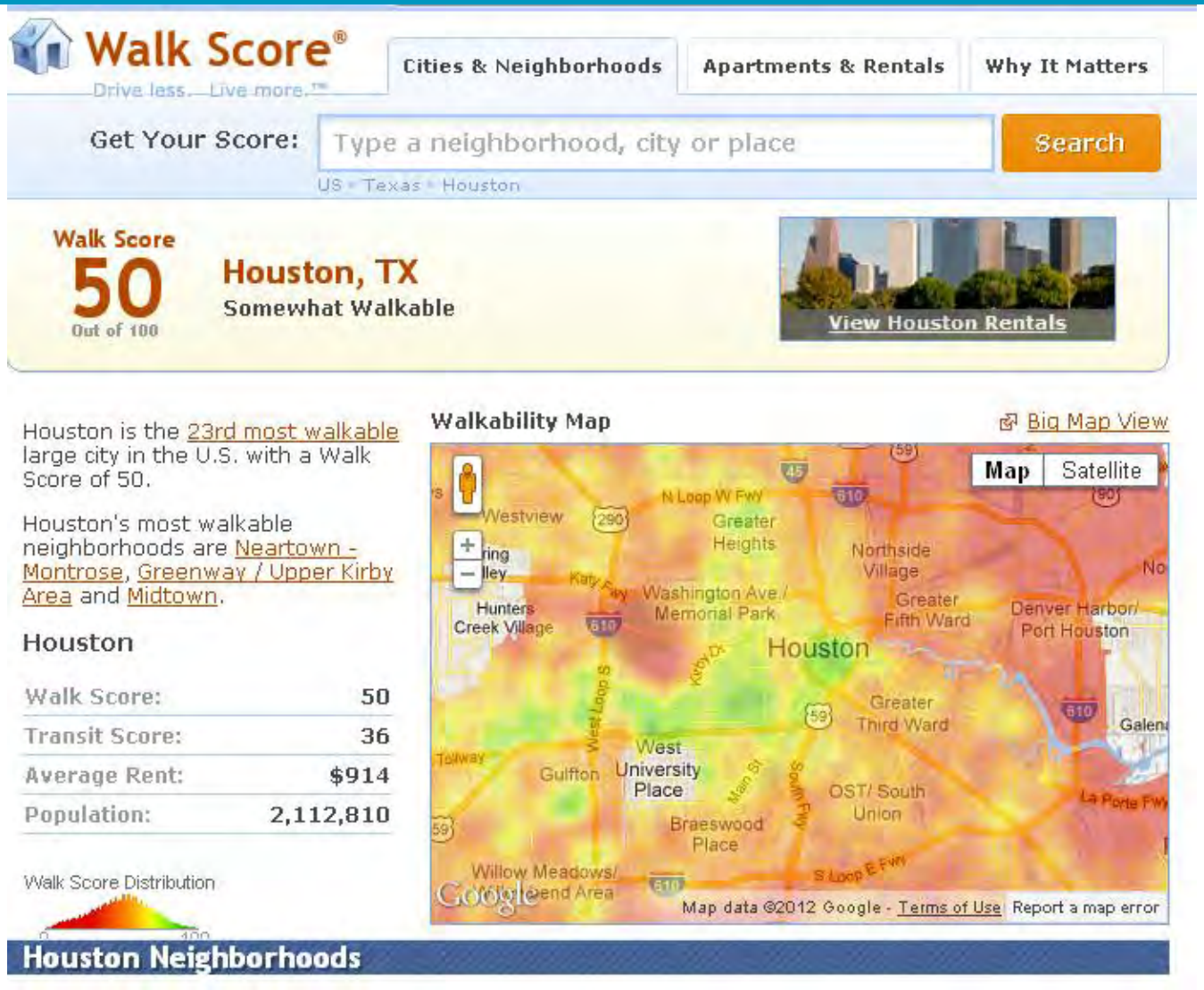
FDOT Quality/Level of Service Handbook

Using Performance Metrics to Prioritize

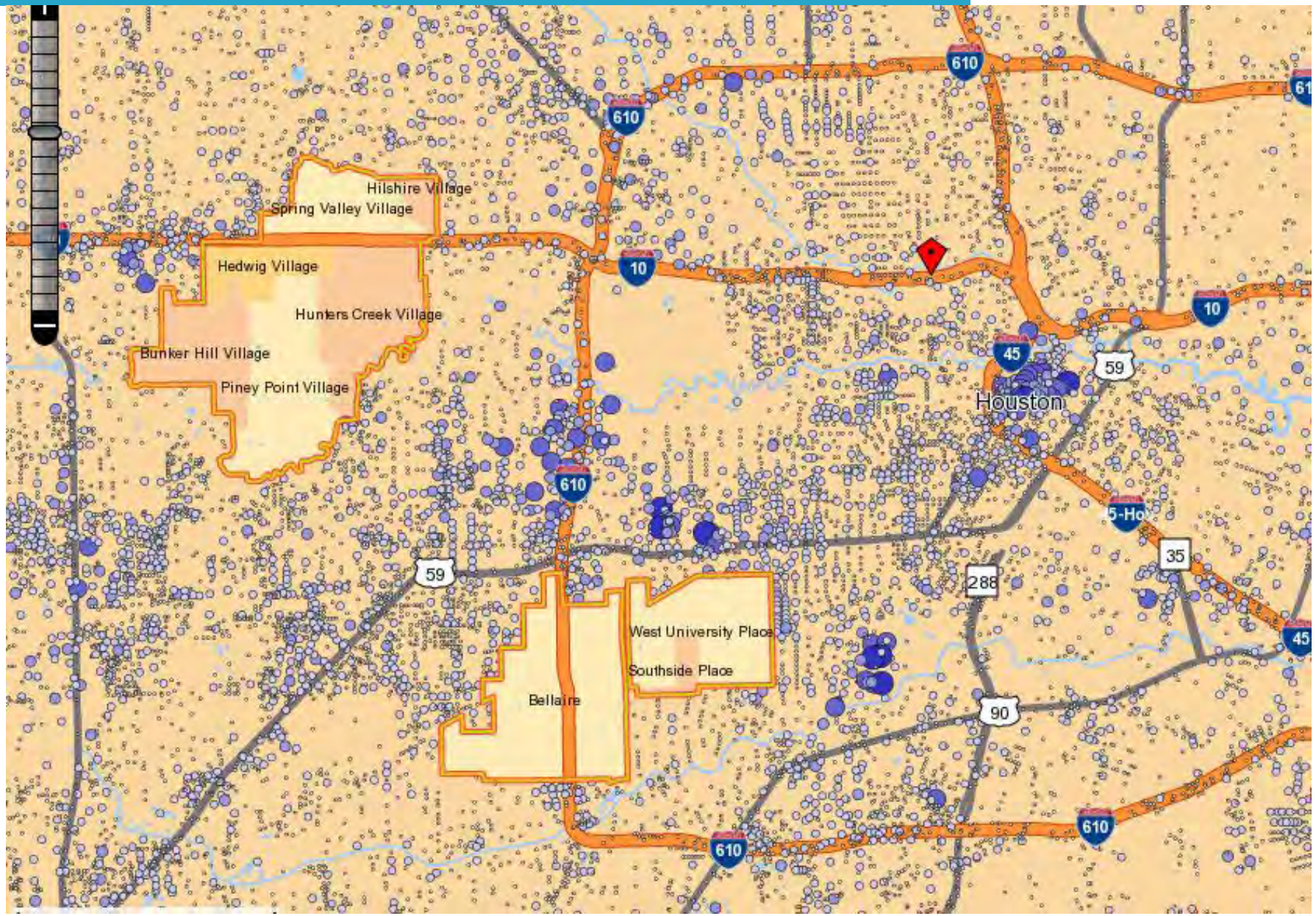


Source: City of Clearwater, FL

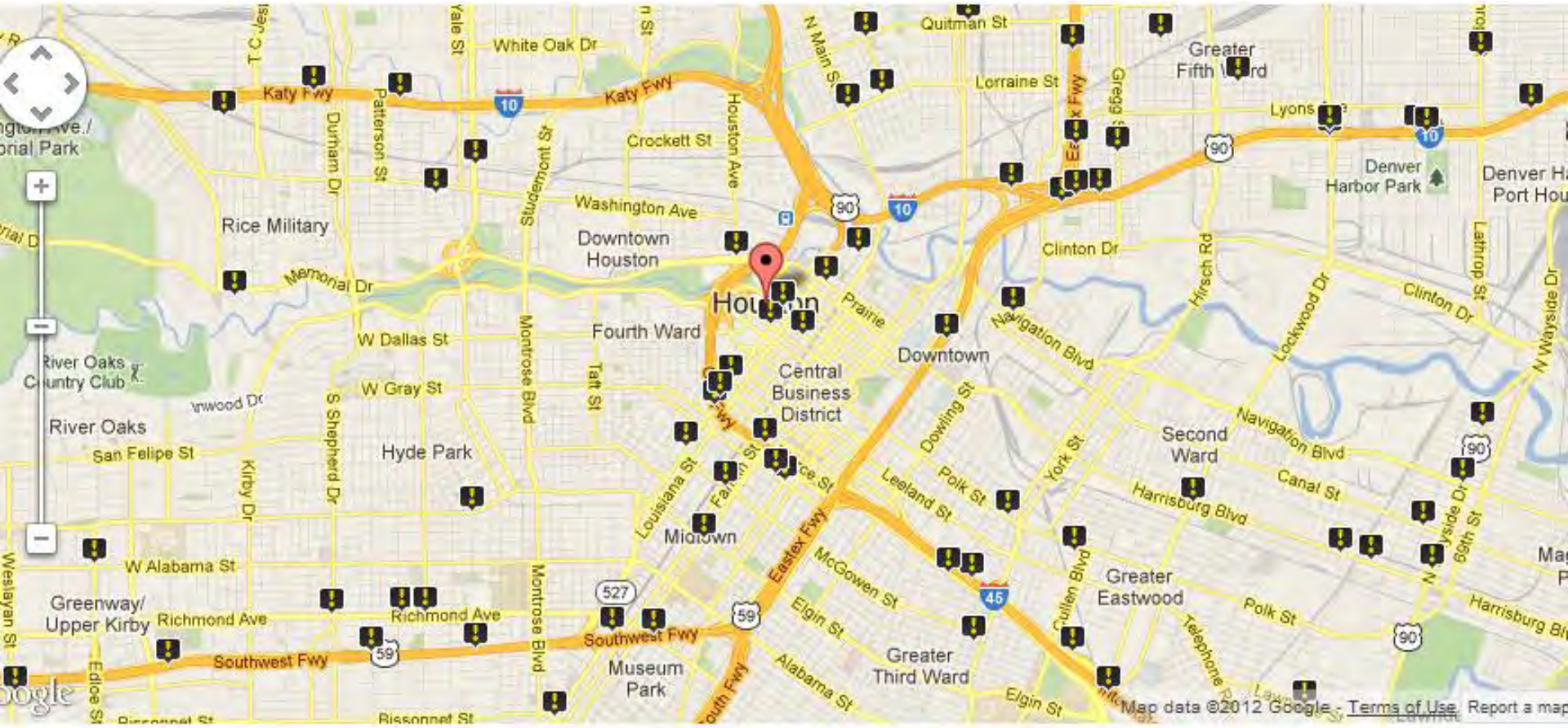
Emerging Web Tools - Walkscore



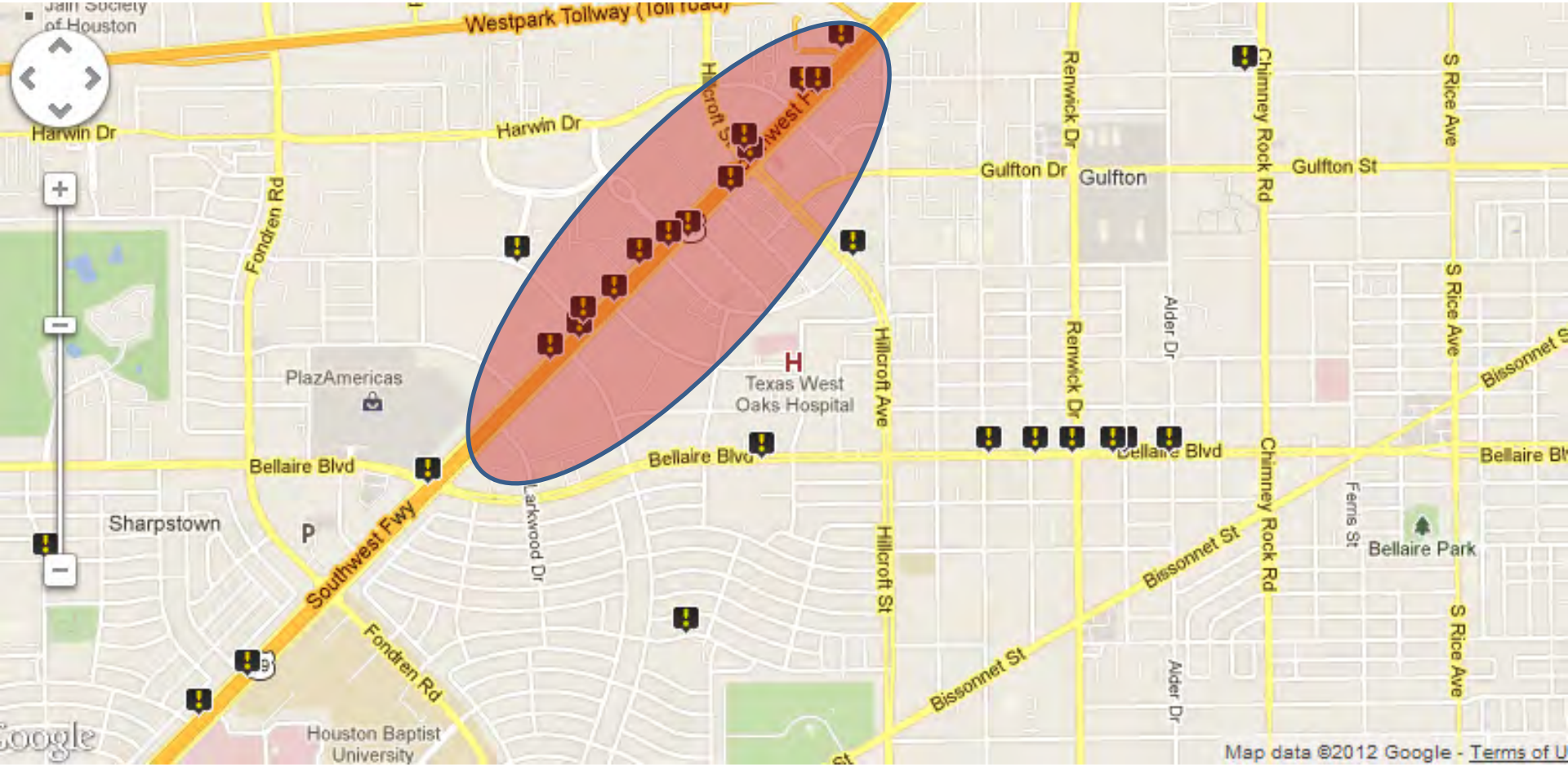
Houston's Major Employment Centers



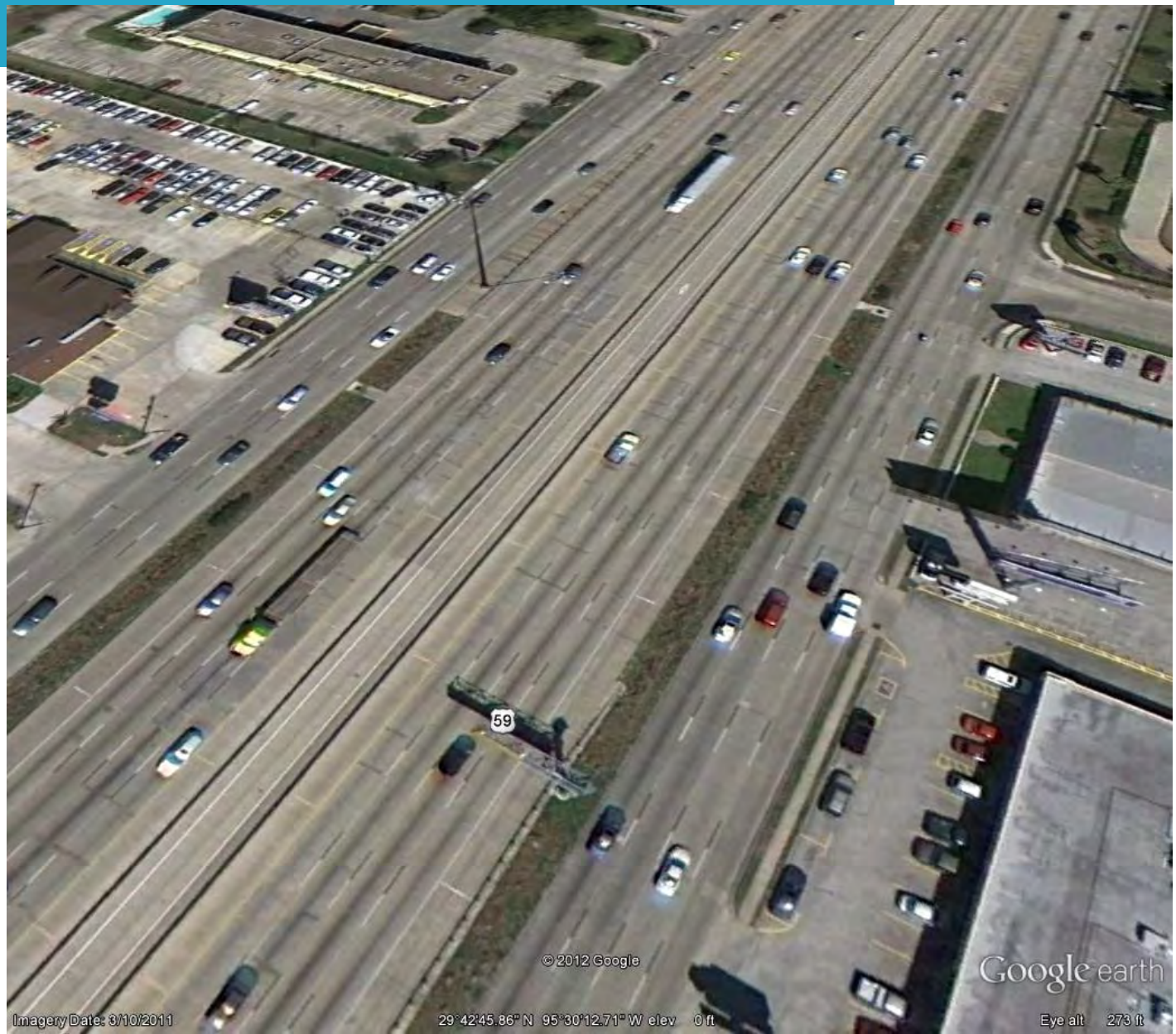
Safety as a Prioritization Tool

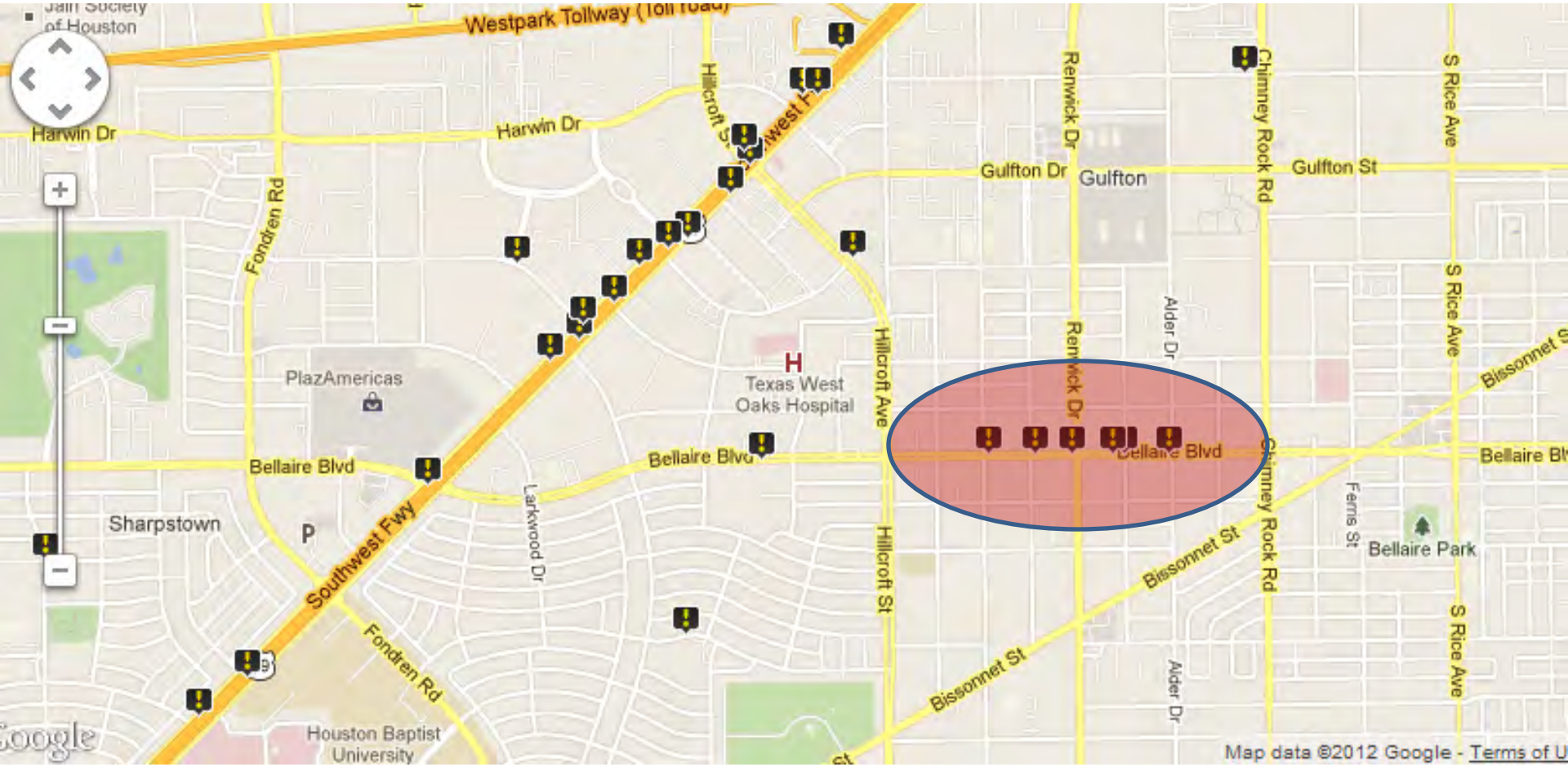


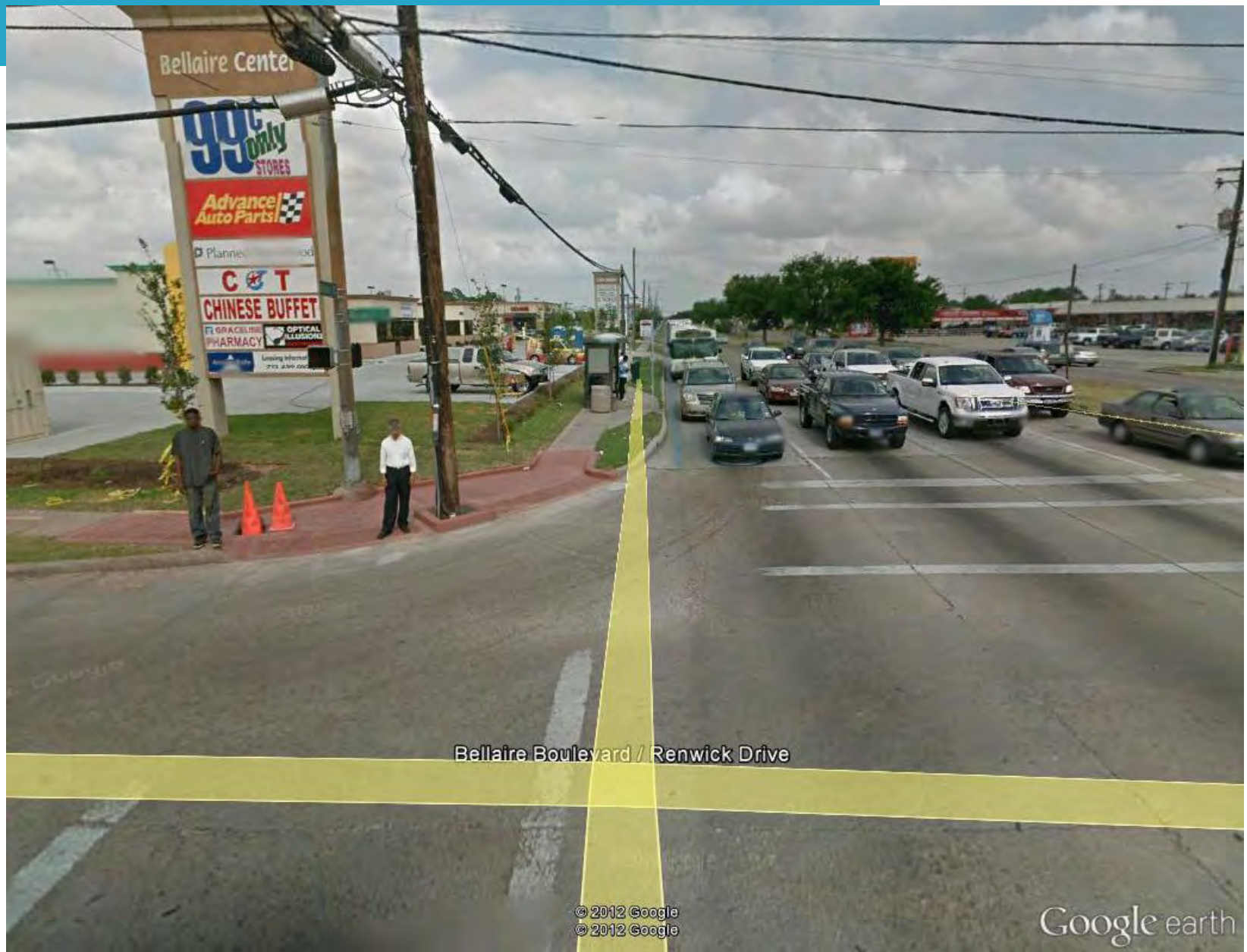
Safety “Hot Spot”



Freeway and Access Road




Westpark Tollway (Toll Road)
Harwin Dr
Harwin Dr
Fondren Rd
Gulfton Dr
Gulfton
Renwick Dr
Chimney Rock Rd
Gulfton St
S Rice Ave
Alder Dr
Hillcroft Ave
PlazAmericas
Texas West Oaks Hospital
Bellaire Blvd
Bellaire Blvd
Bellaire Blvd
Bissonnet St
Bissonnet St
Bissonnet St
Sharpstown
Southwest Fwy
Larkwood Dr
Hillcroft St
Ferris St
Bellaire Park
Fondren Rd
Houston Baptist University
Map data ©2012 Google - Terms of U


Bellaire Center
99¢ only STORES
Advance Auto Parts
C T
CHINESE BUFFET
PHARMACY
OPTICAL ILLUSIONS
Bellaire Boulevard / Renwick Drive
© 2012 Google
© 2012 Google
Google earth


GUITARS
HAIR
Bellaire Boulevard
© 2012 Google
© 2012 Google
Google earth
29°42'18.61" N 95°28'59.73" W elev 54 ft
Eye alt 8 ft

Similar Example - El Camino Real Redesign

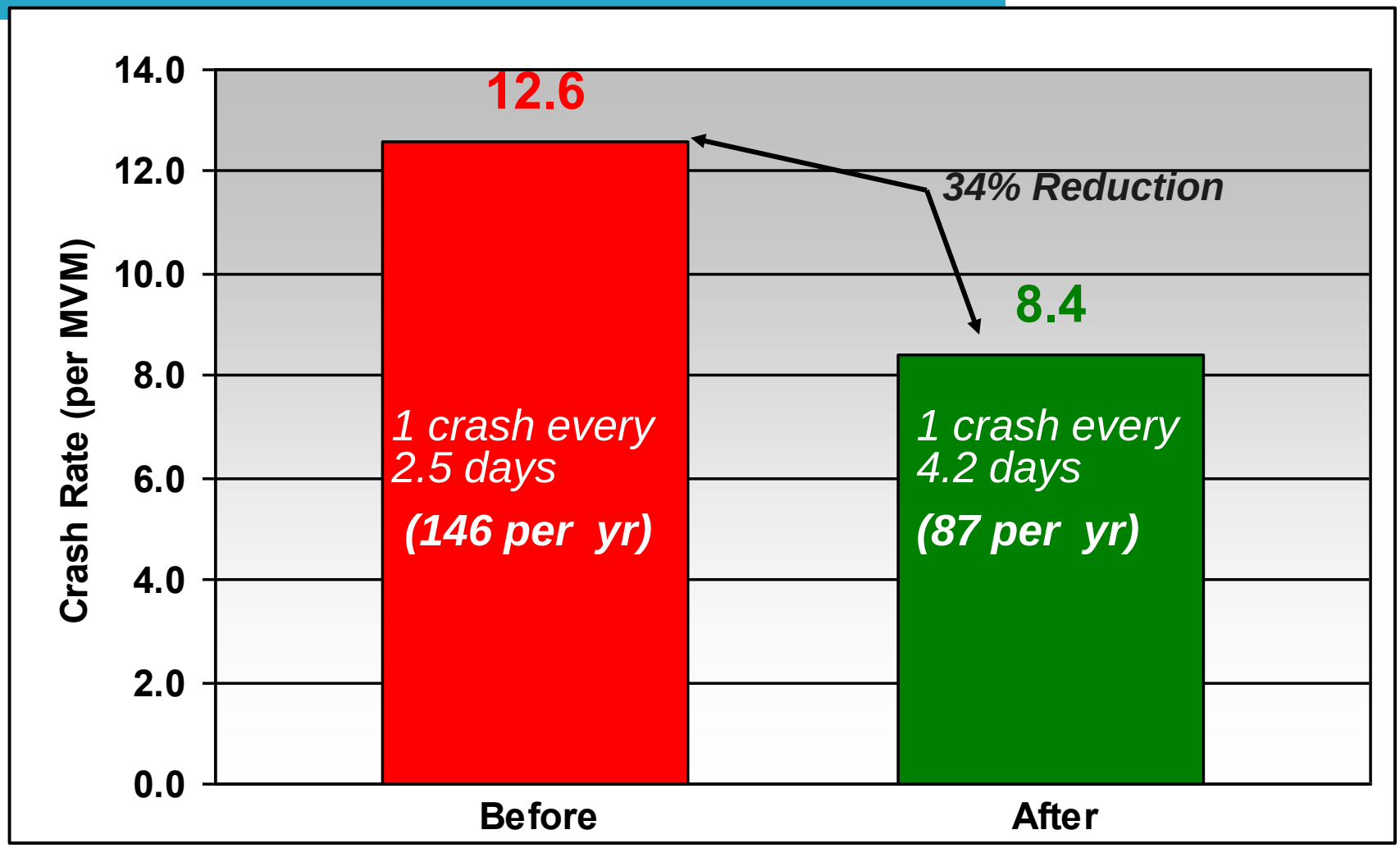
Similar Example - El Camino Real Redesign

Case study: Edgewater Drive Resurfacing Project (Orlando FL)

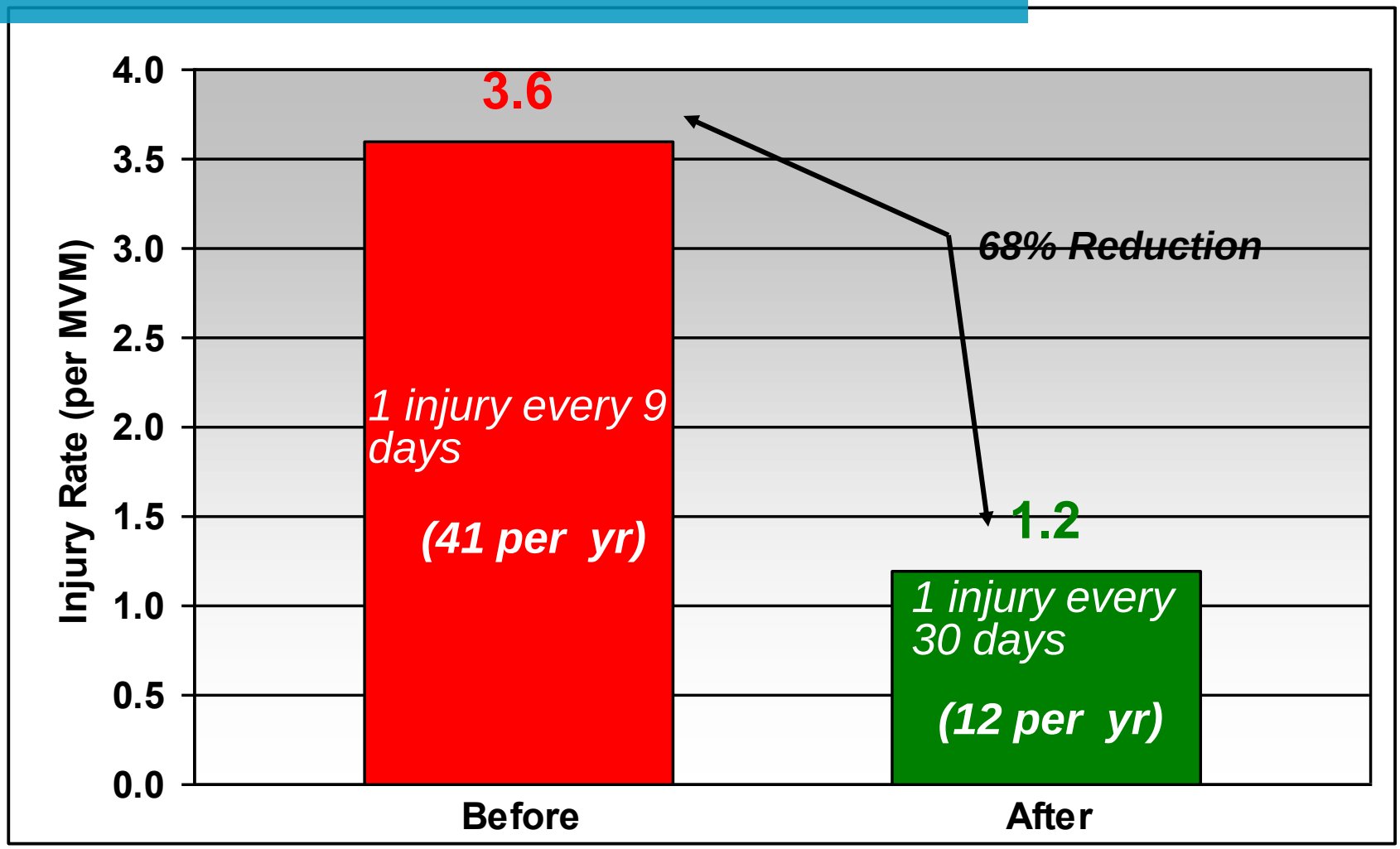
Before

After

Before / After - Crash Rate



Before / After – Injury Rate



Design Charrettes as a Tool for Street Redesign

Engaging the Community In the Design Process

Downtown Little Rock, AK

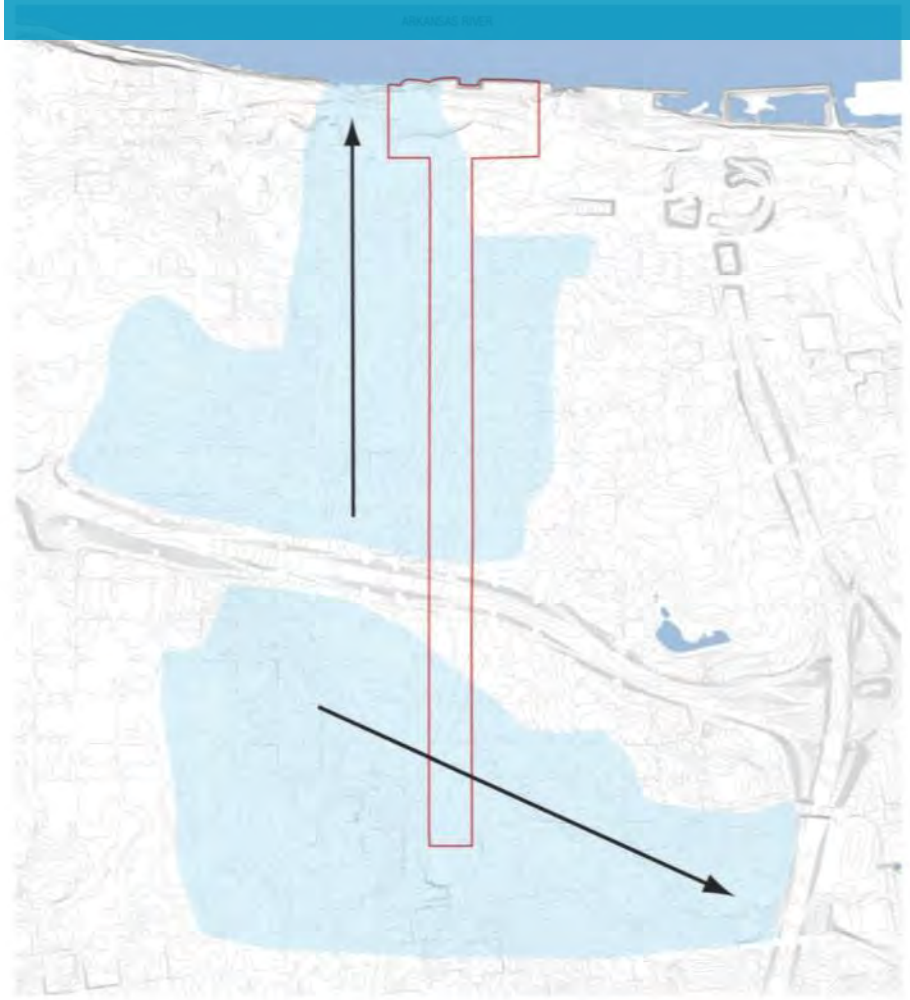


Fig. 12 Existing Watersheds

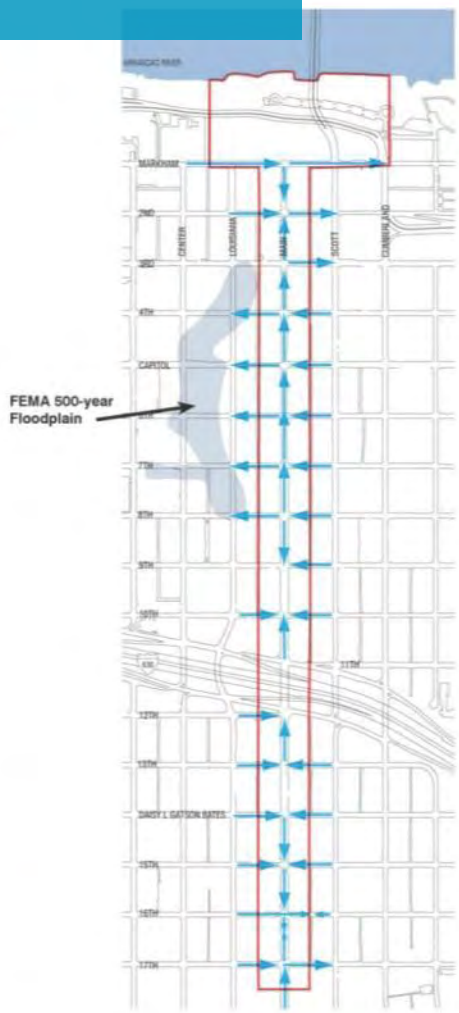


Fig. 13 Street Flow

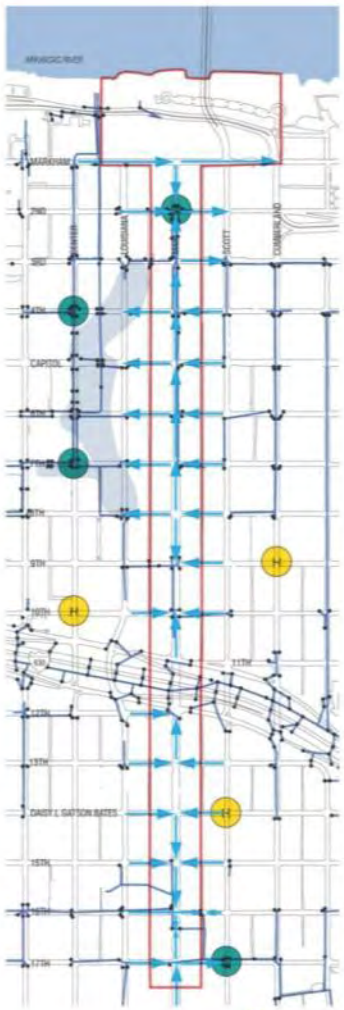


Fig. 14 Stormwater Flows

N

1" = 800'

0 400' 800' 1600'

Stormwater Flows

Fig. 12 illustrates how the project area is part of two separate watersheds, one of which drains directly to the Arkansas River. Fig. 13 shows that Main Street is outside of the 500-year floodplain. Fig. 14 shows that mains north of the highway flow directly to the Arkansas River, while mains in SOMA first flow south.

1

SOMA NEIGHBORHOOD PARK

- lunch and evening crowds
- focal point for SOMA/local Little Rock
- synergy/demonstration with Nursery
- "oasis"
- build on existing sculpture garden
- green alley

2

COMMUNITY MARKET INTERCHANGE

- orchards on interchange slopes
- nursery/handyman marketplace
- residential infill
- support local goods and services

STREETSCAPE

- increased tree cover
- stormwater solutions
- native plantings
- energy efficient lighting
- signage/branding

3

ARTS PARK

- lunch and evening crowds
- special events (plays, movies)
- focal point for Downtown
- water feature
- more intensive hardscape & plantings
- green alley

4

CONVENTION CENTER GATEWAY

- anchor River end of Main St.
- potential sculpture site
- sustainable stormwater demonstration site
- green alley

Crosswalk Redesign

B

NEW CROSSWALKS

To be a true heart of the city, Main Street needs to be easy for all users to access and must feel comfortable and safe for pedestrians of all ages and abilities. New or improved crosswalks are an integral part of this effort, particularly in the SOMA neighborhood where the street is wider and traffic moves faster. Crosswalks with longer crossing times, embedded lights, reflective striping, and vocal countdowns are safer for tourists, families, differently-abled pedestrians, and other users.

Giving a consistent design to new and existing crosswalks all along Main Street, including SOMA, can help create a consistent sense of place and identity. These designs also enhance visibility. See the Indianapolis Cultural Trail on page 36 for an example of how this has worked in another city.

NEW BUILDINGS

New buildings that are built up to the sidewalk and face Main Street are already being built in the SOMA neighborhood. Wherever feasible, new buildings could have minimal setbacks and parking in the rear to allow gardens and civic space along the street, which would create a better environment for walking and biking. On parcels with existing buildings with larger setbacks, a rain garden could be built to collect and treat the runoff from the entire lot (see Street Section D on page 22).

Murals and Landscaping

C

MURALS

Public art, such as murals, can be an integral part of any streetscape. Murals can depict the history, culture, and hopes of a city or of a neighborhood.

Designing and creating a mural can engage different parts of the community, including building owners and developers, students, educators, artists, scientists, historians, and tourists. A mural can also turn a blank wall facing the street from an unused space that offers little of interest to passersby into an amenity that beautifies the street and adds to the neighborhood's sense of identity.

Rain Gardens and Permeable Paving

G

DOWNSPOUT RAIN GARDEN

Runoff from the roofs of Main Street buildings could be directly connected to rain gardens on the street through downspouts. If attractively designed, the downspouts could be public art. These artistic downspouts would create a dramatic visible sign to visitors and residents about the presence of water in the city and how it is managed from roofs to streets.

GREEN ROOFS

Green roofs are important in retaining and detaining stormwater, reducing the ambient air temperature (or urban heat island effect) in the City, and reducing the heating and cooling needs of a building. Over time, buildings on Main Street could be retrofitted to include green roofs using lightweight, drought-tolerant plants such as sedums and grasses. Green roofs are environmentally beneficial for the reasons listed above, however, even the most minimal green roofs will have some impact. Each structure and roof would need to be evaluated and the expense of retrofitting or engineering for a new green roof weighed against the environmental benefit.

PERMEABLE PAVERS

Permeable pavers could provide structured surfaces for on-street parking, let stormwater percolate into the ground and into nearby rain gardens, and make the street more attractive.

Greening Parking Areas

1

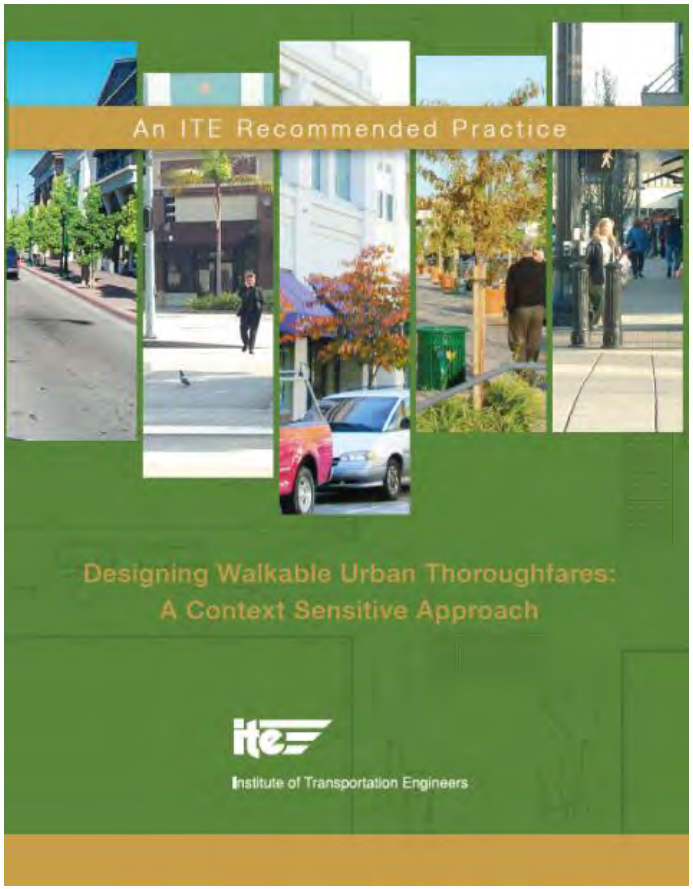
GREENING PARKING AREAS

Parking lots along Main Street present good opportunities to use green infrastructure techniques to capture and filter stormwater runoff and provide a more appealing environment for pedestrians.

Rain gardens and bioswales (long, linear rain gardens) between the sidewalk and parking lot (as shown on the left of Figure 50) could be lushly planted, shading pedestrians and cars and reducing the heat island effect by lowering the ambient air temperature.

Context Sensitive Design Standards

Using ITE's Recommended Practice to Design Context Sensitive Modern Streets (CSMS)



ite

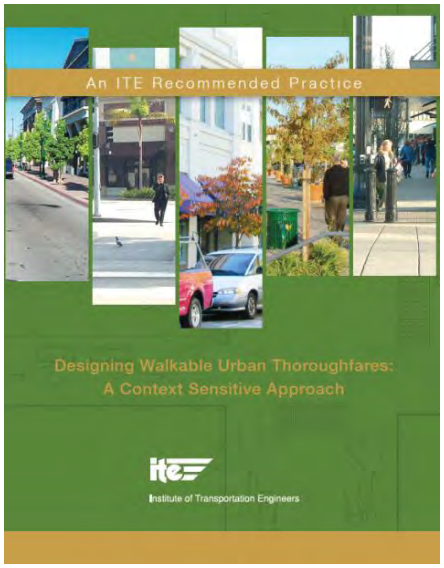
Congress for the New Urbanism

U.S. Department of Transportation
Federal Highway Administration

United States Environmental Protection Agency

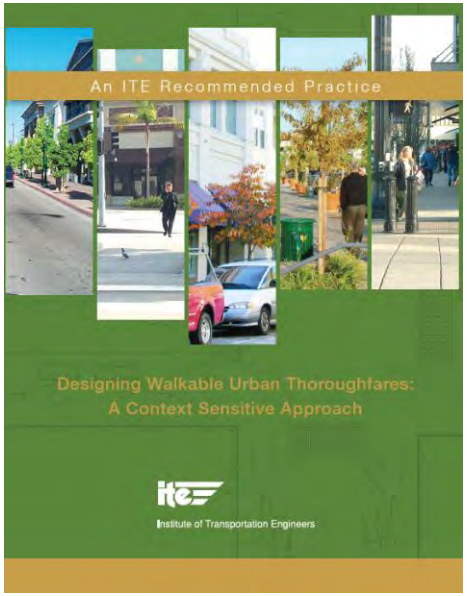
What a CSMS Is and Does

- Serves *local* and system needs and objectives
- Provides safely for all users
- Compatible with adjacent features
- Supports nearby activities
- Serves its role in the thoroughfare system
- Reflects flexible, responsive planning & design



What a CSMS is Not

- Always all modes
- Always has a “road diet”
- Always 2 lanes
- Always landscaped
- Always has bike lanes
- A guarantee of unanimity among stakeholders
- A substitute for informed technical decision making



Examples Discussed Previously

Before

After

Lancaster Avenue, Ft. Worth

Previous Examples

Intersection of minor arterial Gray Street and local street serving mixed-use development, Houston, Texas

Previous Examples

Minor arterial serving business district also serves residential access function, Hidalgo Street, Houston, Texas

Other Examples

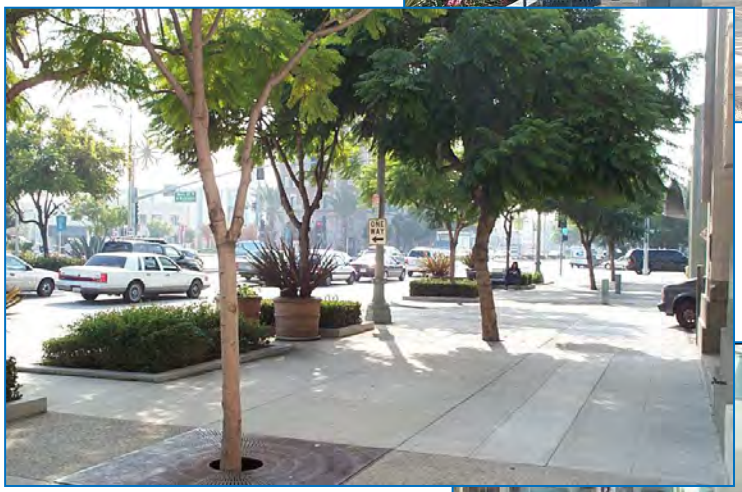
Placemaking and transit environment, Main Street, Houston, Texas

Previous Example

Before

Former state highway route modified to support business district revitalization.

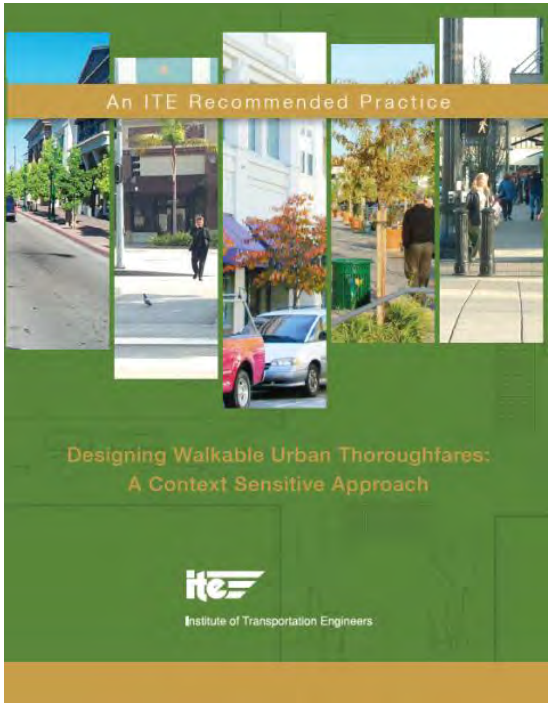
After



Culver Blvd., Culver City, CA

How Does ITE's Recommended Practice Help?

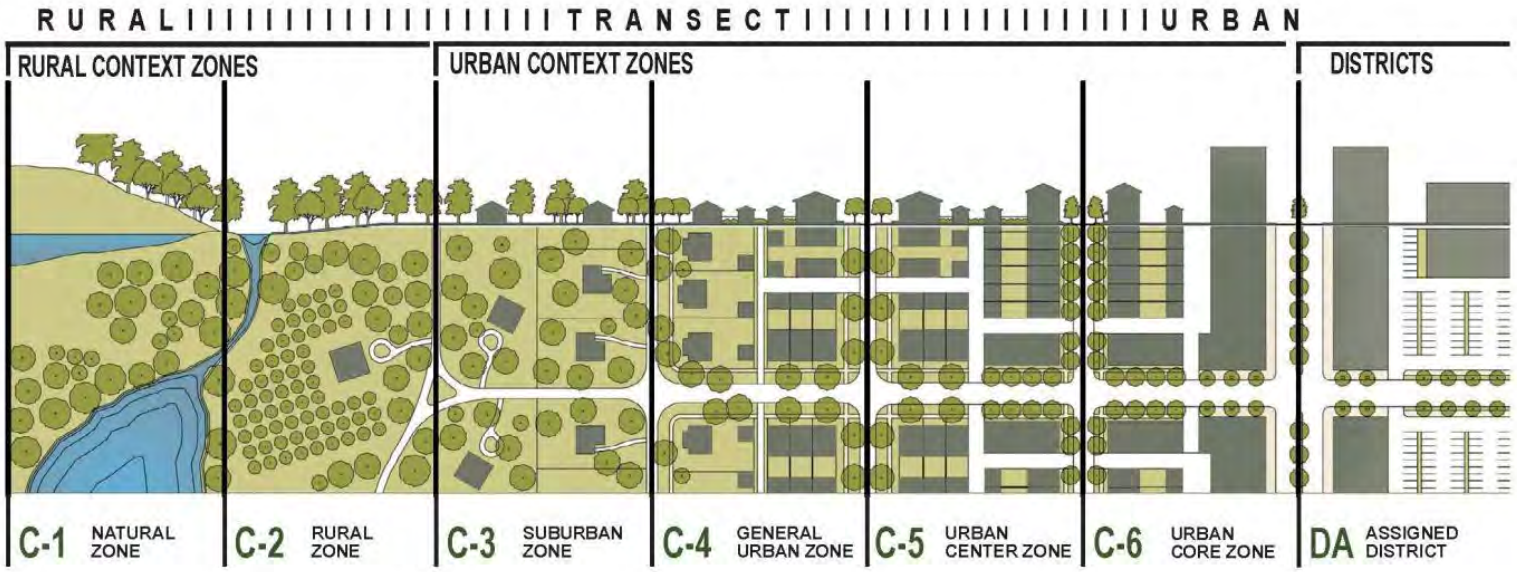
- ITE *Recommended Practice*
- Provides tools
  - Process
  - Stakeholder involvement strategy
  - ***Flexible*** planning and design tools
    - Principles and considerations
    - Justifications
    - Best practices
    - Design criteria
    - AASHTO policy compatibility
- Provides credible source, precedents
  - Sponsored by FHWA, EPA
  - Reviewed by AASHTO



RP Contents

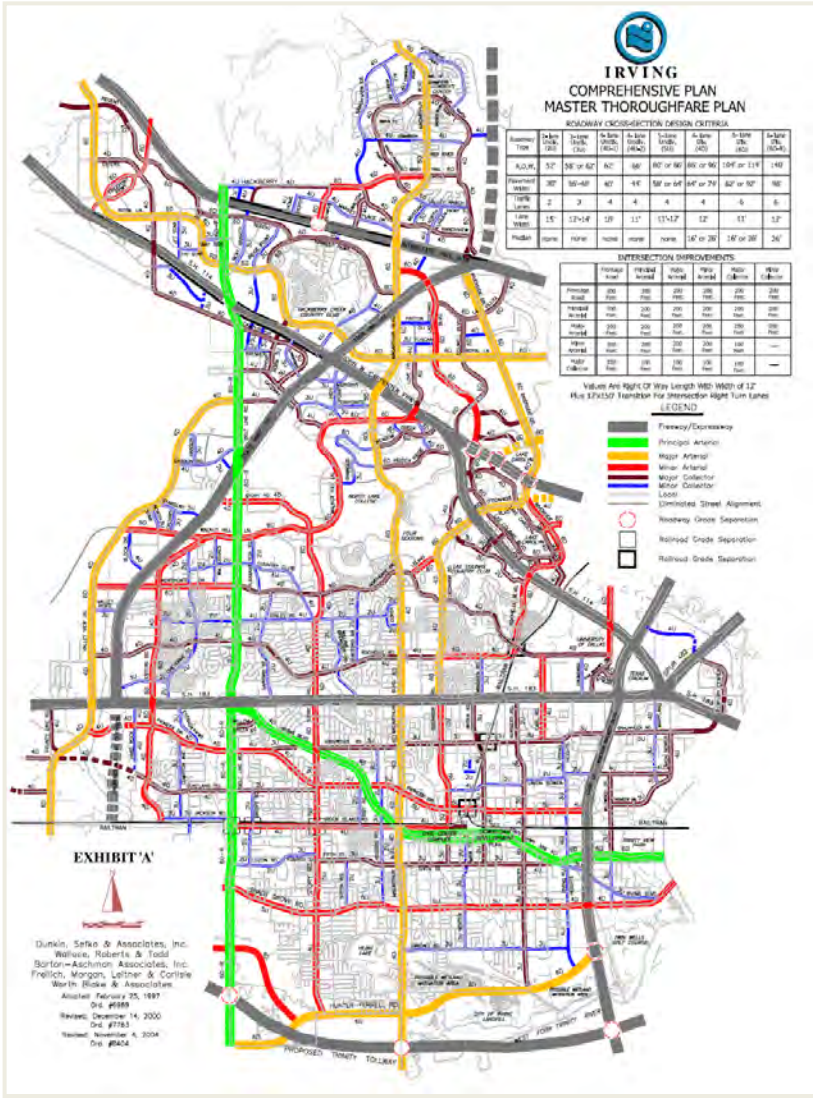
- Design
  - Process
  - General design parameters
  - Design controls
  - Design principles, guidelines, and justifications

Flexibility ! !



CSMS as Part of a System (Chapter 3)

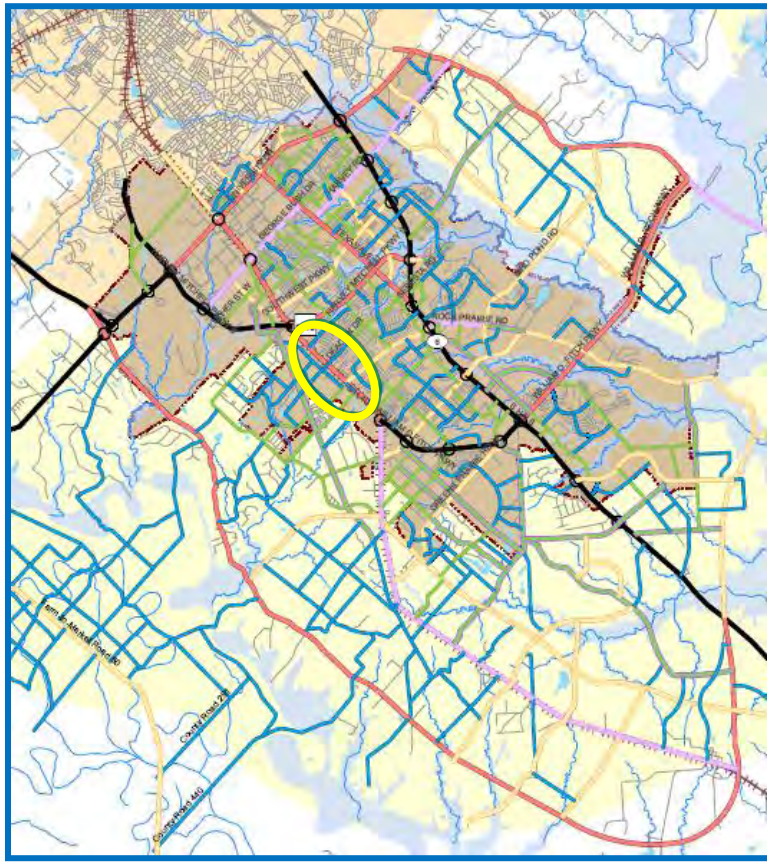
- Part of a system plan
  - System meets needs
  - Each thoroughfare serves roles based on comparative
    - Context
    - Objectives
    - Values
- Capitalizes on assets and opportunities
- Serves local objectives within areawide objectives



East End Example

How Do We Accomplish CSMS?

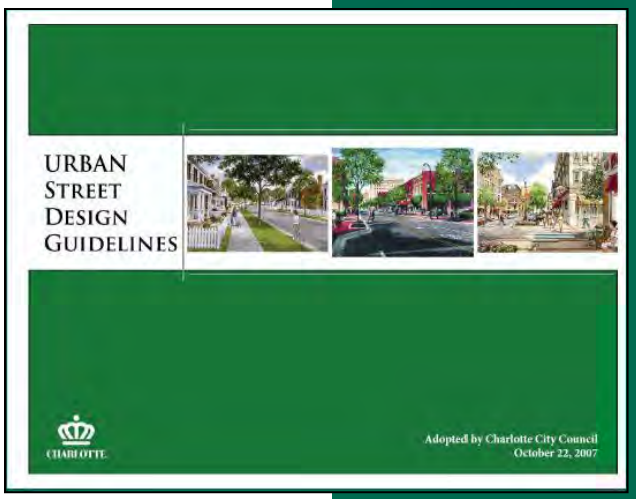
- Adjusts system to include local roles
  - As possible
  - Understanding overall needs and objectives
  - Consider trade-offs and priorities

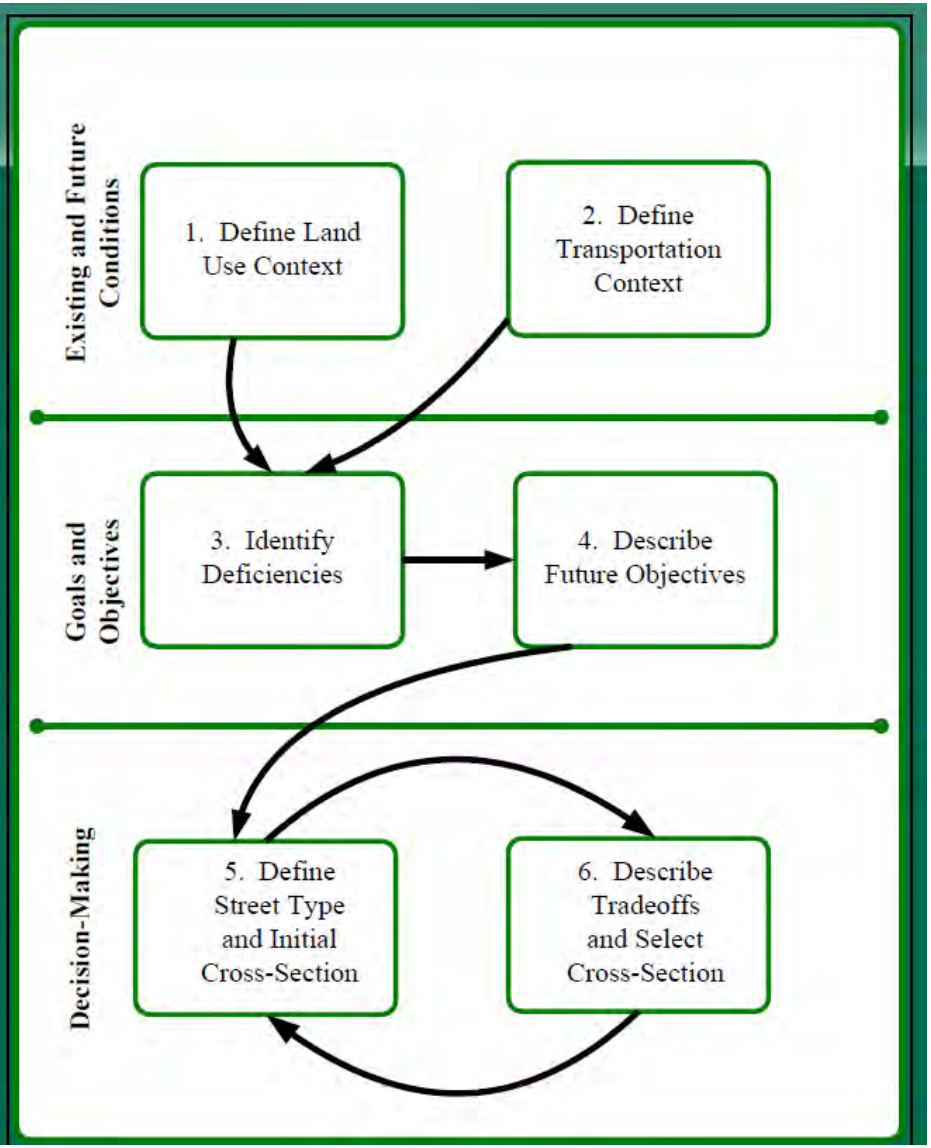


Charlotte, North Carolina

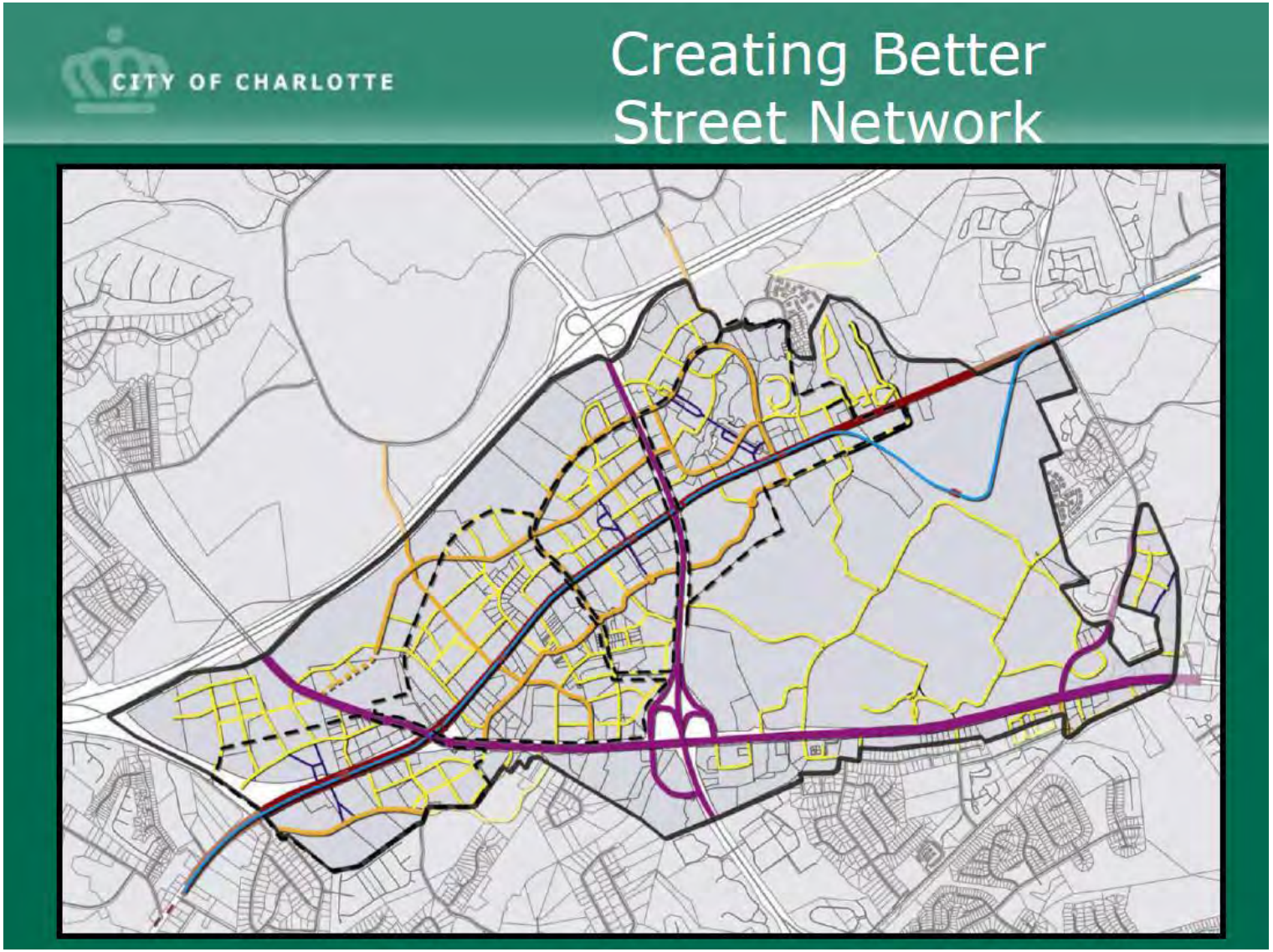
CITY OF CHARLOTTE

The Six-Step Process



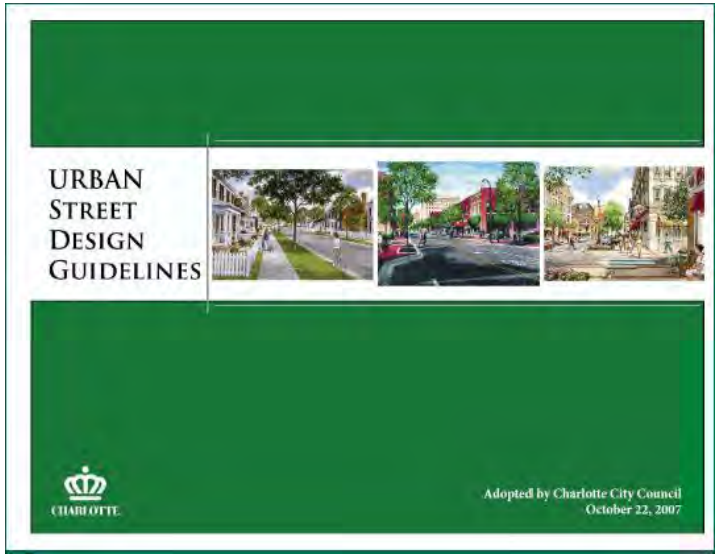


Charlotte, North Carolina



Charlotte Implementation

- New or reconstructed thoroughfares
- Development and redevelopment
- Streetscape and road conversion projects
- Rebuilt intersections
- Sidewalk projects



How Do We Accomplish CSMS? (cont)

- Develop concept for your modern street
  - Stakeholder input
  - Multidisciplinary analysis, planning, design
  - Explore ways to meet all objectives (alternatives)

  - Adjust for different contexts

Remember: Anything can be considered

Traveled Way

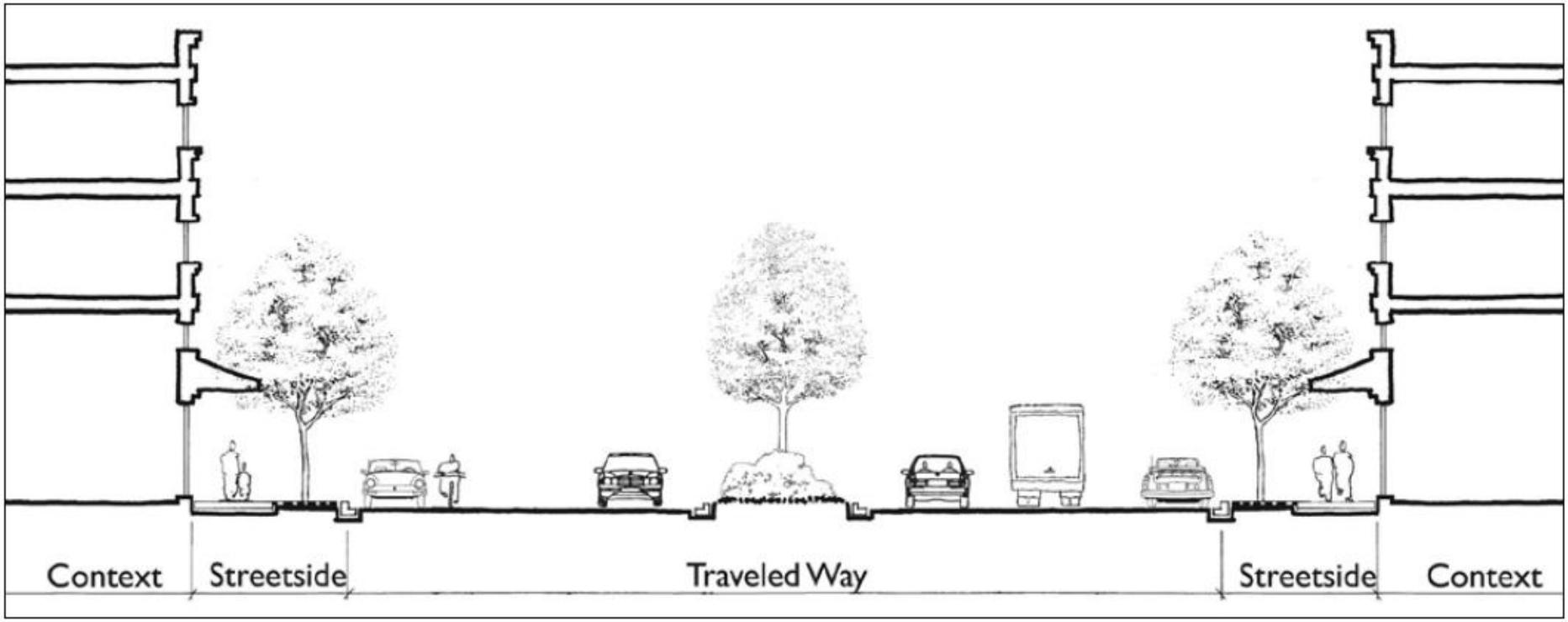


Table 6.4 Design Parameters for Walkable Urban Thoroughfares

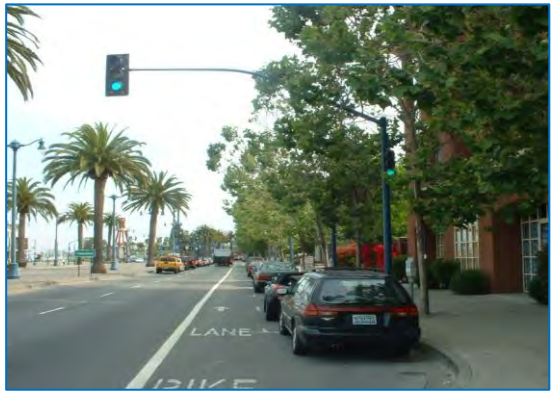
Thoroughfare Design Parameters for Walkable Mixed–Use Areas									
	Suburban (C–3)						General Urban (C–4)		
	Residential			Commercial			Residential		
	Boulevard [1]	Avenue	Street	Boulevard [1]	Avenue	Street	Boulevard [1]	Avenue	Street
Context									
Building Orientation (entrance orientation)	front, side	front, side	front, side	front, side	front, side	front, side	front	front	front
Maximum Setback [2]	20 ft.	20 ft.	20 ft.	5 ft.	5 ft.	5 ft.	15 ft.	15 ft.	15 ft.
Off-Street Parking Access/Location	rear, side	rear, side	rear, side	rear, side	rear, side	rear, side	rear	rear, side	rear, side
Streetside									
Recommended Streetside Width [3]	14.5–16.5 ft.	14.5 ft.	11.5 ft.	16 ft.	16	15 ft.	16.5-18.5 ft.	14.5 ft.	11.5 ft.
Minimum sidewalk (throughway) width	6 ft.	6 ft.	6 ft.	[illegible]	6 ft.	6 ft.	8 ft.	6 ft.	6 ft.
Pedestrian Buffers (planting strip exclusive of travel way width) [3]	8 ft. planting strip	6–8 ft. planting strip	5 ft. planting strip	7 [illegible] well	6 ft. tree well	6 ft. tree well	8 ft. planting strip	8 ft. planting strip	6 ft. planting strip
Street Lighting	For all thoroughfares in all context zones, intersection safety lighting, basic street lighting, and pedestrian-scaled lighting is recommended. See Chapter 8 (Streetside Design Guidelines) and Chapter 10 (Intersection Design Guidelines).								
Traveled Way									
Target Speed (mph)	25–35	25–30	25	25–35	25–35	25	25–35	25–30	25
Number of Through Lanes [5]	4–6	2–4	2	4–6	2–4	2	4–6	2–4	2
Lane Width [6]	10–11 ft.	10–11 ft.	10–11 ft.	10–12 ft.	10–11 ft.	10–11 ft.	10–11 ft.	10–11 ft.	10–11 ft.
Parallel On-Street Parking Width [7]	7 ft.	7 ft.	7 ft.	7-8 ft.	7-8 ft.	7-8 ft.	7 ft.	7 ft.	7 ft.
Min. Combined Parking/Bike Lane Width	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.	13 ft.
Horizontal Radius (per AASHTO) [8]	200–510 ft.	200–330 ft.	200 ft.	200–510 ft.	200–510 ft.	200 ft.	200–510 ft.	200–330 ft.	200 ft.
Vertical Alignment	Use AASHTO minimums as a target, but consider combinations of horizontal and vertical per AASHTO Green Book.								
Medians [9]	4–18 ft.	Optional 4–16 ft.	None	4–18 ft.	Optional 4–18 ft.	None	4–18 ft.	Optional 4–16 ft.	None
Bike Lanes (min./preferred width)	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft./6 ft.	5 ft. / 6 ft.	5 ft. / 6 ft.
Access Management [10]	Moderate	Low	Low	High	Moderate	Low	Moderate	Low	Low
Typical Traffic Volume Range (ADT) [11]	20,000–35,000	1,500–25,000	500–5,000	20,000–50,000	1,500–35,000	1,000–10,000	10,000–35,000	1,500–20,000	500–5,000
Intersections									
Roundabout [12]	Consider urban single–lane roundabouts at intersections on avenues with less than 20,000 entering vehicles per day, and urban double–lane roundabouts at intersections on boulevards and avenues with less than 40,000 entering vehicles per day.								
Curb Return Radii/Curb Extensions and Other Design Elements	Refer to Chapter 10 (Intersection Design Guidelines)								

Examples – Traveled Way Design

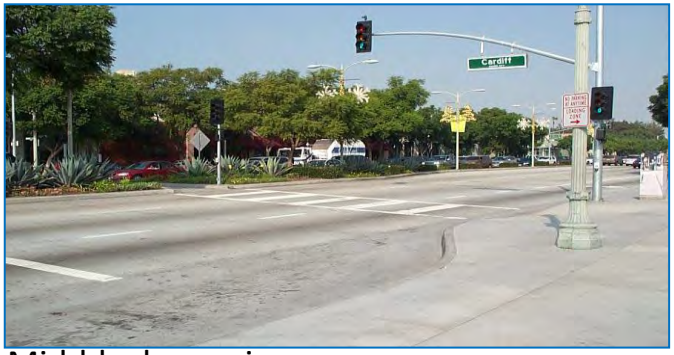
Design vehicle selection

Lane widths, multiway boulevards

Transit stop location, design



Bike lanes, curb parking



Mid-block crossings

Speed management, pedestrian safety

Streetside

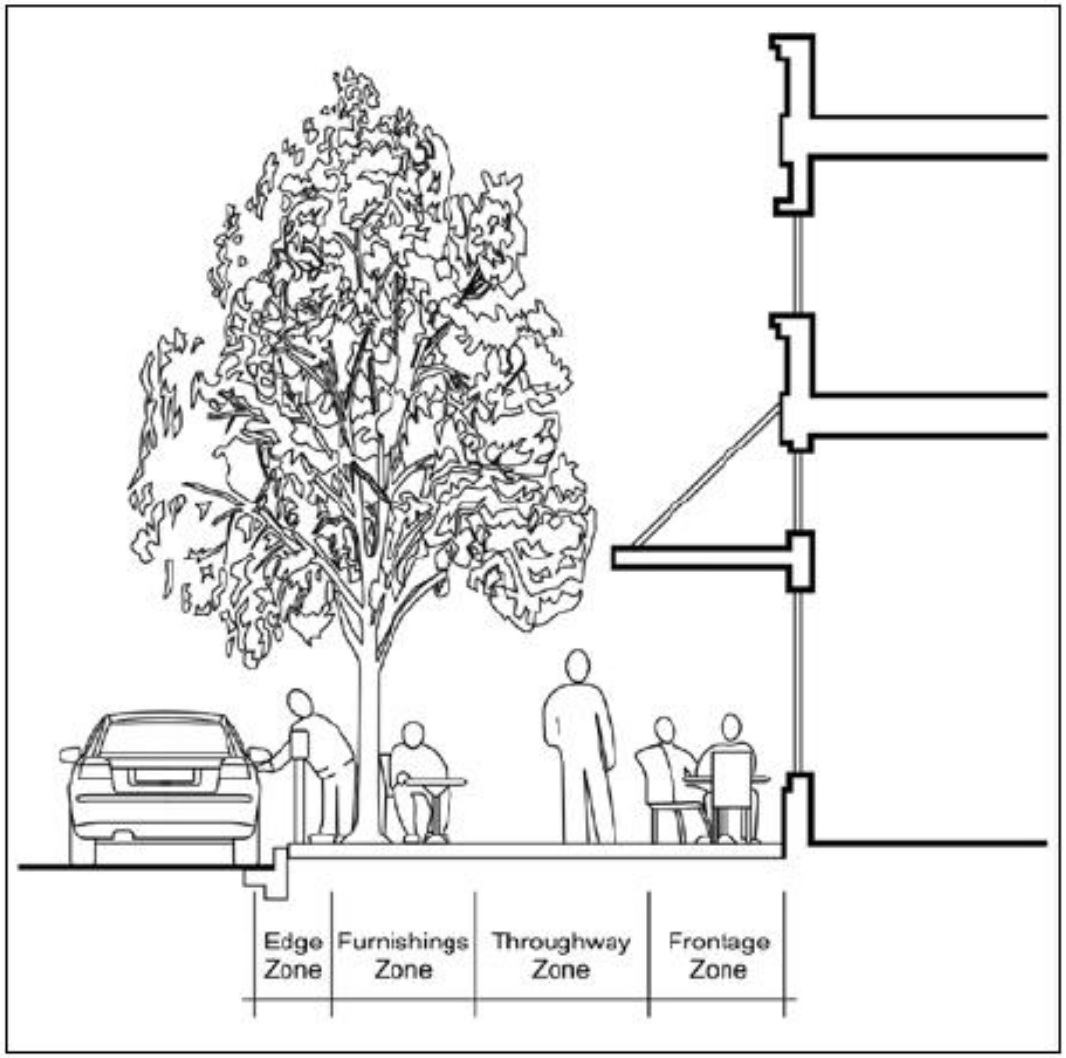
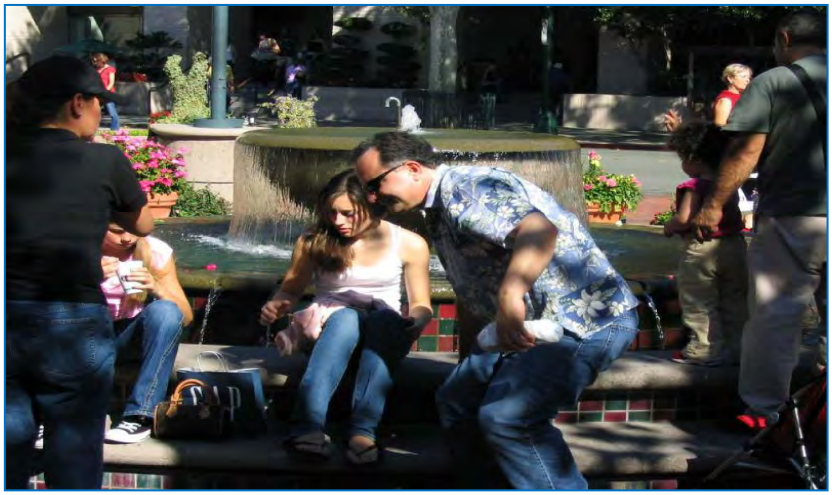


Table 8.1 Recommended Streetside Zone Dimensions

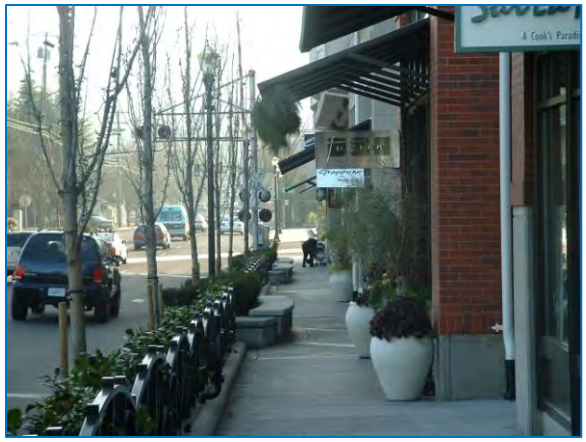
	Sidewalk Zone [1]	C-6 and C-5			C-4 w/ Predominantly Commercial Ground Floor Use			C-4 w/ Predominantly Residential Frontage			C-3 w/ Predominantly Commercial Ground Floor Use			C-3 w/ Predominantly Residential Frontage		
Boulevard	Edge	1.5 feet 2.5 feet at diagonal parking	21.5 foot (recommended)	12 foot (constrained)	1.5 feet 2.5 feet at diagonal parking	19 foot (recommended)	12 foot (constrained)	1.5 feet	17.5 foot (recommended)	9 foot (constrained)	1.5 feet 2.5 feet at diagonal parking	16 foot (recommended)	12 foot (constrained)	1.5 feet	15.5 foot (recommended)	9 foot (constrained)
	Furnishings	7 feet (trees in tree wells)			7 feet (trees in tree wells)			8 feet (landscape strip w/ trees and grasses or groundcovers)			7 feet (trees in tree wells)			8 feet (landscape strip w/ trees and grasses, or groundcovers)		
	Throughway	10 feet			8 feet			8 feet			6 feet			6 feet		
	Frontage	3 feet			2.5 feet			0 feet along lawn and groundcover 1 foot along low walls, fences and hedges 1.5 feet along facades, tall walls and fences			1.5 feet			0 feet along lawn and groundcover 1 foot along low walls, fences and hedges 1.5 feet along facades, tall walls and fences		
Avenue	Edge	1.5 feet 2.5 feet at diagonal parking	19.5 foot (recommended)	12.0 foot (constrained)	1.5 feet 2.5 feet at diagonal parking	16 foot (recommended)	12 foot (constrained)	1.5 feet	15.5 foot (recommended)	9 foot (constrained)	1.5 feet 2.5 feet at diagonal parking	16 foot (recommended)	12 foot (constrained)	1.5 feet	15.5 foot (recommended)	9 foot (constrained)
	Furnishings	6 feet (trees in tree wells)			6 feet (trees in tree wells)			6 feet (landscape strip w/ trees and grasses or groundcovers)			6 feet (trees in tree wells)			8 feet (landscape strip w/ trees and grasses or groundcovers)		
	Throughway	9 feet			6 feet			6 feet			6 feet			6 feet		
	Frontage	3 feet			2.5 feet			0 feet along lawn and groundcover 1 foot along low walls, fences and hedges 1.5 feet along facades, tall walls and fences			2.5 feet			0 feet along lawn and groundcover 1 foot along low walls, fences and hedges 1.5 feet along facades, tall walls and fences		
Street	Edge	1.5 feet 2.5 feet at diagonal parking	16 foot (recommended)	12.0 foot (constrained)	1.5 feet 2.5 feet at diagonal parking	16 foot (recommended)	12 foot (constrained)	1.5 feet	13.5 foot (recommended)	9 foot (constrained)	1.5 feet 2.5 feet at diagonal parking	15 foot (recommended)	12 foot (constrained)	1.5 feet	12.5 foot (recommended)	9 foot (constrained)
	Furnishings	6 feet (trees in tree wells)			6 feet (trees in tree wells)			6 feet (landscape strip w/ trees and grasses or groundcovers)			6 feet (trees in tree wells)			5 feet (landscape strip w/ trees and grasses or groundcovers)		
	Throughway	6 feet			6 feet			6 feet			6 feet			6 feet		
	Frontage	2.5 feet			2.5 feet			0 feet along lawn and groundcover 1 foot along low walls, fences and hedges 1.5 feet along facades, tall walls and fences			1.5 feet			0 feet along lawn and groundcover 1 foot along low walls, fences and hedges 1.5 feet along facades, tall walls and fences		

Examples – Streetside Design

Streetside zone widths, feature placement



Plazas



Pedestrian buffering

Curb extensions

Street furniture

Intersections

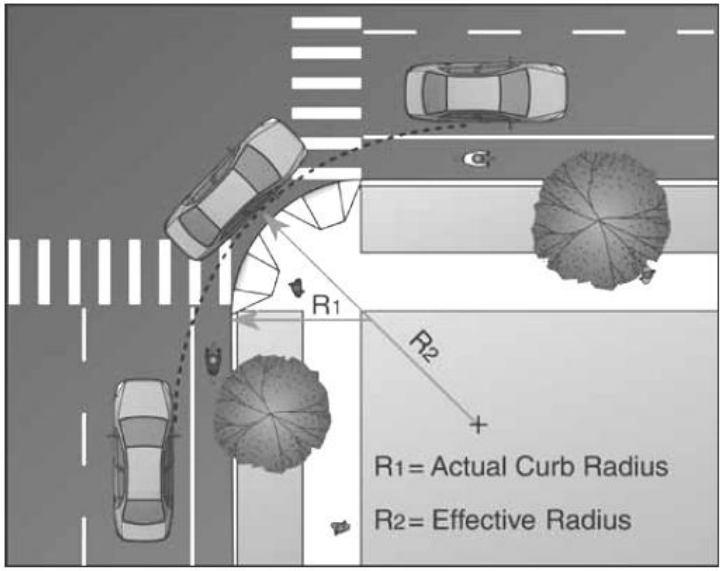


Table 10.2 Recommended Practice for Modern Roundabouts

Parameter	Minimum "Mini-Round-about"	Urban Compact Roundabout	Urban Single-Lane Roundabout	Urban Double-Lane Roundabout*
Maximum Entry Speed (mph)	15	15	20	25
Design Vehicle	Bus and single-unit truck drive over apron	Bus and single-unit truck	Bus and single-unit truck WB-50 with lane encroachment on truck apron	WB-67 with lane encroachment on truck apron
Inscribed circle diameter (feet)	45 to 80	80 to 100	100 to 130	150 to 180
Maximum number of entering lanes	1	1	1	2
Typical capacity (vehicles per day entering from all approaches)	10,000	15,000	20,000	40,000
Applicability by Thoroughfare Type:				
Boulevard	Not Applicable	Not Applicable	Not Applicable	Applicable
Arterial Avenue	Not Applicable	Not Applicable	Applicable	Applicable
Collector Avenue	Applicable	Applicable	Applicable	Not Applicable
Street	Applicable	Applicable	Applicable	Not Applicable

Examples – Intersection Design

Intersection geometrics

Intersection curb extensions, intersection sight distance

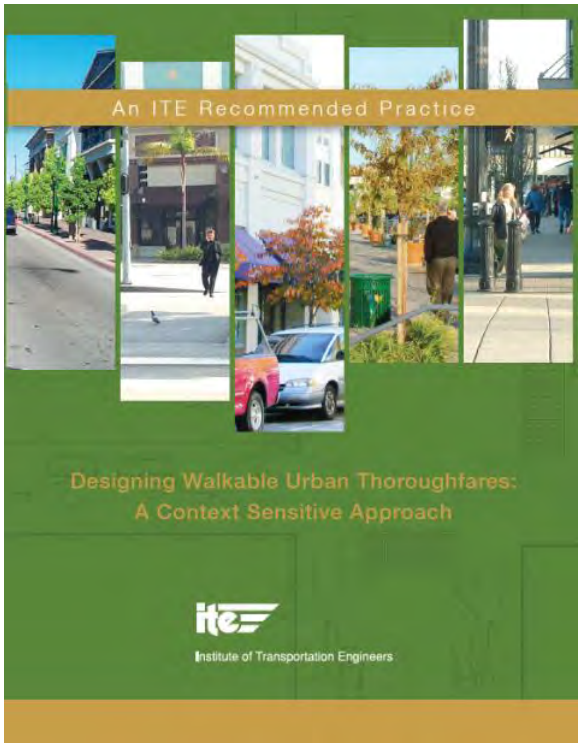
Bus stops at intersections

Emergency vehicle accommodation

Crosswalks, channelization

Benefits To Cities

- Streets CAN do more for communities than move traffic
  - Move people
  - Placemaking
  - Economic development
  - Improved appearance
  - Stimulate desired land uses
  - Encourage private sector cost participation
- Meet more city objectives
- Use transportation to support more needs
- More compatible thoroughfares
- Less transportation project controversy
- More satisfied constituents
- Increased sustainability



Other Supportive Policies

Nashville / Davidson County
Major and Collector Street Plan

Implementing Complete Streets

Major and Collector Street Plan of Metropolitan Nashville
A Component of Mobility 2030

Adopted: April 14, 2011

METROPOLITAN NASHVILLE PLANNING DEPARTMENT
PLANNING A GREAT CITY

Place Based Road Classification

Conventional Street Design	CSS Street Design
Possible Context Designations:	**Possible Context Designations:**
Rural **Urban**	**Rural** Residential (i.e. Whites Creek Pk., Joelton) Mixed-Use (ex. Ashland City Hwy. & Old Hickory Blvd.)
	Suburban Mixed-Use (ex. Old Hickory Blvd. & Edmondson Pk.) Residential (ex. Harding Pl. between I-65 and Nolensville Pk.)
	Urban Mixed-Use (ex. Woodland St. between 5th and 11th St.) Residential (ex. West End Ave. between I-440 and St. Thomas Hospital)
	Center (ex. Rivergate area streets)
	Downtown (ex. James Robertson Pkwy.)
Street design criteria primarily based on:	**Street design criteria primarily based on:**
Vehicle Level of Service Vehicle Design Speed Vehicle Travel Demand Functional Class	Context/Adjacent Land Use Adopted Community Objectives Multiple Travel Modes and Users Demand Functional Class

Table 1: Conventional street design factors compared with CSS street design factors

Specific Design Guidance Included

Environment:

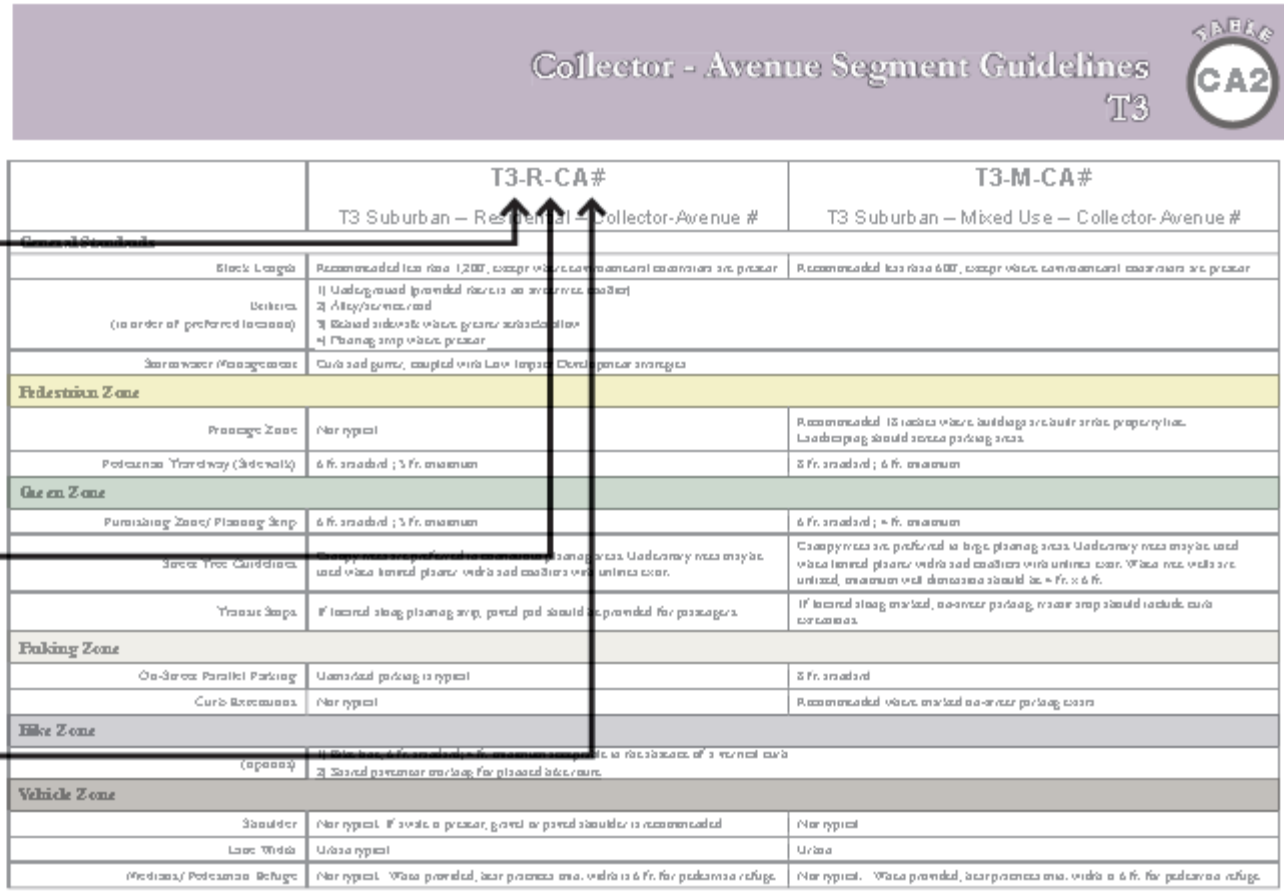
The Transect designation explains whether the street segment is part of a Rural, Suburban, Urban, Center, Downtown, or District area.

Street Context:

Denotes whether the street segment is part of a Residential or Mixed Use area. Industrial Street Context areas follow standards for Mixed Use.

Functional Design Type:

Explains the street's role in the larger network of streets and assigns design criteria to accomplish functional and design goals. The # represents the planned number of lanes.



Collector - Avenue Segment Guidelines
T3

TABLE CA2

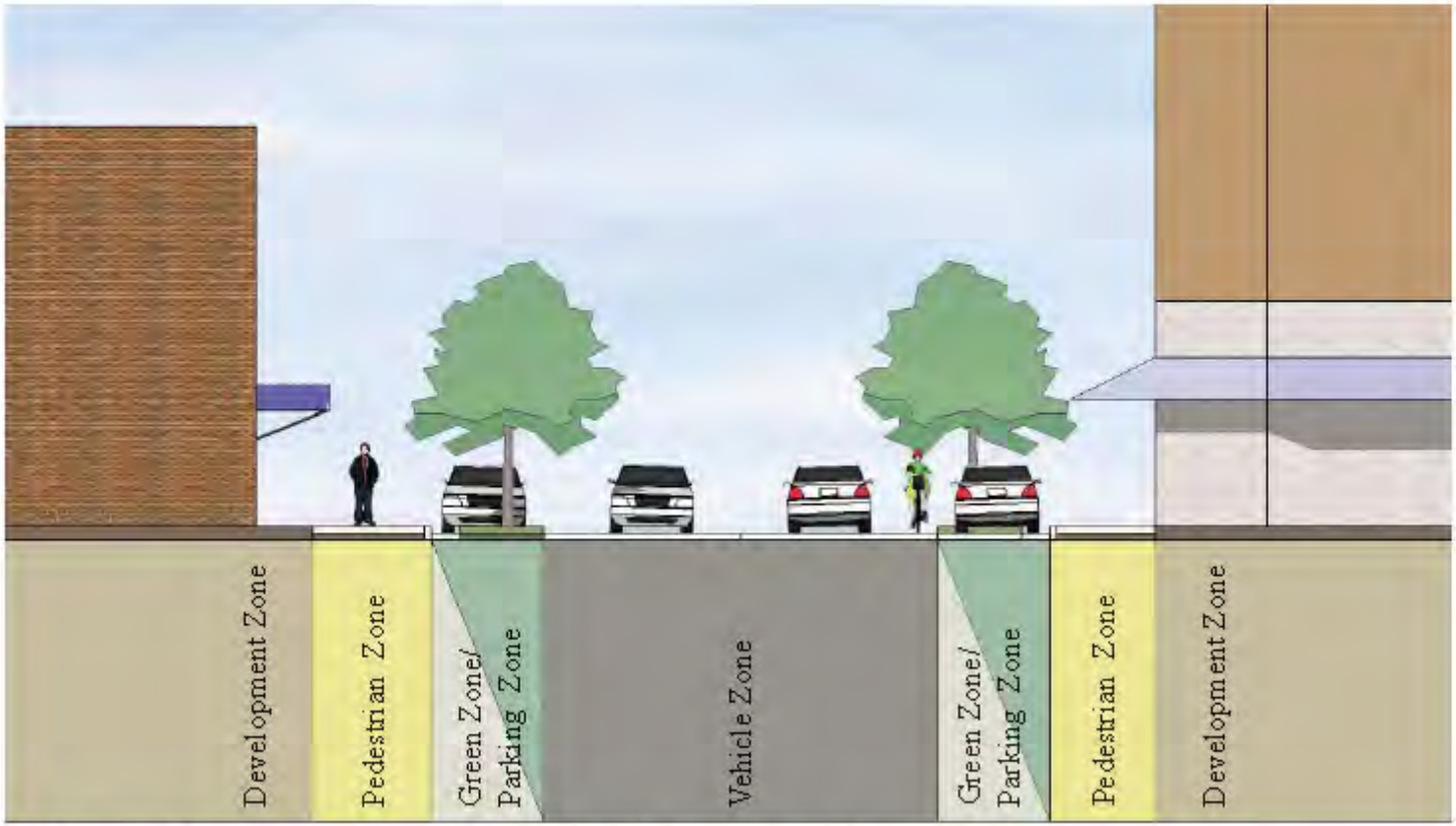
	T3-R-CA# T3 Suburban – Residential – Collector-Avenue #	T3-M-CA# T3 Suburban – Mixed Use – Collector-Avenue #
General Standards		
Block Length	Recommended less than 1,200', except where environmental constraints are present	Recommended less than 600', except where environmental constraints are present
Setback (in order of preferred location)	1) Underground (provided there is an overhead shelter) 2) Alley/service road 3) Raised sidewalk where grade separation is allowed 4) Planting strip where present	
Stormwater Management	Curb and gutter, coupled with Low Impact Development strategies	
Pedestrian Zone		
Frontage Zone	Not typical	Recommended 18 inches where buildings are built to the property line. Landscaping should screen parking areas.
Pedestrian Travelway (Sidewalk)	6 ft. standard ; 5 ft. minimum	8 ft. standard ; 6 ft. minimum
Green Zone		
Furnishing Zone/ Planting Strip	6 ft. standard ; 5 ft. minimum	6 ft. standard ; 4 ft. minimum
Street Tree Guidelines	Canopy trees are preferred in large planting areas. Understory trees may be used where limited space exists and shrubs or ornamental grasses. Where trees will be utilized, minimum soil dimensions should be 4 ft. x 6 ft.	
Transit Stops	If located along planting strip, paved pad should be provided for passengers.	If located along marked, on-street parking, transit stop should include curb extensions.
Parking Zone		
On-Street Parallel Parking	Unmarked parking is typical	8 ft. standard
Curb Extensions	Not typical	Recommended where marked on-street parking occurs
Bike Zone		
(options)	1) Bike lane, 6 ft. standard, 5 ft. minimum, adjacent to the clearance of a vertical curb 2) Shared pavement markings for planned bike routes	
Vehicle Zone		
Shoulder	Not typical. If swale is present, grass or paved shoulder is recommended	Not typical
Lane Width	Urban typical	Urban
Medians/ Pedestrian Refuge	Not typical. Where provided, bike protected area, width is 6 ft. for pedestrian refuge.	Not typical. Where provided, bike protected area, width is 6 ft. for pedestrian refuge.

Figure 3: How to Read the Text String Key to the Guidelines Tables for Each Street Type.

Cross Section Illustrations

FIGURE CA5

Collector - Avenue with On-street Parking and Curb Extensions



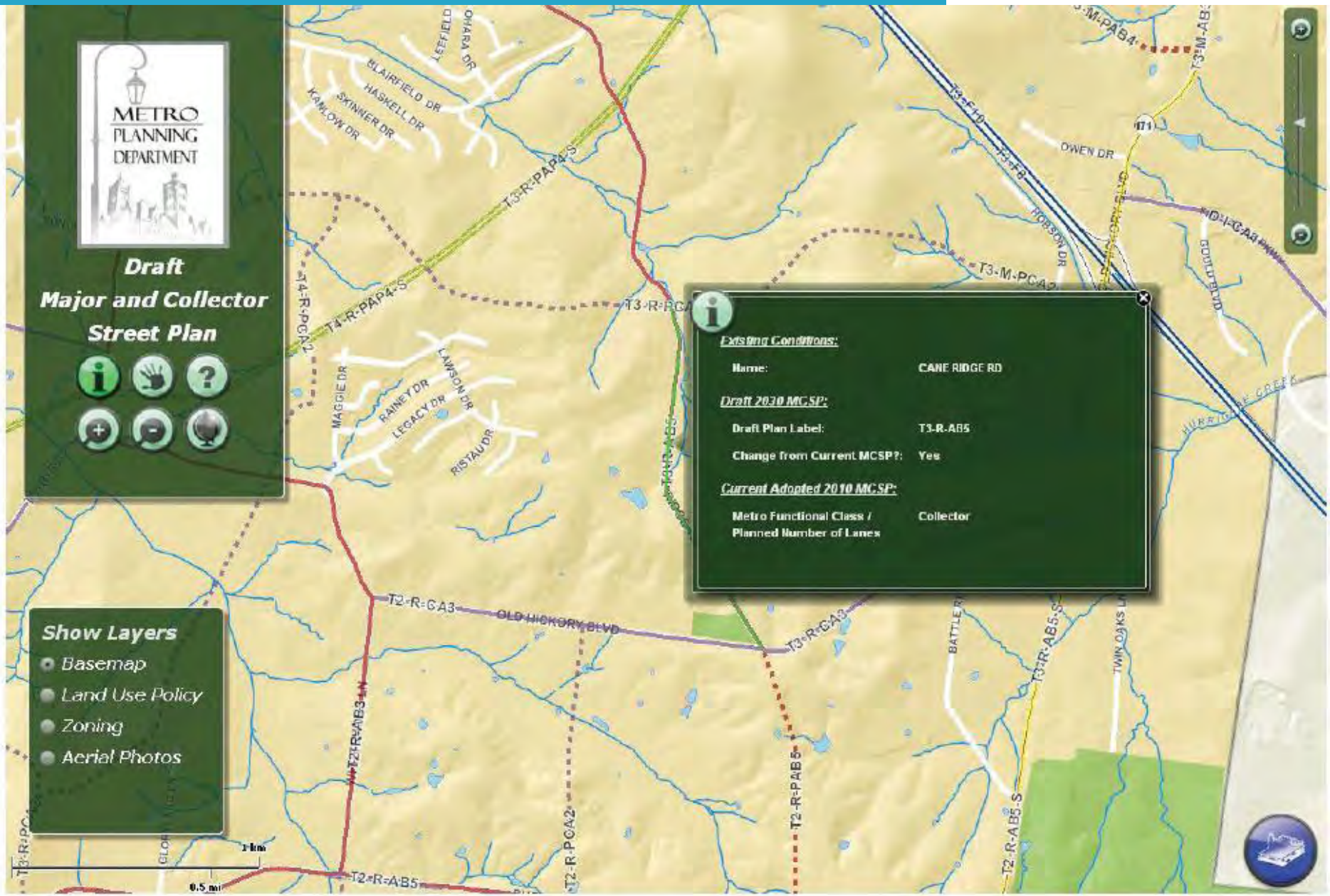
Context

- T3 Mixed Use (Urban lane width)
- T4 Residential (Urban lane width)
- T4 Mixed Use (Urban lane width)
- T5 Mixed Use (Urban lane width)
- T6 Mixed Use (Urban lane width)

See discussion of Street Elements starting on page 27 for detailed information on each element.

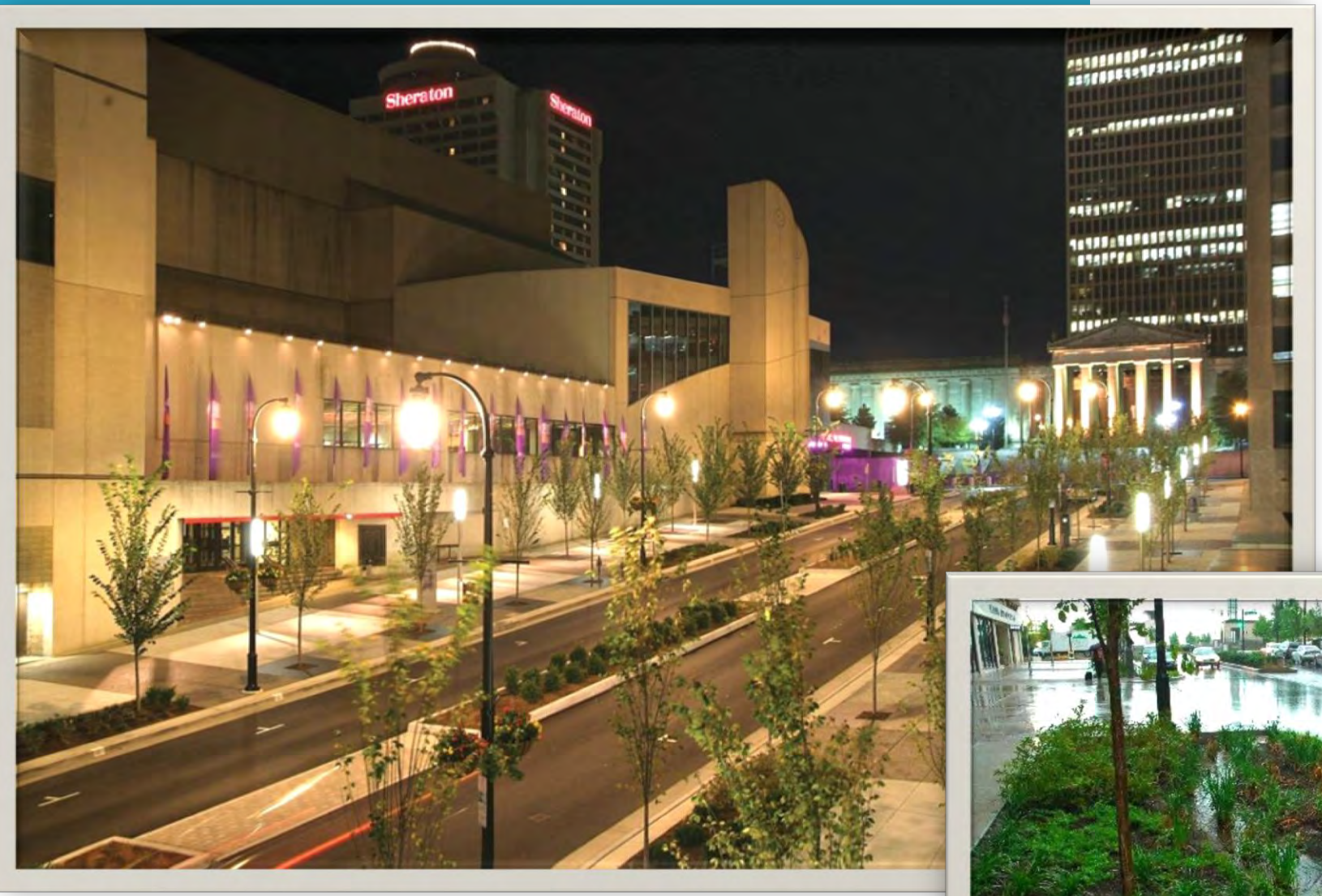
Catalog of Current and Planned Streets

Mapping Database



Deaderick Street Conceptual Drawing

Deaderick Street



Hill Center, Green Hills

Oklahoma City – Downtown Strategic Initiative

- $800 Million Bond Initiative
- Citizen Committees
  - Movin' Around: Transit/Transportation, Walk/Bike-ability, Connectivity, Parking
  - Doin' Business: Real Estate/Vacancy, Incentives, Creative Business, Infrastructure
  - Dressin' It Up: Design and Appearance, Land Use,Street-Level Activity
  - Stayin' Around: Housing, Education, Sustainability, Safety
  - Playin' Around: Arts/Cultural/Entertainment, Parks/Recreation,
- Project 180

Walkable Streets, the Arts and Small Business Development
Roosevelt Row – Phoenix, AZ

http://www.youtube.com/watch?v=PT-H-lbp1TI

Federal Dollars Used to Spur Local Investment
Atlanta Regional Commission

- Funded with CMAQ
- Initiated in 1999
- Distributed more than $1 million annually
- Funded 762 projects in 102 communities across the region

Implementation Opportunities

- As streets are reconstructed or improved
  - CIP
  - Special projects
  - Redevelopment
  - DOT programmed improvements
- When streets are improved/reconstructed, make them CSMS

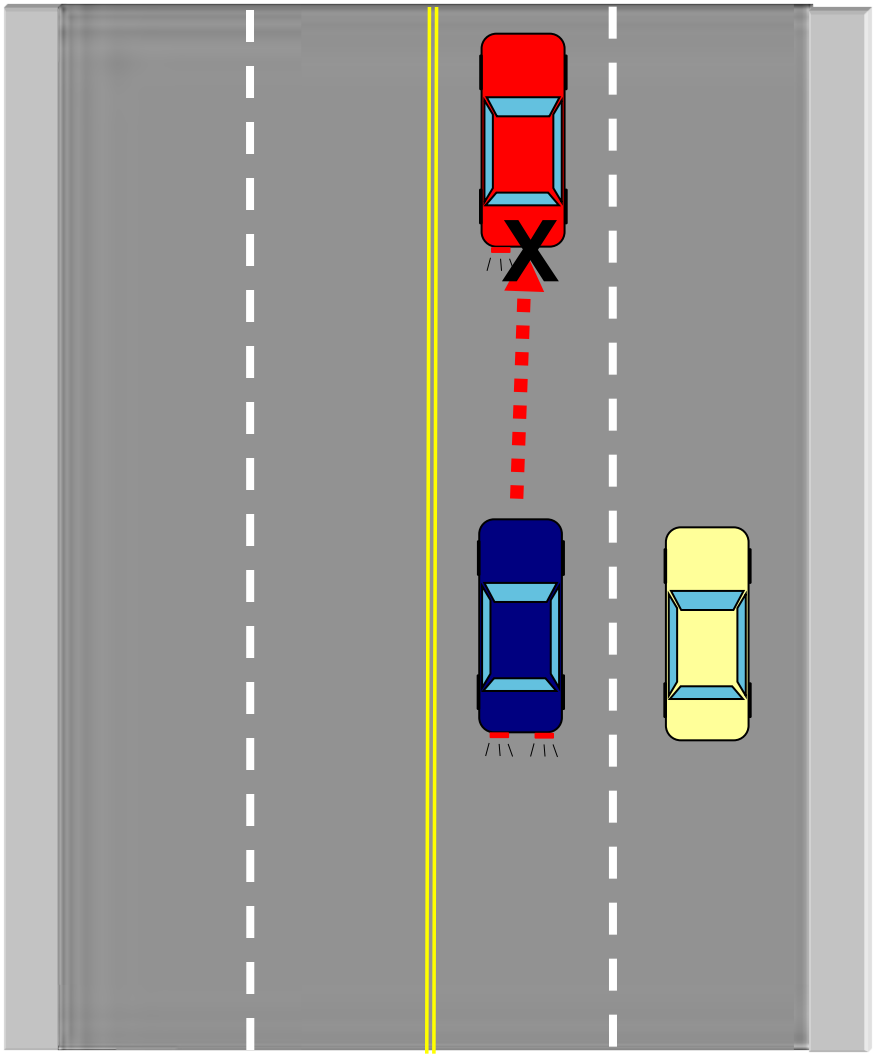
Some Funding Sources for CSMS in Texas

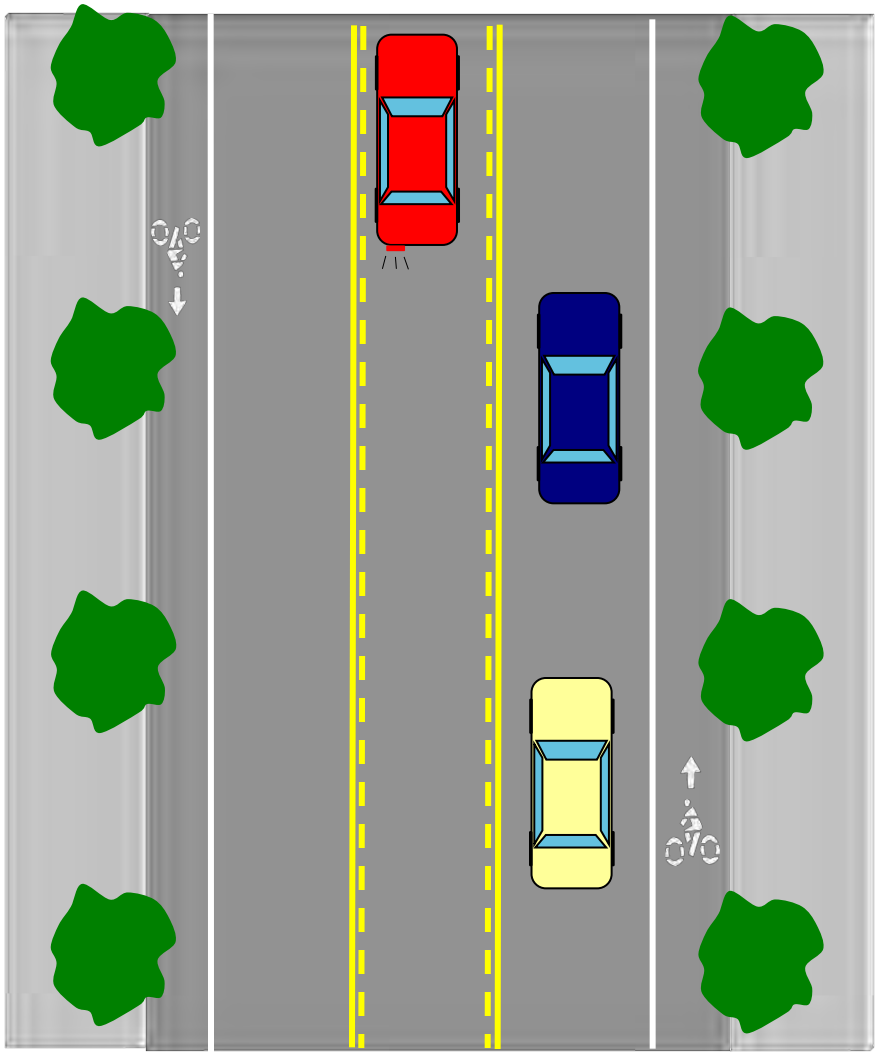
- FHWA/state DOT (several programs)
- FTA/transit agency
- Community development
- Tax Increment Finance Districts
- Special districts
- Local agency
- Bonds
- Developers/owners/businesses
- Private front-end/tax recapture

Discussion Questions

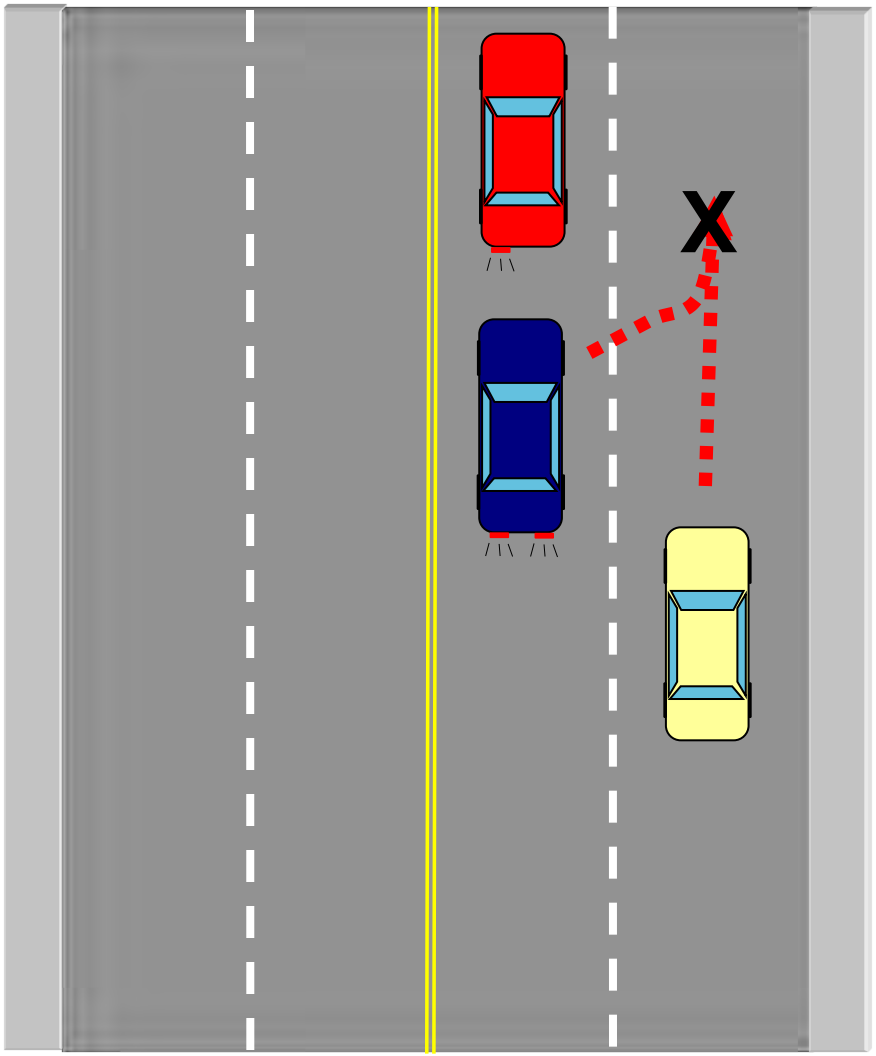
- Near term opportunities to explore new approaches?
  - i.e. upcoming plans, projects, program reviews
- Which districts, neighborhoods, corridors would be good candidates for pilot projects?
- What sources of funding could be used to implement such pilots?
- What other pilot initiatives might be possible?

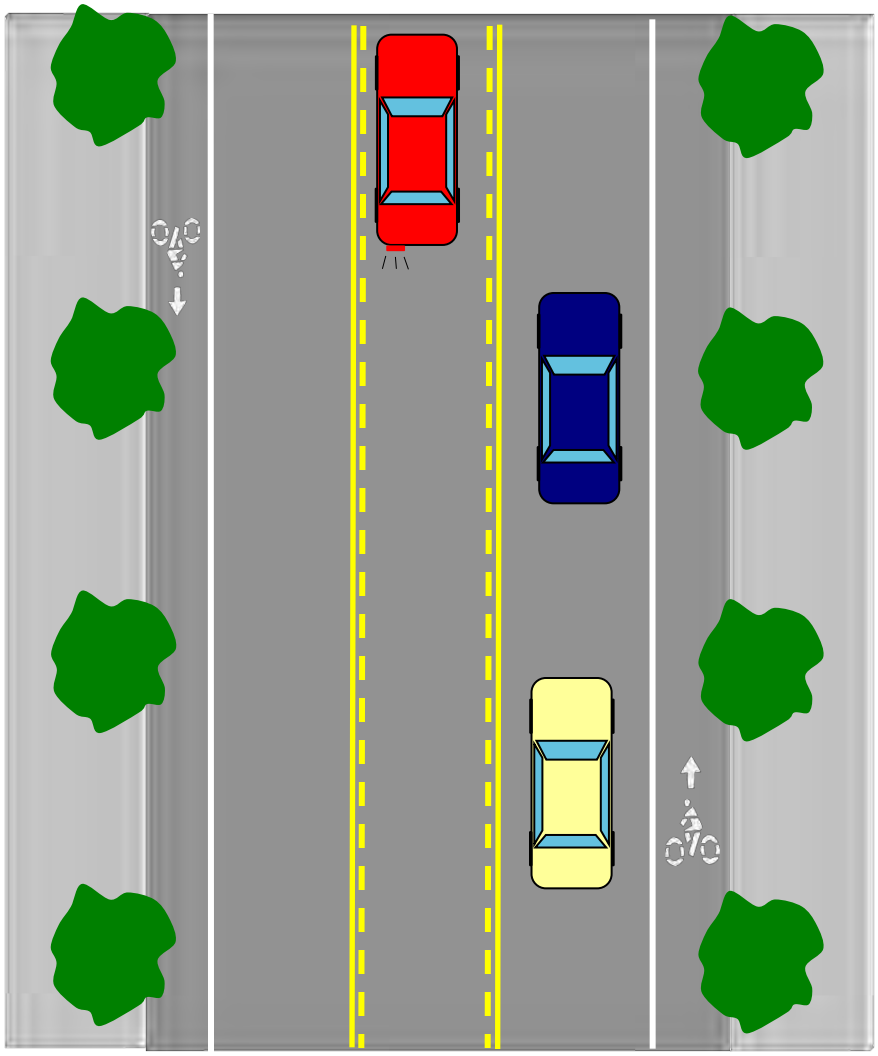
3 crash types can be reduced by going from 4 to 3 lanes: 1 – rear enders





3 crash types can be reduced by going from 4 to 3 lanes: 2 – side swipes





3 crash types can be reduced by going from 4 to 3 lanes: 3 – left turn/broadside