Street Widths & Safety

Pedestrian Advisory Council
October 2, 2017

AUSTIN
TRANSPORTATION
DEPARTMENT

NACTO Urban Bikeway Design Guide – Aug. 2011

RESOLUTION NO. 20110804-023

WHEREAS, the City of Austin is recognized as a national leader in urban bikeway design; and

WHEREAS, the City of Austin is an affiliate member of the National Association of City Transportation Officials' (NACTO's) Cities for Cycling program; and

WHEREAS, NACTO has recognized the need for national guidelines and best practices in urban bikeway designs; and

WHEREAS, as an affiliate member of Cities for Cycling, the City of Austin contributed to the development of the NACTO Urban Bikeway Design Guide; and

NACTO Urban Street Design Guide – Nov. 2013

RESOLUTION NO. 20131107-049

WHEREAS, on August 4, 2011, the City of Austin recognized the National Association of City Transportation Officials (NACTO) *Urban Bikeway Design Guide* as a resource for guidance on the development of bicycle facilities in Austin; and

WHEREAS, in September of 2013 NACTO unveiled a new design manual for city streets entitled the *Urban Street Design Guide*; and

WHEREAS, Austin city staff served on the project steering committee for the *Urban Street Design Guide*; and

Complete Streets Policy – June 2014

ORDINANCE NO. 20140612-119

AN ORDINANCE ADOPTING THE CITY OF AUSTIN COMPLETE STREETS POLICY.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF AUSTIN:

PART 1. Findings.

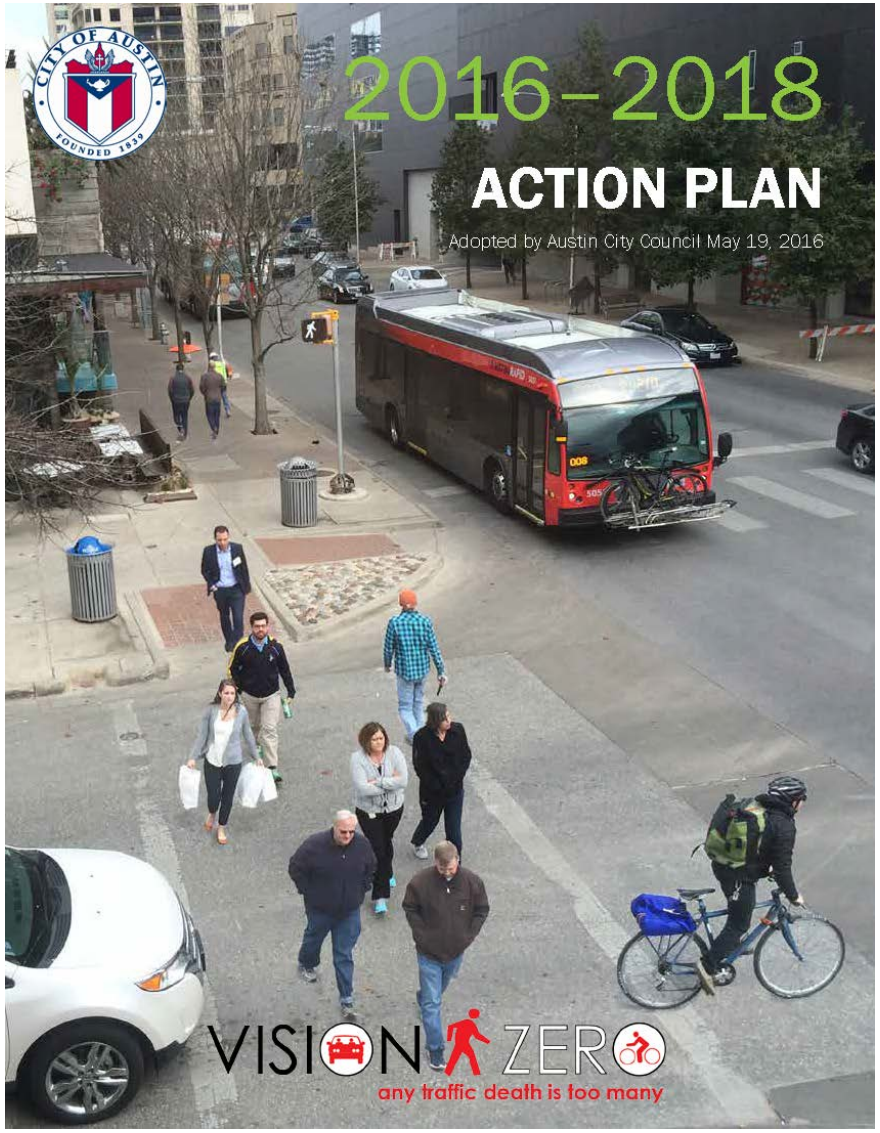
(A) Austin City Council Resolution No. 20131212-080 directed the City Manager to create and implement a comprehensive Complete Streets Policy.

(B) The intent of this policy is to implement the Imagine Austin Comprehensive Plan and to enhance Austin's quality of life over the long-term by advancing mobility; economically sound, compact, and connected development patterns; public health and safety; livability; environmental enhancement; sustainability; equity; affordability, economic activity; climate resiliency; and excellence in urban design and community character.

Policy added to Comprehensive Plan

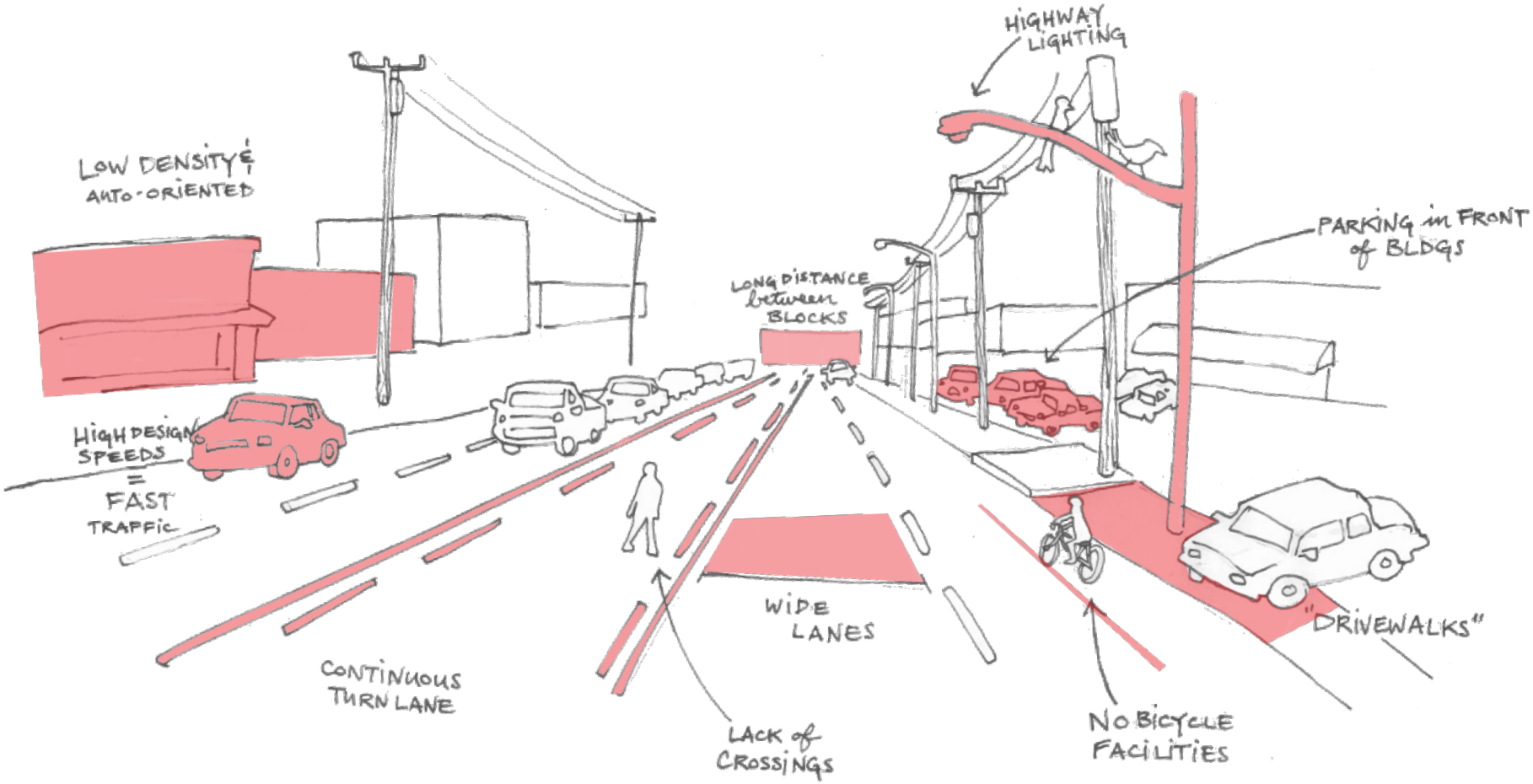
Oct. 2015

Action Plan adopted by City Council

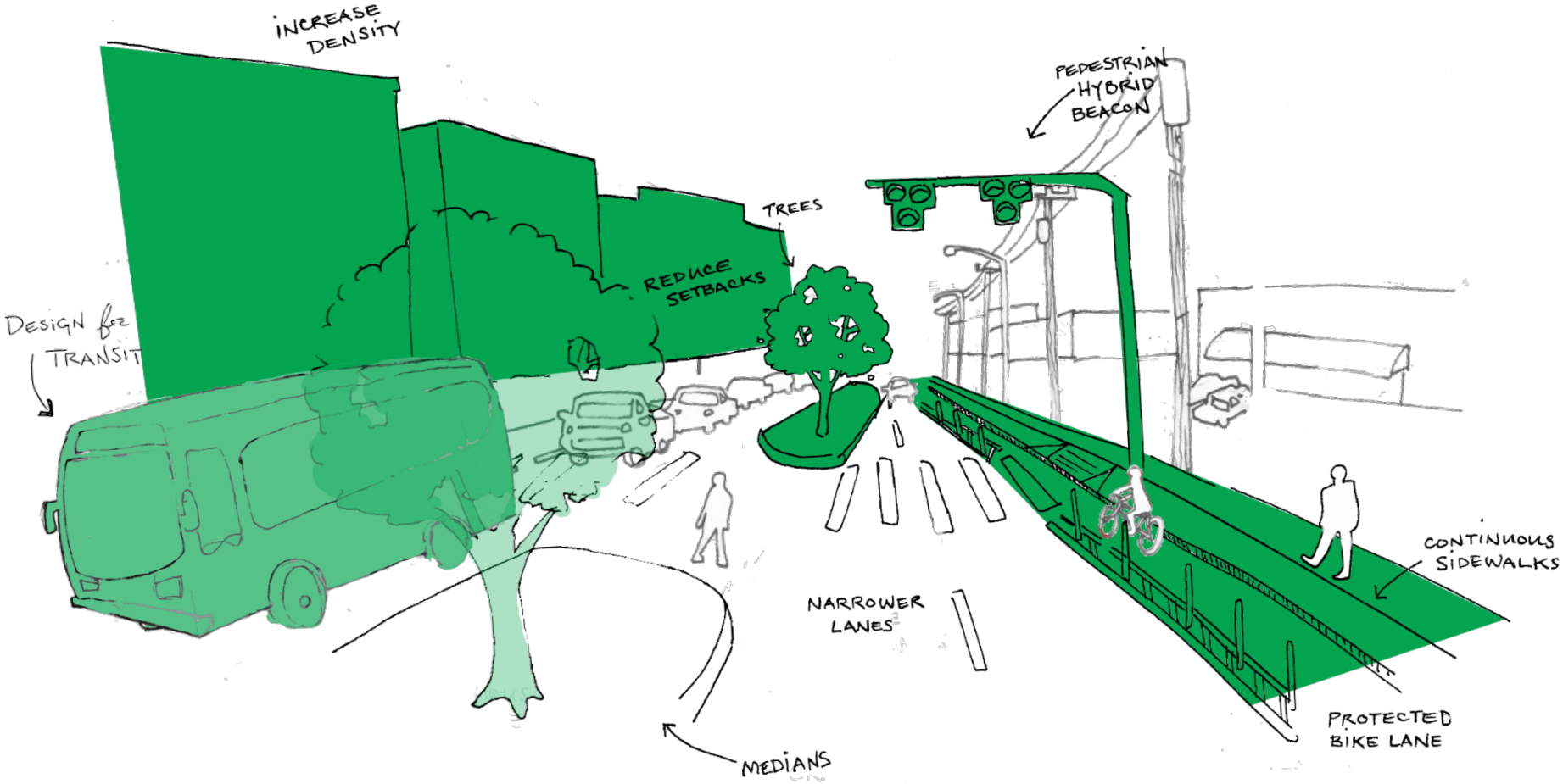


May 2016

Design influences behavior



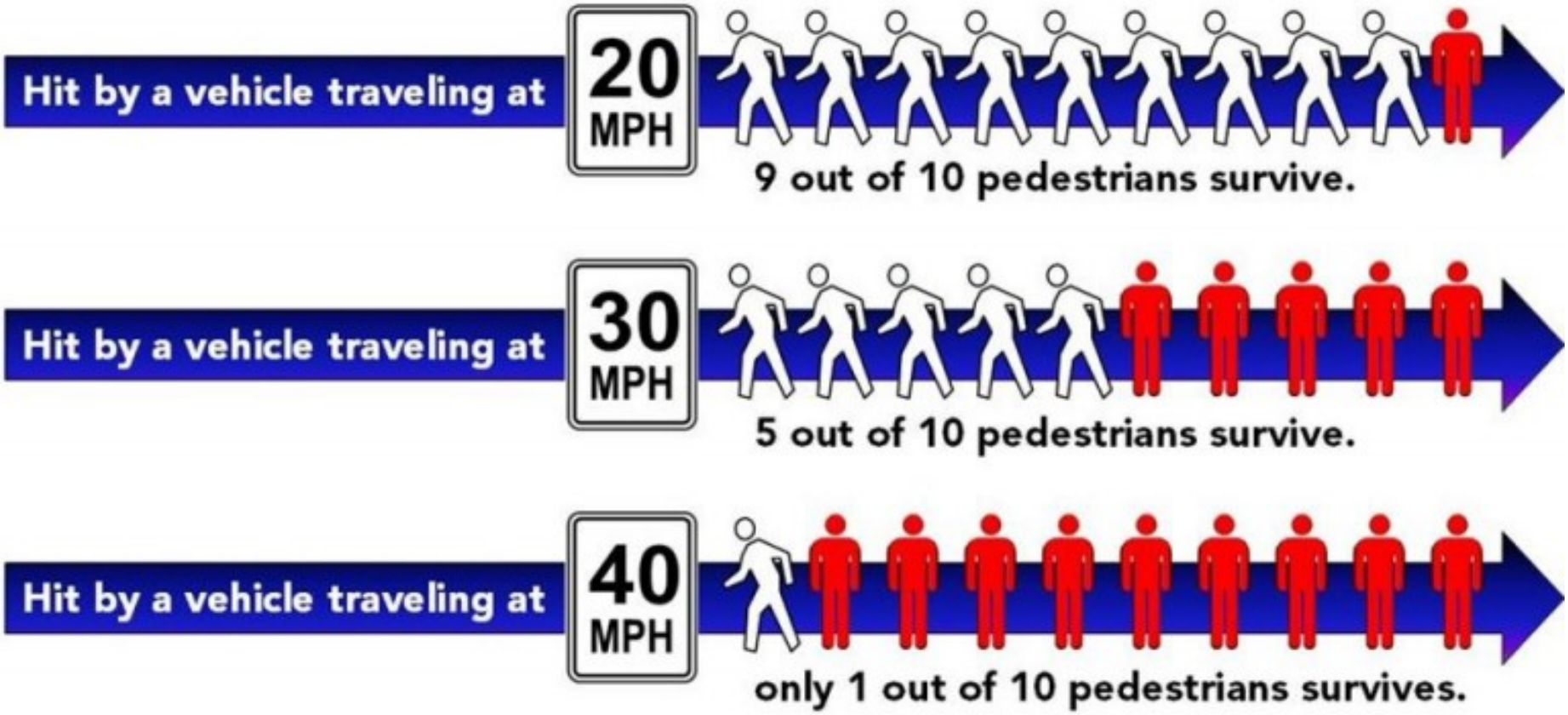
Changes to road & development patterns can improve safety



Street design tools can improve safety

- Better connectivity:
  - Short blocks
  - Connected street networks
  - Alleys
- Access management (limit driveways, turns)
- Street geometry:
  - Width
  - Number of lanes
  - Turn radii
- Bike lanes & sidewalks
- Traffic calming devices:
  - Medians
  - Speed humps
  - Etc.
- Signals
  - PHBs
  - RRFBs

Speed management is critical for safety



Data Source: FHWA. Image: theurbanist.org

Neighborhood context varies

More Urban

1 Community Context + 2 Street Level + 3 Right-of-way + 4 MSP & DC + 5 Number of Lanes = 6 Street Design

Cross-Sections

Different contexts = different safety needs

- On high-speed rural roads, leaving the lane and resulting collisions are a primary concern & may be reduced by wider lanes.
- For lower-speed urban roads, narrower streets decrease the number of collisions.

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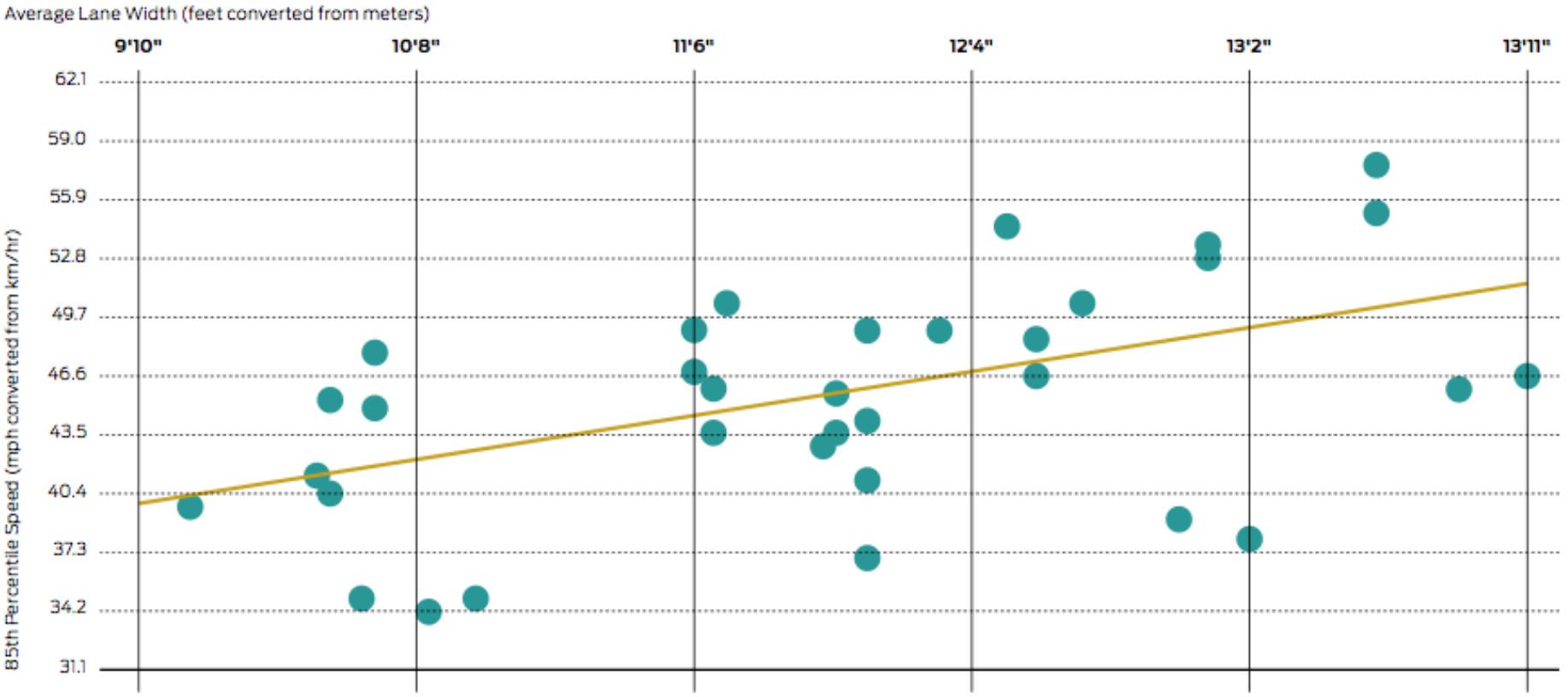
- For lower-speed urban roads, narrower streets decrease the number of collisions.

Wider lanes result in higher speeds



"As the width of the lane increased, the speed on the roadway increased... When lane widths are 1 m (3.3 ft) greater, speeds are predicted to be 15 km/h (9.4 mph) faster."

Regression Line

85th Percentile Speed of Traffic

Chart source: Fitzpatrick, Kay, Paul Carlson, Marcus Brewer, and Mark Wooldridge. 2000. "Design Factors That Affect Driver Speed on Suburban Streets." *Transportation Research Record* 1751: 18–25.

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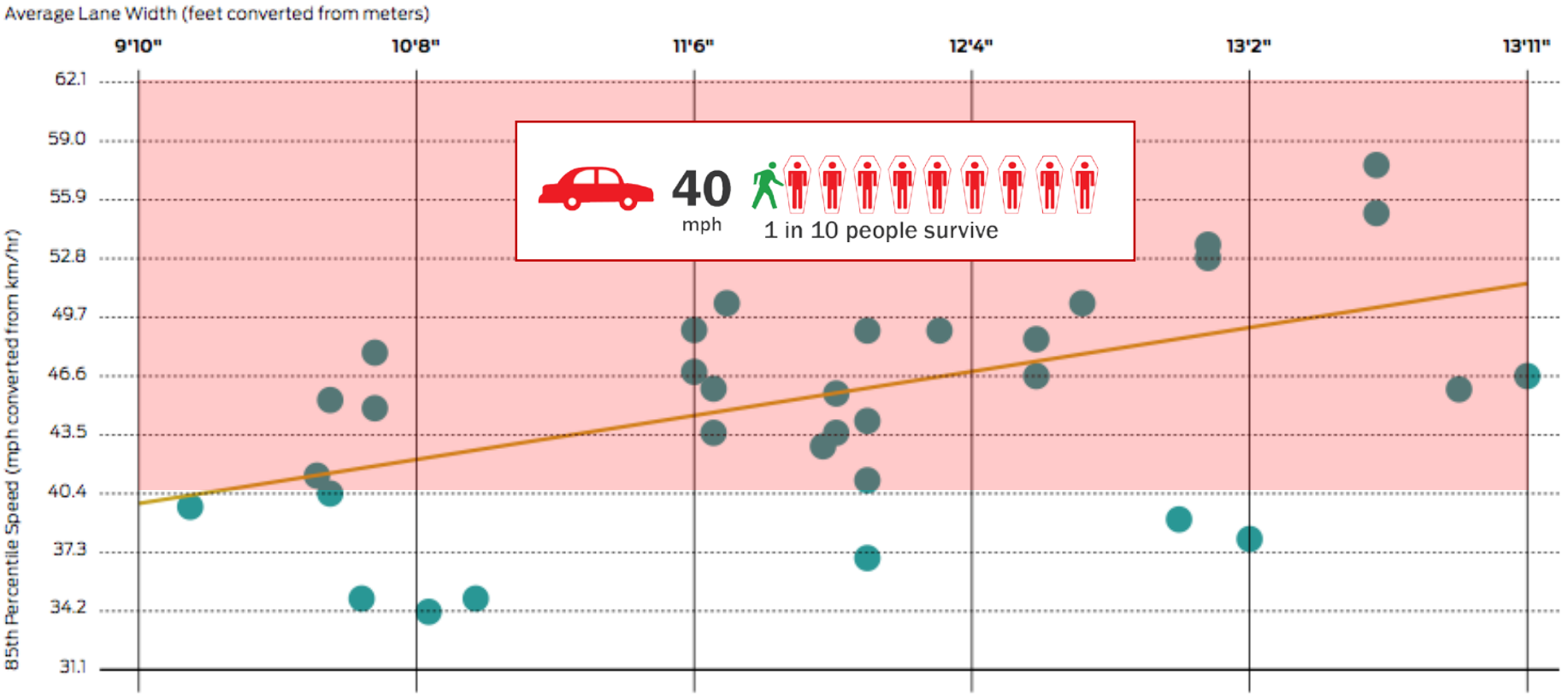

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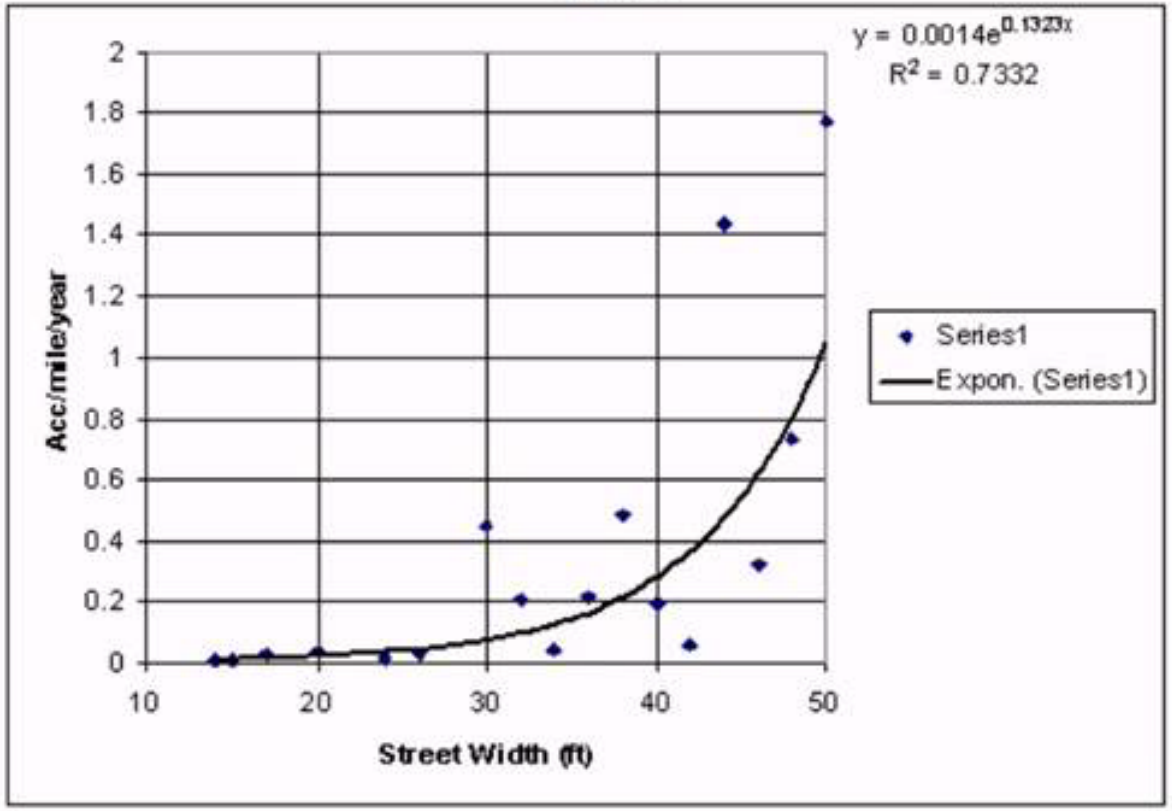
Street width = most significant relationship to injury crashes

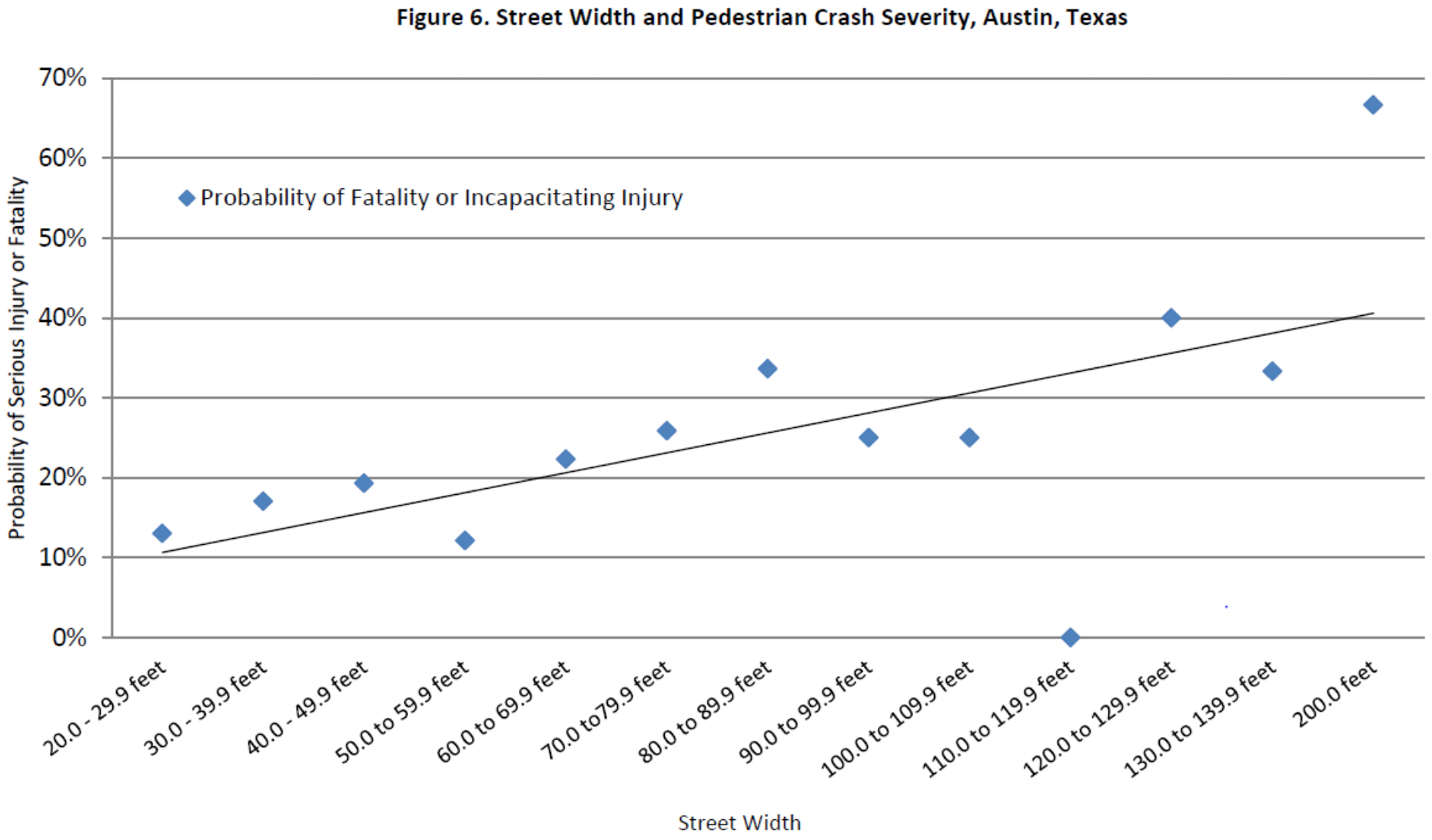
- A typical 36-foot wide residential street has 0.16 crashes per mile per year, as opposed to 0.03 for a 24 foot wide street.
- This difference is about a 487% increase in crash rates.

Crashes per year increase with increases in road width.



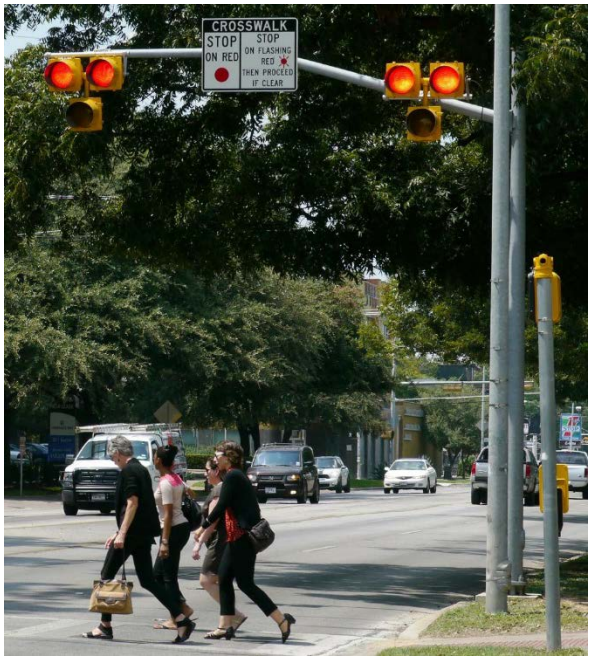
Source: Swift et al., 1997

Ped crash severity increases with road width



Source: TXDOT 2010-2015

Context-sensitive design approach to safety



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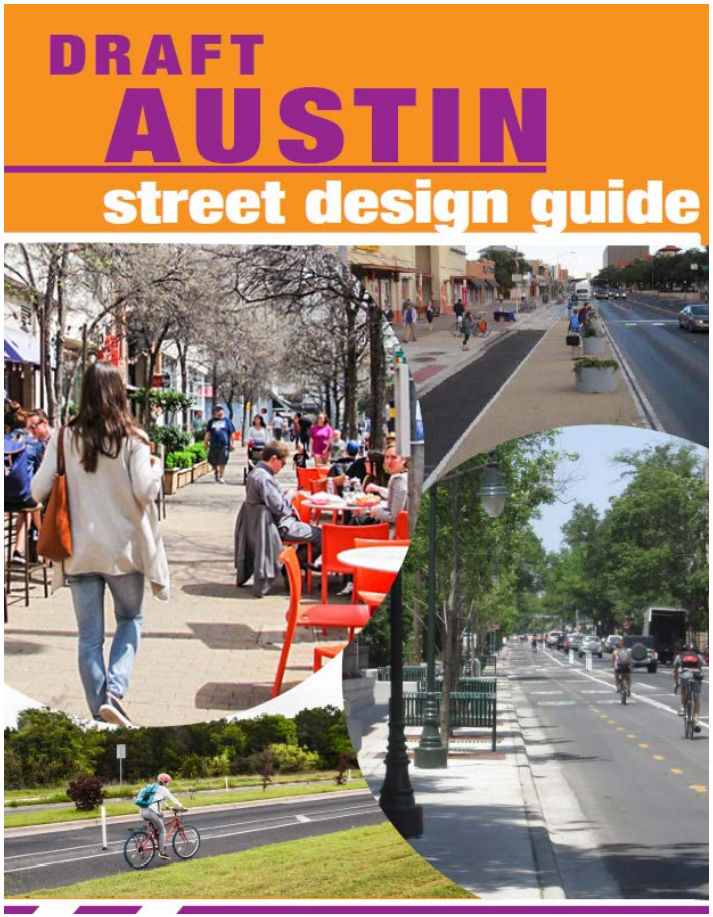


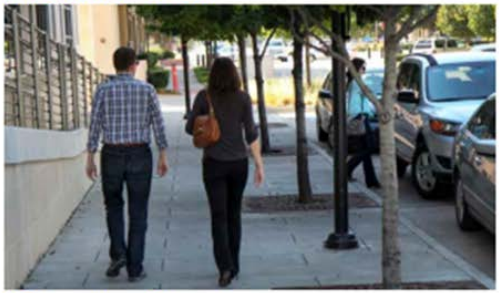
Pedestrian Supportive Design Strategies

Walking, as the basic form of transportation, must be prioritized to provide a safe environment for all users. Strategies vary for designing pedestrian elements depending on context.

Sidewalk treatments in urban areas should provide wide zones that allow for easy cross-access and movement in and out of store fronts. In suburban areas, sidewalks should be adequately sized, provide shading, and be buffered from the roadway.

At **intersections** or **mid-block,** strategies such as striped crosswalks, pedestrian refuge islands, curb extensions/ bulb-outs or raised crossings can be used to increase pedestrian visibility and safety.

Sidewalks -Urban

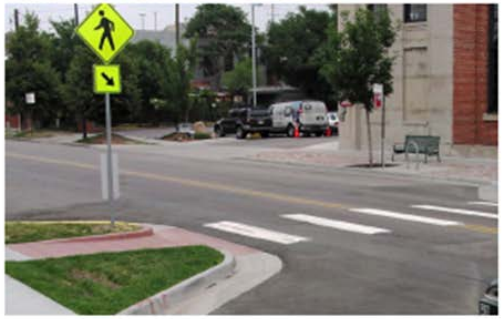


Sidewalks -Suburban

Intersections - Striped Crosswalks

Pedestrian Refuge Island

Curb Extensions/Bulb-outs



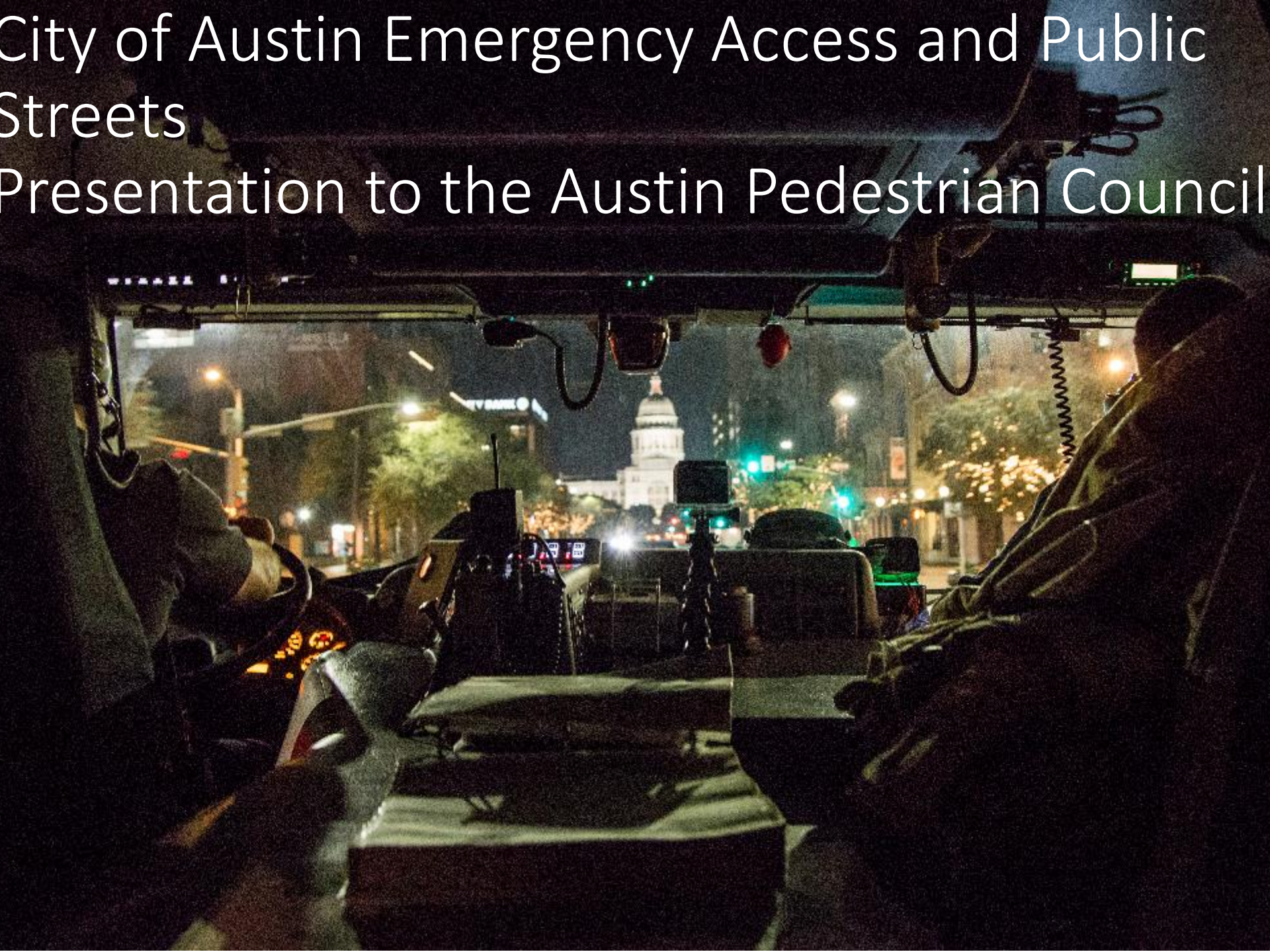
Shared Values: Emergency Response & Smart Growth

1. Life safety is important, should be inclusive, and extend from fire to traffic.
2. We value the efficient use of resources, including property, services, and infrastructure.
3. We value vibrant places that enhance pedestrian activity.
4. We value communities that include a range of neighborhoods and compatible uses.
5. We value streets, structures, and fire protection features that match the context of the neighborhood.
6. We value creative collaboration among those who serve and shape the built environment.
7. We value an ongoing process of education and capacity-building among those who serve and shape the built environment.
8. We value adaptation in life saving responses due to regional differences.

From the April 2008 Smart Growth Streets and Emergency Response Workshop

City of Austin Emergency Access and Public Streets

Presentation to the Austin Pedestrian Council



The City of Austin government should ensure the health, safety, and welfare of the citizens. The best way to accomplish this is not always clear when there are two competing policy options that create a conflict of two public goods that both seek to increase the safety of our citizens.

Objective

The objective of this portion of the presentation is to provide information concerning the requirements for establishing city streets that provide for rapid and *effective* response by Public Safety units in addition to meeting modern city design, functionality and safety.

This presentation will focus on:

- Maintaining *response times* for emergency services
  - Medical emergencies (Cardiac/Stroke…)
  - Fire incidents
  - Various rescue emergencies
- Providing adequate room for *effective* emergency response operations, (Fire, Rescue, HazMat…).

Emergency Response

Fire, HazMat, Rescue, Other

Medical

Emergency Response Data

	2012	2013	2014	2015	2016	5 year total
AFD Total Code 3 Calls	58697	60362	61620	59649	55591	**295,919**
Fire Calls	3657	3787	3668	3764	3683	**18,559**
Cardiac Arrest	636	403	1261	1335	1431	**5,066**
Chest Pain	7	257	525	2878	4889	**8,556**
Stroke	1423	712	1476	1613	1617	**6,841**

Response Times are Critical for Time-sensitive Medical Emergencies

- Trauma
- Cardiac arrest
- Heart attack
- Stroke
- Respiratory emergencies
- Severe allergic reactions
- ***Brain damage starts to occur within 4-6 minutes after cardiac arrest***

A fire department apparatus is often going to be the first to arrive at a medical emergency

Medical Response is a Two-way Trip

Fire Emergencies

Present Day Furnishings = Synthetic Materials

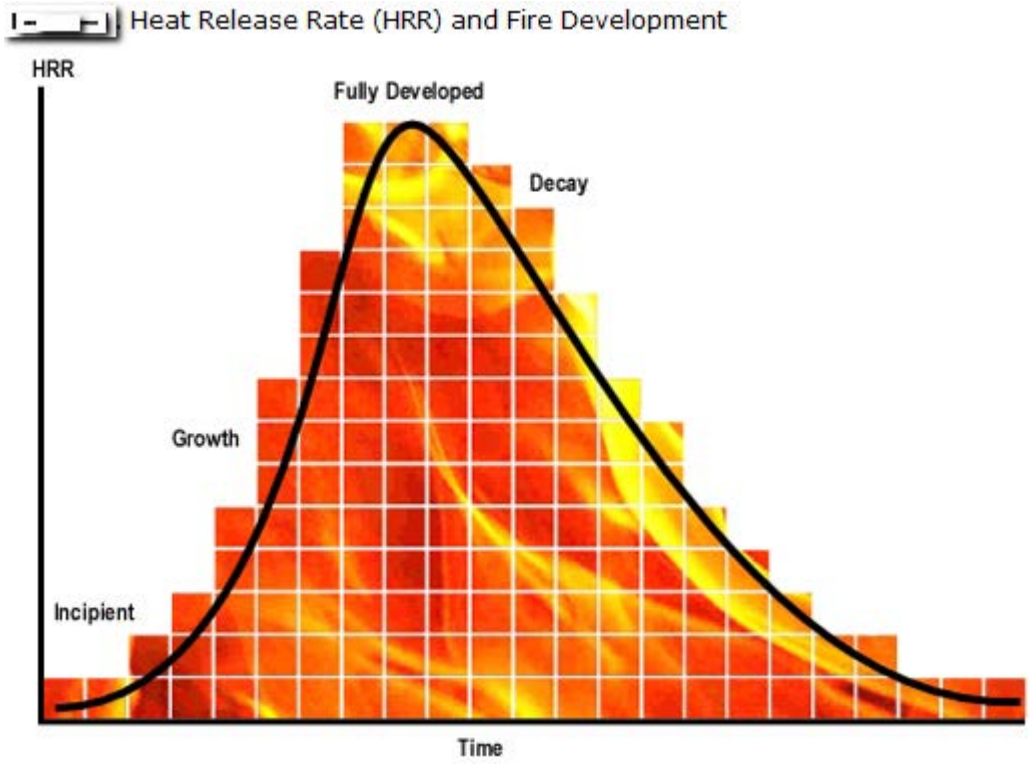
Faster Flame Spread

Toxic Smoke

Carboxyhemaglobin

- Red Blood Cells more attracted to CO (3-4X)
- Doesn’t let go with exhalation
- Suffocation
- Treatment is 100% oxygen administration

- Legacy Fires
  - Cotton
  - Natural Materials
  - Smaller spaces
  - Poor insulation
- Modern Fires
  - Synthetic materials
  - Better Insulation design
  - Open Spaces



Flashover Can Occur Within A Few Minutes

Emergency Response/Set Up Time…

- Is a critical factor for successful outcomes to medical and fire emergencies
- Increased response/set up times could result in less successful outcomes
- Response time is an important performance measurement for emergency services

The AFD Rule of Thumb for risk/benefit analysis is characterized by the following phrase:

- We will risk a lot, within a structured plan, to save a savable life.
- We will risk a little, within a structured plan, to save savable property.
- We will risk nothing to save nothing (lives or property that cannot be saved).

A **risk v. benefit** analysis will determine the fire response operational mode

- **Offensive** fire response mode – aggressive interior attack to perform Rescue, limit fire damage
- **Defensive** mode – too dangerous for interior attack. Firefighters fight the fire from outside the burning building and protect adjacent structure. Results in greater fire damage.
- A quicker, ***effective*** fire response time generally results in a smaller, lower risk fire and allows offensive fire response mode.

Structural Fire Fighting is Personnel and Equipment Intensive

Pumping Apparatus/Fire Engine

- Equipped with a fire pump and hose
- Connect to fire hydrant and deploy hose
- Pump and flow water
- Fire attack

Aerial Apparatus/Ladder Truck

- Forcible entry
- Ventilation
- Search
- Check for fire extension
- Exposure protection
- Overhaul
- Salvage

Aerial Apparatus Used To Provide Elevated Master Streams vs. Ground Level Master Stream

Denser infrastructure creates greater chance of fire spreading to adjacent structures

Aerial used for ventilation, rescue, exposure protection, extinguishment

Aerial Apparatus Placement

- Positioned of the aerial ladder for rescue
- Other vehicles should not be placed where they will not hinder removal of ladders or extending the stabilizers
- Later arriving aerial apparatus should be placed to best to perform exposure protection, generally on the corners where they can cover two sides.
- Outside the collapse zone

Apparatus Dispatched for First Alarm

For a single/first alarm structure fire:

- 4 pumping apparatus (engine or quint)
- 2 aerial apparatus (ladder or quint)
- 1 rescue unit
- 2 battalion chiefs & vehicles
- 1 safety officer vehicle

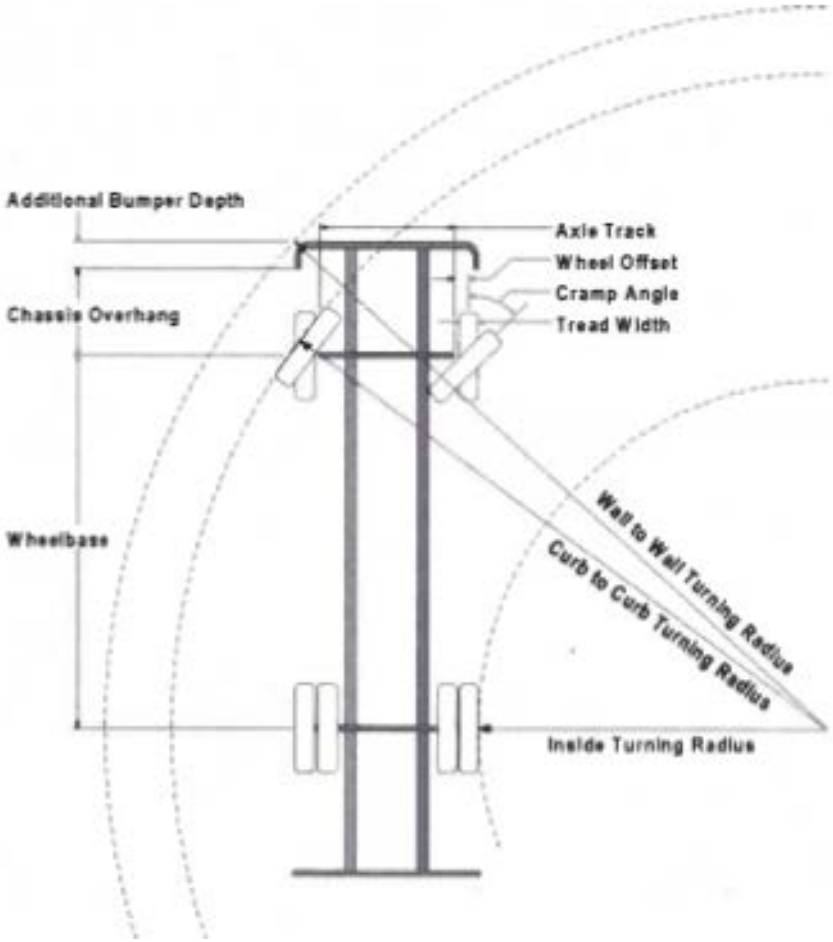
19 ft. + for outrigger set up to support extension of the ladder

Additional Clearance May Be Needed To Allow Firefighters To Access Tools and Equipment

Inadequate Clearance to Extend Outriggers, Access Tools, Equipment and Pump Controls

25 ft. Inside and 50 ft. Outside Turn Radius

Department: Austin Fire Department **Body:** Aerial, Platform 100', No Pump, Alum Body



Parameters:

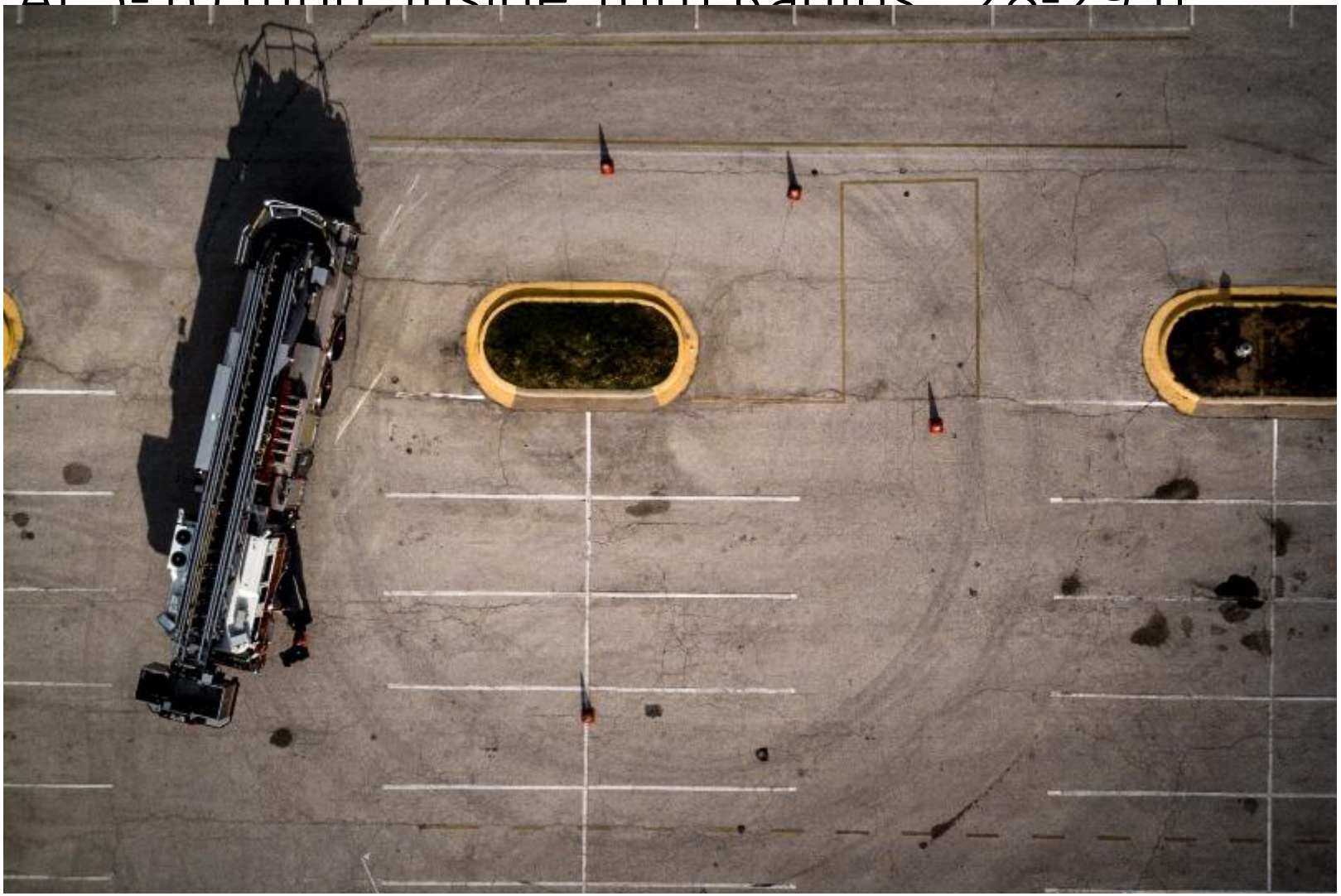
Inside Cramp Angle:	45°
Axle Track:	82.92 in.
Wheel Offset:	5.25 in.
Tread Width:	17.7 in.
Chassis Overhang:	78 in.
Additional Bumper Depth:	0.00 in.
Front Overhang:	146.6 in.
Wheelbase:	257 in.

Calculated Turning Radii:

Inside Turn:	20 ft. 3 in.
Curb to curb:	36 ft. 8 in.
Wall to wall:	44 ft. 9 in.

Comments:

At 5-10 mph, Inside Turn Radius ~28-29 ft



Challenges

Austin Fire Code Requirements for Fire Apparatus Roadways/Fire Lanes

14 ft wide street in Austin

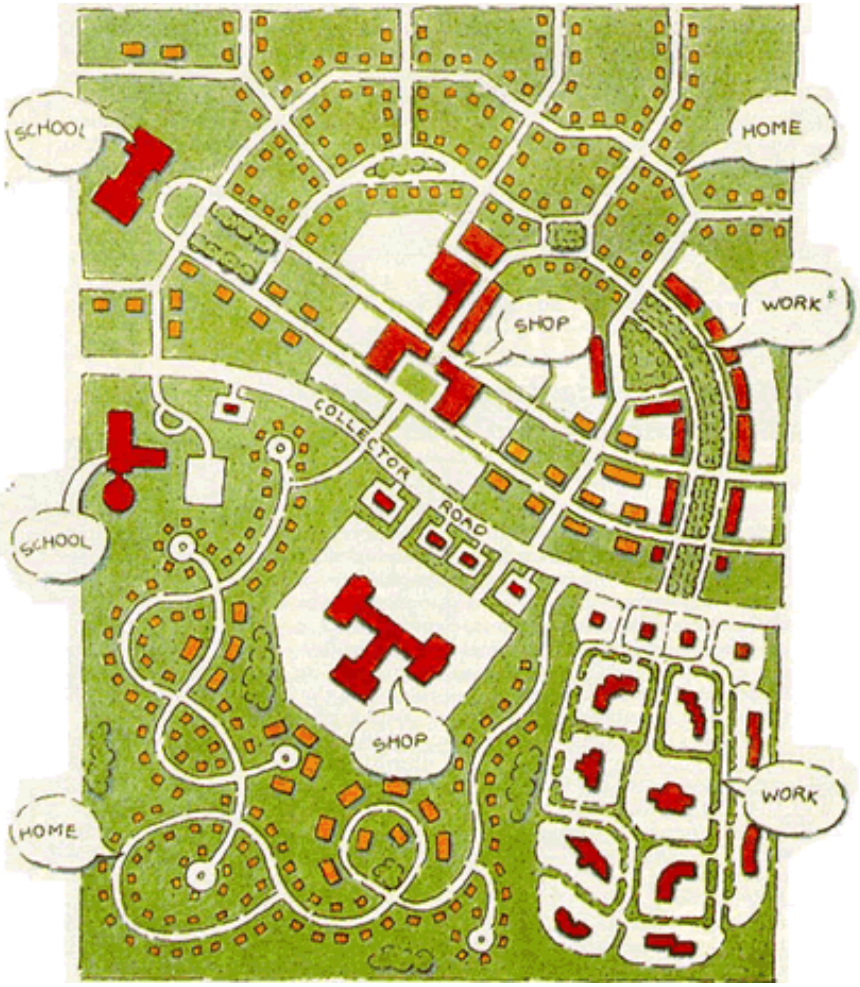
Potential Solutions

- Bike lane as part of Fire Lane
- Rolled Curbs
- “Grass Create”
- * Roll up doors vs. Hinged

Land use patterns and street connectivity can improve emergency response times

1. Compact neighborhoods
2. Shorter blocks
3. Gridded streets

Traditional neighborhood

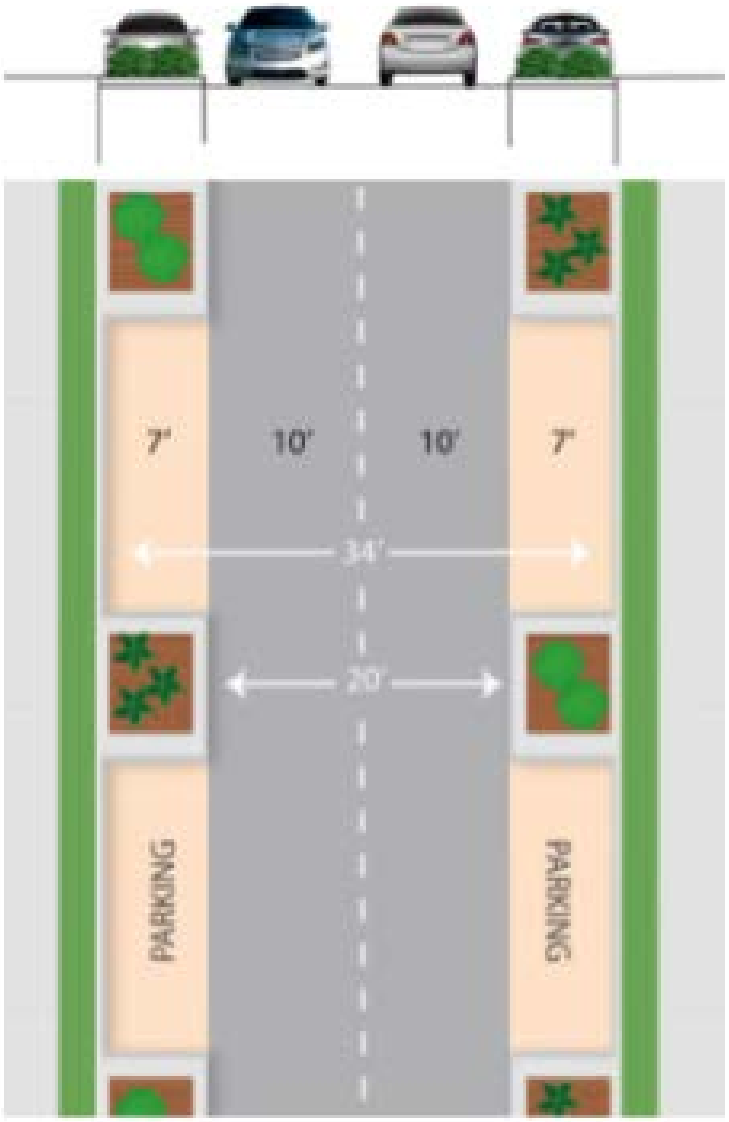


Suburban sprawl

Street design to accommodate emergency vehicles while also calming traffic

1. Parking placement strategies
2. Mountable curbs
3. Use of surface materials and paint
4. Roundabouts
5. Appropriate use of traffic calming measures

Parking placement strategies



Bulbouts at intersections and narrowing the street midblock can slow streets, while leaving room for emergency vehicles.

On streets with greater amounts of parking utilization, alternating parking between sides of the street allows room for emergency vehicles.

Surface materials and paint

Street treatments such as flexible delineators, paint or epoxy gravel, and bike lanes can narrow a street while still providing adequate width for emergency vehicles.

Roundabouts & mountable curbs

Mountable curbs allow large vehicle access while slowing other vehicular traffic.

Traffic calming

Speed cushions slow passenger vehicles, but allow emergency vehicles to straddle cushions.

Thank You!