

# Some Thoughts about

# Non-Motorized Transportation

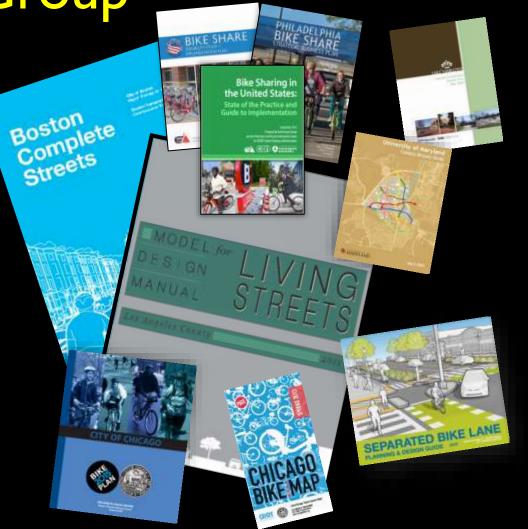




Toole Design Group

- Engineers
- Planners
- Landscape Architects
- Authors





## **AASHTO Bike Guide**

- Draft 1 complete (NCHRP 15-60): May 2018
- AASHTO Active Transportation Committee Review: Summer 2018
- Draft 2 complete: Fall 2018
- Other AASHTO Committees Review: Winter 2018/2019
- Draft 3 complete: Spring 2019
- State Balloting: Summer 2019
- Publication: Spring 2020

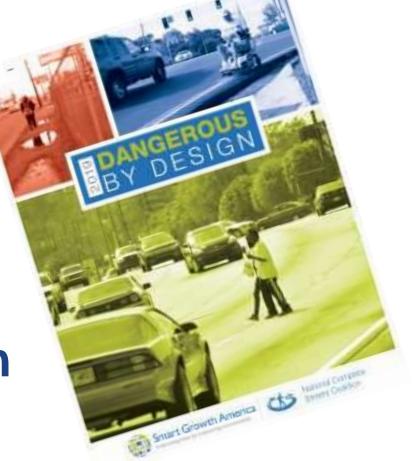


## Understanding the Scale of the Problem in Florida



8 of the top 10

most dangerous metro areas for pedestrians in the U.S.A. are located in Florida

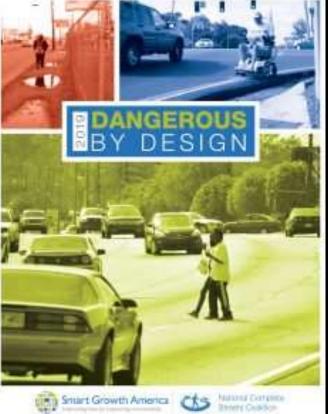




2019 Rank <b>‡</b>	Metro Area		Pedestrian Deaths 2008-2017)	•	Annual Pedestrian Fatalities per 100,000 People	*	2019 Pedestrian Danger Index
1	Orlando-Kissimmee-Sanford, FL	6	556		2.82		313.3
2	Deltona-Daytona Beach-Ormond Beach, FL	2	212		3.45		265.4
3	Palm Bay-Melbourne-Titusville, FL	1	165		2.94		245.0
4	North Port-Sarasota-Bradenton, FL	1	194		2.58		234.6
5	Lakeland-Winter Haven, FL	1	162		2.54		230.9
6	Jacksonville, FL	4	419		2.94		226.2
Ž	Bakersfield, CA	2	247		2.83		217.7
8	Cape Coral-Fort Myers, FL	1	148		2.17		217.0
9	Tampa-St. Petersburg-Clearwater, FL	9	900		3.07		204.7
10	Jackson, MS	1	111		1.92		192.0
11	Memphis, TN-MS-AR	2	297		2.21		184.2
12	Baton Rouge, LA	1	182		2.21		157.9
13	Birmingham-Hoover, AL	1	179		1.57		157.0
14	Miami-Fort Lauderdale-West Palm Beach, FL	1	1,549		2.61		153.5
15	Greenville-Anderson-Mauldin, SC	1	197		2.29		152.7
16	McAllen-Edinburg-Mission, TX	1	140		1.69		140.8
17	Albuquerque, NM	2	213		2.35		138.2
18	Detroit-Warren-Dearborn, MI	7	757		1.76		135.4
19	Little Rock-North Little Rock-Conway, AR	1	118		1.62		135.0
20	Augusta-Richmond County, GA-SC	1	126		2.15		134.4

## **Are Florida Streets**

- Safe?
- Comfortable?
- Inclusive?





Add scores to your site

Type an address, neighborhood or city

Get Scores

Go



## 6001 Destination Parkway

Orlando, Florida, 32819

Commute to Downtown Oak Ridge

€ 13 min # 40 min 34 min 160+ min View Routes

○ Favorite

Ш Мар

Nearby Apartments



#### Car-Dependent

Most errands require a car.



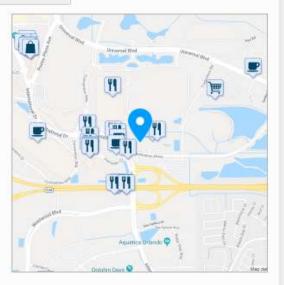
#### Some Transit

A few nearby public transportation options.



Somewhat Bikeable

About your score



About this Location



6001 Destination Parkway has a Walk Score of 30 out of 100. This location is a Car-Dependent neighborhood so most errands require a car.

This location is in Orlando.

#### **Nearby Apartments**



Cumberland Park

1-2 Beds

Walk Score 38



Falcon Square at Independence 1 - 3 Beds Walk Score 9



## The Scale of the Problem in Florida

# 277 pedestrians or bicyclists INJURED 16 pedestrians or bicyclists KILLED

**EACH WEEK** 



## Matts-Åke Belin Swedish Transport Administration

matts-ake.belin@trafikverket.se

Vision Zero a road safety policy innovation

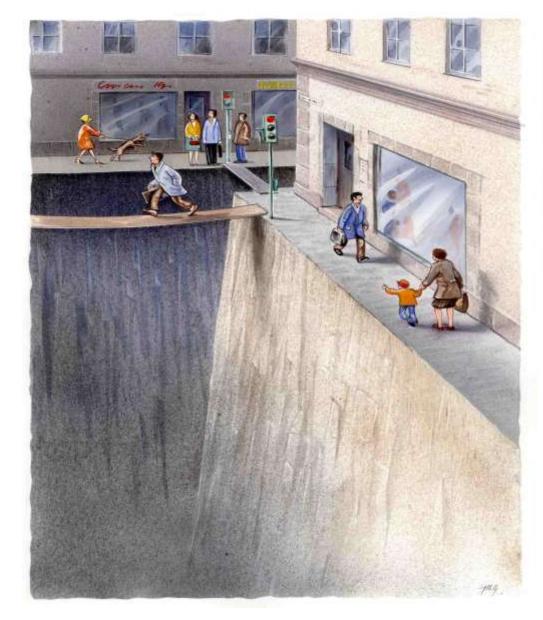
Transforming Transportation



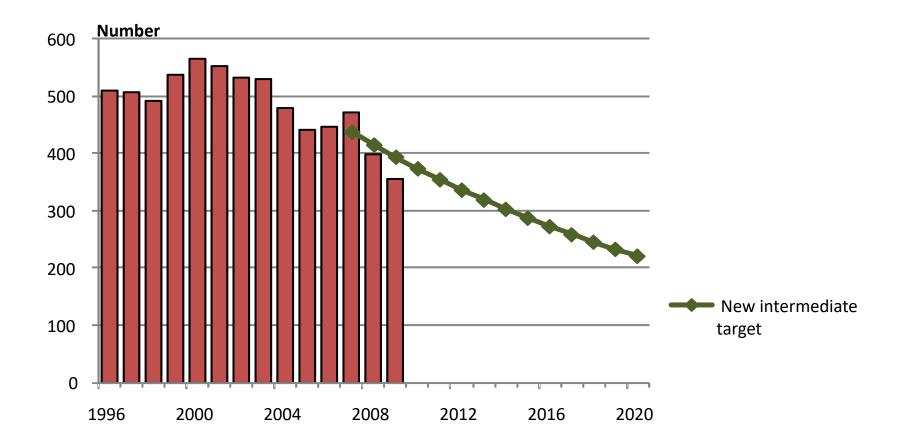
## **VISION ZERO**

- October 1997 the Swedish Parliament passed a new bill on Road Traffic Safety
- the design and functioning of the road transport system must be adapted to the requirements resulting from this ruling.

 long-term goal NO ONE should be killed or seriously injured as the result of an collision within the road transport system







Responsibility: providers & regulators of the road traffic system share responsibility with users.

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**Safety**: road traffic systems should take account of human fallibility & minimize the opportunities for errors & the harm done when they occur.

Responsibility: providers & regulators of the road traffic system share responsibility with users.

**Safety**: road traffic systems should take account of human fallibility & minimize the opportunities for errors & the harm done when they occur.

Mechanisms for change: providers & regulators must do their utmost to guarantee the safety of all citizens; they must cooperate with road users; & all three must be ready to change to achieve safety.

## **VISION ZERO – WHAT IS IT?**

Vision Zero is a systematic strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all.

## **CONVENTIONAL APPROACH**

Traffic deaths are INEVITABLE

**PERFECT** human behavior

Prevent COLLISIONS

**INDIVIDUAL** responsibility

Saving lives is **EXPENSIVE** 

## **VISION ZERO**

Traffic deaths are PREVENTABLE

Integrate HUMAN FAILING in approach

Prevent FATAL AND SEVERE CRASHES

**SYSTEMS** approach

VS

Saving lives is NOT EXPENSIVE



# VISION ZERO CITIES



## FDOT is a Vision Zero organization

## **Vision Zero:**

- Systematic, proactive approach vs. reactive crash evaluations
- Criteria/judgement vs. standards



Substantive Safety
Statistical Safety
(Vision Zero)

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Statistical Safety
(Vision Zero)

Nominal Safety
Legal Safety
(Freedom from Liability,
Standard Practices, Street
Design Guidelines)

Substantive Safety
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Vision

Substantive Safety
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**Normal Inclination** 

Substantive Safety
Statistical Safety
(Vision Zero)

Nominal Safety
Legal Safety
(Freedom from Liability,
Standard Practices, Street
Design Guidelines)

**Encouragement** 

Substantive Safety
Statistical Safety
(Vision Zero)

# State Statute 335.065 (1)(a)

Figure 1 Bicycle and pedestrian ways shall be given full consideration in the planning and development of transportation facilities, including the incorporation of such ways into state, regional, and local transportation plans and programs.

Bicycle and pedestrian ways shall be established in conjunction with the construction, reconstruction, or other change of any state transportation facility, and special emphasis shall be given to projects in or within 1 mile of an urban area.



# FDOT Florida Transportation Plan (FTP)

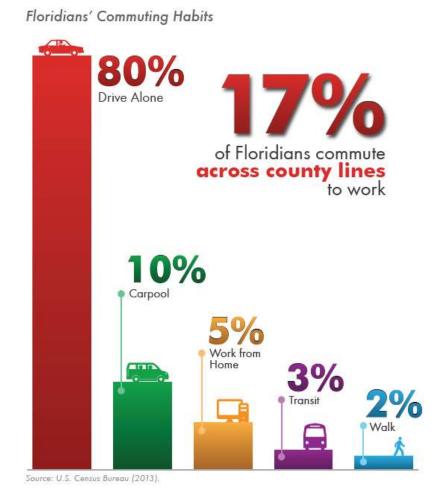


Florida's Health and Wellbeing

3 out 5 inin

Floridians are **overweight or obese**, in part due to limited physical activity

Source: Florida Department of Health (2013).



VISION ELEMENT

AUGUST 2015 FTP SIS

# FDOT's Complete Streets Policy (2014)



## Florida Department of Transportation

RICK SCOTT GOVERNOR

605 Suwannee Street Tallahassee, FL 32399-0450 ANANTH PRASAD, P.E. SECRETARY

POLICY

Office: Design Director
Topic No.: 000-625-017-a

#### COMPLETE STREETS

It is the goal of the Department of Transportation to implement a policy that promotes safety, quality of life, and economic development in Florida. To implement this policy, the Department will routinely plan, design, construct, reconstruct and operate a context-sensitive system of "Complete Streets." While maintaining safety and mobility, Complete Streets shall serve the transportation needs of transportation system users of all ages and abilities, including but not limited to:

Cyclists

Motorists

Transit riders

- Freight handlers
- Pedestrians

The Department specifically recognizes Complete Streets are context-sensitive and require transportation system design that considers local land development patterns and built form. The Department will coordinate with local governments, Metropolitan Planning Organizations, transportation agencies and the public, as needed to provide Complete Streets on the State Highway System, including the Strategic Intermodal System.

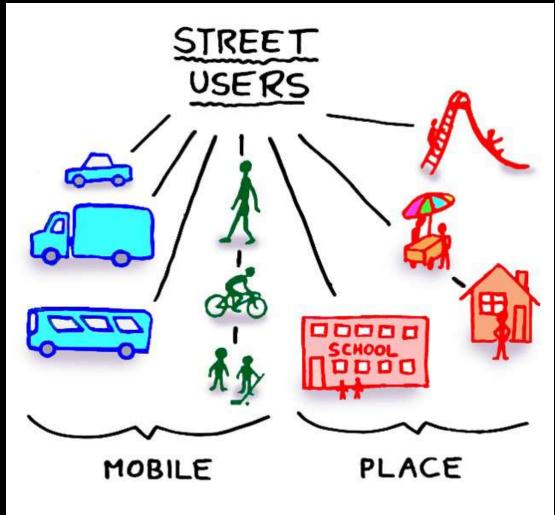
This **Complete Streets Policy** will be integrated into the Department's internal manuals, guidelines and related documents governing the planning, design, construction and operation of transportation facilities.

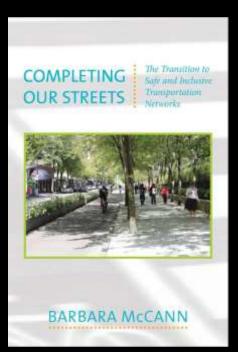
Ananth Prasad, P.E.

Secretary

# **Complete Street:**

a street that is designed to comfortably accommodate those who use the street.







# FDOT's Complete Streets Policy (2014)

Q: What do we do with it?

A: Allow it to provide DIRECTION on planning, designing, & building Complete Streets!



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# FDOT's Complete Streets Policy (2014)

Q: What do we do with it?

A: Allow it to provide DIRECTION on planning, designing, & building Complete Streets!

Q: But Why?



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Secretary

# **FDOT Complete Streets Goals**

Safety ..... best practices, slower speeds,

Quality of Life ...... walkability, health, identity, place,

Economic Development ..... successful land uses, employment, vibrancy,

# FDOT Policy

Plan, design, construct, reconstruct and operate in a context-sensitive system of 'Complete Streets.'

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Plan, design, construct, reconstruct and operate in a context-sensitive system of 'Complete Streets.'

Considering local land development patterns and built form

# FDOT Policy

Plan, design, construct, reconstruct and operate in a context-sensitive system of 'Complete Streets.'

Considering local land development patterns and built form



**C1** Natural

Rural

**C2T**Rural
Town

C3R
ral Suburban
wn Residential

**C3C**Suburban
Commercial

**C4**Urban
General

**C5**Urban
Center

C6 Urban Core

"including the Strategic Intermodal System"

## Why is FDOT interested in Complete Streets?

Mobility needs of

all ages and abilities

including but not limited to:

**Cyclists Motorists Pedestrians Transit Riders Freight Handlers** 

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Mobility needs of

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including but not limited to:

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# Mobility (in the past)

the movement of people & goods

assumption: faster, farther, and in greater numbers means progress for society

# Mobility (now and in the future)

The populations' capabilities and strategies to move in order to access what they need to live within the city.

Many Populations: people who have disabilities, have different income levels, and/or are young, elderly, millennials, pedestrians, cyclists, transit users, students...

# Mobility (now and in the future)

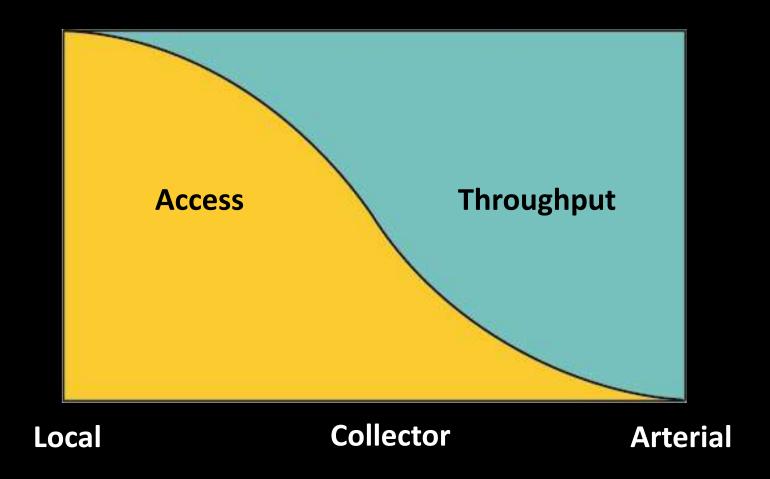
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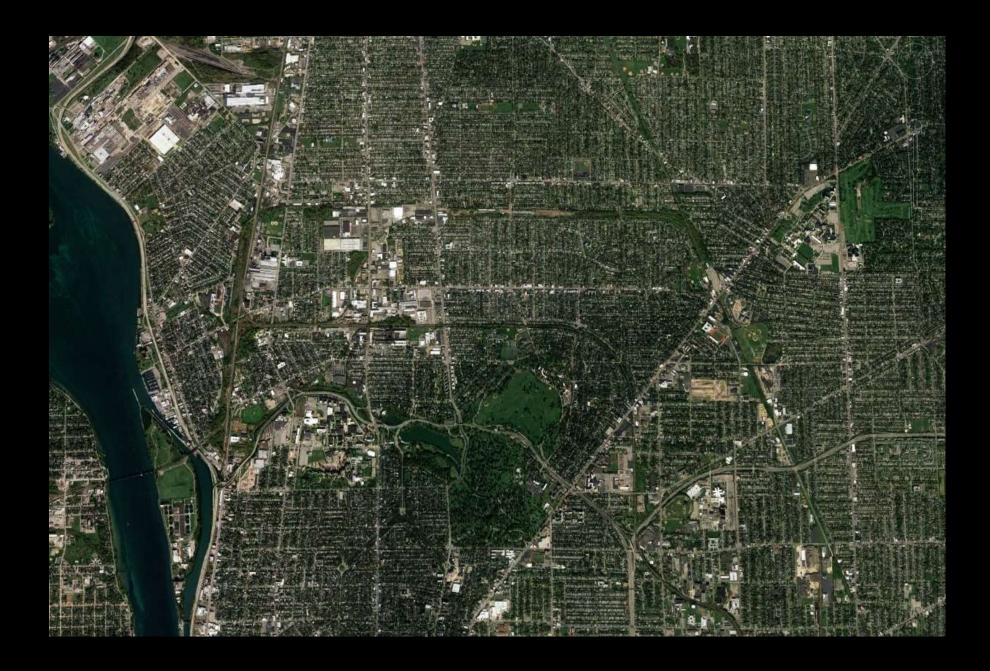
the movement is purposeful:

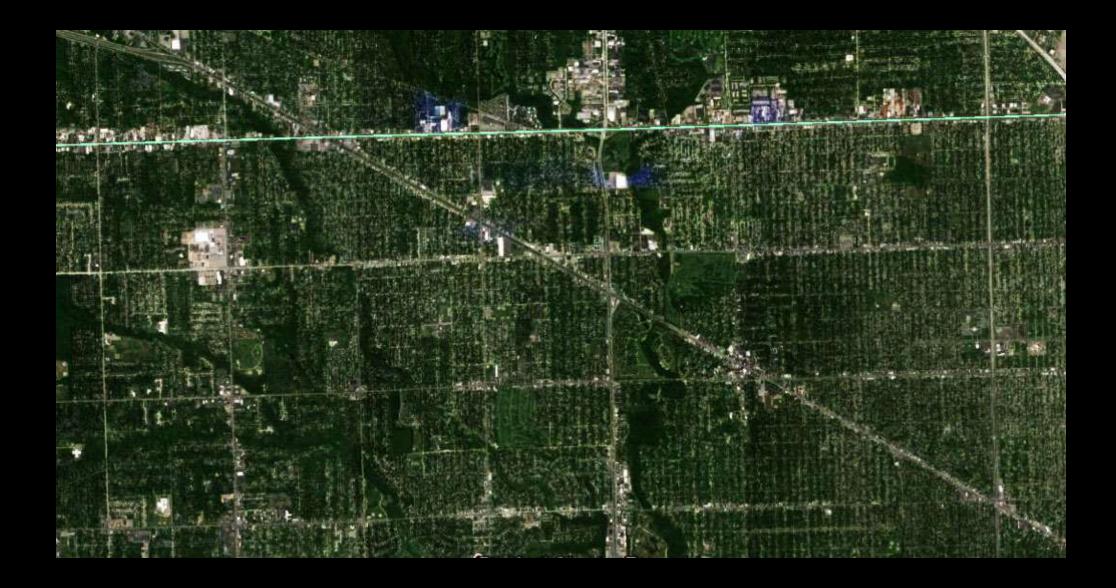
Trip Type	<u>%</u>
work	18.0
work-related	2.6
shopping	20.2
doctor/dentist	1.5
family/personal	24.2
church/school	8.8
social/recreational	24.5
other	0.2

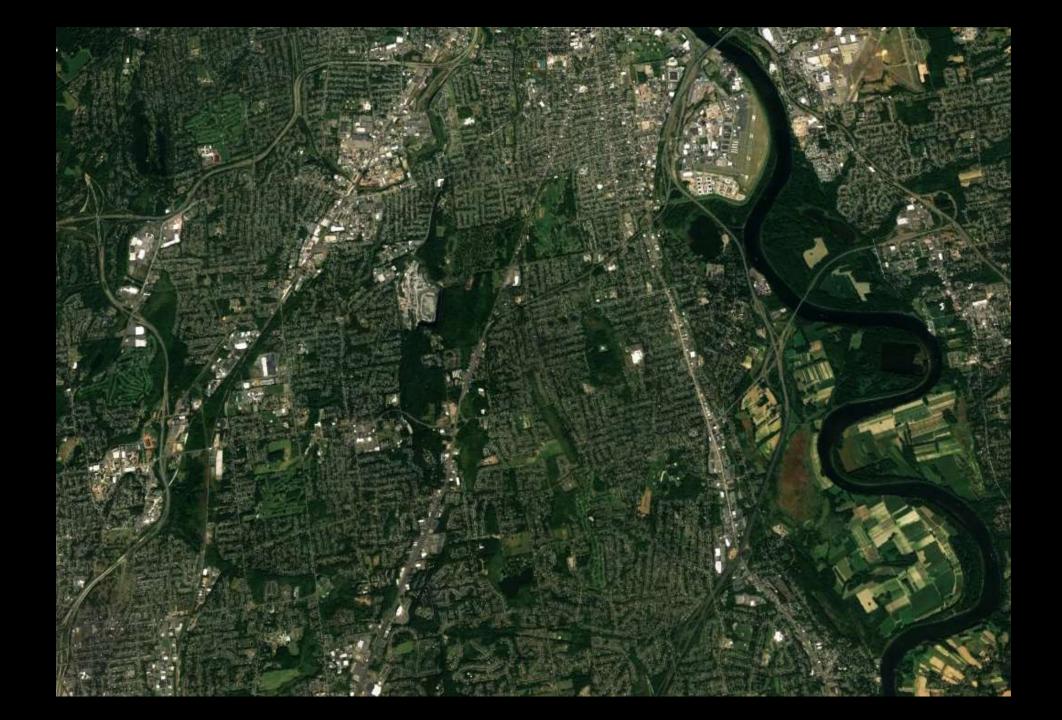


#### **Modern Conception of the Purpose of Streets**

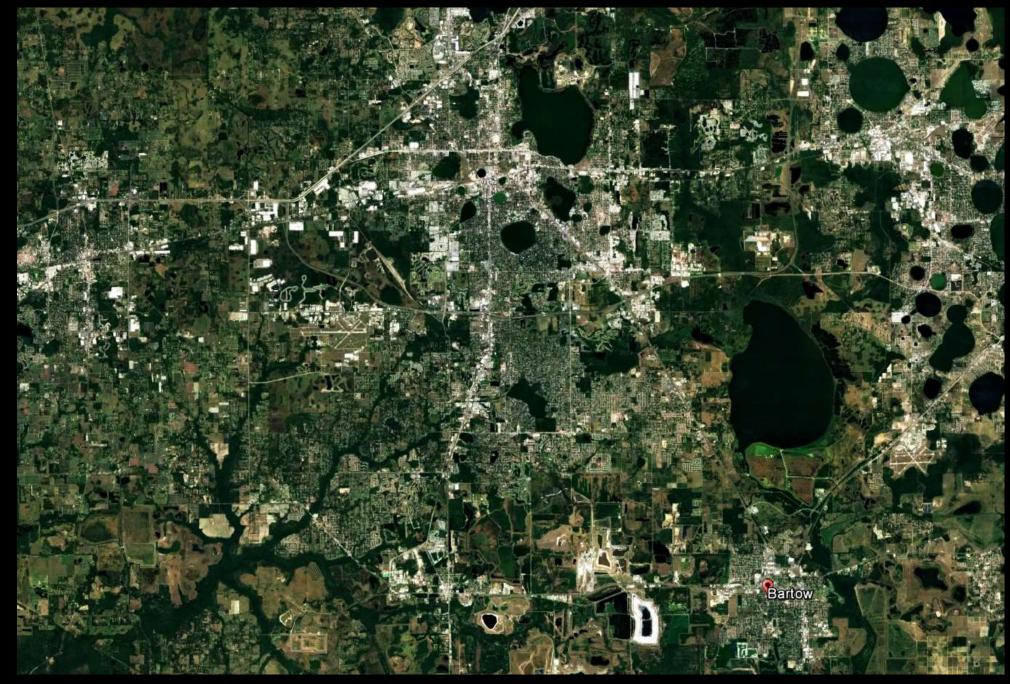




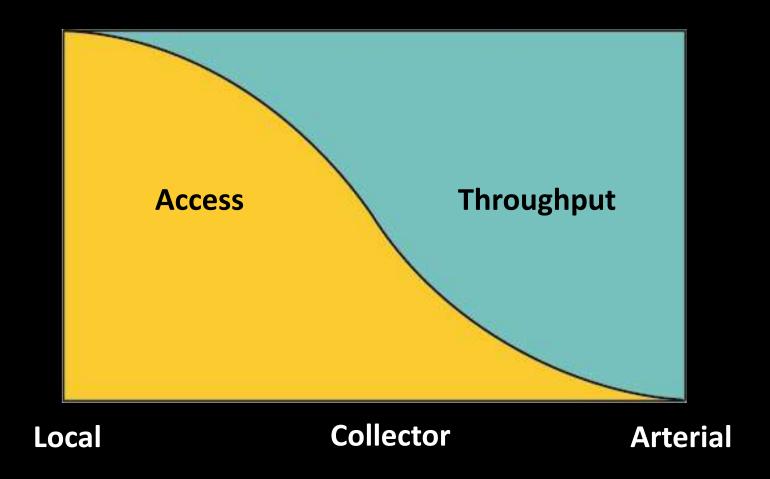






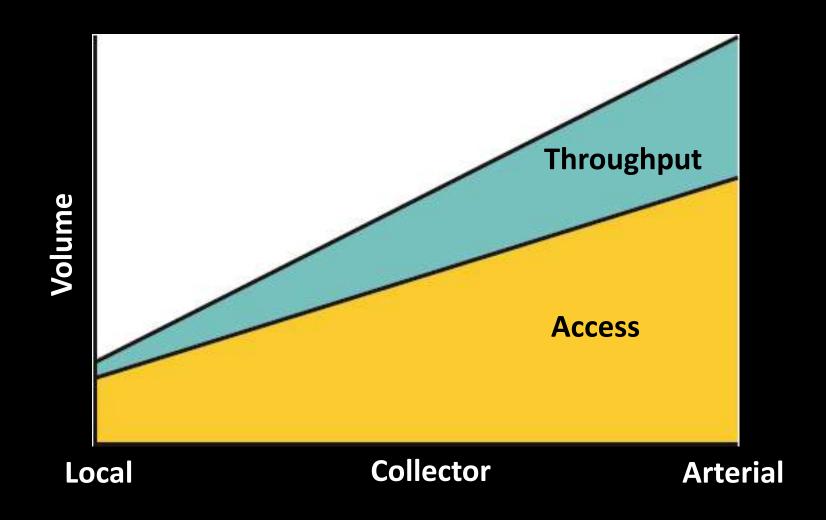


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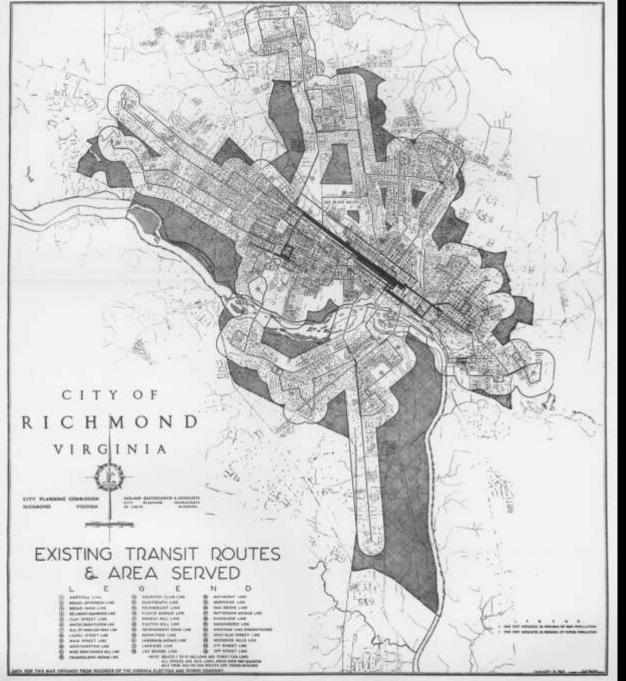


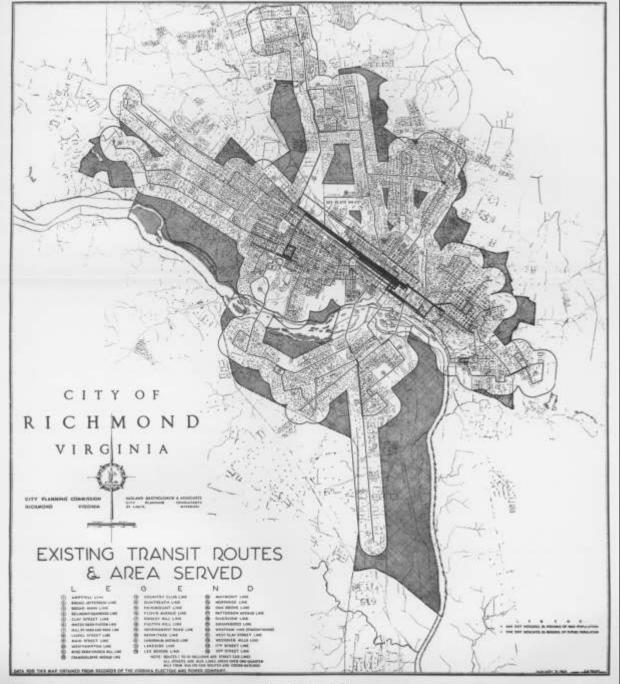


#### **Traditional Conception of Access & Throughput**



Source: Toole Design Group

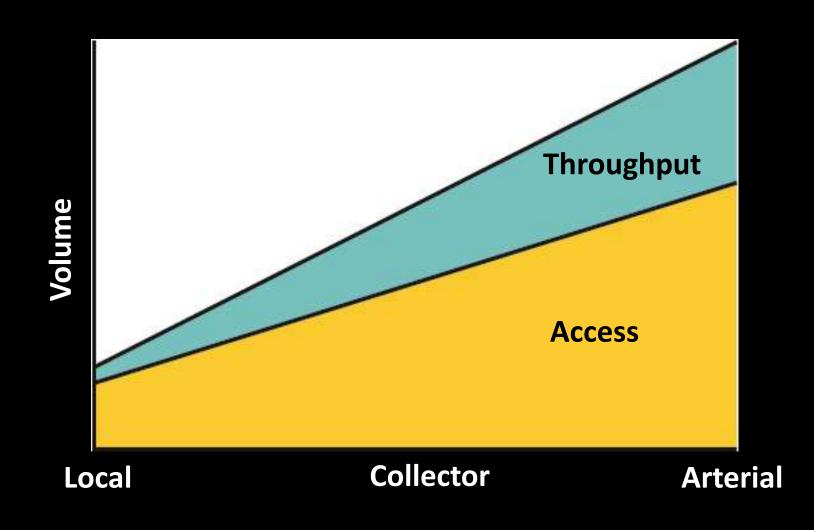








#### **Traditional Conception of Access & Throughput**



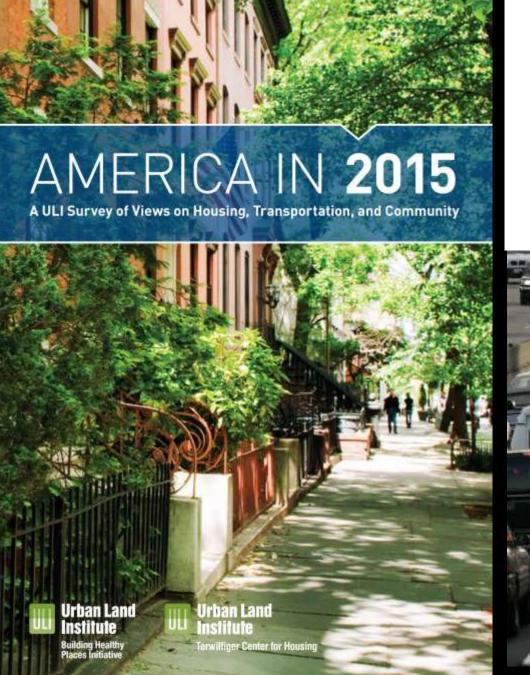


The populations' capabilities and strategies to move in order to access what they need to live within the city.

people who have disabilities, have different income levels, and/or are young, elderly, millennials, pedestrians, cyclists, transit users, students...

# Which street provides more mobility?



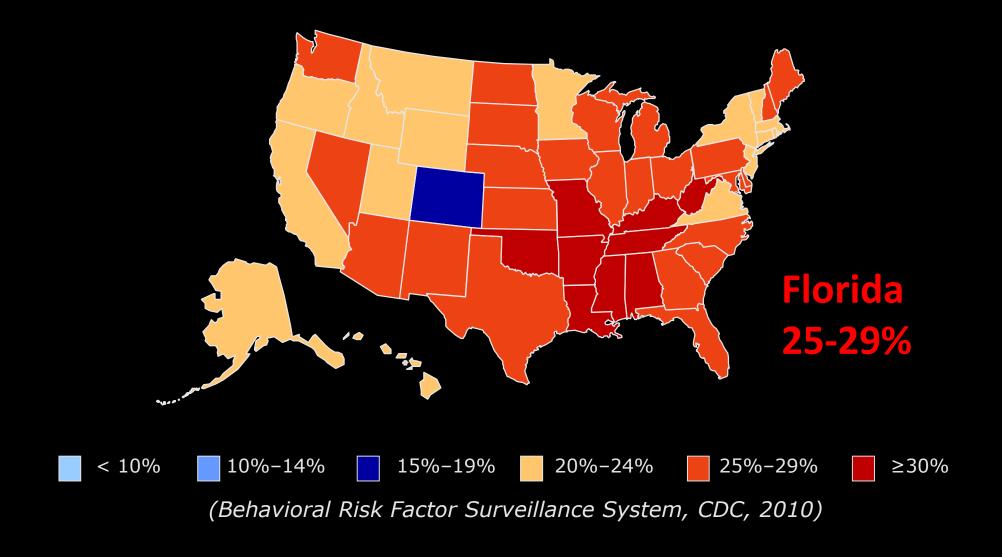


52%

of Americans would like to live in a place where they do not need to use a car very often.

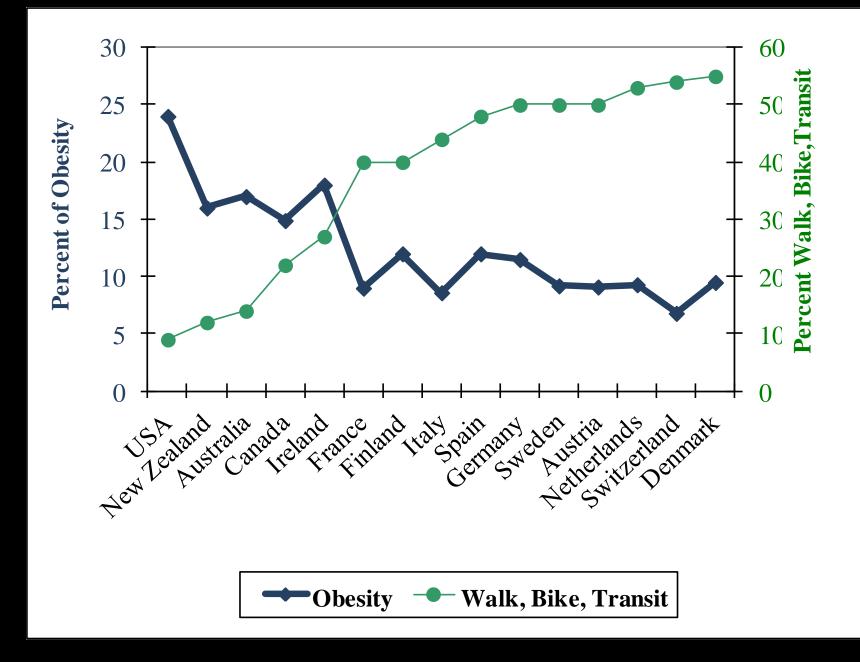


#### Obesity trends among U.S. adults: 2009



#### Health Benefits

Obesity is lower in places where people use bicycles, public transportation, and their feet.



#### Health Benefits of Complete Streets

- Reduced incidence of obesity and diabetes
- Improved cardiovascular health
- Improved mental health
- Reduced risk of cancer
- Improved air quality (benefits to lung health)
- Reduced exposure to unsafe environments for walking and bicycling (fewer crashes)

#### Sustainability – Climate Change

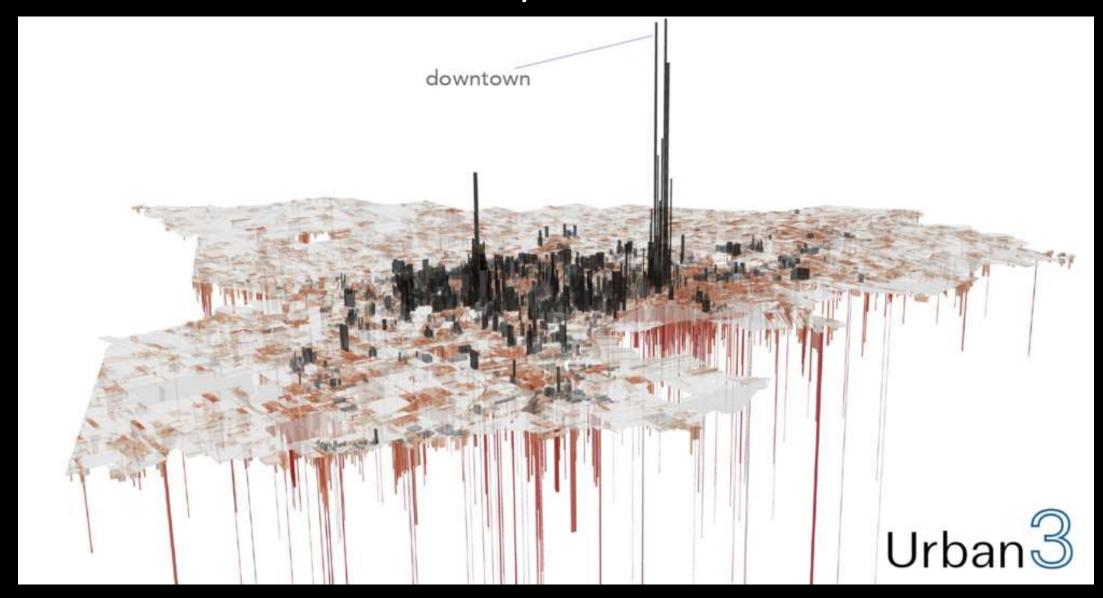


#### Complete Streets and Resilience

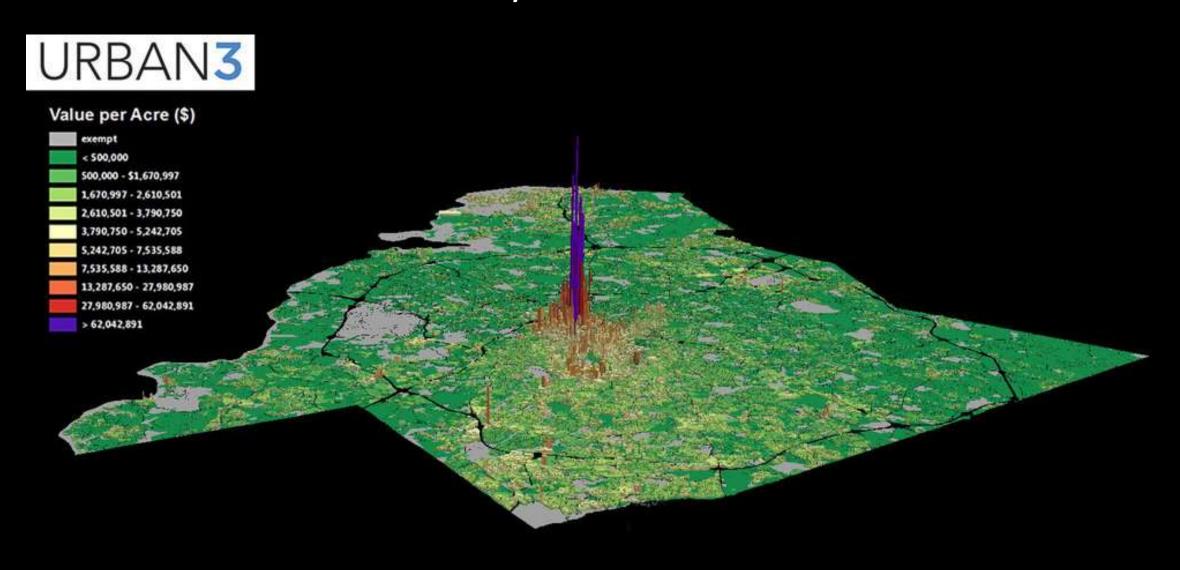


Complete Streets
can create or
maintain mobility
options for people
to meet their
needs when
disaster strikes

## Economic Sustainability & Return of Investment



#### Economic Sustainability & Return of Investment



#### Conventional/Modernist Values

Reward Long Trips

Automobile Focus

Automobile LOS

Speed Important

Single Use Land Use

Dendritic Street Hierarchy

Congestion is Bad

Individually Appealing

Simple (get from A to B quickly)









It's not complicated:



It's not complicated:

Faster is Better

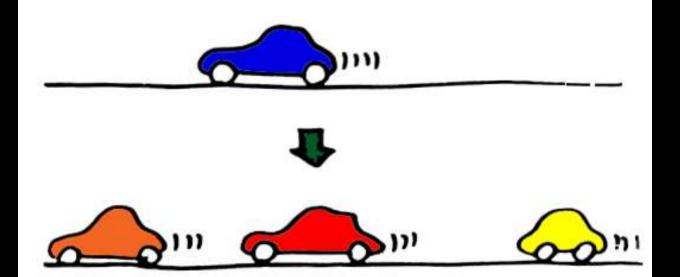


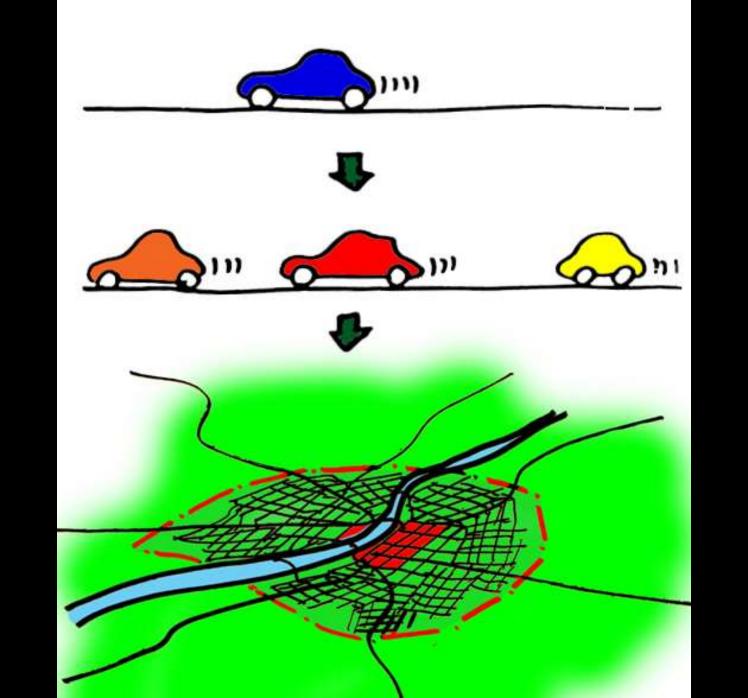
# Tragedy of the Commons

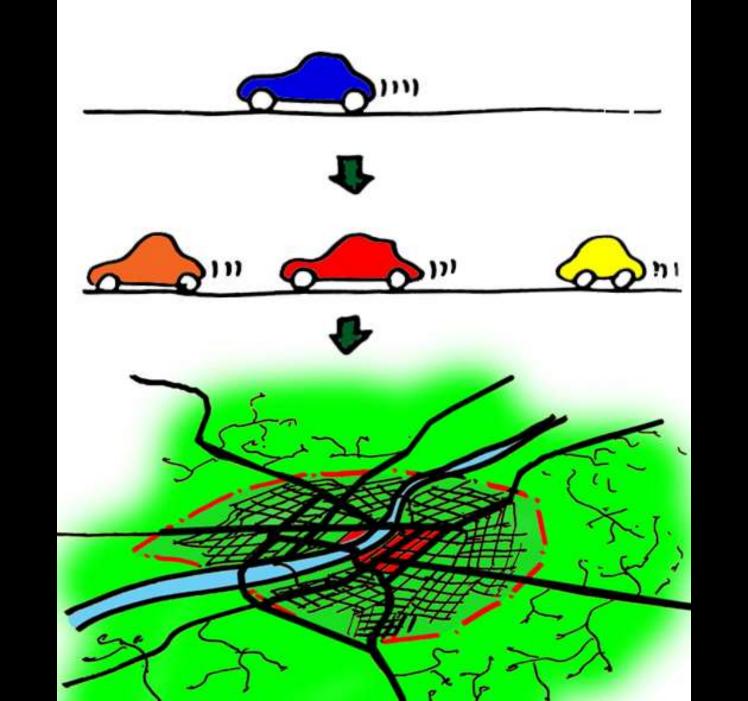




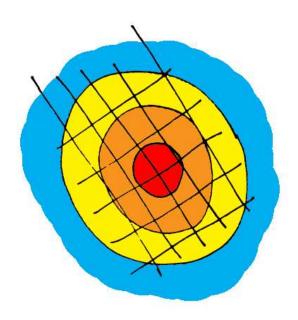




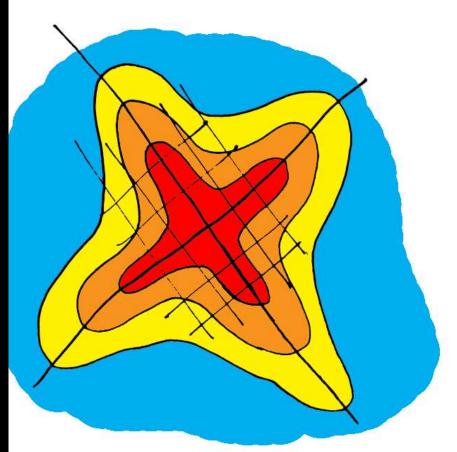


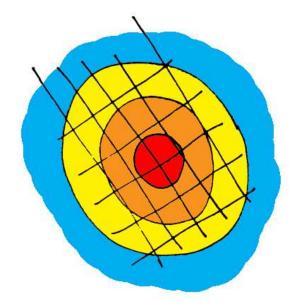






Traditional City
Value = fn (proximity to center)





Traditional City
Value = fn (proximity to center)

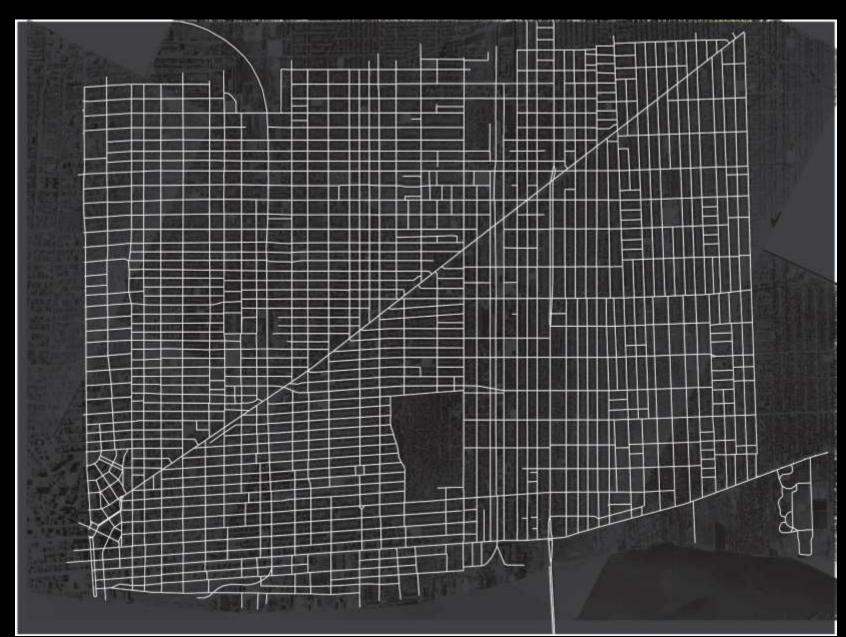
Conventional Theory
Value = fn (travel time to center)

#### Michigan Theater Detroit, MI



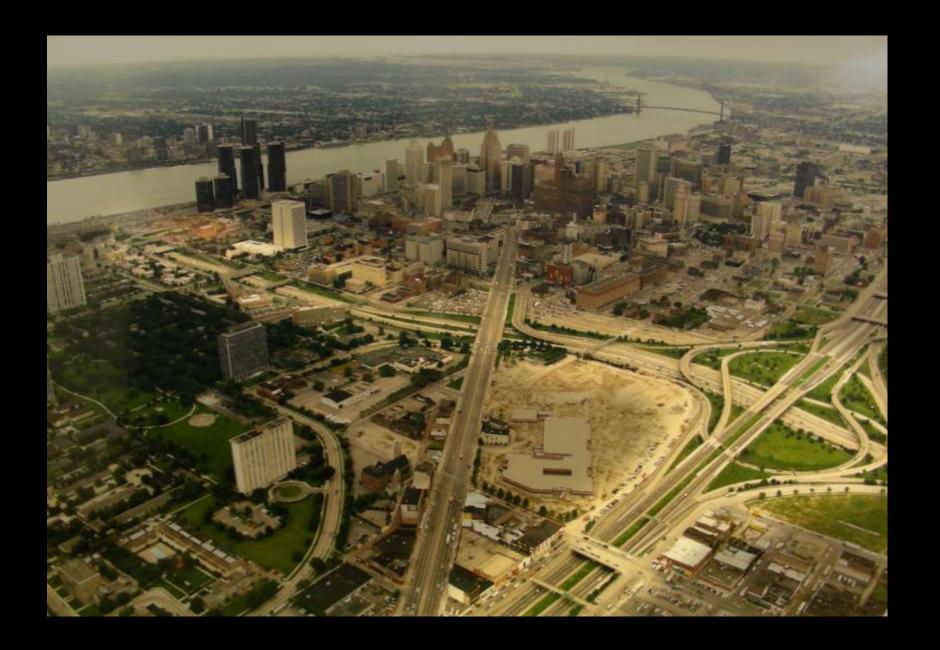


#### **1949 Street Network**



#### **Existing Street Network**









#### Michigan Theater Detroit, MI





















#### Conventional Paradigm

#### **Traditional Paradigm**

#### **Higher Calling**

**Focus** 

**Problem Definition** 

Land Use Relationship Complexity Key Strategies

Capacity of Streets

**Typical Outcomes** 

Transportation Demand Model
Expert Direction
Reward Long Trips
Accommodate Automobiles
Fight Congestion
Increase Speed
Move Traffic
Indifferent
Simple
Add Lanes
Speed Up Streets
Raise LOS

Traffic = fn(Trip Generation)

To Move Traffic

Lack of Identity
Poor Health
Limited Options
More Energy Use
Car Dependency/Congestion
Less Vibrancy

Community Vision

Public Good

Reward Short Trips

Accommodate Many Users

**Advance Priorities** 

Make Places

Increase Proximities

Integrated

Multi-Layered

**Shorten Trips** 

Safe Speeds

Increase Access

Traffic = fn(Multiple Factors)

Nurture Businesses

**Increase Social Interaction** 

Add Character

Strong Identity

Better Health

More Options

Less Energy Use

Choices

More Vibrancy

# Complete Street:

a street that is designed to comfortably accommodate those who use the street.



# **Encouraging Trends**

### **State DOTs leading roles:**

Texas: new design manual

- Minnesota: design manual, school zones, ped & bike

- California: ped and bike plans in all 12 Districts

#### **Professional Organizations:**

- ITE
- CNU
- AASHTO

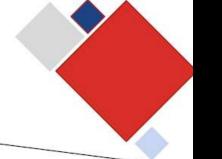


"Traffic Calming is the combination of mainly physical measures that:

- reduce the negative effects of motor vehicle use;
- ii) alter driver behavior; and
  - ii) improve the conditions for non-motorized street users."

	Traffic Calming Classification		Framework Street			Framework Street or Non- Framework Street		Non- Frame- work Street		Traffic Calming	ı Classification	Framework Street		Framework Street or Non- Framework Street		Non- Frame- work Street
Conventional Street Classification  Posted/Design/Target/Operating Speed (mph)  Transition Zone from/to higher speed environment			28	Regional Boulevard	Community Boulevard	Community	Neighborhood Avenue	Local Street	Horizontal Measures Periodic Measures	Control of the Contro	Roundabouts					
			Boulevards in Transition (partially calmed)								Mini-Roundabouts					
											Mini Traffic Circles					
											Impellers (T-intersections)					
			+	05.	00.	00.		00			Two-lane chicanes					
			35 mph +	25 to 30 mph	20 to 30 mph	20 to 30 mph	20 to 25 mph	20 mph or below			One-lane chicanes (yield condition)			< 3,000 ADT	< 3,000 ADT	< 3,000 ADT
					-						Short medians					
Entrance Features (architecture/landscaping/			e e								Medians on curves					
monument)											Yield Streets			< 1,500 ADT	< 1,500 ADT	< 1,500 ADT
Cross- Section Measures	Reduction in number of lanes								Not Traffic Calming Measures	Narrowings	Pinch Points			< 3,000 ADT		< 3,000 ADT
	Reduction in width of lanes			1				- 1			Bulb-outs					
	Long Median / Continuous Median			-	-					Vertical Measures	Raised Intersections					
	Short Meduan / Refuge										Raised Crosswalks					
	Short Medians on Curves Bulb-outs										Flattop Speed Humps (speed tables)					
	Curb and Gutter				1 - 1						Speed Cushions				-	
	Curbless / Flush Streets										Speed Humps					
	Flush Medians				1					Vertical Changes	Rumble Strips (for	in cural	<del>+</del>			
	Pedestrian Scale Lighting										warning purposes)	areas only				
	Street Trees			1	11 1						Speed Bumps	Only	+			1
	Building up to the right-of-way								Note: Many	of those measures	can be combined in a variety	of ways that ar	e too nume	rous to lis	in this ch	ort
	Lateral Shifts		-	11						or mose measures	can be combined in a farely		0 100 1101110	1000 10 110	117, 11,122, 541	·
	Shared Spaces		ř.	11	1 1									Ap	propriate	
	Bike Lanes / Protected Bike Lanes / Cycle Tracks												Leg	end on	propriate specific	
	Textured and/or Colored Paving Materials (parking, lanes, bike lanes, crossings, intersections, general purpose lanes, turn lanes, medians													13	cumstanc of Appres	
		Parallel														
	On-Street Parking	Back-in angled								Model	Design Manu	al for Li	ivina	Stre	ets	
		Front-in angled						-								
		Right-angle								Los Ang	geles County,	2011				
		Valley gutters used in conjunction with parking														

# THE BIG IDEAS – FROM FDM 202



- Enclosure, Engagement, Deflection
- 202.3.3 Chicanes
- 202.3.4 Lane Narrowing
- 202.3.5 Horizontal Deflection (chicanes)
- 202.3.6 Street Trees
- 202.3.7 Short Blocks
- 202.3.9 Speed Feedback Signs
- 202.3.10 Speed Limit Pavement Marking
- 202.3.12 Curb Extension (chicanes)
- 202.3.13 RRFB and PHB
- 202.3.14 Terminated Vista
- Use C4 Future Context Classification
  - 35 mph design/target speed
  - Land use changes in near future

FDOT Design Manual

#### 202 Speed Management

#### 202.1 General

This chapter describes strategies that may be used to achieve desired operating speeds across all context classifications. The design elements described in this chapter are across an context crassincations. The design elements described in this chapter are national best practices for low speed designs and are allowable on arterials and collectors

The FDM recognizes a range of design speeds for each context classification. For very low speed conditions (35 mph or less) the context classification design speed range low speed conditions (55 mpn or less) the context cassanication design speed indicates the upper end of desirable operating speeds. For instance, the design speed range for C4 is 30-45 mph, but in conditions where on-street parking is present, a 35 mph or lower design speed should be used. Additionally, when the current design speed of a or lower design speed should be used. Additionally, when the current design speed or a roadway exceeds the allowable range for the context classification, the design elements described in this section can be used to achieve a lower operating speed

#### Lane Elimination Frojects

Lane elimination projects (a.k.a., 'road diets") are intended to reconfigure the existing cross section to allow other uses. This type of project typically does not move existing curbs, but with the removal of a travel lane(s) may provide space to implement the speed curps, but with the removal of a traverrane(s) may provide space to implement are speed management strategies discussed in this chapter. Lane elimination alone is not a speed See FDM 126 for information on lane elimination projects.

#### Speed Management Concepts

Low speed areas will typically have characteristics where conventional controls, such as

- C6, C5 and C2T segments, which may be only a few blocks long and may already
- C4 and C3 segments which are only a few blocks long and where reconstruction
- Any project where interventions are part of a RRR project rather than a reconstruction or realignment, so curb lines are assumed to be fixed.

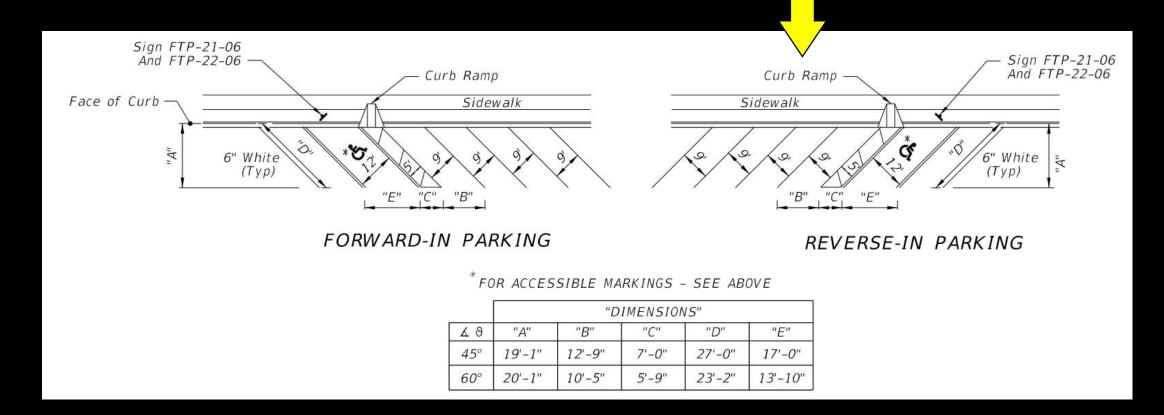
202-Speed Management



# Back-in Angled Parking

#### **FDM Section 210.2.3:**

"On-street parking may be either parallel or angle (traditional or reverse). See Chapter 316, F.S. for laws governing parking spaces. Standard Plans, Index 711-001 provides dimensions and additional requirements for on-street parking."





See FDM Section 210.2.3







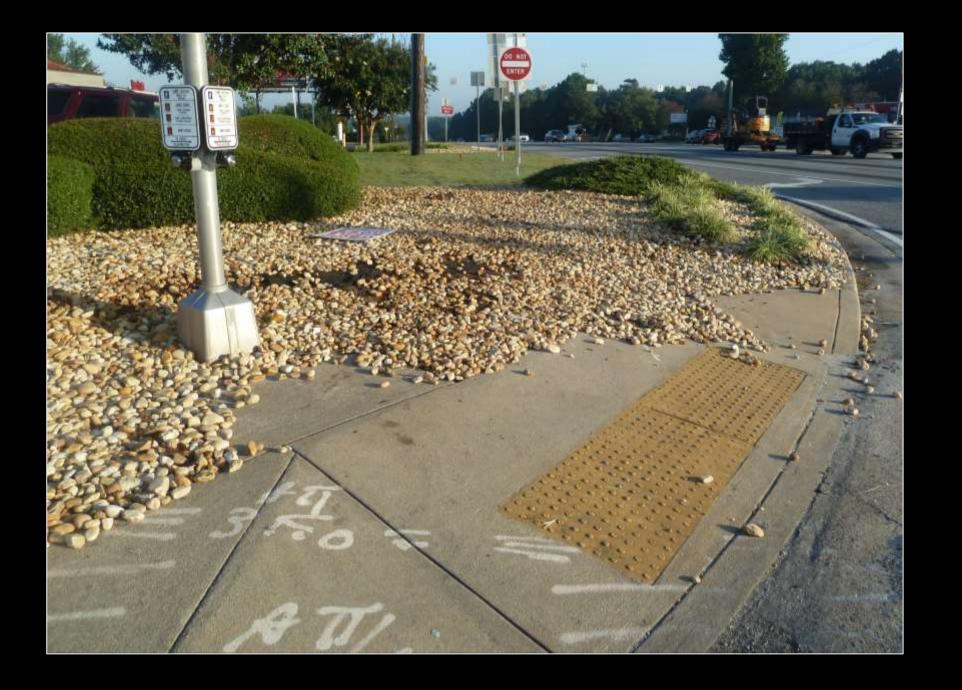


















Salt Lake City, UT





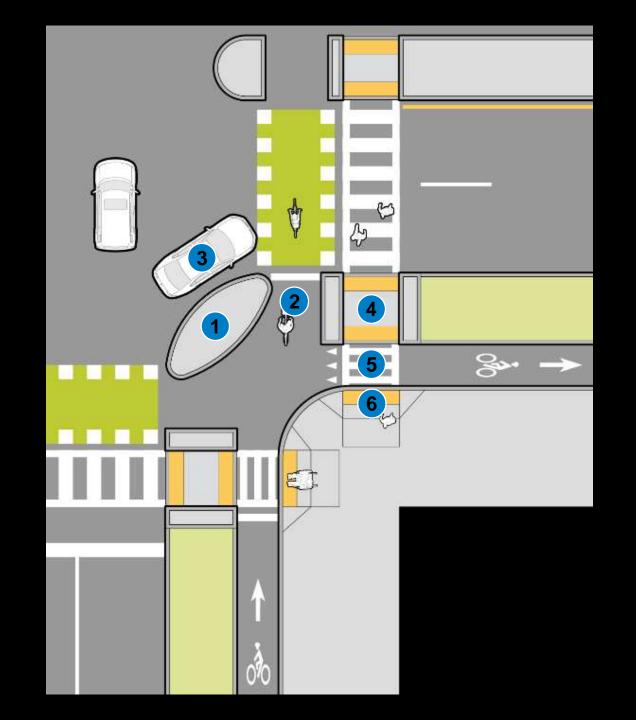
Chicago, IL



Austin, TX

## Protected Intersections

- Corner refuge island
- 2 Forward bicycle queuing area
- Motorist yield zone
- 4 Pedestrian crossing island
- Pedestrian crossing of separated bike lane
- 6 Pedestrian curb ramp















**Bike Lanes (a.k.a. Micro Mobility Lanes)** 

#### **Characteristics (draft):**



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#### **Characteristics (draft):**

- Powered or power-assisted up to 20 mph



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- Compatible with bicycles (e.g., acceleration, deceleration, turning)



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#### **Characteristics (draft):**

- Powered or power-assisted up to 20 mph
- Zero emissions
- Compatible with bicycles (e.g., acceleration, deceleration, turning)
- Completely fits within a volume of:

Single unit: L<= 108"

W<= 34"

H<= 84"

Hinged: L<= 168"

W<= 34"

H<= 84"



Bike Lanes (a.k.a. Micro Mobility Lanes)

#### **Characteristics (draft):**

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- Zero emissions
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- Completely fits within a volume of:

Single unit: L<= 108"

W<= 34"

H<= 84"

Hinged: L<= 168"

W<= 34"

H<= 84"

Or...





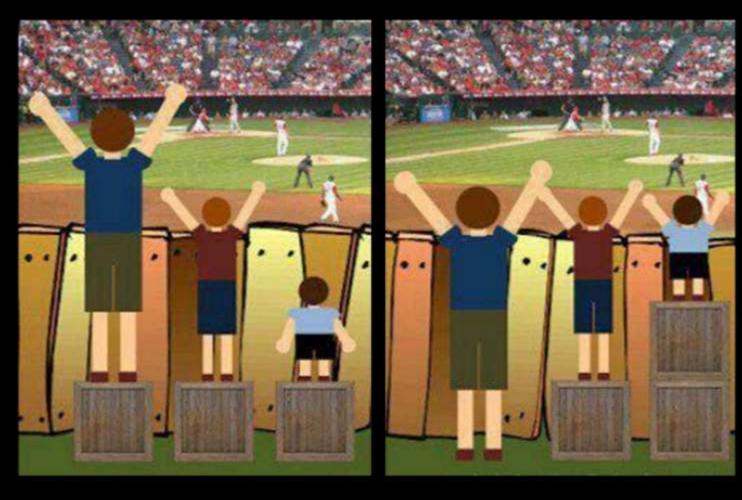




A person who uses a wheel chair or motorized wheelchair, scooter, etc.

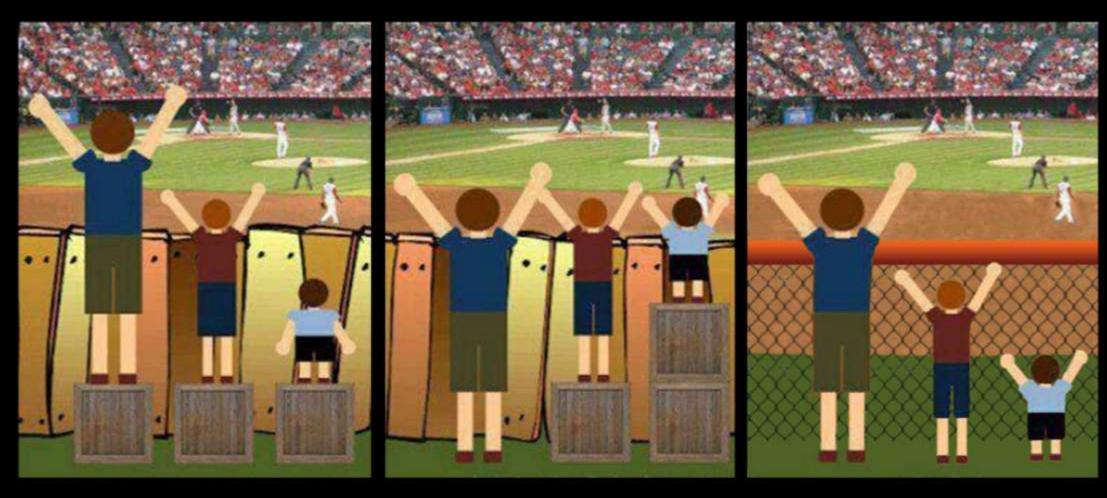


Equality



**Equality** 

**Equity** 



**Equality Equity** Resolution







Accommodating People with Mobility Impairments













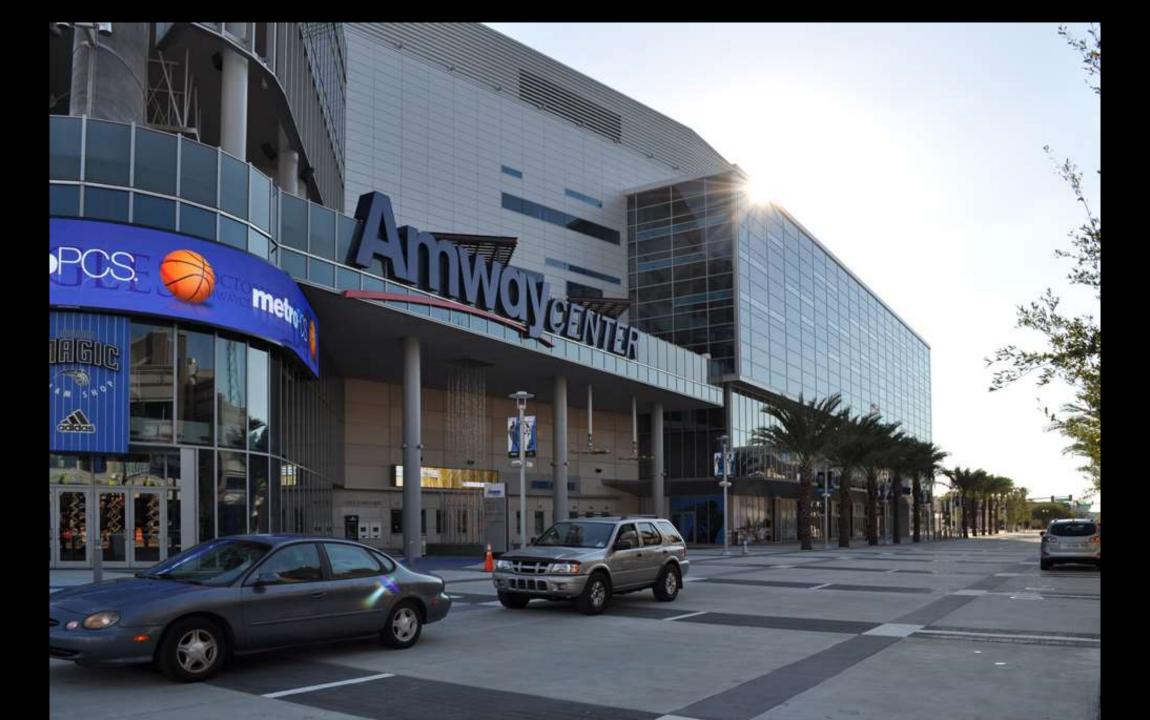






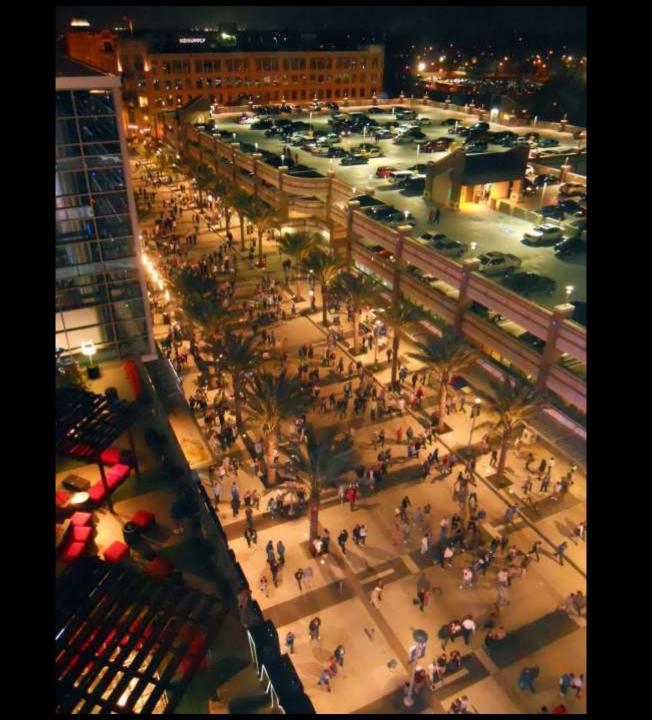


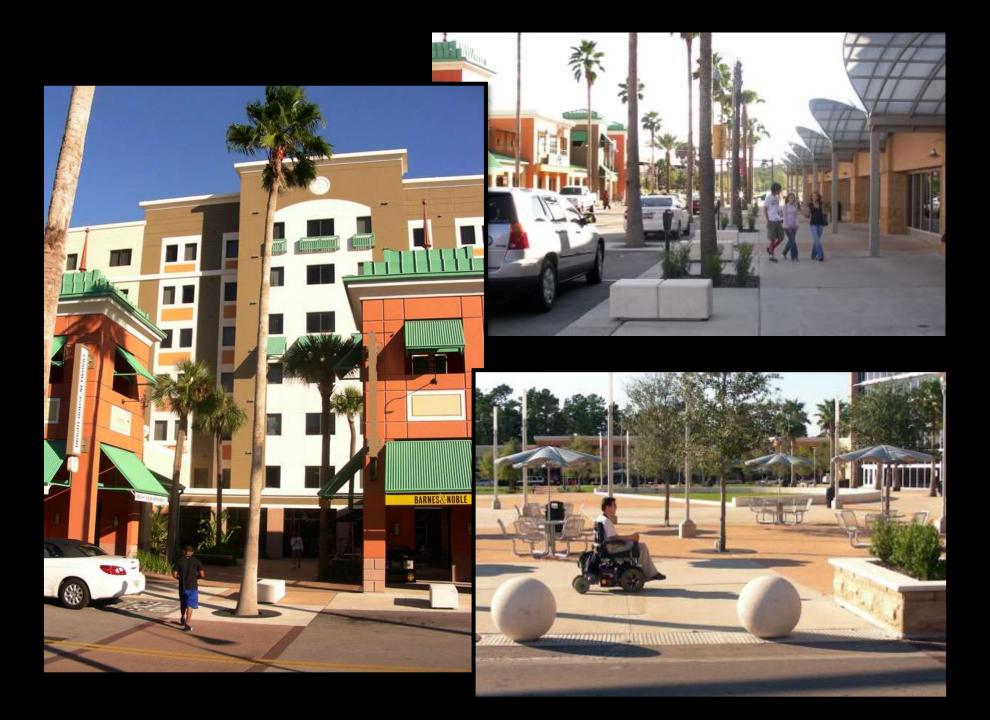






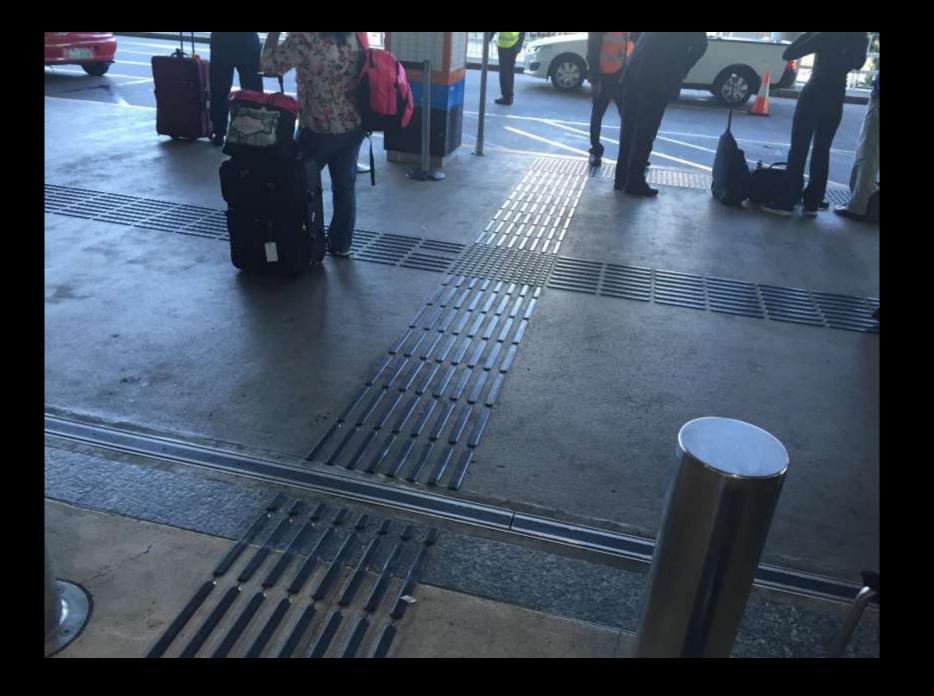


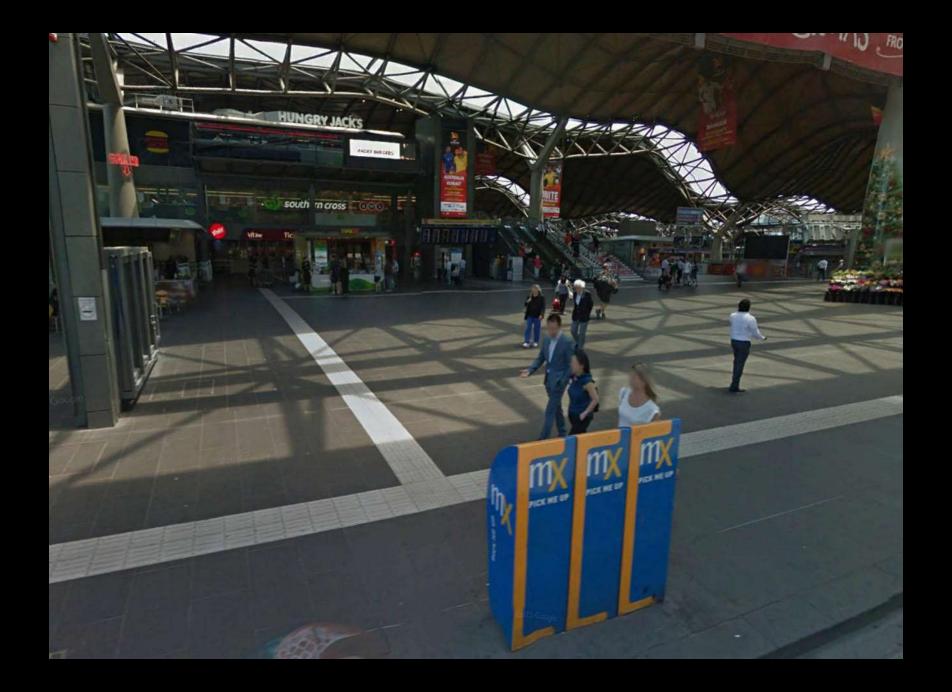
















# Transportation Network Company (e.g. Uber and Lyft) & Autonomous Vehicles



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 Off-street and on-street parking will be less important



# Transportation Network Company (e.g. Uber and Lyft) & Autonomous Vehicles

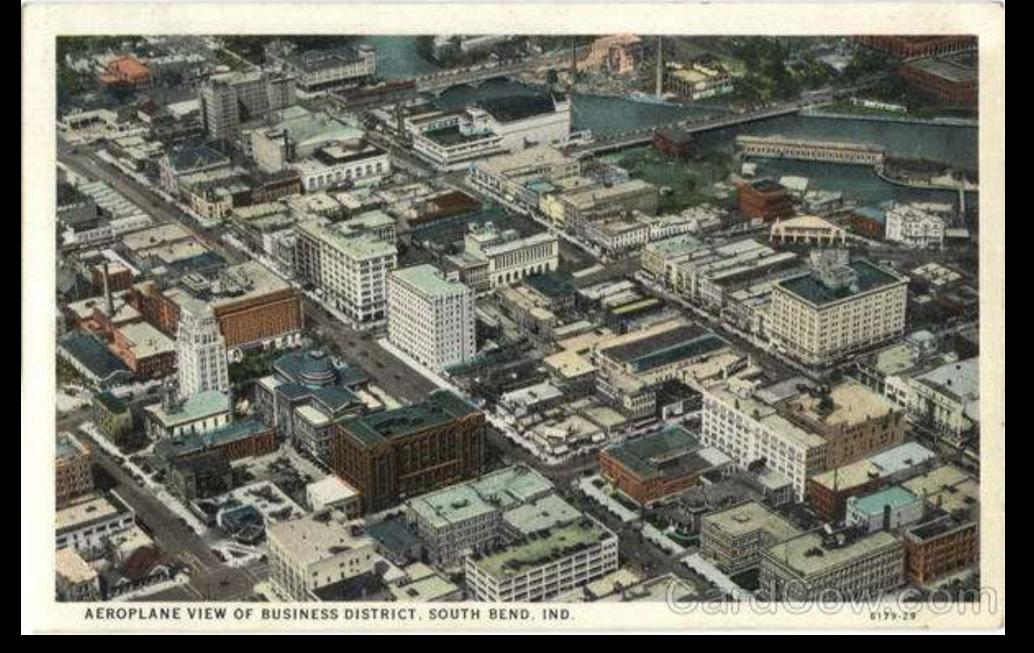
 Off-street and on-street parking will be less important

 Curb/edge management will be more important

Pick-up/drop-off
Designated TNC curb areas
Separated bike facilities
Transit facilities



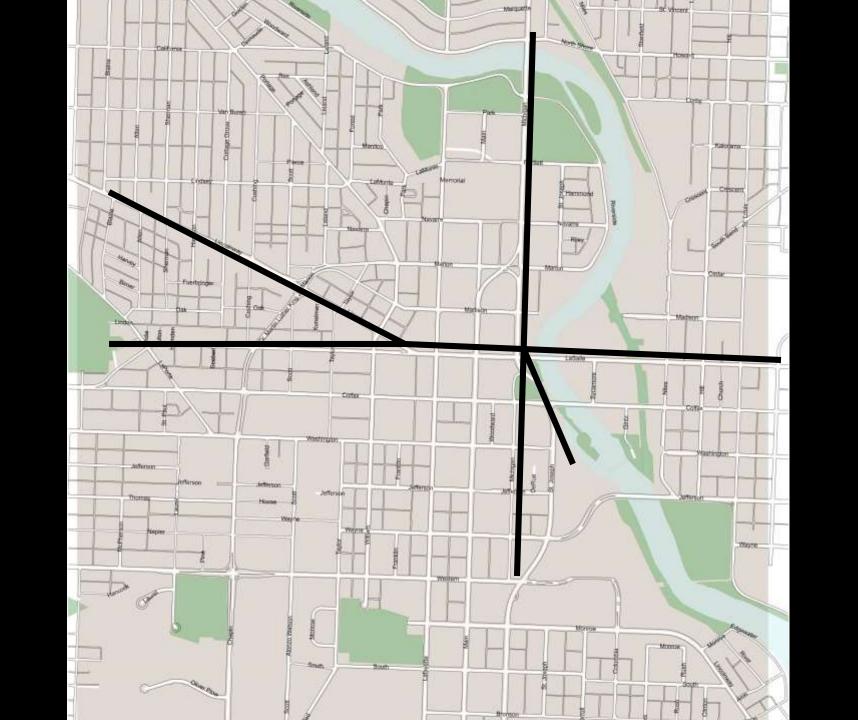


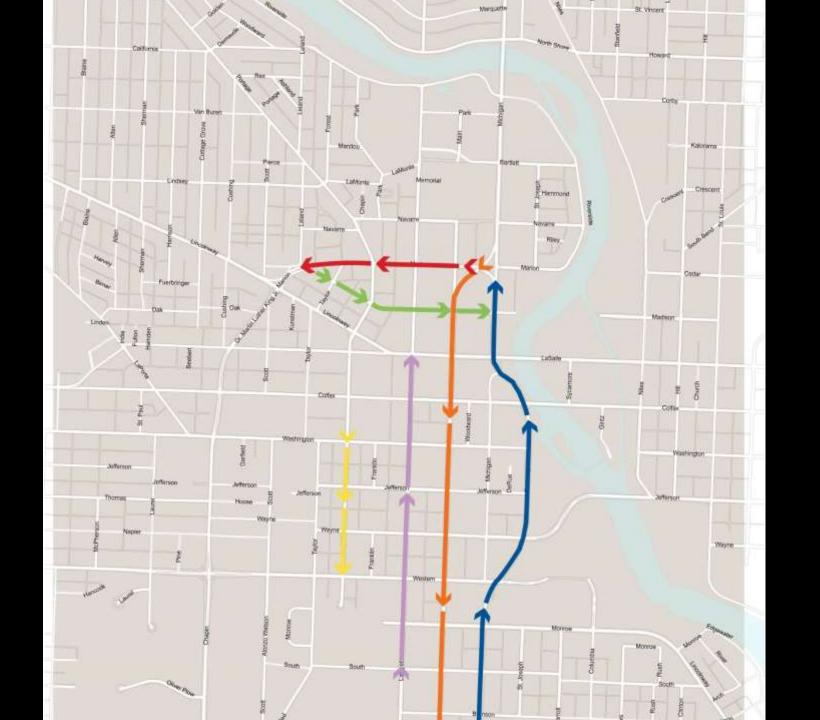


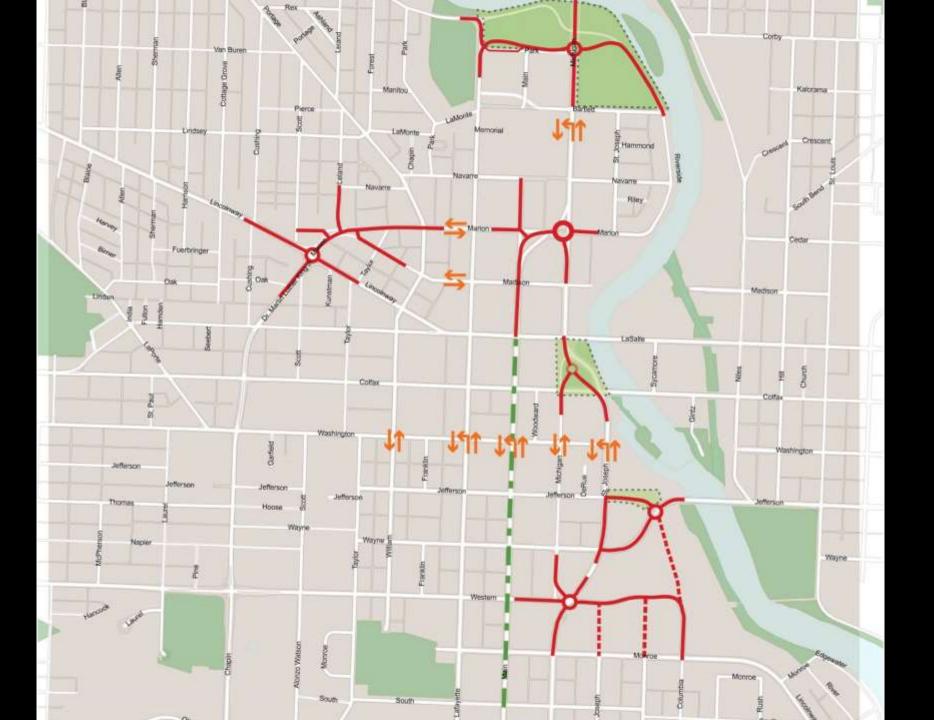










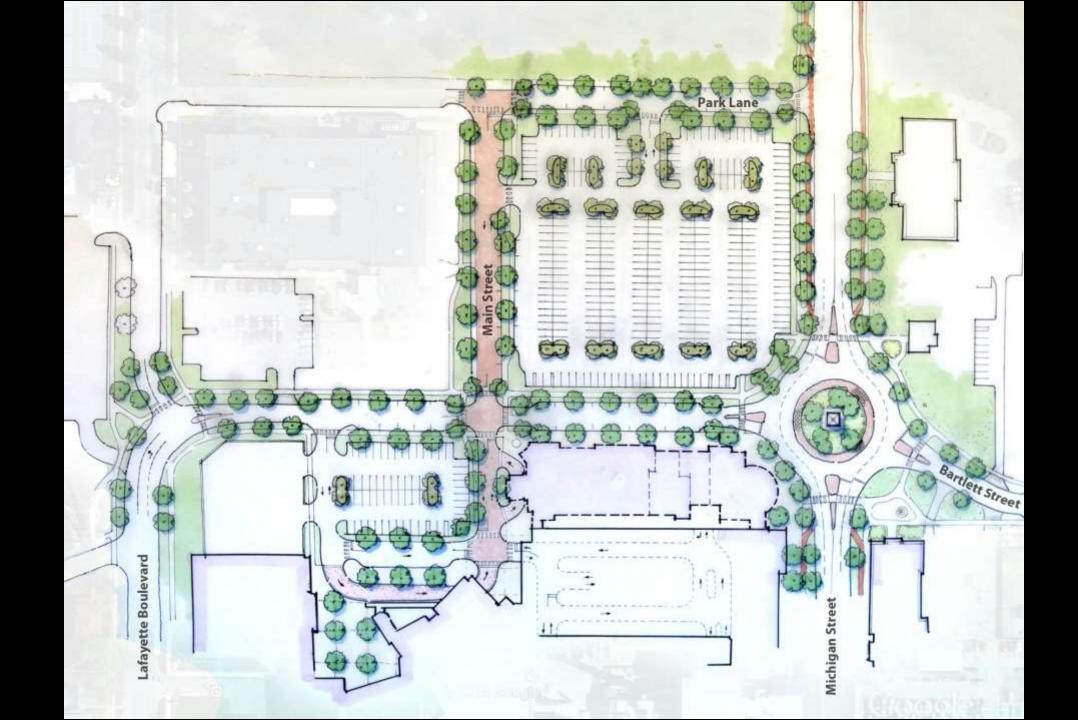


South Bend Downtown Master Plan















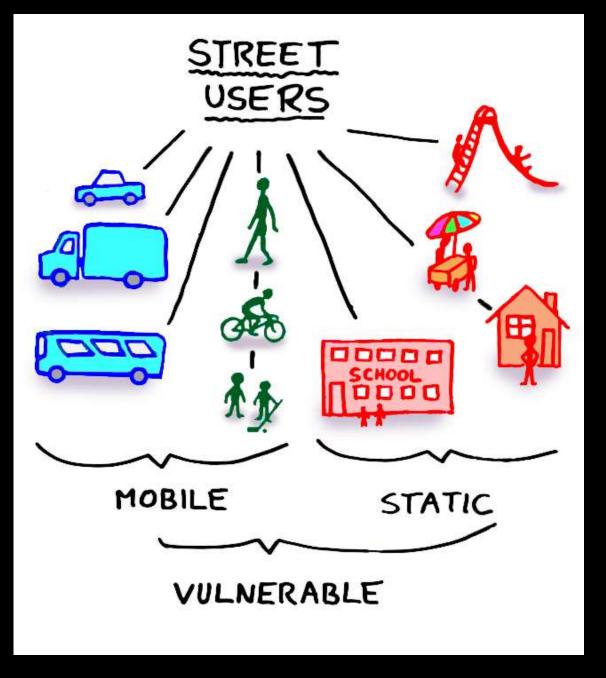




a street that is designed to comfortably accommodate those who use the street.



a street that is designed to comfortably accommodate those who use the street.



Whatever you do for a living, please:

i) be inclusive;

a street that is designed to comfortably accommodate those who use the street.



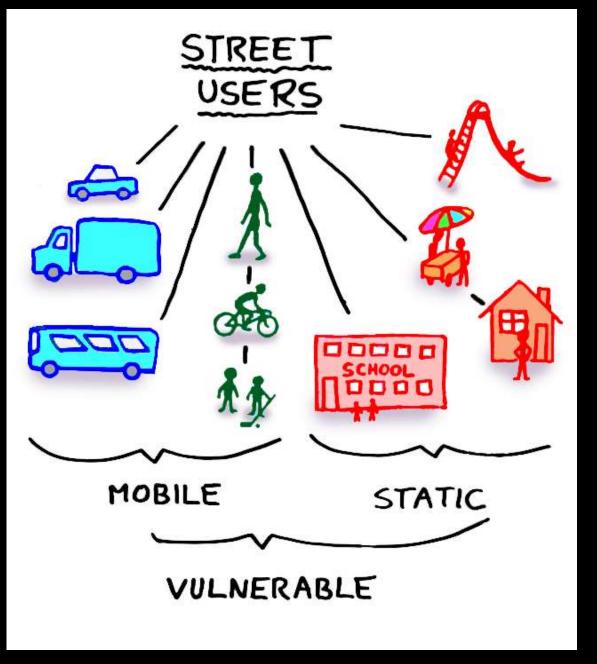
- i) be inclusive;
- ii) be empathetic;

a street that is designed to comfortably accommodate those who use the street.



- i) be inclusive;
- ii) be empathetic;
- iii) change something, expect better, push to do the right thing; and

a street that is designed to comfortably accommodate those who use the street.



- i) be inclusive;
- ii) be empathetic;
- iii) change something, expect better, push to do the right thing; and
- iv) know that you are on the right side of history the FDOT has your back



**Thank You** 



