

Users and Coverage

Initial Consultation Meeting with the State of Nevada



Users and Coverage Goals



1. First Responder Users / Operations

- Identify potential user base and their operational areas
- Estimate current usage of mobile data today

2. Coverage

- Review FirstNet Initial Coverage Objectives
- Discuss State Inputs and Approach to Objectives
- Discuss Coverage Modeling and Desired Outputs

Key Inputs to FirstNet Design



Coverage

Where?

- Where Needed (Objectives)
- Different Device Types
- Throughput levels

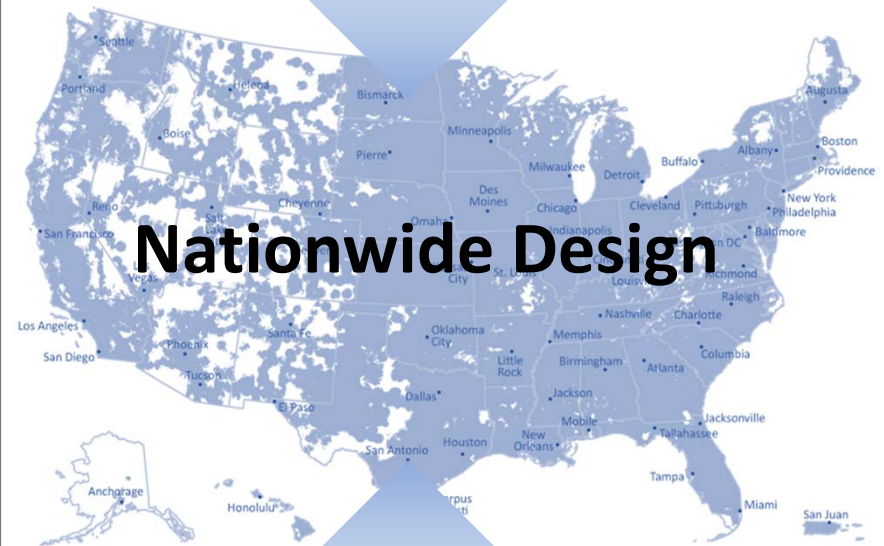
Capacity

How Much?

- # of Users and Devices
- Application Usage
- Data Consumption

FirstNet Financial Team

- RFP Development/Evaluation
- Economic Modeling



FirstNet Engineering Team

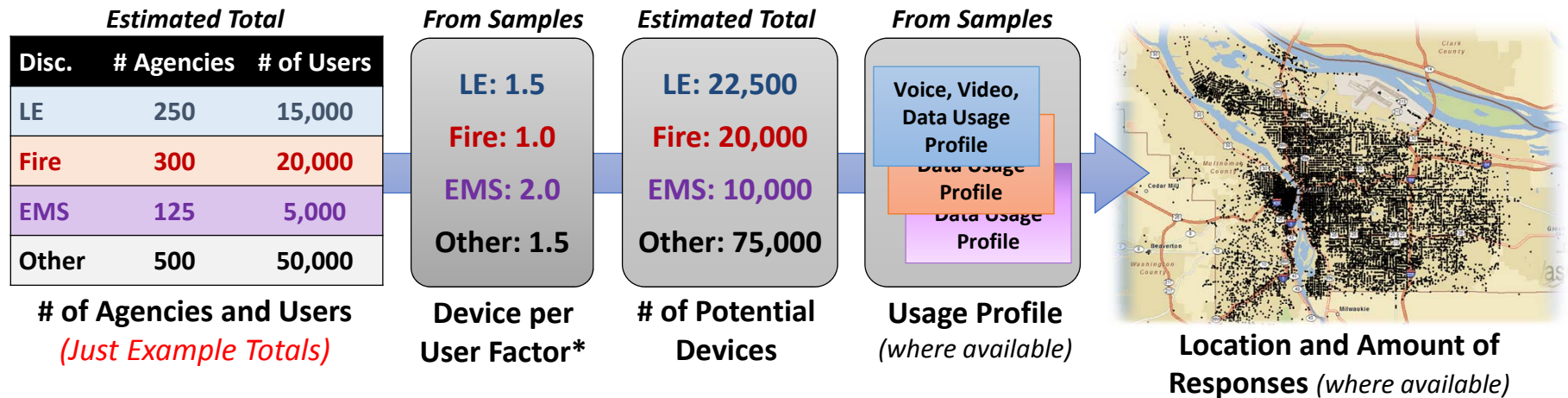
- RFP Development/Evaluation
- Core, RAN and Devices

Guiding Principles for Data Requests



- **Critical Data**: only gather critically essential data
- **When Needed**: collect data close to when it will be used to ensure accuracy
- **Pre-populate**: where possible, FirstNet will collect as much data as possible from available sources for editing and validation
- **Specify Deliverables**: identify required deliverable formats, not necessarily specific tools and processes
- **Be Flexible**: allow flexibility given different stakeholders' existing use of tools, processes and resource constraints
- **Get Feedback**: socialize the process before formalizing
- **Advance Notice**: identify schedule, process and tools as early as possible for stakeholders to plan accordingly
- **Local Knowledge**: rely on stakeholder knowledge to help prioritize data collection

Users / Operations Overview



= > Inputs to RAN Design representative of Public Safety Operations

Who does Nevada consider to be eligible users?

What kind of assessment has been done on the potential user base?

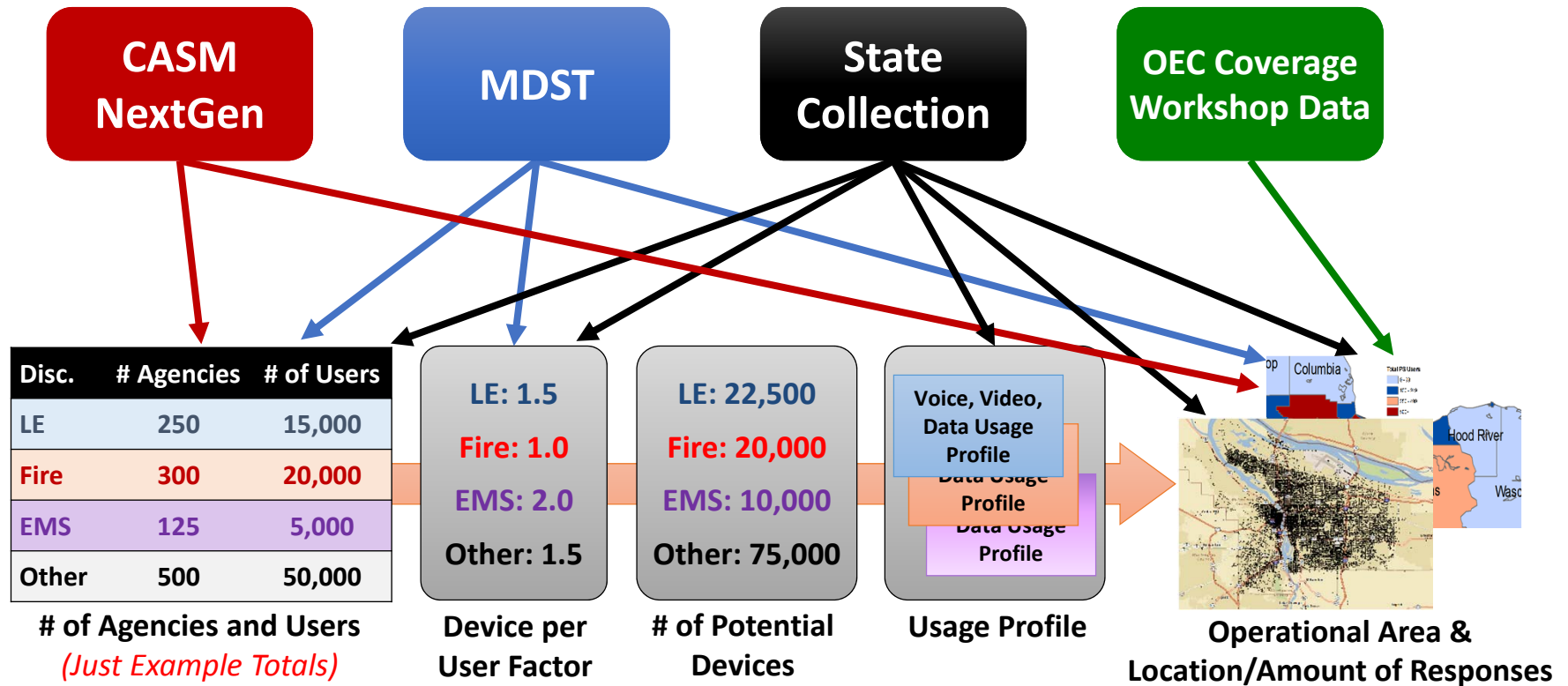
Current provider? Device types and counts? Procurement options and vehicles? Typical costs?
Current usage amounts? Growth projections? Operational areas? Potential adoption?

**Several inputs: current usage, adoption rate, growth projections, new devices, etc.*

Users / Operations Collection



CASM NextGen – Communications Assets Survey and Mapping Next Generation
 MDST – Mobile Data Survey Tool



**In the absence of any of this data, FirstNet will use baseline assumptions and estimates*

Users / Operations Collection



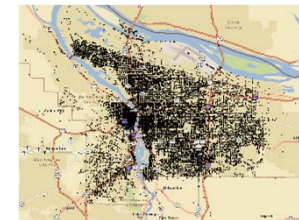
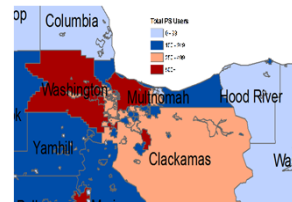
- FirstNet will provide a spreadsheet template defining requested fields (similar to example below)
- CASM NextGen could support this type of data capture and reporting
- State may already have existing database and/or tools for use
- FirstNet looking at comprehensive tool to support all data uploads

Disc.	# Agencies	# of Users
LE	250	15,000
Fire	300	20,000
EMS	125	5,000
Other	500	50,000

of Agencies and Users
(Just Example Totals)

LE: 1.5
Fire: 1.0
EMS: 2.0
Other: 1.5
Device per User Factor

LE: 22,500
Fire: 20,000
EMS: 10,000
Other: 75,000
of Potential Devices



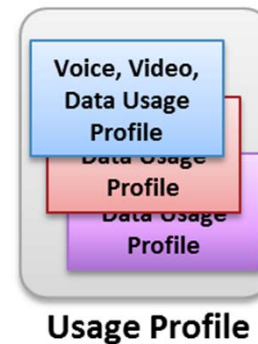
Agency	POC	Discipline	County	State	Jurisdiction	Full Time Personnel	Part Time Personnel	Volunteer Personnel	Total Personnel	# of mobile data devices	Calls for Service data
										If available	If available

Spreadsheet template for Agencies, Users and Devices

Users / Operations Collection



- Usage profiles will include important information on how public safety entities may use FirstNet
- Historic use is also helpful to show growth trends
- Important metrics include:
 - Number of responders and devices
 - Type of responders (discipline)
 - Location of responders
 - Variability by incident types and scale
 - Upload vs. Download
 - Data usage by application
 - Time data sent
- Data can be averaged by:
 - Discipline
 - Area
 - Incident types
- Leverage same upload portal mentioned previously



Law Enforcement User (Busy Hour):

xxx kbps SMS/text
xxx kbps voice calls
xxx kbps video
xxx kbps other data
xxx kbps total usage

**Has any analysis like this been done already?
Could information like this be gathered from representative agencies?**

- Capture current service providers
 - Commercial and Private
- Identify major procurement vehicles / options
- Identify different service plan types and costs
- Capture any specialized services
 - COLTs/COWs, network interfaces/customization, etc.
- Identify current barriers



Users / Operations Collection Summary



Data Type	FirstNet Use	Deliverable Format	Possible Resources
# of Agencies and Users	Estimate total number of potential FirstNet users	Excel file (FirstNet template)	Statewide database, CASM, Commercial sources, gov't & association census
Device per User Factor	Factor to estimate number of potential devices on the network	Excel Table (FirstNet template)	Statewide survey, MDST
# of Potential Devices	Estimate of potential devices for technical design and economic model inputs	Excel Table (FirstNet template)	Samples from agency surveys, calculate from agency/user counts
Usage Profiles (where available)	Technical design input to estimate how public safety may use the network	Excel Table (FirstNet template)	Commercial tools
Operational Areas	Identifies where public safety needs coverage; capacity input	GIS maps and/or from Agency File	Agency jurisdiction (city, county, state, etc.), State/local GIS offices
Location/Amount of Responses (where available)	More precise inputs to operational area	Excel files (FirstNet template)	Participating agencies
Current Providers / Procurement	Identify current service plans, procurement methods and potential procurement restrictions	Excel Table (FirstNet template)	Statewide survey, MDST

Coverage Objectives



Coverage Objectives vs. Coverage Maps



- **What is a Coverage Objective?**

Targeted areas within a state/territory identifying where FirstNet coverage is projected to be needed

- **What is a Coverage Map?**

A predicted coverage footprint showing where devices can reliably communicate with each other above a minimum data rate

Coverage Objectives are NOT Coverage Maps

FirstNet's Coverage Objective Goals



- ***GOAL: Come up with a consistent, nationwide starting point to objectively identify Public Safety's coverage desires***

1. Set a FirstNet Nationwide Coverage Objective Baseline

- Identify initial coverage objectives relevant to Public Safety's desires
- Develop a systematic, consistent and objective approach applied nationwide
- Leverage feedback from OEC's Coverage Workshops
- Generate maps to document the starting point

2. Facilitate coverage discussion for a phased build out

- Include additional data to tailor needs for each state
- Modify based on stakeholder input and feedback

3. Generate coverage maps based on culmination of acquisition process

FirstNet Envisions Continued Discussion and Revisions on Coverage Beyond Delivery of a State Plan

Starting Coverage Objectives Data

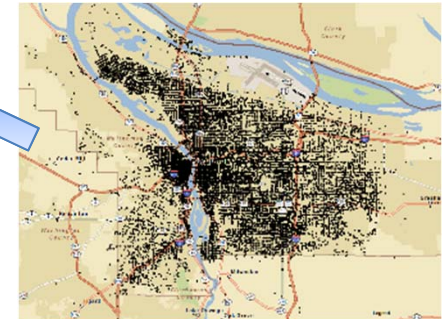


1. Public Safety User Population *(Source: HSIP, OEC provided)*

- **Public Safety User Density** based on jurisdiction (OEC data to start)
- **Common response areas (CAD data)** – as it's made available with State collection

2. Public Safety High Risk / Areas of Interest *(Source: HSIP)*

- **Key facilities** – PS agencies, corrections, airports, EOCs, hospitals, PSAPs, schools, etc.
- **Critical infrastructure** – manufacturing, energy, dams, etc.
- **Large Public Venues** – stadiums, theme parks, malls
- **Other major event locations** – if provided with initial consultation submission
- ***Area for feedback** – tourist/recreational destinations (parks, hiking, waterways, etc.)



3. US Population *(Source: 2012 US Census)*

- **Population density**

4. Developed Areas / Buildings *(Source: 2006 National Land Cover Database)*

- **Dense / Medium / Light / Open / None**

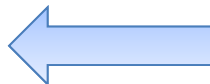
5. Roadways *(Source: Federal Highway Administration)*

- **National Highway System**
- **Average Daily Traffic Counts** to identify significant secondary roadways

6. Tribal Land

7. Rural Metrics

8. Federal Land



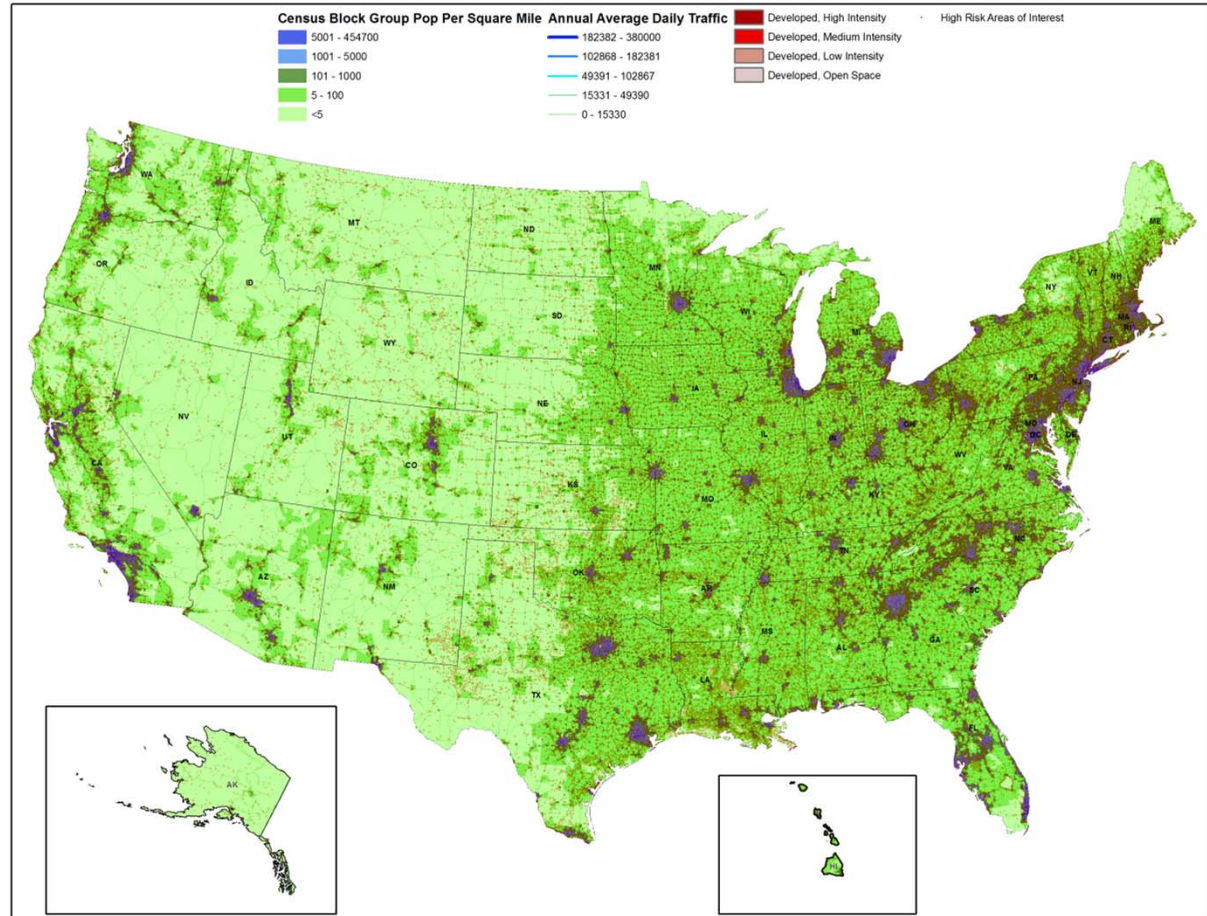
These will be incorporated with additional considerations (i.e. FirstNet Rural milestones) or via separate consultation (i.e. Federal)

Nationwide Approach



1. Employee count of L.E., Fire, EMS agencies
2. Public Safety High Risk / Areas of Interest
3. US Population
4. Developed Areas / Buildings
5. Roadways / Avg. Daily Traffic

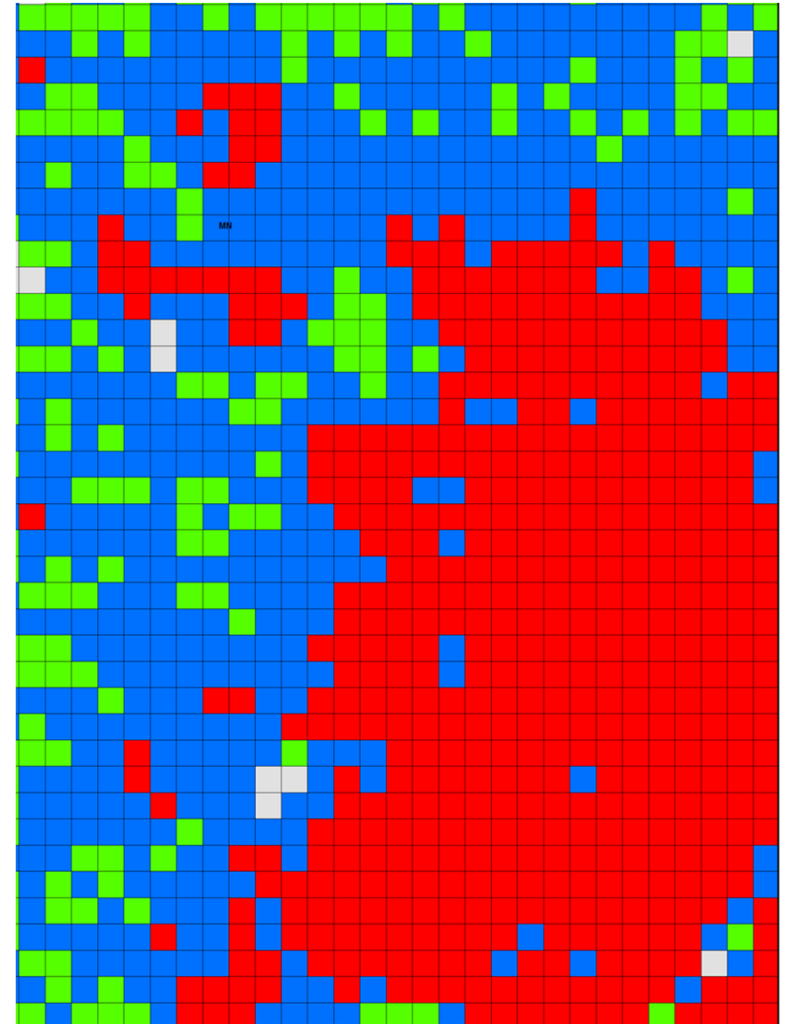
Resulting Combined Map =>



Converting Data into Coverage Objectives



1. Employee count of L.E., Fire, EMS agencies
 2. Public Safety High Risk / Areas of Interest
 3. US Population
 4. Developed Areas / Buildings
 5. Roadways
- A lot of data in different formats
 - Points, lines, polygons, etc.
 - To evaluate these broad datasets, applied a 1x1 mile grid for uniformity
 - Evaluated all data by grid to:
 - 1) Identify areas that had data of interest to PS
 - 2) Show concentration areas



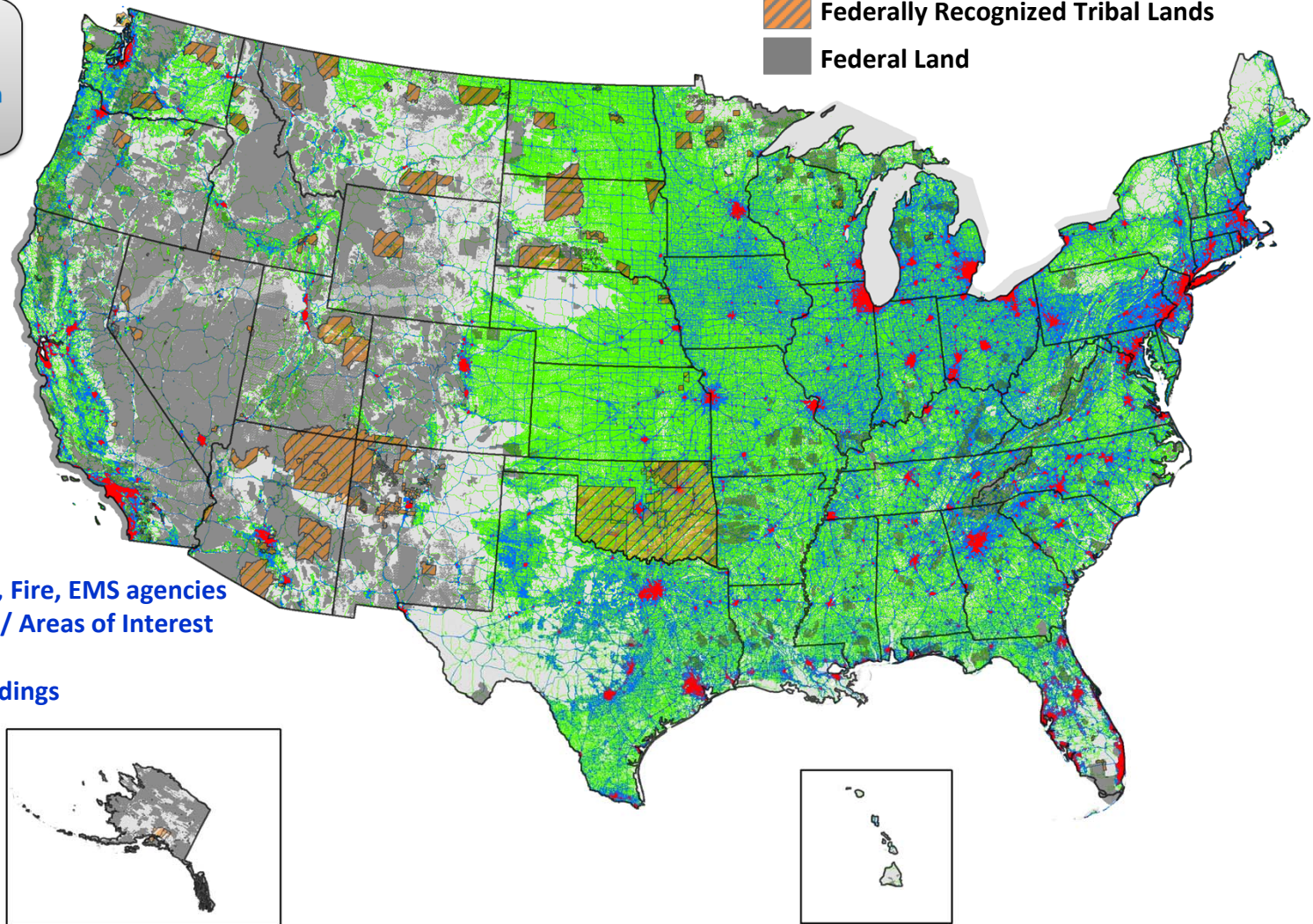
Nationwide Coverage Objective



Legend:

- High Concentration
- Moderate Concentration
- Low Concentration

- ▨ Federally Recognized Tribal Lands
- Federal Land



1. Employee count of L.E., Fire, EMS agencies
2. Public Safety High Risk / Areas of Interest
3. US Population
4. Developed Areas / Buildings
5. Roadways

Results for Nevada



1. Employee count of L.E., Fire, EMS agencies
2. Public Safety High Risk / Areas of Interest
3. US Population
4. Developed Areas / Buildings
5. Roadways

Legend:

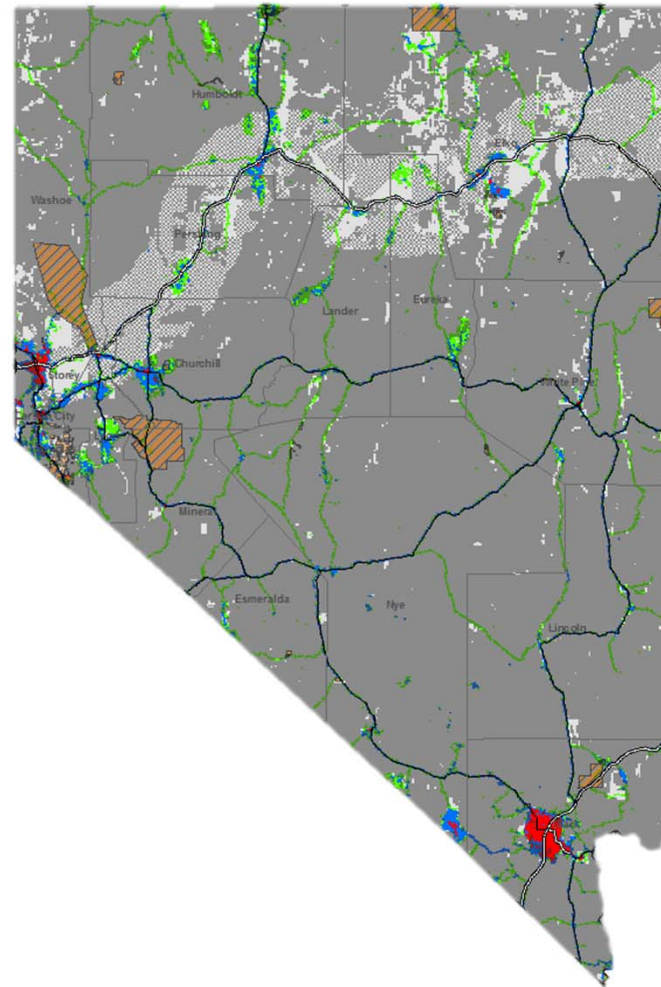
 **High Concentration**

 **Moderate Concentration**

 **Low Concentration**

 **Federally Recognized Tribal Lands**

 **Federal Land**

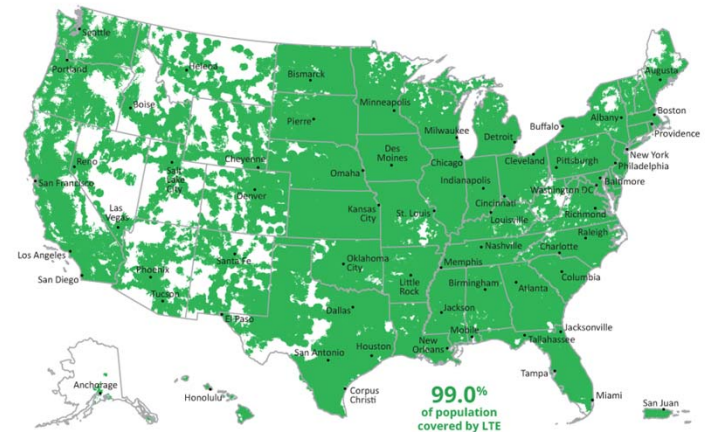


How Should FirstNet Phase a Build Out?



Coverage Objective	Phased Build Out
<ul style="list-style-type: none"> Public Safety High Response (CAD) or Interest Areas 	Build out →
<ul style="list-style-type: none"> Remaining Urban / Dev. Areas Remaining Rural Areas 	Build out →
<ul style="list-style-type: none"> Remaining Major Highways 	Build out →
<ul style="list-style-type: none"> Remaining Critical Infrastructure Remaining Secondary Roadways 	Build out →
<ul style="list-style-type: none"> Remaining Potential Users 	Build out →
<ul style="list-style-type: none"> Additional Land Area 	Build out →

Commercial LTE Build Out 2010-2014



Aggregate LTE Coverage 2Q 2014

Network Intelligence Provided By



All coverage illustrated is derived from public information provided by terrestrial mobile operators. Not all operators choose to market coverage information. Standards for coverage representation vary among operators. Mosaik Solutions provides no warranty to the accuracy of the data. Analysis reflects 2010 U.S. Census Data.

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**What would a phased FirstNet build out look like in Nevada?
What decision factors would you consider?**

Adjusting to Other Deployment Considerations



Coverage Objective	Build Out	**EXAMPLE ONLY**
<ul style="list-style-type: none"> • Co-location / Common Areas of Need <i>(Population, Developed Areas, Highways, etc.)</i> • Rural Areas <i>(FirstNet Rural milestones)</i> 	Partner(s) Co-Location / Common Need	
<ul style="list-style-type: none"> • Remaining PS Areas of Risk/Interest • Remaining Areas of Need 	Site Acquisition	Public Safety Gaps <i>(State/Local/Other Asset Considerations)</i>
<ul style="list-style-type: none"> • Tribal Lands • Federal Land 	Site Acquisition	Tribal, Federal Needs <i>(Tribal/Federal/Other Asset Considerations)</i>
<ul style="list-style-type: none"> • User Feedback • Capacity Growth 	Site Acquisition	FirstNet User Needs <i>(All Asset Considerations)</i>
Funding Source	<ul style="list-style-type: none"> • Partner(s) Co-location (Excess Capacity Exchange) • Initial Capital (\$7 Billion), where required 	Network Revenue

Proposed build out will be refined after RFP Award, ongoing discussion and additional build out considerations and tradeoffs

Coverage Modeling



Coverage Modeling Overview



- Coverage Objectives will be an input to modeling tools
- FirstNet has selected a coverage modeling tool
 - Used worldwide for LTE modeling
 - Granular dataset (terrain and land use)
 - 30 meter in rural
 - 10 meter in metro areas
 - 5 meter in dense urban (3D buildings)
 - Multiple propagation models
 - Tailored for land area type (urban, dense urban, rural, etc.)
 - Tuned with drive test data for different regions of country
- FirstNet intends to discuss coverage parameters and assumptions for our predictions



Coverage Modeling Viewing



- By Device Type *(for example)*

- Handheld**
- Vehicular (low power)**
- Vehicular (high power)**

- By Data Rate *(for example)*

- >1 Mbps** *(Video, web, email, etc.)*
- >512 kbps** *(Low-res video, web, email, etc.)*
- >256 kbps** *(web, email, SMS, etc.)*

- Provide results by layers in an interactive map to:
 - Zoom to areas of interest
 - View by device(s)
 - View by data rate(s)
- From Draft RFI/SOO: “...throughput >256kbps > 95% of time...”

How would you like to see proposed coverage?
By device type and/or data rate?

Users and Coverage Wrap-up



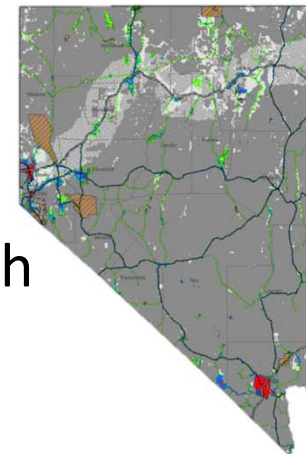
- Identifying the potential user base and their current use of mobile data is important
 - Both Engineering and Financial needs
- Identifying coverage needs and a potential phased build out is also important
 - RFP Evaluation and Eventual Build Out
- Coverage will be an ongoing discussion throughout consultation and into network deployment

Call to Action... Next Steps



- Continued Outreach and Education
- Potential Users and Operations
 - Estimate current potential user base
 - Identify Operational Areas
 - Estimate current usage of mobile data
- Coverage Objectives
 - Identify coverage objectives
 - Provide a phased build out approach

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• Remaining Urban / Dev. Areas • Remaining Rural Areas	Build out
• Remaining Major Highways	Build out
• Remaining Critical Infrastructure • Remaining Secondary Roadways	Build out
• Remaining Potential Users	Build out
• Additional Land Area	Build out


Meeting Evaluation



We want to hear from you!

- How was the meeting?
- What did you like?
- What can we improve?

Please provide us with your valuable feedback by completing your evaluation.



First Responder Network Authority
Initial Consultation Evaluation Form

Please answer the following questions about your experience in this Initial Consultation Meeting according to the scale below:

	1	2	3	4	5
	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
1. The Initial Consultation Meeting met my expectations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:					
2. This initial consultation meeting improved my knowledge of FirstNet and the processes ahead of us.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:					
3. The initial consultation presentations and materials were clear and easily understood.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:					
4. I have a better understanding of the roles and responsibilities of FirstNet and my state/territory in the consultation process.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:					
5. The detailed discussion about users was helpful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:					
6. The detailed discussion about coverage was helpful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:					

FirstNet Contacts



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Thank You