

# Complete Streets – Some Assembly Required



We've known how to build great streets...





What  
Happened???

Grin & Bear It

By Fred Wagner



"We're gonna need roads...lots of 'em!"

*Cartoon courtesy of Walter Kulash*

And Complete Streets are important  
because?



"I never know where I'm going to cross,  
so I keep the sign with me."



# The Results



April 22, 2003

A photograph of a pedestrian crossing sign. The sign is rectangular with a black background and a white border. The word "WALK" is written in large, blue, block letters at the top. Below it, the word "CANT" is written in large, yellow, block letters. At the bottom, the word "WALK" is written in large, yellow, block letters. The sign is mounted on a metal post.

By Martha T. Moore  
USA TODAY

Why don't Americans walk anywhere?

Old answer: They're lazy.  
New answer: They can't.

There is no sidewalk outside the front door, school is 5 miles away, and there's a six-lane highway between home and the supermarket.

Many experts on public health say the way neighborhoods are built is to blame for Americans' physical inactivity — and the resulting epidemic of obesity.

The health concern is a new slant on the issue of suburban sprawl, which metro regions have been struggling with for a decade. These health experts bring the deep-pocketed force of private foundations and public agencies into discussions about what neighborhoods should look like.

The argument over whether suburbs are bad for your health will hit many Americans precisely where they live: in a house with a big lawn on a cul-de-sac.

"The potential for actually tackling some of these things, with the savvy of the folks who have tackled tobacco, is enormous," says Ellen Vanderslice, head of America Walks, a pedestrian advocacy group based in Portland, Ore.

A study by the federal Centers for Disease Control and Prevention is tracking 8,000 residents of Atlanta to determine whether the neighborhood they live in influences their level of physical exercise. The Robert Wood Johnson Foundation in New Jersey,

**Cover  
story**

## The way cities and suburbs are developed could be bad for your health

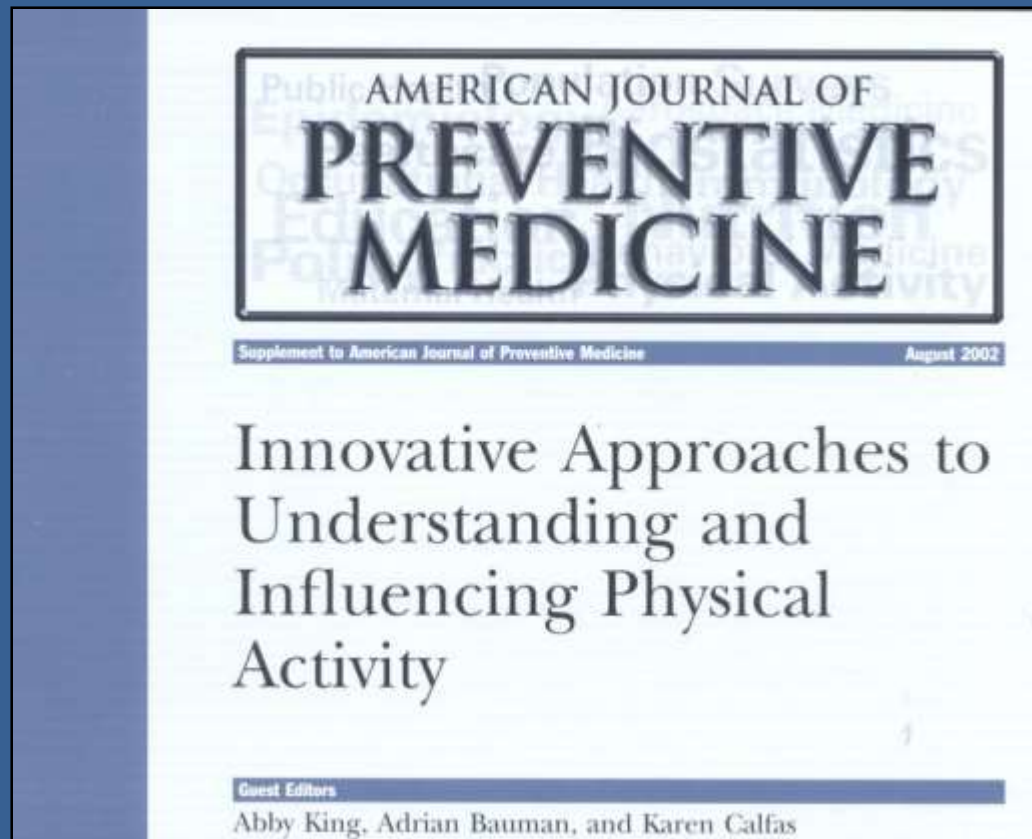
Please see COVER STORY next page ►





- 31% of US adults are obese, 65% are obese or overweight -- and gaining 1-2 lbs a year
- Between 10% and 15% of children and teens are overweight/obese -- and more likely to become obese adults
- Overweight/obesity rates highest in low-income and minority populations
- Obesity health and productivity costs exceed \$147 billion per year
- 956 Billion in cost 2030

# Paradigm Shift for Public Health Research: Community Design and Transportation Matter





# Brookings Institute Study Walkability Adds

- \$9 /sqft to office rents
- \$7/ sqft to retail rents
- \$300 more for monthly rents
- \$82 /sqft to home values



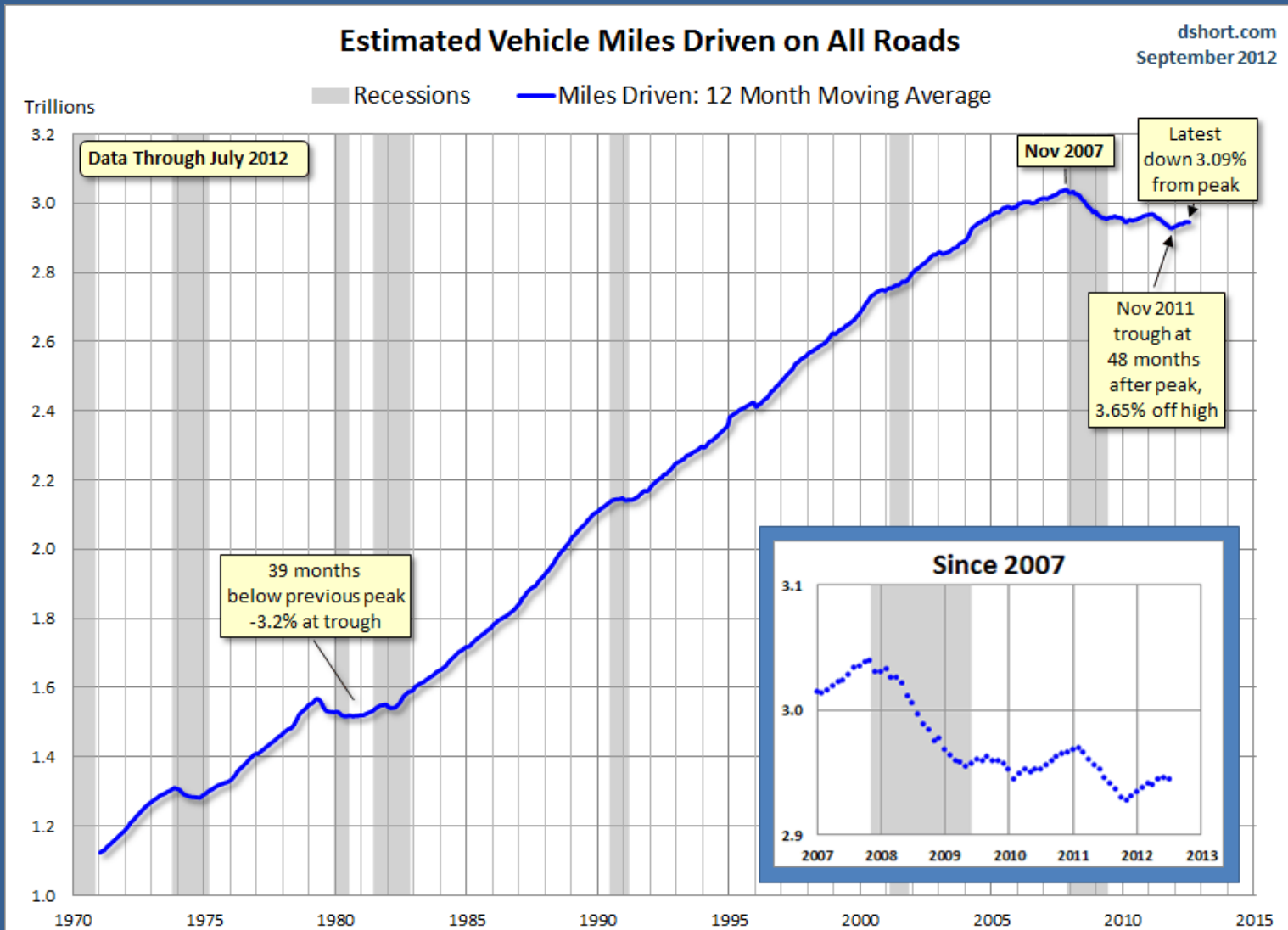
*As neighborhoods step up the walkability ladder household income increases by some \$10,000.*

# Trends

- Millennials driving less
  - Low car ownership
  - Open to multi-modal travel
  - Seeks affordability
- Changing Parking Direction
  - Pushing parking to the edges
  - Building parking decks = \$\$\$\$\$
  - Highest and best purpose for valuable real estate
- Growth/Interest in diversity of transportation options

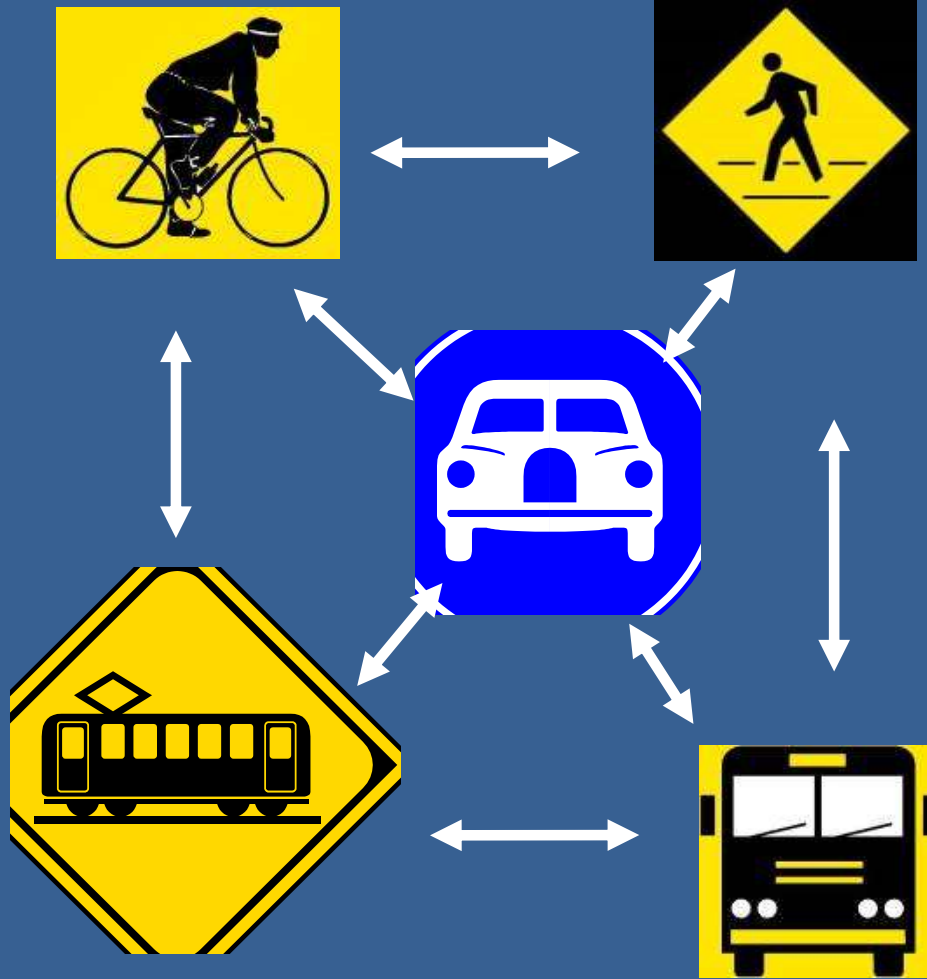


# People are driving less...





Goal: Move PEOPLE, not just cars



# Complete Streets: So what's next?



- Changing the rules
- Show me the \$\$!
- Implementation challenges

# Conventional Transportation Philosophy

- Capacity
- Operational Efficiency
- Vehicular LOS
- Minimize Vehicular Delay



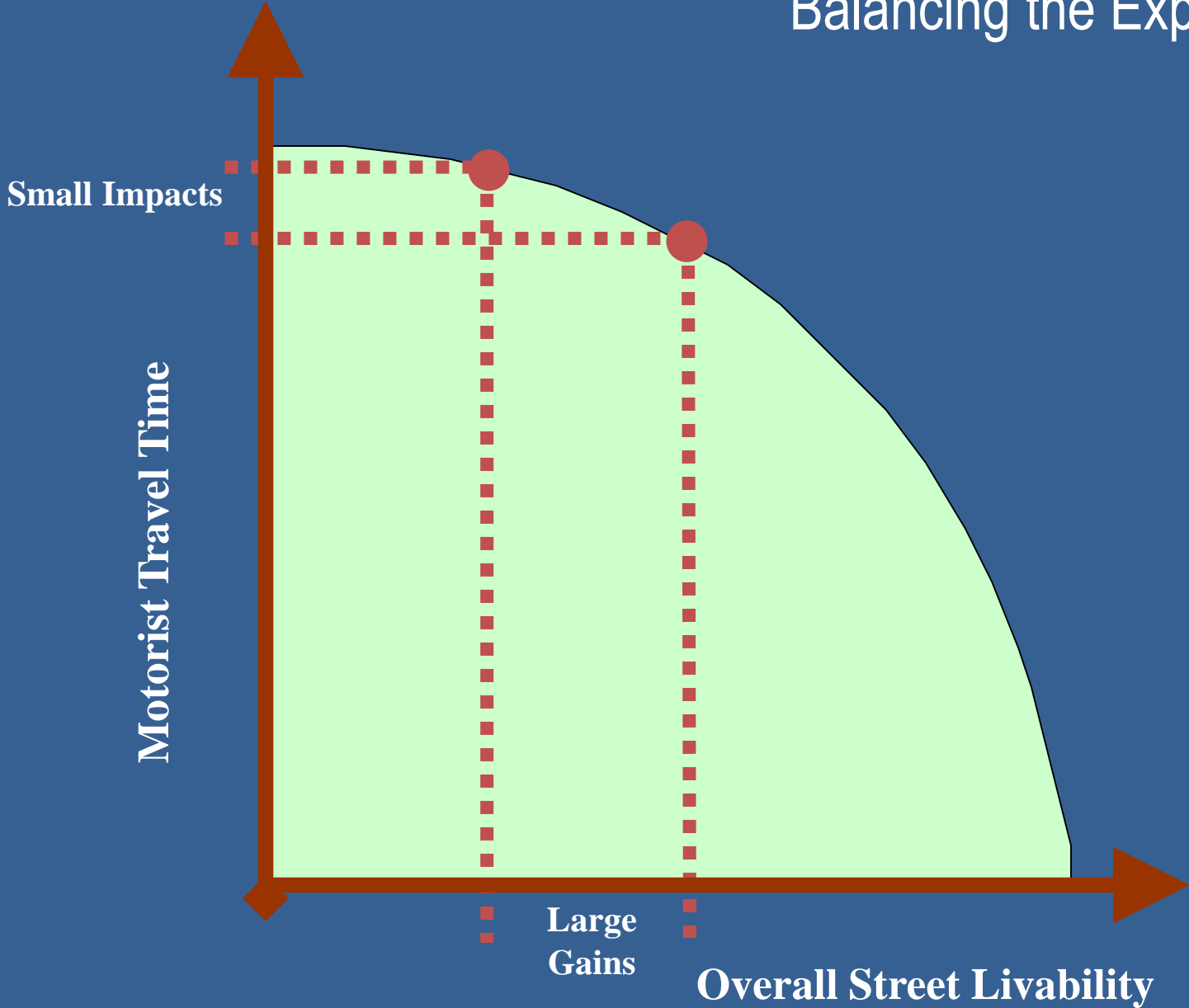


# Holistic Transportation Strategy

- Livability and balance – “Complete Streets”
- Combine land use and transportation improvements
- Full range of seamless multi-modal opportunities – transit, pedestrian, bicycle, and roadway networks
- Context sensitive solutions – utilize inherent flexibility in design
- Collaborative, interdisciplinary, and community-led design
- ***Move PEOPLE, not just cars***



# Balancing the Expectations



# Think of the Space between Buildings as an Asset

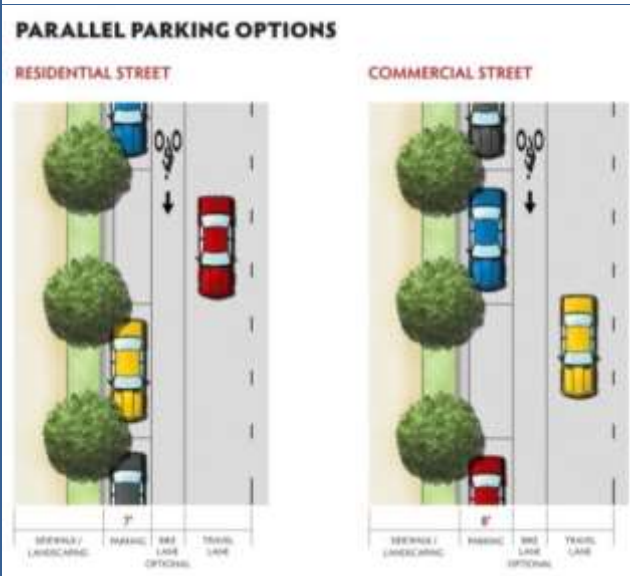
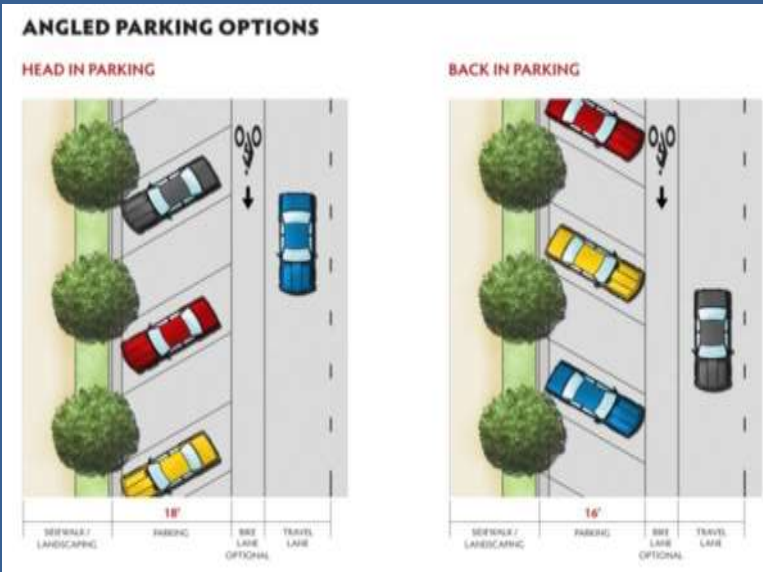
- Parking
  - Parallel
  - Angled (head in/back in)
  - Bicycle
- Wider Sidewalks
- Street Furniture
- Streetscape
- Stormwater
  - Rain Gardens
  - Bioswales
- Bike Facilities
  - Bike lanes
  - Cycle Tracks
  - Multi-use Paths
- Medians
  - Turn lanes
  - Planting opportunities
  - Access Management



*Photo by Dan Gallagher, Charlotte DOT*



# Parking



- Parallel Parking
  - Narrower roadways
  - Parking lane width – 6-8', length – 20'
- Angle Parking
  - Wider roadways, more parking per block
  - 45° Angle – 16' projection
  - 60° Angle – 18' projection
  - Back-in angle parking?

# Bike Facilities



Bike Lanes:  
5-6' wide  
Between vehicle lanes & parking  
Most appropriate for streets 25-35 mph



Shared Lanes:  
Most appropriate for streets  $\leq 25$  mph  
Typically installed in middle of street



Cycle Track: Buffered, 6-11' wide



"Cyclists Spend \$\$"



# Medians

- Benefits
  - Aesthetic Improvement
  - Reduces apparent road width
  - Improves pedestrian crossing safety
  - Consolidates left turn movements
- Minimum Width
  - 4' for raised median without landscape
  - 8' for landscaped median
  - 10' to accommodate left turn lanes
  - 14' to accommodate left turn lanes with adjacent median





# Midblock Crossings

- 75% of pedestrian fatalities occur away from intersections
- Most appropriate when:
  - High pedestrian volume
  - Intersections > 600' apart
  - Low-to-moderate speeds (<40 mph)
  - Enforcement
- Visibility is paramount!
  - Crosswalk markings
  - Street lighting
  - Bulbouts, Medians
  - Vehicular warnings (HAWK, etc)





- LEGEND**
- PROPOSED GREENLINE
  - EXISTING GREENLINE
  - GREENLINE - BRIDGE / TRESTLE
  - STREET CROSSING - AT GRADE
  - GREENLINE ALTERNATE ROUTE
  - PROPOSED PEDESTRIAN ACCESS
  - SHARED PARKING
  - STREAM CHANNEL



## SHELBY FARMS GREENLINE EXTENSION

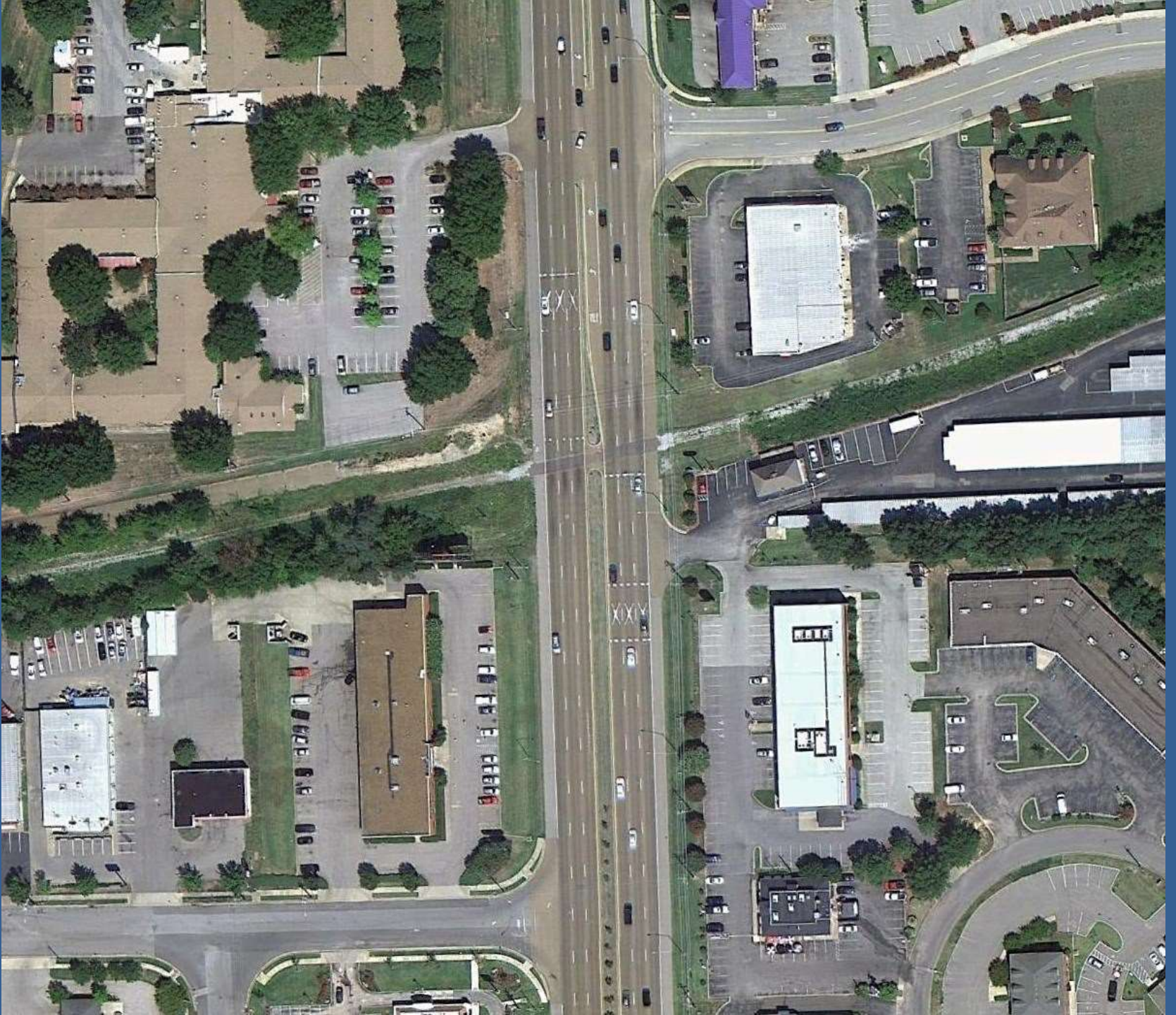
SHELBY COUNTY GOVERNMENT | SHELBY FARMS PARK CONSERVANCY

TETRA TECH | RITCHIE SMITH ASSOCIATES | TOLES AND ASSOCIATES | FUSS & O'NEILL | PSI | APRIL 16, 2012



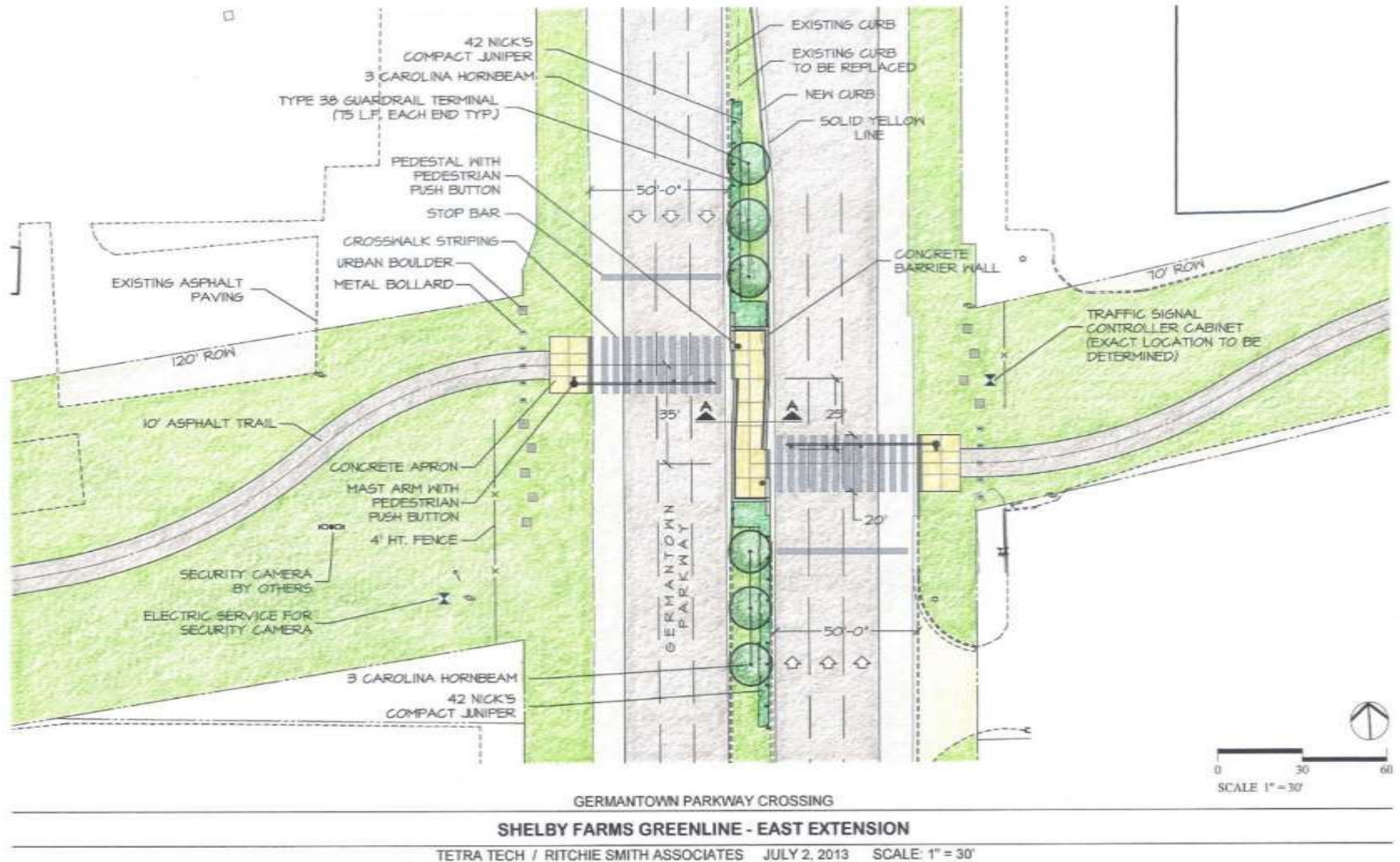








# No Road too Big...



Eastern Extension of the Shelby Farms Greenline – Germantown Parkway Crossing  
Six lane arterial, state road, 70,000 ADT















# Green Streets Techniques

- Stormwater Management
- Bioswales
- Rain Gardens
- Permeable Pavement



# Pavements





# Furnishings



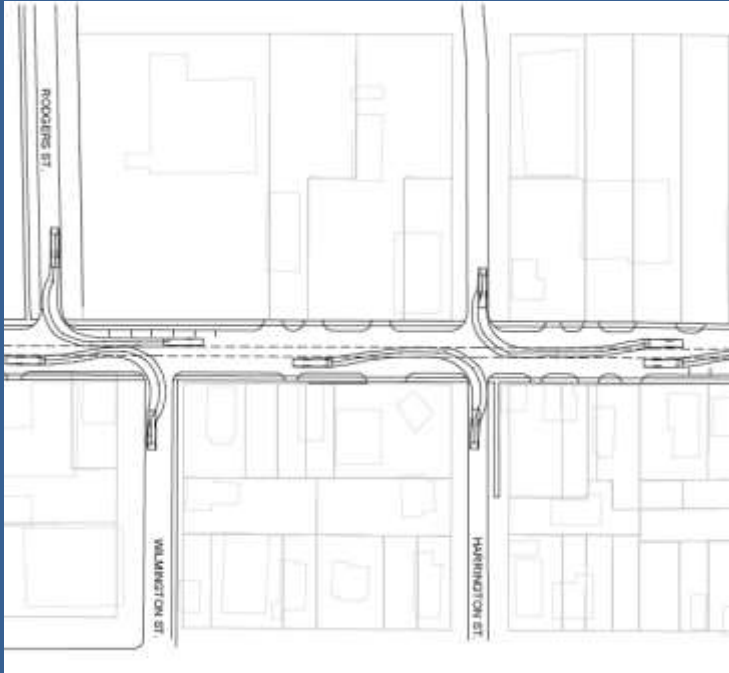
'PITTSFIELD' BANNERS AND SIGNS



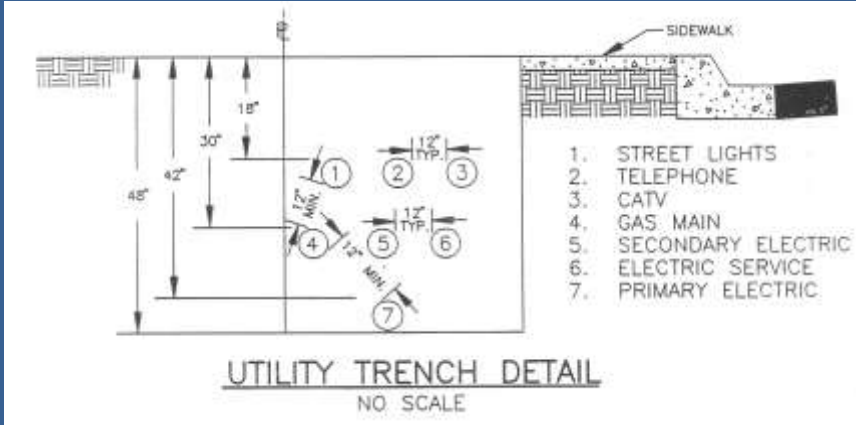


# Additional Considerations

- Transit Accommodations
- Freight Accommodations
- Emergency vehicles
- Utilities
- Street Transitions
- Access Management
- Maintenance
- Wayfinding



Above: Turning Radii Analysis



A Policy on  
**Geometric  
Design of  
Highways  
and Streets**

2011  
6th Edition



*“The intent of this policy is to provide guidance to the designer by referencing a recommended range of values for critical dimensions. Good highway design involves balancing safety, mobility, and preservation of scenic, aesthetic, historic, cultural, and environmental resources. This policy is therefore not intended to be a detailed design manual that could supersede the need for the application of sound principles by the knowledgeable design professional. Sufficient flexibility is permitted to encourage independent designs tailored to particular situations. Minimum values are either given or implied by the lower value in a given range of values. The larger values within the ranges may be used where social, economic, and environmental impacts are not critical. Engineering judgment is exercised by highway agencies to select appropriate design values.”*

*From the Forward to the AASHTO Green Book*

A Policy on  
**Geometric  
Design of  
Highways  
and Streets**

2011  
6th Edition



*“These geometric design are intended to provide operation efficiency, comfort, safety, and convenience for the motorist. The design concepts presented herein were also developed with consideration for environmental quality. The effects of the various environmental impacts can and should be mitigated by thoughtful design processes. This principle, coupled with that of aesthetic consistency with the surrounding terrain and urban setting, is intended to produce highways that are safe and efficient for users, acceptable to non-users, and in harmony with the environment.”*

*From the Forward to the AASHTO  
Green Book*



# FHWA Policy Statement (2010)

“Walking and bicycling foster safer, more livable, family-friendly communities; promote physical activity and health; and reduce vehicle emissions and fuel use. ”

“... DOT encourages transportation agencies to *go beyond the minimum requirements*, and proactively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians

of *all ages and abilities*...

## United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations

Signed on March 11, 2010 and announced March 15, 2010

### Purpose

The United States Department of Transportation (DOT) is providing this Policy Statement to reflect the Department's support for the development of fully integrated active transportation networks. The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of federal-aid project developments. Walking and bicycling foster safer, more livable, family-friendly communities; promote physical activity and health; and reduce vehicle emissions and fuel use. Legislation and regulations exist that require inclusion of bicycle and pedestrian policies and projects into transportation plans and project development. Accordingly, transportation agencies should plan, fund, and implement improvements to their walking and bicycling networks, including linkages to transit. In addition, DOT encourages transportation agencies to go beyond the minimum requirements, and proactively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians of all ages and abilities, and utilize universal design characteristics when appropriate. Transportation programs and facilities should accommodate people of all ages and abilities, including people too young to drive, people who cannot drive, and people who choose not to drive.

### Policy Statement

The DOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide — including health, safety, environmental, transportation, and quality of life — transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes.

### Authority

This policy is based on various sections in the United States Code (U.S.C.) and the Code of Federal Regulations (CFR) in Title 23—Highways, Title 49—Transportation, and Title 42—The Public Health and Welfare. These sections, provided in the Appendix, describe how bicyclists and pedestrians of all abilities should be involved throughout the planning process, should not be adversely affected by other transportation projects, and should be able to track annual obligations and expenditures on nonmotorized transportation facilities.

# FHWA Policy Statement

(2010)

"... DOT encourages transportation agencies to **go**

"Walking and bicycling foster safer, more livable, family-friendly communities; reduce vehicle emissions and fuel use."

**beyond the minimum**

**requirements**, and **proactively** provide

agencies to *go beyond the minimum requirements*, and

proactively provide convenient, safe, and foster increased use by bicyclists and pedestrians of **all**

**ages and abilities...**"

and Pedestrian Accommodation Regulations and Recommendations. 2010.

## United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations

Signed on March 11, 2010 and announced March 15, 2010

### Purpose

The United States Department of Transportation (DOT) is providing this Policy Statement to reflect the Department's support for the development of fully integrated active transportation networks. The establishment of well-planned walking and bicycling facilities, and their design should be a fundamental part of all transportation projects. Walking and bicycling foster safer, more livable, family-friendly communities; promote physical activity and health; and reduce vehicle emissions and fuel use. Legislation and regulations exist that require inclusion of bicycle and pedestrian policies and projects into transportation plans and project development. Transportation agencies should plan, fund, and implement improvements to walking and bicycling networks, including linkages to transit. In addition, DOT encourages transportation agencies to go beyond the minimum requirements, and proactively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians of all ages and abilities, and utilize universal design characteristics where appropriate. Transportation programs and facilities should be designed to accommodate all users, including people too young to drive, people

### Policy Statement

Walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide — including safety, health, and environmental benefits — DOT encourages transportation agencies to encourage and support walking and bicycling for these modes.

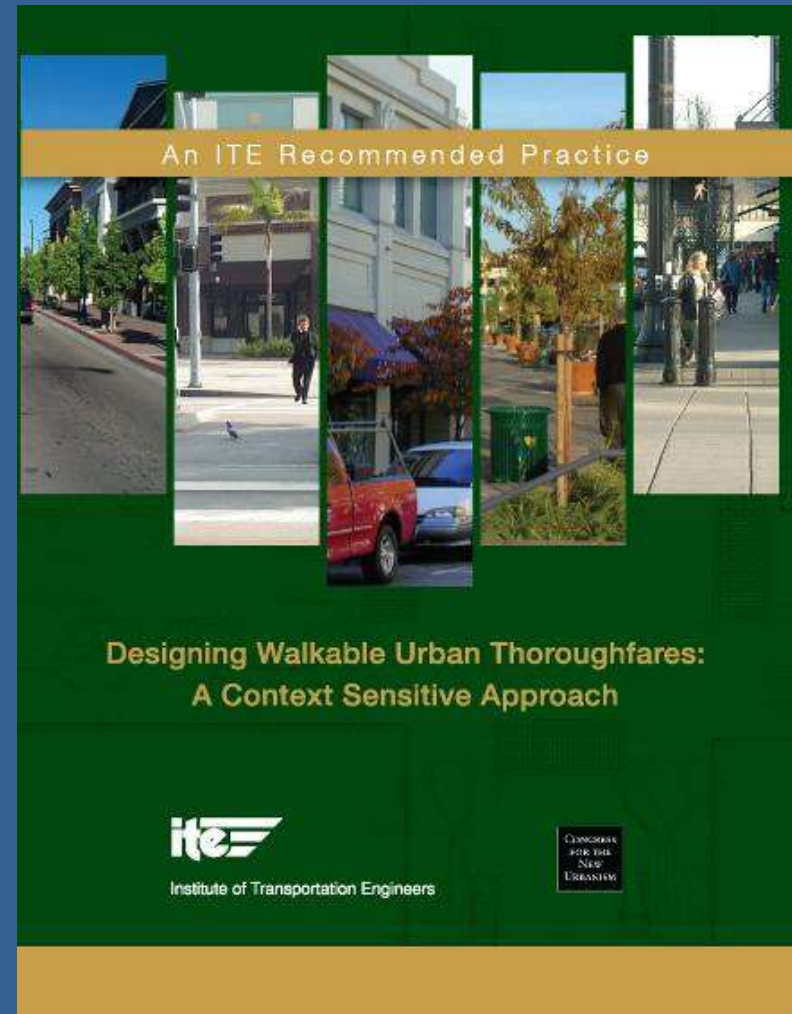
### Authority

This policy is based on various sections in the United States Code (U.S.C.) and the Code of Federal Regulations (CFR) in Title 23—Highways, Title 49—Transportation, and Title 42—The Public Health and Welfare. These sections, provided in the Appendix, describe how bicyclists and pedestrians of all abilities should be involved throughout the planning process, should not be adversely affected by other transportation projects, and should be able to track annual obligations and expenditures on nonmotorized transportation facilities.

# Guidance Today

*“This report has been developed in response to widespread interest for improving both mobility choices and community character through a commitment to creating and enhancing walkable communities.”*

*From Chapter 1 of the Recommended Practice, 2010*



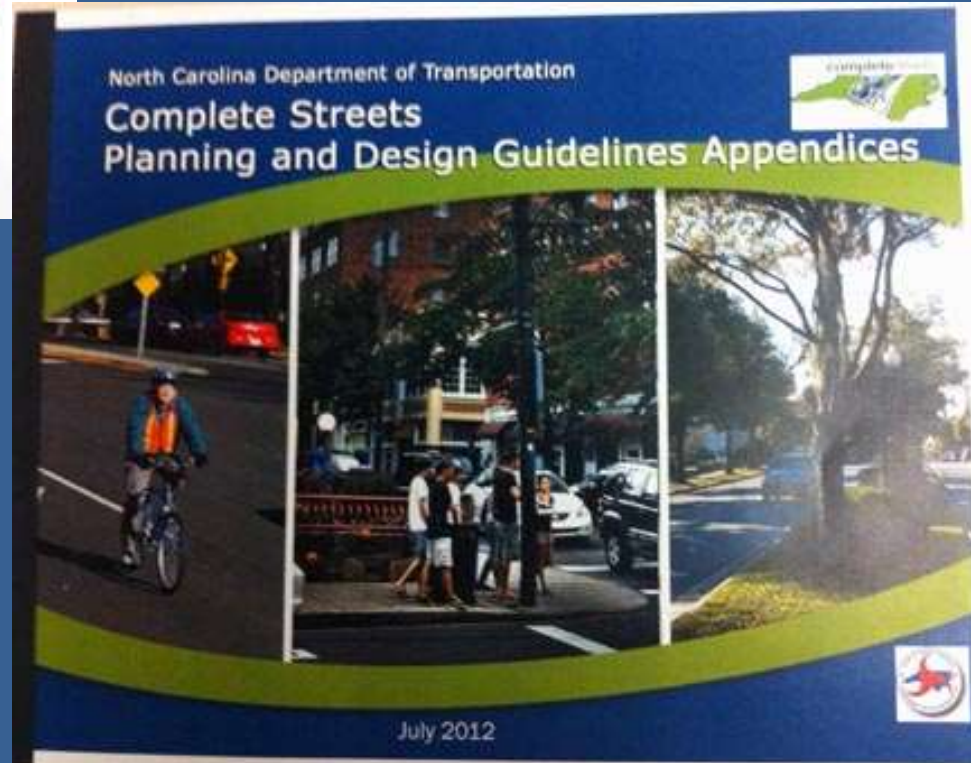


# Further Guidance

- ITE Walkable Thoroughfares (2010)
- NACTO Urban Bikeway Design Guide (2012)
- NACTO Urban Street Design Guide (2013)



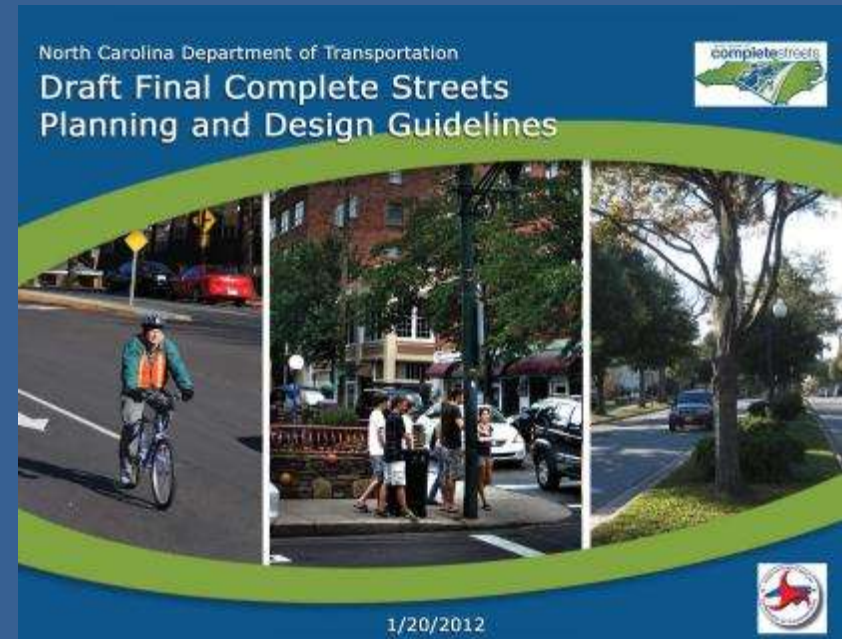
# And More Guidance...



# State Guidelines

## North Carolina

- Complete Streets Policy adopted 2009
- Immediately launched context-specific CS Design Guidelines
- Guidelines finalized 2012

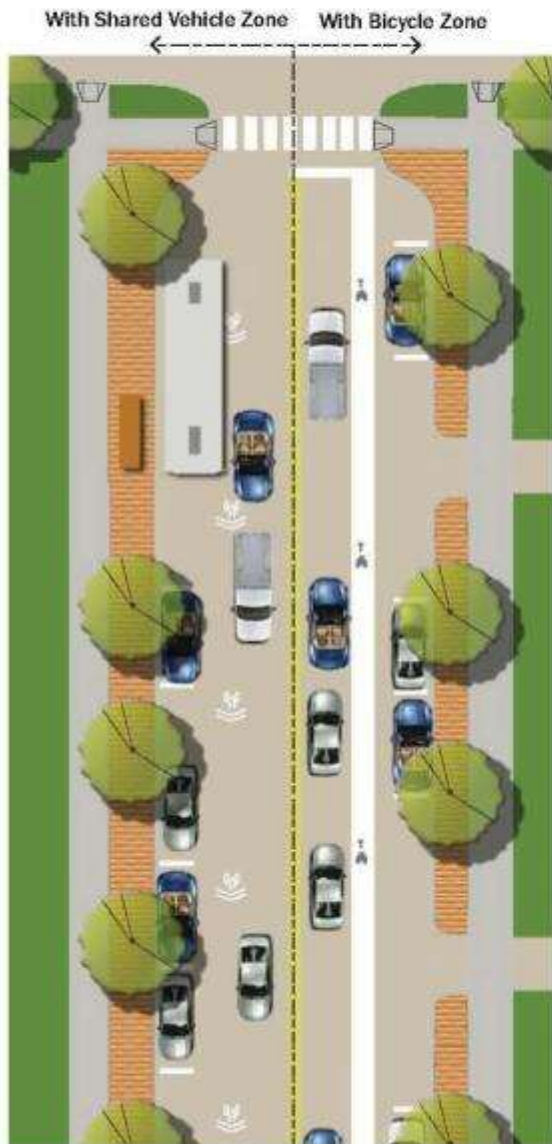


***Result: CS on state routes where contextually appropriate***



# URBAN/SUBURBAN MAIN STREET

## PLAN VIEW



## KEY ELEMENTS

- May function as an arterial, collector or local street. May function as a collector serving as a primary thoroughfare for traffic circulation in a limited area. May function as a local street for an outlying business district.
- Designed to carry vehicles at low speeds.
- A destination street for a city or town, serving as a center of civic, social and commercial activity.
- Serves substantial pedestrian traffic as well as transit and bicycles.
- Characterized by wide sidewalks, crosswalks and pedestrian amenities, due to emphasis on pedestrian travel.
- Bicycle lanes are allowed but typically not necessary on these streets due to lower speeds and volumes and the desire to keep pedestrian crossing distances to a minimum.

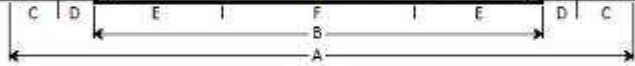


## STREET CROSS-SECTION ZONES

- **Sidewalk Zone:** The pedestrian walk area is of sufficient width to allow pedestrians to walk safely and comfortably. Pedestrians are the priority on a main street.
- **Green Zone:** Consists of the area between the sidewalk zone and curb. Includes street trees and other landscaping, as well as interspersed street furnishings and pedestrian-scale lighting in a hardscaped amenity zone.
- **Parking/Transit Zone:** Accommodates on-street parking and transit stops. Width and layout may vary.
- **Bicycle Zone:** A zone for bicyclists separate from vehicular traffic.
- **Motor Vehicle / Shared Vehicle Zone:** The primary travel way for vehicles. A shared vehicle zone has mixed traffic (cars, trucks, buses and bicycles).
- **Development Zone:** Development should be pedestrian-oriented with narrow setbacks and an active street environment.

# UDO & Design Manual – Raleigh, NC

## E. Main Street, Angle Parking



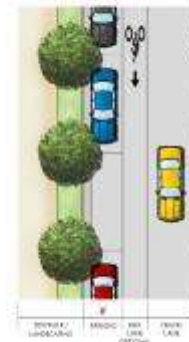
	Mixed Use	Residential
<b>Width</b>		
A Right-of-way width	102'	94'
B Clear width	60'	60'
<b>Streetscape</b>		
C Sidewalk (min)	15'	11'
D Planting area (min)	6'	6'
<b>Travelway</b>		
E Parking lane	18'	18'
F Travel lanes	24'	24'
<b>General</b>		
Street type	2-lane collector	2-lane collector
Walkway type	Sidewalk	Sidewalk
Planting type	Tree grate	Tree grate / lawn
Tree spacing	30' o.c. avg	30' o.c. avg
Parking type	Angle on 2 sides	Angle on 2 sides

### PARALLEL PARKING OPTIONS

#### RESIDENTIAL STREET



#### COMMERCIAL STREET

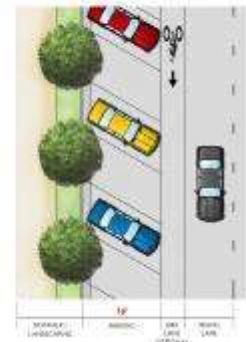


### ANGLED PARKING OPTIONS

#### HEAD IN PARKING



#### BACK IN PARKING





# Great Streets, but how do we pay for them?

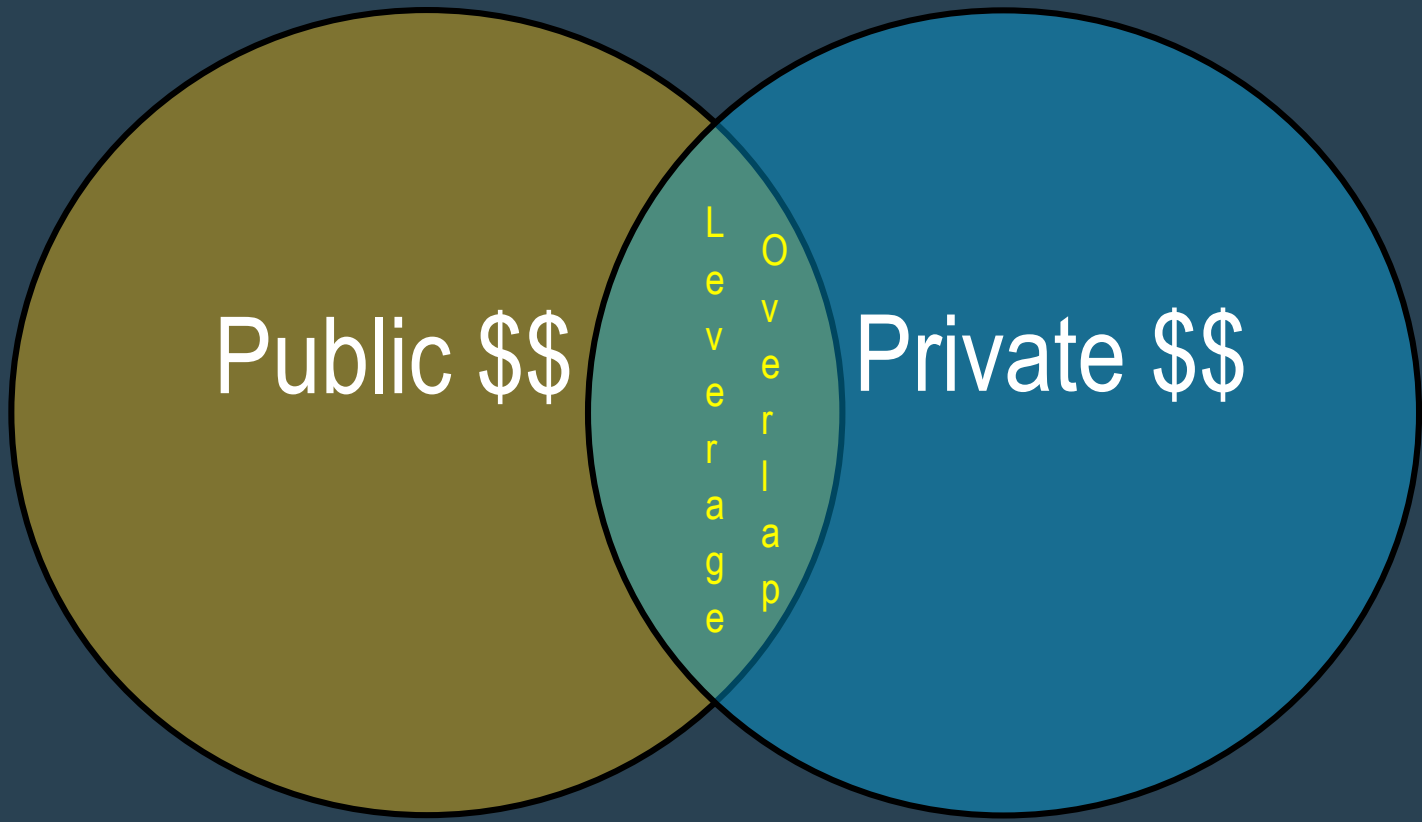


# The OPM Funding Method

Other

People's

Money



Public \$\$

L  
e  
v  
e  
r  
a  
g  
e

Private \$\$



# Funding: Key Points

- Municipalities can partner with other groups
- Leverage funding and completed work
  - Diverse and complimentary fund sources
  - Partnerships: NFP, NGO's, Corporate, Private
  - Phasing/staging/breakdown of projects
- Be innovative—Leverage/match earmarks, brownfields grants, etc.
- Develop planning ahead of time to be on ball when funding sources come available
- May receive less than requested—initially

# So you have a plan...now what?



Main Street/US 64 Downtown Streetscape - COMPLETED



El Paso Avenue Complete Street - COMPLETED

Build it? Not so fast...





# Pitfalls AFTER Planning: The Usual Suspects

- Doesn't conform to local/state standards
- Community resistance
- Agency resistance (especially with respect to motorized traffic performance)
- Constructability issues
- Funding constraints (including cost escalation)

# Memphis, TN – The Hampline



# Jumpstarted with Tactical Urbanism

A **New** Face  
for an **Old** Broad  
November 19 & 20 | Broad Avenue Arts District



<http://vimeo.com/22106488>



# Arts District – Broad Avenue



# Tillman Street



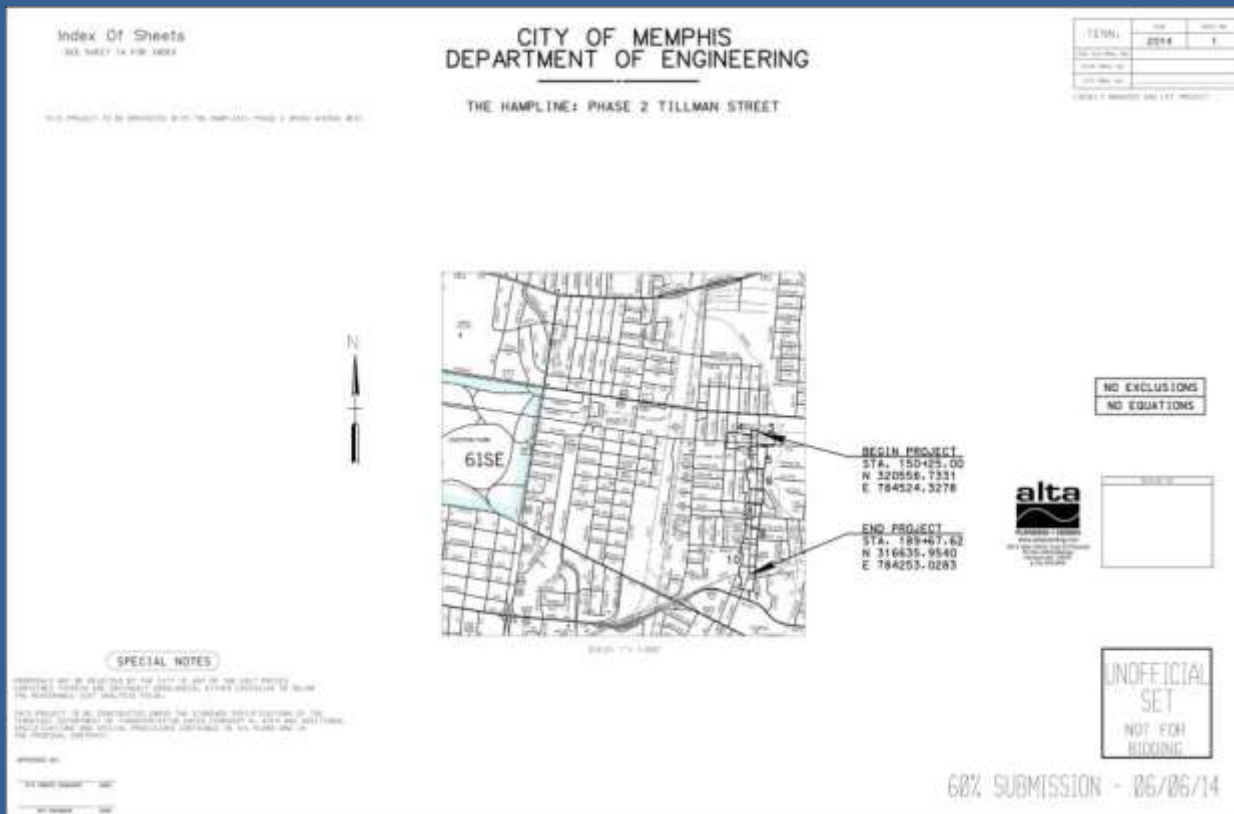


# Challenges

- Funding (or lack thereof)
  - Solution – Crowdsource and foundation match paid for design; CMAQ grant paid for construction



# Design



# Challenges

- Funding (or lack thereof)
  - Solution – Crowdsource and foundation match paid for design; CMAQ grant paid for construction
- City engineering and state DOT didn't understand project
  - City has been brought along thru education and is now partner in advocating to TDOT

# Hampline – segment opened Fall 2015





# Payoffs – Broad Avenue Corridor

\$20+ million  
in properties purchased, built  
and/or renovated, completed  
and/or planned

## New Businesses

bringing retail,  
bars/restaurants,  
medical/dental, spiritual and  
related services



30  
New  
Businesses



40,000+  
Art Walk  
Visitors



29 Significant  
Property  
Build/  
Renovations

(including 17  
blighted  
locations)



5  
Public Art  
Installations

Revitalizing a Neighborhood

PLUS Overton Park Conservancy and  
Shelby Farms Greenline

# Water Tower Pavilion

## ArtPlace America Grant Winner

- Water Tower becomes beacon
- Street and loading dock area are knitted together via terraced seating
- 500 foot linear park developed
- Community-based programming delivered



# Chattanooga, TN – Broad Street







# Challenges

- Funding didn't cover ultimate vision
  - Solution: Construct interim phase that could be retrofit later



# Broad Street – Open Late 2015







BEN FOLDS  
Y MUSIC  
NOV 6 8PM

TIVOLI  
ENTERTAINMENT  
HALL OF THE WEST

BEN FOLDS  
Y MUSIC

Ben Folds  
Y Music



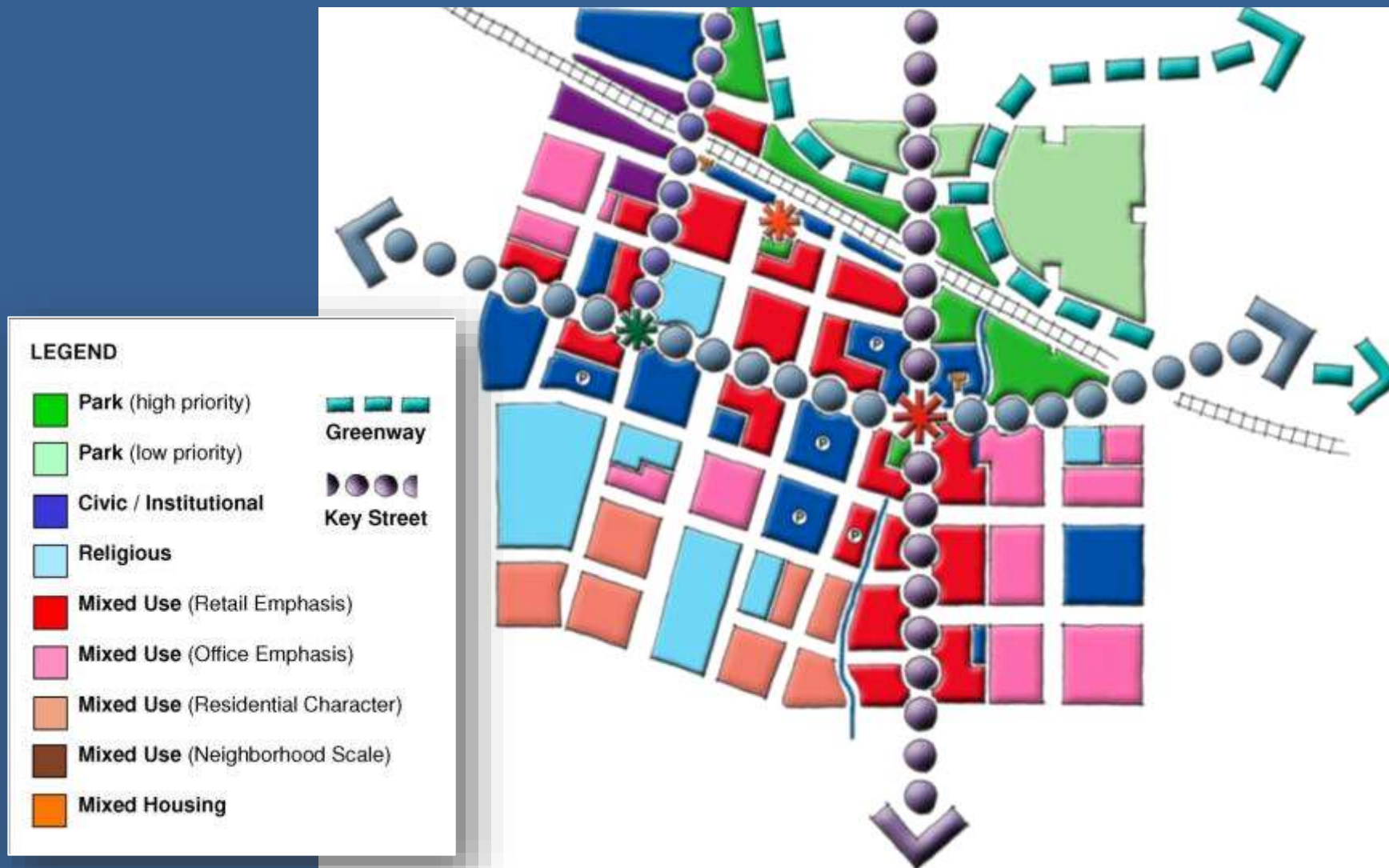




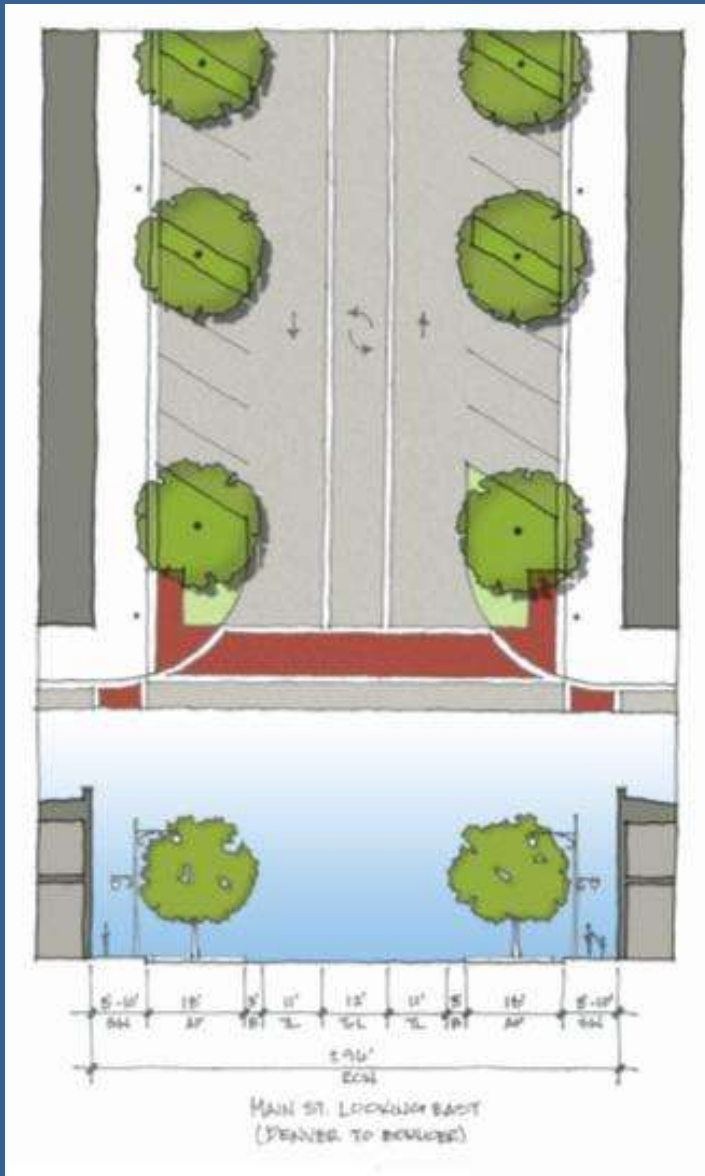




# Russellville (AR) Downtown Master Plan (2011)



# Main Street/US 64 Initiative



# Challenges

- Construction issues with soils
  - Solution: retrofit base material for crosswalks post-construction



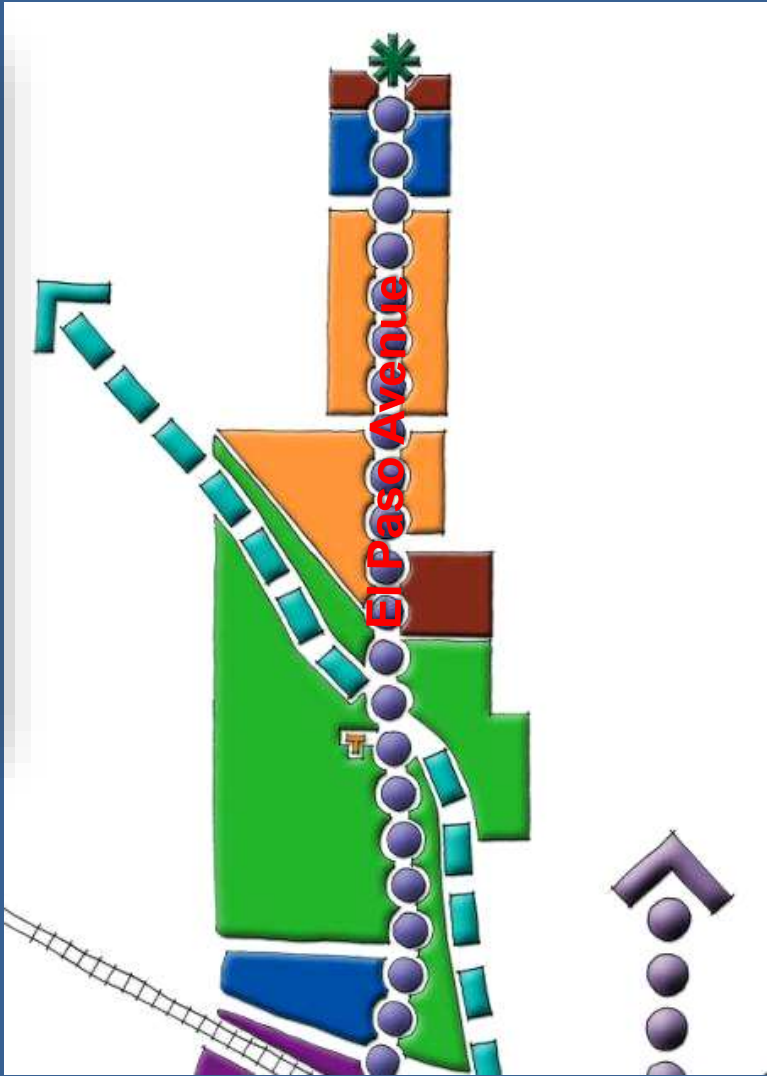
# Main Street Bulbouts



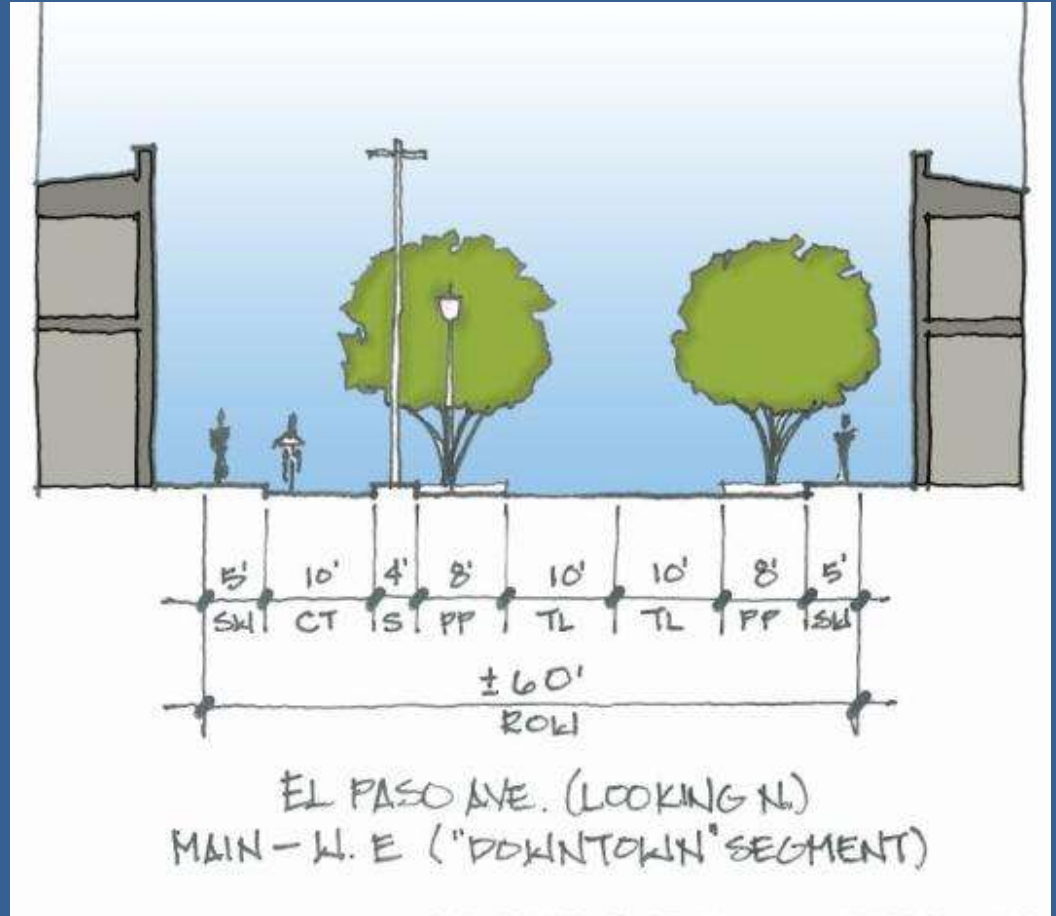
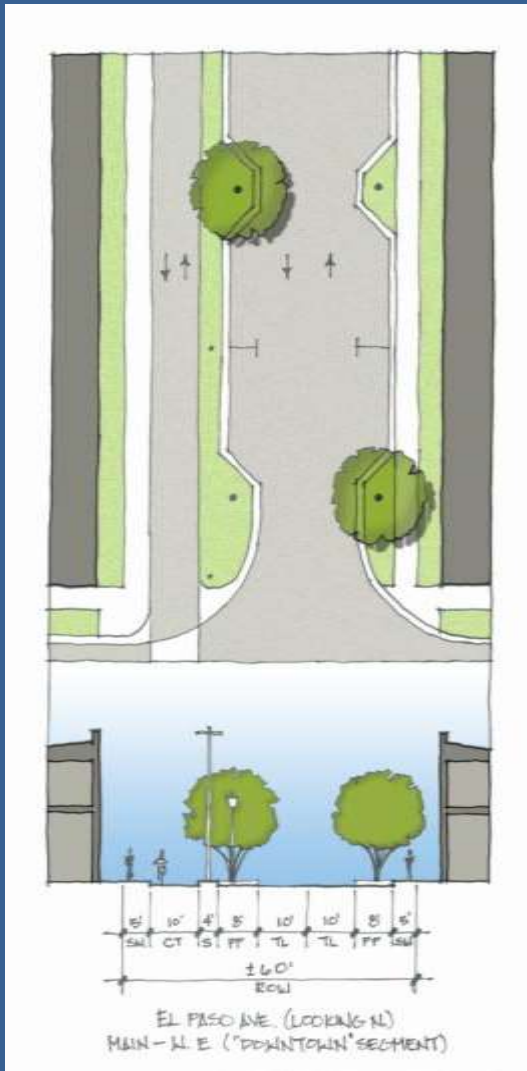
# El Paso Corridor – Master Plan

**LEGEND**

 Park (high priority)	 Greenway
 Park (low priority)	 Key Street
 Civic / Institutional	
 Religious	
 Mixed Use (Retail Emphasis)	
 Mixed Use (Office Emphasis)	
 Mixed Use (Residential Character)	
 Mixed Use (Neighborhood Scale)	
 Mixed Housing	



# Charrette Concept

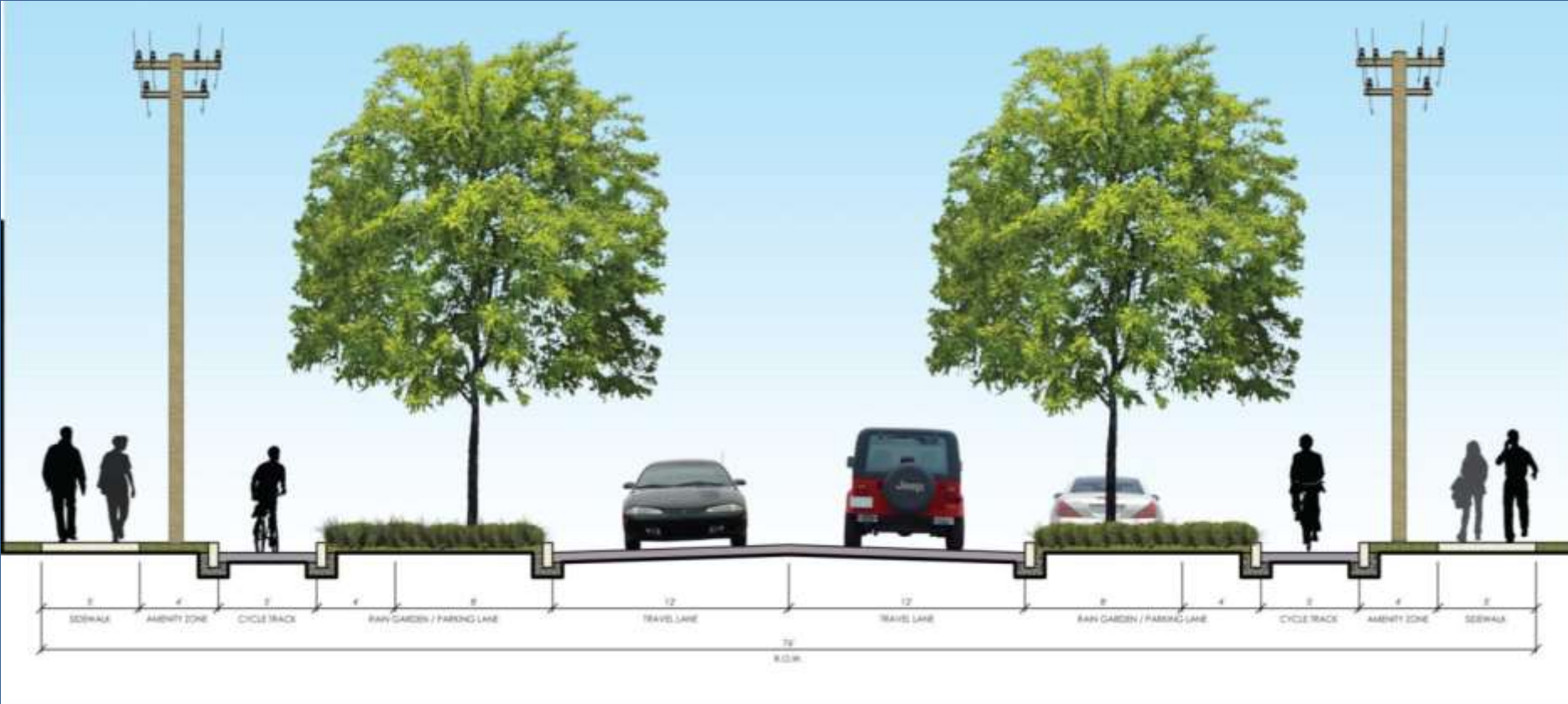




# Challenges

- Construction issues with soils
  - Solution: retrofit base material for paver crosswalks post-construction
- Discovered massive concrete slab under roadway (former state highway)
  - Solution: Modify design concept to keep centerline in place to avoid significant demolition

# El Paso Corridor – Refined Concept



One Way Cycle Track

# Design (Fall 2012-Spring 2013)





# Construction (2013- 2014)



Key: progressive City traffic engineer and supportive university (\$)

**“Though El Paso Avenue has its own design, the concept is similar to the H Street and Parker Road project, with vehicle travel lanes, bike lanes, trees, sidewalks and period lighting.**

**“It’s going to be one cool street,” Oakes said... He added that capital road projects such as these are paid for with proceeds from the city’s one-cent sales tax.”**















**RUSSELLVILLE**

Post-construction:

- New businesses along corridor
- New businesses downtown
- Foot and bike traffic
- University pursuing mixed use with housing corridor

# Strategies to Overcome Challenges in Implementation

- Use national guidance; change the rules
- Collaborate with community at all stages
- Quantify impacts; accept congestion
- Tap non-traditional funding; know your contracting community
- Be flexible with design, but respect the vision



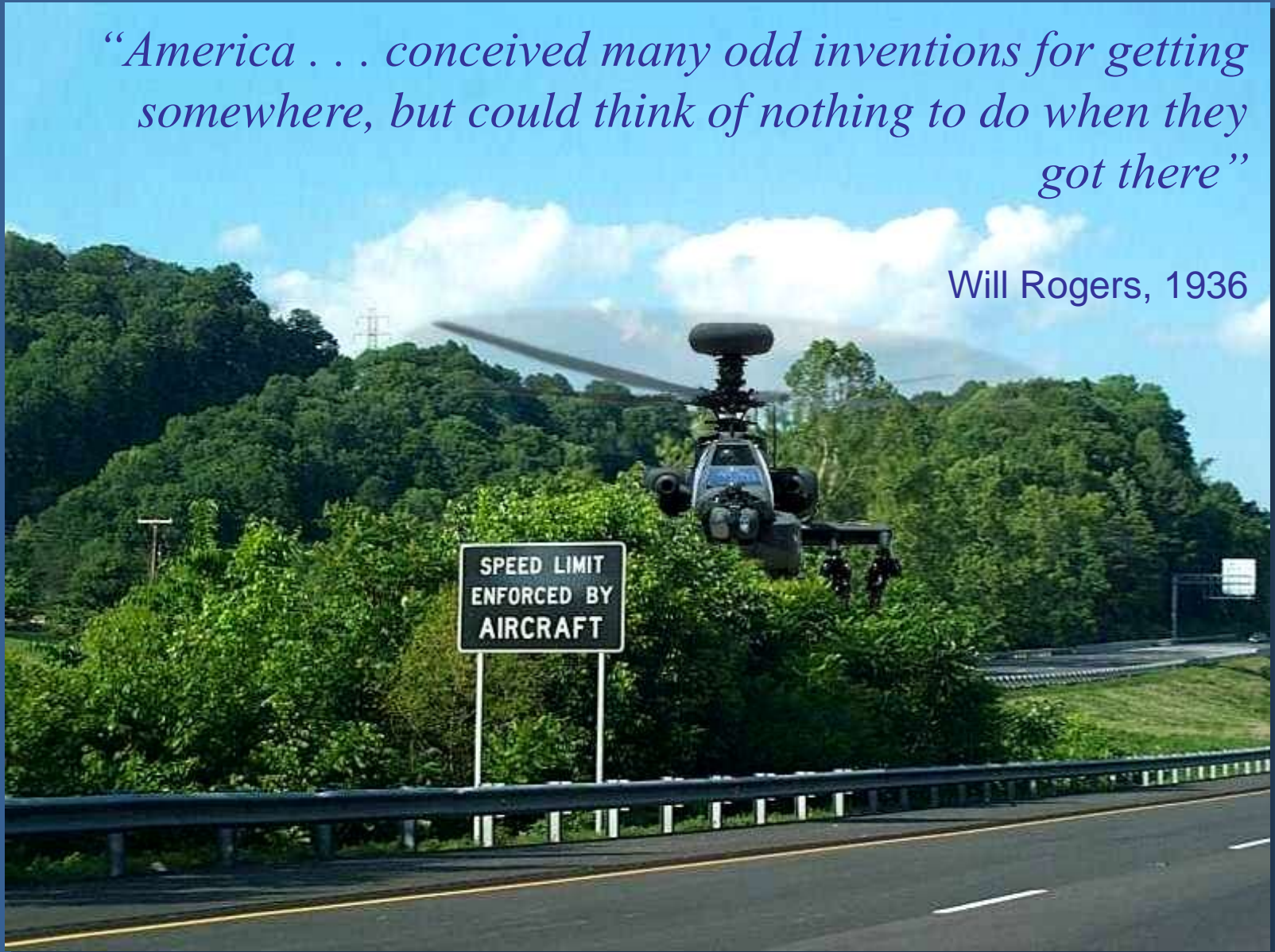
# What YOU Can Do

- Reinforce context sensitive solutions
- Highlight flexibility in standards; compile “best of” for Complete Streets guidelines
- Quantify changing travel trends – no longer “business as usual”
- Compile before and after data

# Thank You!

*“America . . . conceived many odd inventions for getting somewhere, but could think of nothing to do when they got there”*

Will Rogers, 1936



# Anatomy of a Complete Street



**A** Street Trees

**B** Lighting

**C** Furnishings

**D** Materials and Finishes

**E** Landscape Planters

**F** Broad Sidewalks

**G** On-Street Parking

**H** Bicycle Lane

**I** Narrow Travel Lanes

**J** Textured Turn Lanes

**K** Street Presence from Buildings



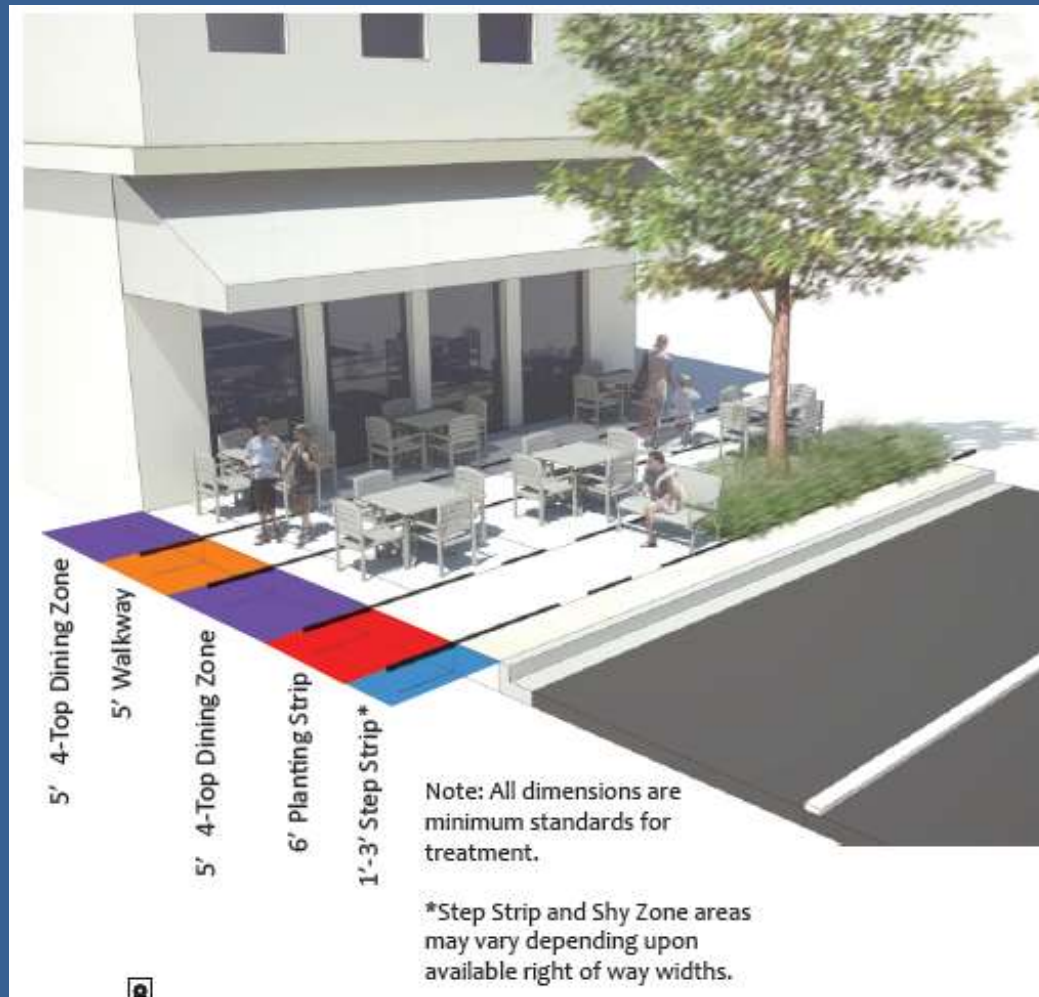
# Think of the space between buildings as an asset



*Photo by Dan Gallagher, Charlotte DOT*

- Parking
  - Parallel
  - Angled (head in/back in)
  - Bicycle
- Wider Sidewalks
- Street Furniture
- Streetscape
- Stormwater
  - Rain Gardens
  - Bioswales
- Bike Facilities
  - Bike lanes
  - Cycle Tracks
  - Multi-use Paths
- Medians
  - Turn lanes
  - Planting opportunities
  - Access Management

# A place beyond the curbs



Sidewalk Zone

# Sidewalk Zone



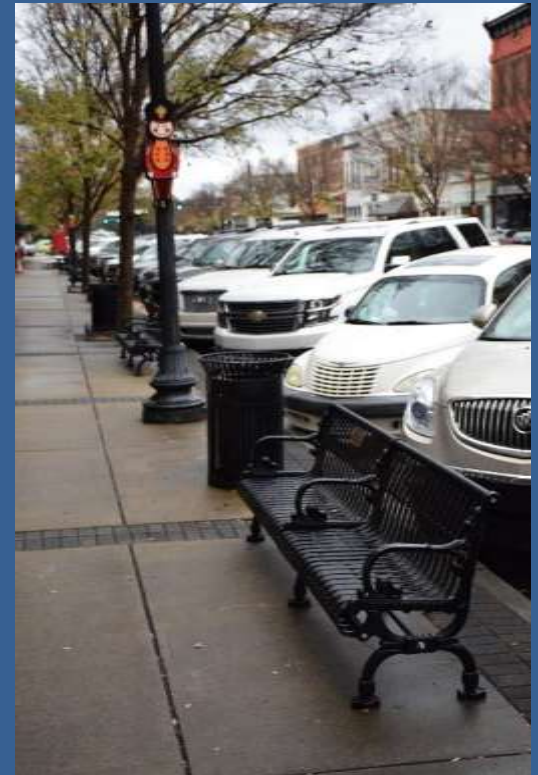


Sidewalk Zone

# Sidewalk Zone

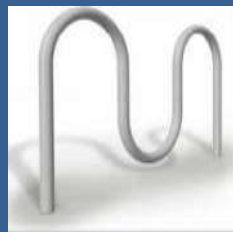
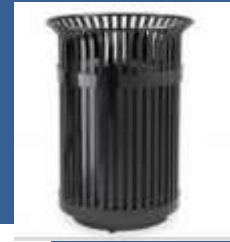
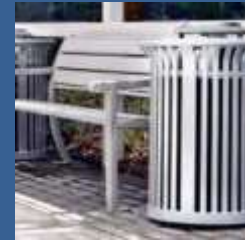


# Sidewalk Zone





# Design Elements: Furnishings





# Design Elements: Pavement



# Design Elements: Lighting





# Design Elements: Plant Materials

