

A Network of the Future for a Workforce of the Future

Bridging the Digital Divide Overview Presentation

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Digital Divide

- COVID-19 pandemic shifted education from classroom to home-based learning, schools are changing delivery methods, time & place
- Students without internet access are significantly challenged
- Pandemic exacerbated technology gap in areas of the City, K-20 and adults
- Even if computers were provided to families, many cannot connect
- There is a device and connectivity disconnect



Background

- 5/14/20 – City Council authorized \$2M
- Federal Coronavirus Aid, Relief, and Economic Security (CARES) funding
- Distance Learning and Wi-Fi Access
- Broaden citywide Wi-Fi
- Underserved areas
- Bridge digital divide with educational institutions



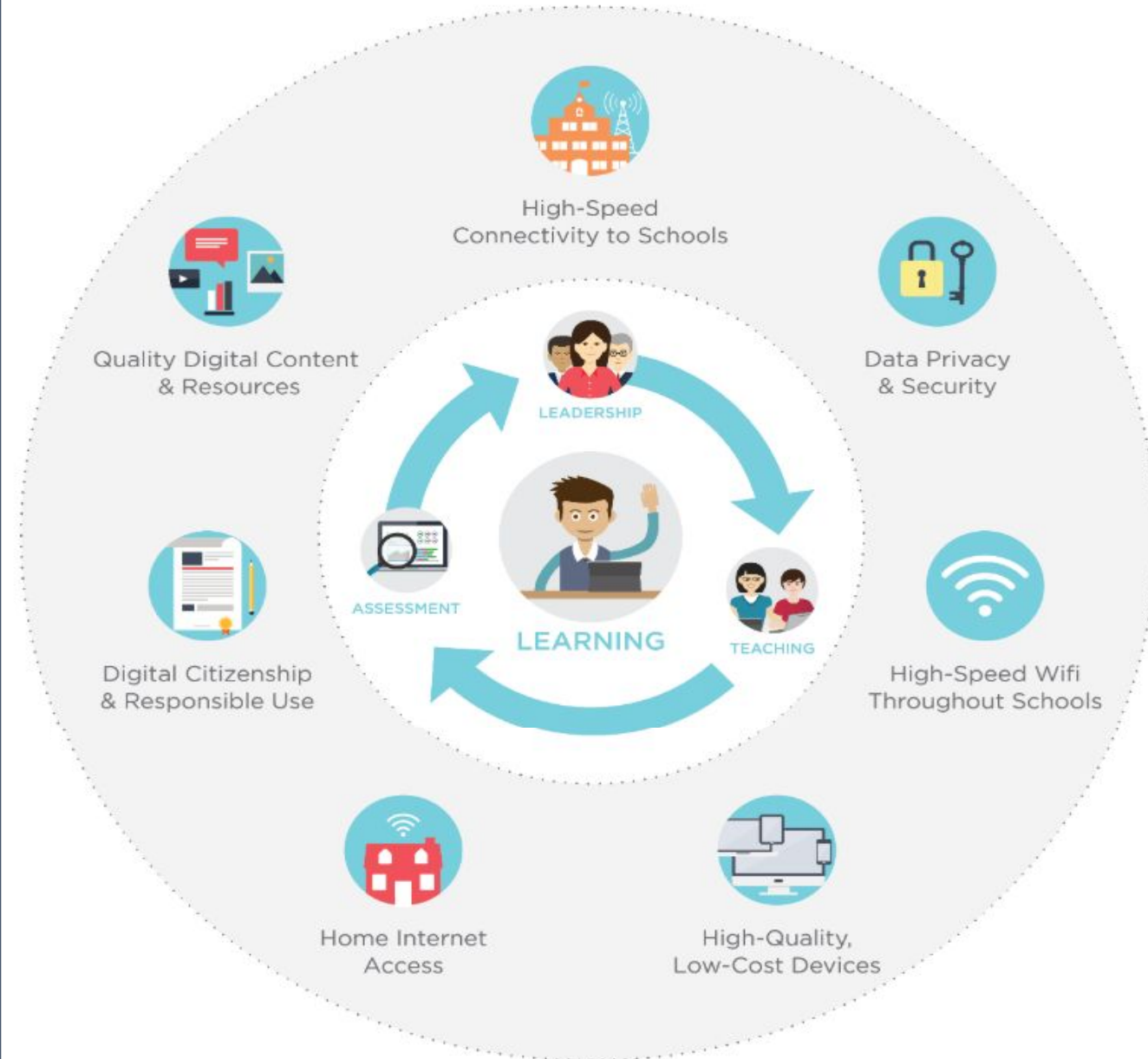
City of Phoenix

Partner School Districts

Alhambra Elementary School District
Balsz Elementary School District
Cartwright Elementary School District
Creighton Elementary School District
Isaac Elementary School District
Laveen Elementary School District
Murphy Elementary School District
Osborn Elementary School District
Phoenix Elementary School District
Riverside Elementary School District
Roosevelt Elementary School District
Wilson Elementary School District
Phoenix Union High School District
Maricopa Community Colleges
Phoenix College

Plan Overview

- Build digital network infrastructure
- In phases, cover all 250 square miles of PUHSD; then other school districts
- Close Digital Divide for K-20 – connect all residential areas to their schools
- Provide Workforce training programs to serve this technology
- Bring new programs + jobs to Phoenix



What has been done to-date

City of Phoenix

Summer 2020 – Housing Department:

- 800 tablets – families in public housing - School age children
- Two years free Wi-Fi hotspot connectivity

Extending Wi-Fi on City Buildings:

- Install Wi-Fi access points and antennas
- Roof or exterior wall(s)
52 libraries, community and senior centers, recreation centers

Schools in the central Phoenix area

- Issued 5,000+ hotspots (over 15K hotspots across region)
- 70,000+ devices
- Drive thru campaigns for issuing devices
- Wi-fi deployed across parking areas and green spaces on school campuses
- Wi-fi on school buses to create local hotspots for access
- Information Technology departments in schools and colleges pivoted quickly to deploy new services and expand existing services
- Enabled remote services to on campus and cloud resources

Methodology

We have created a methodology for the analysis of multiple data sources including geographic mapping.

Including (plus others)

American Community Survey, US Census, FCC Funding, Universal Service Fund, Federal Financial Institutions Examination Council, Free & Reduced Lunch Data, School Enrollment & Demographics, Arizona Department of Education data, plus other data sets, and geographic overlays including the GPS coding over 174K locations.

Data - Did You Know (selected figures)

- In Maricopa County % of Census Tracts **below poverty** (FFIEC, 2020)
 - In Maricopa County **4%** (38/916) **Greater than 50%**
 - In Maricopa County **21%** (195/916) **Between 25% - 50%**
-
- **% of Households in a Census Tract without an internet subscription**
 - In Maricopa County **3%** (26/909) **Greater than 50%**
 - In Maricopa County **29%** (265/909) **Greater than 25%**
 - Navajo County or Apache County **55%** (26/47) **Greater than 25%**
- **% of Households in a Census Tract without without a computer**
 - In Maricopa County **7%** (63/909) **Between 25% - 53%**
 - In Navajo County or Apache County **47%** (22/47) **Between 25% - 87%**

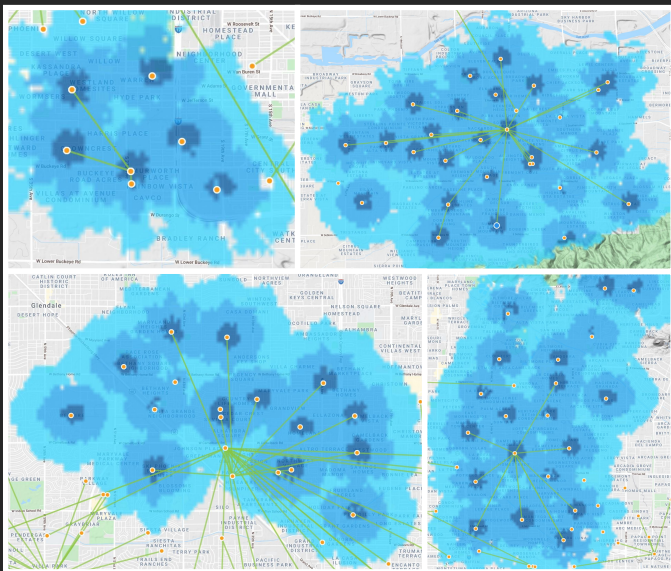
Accomplish coverage, most systems expensive, not sustainable and with lengthy timelines to implement.

The Framework

- Leveraging multiple public agencies
- Financial capabilities
- Physical Assets
- Staffing and Technologies
 - Phoenix College (PC)
 - Phoenix Union High School District
 - Elementary School Districts
 - City of Phoenix

TECHNICAL CONSIDERATIONS

- Team has been exploring options
- This challenge must be solved
- Not only for our students, but for future workforce
- There is not a one solution for all scenarios.



Creative solutions launched to close the gap connecting students to their schoolwork remotely.

Technical Options Explored

- Technical options include:
 - Fixed Wireless PTP/PTMP LTE/Wi-fi combinations
 - CBRS/Private LTE
 - CBRS/Private/LTE/Wi-fi
 - Eduroam
- An emphasis on wireless solutions focused on educational services.
 - Use multiple sites to create wireless connections
 - Equipment installation – utilize government and school real estate; light poles
 - Physical hardware connections
 - Use existing school internet connections
 - Secure connection only to educational institutions
 - Only to connect back to school
 - Silos in Arizona
 - There is not a K-20 education network across the state

There is not one solution for all scenarios.

Data Driven

Mapping locations,
need, types of
housing, geographic
challenges, multiple
scenarios within the
4 square mile area.

Project Phases

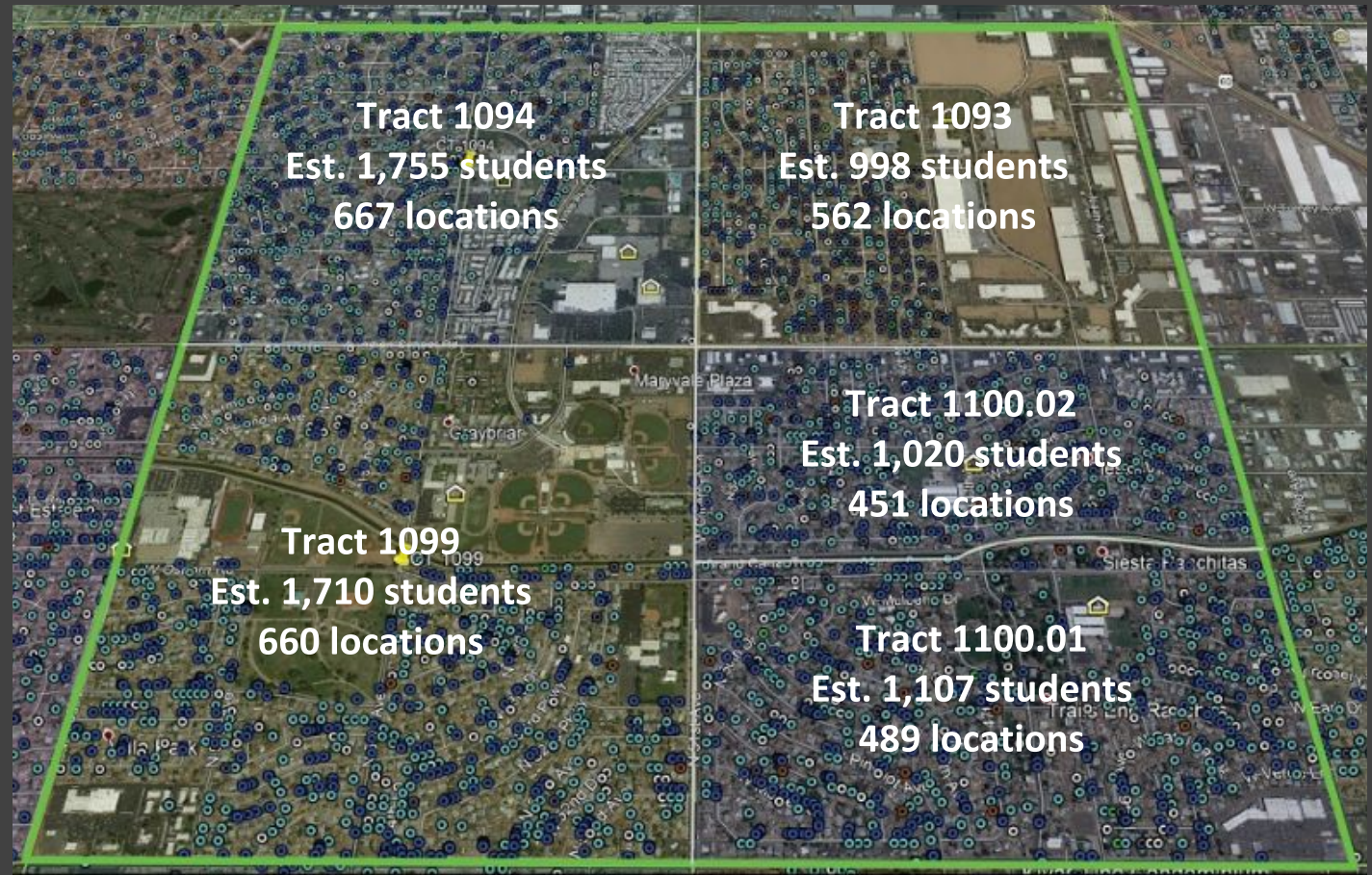
Initial Deployment

Phase I and II:

- Micro Proof of Concept (POC) at Phoenix College **(Complete)**
- Micro POC in community
- Full POC tested in 4-square miles

Short-Term Proof of Concept

4 Square Miles of Cartwright (3) & Alhambra (1) Elementary School Districts

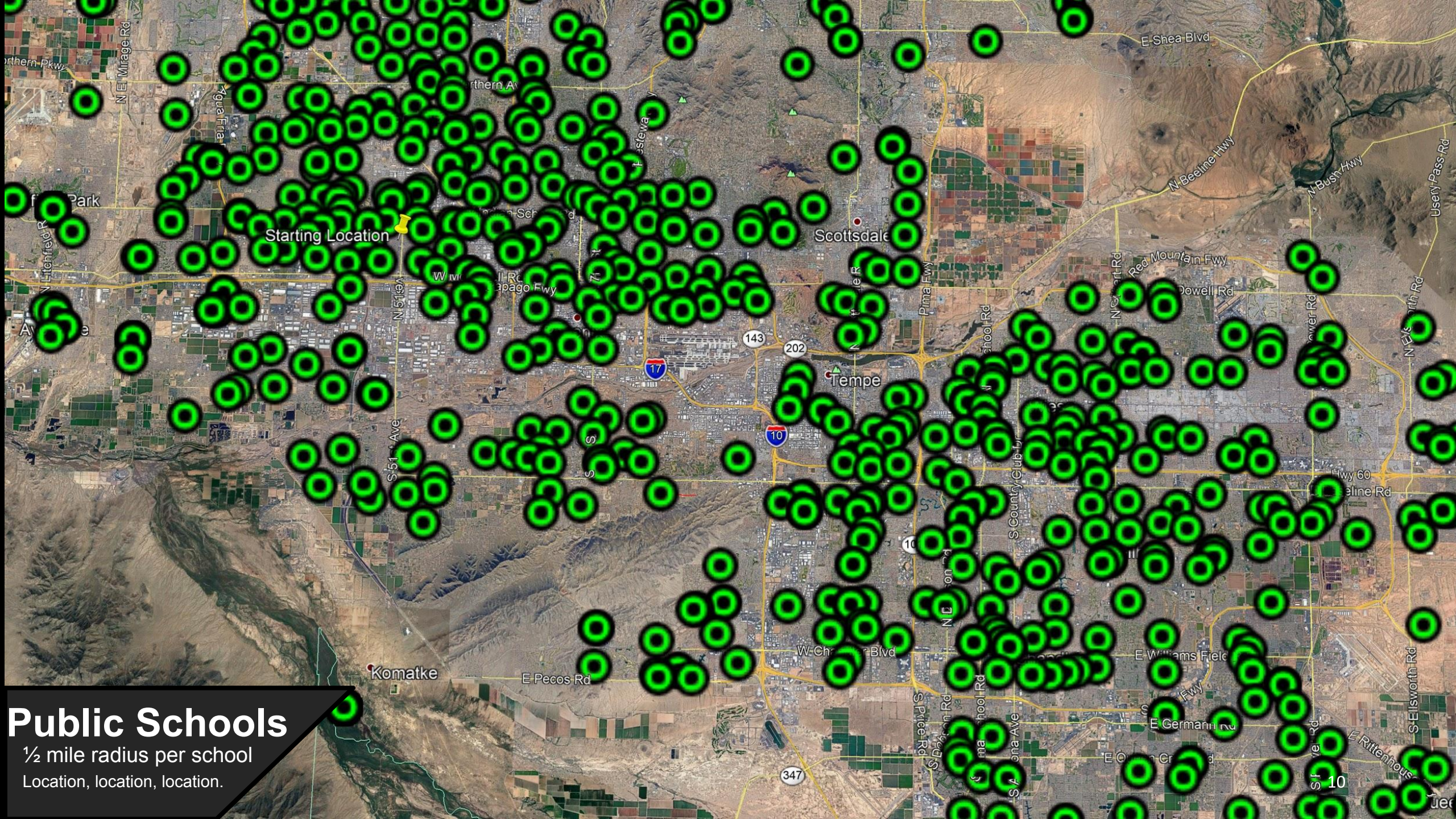


Apartments (7)

123, 108, 107, 98, 86, 80, & 55.

Households Size & Number of Students

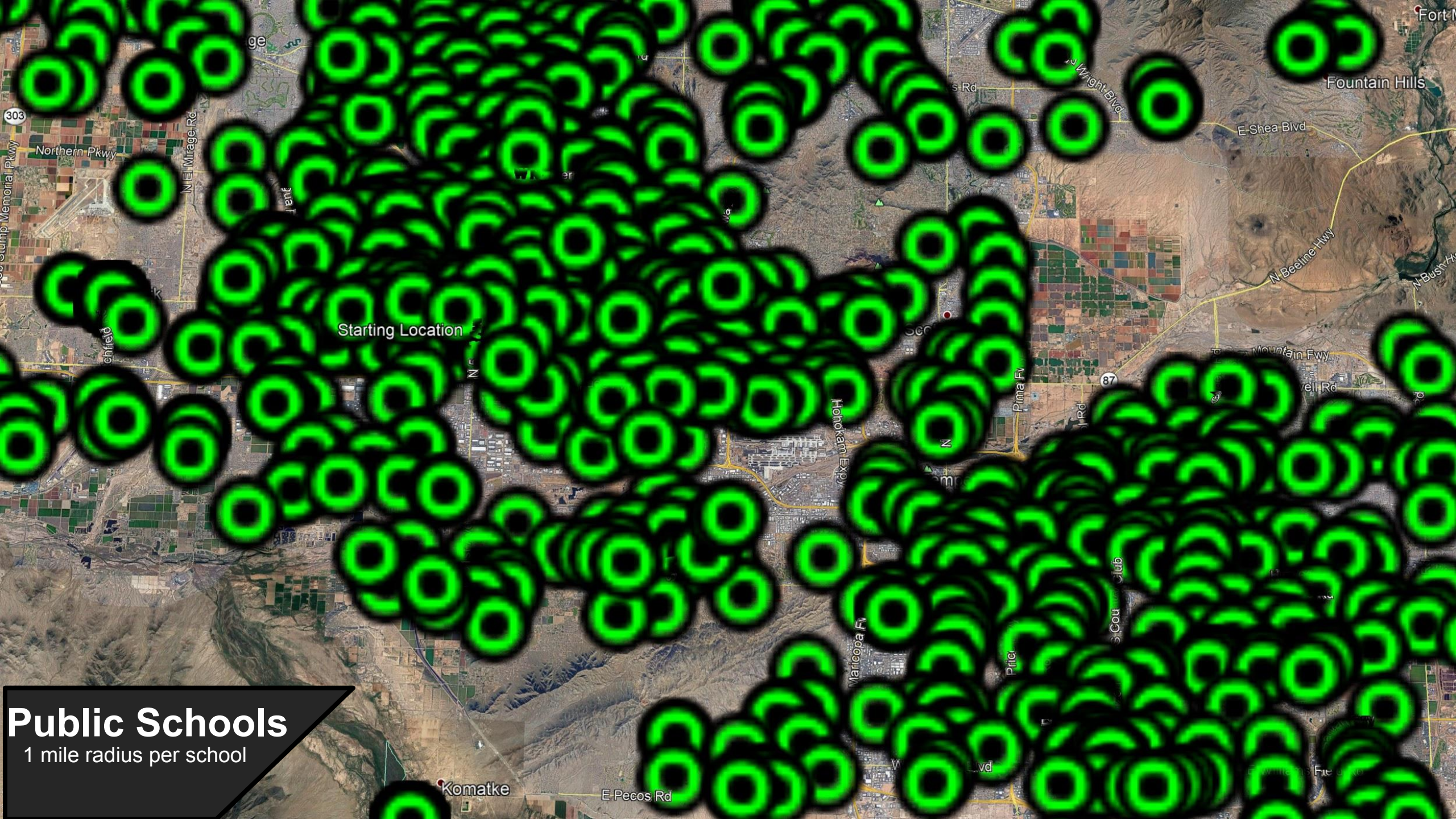
46% (1) 26% (2) 14% (3) 7% (4) 6% (5-10) 0.01% (10+)



Public Schools

1/2 mile radius per school

Location, location, location.



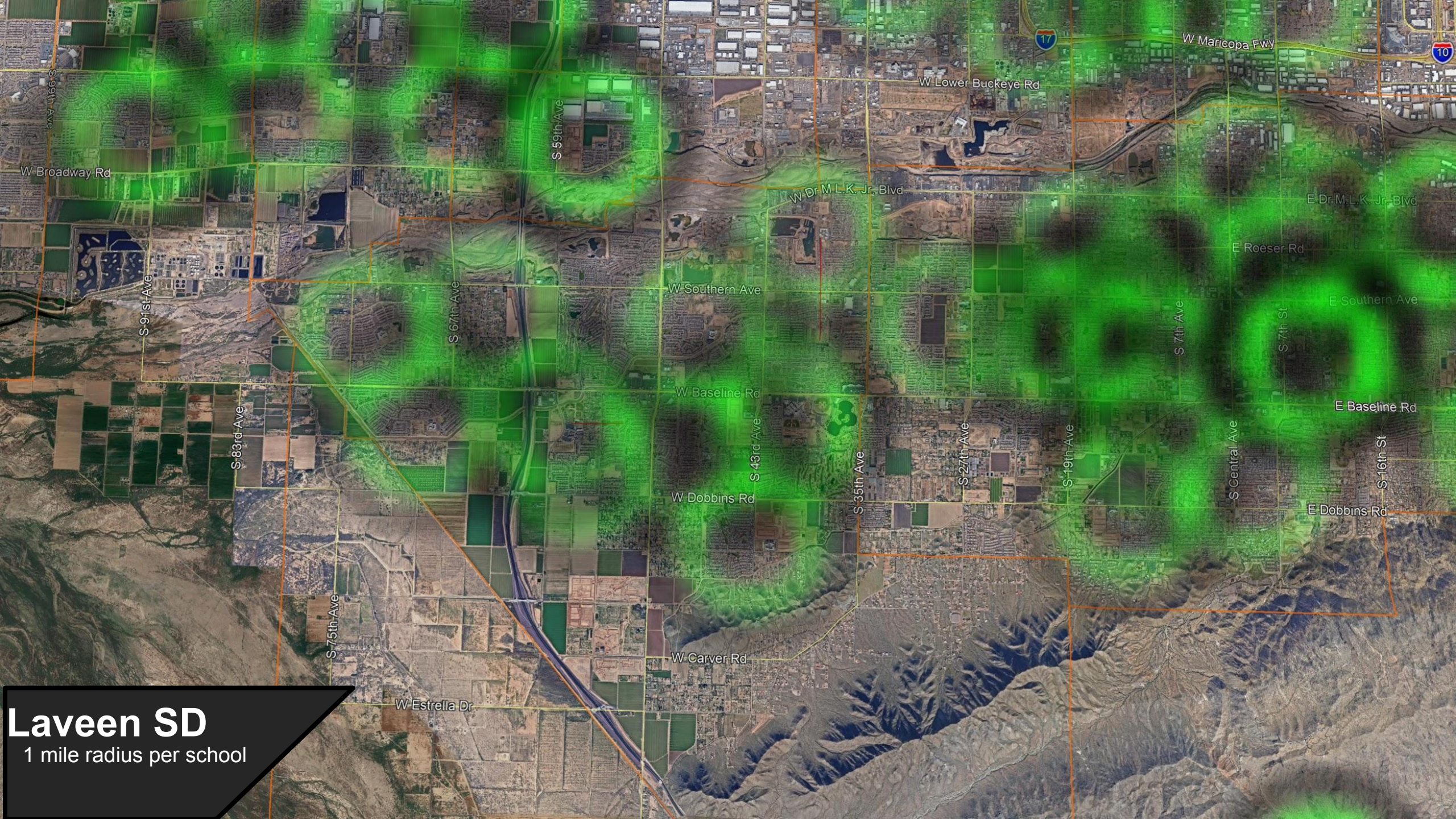
Starting Location

Public Schools

1 mile radius per school

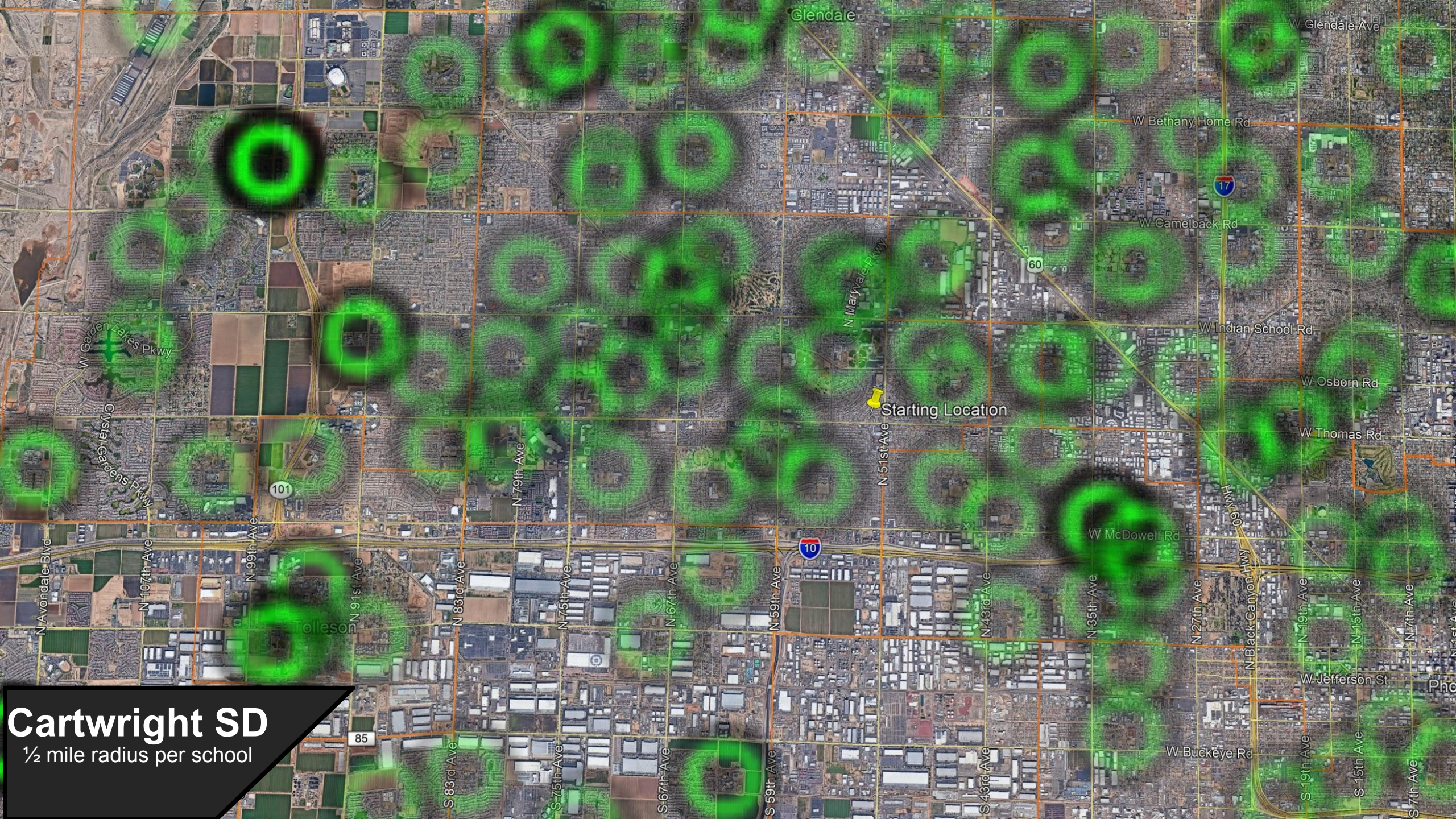
Laveen SD

1 mile radius per school



Cartwright SD

½ mile radius per school



Cartwright SD

1 mile radius per school

Long-Term Solution

Implementation:

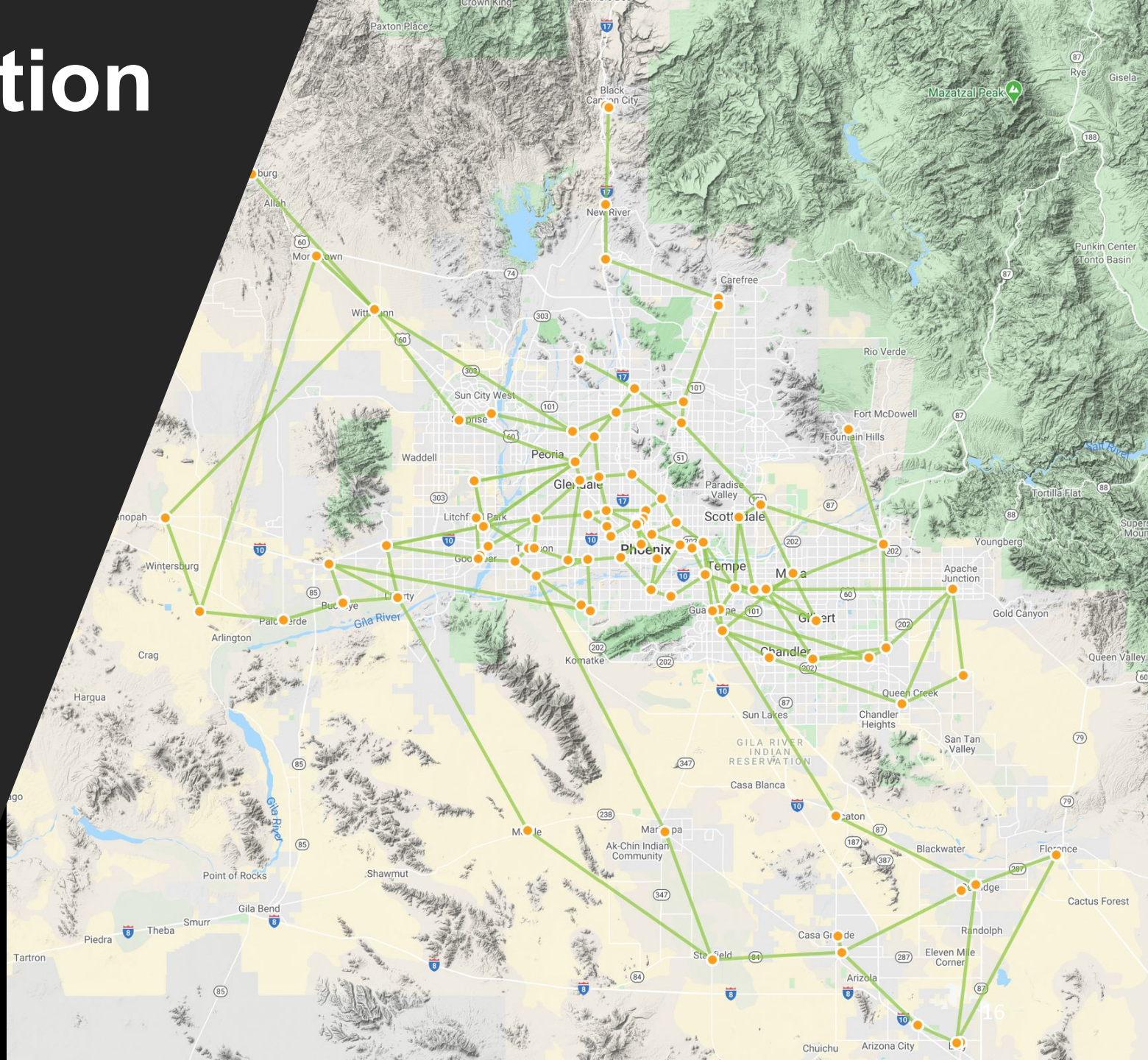
- Phoenix Union High School District
- 13 Elementary schools
- 250 square miles

Future Deployment

- Paradise Valley Unified School District
- Deer Valley Unified School District
- Washington Elementary School District
- Glendale Union High School District

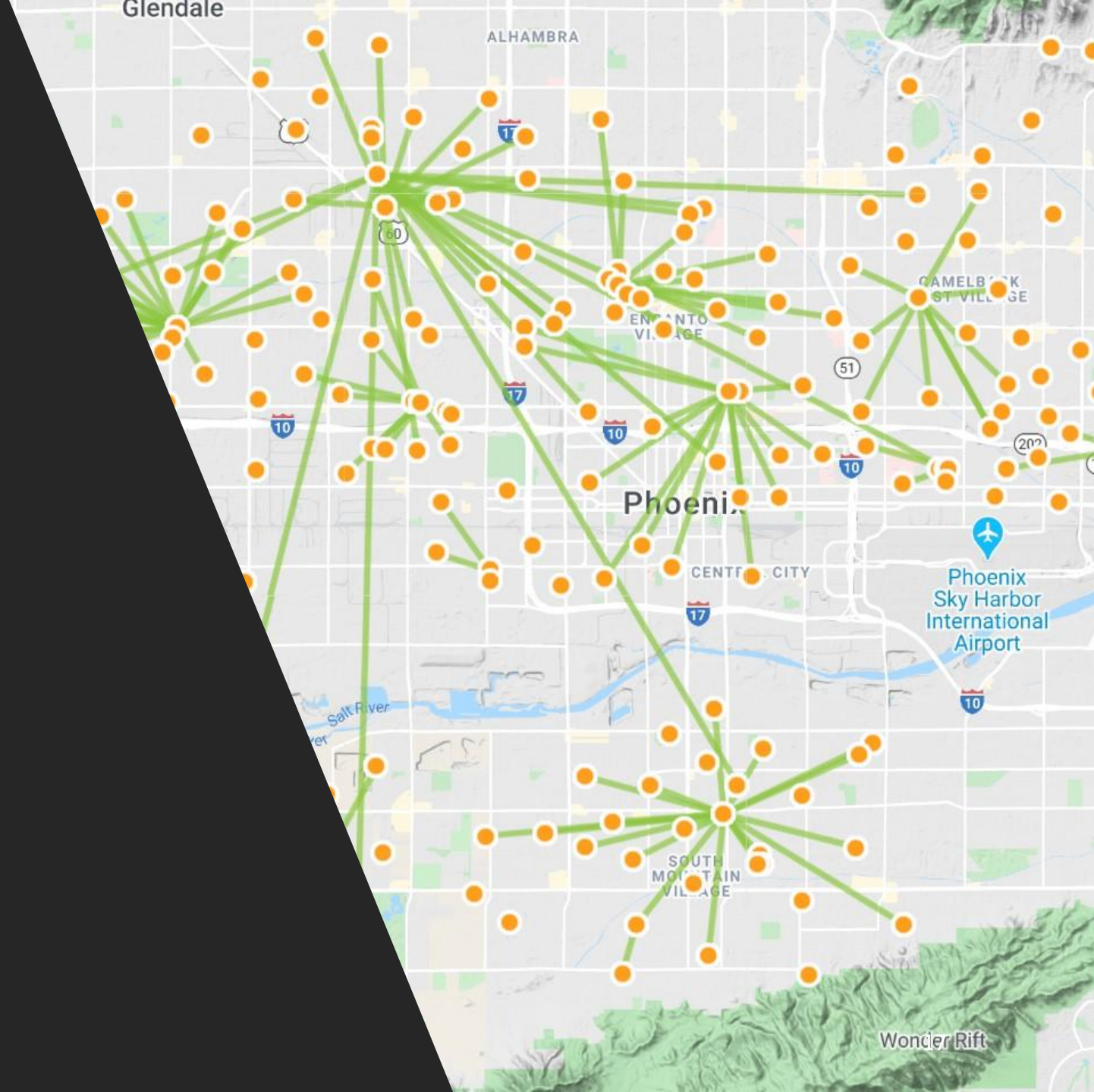
Vision

- Bridge the Digital Divide
- Develop a scalable sustainable solution suitable for schools, education partners K-20 and cities
- Connect partners to eliminate silos
- Develop innovative and creative solutions
- Deploy Eduroam across school partners



Outcomes

- Provide robust digital network removing digital divide – disparity amongst communities
- Model could be easily deployed into other areas
- Students / families within service territory will have Internet connection
- Create education programs that can support IT infrastructure needs – leads to workforce that can support increase in technology
- Create educational programs that can support IT infrastructure needs
- Identify Workforce Innovation and Opportunity Act funding sources – training



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