



# Oregon Broadband Middle-Mile Infrastructure Planning Group

## Broadband Middle-Mile Infrastructure Opportunities for Oregon

Briefing slides  
Steve Corbató & Stuart Taubman

August 25, 2021

# Background

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- *Ad hoc* group of Oregon broadband leaders with expertise in technology and business models
- Convened in May 2021 by **Rep. Pam Marsh, Sen. Lee Beyer & Rep. Mark Owens**
- Purpose was to assess the status of middle-mile network infrastructure and associated economic considerations in Oregon and to make recommendations to legislators and the Oregon Broadband Office (OBO).
- **DRAFT PROBLEM STATEMENT** – *Rep. Pam Marsh (April 22, 2021)*

Attaining digital equity for all Oregonians is about more than availability. Cost differentials caused by population density variations impact construction costs and length of a return on investment. More fundamental than that though are the huge disparities in cost of data transport from communities across the State back to the nearest Internet Exchange. Those costs can vary by a factor of 20x or more depending on distance and competition amongst transport providers. This situation makes it almost impossible for citizens of, and communities around our State to realize the same opportunity that affordable broadband access provides. We must find a solution to this issue if Oregon is going to realize its full potential.

# Planning Group Participants

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**Trent Anderson**, LS Networks

**David Barber**, Oregon State University

**Steve Corbató**, Link Oregon (co-chair)

**Kurtis Danka**, State of Oregon CTO, Enterprise Information Services

**Joe Franell**, OBAC chair & Blue Mountain Networks

**Keith Grunberg**, Hunter Communications

**Leif Hansen**, LS Networks

**Craig Heidgerken**, Western Independent Networks

**Tre Hendricks**, Lumen

**Daniel Holbrook**, Oregon Broadband Office, Business Oregon

**Stuart Taubman**, Zayo (co-chair)

**Matt Updenkelder**, Wave Broadband

**John van Oppen**, Zply Fiber

Planning group supported by Molly Thurston, Link Oregon



# Key definitions

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## Last Mile

The connection from the final provider service location (node) to the end user (consumer).

- The end user's effective speed will be no greater than the bandwidth of this connection.
- Average last-mile construction costs vary depending on the build distance, population density, terrain, and competitive landscape.

## Middle Mile

In general, these connections across the state tie together two or more provider nodes (points of presence – POPs).

- At the operating level, this definition recognizes that standards are not universal and that it often is not cost effective to deliver access along the path at every possible point.
- Network planners must cost effectively support the primary goal of why the infrastructure is being installed.
- Over time, new nodes in communities and end user locations may be developed.

# Goals

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We identified the following two fundamental goals for Oregon's upcoming broadband investments:

- Assure the delivery of robust broadband services to *all* Oregonians
- Attain broadband availability in currently underserved communities with network speeds and consumer pricing on par with Oregon's largest cities

# All Middle-Mile Fiber is Not the Same!

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When evaluating a community's middle-mile fiber resiliency or assessing the need for additional public investment to construct a new route, consider these **interdependent factors** that can differentiate existing fiber builds:

- **Physical characteristics:** fiber type, age, and estimated capacity (number of fiber pairs installed, maximum bandwidth per fiber pair)
- **Design considerations:** placement (**buried vs. aerial**), path redundancy, network purpose (i.e., express vs. local – a highway analog is I-5 vs. 99W), spacing and location of access points
- **Resiliency factors:** environmental risks (wildfire, geotechnical, inundation due to tsunami or flood), human risks (accident, vandalism)
- **Business considerations:** availability of unused fiber pairs and equipment colocation space under commercially reasonable terms

Engineering and general public benefit considerations can frequently provide justification for new middle-mile fiber builds along previously built corridors when there is outdated fiber, capacity exhaustion, aerial installations in fire-prone areas, or other forms of non-resilient connectivity.

# Communities Lacking Resilient Middle-Mile Connectivity

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**Adel** (Lake Co.)

**Antelope** (Wasco Co.)

**Ashwood** (Jefferson Co.)

**Beatty** (Klamath Co.)

**Bly** (Klamath Co.)

**Christmas Valley** (Lake Co.)

**Clarno** (Wasco Co.)

**Condon** (Gilliam Co.)

**Crescent Lake Jct.** (Klamath Co.)

**Elkton** (Douglas Co.)

**Elsie** (Clatsop Co.)

**Enterprise** (Wallowa Co.)

**Fossil** (Wheeler Co.)

**Granite** (Grant Co.)

**Imnaha** (Wallowa Co.)

**Jewell** (Clatsop Co.)

**Joseph** (Wallowa Co.)

**Kimberly** (Grant Co.)

**Lakeview** (Lake Co.)

**McKenzie Bridge** (Lane Co.)

**Mitchell** (Wheeler Co.)

**Monument** (Grant Co.)

**Paisley** (Lake Co.)

**Pine Hollow** (Wasco Co.)

**Plush** (Lake Co.)

**Seneca** (Grant Co.)

**Shady Cove** (Jackson Co.)

**Shaniko** (Wasco Co.)

**Sprague River** (Klamath Co.)

**Spray** (Wheeler Co.)

**Sumpter** (Baker Co.)

**Tygh Valley** (Wasco Co.)

**Ukiah** (Umatilla Co.)

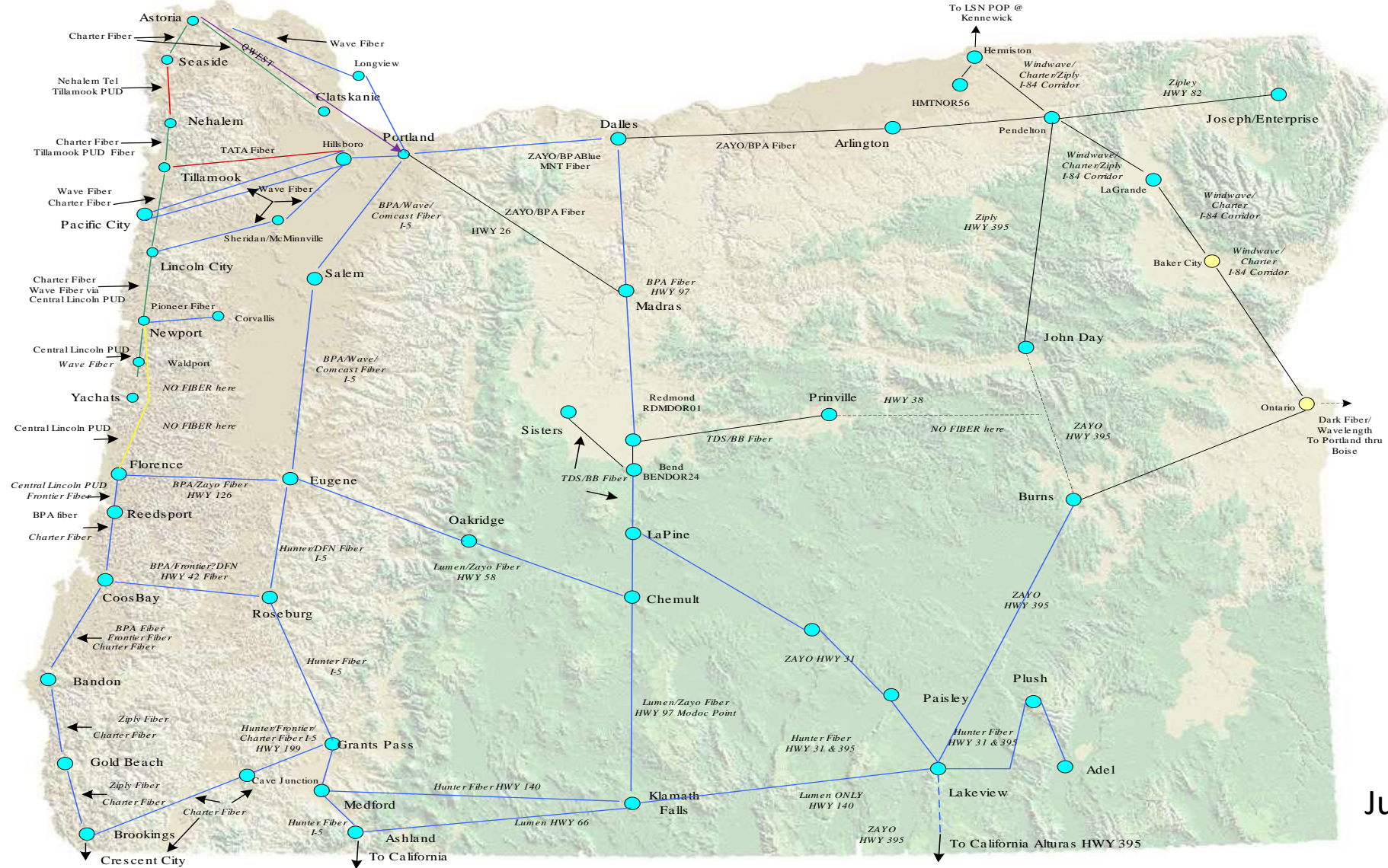
**Unity** (Baker Co.)

**Wallowa** (Wallowa Co.)

**Wamic** (Wasco Co.)

- ❖ The Bootleg Fire in Klamath and Lake Counties (2021) threatened a *non-redundant, mostly aerial-fiber deployment over 150 miles in length*. Supported communities are **highlighted** above.
- ❖ List developed through group discussion and working knowledge of fiber infrastructure across Oregon
- ❖ List should not be considered authoritative or complete

# Preliminary Oregon Middle-mile Network Map



July 2021



# Recommendations\*

**1**

**Ensure a robust, capable state broadband office**

The OBO needs sufficient personnel and robust external partnerships to keep pace with the rapid changes in digital infrastructure technologies and achieve its mission.

**2**

**Establish a ‘future-proof’ residential bandwidth standard**

We recommend that Oregon move beyond the current FCC standard (25 Mbps down, 3 Mbps up) to a minimum of 100 Mbps symmetrical.

**3**

**Accelerate Oregon’s broadband mapping**

The State should track the status of last-mile broadband speeds statewide from a broader range of sources to enable a more accurate visual indicator of need.

**4**

**Establish a central repository of middle-mile network infrastructure maps**

The OBO should establish and maintain a limited-access repository of middle-mile fiber route information to assess community access and resiliency as well as the anticipated asset performance and lifetime.

\* Order of presentation is thematic and does not convey prioritization

# Recommendations

**5**

**Cultivate a richer array of local Internet Exchanges statewide**

The State should support the development of more exchanges (IXs) in southern and eastern Oregon to extend performance, resiliency, and cost-effectiveness to residents in these regions.

**6**

**Develop and evolve effective strategies for making public broadband investments**

Competitive, community-based broadband grant programs could increase cost- and time-effectiveness in moving development efforts forward in all regions of the state.

**7**

**Apply some broadband funding to develop needed middle-mile network extensions**

We identified 37 remote and Tribal communities in Oregon that lack middle-mile connectivity to support resilient last-mile broadband services, putting them at risk should wildfire, earthquakes, or other disasters disrupt main connections.

**8**

**Ensure future growth and equitable access for publicly funded network assets**

Infrastructure that is mainly capitalized via public funding sources should be designed with sufficient capacity to allow for network growth and expansion over time.

# Recommendations

<b>9</b> Recognize State and local governments as important stakeholders in broadband deployment	<b>10</b> Take a 'whole of government' approach to solving the broadband problem	<b>11</b> Consider the full spectrum of technologies needed to connect all Oregonians	<b>12</b> Recognize that broadband adoption is NOT just a technical issue
Streamline and coordinate the processes for accessing ODOT and other State and local rights-of-way for fiber builds and any associated construction permitting.	We recommend the formation of an interagency State task force, led by the OBO, to support fast-tracked broadband deployment, eliminate roadblocks, and maximize access to federal funding opportunities.	OBO should add high-speed fixed wireless and low Earth orbit (LEO) satellite technologies into the broadband mix along with fiber to support Oregonians living beyond fiber's reach.	State broadband planning must address the significant human and socioeconomic factors that influence broadband adoption beyond the deployment of technology.

# Recommended Next Steps

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- 1) Establish a future-proof broadband standard (#2)
- 2) Launch broadband mapping efforts (#3 & #4)
- 3) Conduct engineering and cost-benefit analyses to scope and prioritize middle-mile gaps (#7)
- 4) Develop a statewide implementation strategy (#6 & #11)
  - Success metrics should be outcomes based – statewide availability & adoption
  - Maximize last-mile fiber deployment
  - Integrate alternative technologies where necessary
  - Leverage upcoming waves of federal broadband investment (largely directed to the states)
- 5) Develop adoption strategies around affordability, inclusion, and digital literacy (#12)
- 6) Launch an interagency task force focused on accelerating readiness and deployment (#10)



# Thank you!

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