

Validation of Oklahoma's Broadband Map: A Multi-Pronged Approach

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Outline

- Program overview
- Data validation done by Sanborn
- Data validation undertaken by Oklahoma University
- Challenges with data validation
- How can you help?



The National Broadband Map

- Provide grants to the states (stimulus funded)
- Create 50 state broadband maps
- Put the 50 states together for the national map



NTIA'S State Broadband Data Development Program: Process Overview



Data
Gathering

Data
Processing

Data
Validation

Data
Integration
& Delivery

Data
Synthesis
& Display

**GIS: an integrative
framework**



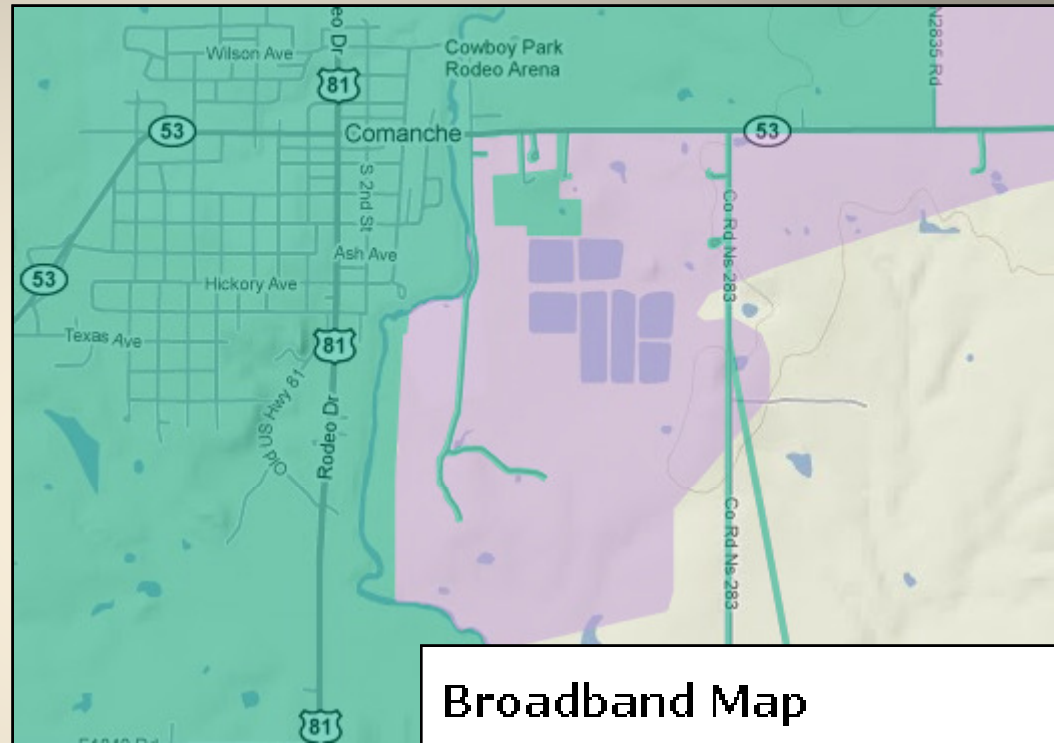
What Are We Gathering?

- Information about:
 - Where is broadband available?
 - What technology is used?
cable/dsl/wireless
 - What speeds?
 - Where is the broadband infrastructure to deliver services
- Information from:
 - Providers of broadband
 - ✓ Public
 - ✓ Public
 - ✓ Public/Private
 - × No information from resellers



How Is Data Processed?

- To protect provider customer data, all information is **aggregated to census blocks or street segments**
- If a census block is >2 sq. miles (indicating rural areas) information is aggregated to street segments



Broadband Map

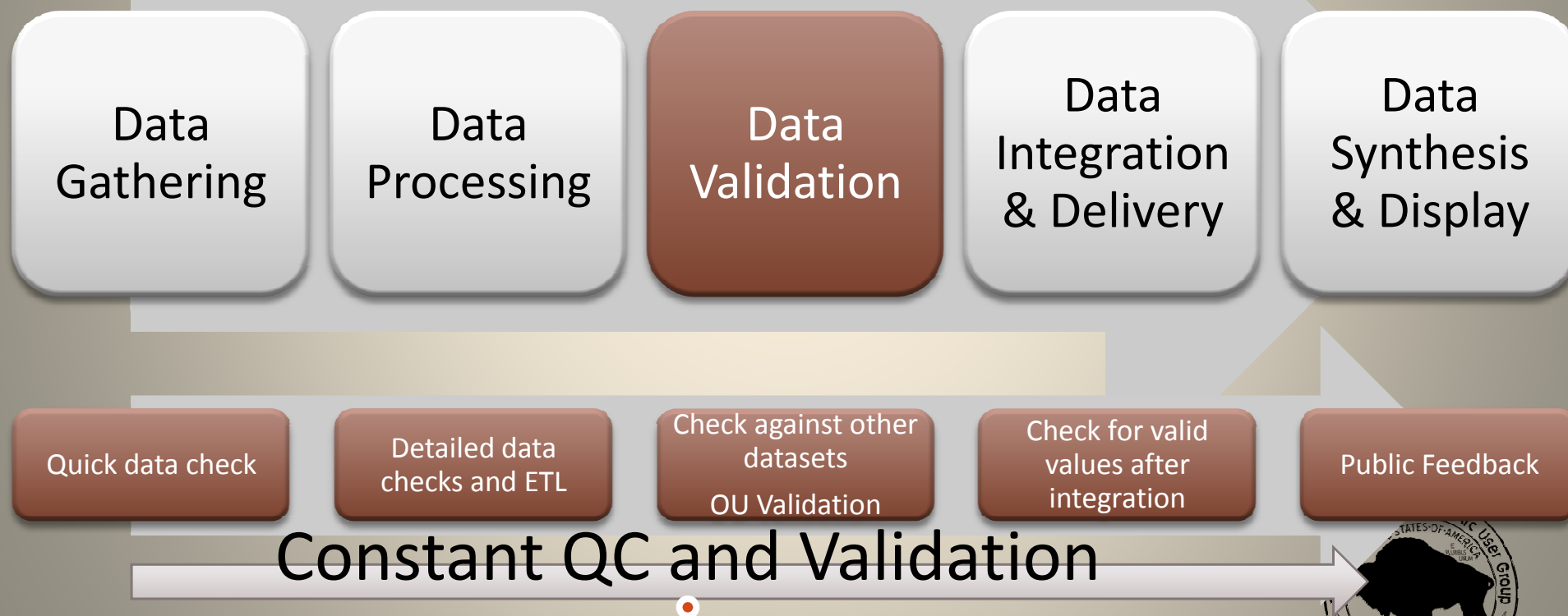
Broadband Availability

Wireline Technology

Wireless Technology

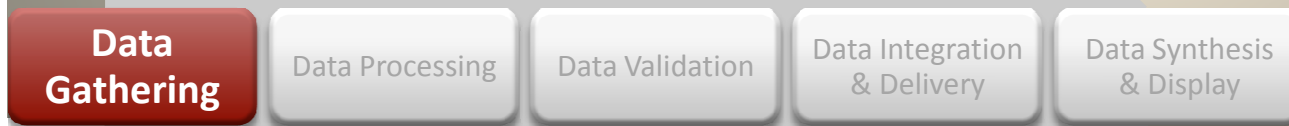


Data Validation: A Multi-Pronged & Iterative Process



Data Validation: During Data Gathering

- Check the data that comes in to make sure that it has:
 - All the pieces of information
 - Service availability for blocks < 2 sq. miles and blocks > 2 sq. miles
 - Information about provider, technology of transmission, and speed
 - Middle mile infrastructure
 - Weighted average speeds for residential customers



Data Validation: During Data Processing

- More detailed checks to see:
 - Missing values in records
 - Invalid values in records
 - Spatial outliers

Data Gathering

**Data
Processing**

Data Validation

Data Integration
& Delivery

Data Synthesis
& Display



Data Validation: A Multi-Pronged View

- Provider validation
- Speed test data
- Telephone Exchange boundaries for DSL
- Cable boundaries for cable
- Public validation
- Independent validation by Oklahoma University

Data Gathering

Data Processing

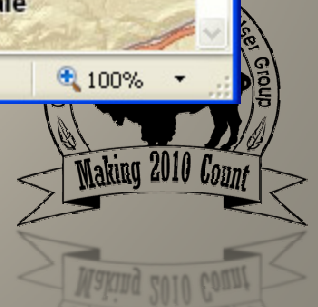
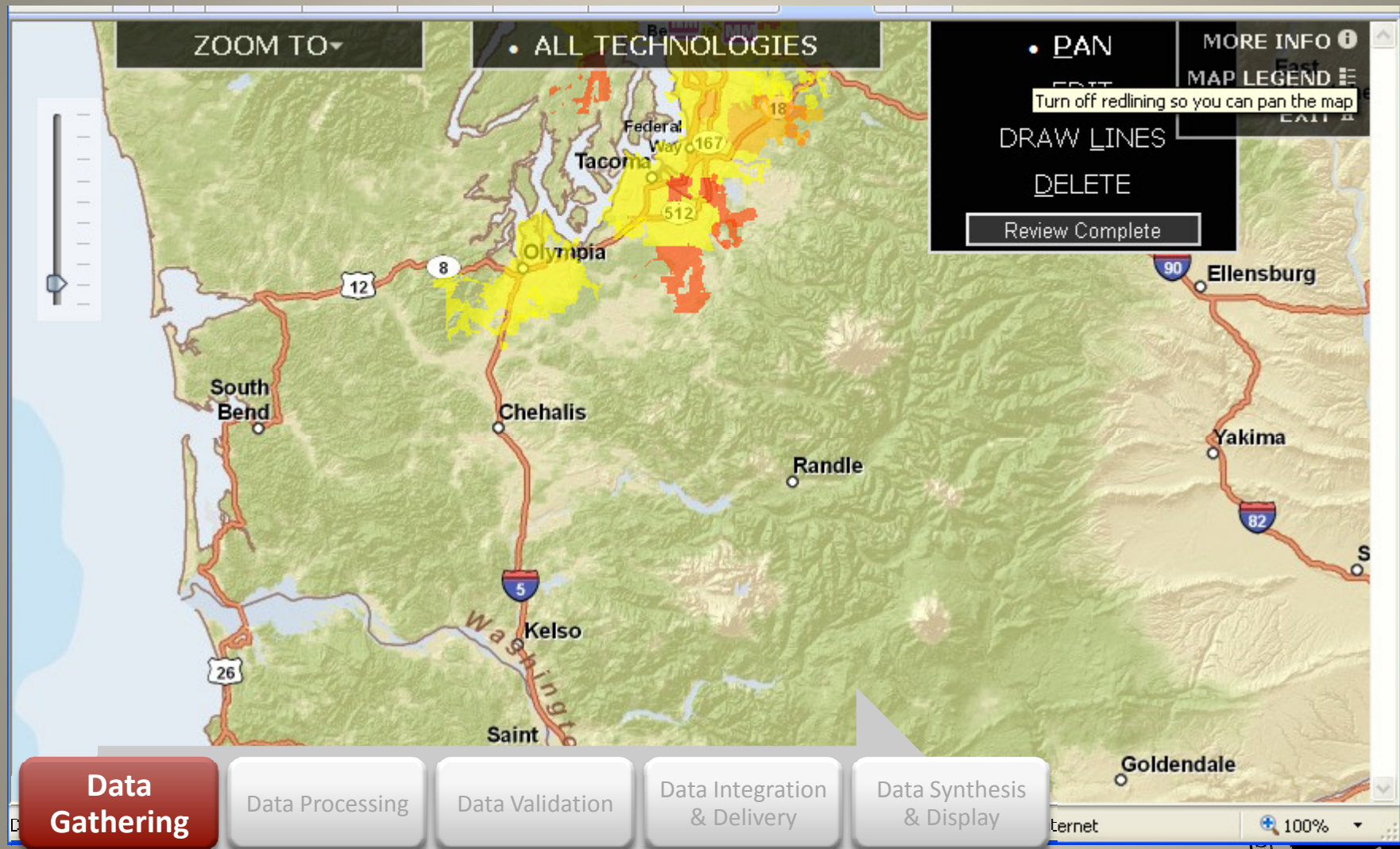
**Data
Validation**

Data Integration
& Delivery

Data Synthesis
& Display



Provider Validation: Secure Provider Portal



Speed Tests

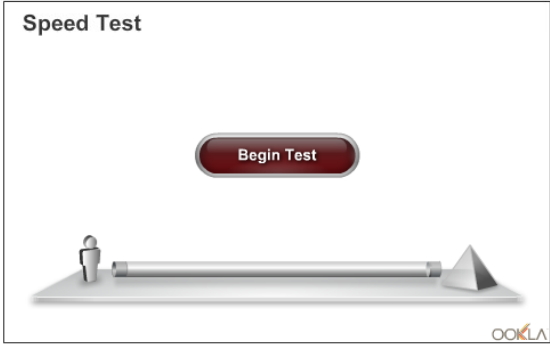
Search Site

Home / Broadband Home / Mapping Home / Test Your Speed

OKLAHOMA SPEED TEST

Click the **Begin Test** button

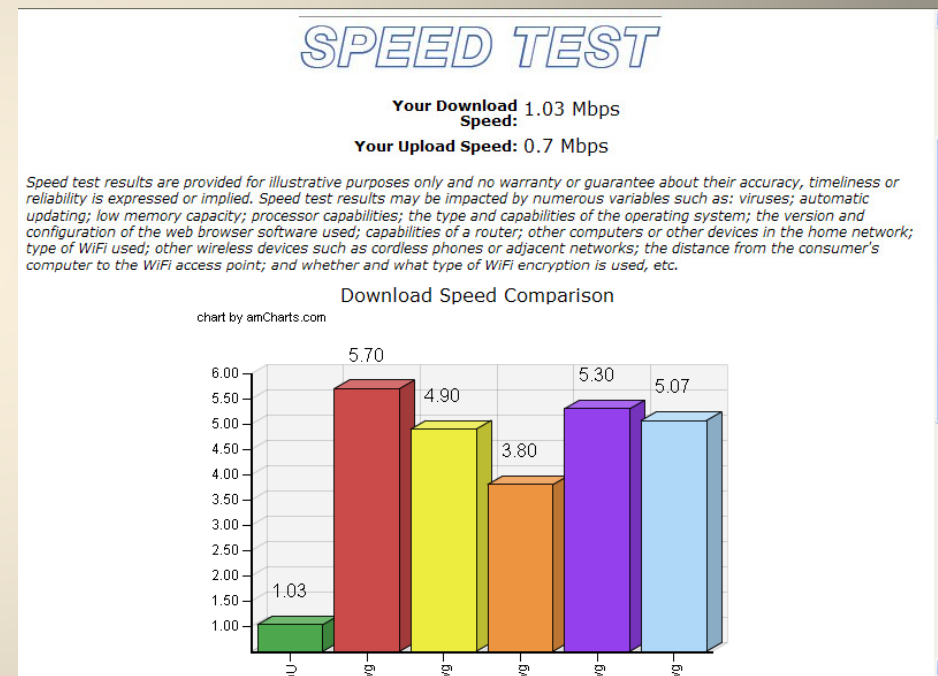
Speed Test



Begin Test

You Entered:

You are at: Other



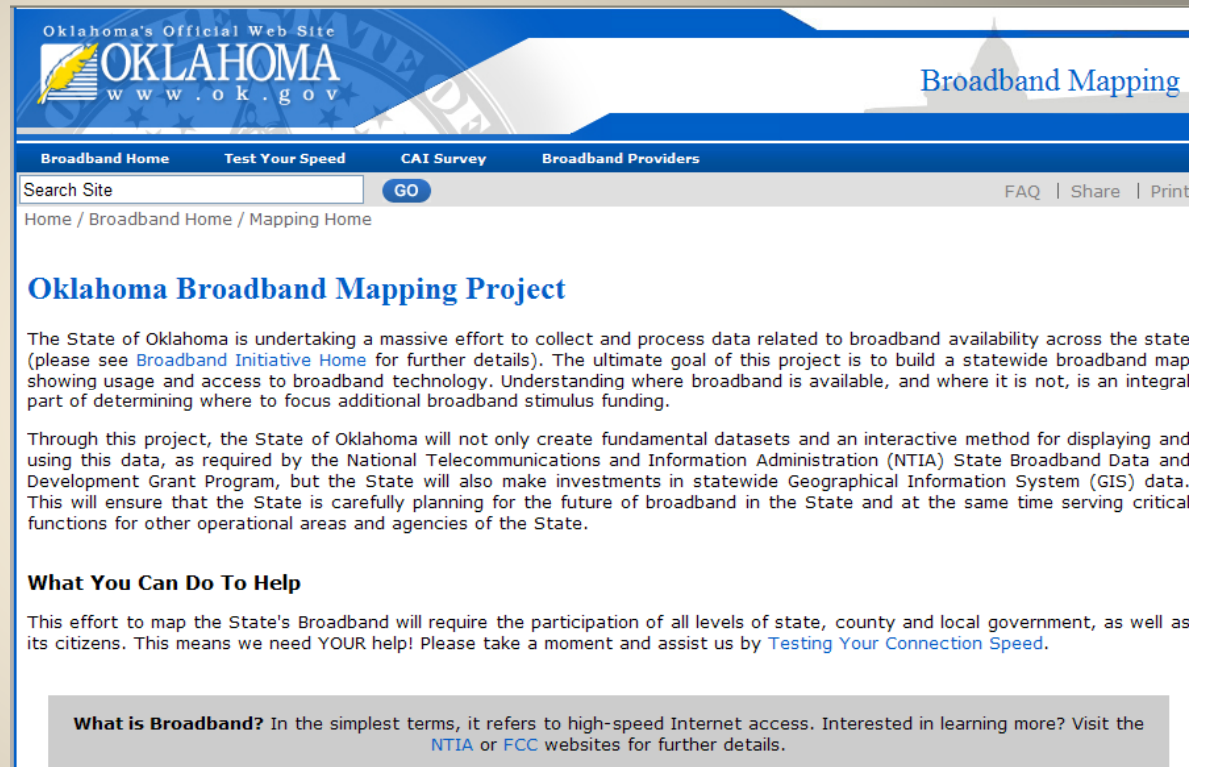
Checking against other datasets

- Telephone Exchange Boundaries for DSL
- Media Prints
- Community Anchor Institutions



Public Validation

- Through
 - Surveys – mail survey, Community Anchor survey
 - Speed tests
 - Feedback on the map



The screenshot shows the Oklahoma Broadband Mapping Project website. At the top, it says "Oklahoma's Official Web Site" and "OKLAHOMA www.ok.gov". The page has a blue header with "Broadband Mapping" on the right. Below the header is a navigation bar with links: "Broadband Home", "Test Your Speed", "CAI Survey", and "Broadband Providers". There is a search bar with "Search Site" and a "GO" button. Below the navigation bar, the page title is "Oklahoma Broadband Mapping Project". The main content area contains two paragraphs of text. The first paragraph states that the State of Oklahoma is undertaking a massive effort to collect and process data related to broadband availability across the state, with the goal of building a statewide broadband map. The second paragraph explains that the project will create fundamental datasets and an interactive method for displaying and using this data, as required by the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program. It also mentions that the State will make investments in statewide Geographical Information System (GIS) data. Below the paragraphs is a section titled "What You Can Do To Help" which encourages participation from all levels of government and citizens. At the bottom of the page, there is a box titled "What is Broadband?" which defines it as high-speed Internet access and provides links to the NTIA and FCC websites for further details.

Oklahoma's Official Web Site
OKLAHOMA
www.ok.gov

Broadband Mapping

Broadband Home Test Your Speed CAI Survey Broadband Providers

Search Site GO

Home / Broadband Home / Mapping Home

Oklahoma Broadband Mapping Project

The State of Oklahoma is undertaking a massive effort to collect and process data related to broadband availability across the state (please see [Broadband Initiative Home](#) for further details). The ultimate goal of this project is to build a statewide broadband map showing usage and access to broadband technology. Understanding where broadband is available, and where it is not, is an integral part of determining where to focus additional broadband stimulus funding.

Through this project, the State of Oklahoma will not only create fundamental datasets and an interactive method for displaying and using this data, as required by the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program, but the State will also make investments in statewide Geographical Information System (GIS) data. This will ensure that the State is carefully planning for the future of broadband in the State and at the same time serving critical functions for other operational areas and agencies of the State.

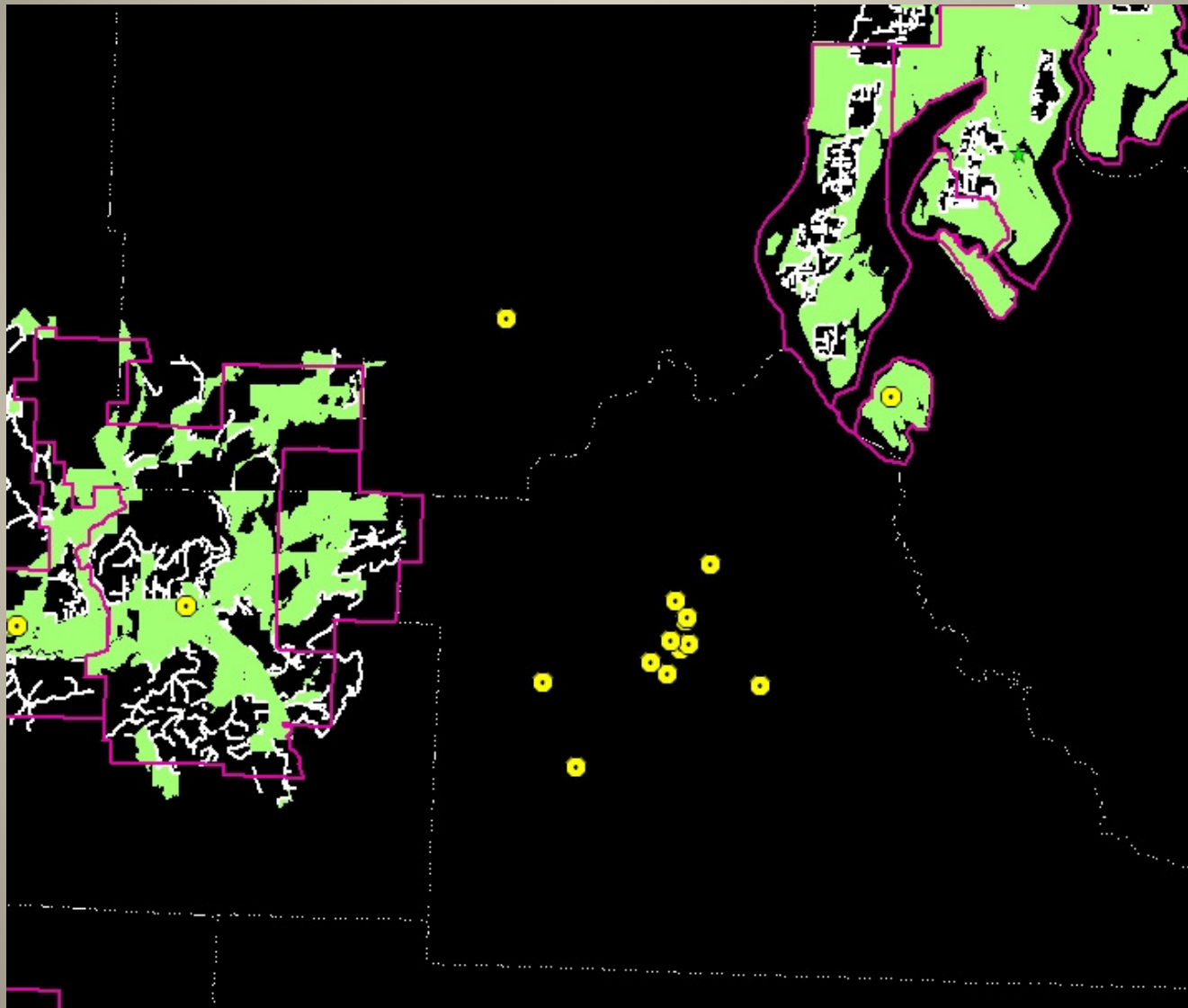
What You Can Do To Help

This effort to map the State's Broadband will require the participation of all levels of state, county and local government, as well as its citizens. This means we need YOUR help! Please take a moment and assist us by [Testing Your Connection Speed](#).

What is Broadband? In the simplest terms, it refers to high-speed Internet access. Interested in learning more? Visit the [NTIA](#) or [FCC](#) websites for further details.



No simple/complete truth!



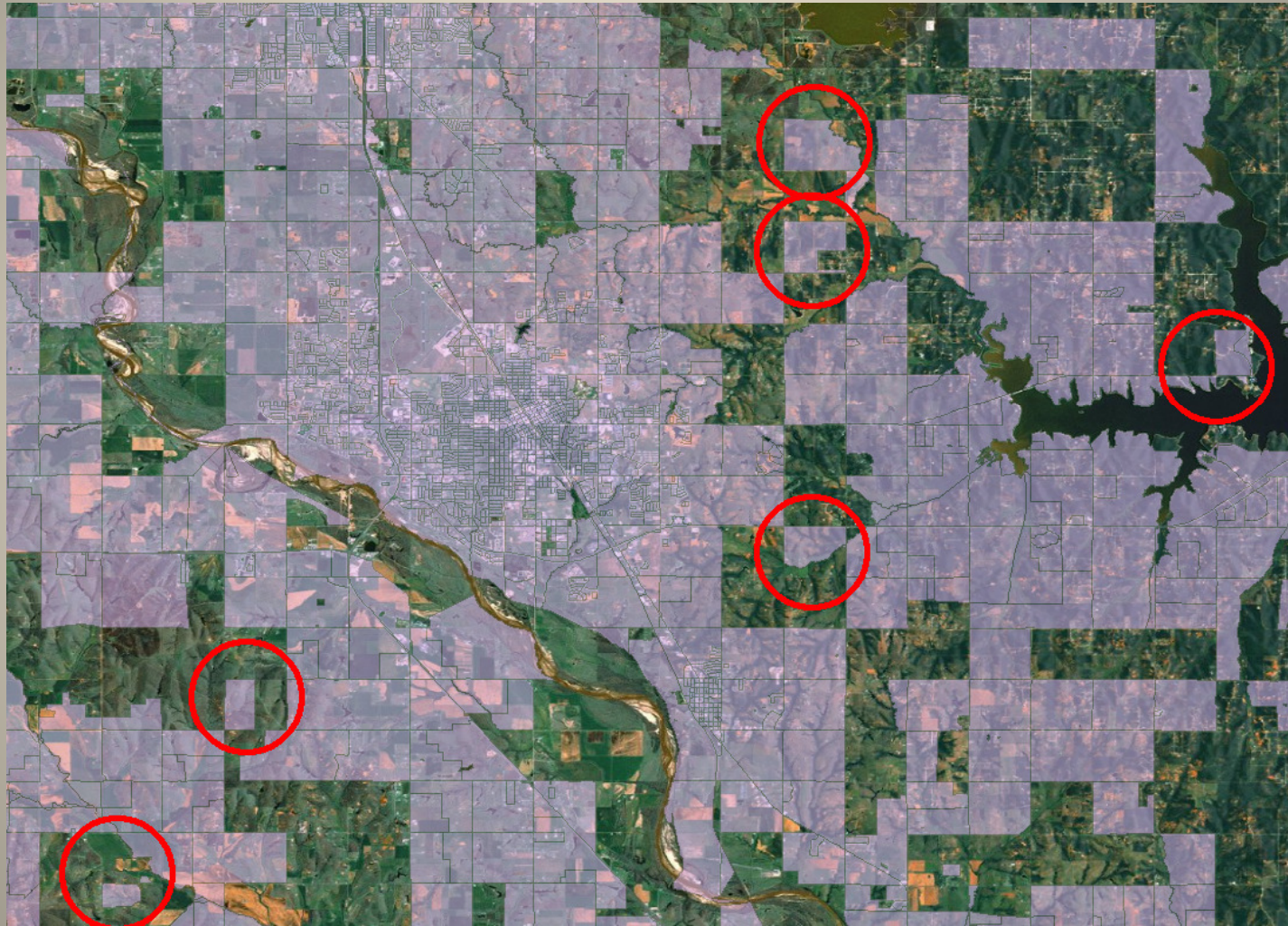
**INDEPENDENT VALIDATION BY
OKLAHOMA UNIVERSITY**

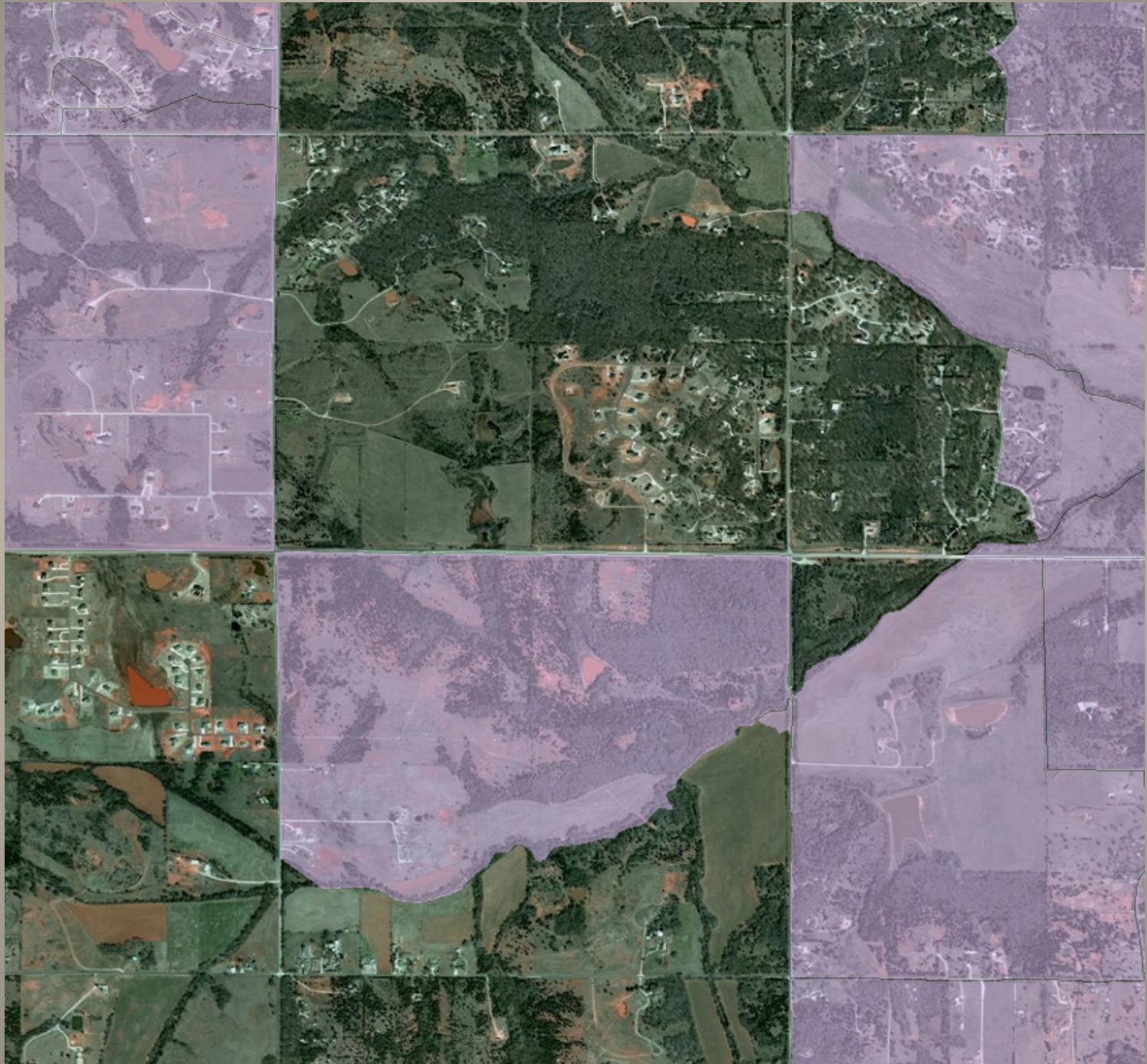
Independent Validation by OUCSA

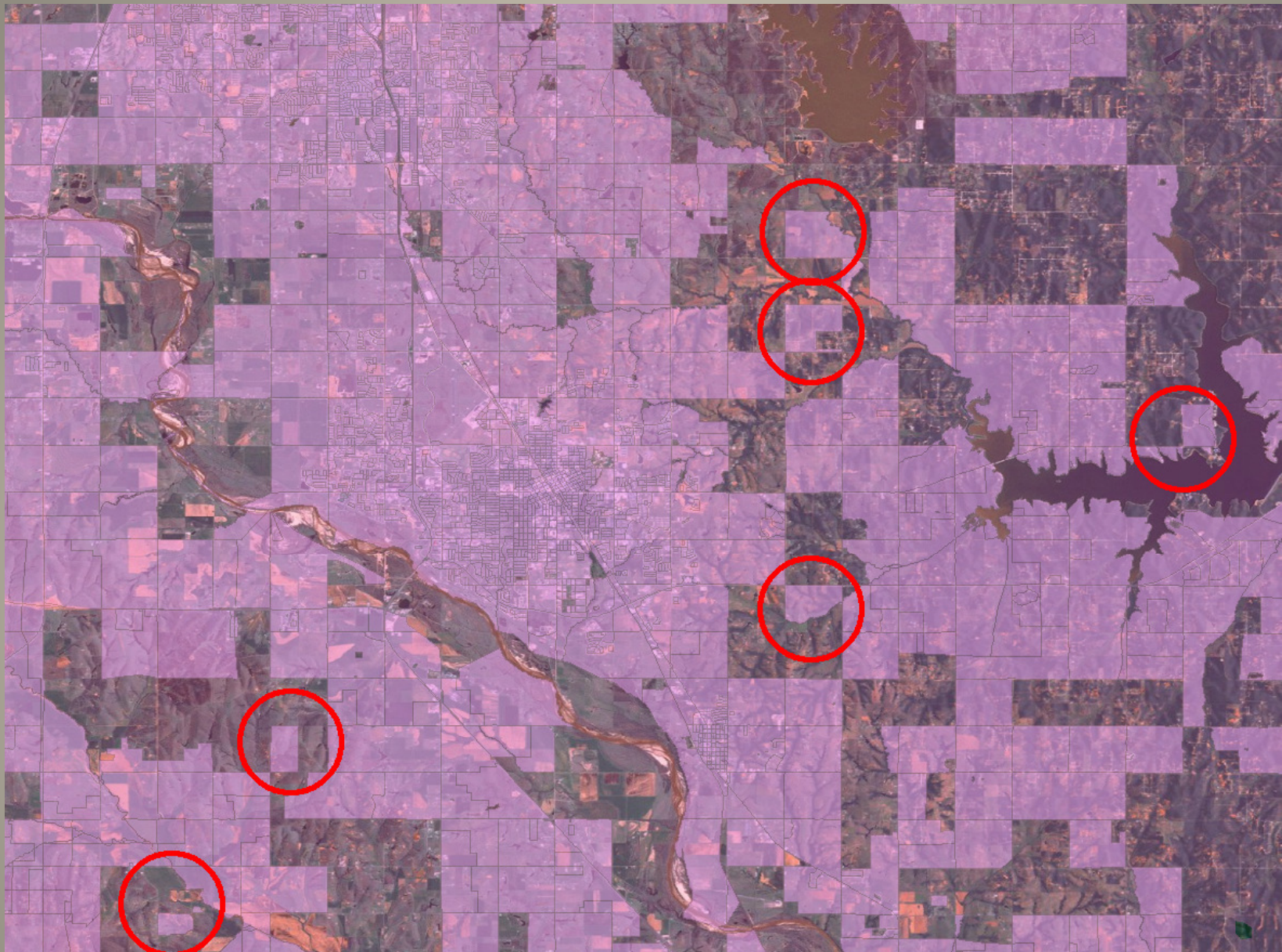
- Validation independent of Sanborn data processing and compilation
- Broadband coverage map provided by Sanborn
- Bottom-up approach to determining broadband availability across the state with an emphasis on reaching unserved populations through surveys
- Validate the broadband coverage map:
 - False positive: blocks mapped as served but not
 - False negative: blocks mapped as unserved but are
- Priority: focused on false positive
- Estimate the percentage of population and houses in false positive



Examples of blocks in question east Norman; wirelines only







With wireless coverage, the entire area is shown fully covered.

Examples of false negative



OU CSA Validation Process

- Norman – Pilot Validation
- Survey
 - Mail out
 - Email
 - Snowball Sampling



CSA Validation Process

- Norman Pilot Validation
 - Collaborate with Norman Police Department
 - Door-to-Door Verification of outlying areas
 - Develop process for identifying suspect outliers
- Purpose: to identify spatial characteristics of blocks in question >> targeted survey strategy for the state



CSA Validation Process

- Survey
 - On-line at..

<https://selectsurvey.net/ouit/TakeSurvey.aspx?SurveyID=m42M7o8>

- Adobe clickable form at...

<http://ags.ou.edu/~myuan/broadbandsurvey.pdf>



CSA Validation Process

- Survey - Methodology
 - Email
 - Employees and Service Providers
 - OSDH, ODH, ODMHSAS, OSU – Extension Centers, Choctaw Nation
 - Council of Governments
 - Inter-tribal Emergency Managers
 - GeoTech networks
 - OK GIS listserv



CSA Validation Process

- Survey - Methodology
 - Mail-out
 - Random selection by county of voters in Oklahoma
- Geocode addresses and accessibility information
- Overlay the survey addresses with the broadband coverage map
- Identify and map blocks of false positive or false negative
- Follow-up with geotechs, county officers, or other contacts to double check if available
- Finalize a map with problematic blocks
- Questions?



Data Validation Challenges

- No good validation for wireless providers
 - Drive tests are expensive
 - Will have more in Years 3-5 grant
- Conflicting information from various sources
- Swiss cheese valid or not valid?
- Speed test accuracy
 - Critical mass of data needed
 - Local environments affect speeds
- Budget for validation not sufficient to survey a statistically significant sample



How Can You Help?

- Help us collect speed test and community anchor institutions data
- Validate the data that is on the interactive map
- Work with local officials to provide more local knowledge
- Spread the word – get your friends, neighbors, colleagues and their friends, neighbors and colleagues to create a viral campaign to crowd source information



Thank you!

- For more information about program and Sanborn validation:

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- For more information about Oklahoma University validation:

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