



NCTCOG PRESENTATION

STREET CONNECTIVITY AND SUBDIVISION DESIGN

2022 SAFE ROUTES TO SCHOOL WEBINAR SERIES | 1.28.2022

NCTCOG 2022 SAFE ROUTES TO SCHOOL WEBINAR SERIES

Webinar #2: Building for Fiscal Sustainability & Changing Housing Demands

- Summer 2022
- Structures for building sound, fiscally sustainable street networks mirror strong street networks for walking and biking
- Market demands for housing types are shifting across all age groups

Webinar #3: Neighborhood-Scale Planning for Community Schools

- Fall 2022
- City-ISD coordination for siting schools in neighborhoods to encourage Safe Routes to School (SRTS) activities
- Planning for “right-size” and “right-location” schools



TODAY'S MEETING

NCTCOG Introduction

Shawn Conrad and Erin Curry: NCTCOG

Street and Street Networks: Livable Lovable Sustainable Resilient Places

Dr. Norman Garrick

Local Examples

Subdivision Planning and Street Connectivity: Mary Elliot, Development Services Department, City of Fort Worth

Safe Routes to School 2022 Waxahachie: Jennifer Pruitt, Planning Director, City of Waxahachie

Panel Discussion

All Speakers

Open Q&A Session with Audience



Mentimeter Polls



- Help us understand our audience by completing the two-question Mentimeter poll!

www.menti.com

Voting Code: 5878 7742

WHY DO WE NEED SAFE ROUTES TO SCHOOL?

- Reduction of students walking and biking to school in favor of commuting via private vehicle in past 50 years
 - Vehicle trips to K-12 schools now account for 10-14% of traffic during the morning commute
- Easier, safer routes for students to walk and bike to school
- Healthier students and improved school performance from increased exercise
- Reduce school transportation costs, reduce need for hazard bussing
- Household cost savings from reduced fuel and car use

Source: The National Center for Safe Routes to School, 2011



REGIONAL STATISTICS



SCHOOL TRIPS

In 2017, only 10% of school students walked or biked to school in the Dallas-Fort Worth region (NHTS)

COVID-19 Considerations



SUBDIVISION DEVELOPMENT

NCTCOG recorded 1,376 new subdivisions built between 2008 and 2018, totaling 142,154 new lots



POPULATION GROWTH

NCTCOG Population Estimates:

2021: 7,737,550

2045: 11,246,516

+3,508,966 (~146,206/yr)



THE PROBLEM WITH TRADITIONAL SUBDIVISION STREET NETWORKS

Modern subdivisions are often not built to accommodate safe and convenient active transportation.

- Cul-de-sacs
- Long block lengths
- Limited points of entry and exit
- Low connectivity between neighboring subdivisions and destinations



STREET CONNECTIVITY

Higher levels of street connectivity promote active transportation.

- Higher levels of connectivity result in:
 - Improved route choice
 - More direct routes to destinations
 - Wider vehicle traffic dispersal



REGULATING STREET NETWORK DESIGN

Texas law states that subdivision design approval is a function of local government.

- Subdivision plans must be approved if they conform to the municipality's plan for current and future streets
- Rejected subdivision design proposals without legal backing may be subject to legal challenges

The best time to ensure connectivity and subdivision design to promote active transportation is before the design stage. Codes supporting active transportation and early coordination with developers is vital.



STREET CONNECTIVITY STRATEGIES

Connectivity indexes measure how well connected internally a proposed road network is using a ratio of roadway “segments” and “nodes” (intersections).

- Other measures that can provide a safer walking environment:
 - Short block lengths
 - Eliminating cul-de-sacs
 - Required connections between subdivisions



STREET NETWORKS AND SRTS

Well-connected street networks support SRTS efforts by allowing for safe walking and biking from the start without expensive future retrofitting with safety countermeasures.

- If walking or biking routes from subdivisions to schools are not:
 - Safe
 - Comfortable
 - Direct
- They will not be used!
- “Human fueled” transportation looks for the most direct and efficient routes to travel along



Image Courtesy of Fort Worth



SCHOOL/ISD/CITY COORDINATION

- Cities and ISDs make decisions that affect each other and transportation
- Cities and ISDs often complete the same kinds of localized analysis on population growth trends and transportation needs independently of one another
- Funding is limited and smart land use planning can affect transportation choices



NCTCOG RESOURCES FOR SRTS AND SCHOOL SITING

SRTS:

- School District – Public Transportation Coordination in the Dallas-Fort Worth Region
- Safe Routes to School Brochure
- Look Out Texans Program
- School Zone Safety Tips
- Previous SRTS Plans for Schools
 - Dallas
 - Arlington
 - Kennedale
 - Fort Worth

www.nctcog.org/SafeRoutesToSchool

School Siting:

- Planning for Community-Oriented Schools: A Guide to School Siting in North Texas
- EPA Smart School Siting Tool
- *Joint-Use Agreement Resources*
- Memos
 - Coordinating Demographic Projections
 - Review of State Legislation and Policies Related to School Siting Requirements
 - Land Banking Programs and Best Practices Research

www.nctcog.org/SchoolSiting



COMING SOON: JOINT-USE AGREEMENT RESOURCES

Joint-Use Agreements are formal agreements usually between two separate government entities, such as a school and city to share public property or facilities.

- New resources coming to the NCTCOG website:
 - Local examples of Joint-Use Agreements in the DFW Region
 - Joint-Use Agreement templates from ChangeLab
 - Guidance on creating new Joint-Use Agreements

www.nctcog.org/SchoolSiting

	Standard Language	Facility Rules	City + ISD Responsibilities	Law Compliance + Liability
Local Examples of Joint-Use Agreements <i>[most applicable to other potential local agreements]</i>	<ul style="list-style-type: none"> • Effective date • Citing state statutes 	<ul style="list-style-type: none"> • No specifics on areas included in agreement (school grounds, etc.) 	<ul style="list-style-type: none"> • Basic maintenance and repair responsibility • Storage agreements 	<ul style="list-style-type: none"> • Basic liability release
ChangeLab Joint-Use Agreement Templates <i>[may include items that local agreements do not require]</i>	<ul style="list-style-type: none"> • Terms of the agreement • Renewal timelines 	<ul style="list-style-type: none"> • Specific sites are listed that are included in the agreement (playground area, ball field, etc.) • Listed permitted uses of grounds 	<ul style="list-style-type: none"> • Maintenance & repair responsibility • Storage agreements • Access (locking & unlocking) • Staff supervision • Restroom access • Parking access • Custodial responsibilities 	<ul style="list-style-type: none"> • Law compliance clause • Liability release • Workers' compensation • Insurance requirements

Items that are in bold are found in both the local examples and ChangeLab templates.



CONTACT US



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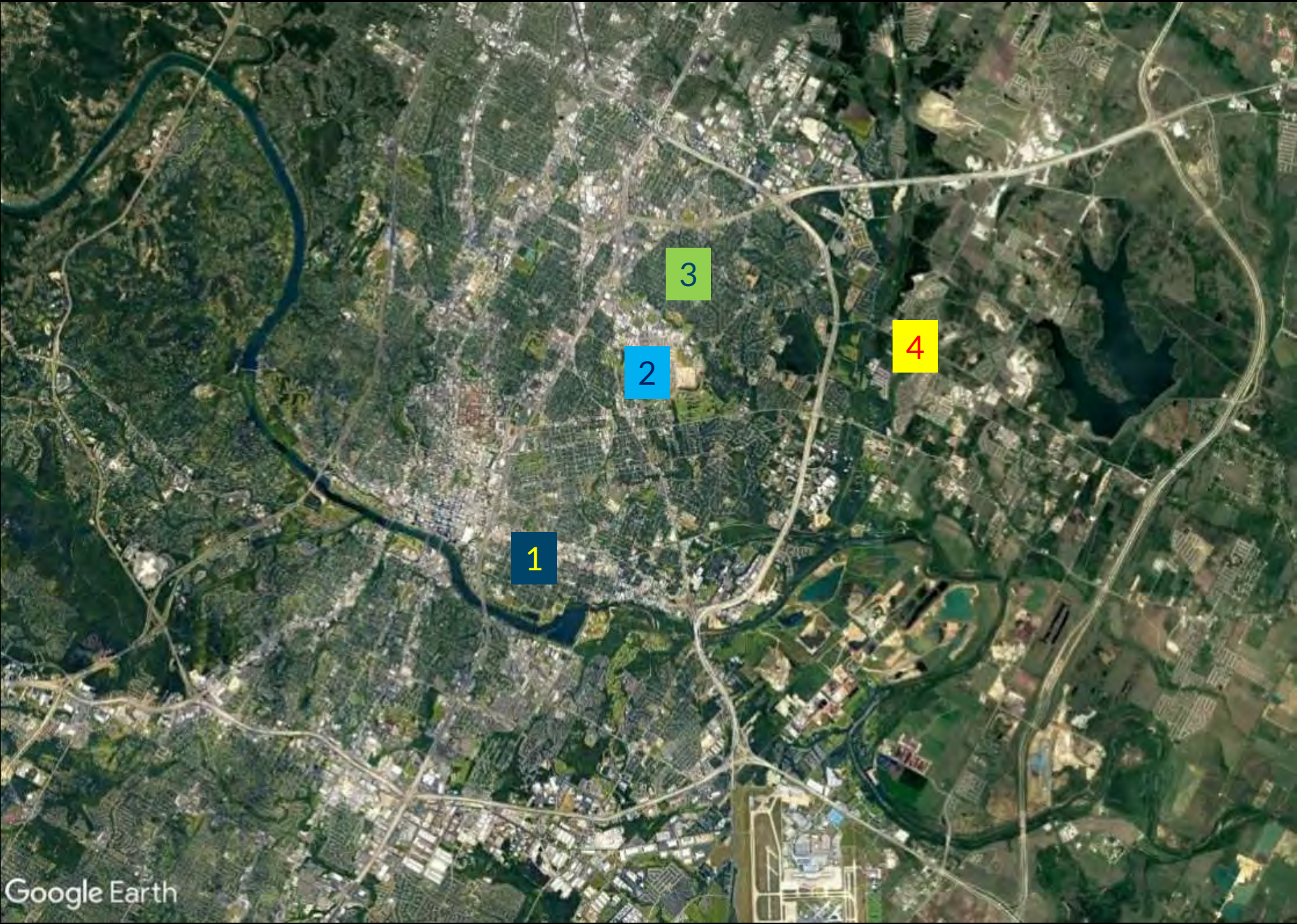
Erin Curry
Transportation Planner
North Central Texas Council of Governments
ecurry@nctcog.org





Street and Street Networks
Livable Lovable Sustainable Resilient Places

Norman W. Garrick



1



Google Earth



3



Google Earth

4

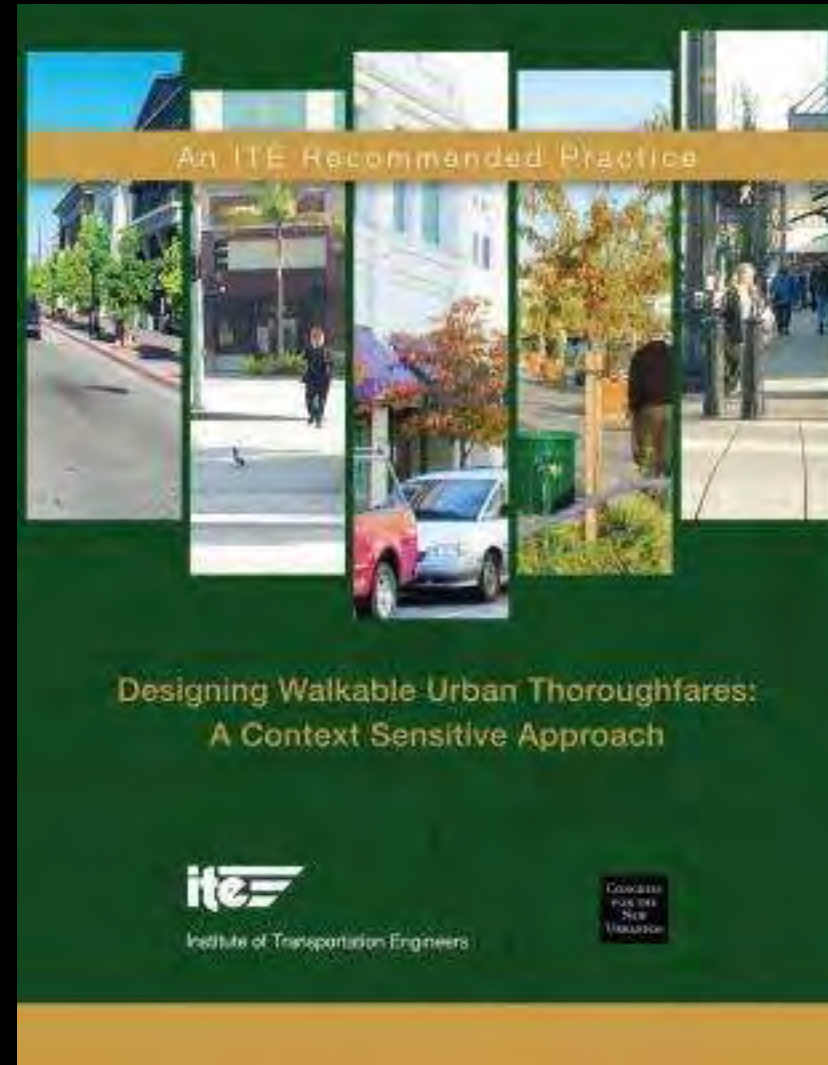


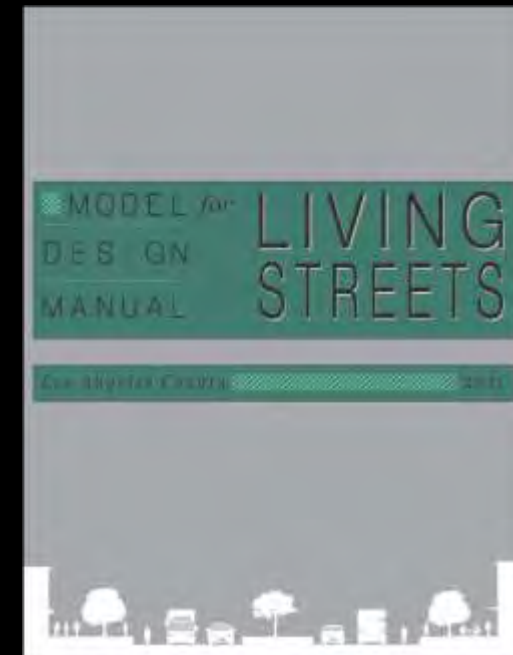
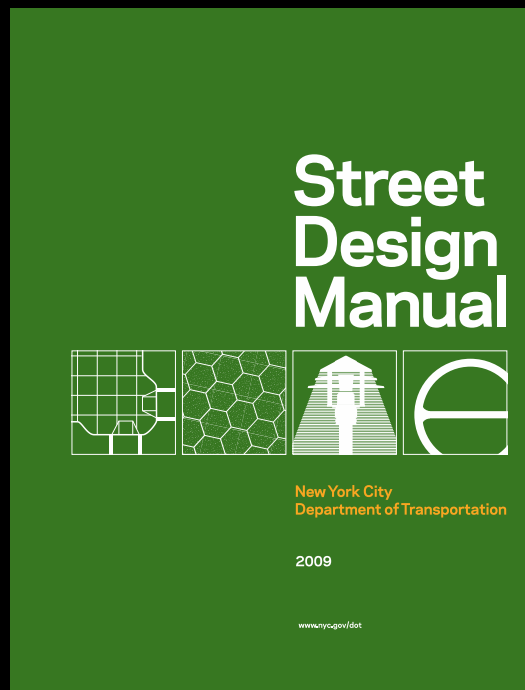
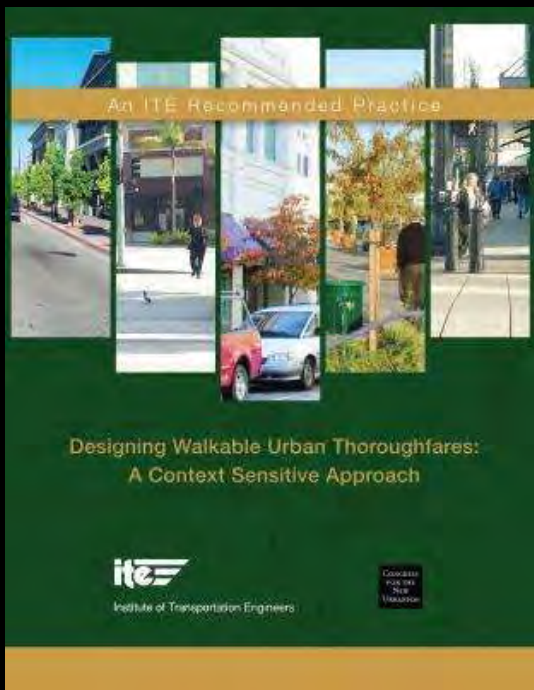
Google Earth

2007

First of a New Generation of Urban Streets Design Manuals

CNU/ITE/FHWA/EPA





Global



Street



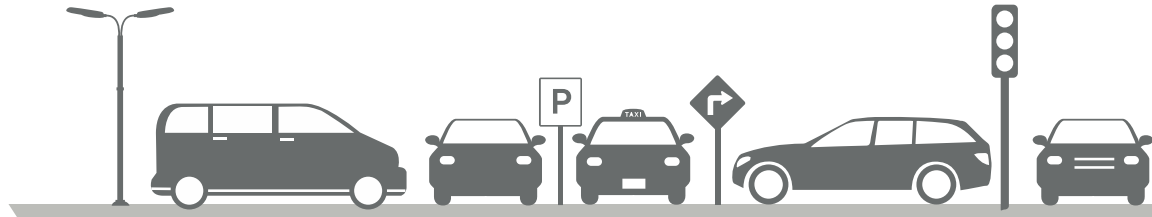
Design



Guide



Global Designing Cities Initiative



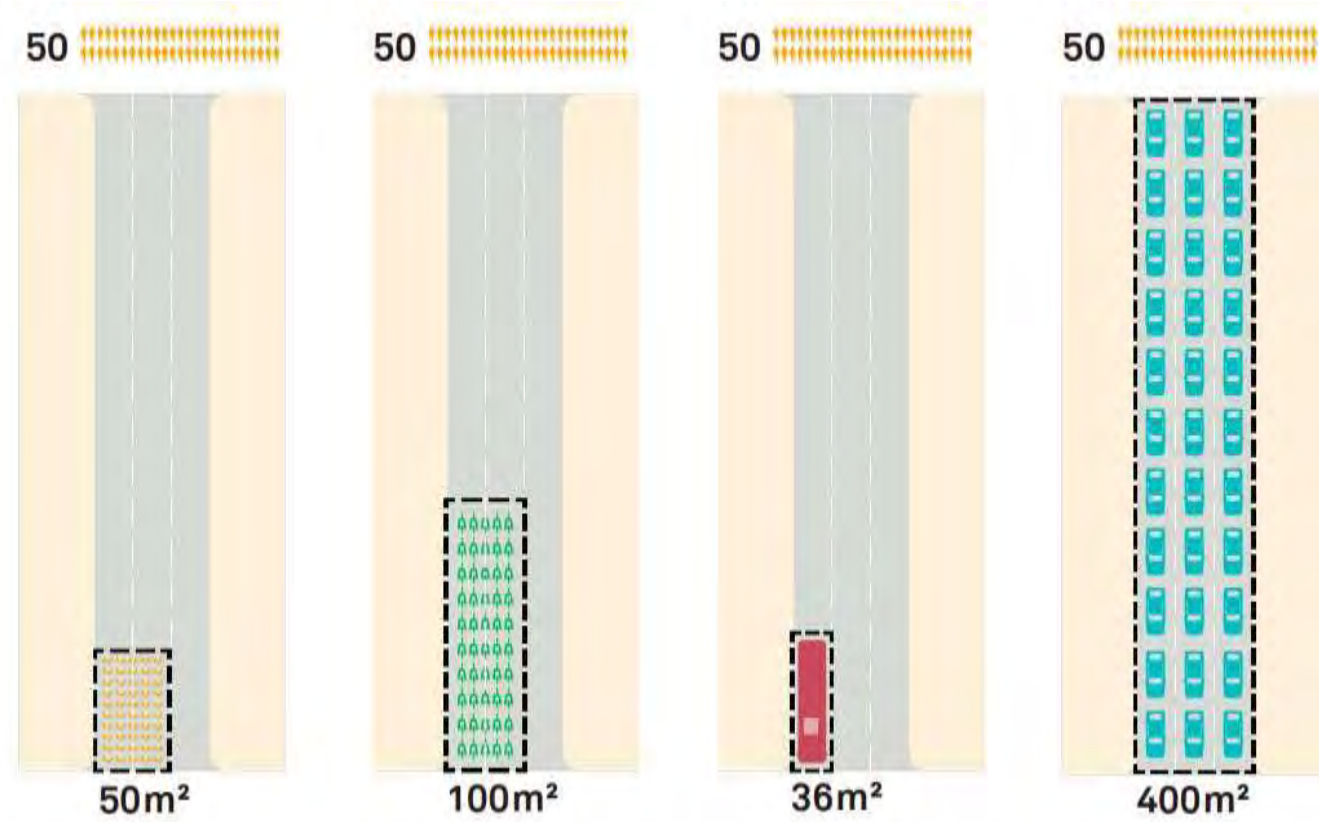
the old way



the new way

Streets Users Comparison

Space to move
50 people



Three Essential Elements of Urban Street Design

1. Connected and Complete Street Network

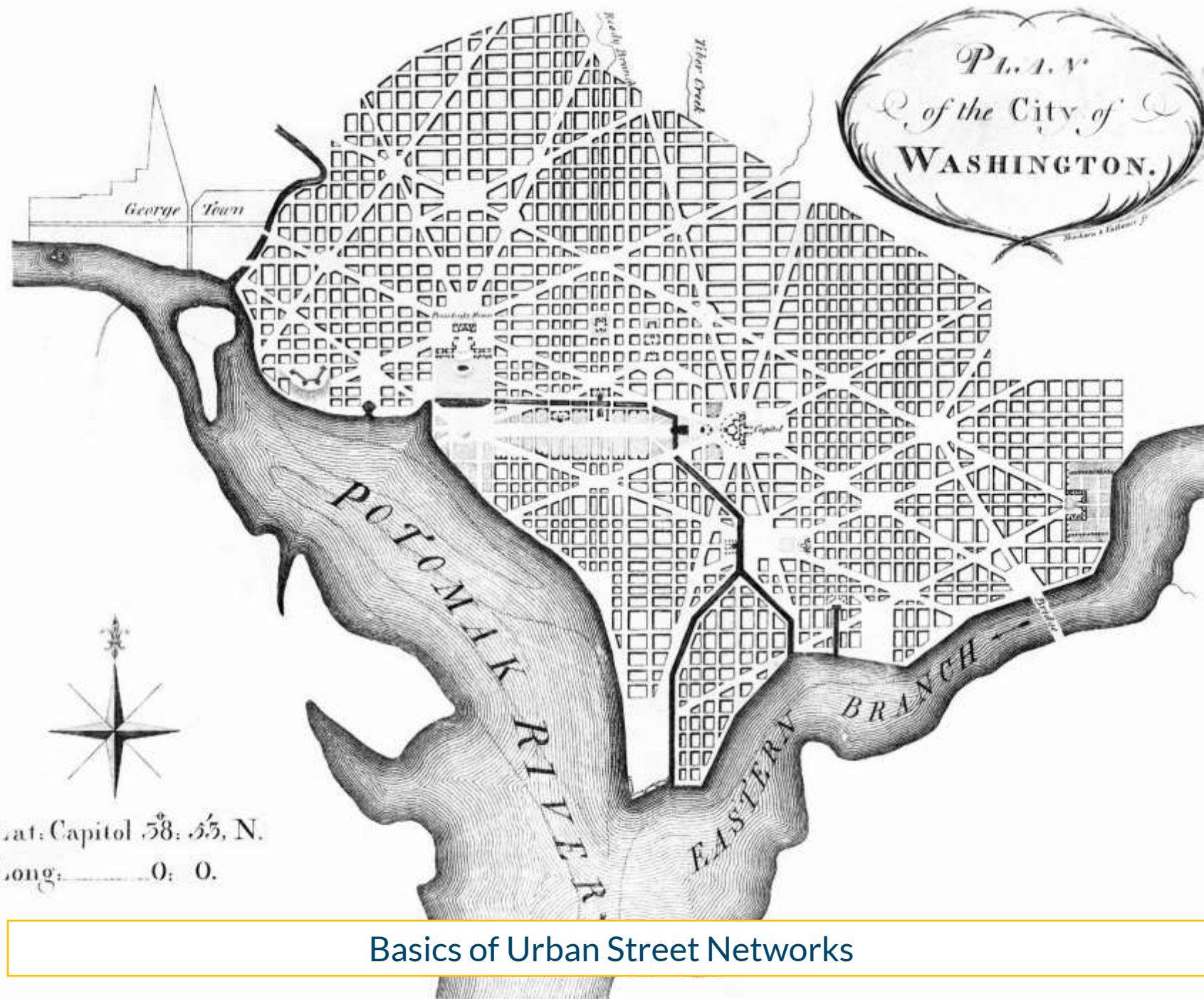
Good urban streets function as part of a **connected and complete network** with different types of streets serving different functions

2. Convenience, Comfort and Safety for All Road Users

Good urban streets are convenient, safe and comfortable for all, but especially for **non-motorized road users**

3. Sense of Place

Good urban streets are **places**, never just conduits for travel. Street design sets the tone for how a place feels and functions. The street also work in conjunction with other public spaces and buildings to create a sense of place.



Lat: Capitol 38: 55. N.
Long: 0: 0.

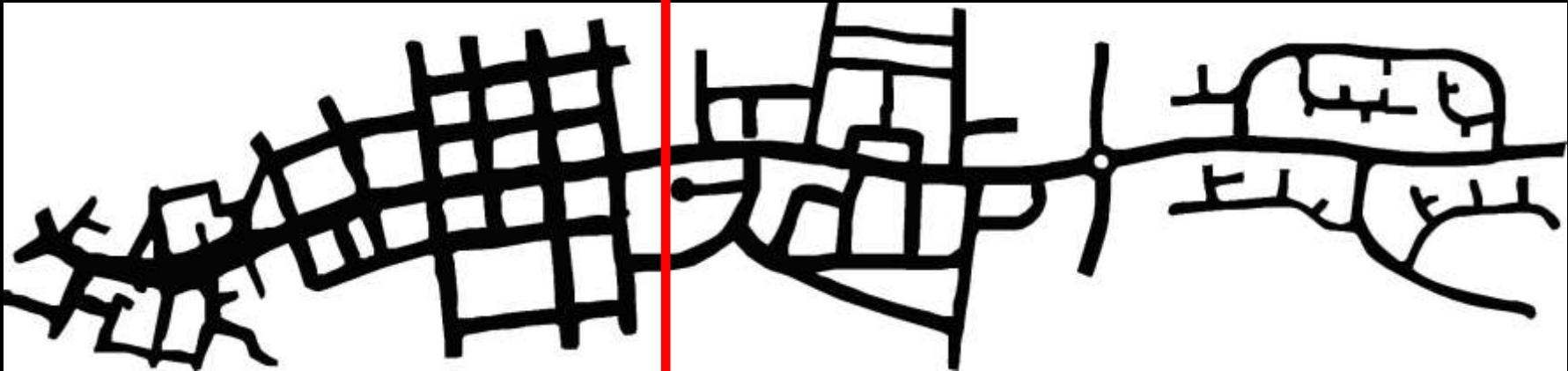
Basics of Urban Street Networks



Bringing the Garden City to America
Radburn, NY - 1928



Evolution of the Street Network



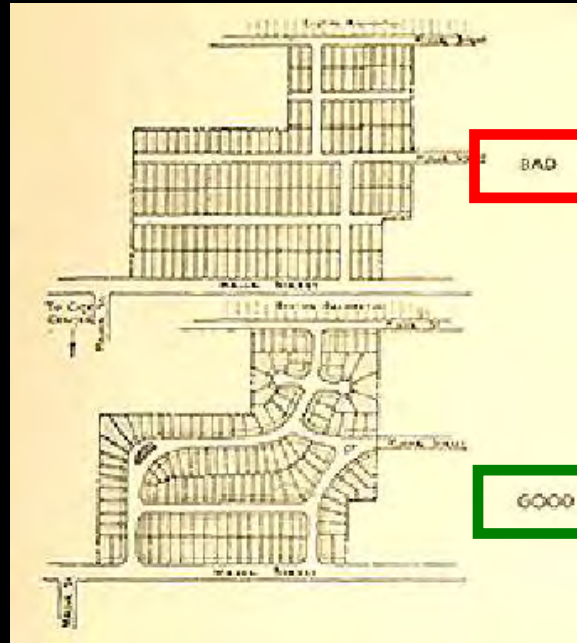
Pre-1950's

Post-1950's

Adapted from Stephen Marshall

How Did This Drastic Change Occur?

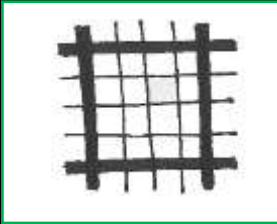
One important agency in getting rid of the grid network was
the
Federal Housing Authority



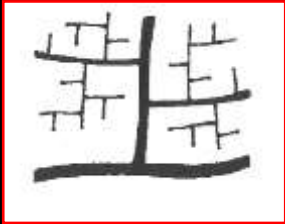


Researching the Network

Risk of Severe Injury or Fatality*



versus

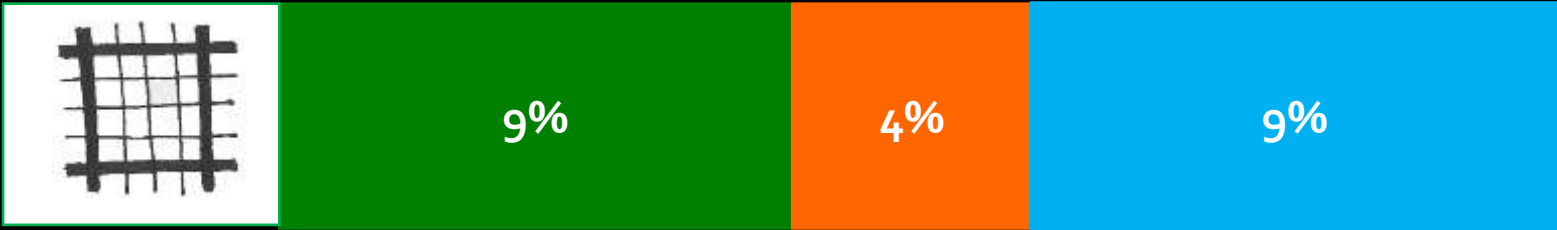
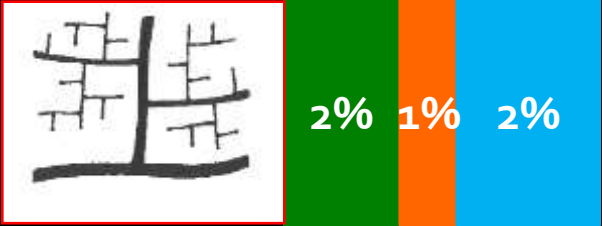


Chance of being Severely Injured
30% Higher

Chance of being Killed
50% Higher

*Given that an injury occurred

Percentage of People Walking, Biking or Taking Transit



The
Washington
Post

Why sprawl may be bad for your health

Their study* looked at 24 medium-sized cities in California, built at different times and with a variety of different street designs.

They then examined self-reported health data from the California Health Interview Survey, which sampled 40,000 to 50,000 adults in 2003, 2005, 2007 and 2009.

Their analysis controlled for socioeconomic status, commute times, the presence of fast-food restaurants and grocery stores and other land uses.

Ultimately, they found that higher intersection densities were significantly linked to reduced rates of **obesity, diabetes, high blood pressure, and heart disease**

*Marshall, Garrick and Piatkowski

Cul-de-Fat: How Suburbanization is Contributing to Obesity

HEALTHFITNESSREVOLUTION



Do We Look Fat in These Suburbs?



Just living close to Walmart makes you Fat



Storrs Center, Connecticut

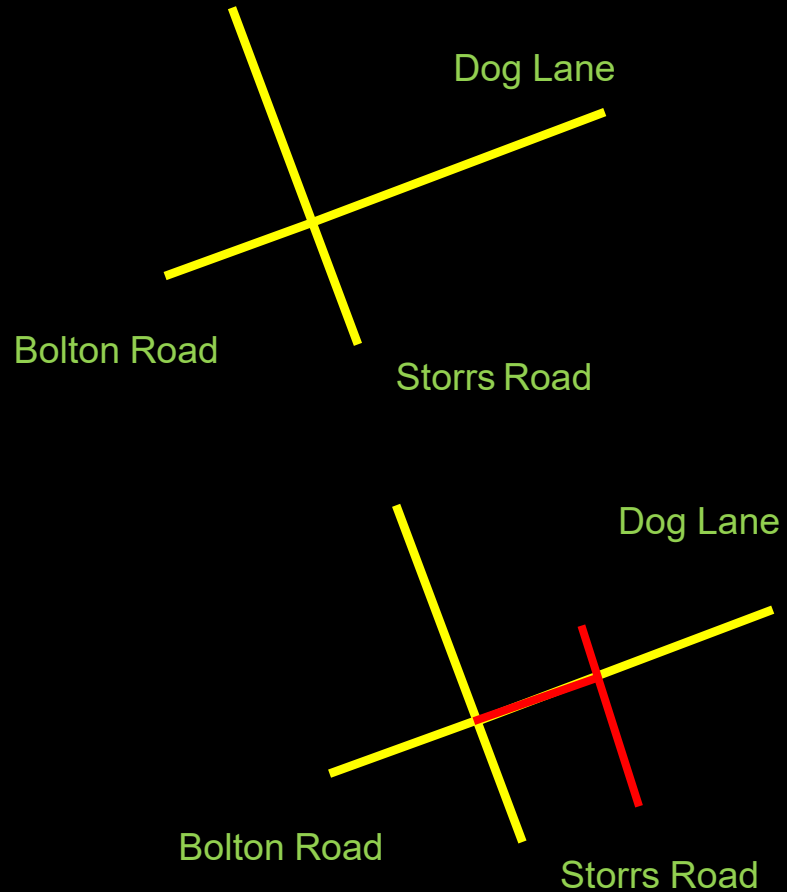
Storrs Center The Network

Pedestrians Only —
Vehicles + Pedestrians —



Street Network

Storrs Center



Problem: Engineers proposed widening Storrs Road to three lanes because the **models** showed that intersection could not handle the **projected** traffic

What was done: Creating a more complete network meant less pressure to widen Storrs Road to 3 lanes

Features of a Sustainable Street Network

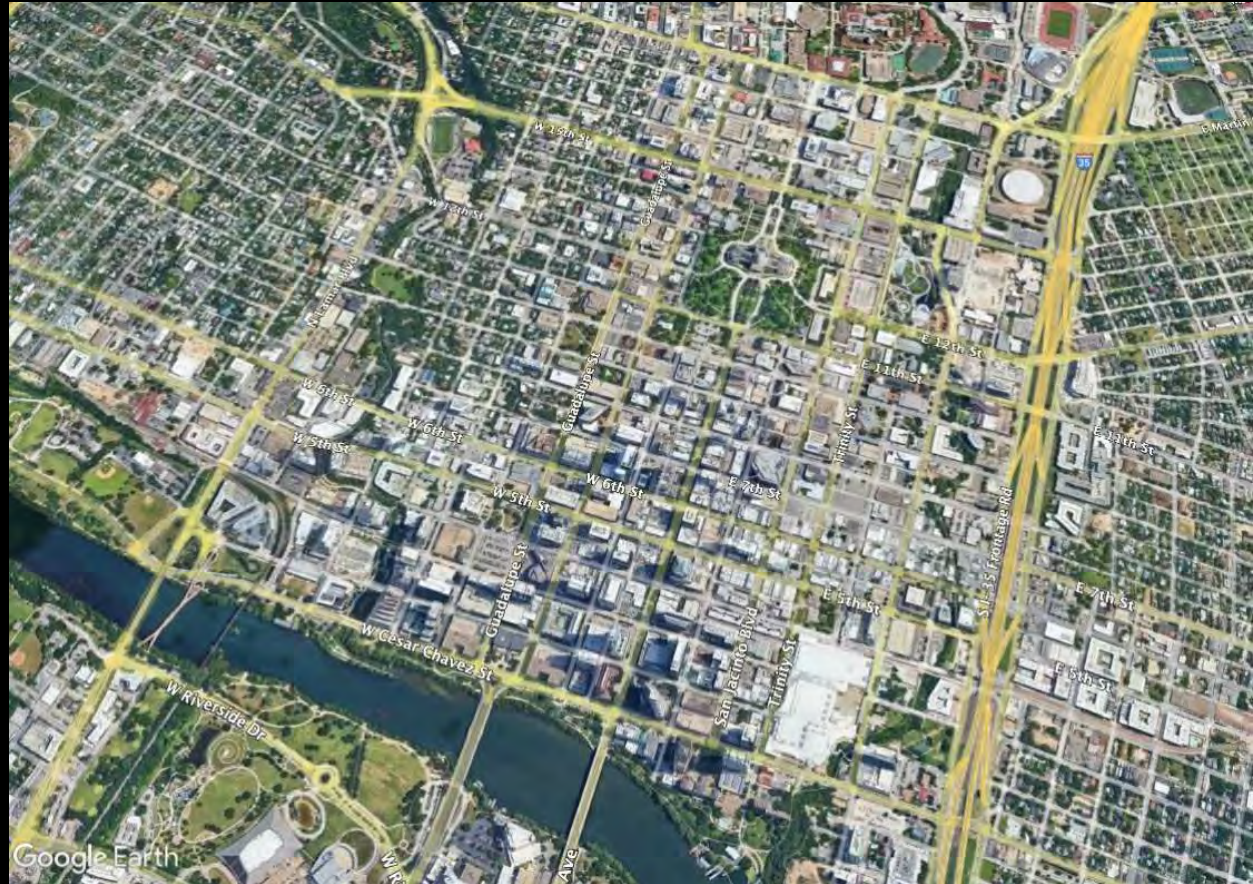
1. High Density of Intersections
2. High Connectivity within Neighborhoods
3. Good Porosity Between Adjacent Neighborhoods
4. Great Variety in Streets Types
5. No Restrictions on the types of streets that are connected to each other.
6. All Streets should be walkable and crossable and multipurpose
7. All Streets should have building frontage



Google Earth

W 15th St
W 14th St
W 13th St
W 12th St
W 11th St
W 10th St
W 9th St
W 8th St
W 7th St
W 6th St
W 5th St
W 4th St
W 3rd St
W 2nd St
W 1st St
W Cesar Chavez St
W Riverside Dr
W 1st Ave
W 2nd Ave
W 3rd Ave
W 4th Ave
W 5th Ave
W 6th Ave
W 7th Ave
W 8th Ave
W 9th Ave
W 10th Ave
W 11th Ave
W 12th Ave
W 13th Ave
W 14th Ave
W 15th Ave
Guadalupe St
San Jacinto Blvd
Trinity St
E 12th St
E 11th St
E 10th St
E 9th St
E 8th St
E 7th St
E 6th St
E 5th St
E 4th St
E 3rd St
E 2nd St
E 1st St
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E 10th St
E 9th St
E 8th St
E 7th St
E 6th St
E 5th St
E 4th St
E 3rd St
E 2nd St
E 1st St
I-35 Frontage Rd
I-35

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Google Earth

E Martin Luther King

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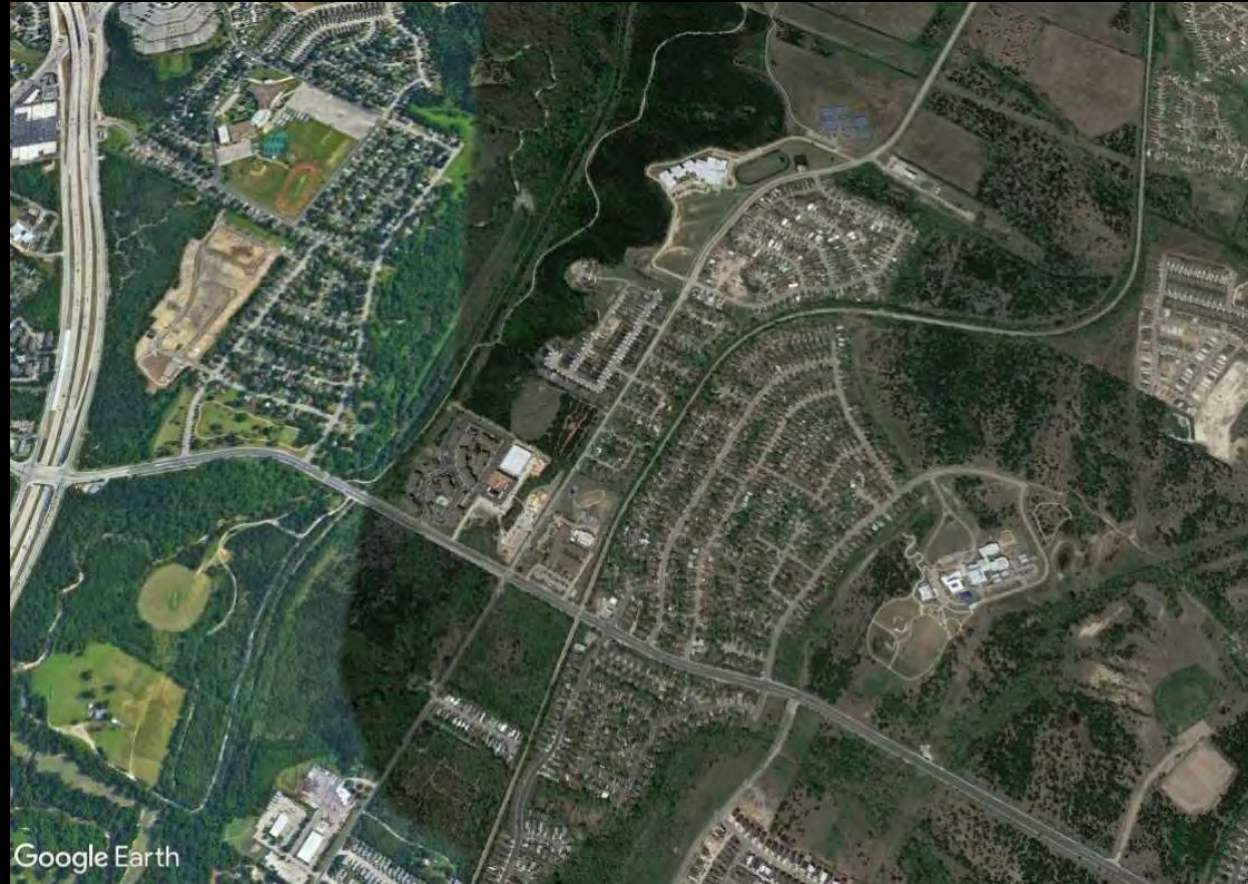
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Google Earth

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The 15-minute city

Carlos Moreno's 15-minute city framework highlights four key characteristics for sustainability and resilience:

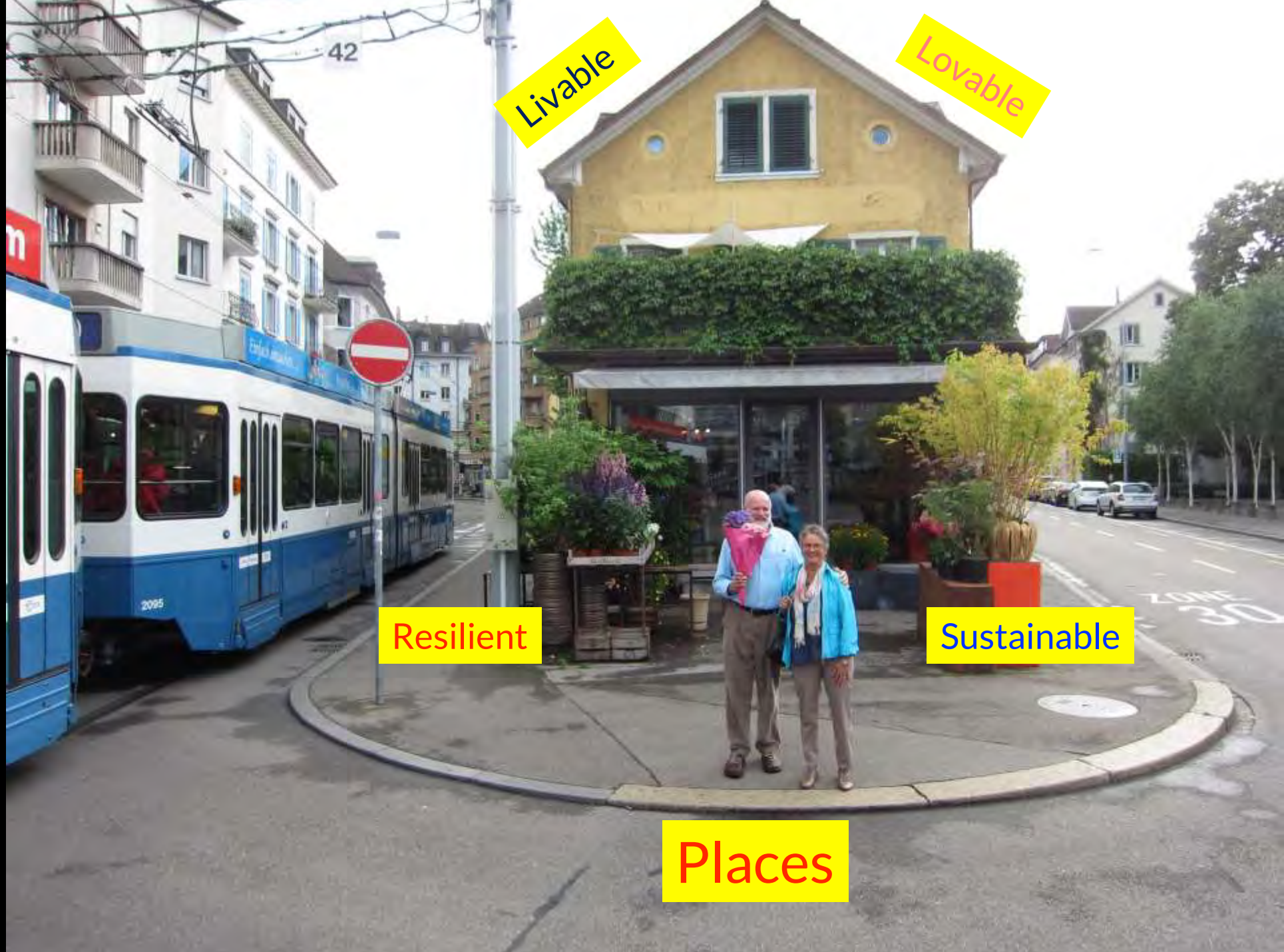
Proximity: Things must be close.

Diversity: Land uses must be mixed, providing a wide variety of urban amenities nearby.

Density: There must be enough people to support a diversity of businesses in a compact land area. This does not mean Manhattan-level density is needed

Ubiquity: These neighborhoods must be so common that they are available and affordable.

<https://www.15minutecity.com/blog/hello>



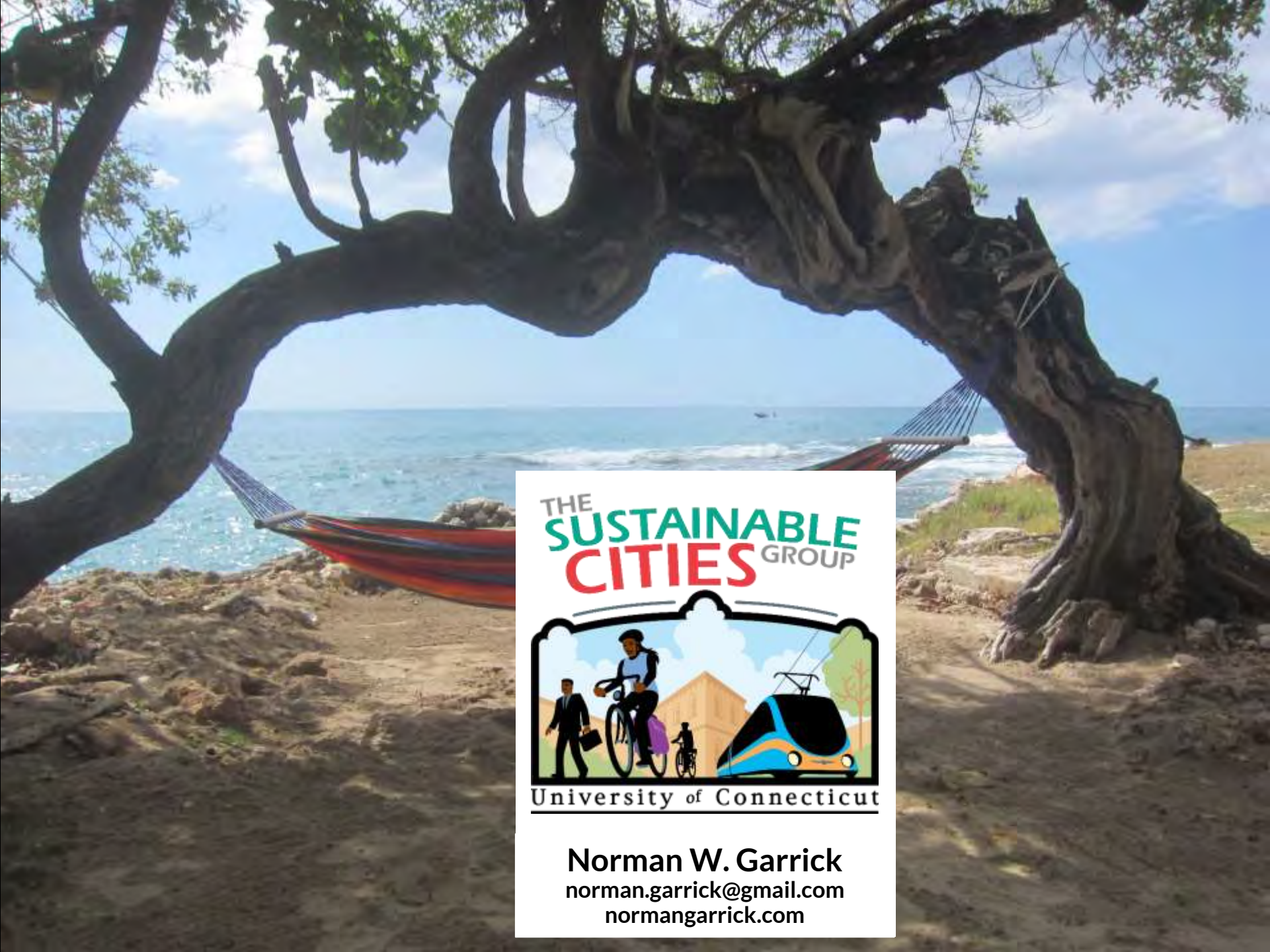
Livable

Lovable

Resilient

Sustainable

Places



THE
SUSTAINABLE
CITIES GROUP



University of Connecticut

Norman W. Garrick
norman.garrick@gmail.com
normangarrick.com

Subdivision Planning and Street Connectivity

North Central Texas Council of Governments

January 28, 2022

Goal of Multiple Access Points

- To create a **System of Complete Streets** with multiple routes and connections serving the same origins and destinations
 - Reduce Traffic Volumes
 - Increase Route Choices
 - Increase Mobility
 - Reduce Emergency Response Times
 - Create Reliable Infrastructure Network
 - Decrease Pedestrian Fatalities

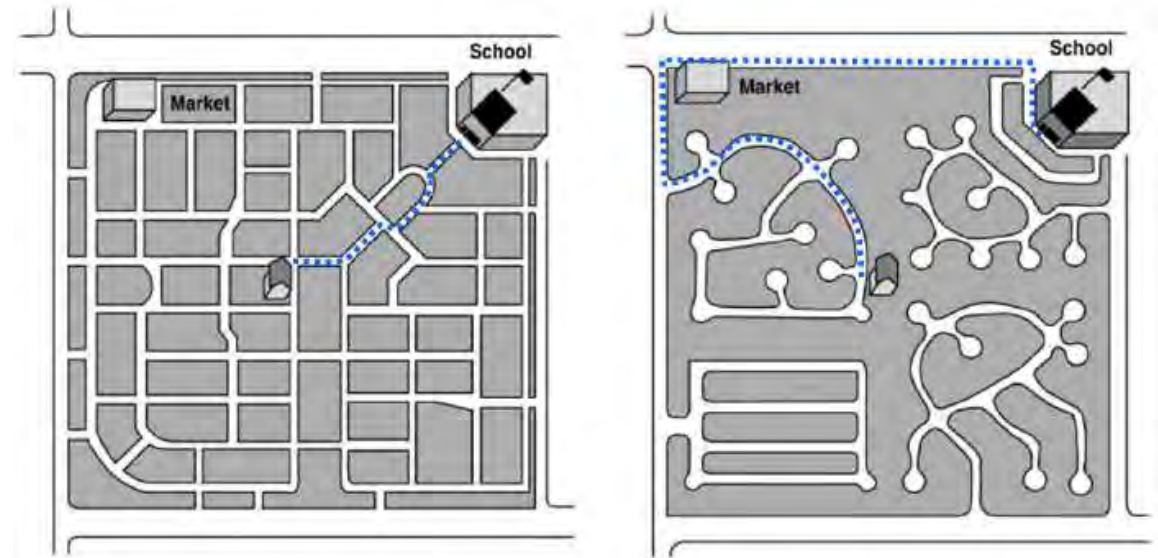


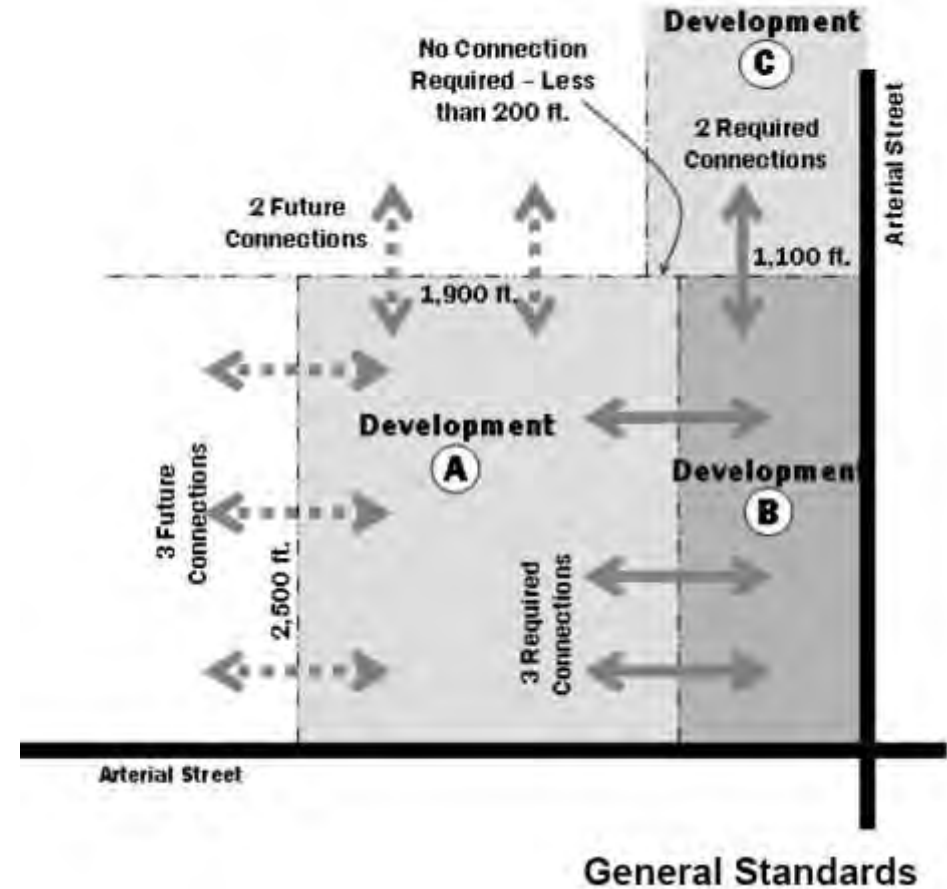
Figure 1: Shorter trip distance with connected network

Credit: Institute of Transportation Engineers (ITE)

Benchmarking

- **Raleigh, Charlotte and Cary, NC** –Urban Streets, Street Connectivity and Access
- **Austin, TX** Connectivity, Complete Streets and Healthy Living Policy
- **State of Virginia** Secondary Street Acceptance Requirements
- **El Paso, TX** Subdivision Ordinance
- **Frisco, TX** Form Based Code and Engineering Standards
- **McKinney, TX** Town Center Zoning
- **State of Kentucky/Fort Collins, CO** - Model Subdivision Ordinances

Sample Illustration of Street Connections

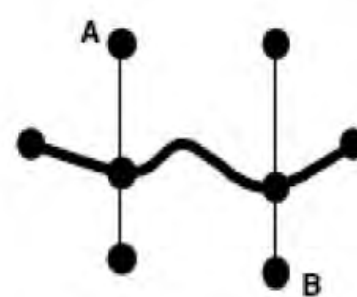


Credit: Frisco, TX form-based code

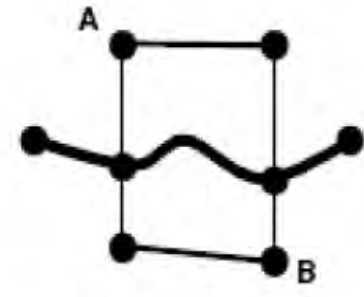
Combining maximum intersection spacing, block length and block perimeter standards, with a connectivity index ensures **shorter trip distances**

- **Link-node ratio** is the **industry standard** for measuring connectivity
- Link-node ratio is the number of **links** **divided** by the number of **nodes**
- **Links** are roadways between two nodes or a stub-out
- **Nodes** are intersections or ends of cul-de-sacs
- Most common measure for non-grid street networks is **1.4 LNR**

Link-node ratio increases as connectivity of road network increases



Ratio = $7/8 = 0.88$



Ratio = $9/8 = 1.13$

Credit: Virginia Secondary Street Acceptance Requirements

2016 Text Amendments

Additional requirements were added to address added **street connections** and **mid-block access ways** for schools and parks

- **Adequate facilities** section was added to address needs above two points of access through a traffic study
- **Public pedestrian access easements (PPAEs)** were added as an alternative for mid-block relief for long blocks near schools and parks
- **Differentiation** among arterials, collectors and residential streets for secondary access
- **Local streets** shall not connect to adjacent streets at less than 600-foot intervals with **arterials**, and less than 250-foot intervals with **collectors**



Credit: Goodwin-Marshall Engineers

2016 Text Amendments

Block length requirements were amended to address “UR” Urban Residential, a new zoning district introduced into urban villages and growth centers

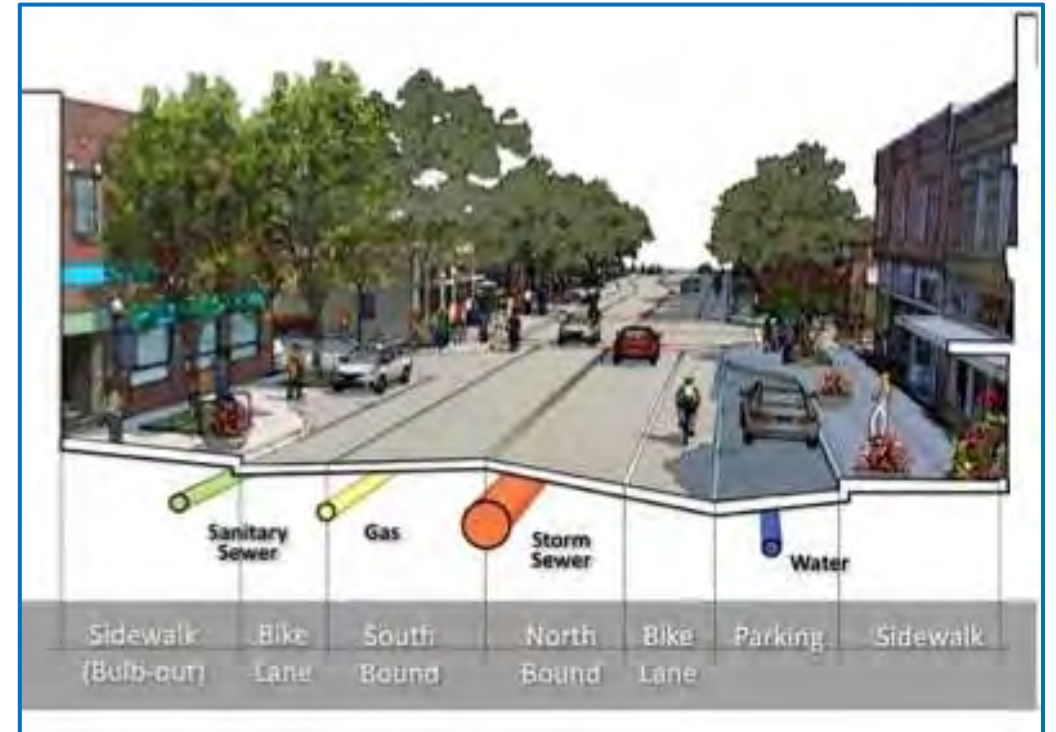
- **Maximum distance** between publicly accessible streets shall be 1,000 feet
- For areas zoned UR, Mixed Use districts, or “H” Central Business District, the **block perimeter** cannot exceed 1,600 feet with a maximum **block face** is 500 feet
- PPAEs, or private walkways in a public use easement, may be **substituted** for a block boundary and shall connect to existing public sidewalk system



Credit: Near Southside, Inc.

2016 Master Thoroughfare Plan was adopted and incorporated into the **Subdivision Ordinance** by reference

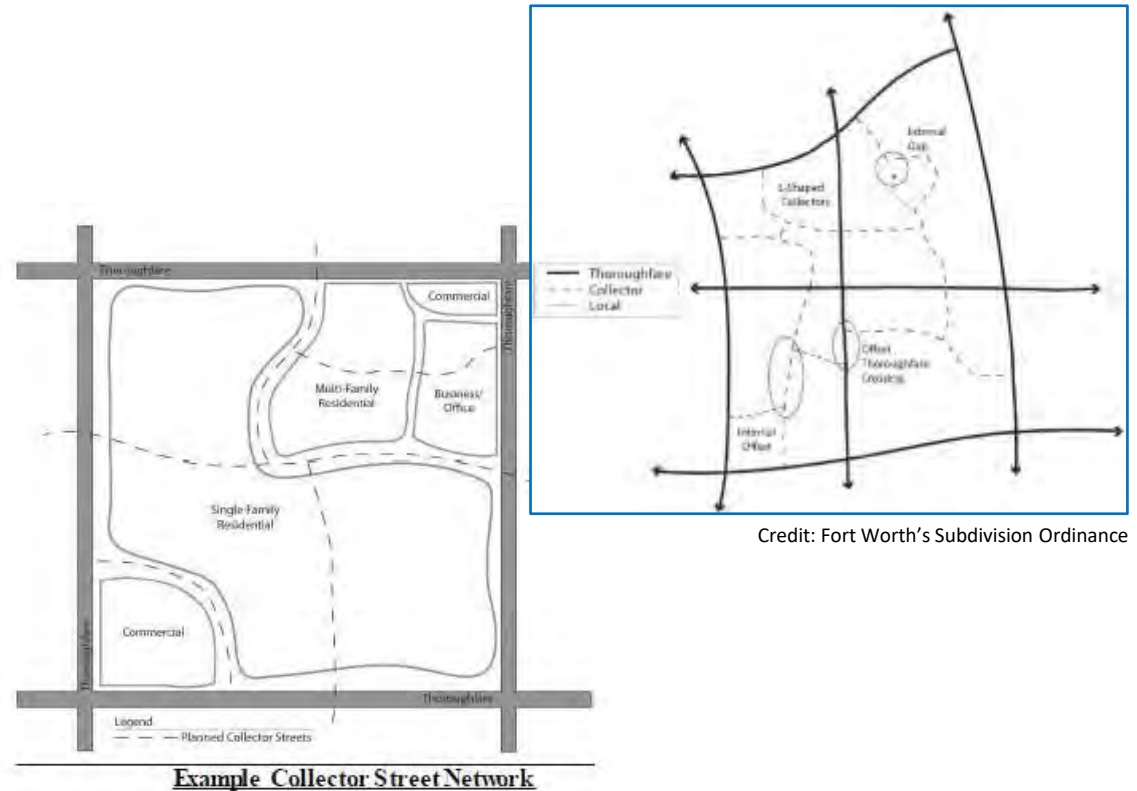
- Traditional **street classifications** were replaced by **street types**, which reflect the relationship between adjacent land uses and thoroughfares
- Street types (Activity Street, Mixed Use/Commercial, Commercial Connector, and Neighborhood Connector) provide the applicant with **multiple street sections** that can be applied to specific land uses
- **Complete Streets** practices are incorporated into the 2016 MTP to address pedestrian, bicycle, vehicular and other modes of transportation



Credit: Fort Worth's 2016 Master Thoroughfare Plan

Access Management Policy was adopted and incorporated into the **Subdivision Ordinance** by reference, and **Collector Network Planning** was introduced

- Collector planning is a **careful balance** between providing **direct connectivity** and attracting **no more traffic** than is appropriate
- Collector streets shall connect to thoroughfares at **full median opening** locations where feasible
- Criteria for approving **discontinuities** are provided that recognize existing conditions and various densities



Credit: Fort Worth's Subdivision Ordinance

Subdivision Ordinance, Street Design Standards were updated to include block lengths for Multifamily Zoning Districts

- Multifamily Zoning Districts (“CR” Low Density, “C” Medium Density, and “D” High Density) shall have a maximum **block face** of 1,000 feet
- PPAEs, or private walkways in a public use easement, may be **substituted** for a block boundary and shall connect to existing public sidewalk system
- **Zoning Ordinance** was also updated to encourage multifamily building forms that are more consistent with FBCs



Credit: McKinney Town Center Zoning District

Active Transportation Plan was adopted and incorporated into the **Subdivision Ordinance** by reference

- Additional **widths** introduced for public pedestrian access easements and public use easements
- Where a site is adjacent to an adopted plan for a **lake, river or creek trail system**, the plat will connect with a dedicated easement
- **Public trails** in public use easements allow for other surfaces that are more appropriate than concrete

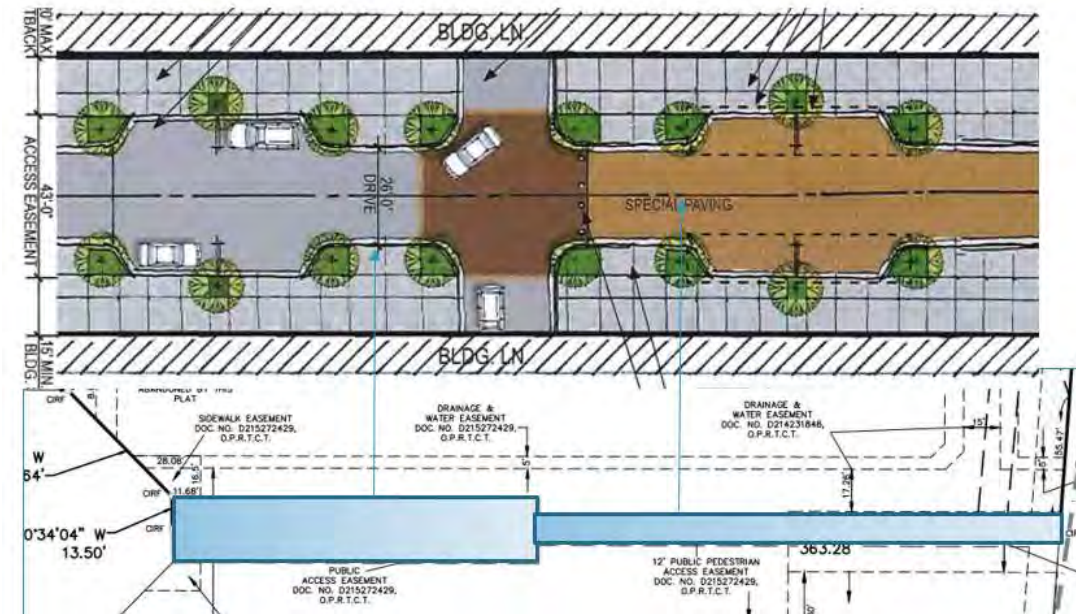


Credit: Fort Worth's Left Bank Mixed Use Development

Conclusion

Future **Subdivision Ordinance** amendments to address other design manual updates and add an infill development section

- Find the **right planning tool** for the planning area’s context and scale
- Build consensus by having difficult discussions about **urban density** with staff, development community and neighborhoods
- Implement **connectivity ordinances** in **phases** when there are areas that need additional consensus building, or other alternatives need to be researched and considered



Credit: Fort Worth’s Left Bank Mixed Use Development



Thank you!

Mary Elliott, AICP

Mary.Elliott@fortworthtexas.gov

817-392-7844



Safe Routes to Schools 2022 Waxahachie



Jennifer Pruitt
AICP, LEED-AP, CNU-A
January 28, 2022



Department Overview

- The Planning Department works to improve the welfare of people and their communities by creating more efficient, convenient, safe, equitable, healthy, and attractive places for present and future generations.
- In order to create this sense of place, the Planning Department provides residents and developers with a one-stop destination for all key functions related to the initial development review process
 - Zoning Revisions and Specific Use Permits
 - Comprehensive Plan
 - Zoning Board of Adjustments
 - Parkland Dedication or Fee in lieu
 - Impact Fees
 - Platting
 - Site Plan Reviews
 - Development Review Committee
 - Addressing
 - GIS and Mapping



Tools



City of Waxahachie
2021

Sidewalk Program(PW)

- This new program installed ADA (American Disability Act) concrete sidewalks

Sidewalk Grant Program(PW)

- This new program allows for the City of Waxahachie and property owners to share in the cost of repairs to sidewalks.

Subdivision Ordinance

- The Subdivision Ordinance has language to facilitate safe routes

GIS

- Data collection and documentation

2020 Sidewalk Program



City of Waxahachie
2021

FY20-21 PROJECT STATUS UPDATE

- This new program installed ADA (American Disability Act) concrete sidewalks in the following street:
 - **East Marvin Avenue** from Flat St. to Ennis St. which was approximately 2,500 LF
 - **Dr. MLK Jr. Blvd.** from Kaufman Street to Wyatt Street which was approximately 900 LF
 - **Brown Street (FM 813)** from Kirksey St to Criddle St which was approximately 1,800 LF in length with 5' width and also ADA barrier free ramps at various intersections.
 - **Harbin Avenue** from W. Marvin Ave to Second St. with ADA barrier free ramps.

The original construction cost was \$228,008.94 and the final cost was \$228,008.94.

All work has been completed as of December 2020.

FY20-21 PROJECT STATUS UPDATE

2020 Sidewalk Program-Before



Harbin Ave - Before



Brown & Barger - Before



704 Brown - Before

FY20-21 PROJECT STATUS UPDATE

2020 Sidewalk Program-After



Harbin Ave - After



Brown & Barger - After



704 Brown - After

Wilemon Academy



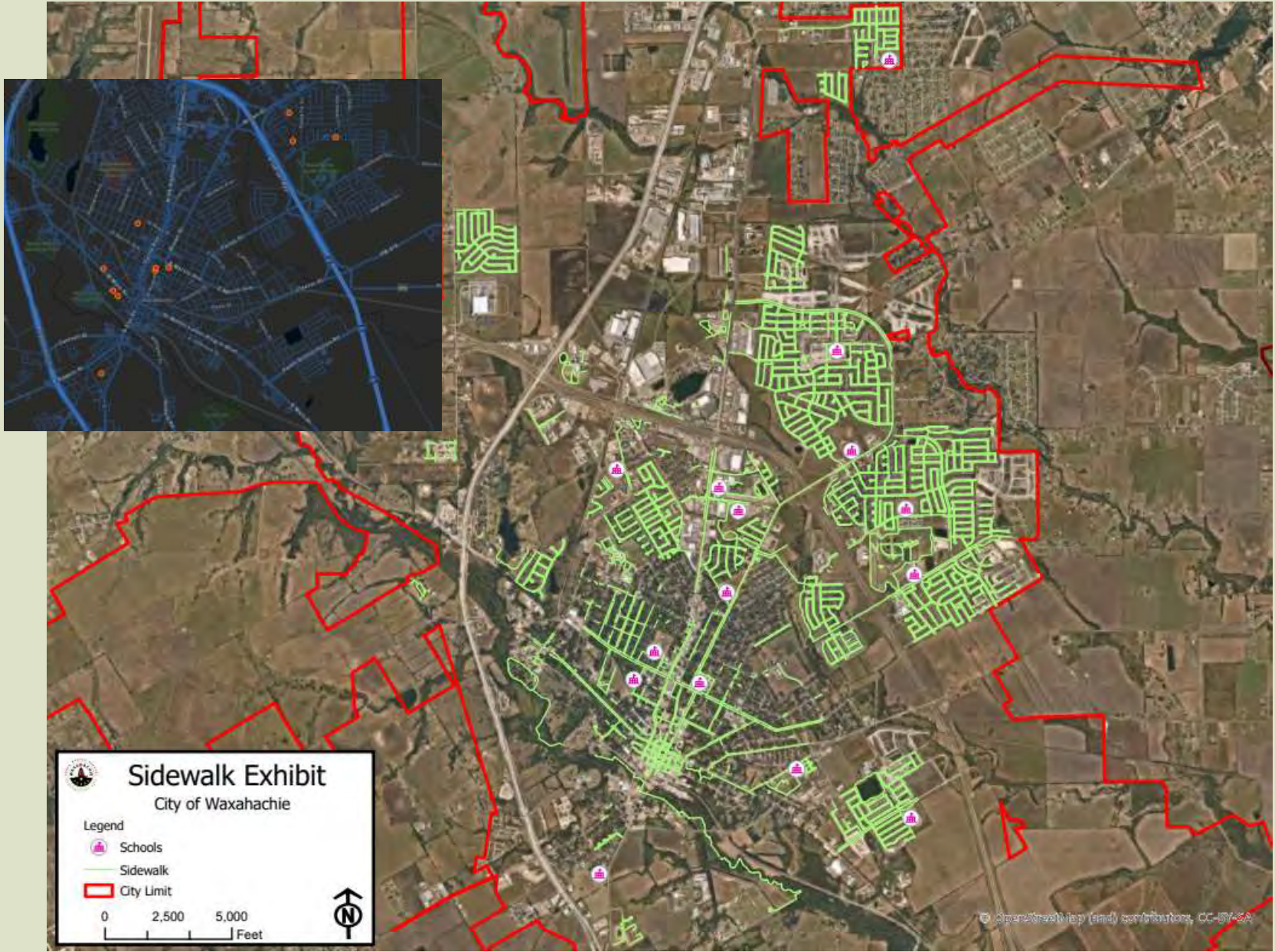
Northside Elementary



Finley Jr HS







2020 Sidewalk Grant Program



City of Waxahachie
2021

FY20-21 PROJECT STATUS UPDATE

This new program allows for the City of Waxahachie and property owners to share in the cost of repairs to sidewalks.

Currently have eleven applications:

523 N Rogers
120 Chieftain
603 N Rogers
5165 N College
604 W Jefferson
911 Ellis
15 Blue Moon
302 Harbin
204 Hacienda
818 W Main
514 W Jefferson

sidewalkgrant@waxahachie.com

FY20-21 PROJECT STATUS UPDATE

2020 Sidewalk Grant Program



516 North College - Before



523 North Rogers - Before



603 North Rogers - Before

FY20-21 PROJECT STATUS UPDATE

2020 Sidewalk Grant Program



516 North College - After

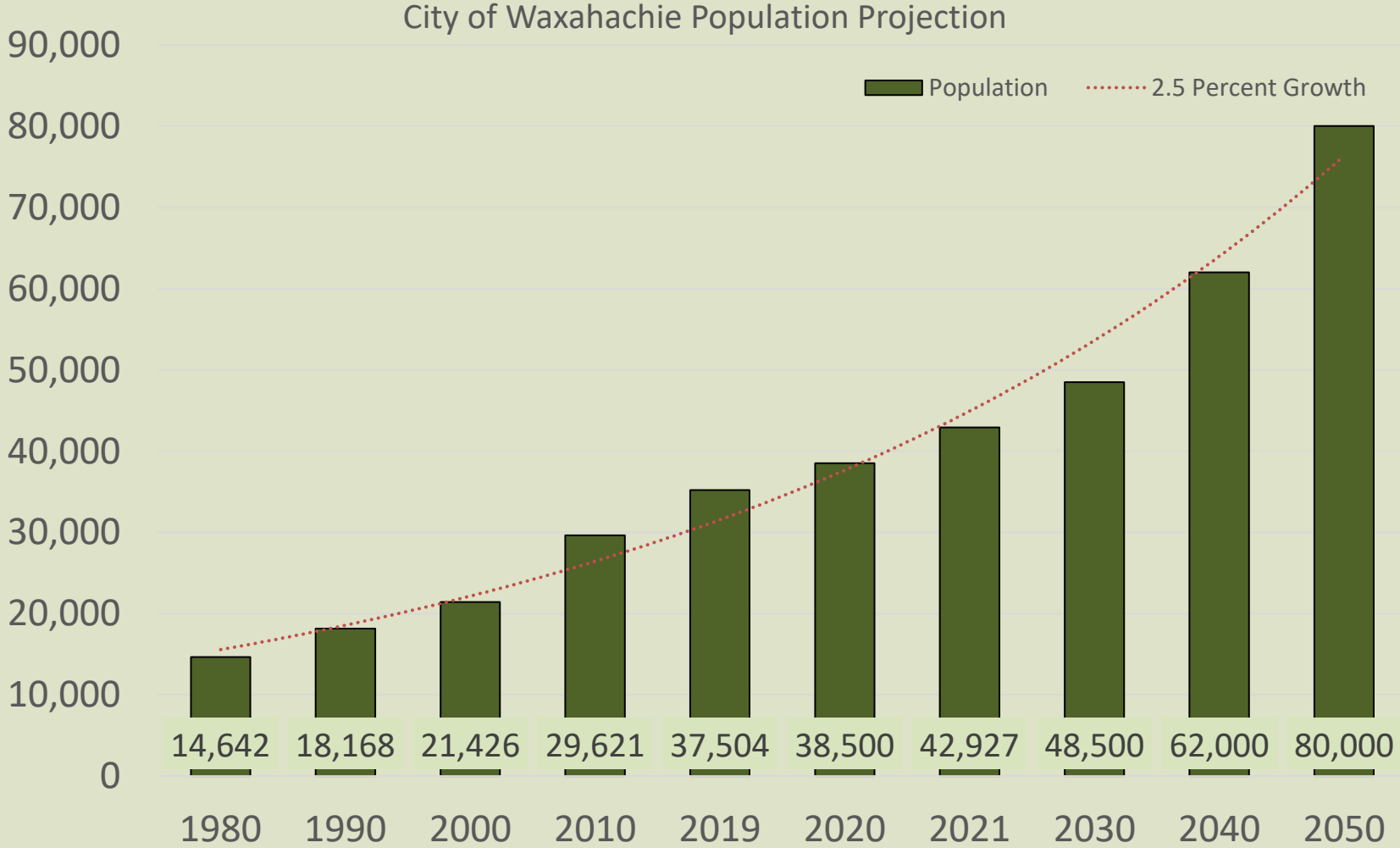


523 North Rogers - After



603 North Rogers - After

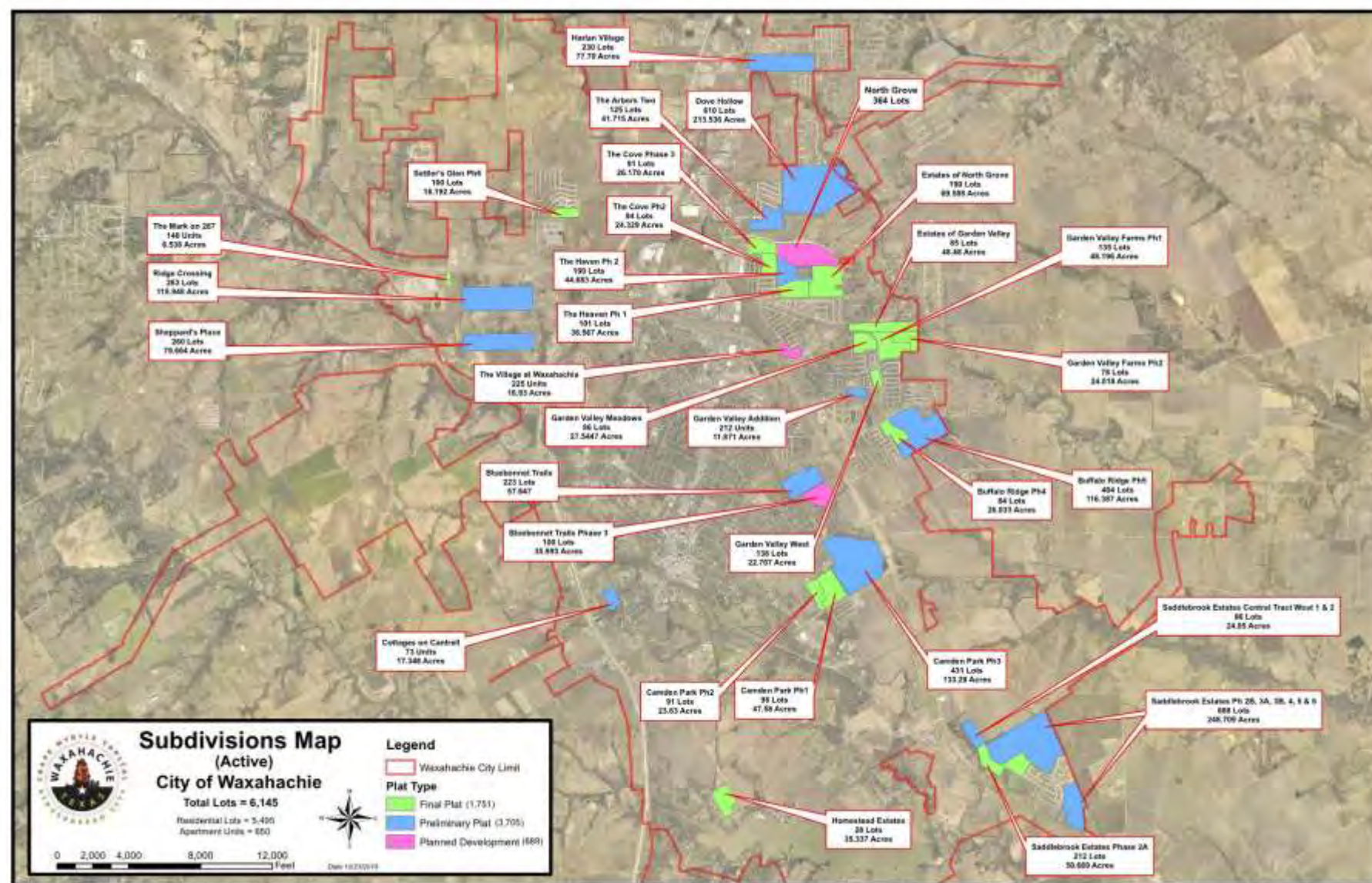
Population Information



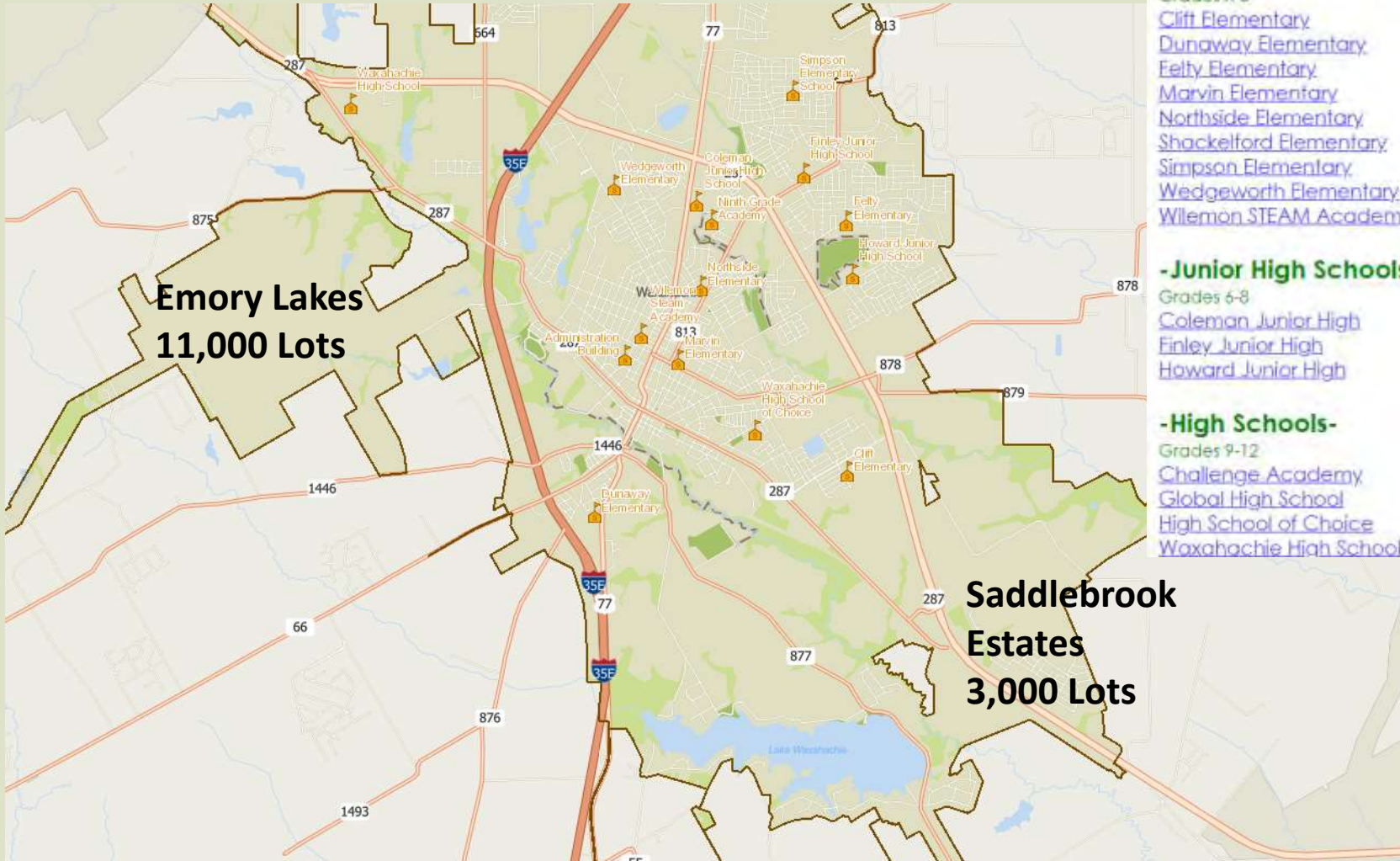
Population Information



Areas of Growth



Schools



-Pre Schools-
Grade Pre-K, ECSE
[Turner Pre-Kindergarten Academy](#)
[Marvin Elementary](#)
[Northside Elementary](#)
[Early Childhood Special Education](#)

-Elementary Schools-
Grades K-5
[Clift Elementary](#)
[Dunaway Elementary](#)
[Felt Elementary](#)
[Marvin Elementary](#)
[Northside Elementary](#)
[Shackleford Elementary](#)
[Simpson Elementary](#)
[Wedgeworth Elementary](#)
[Wilemon STEAM Academy](#)

-Junior High Schools-
Grades 6-8
[Coleman Junior High](#)
[Finley Junior High](#)
[Howard Junior High](#)

-High Schools-
Grades 9-12
[Challenge Academy](#)
[Global High School](#)
[High School of Choice](#)
[Waxahachie High School](#)



Providing connections between subdivisions

- Section 3.1: Streets
 - Provide for future access (i.e., provide stubbed streets for future extension) to adjacent vacant areas which will likely develop under a similar zoning classification;
- Requiring relatively short blocks
 - Section 3.1: Streets
 - The maximum length of any block or street segment shall be one thousand two hundred (1,200) feet, as measured along the street centerline and between the point(s) of intersection with other through (i.e., not dead-end or cul-de-sac) streets.
- Not allowing dead-end streets to encourage circulation/connections
 - Section 3.1: Streets
 - Except in unusual cases, no dead-end streets will be approved unless such dead-end streets are provided to connect with future streets on adjacent land.
- Section 3.5 Sidewalks:
 - Sidewalks not less than eight feet (8') wide shall be provided along all perimeter roadways (residential and non-residential) as set forth in the City of Waxahachie C&D Manual.
 - A street that will serve as a primary route for children to walk or bicycle to a neighborhood park or school shall be required to have sidewalks on one or both sides, as the City deems appropriate.

Providing connections between subdivisions

Not allowing dead-end streets to encourage circulation/connections

Section 3.1: Streets

Except in unusual cases, no dead-end streets will be approved unless such dead-end streets are provided to connect with future streets on adjacent land.



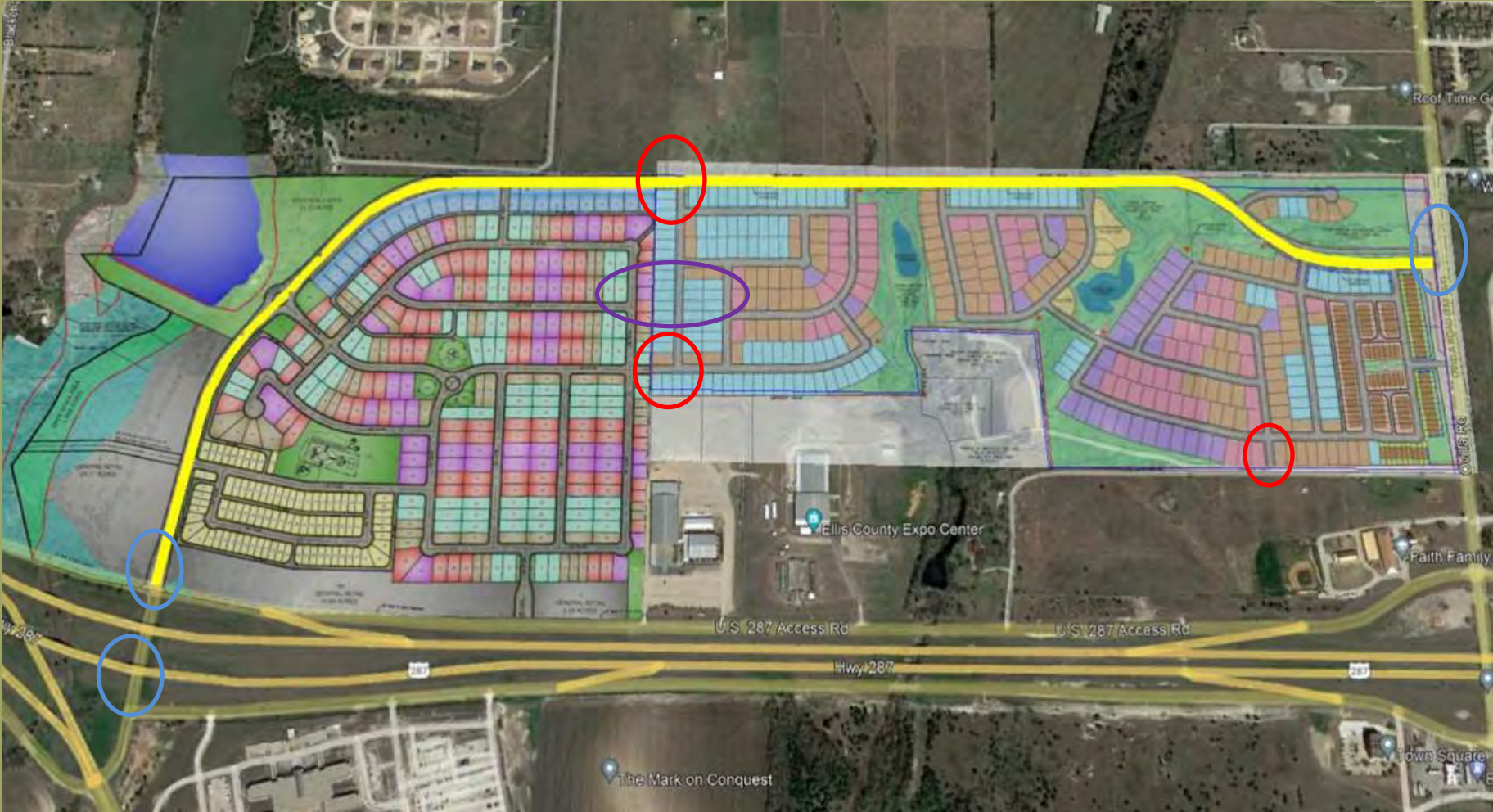
Providing connections between subdivisions

- Section 3.1: Streets
 - Provide for future access (i.e., provide stubbed streets for future extension) to adjacent vacant areas which will likely develop under a similar zoning classification;



Future Connection

Connectivity- Coordination



Providing connections between subdivisions

Section 3.5 Sidewalks:

Sidewalks not less than eight feet (8') wide shall be provided along all perimeter roadways (residential and non-residential) as set forth in the City of Waxahachie C&D Manual.





Questions?



PANEL DISCUSSION



After Today's Webinar

Log AICP CM Credits



CM I 1.5

Connected Street Grid and
Subdivision Design

Complete Post-Event Survey

<https://forms.office.com/r/JNeb3G2ijV>

Access Meeting Recording & Slides

www.NCTCOG.org/saferoutestoschool



THANK YOU FOR JOINING US!



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