

20-MINUTE CITY PROJECT

City Studio

DR. DAVID KING, SHEA LEMAR, MARINA
COPELAND, DENISE CAPASSO DA SILVA, MEHAK
SACHDEVA, AHMED TAMBE, WENQI DING, SYERA
TORAIN, CLEMENTE FRANCISCO, MAX COURVAL,
JOSUE BARBOZA, & BRITTNEY TOPEL



Tempe and the 20-Minute City

*A 20-minute City is characterized by a vibrant mix of commercial and residential establishments within a **1-mile walk, 4-mile bike ride, or 20-minute transit ride**. The 20-minute City premise focuses on traditional neighborhood design, transit-oriented development, and complete streets. A few of the many benefits of the 20-minute city are reduced transportation costs, reduced greenhouse gas emissions, improved public health, and improved access to residents' daily needs.*

In the City's General Plan 2040 (ratified by voters in 2014) and in the 2015 Transportation Master Plan, the City of Tempe set an ambitious vision to become a 20-minute City. The General Plan further defines the 20-minute City as people's ability to access '**Daily Necessities**' and '**Quality of Life Factors**'.

This vision **prioritizes** the use of **walking, biking, and transit** infrastructure to achieve many overarching goals for the city: **safety, sustainability, quality of life, and community health**, among others

City of Tempe and ASU Collaboration

- The City of Tempe engaged ASU students and faculty for the development of 20-minute city metrics.
- ASU worked with Tempe to establish a baseline measurement for the full city, to document how many residential units are accessible in 20-minutes by walking, biking, or transit.
- The City staff and City Council will then use these baseline measurements to establish targets for transportation system management and prioritization of transportation infrastructure projects.

Baseline Assessment Methodology

Goal

- To develop a baseline for current conditions in Tempe, identify in areas or destination types that are not accessible within 20 minutes by walking, biking or transit.

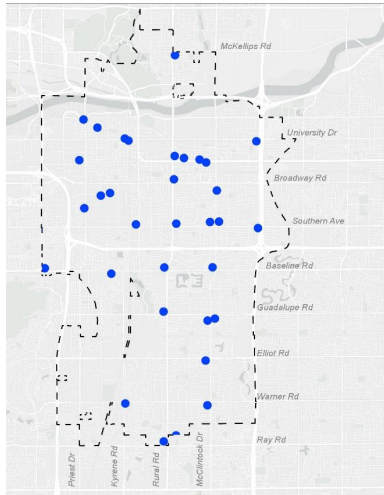
Factors

- Destinations - identification of the relevant destinations for daily necessities and quality of life amenities.
- Networks - assessment of the three transportation networks (pedestrian, bicycle, and transit).
- Coverage - comparing the 20-minute City network against the full city limits and the number of residential units reached by each network.

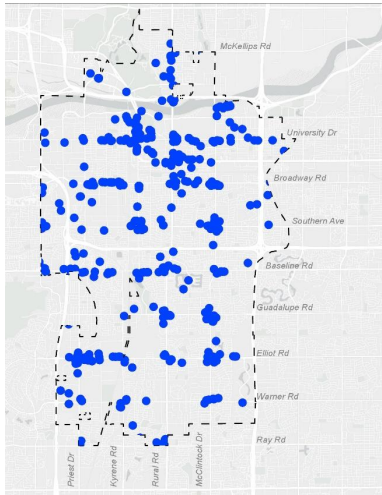
Methodology – Destinations

DESTINATION GROUP	SUBCATEGORIES	DATA
Grocery Stores		NAICS
Restaurants		NAICS
Fitness Centers		NAICS
Retail Goods / Services	Pharmacy / Drug Store, hardware store, bike shops, shopping districts, and convenience stores	NAICS
Parks	Parks, dog parks and preserves	CITY
Schools	Day care, K-12, and higher ed	NAICS
Festivals and Special Event Spaces	Sun Devil Stadium, Wells Fargo Arena, Phoenix Rising Soccer Complex, ASU Gammage, Marquee Theatre, Alberta B. Farrington Softball Stadium, Tempe Beach Park, Kiwanis Park, Downtown, Tempe Diablo Stadium, Tempe Center for the Arts, Galvin Playhouse, Childsplay Theatre, Lyceum Theatre, Katzin Concert Hall, Tempe Library Complex, Tempe Sports Complex	CITY
Civic Institutions	City Offices/Facilities, Fire Stations, Police Stations	CITY
City Recreational and Cultural Amenities	Community Centers, Museums, Libraries, Public Art, Aquatic Centers, Gardens, Zoos, “Points of Pride”	CITY
Services	Banks, Post Office, Beauty Salons / Barber Shops, Laundry / Cleaners	NAICS
Health Services		NAICS
Faith-based Organizations	Houses of worship and faith-based community services	NAICS

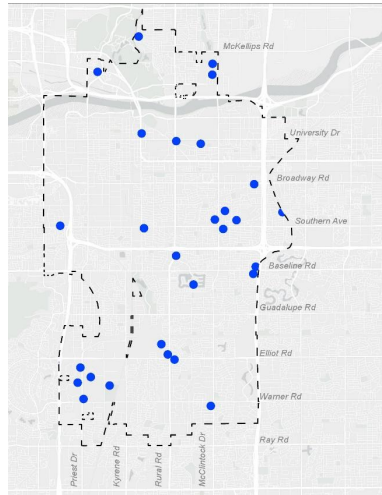
Methodology – Destinations



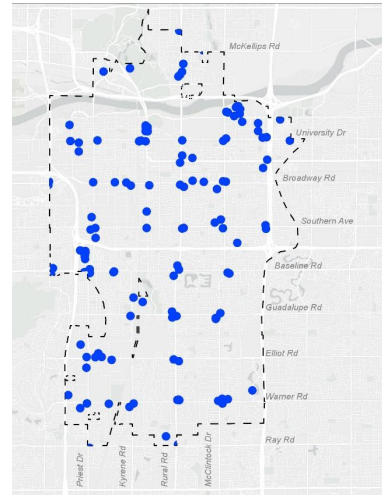
Grocery Stores (33)



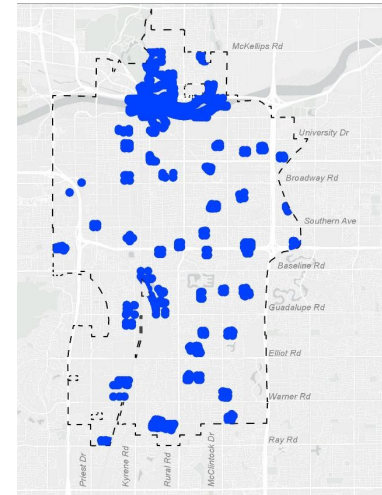
Restaurants (461)



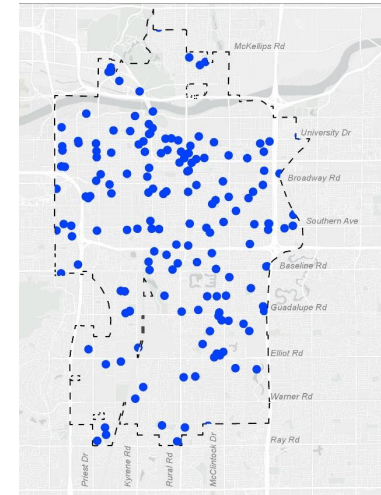
Fitness Centers (28)



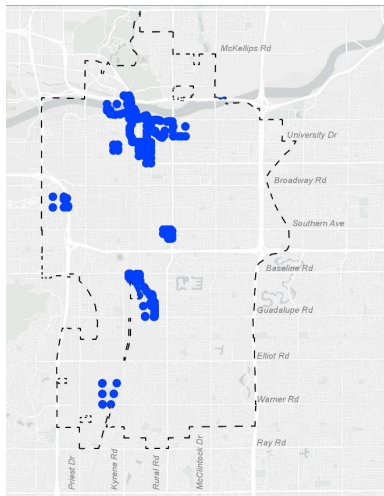
Retail Goods/Svcs. (172)



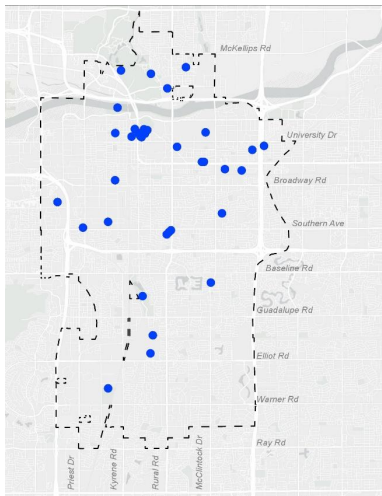
Parks (65)



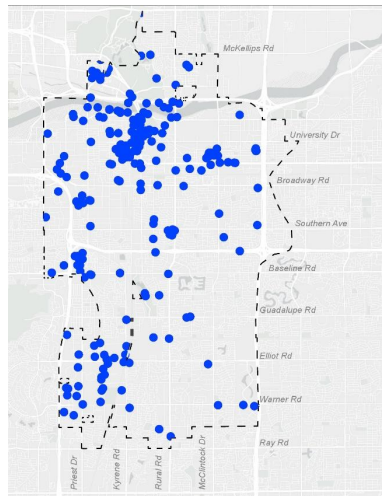
Schools (174)



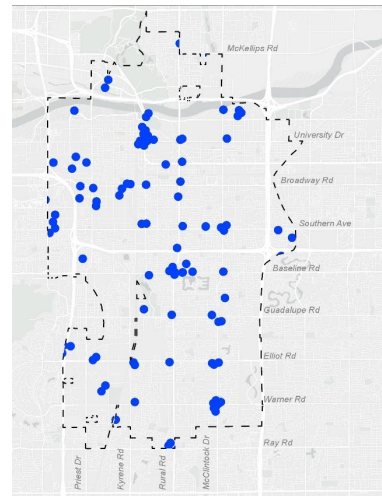
Festival & Special Event Space (15)



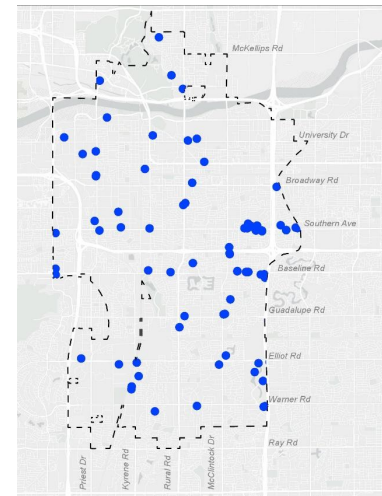
Civic Institutions (37)



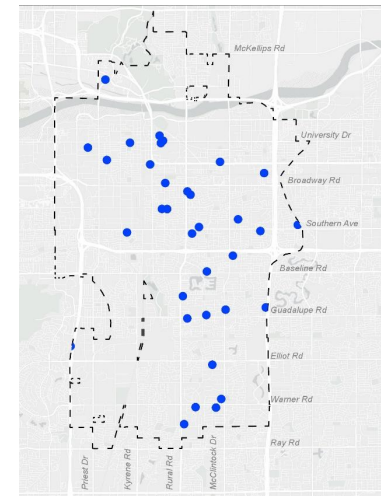
Recreational/Cultural Amenities (258)



Services (101)



Health Services (93)

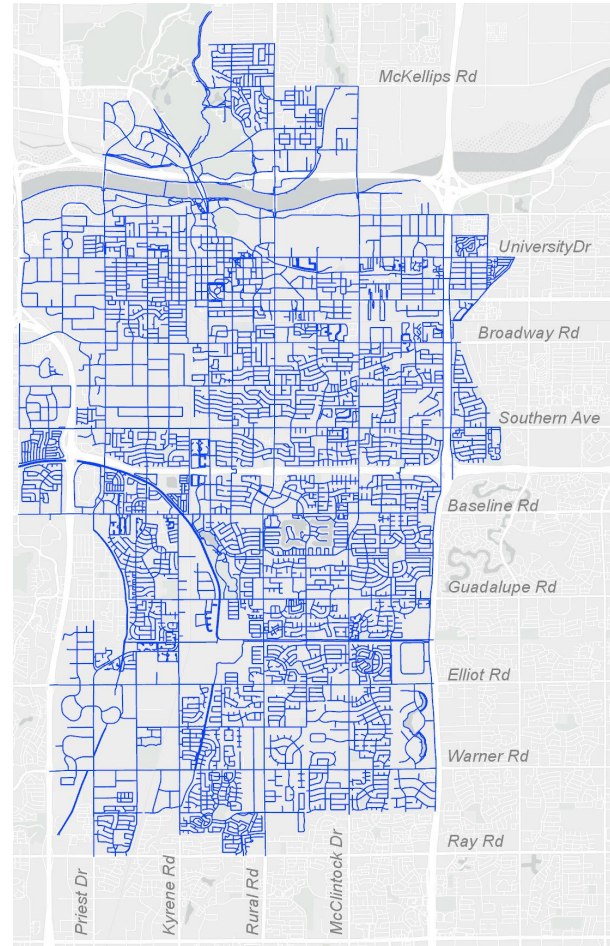


Faith-Based Organizations (33)

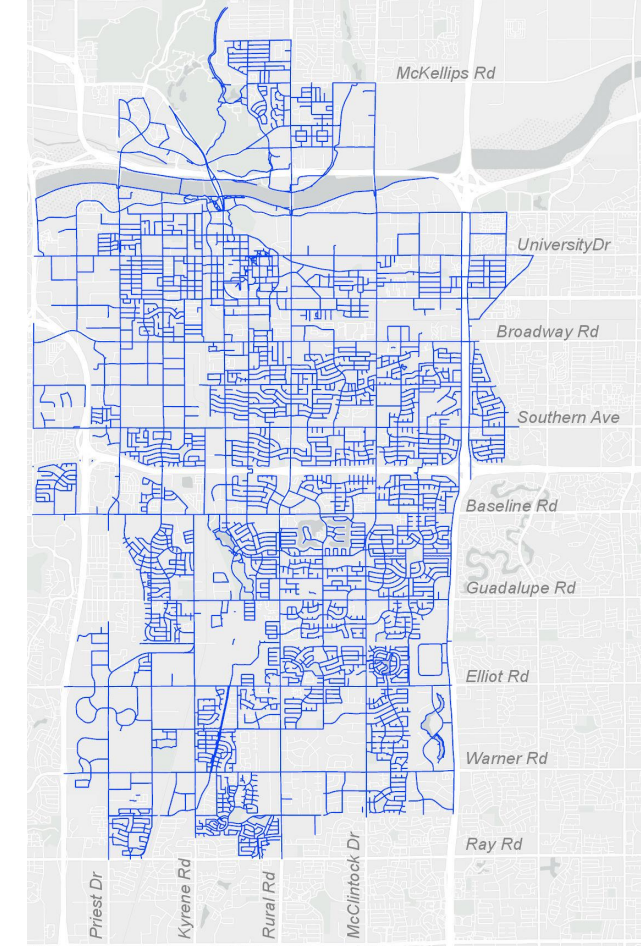
Methodology – Networks

Transportation Mode	Network Data Components	Analysis Travel Sheds
Pedestrian	<ul style="list-style-type: none"> Sidewalk Network Off-Street Walkways Multi-use Paths 	<ul style="list-style-type: none"> 1-mile (assumed 3-mph travel speed) on all roadways and multi-use paths 1-mile (assumed 3-mph travel speed) on roadways with sidewalks and multi-use paths
Bicycle	<ul style="list-style-type: none"> All Roadways Low-Stress* (Bicycle Level of Traffic Stress 1 and 2) Roadways Multi-use Paths 	<ul style="list-style-type: none"> 4-miles (assumed 12-mph travel speed) on all roadways and multi-use paths, and 4-miles (assumed 12-mph travel speed) on Low-Stress* roadways and multi-use paths
Transit	<ul style="list-style-type: none"> Pedestrian Network Components (listed above), and Valley Metro and City Data, which includes: <ul style="list-style-type: none"> Transit Routes Transit Stops Vehicle Type (e.g. bus, orbit, light rail) 	<ul style="list-style-type: none"> Assumed door-to-door walking plus transit travel time at 30 minutes (¼-mile walk + 6-mile transit ride + ¼-mile walk)

All Pedestrian Network

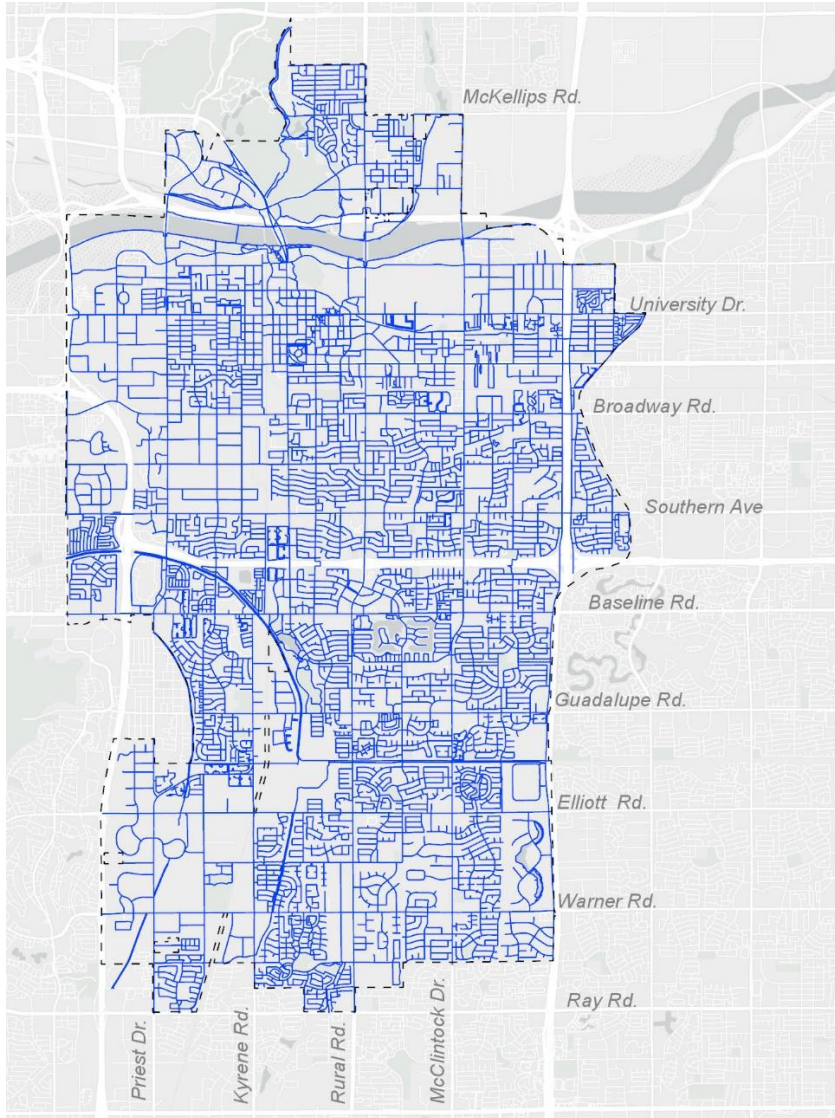


Sidewalk Pedestrian Network

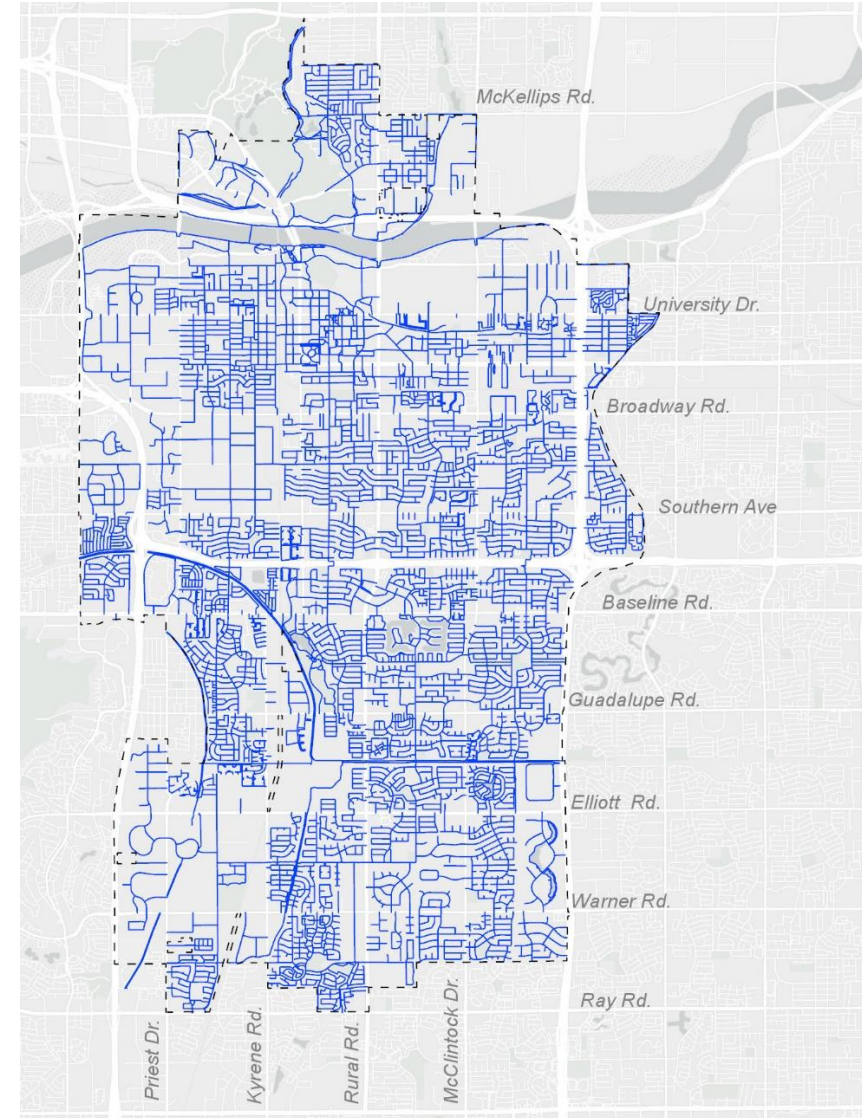


Methodology – Bicycle Networks

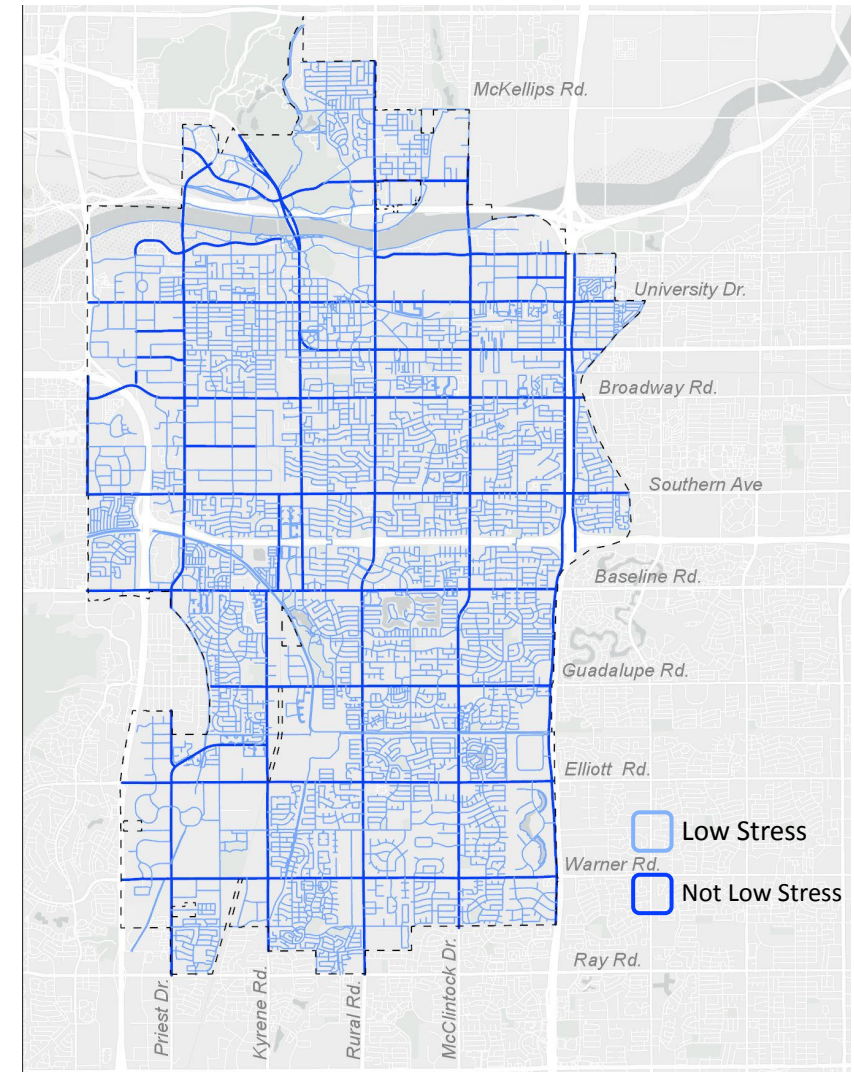
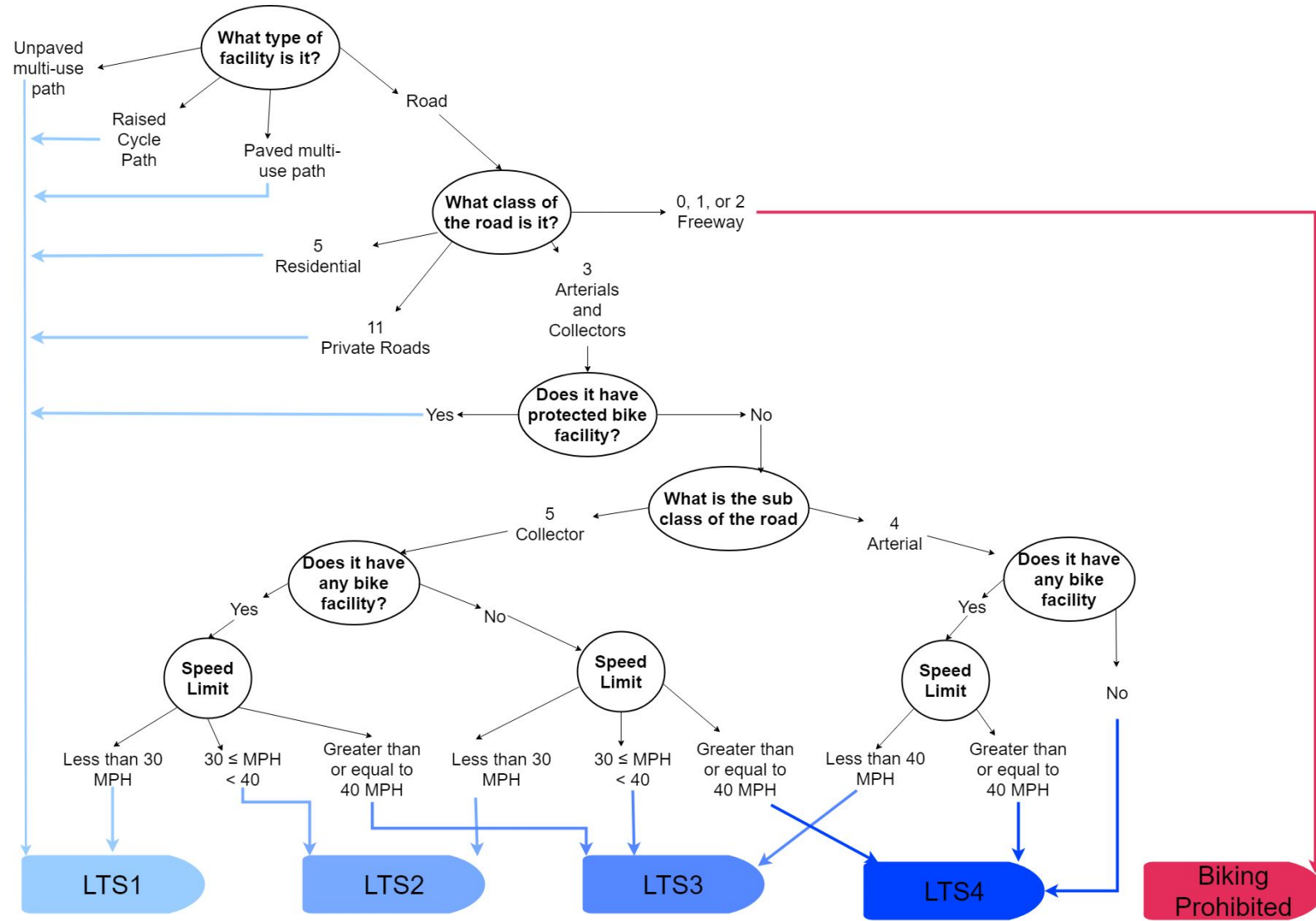
Bicycle Network



*Low Stress
Bicycle Network*



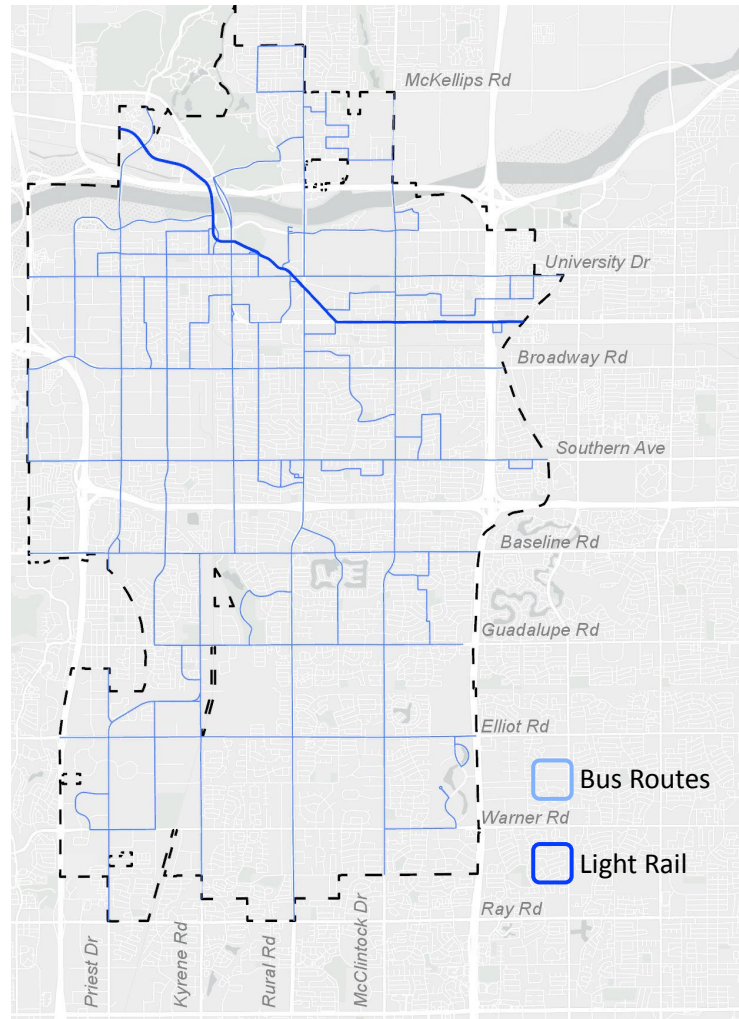
Methodology – Low Stress Bicycle Networks



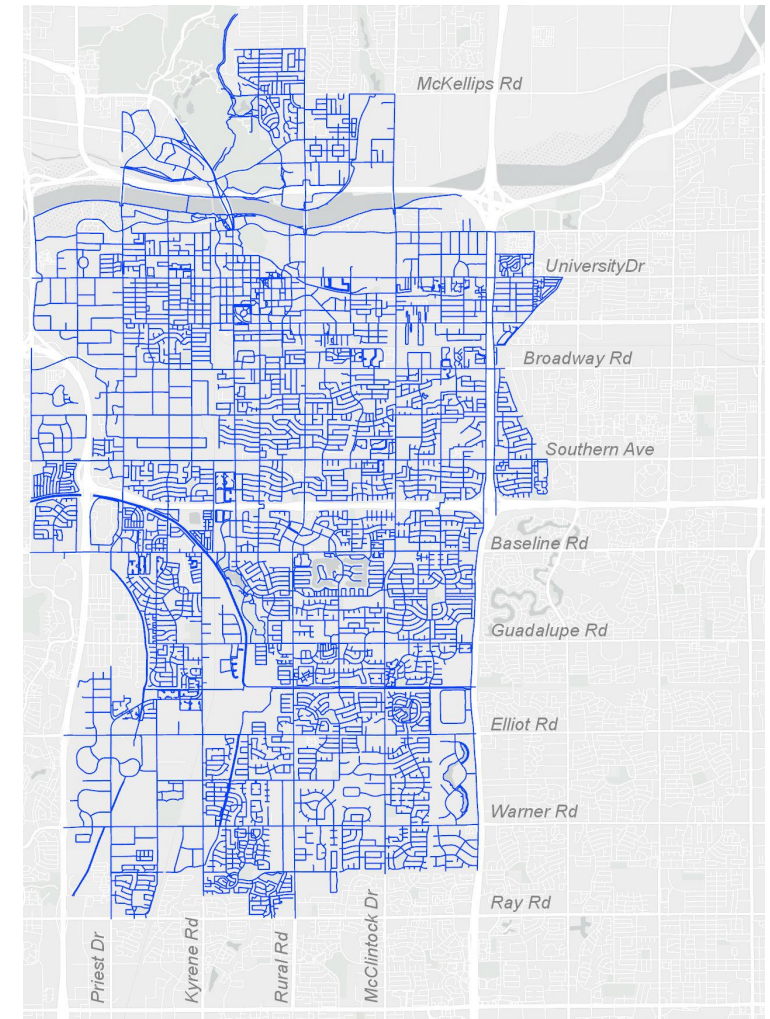
Methodology – Transit Networks

- Transit network was multi-faceted, including a combination of pedestrian and in-vehicle travel time.
 - Bus/light rail stops are within $\frac{1}{4}$ mile of a residential parcel at one end of a trip and within $\frac{1}{4}$ mile of a destination at the other end of a trip.
 - Transfers were not a part of this model.

Transit Network – Bus & Light Rail



Transit Network – Pedestrian Portion



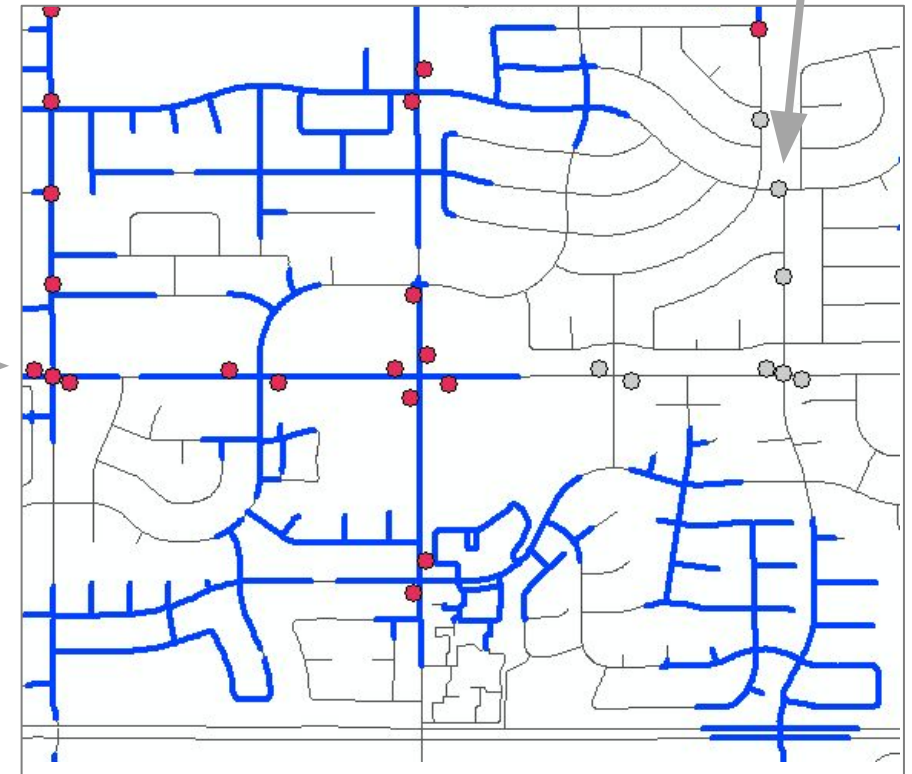
Methodology – Transit Networks



Destination points
(e.g. Schools)

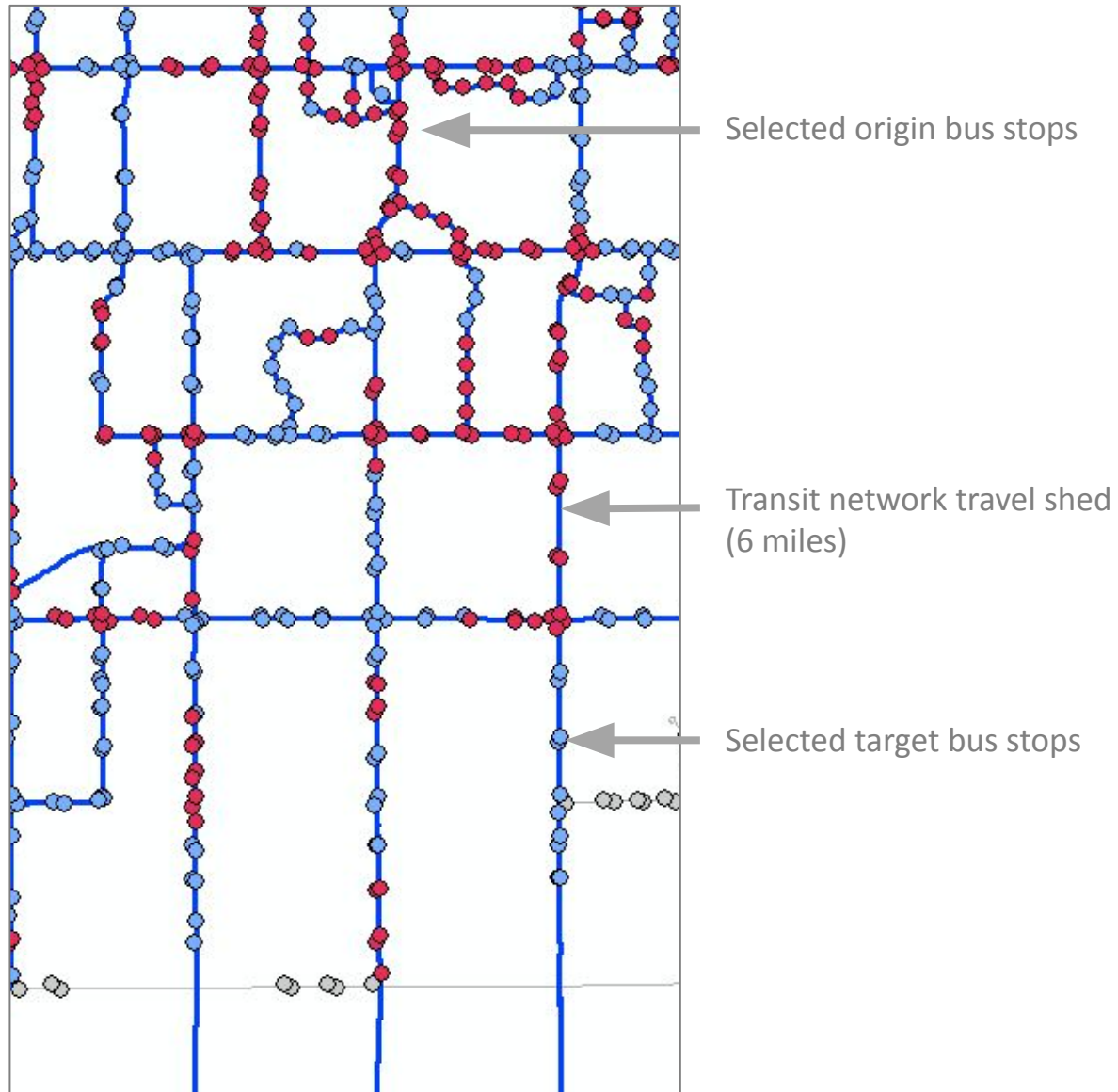
Pedestrian travel shed
(1/4th mile)

Selected origin
bus stops



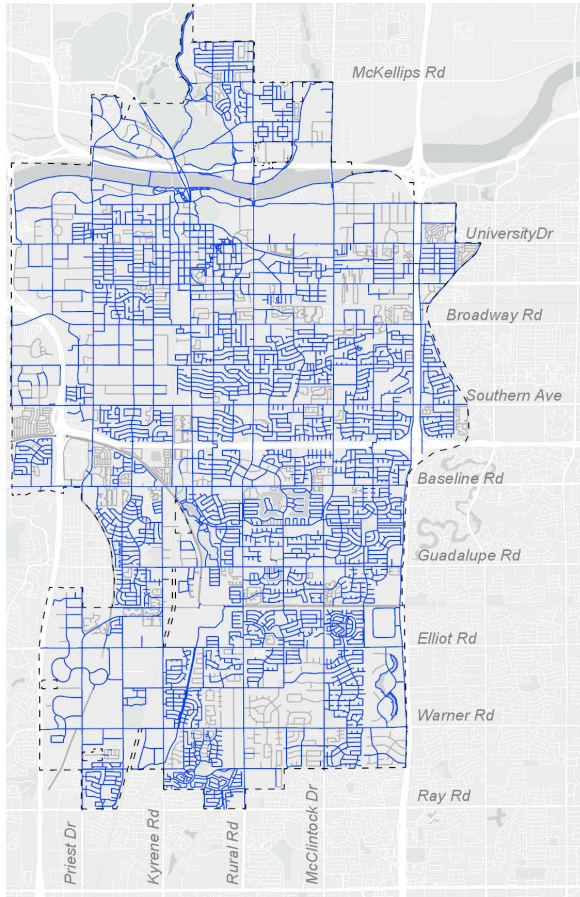
Bus stops not within the
pedestrian travel shed

Methodology – Transit Networks

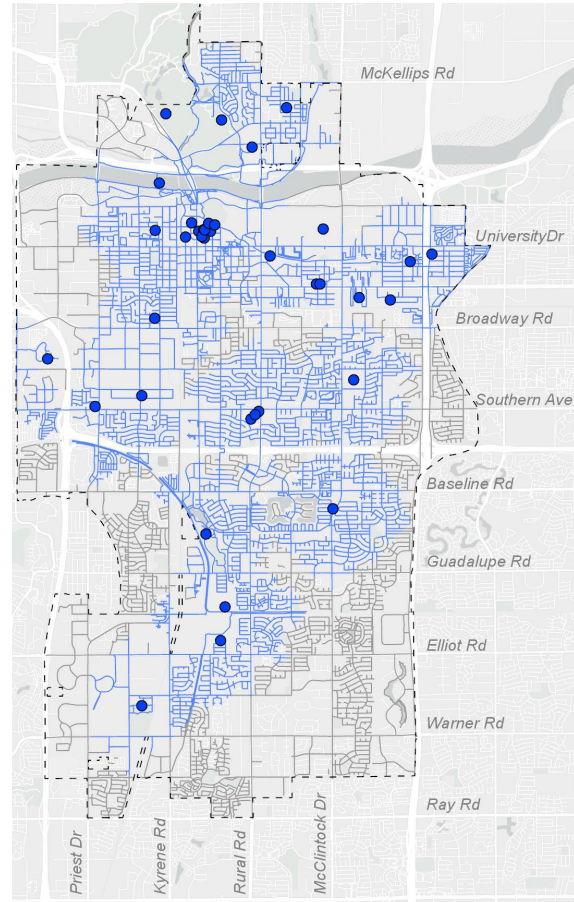


Methodology – Coverage

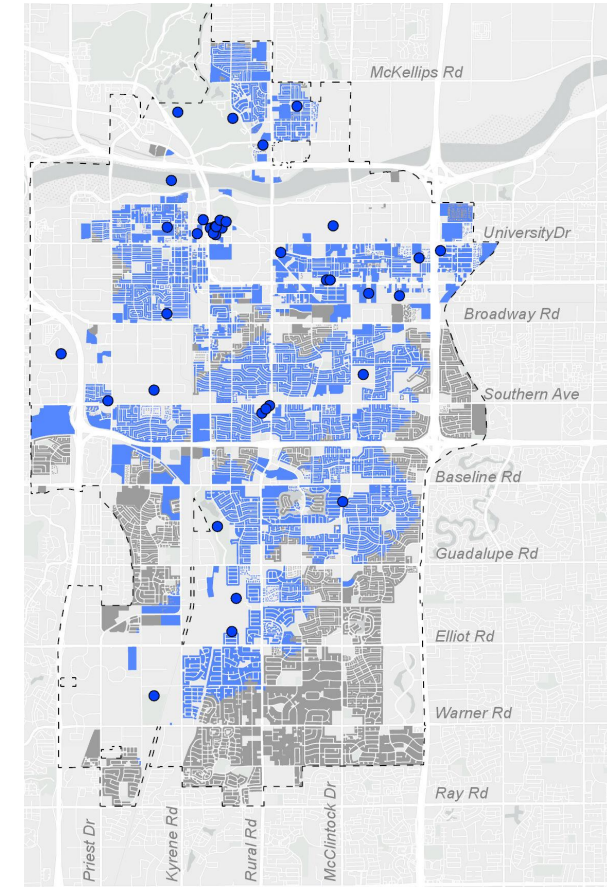
Sidewalk Pedestrian Network



*SW Pedestrian Travel Sheds
for Civic Destinations*



*Parcels within 20 minutes (1 mile)
of Civic Destinations*



Results – All Networks

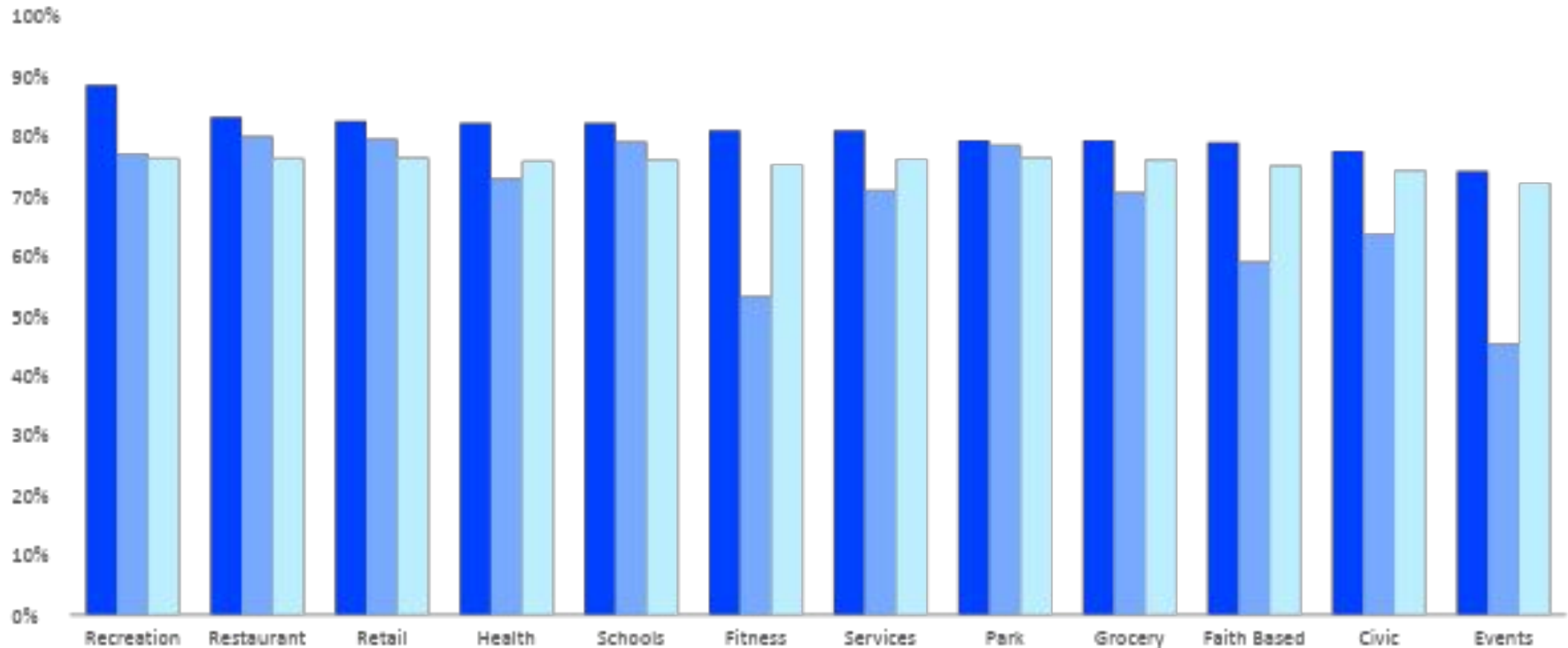
On average, a high percentage of residential units can reach a variety of destinations.

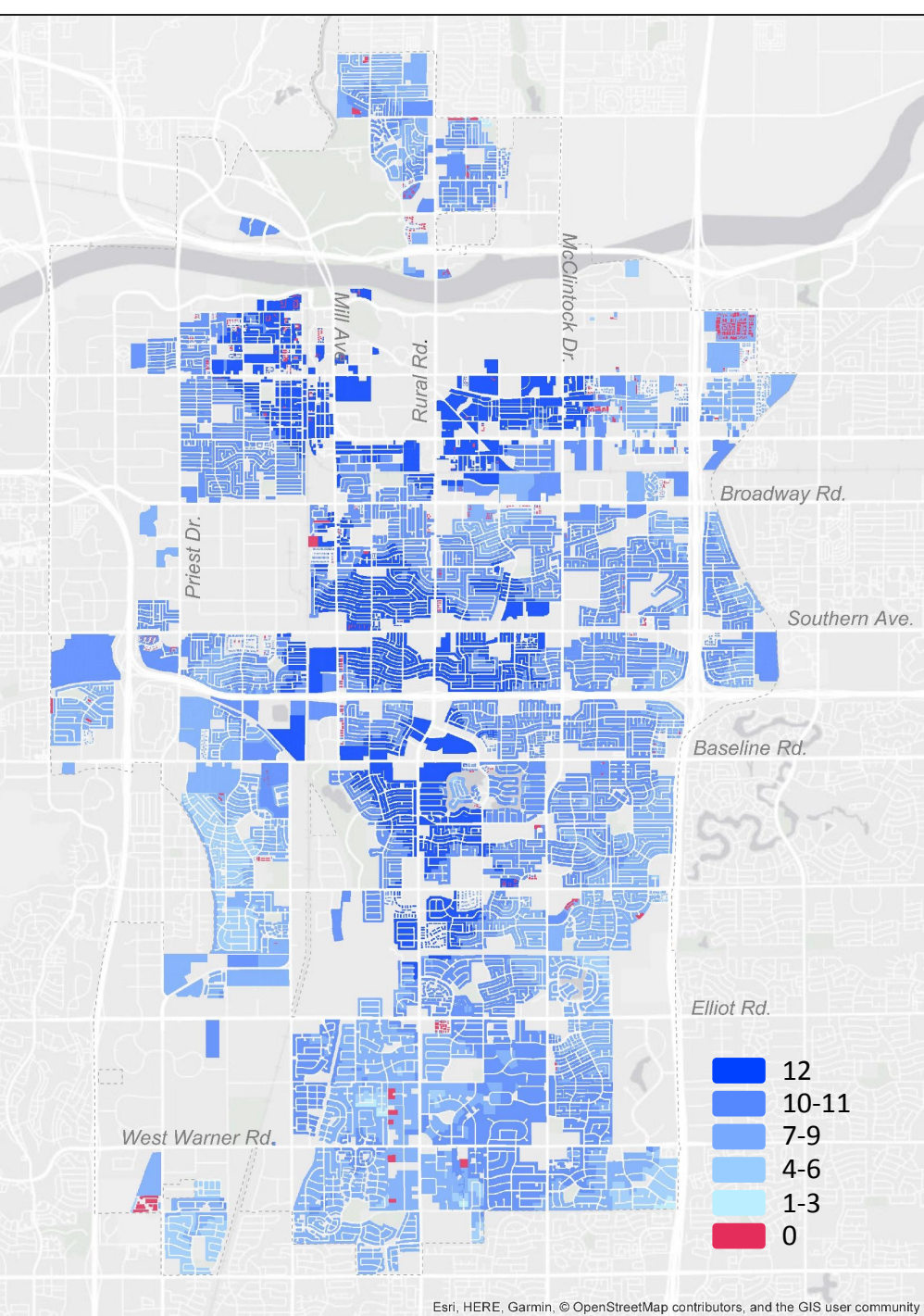
- The best networks are the Bicycle Networks:
 - All-Street Bicycle Network has the best accessibility
 - Low-Stress Bicycle Network has good accessibility
- Both Pedestrian Networks and Transit Network have room for improvement:
 - All-Street Pedestrian Network has fair accessibility
 - Sidewalk Pedestrian Network has fair accessibility
 - Transit has good accessibility

Percent of Residential Units within 20-Minutes of Destinations					
98,027 total RUs in Tempe					
Destinations	All-Street Bicycle	Low-Stress Bicycle	All-Street Pedestrian	Sidewalk Pedestrian	Transit
Civic	88.5%	77.5%	63.7%	63.7%	74.2%
Events	88.4%	74.1%	50.8%	45.3%	72.1%
Faith Based	88.5%	78.9%	64.4%	59.0%	75.0%
Fitness	88.5%	80.9%	57.4%	53.2%	75.2%
Grocery	88.5%	79.2%	77.6%	70.6%	76.0%
Health	88.5%	82.1%	80.5%	72.9%	75.8%
Park	88.4%	79.3%	87.1%	78.5%	76.4%
Recreation	88.5%	88.5%	85.0%	77.0%	76.3%
Restaurant	88.5%	83.1%	88.5%	79.9%	76.3%
Retail	88.5%	82.5%	87.9%	79.5%	76.4%
Schools	88.5%	82.1%	87.2%	79.0%	76.0%
Services	88.5%	80.9%	78.7%	70.9%	76.1%
Average	88.5%	80.8%	75.7%	69.1%	75.5%

Percent Residential Units per Network

Low-Stress Bike Sidewalk Pedestrian Transit





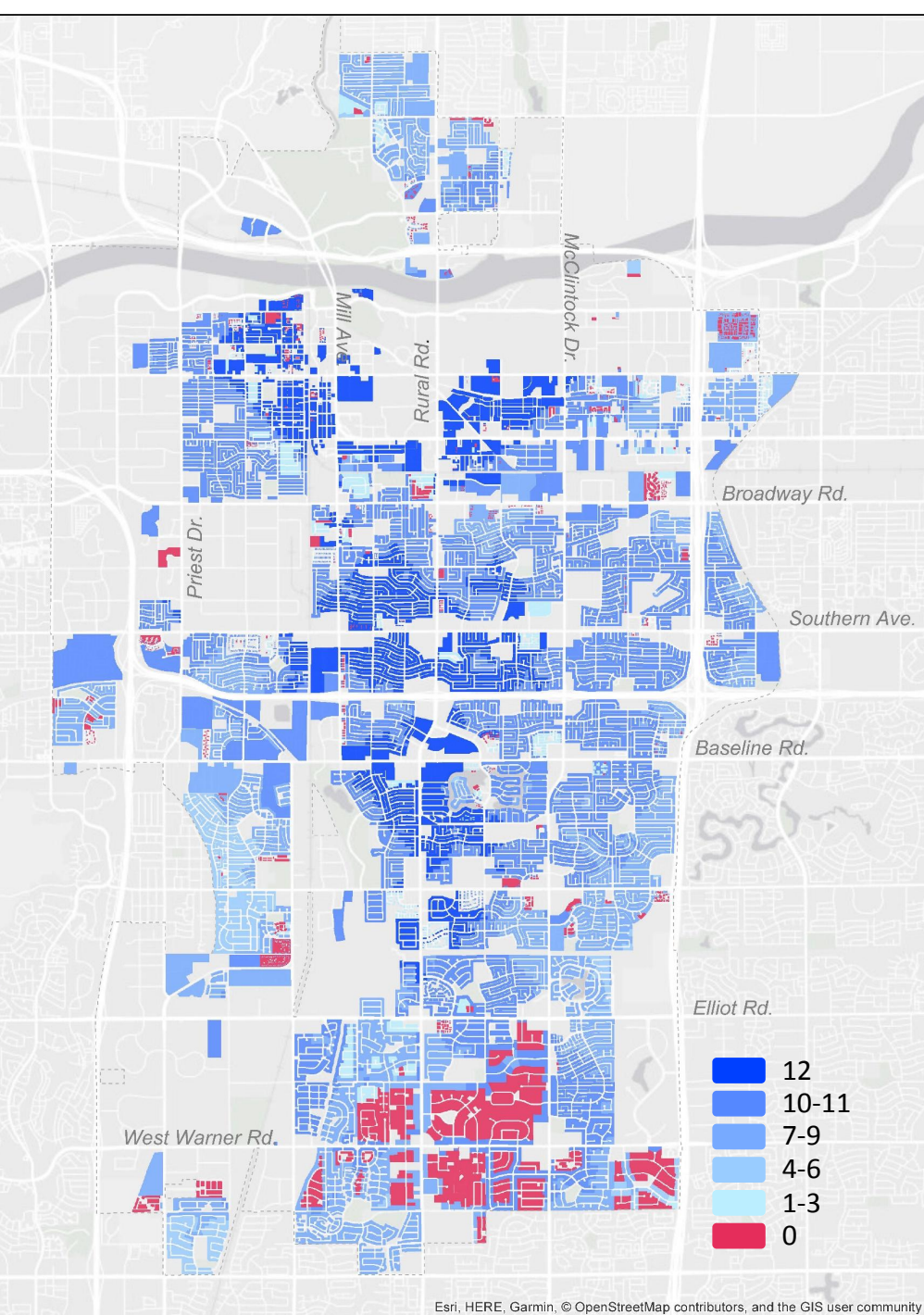
All-Street Pedestrian Network

Residential Units within 20-Minutes of Destinations (98,027 total RUs in Tempe)		
Civic	62,469	63.7%
Events	49,780	50.8%
Faith Based	63,084	64.4%
Fitness	56,250	57.4%
Grocery	76,055	77.6%
Health	78,929	80.5%
Park	85,344	87.1%
Recreation	83,287	85.0%
Restaurant	86,730	88.5%
Retail	86,138	87.9%
Schools	85,523	87.2%
Services	77,133	78.7%
Average	74,227	75.7%

An average 75.7% of residential units can access a given destination by walking 1 mile or less.

The most commonly accessible destinations include restaurants, retail goods providers, schools, and parks. The least commonly accessible destinations include fitness centers and event spaces.

There are areas of lower access at the southwest and southeast corners of Tempe, and on Kyrene, between Baseline and south of Guadalupe.



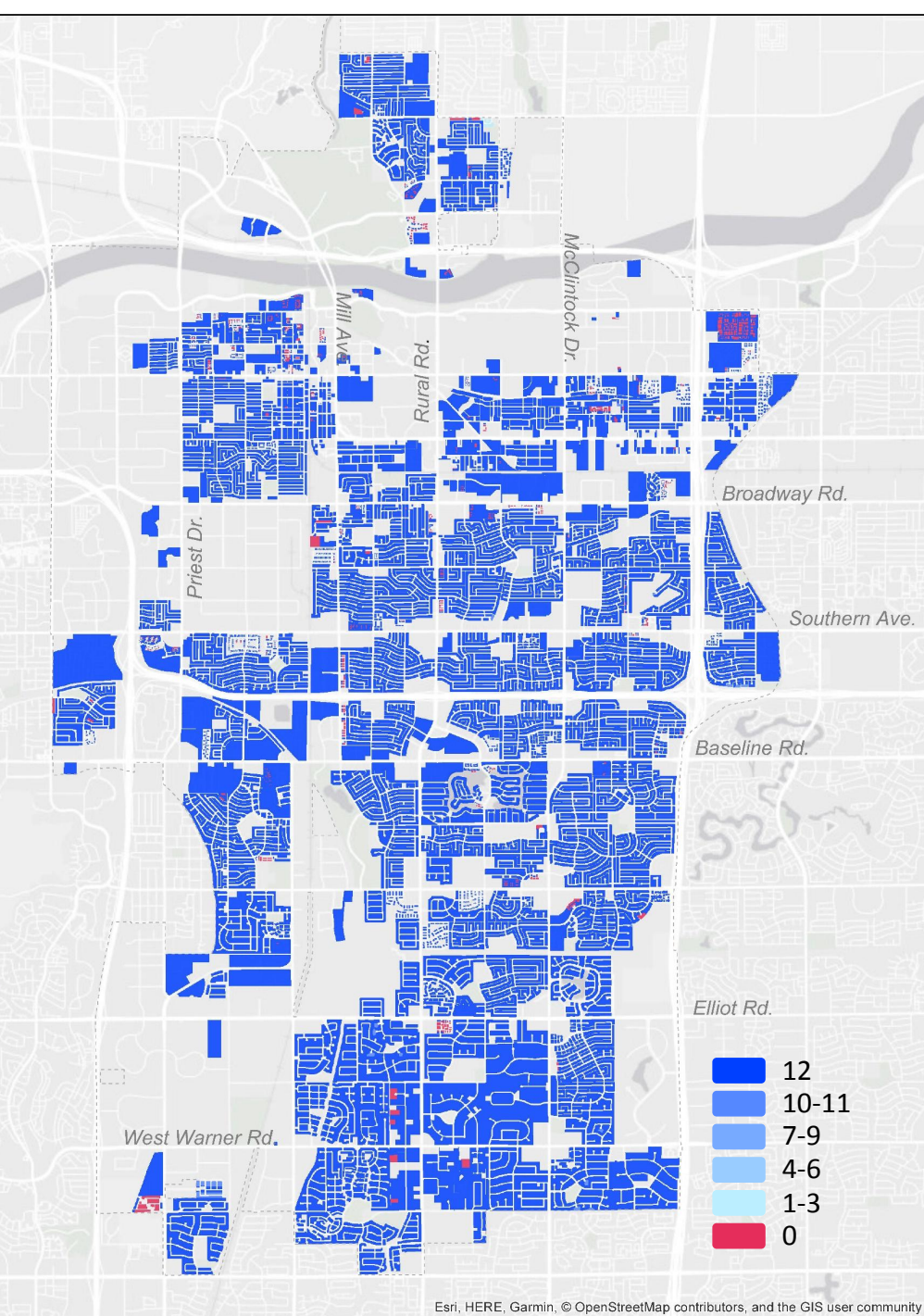
Sidewalk Pedestrian Network

Residential Units within 20-Minutes of Destinations (98,027 total RUs in Tempe)		
Civic	62,469	63.7%
Events	44,445	45.3%
Faith Based	57,835	59.0%
Fitness	52,193	53.2%
Grocery	69,205	70.6%
Health	71,508	72.9%
Park	76,923	78.5%
Recreation	75,443	77.0%
Restaurant	78,349	79.9%
Retail	77,929	79.5%
Schools	77,405	79.0%
Services	69,462	70.9%
Average	67,764	69.1%

The number of residential units that can be reached when walking on roads with sidewalks and/or paved paths decreases in comparison to all-street pedestrian network from 75.7% to 69.1%.

The most and least commonly accessible destinations are the same as walking on the full pedestrian network.

Large areas in south Tempe lose access due to private roads and sidewalks, as do smaller areas throughout the city.



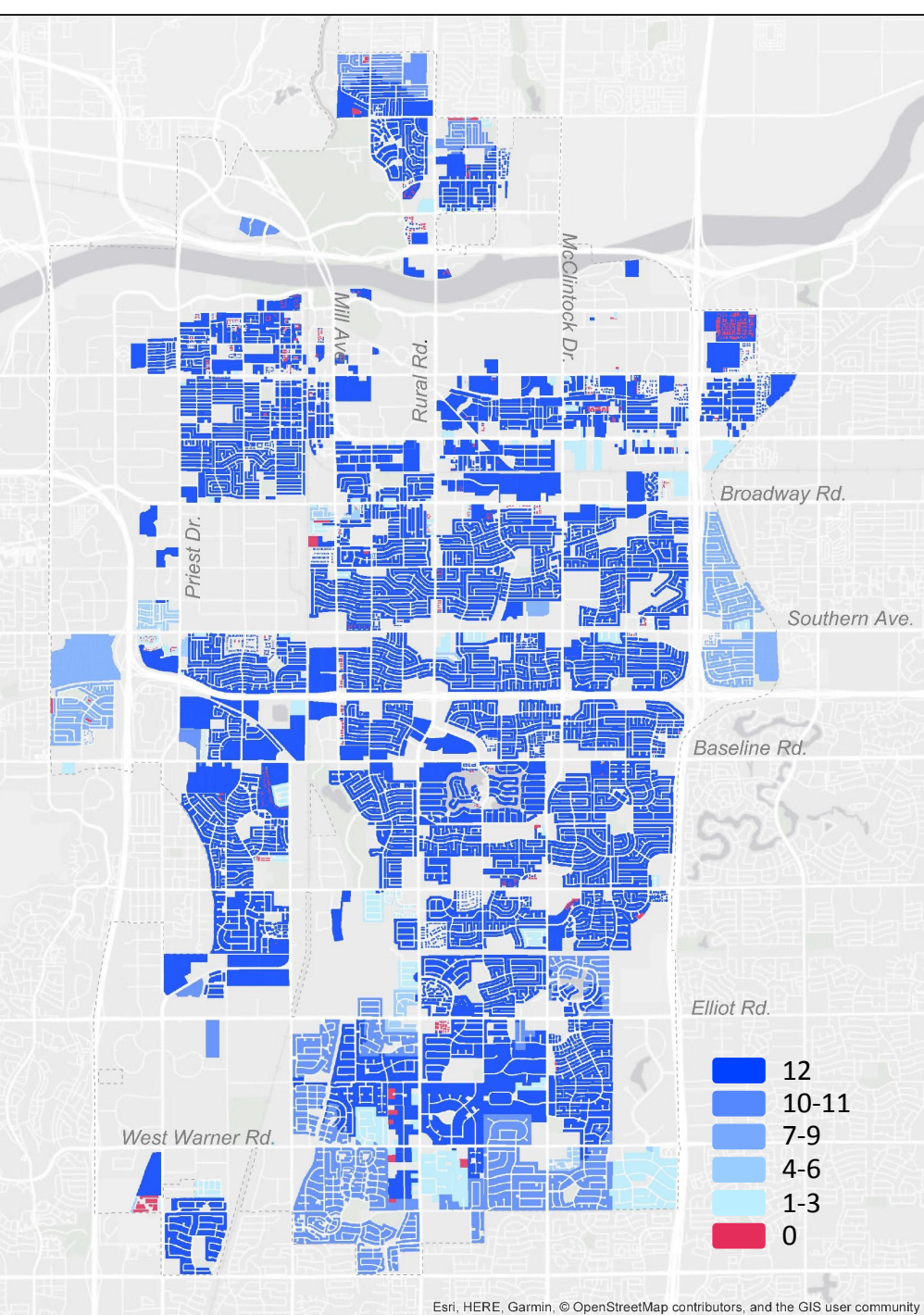
All-Street Bicycle Network

Residential Units within 20-Minutes of Destinations (98,027 total RUs in Tempe)		
Civic	86,173	88.5%
Events	86,689	88.4%
Faith Based	86,776	88.5%
Fitness	86,776	88.5%
Grocery	86,776	88.5%
Health	86,776	88.5%
Park	86,635	88.4%
Recreation	86,776	88.5%
Restaurant	86,776	88.5%
Retail	86,776	88.5%
Schools	86,776	88.5%
Services	86,776	88.5%
Average	86,752	88.5%

88% of residential units can access a given destination by biking 4 miles or less.

Issues:

- Multi-family complexes with large footprints.
 - 98.5% area coverage vs. 88.5% unit coverage.



Low-Stress Bicycle Network

Residential Units within 20-Minutes of Destinations (98,027 total RUs in Tempe)		
Civic	76,002	77.5%
Events	72,632	74.1%
Faith Based	77,311	78.9%
Fitness	79,303	80.9%
Grocery	77,627	79.2%
Health	80,444	82.1%
Park	77,714	79.3%
Recreation	86,776	88.5%
Restaurant	81,447	83.1%
Retail	80,880	82.5%
Schools	80,483	82.1%
Services	79,288	80.9%
Average	80,052	80.8%

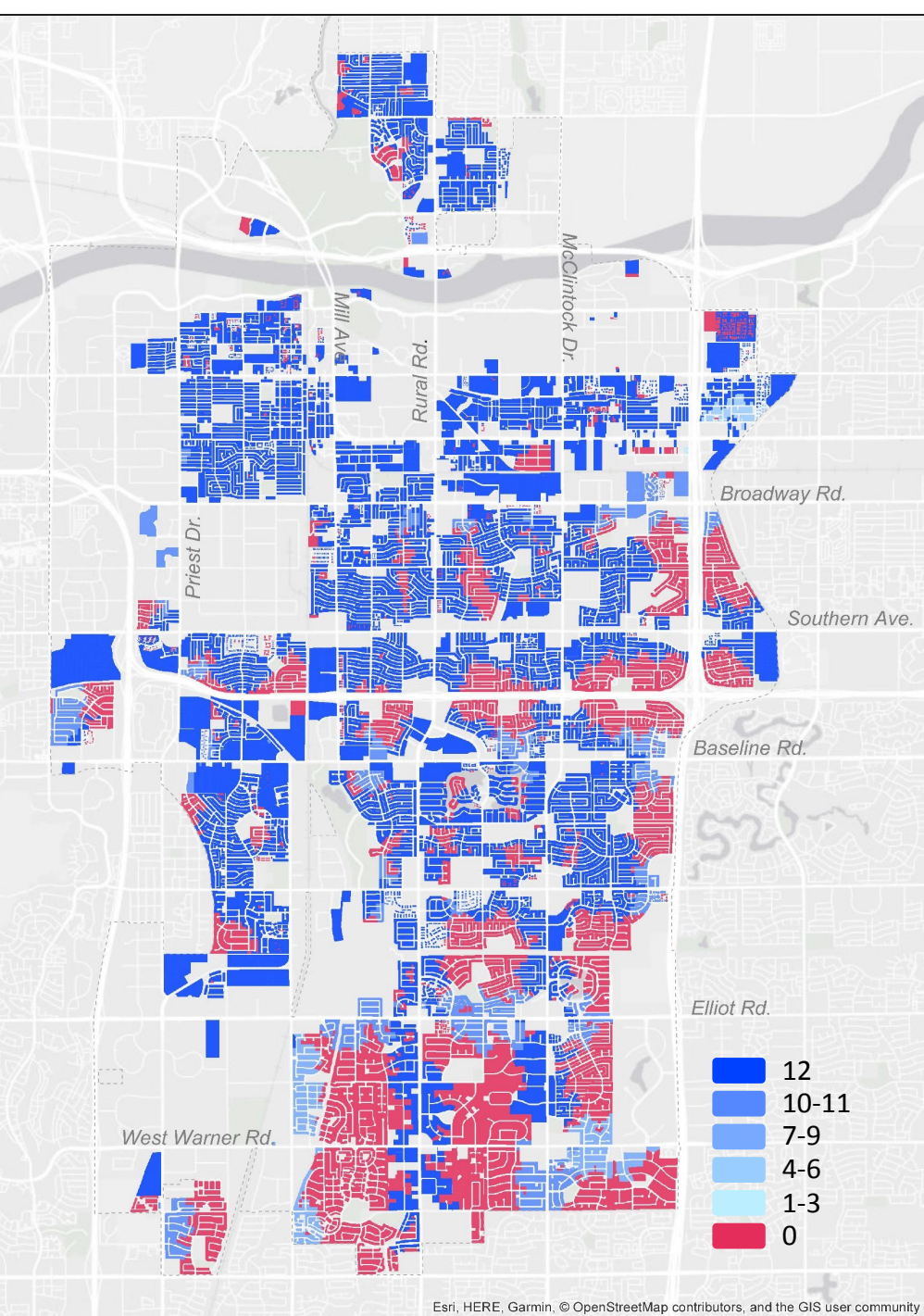
An average 80.8% of residential units can access a given destination by biking 4 miles or less on a low stress surface. There is a much higher variability in the type of destination that is accessible than there is when people can bike on any surface.

Issues:

- Neighborhoods cut off by freeways.
- Many neighborhoods and apartment complexes have only one outlet onto a high stress street.

Recommendations:

- Protected bike lanes across freeways and arterial with high amounts of apartment complexes.



Transit Network

Residential Units within 20-Minutes of Destinations (98,027 total RUs in Tempe)		
Civic	72,781	74.2%
Events	70,645	72.1%
Faith Based	73,510	75.0%
Fitness	73,723	75.2%
Grocery	74,547	76.0%
Health	74,341	75.8%
Park	74,869	76.4%
Recreation	74,772	76.3%
Restaurant	74,834	76.3%
Retail	74,869	76.4%
Schools	74,535	76.0%
Services	74,640	76.1%
Average	74,005	75.5%

An average of 75.5% of residential units can access a given destination. Transit allows the second lowest level of accessibility of all the five networks analyzed, after only the sidewalks network.

Issues:

- Areas where the transit routes are not available, such as Warner road, away from Rural road do not allow residents to use transit.
- Parcels in the middle of larger blocks may not have access to transit available on arterials.

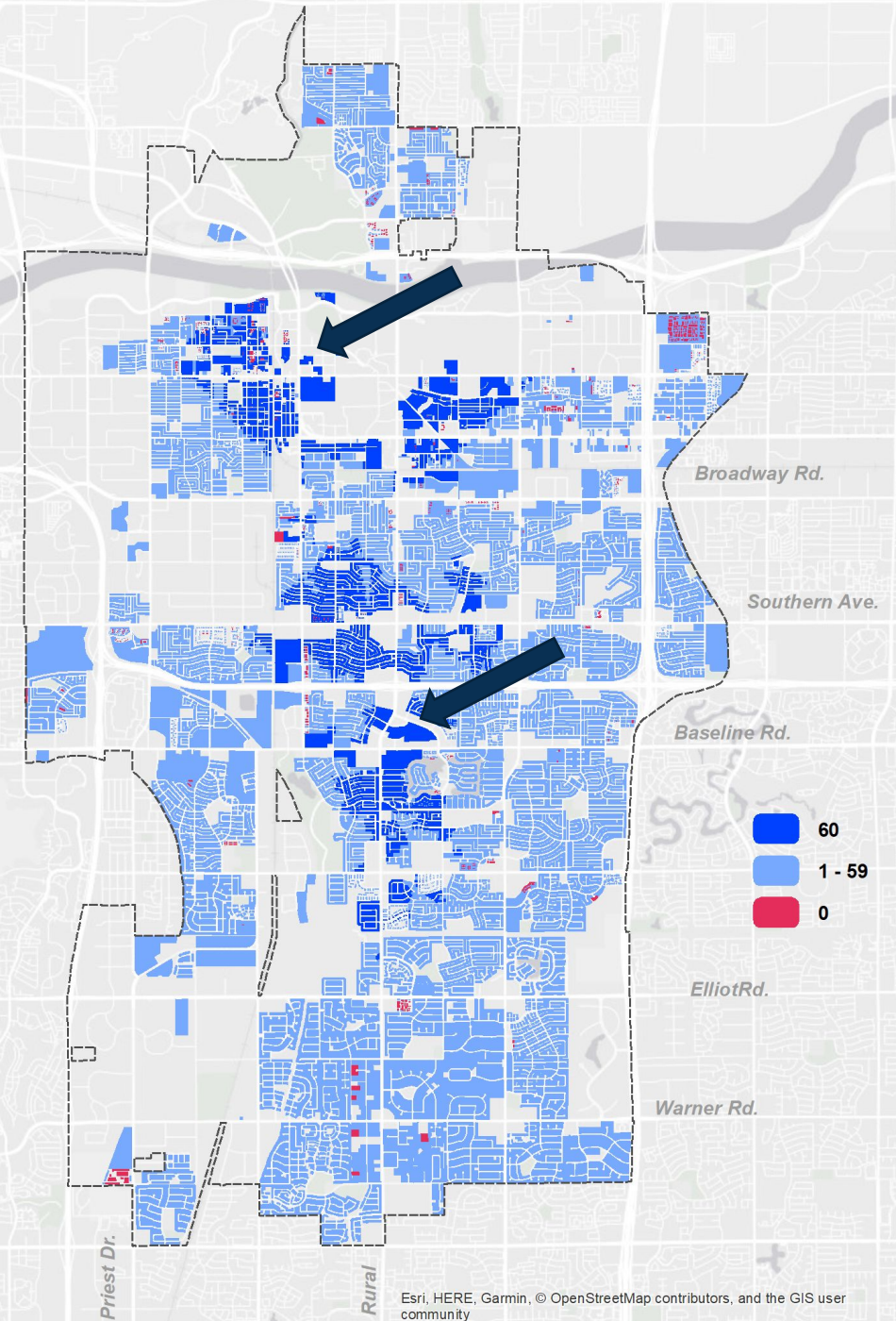
Recommendations:

- Expand circulators.
- First and last mile options.

Accessibility Considerations and Future Research

Based on analysis Mill Avenue and Baseline/Rural are equally accessible. But there are differences to measure.

- Quality of walking/biking environment
- Street facing doors
- Corner entrances
- Clear paths through parking lots
- Bike racks
- Shade for sidewalks
- Protection from street
- Access through walls
- Signal timing





Thank
you!