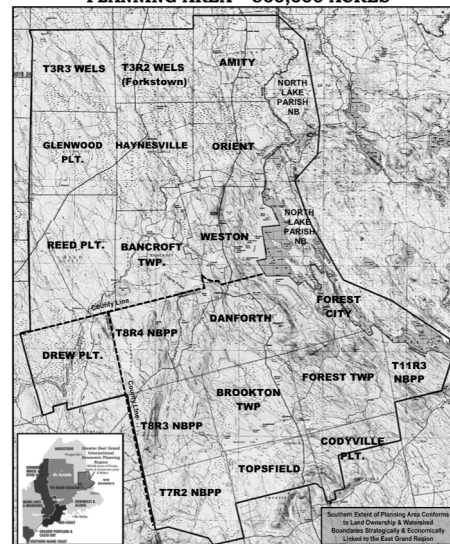Greater East Grand Region
Broadband Planning
March 3, 2022
Meeting #1

1

Greater East Grand Region

- Citizen-designated based on heritage, demographics, businesses, and economic interests

- EGS student distribution

- East Grand Health Center patient distribution

- Danforth as service center and distance from Lincoln, Houlton, Calais

- River, lake, forest and farmland based enterprises

GREATER EAST GRAND REGION ECONOMIC PLANNING AREA – 500,000 ACRES

2

Greater East Grand Economic Council

- Launched in 2021 as a non-profit

- Foundation grants and donor gifts supporting start-up

- Local Board of Directors

- Priorities driven by Vision, Mission and 2022-2024 Strategic Plan

- Advisors Forum to begin in 2022

■ **GEGR Vision**

In 2030, the Greater East Grand Region is an economically stable, unified constellation of remote, rural, welcoming communities that collaborate to attract and retain people of all ages to live, work, visit and play.

■ **GEGEC Mission**

To advance the economic well-being of the people living in the Greater East Grand Region by providing economic development assistance to twelve widely distributed communities, situated in a distressed and remote area of Eastern Maine.

■ **Communities**

Amity, Orient, Weston, Bancroft, Haynesville, Glenwood Plantation, Reed Plantation, Drew Plantation, Brookton, Forest, Forest City and Danforth.

3

GEGEC's Role

Stewardship

Advocate

Engage

Convene

Collaborate

Support

Invest

The region in ten years

■ **New business and employment opportunities** through investment and peer-to-peer support for existing businesses and entrepreneurs.

■ **Four-season recreational tourism** is a positive economic driver and supporter of existing businesses.

■ **Youth** are involved in community, public service, stewardship and volunteer leadership roles.

■ **Young adults** have chosen to remain or return "home" because of the region's positive support and career opportunities.

■ **New families** have moved to the region because of the excellent education, welcoming community and job opportunities.

■ **Elders** are able to successfully "thrive in place."

4

High-speed, affordable
broadband
is one of the most
important
infrastructure
investments
to attract and
retain people
and businesses
to the region.

Three-Year Economic Development Goals

■ Goal A – Economic Vitality
  – *Stable local businesses and investment in entrepreneurs*

■ Goal B – Workforce Development
  – *an educated, reliable workforce for local businesses*

■ Goal C – Vibrant Communities
  – *attract visitors, welcome newcomers, support residents*

■ Goad D – GEGEC Value
  – *Grow capacity and demonstrate value across the region*

5

The Broadband Expansion Opportunity
In Maine

■ An estimated $400M+ in federal and state funding will be available to build out infrastructure in Maine.

■ Access to federal and state funds will be < than 5 years.

■ Decisions on where to award grant funds will be through:
  – *Maine Connectivity Authority*
  – *ConnectME Authority*

■ Remote, rural Maine communities are a priority.

■ Low customer density per mile has been a competitive disadvantage for expanded services by existing providers - up to now.

■ 70% of addresses in GEGR are unserved or underserved.

■ Digital equity is a priority for funding – accessible, affordable service; equipment and training to support school, work, business, health care and many other services.

6

GEGR Broadband Planning

Dwayne Young, Task Force Chair
Sarah Strickland, Project Manager
Angela Cowger - Project Coordinator

- 2020 – Phase 1
  - *Community need*
  - *Preliminary mapping*
  - *Speed testing*
  - *Vendor meetings*
- 2021 to Present – Phase 2
  - *Mission Broadband retained*
  - *Understand feasibility through RFP and Vendor proposals*
  - *Invite towns to make decisions about a regional approach.*

7

Local Commitment to Phase 2 Regional Planning

Phase 2 Grant Funds
- ConnectMaine Authority
- Maine Community Foundation
- Maine Broadband Coalition

Municipal contributions
- Danforth
- Weston
- Reed Plantation

Washington County TIF
- Brookton
- Forest
- Forest City

Aroostook County UT
- Bancroft

8

4

GEGR Broadband Planning – The RFP Process

- Mission Broadband

- RFP Process

- RFP Results

- "The devil is in the details."

9

The Mission Broadband Team

John Dougherty, VP and General Manager
Mark Van Loan, Network Engineer
Jean Santora, Project Manager

Mission

To bring equitable broadband access to every citizen by helping communities navigate the process of expanding and enhancing broadband connectivity.

10

RFP Overview

What model/design is proposed? What are the features of the network?
What is the estimated cost to build out what is proposed?

RFP Process

■ RFP drafted by MB, reviewed and approved by Young and Strickland.

■ RFP sent to 17 vendors (ISPs)

■ The ISPs currently serving some part of the region

■ Other ISPs who might be interested based on other active projects in Maine and Northern New England.

RFP Parameters

■ Did not lock into a specific ownership or network model

■ FTTP to every premise

■ Future-proof but hybrid tech approaches considered for interim solutions

■ Provide different levels of bandwidth at different prices with a product to close the digital divide

■ Excellent customer service.

11

RFP Results

What model/design is proposed? What are the features of the network?
What is the estimated cost to build out what is proposed?

6 Proposals Received

■ Sertex

■ Pioneer (incomplete)

■ Charter/Spectrum

■ Consolidated (CCI)

■ Axiom

■ Wireless Partners

Highlights

■ Different ownership models

■ Future-proof varies based on technology

■ Universal access

■ No hybrid approaches

■ Different customer price tiers

■ $3.4M to $17M to build the network based on provider model, technology and features
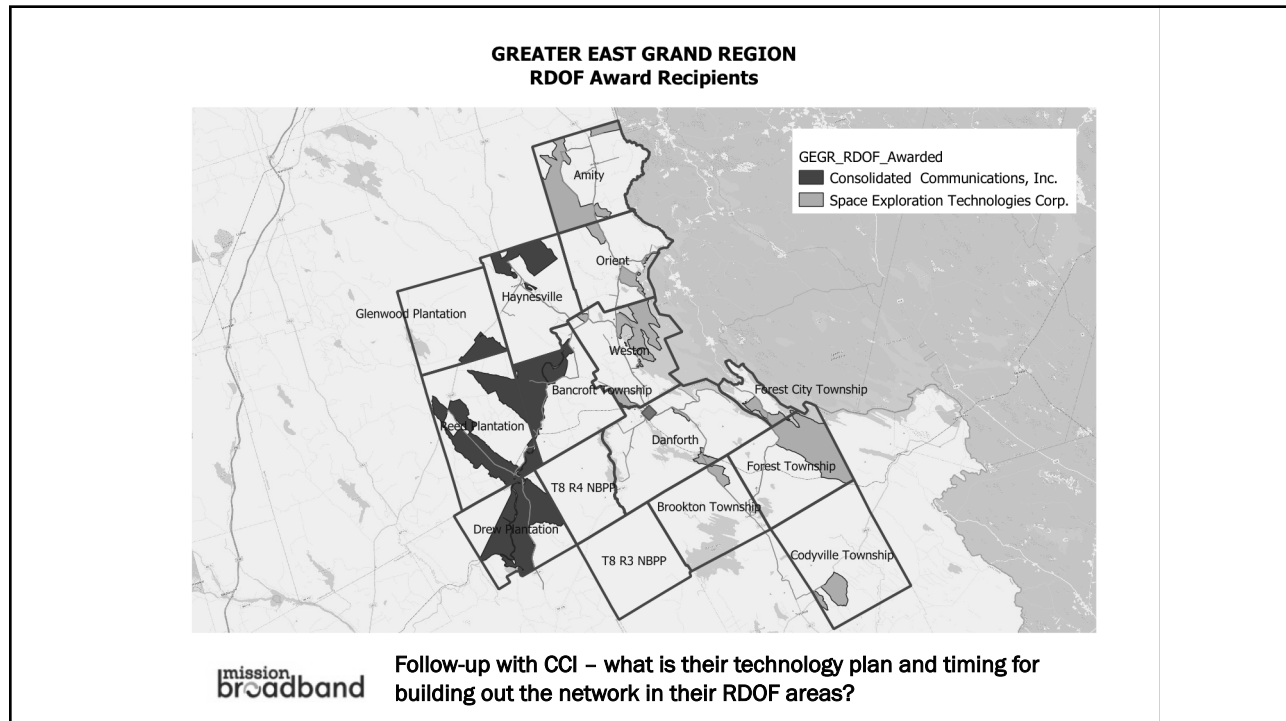
12

WHERE WE GO FROM HERE

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Scenarios for each Town to Consider

Scenario A	Scenario B	Scenario C	Scenario D
Status Quo	RDOF*	SOLO/COUNTY	REGIONAL
Town chooses to not participate because high speed broadband is adequate or is not a priority.	Town decides to work with the RDOF provider, not with the region.	Town decides to pursue a separate broadband planning project on its own or with another planning entity like a county.	Town decides to continue to be a part of the regional effort and the upcoming decisions about provider, ownership and financing options.
Examples • Amity • Others?	Examples: • Haynesville • Glenwood Plt	Examples: • Aroostook County towns	Examples: • Danforth • Weston • Reed Plt • WashCo UT

*RDOF: Rural Digital Opportunity Fund – an FCC auction where providers are awarded federal funds to build out broadband networks in remote rural areas. CCI and SpaceX were awarded territories in the GEGR in 2020 and have to 2028 to complete their commitment.

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Follow-up with CCI – what is their technology plan and timing for building out the network in their RDOF areas?

15

ConnectMaine Advice

The 3 questions every committee or town needs to decide before reviewing proposals.

Do you want universal service?   Yes / No

Do you want a fiber to the home project?   Yes / No

Do you want to own the infrastructure?   Yes / No

From this article by Peggy Schaeffer, Executive Director of ConnectMaine

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The Future Network - Preliminary Goals
To be revised and finalized with towns' input by regional task force

- Expand highspeed broadband service to every home/business that has electricity service available. (FTTH/FTTP)
- Be "future-proof" – build internet speeds that will ensure our children, young adults, adults and businesses will be able to live, study, work, play and be competitive in order to thrive well into the future.
- Design for tele-health and tele-psychology.
- Design for remote employees and local businesses who have global customers.
- Design for permanent and seasonal residents.
- Have an affordable package with a low-cost option for fixed income and low income households (digital inclusion).
- Include and fund locations in the region for people to access free internet service and training. (digital inclusion)
- Evaluate the benefits and risks of different ownership models, including broadband utility districts (BUD).

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Discussion Questions for your next Community and/or Select Board Meeting

1. **Do you want the town to continue to be part of the regional planning task force?** How do you feel about collaborating on broadband with other towns in the Greater East Grand region? **What questions** do you need answered in order to help you make this decision?

2. **Is your goal for the town, universal broadband service?** This means that EVERYONE, no matter where they live, has service if they want it – including people who live in remote, expensive to serve places.

3. **What technology do you want?** Is a hybrid approach of wireless and fiber or cable okay, do you want fiber only, does it not matter?

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Discussion Questions for your next Community and/or Select Board Meeting

4. Do you want to own the infrastructure?
   – *Ownership provides long-term control, but it requires a business plan to understand and manage financials and operations.*
   – *Broadband utility districts are being explored by regions with adequate population density.*
   – *If you don't want to own it then looking to an incumbent provider to expand their service is most likely the easiest and least expensive approach but there can be compromises on the project goals.*

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Broadband Bootcamp via Zoom
provided by Sunrise Economic Council
register at www.sunrisecounty.org

Session 3: March 3 (10am -12pm) Community engagement
[When and How do we start?]

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[What improvements will be made to our broadband infrastructure, When and Where will they happen?]

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[What is it, How did they do it, and Where is it happening?]

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Funding Sources [How do we pay for this and Who can assist us?]

Recordings of Session 1 and 2 available to listen to on the SCEC website.

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Next Steps
March – April

Next Regional Broadband
Meeting

Thursday, April 28

5:00 pm

Location - TBD

- Begin monthly updates to all residents in the local Community News and on the GEGEC website.

- Provide information and meet with each town as requested to answer all follow-up questions.

- Provide towns who want to pursue Scenario A, B or C with referrals to people who can help them with their planning.

- Meet with CCI to learn more about their build-out plans for the RDOF areas in the region.

- Meet with Pioneer to better understand their plans for expanding their existing fiber network.

- Hold the next meeting with the authorized town representatives who want to continue meeting regionally (Scenario D). This task force will review Mission Broadband's report from the provider proposals. Next steps for the task force will be developed at that time.

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Greater East Grand Region
Broadband Planning
April 28, 2022
Meeting #2

22

VINALHAVEN COMMUNITY BROADBAND

GLOSSARY OF TERMS

AN EDUCATIONAL TOOL COMPILED BY FOX ISLANDS BROADBAND TASK FORCE

BROADBAND: The term broadband commonly refers to high-speed Internet access that is always on and faster than traditional dial-up access. Over the years, as what we use the internet for has demanded a larger capacity for moving data, the speed definition of broadband has increased accordingly. The current definition of broadband internet, set by the FCC (Federal Communications Commission), is a minimum bandwidth speed of 25 Mbps download and 3 Mpbs upload.

BANDWIDTH: Internet speed is your allocated bandwidth. Bandwidth is a measure of how much data, measured in bits, a network can deliver per second. Bandwidth determines if you can download a picture in 2 seconds or 2 minutes.
- Bit: smallest unit of digital information
- Bps: bits per second
- Kbps: kilobits per second (1000 bits per second)
- Mpbs: megabits per second (I million bits per second)
- Gbps: gigabits per second (1 billion bits per second)

DATA: Content uploaded or downloaded via the internet, such as videos, music, emails, webpages, documents, images and so forth. Data is to bandwidth as water is to the size of a hose; as the bandwidth increases so does the amount of data that can flow through it per second. Similarly, increases in the diameter of a hose allow more water to flow in a given period of time. If the allotted bandwidth (or the water) is serving multiple devices, the flow to each can slow to a trickle. The same thing happens on a system where many users are making demands on a limited amount of bandwidth.

FACTORS AFFECTING INTERNET SPEED
- Connection type is significant to how fast your internet can be. (see below)
- Outdated or misconfigured equipment can slow down the transmission of data.
- Distance from your ISP hub. The longer the distance, the longer it will take for your data to transfer from the internet to your computer.
- Congestion usually happens during peak usage times, like when everyone gets off work and logs onto the internet, or any time when more demand is placed on the system (for example, Vinalhaven in the summer). In a home network, congestion slows the internet when everyone is online at the same time: someone streaming a movie, another doing homework, another playing video games and so forth.

I**NTERNET SERVICE PROVIDERS (ISPs)** come in several forms including privately owned commercial businesses, electric cooperatives, and municipal providers.

ISPs employ several transmission technologies to connect to your home.
- Digital Subscriber Line (DSL) is a wireline technology, using copper phone lines to transmit data. Speed degrades quickly over distance. The longer the distance between the DSL connection point and the user, the slower the service. Speeds for DSL usually top out at 5-7 Mbps.
- Cable companies use cable TV infrastructure (coaxial cables) to provide internet access, similar to the way DSL uses the phone network infrastructure. Since a cable network can share the last mile connection among hundreds of subscribers, they are particularly prone to congestion problems.
- Fiber Optic Technology converts electrical signals carrying data to light and sends the light through transparent glass or plastic fibers about the diameter of a human hair. These fibers are capable of transmitting large amounts of data at high transfer rates as pulses of light. Fiber transmits data at speeds far exceeding DSL or cable modem speeds. Often abbreviated as FTTH (fiber to the home) or FTTP (fiber to the premise), fiber optics connect directly to a home or building.
- Satellite broadband is a form of wireless broadband, which is affected by line of sight to the orbiting satellite and the weather. Often the only option in rural areas, satellite speeds are generally comparable to DSL and cable.
- Wireless broadband connects a home or business to the Internet using a radio link between the customer's location and the service provider's facility, often a cell phone tower. Speeds are generally comparable to DSL and cable.

3G, 4G, 5G designates successive generations of wireless technology, each faster than the one before.
- 3G offered speeds of less than 1 Mbps
- 4G is 10 times faster than 3G with speeds of 5-12 Mbps.
- 4G LTE, the next generation of 4G, provides speeds up to 100 Mpbs.
- 5G, which is still under development, is rumored to offer speeds of up to 1 Gbps.

BLUETOOTH: Wireless data standard for transferring data over short ranges. Bluetooth is used for many applications such as wireless mice and keyboards and connecting peripherals to smartphones. Fun fact: It is named after a 12th century king, Harold Bluetooth, famed for uniting tribes in Demark.

WiFi: Term used for wireless internet or wireless signal.

HOT SPOT: Area where there is a wireless wi-fi signal.

SIM: Subscriber Identity Module. A memory chip that stores mobile subscriber information and allows access to mobile network services.

MODEMS and ROUTERS: A modem is a device that converts data to and from a format that's suitable for transmission between devices, like a computer to the internet.
A router directs traffic on a home network.

UPLOAD AND DOWNLOAD – SYMMETRICAL AND ASYMMETRICAL
Download and upload describe the direction of the data between the end user and the provider. Download and upload speeds are expressed in Mbps: 10/10 is a symmetrical system with both down and upload at the same speed. An asymmetrical system, for example 25/3, lists the download speed first. Most internet services are asymmetric, with wider bandwidth/faster speeds to download, and slower to upload. The assumption is that most users consume data rather than share or upload it. Upload speed is important to users who need to share large files of data.

LATENCY: Reaction speed of a network; the time it takes to send data and receive a reply, measured in milliseconds (ms). Too high a "lag" can be a problem for activities that rely of rapid communications, such as online gaming. Satellite broadband connections have very high latency rates due to the time it takes to transfer data to and from orbit.

DIGITAL DIVIDE: The gulf between those parts of the population who have access to the internet and other digital technologies and those sections that do not. There is concern that as so many services become available online, groups without digital access will be left behind and miss opportunities in life and in work.

DIGITAL EQUITY ensures that all individuals and communities have the information technology capacity needed for full participation in society, democracy and economy. Equity is necessary for civic and cultural participation, employment, lifelong learning, and access to essential services.

INTERNET OF THINGS: Objects with embedded electronics and sensors which share data and can be remotely controlled. A "thing" can be anything from a smart thermostat to a security camera, a smart home device like Alexa to an internet-connected refrigerator.

VoIP: Voice over Internet Protocol. A technology for making phone calls using an internet connection from any device, including mobile and land-line phones. Skype is currently the most popular VoIP application.

TELEMEDICINE: The use of high-speed, high-capacity internet to support long-distance health care services. Goals include the ability to bring quality health care to those living far from hospitals or to elderly patients wishing to age in place. Patients are able to be seen, treated, monitored, and given tools to manage their own health care.

ONLINE EDUCATION: Creating access for all eliminates the "homework gap" for those students increasingly required to complete assignments online. Adult learners benefit from remote learning opportunities to complete academic degrees and access technical and mechanical training.

TELECOMMUTING: Working from home. More and more corporations and small companies are hiring workers to work full time from home. Those who have that ability today are weathering the pandemic while maintaining their livelihoods. Online job opportunities allow one to live wherever they choose while still making a good living. Telecommuting also encourages entrepreneurship and helps small businesses compete in a wider marketplace.

SOCIAL INTERACTION: Online conferences, meetings, and social gatherings have become the norm. Internet connections support the ability of isolated people to maintain contact with often widely scattered family and friends, as well as access to information and networks of shared interests. Social support and interaction have positive influences on physical and mental well-being, especially among people living alone, decreasing loneliness and fostering a sense of belonging.

Terms for constructing a system
GRANT: A legal instrument reflecting the relationship between a government agency and a recipient. The main purpose is to dispense money and/or resources in order to accomplish a public purpose.

BACKBONE: The internet is a network of networks, and the large trunk lines that connect them are referred to as the backbone. Like a highway network, the interstate highways are the backbones that connect regions that have highway networks of their own.

BACKHAUL or MIDDLE MILE: Section of the network that connects the last mile portion of the network to the service providers core network.

LAST MILE: Final leg of the connection between the service provider and the customer.

MAKE READY: Work necessary to make a pole or right-of-way available for the attachment of additional lines, wires or cables.

TAKE RATE: The number of subscribers to a service, typically expressed as a percentage of those taking the service divided by the total number of people who could take the service. If a community fiber network passes 1000 people and 600 people subscribe, it has a take rate of 60%. When planning a network, it will be built to be profitable at or above a certain take rate.

MUNICIPAL NETWORK: A broadband network owned by a local government. Some are run by the municipality and others are managed by an ISP under contract.

PPP: A public-private partnership divides risks and responsibilities of an infrastructure project between public and private entities.

FIBER AS A FUTURE-PROOF TECHNOLOGY
- **Tried and tested over decades throughout the world.** Fiber optic is not new. Fiber cables have been used for backbone connectivity since the 1980s, with hundreds of fiber optic cables running across the sea floor all around the world. What's new is fiber cables crossing the last mile to connect directly to homes and businesses.
- **Capability.** Bandwidth use roughly doubles every two years, as the expansion and demand from the Internet of Things, HD content, and the amount of data generated and transmitted increases. Technologies like 3D holographic high definition television and gaming will someday be everyday items in households. One bundle of fiber cable not much thicker than a pencil can and currently does carry all the world's communication traffic. FTTP will be able handle the increased demands with ease.

- **Easily upgradable.** Fiber optics uses glass or plastic to carry light which is used to transmit electricity. Fiber is attached to a laser that sends data as light signals. Fiber internet currently offers gigabit speeds. While that's a very high speed by today's standards, it will probably seem very slow in as little as 15 to 20 years. As the demand becomes greater, fiber has ready capacity to share. The lasers may need to be upgraded to send more information along the same strand of fiber, and one may have to upgrade home hardware, but the fiber-optic cable will require no structural upgrade to offer the capacity future generations will need.
- **Affordable.** The cost of fiber internet service is comparable to those offered by ISPs. However, the fiber is significantly more reliable, is not affected by distance from a hub or traffic congestion on the lines. Moreover, fiber offers one delivery system for telephone (cell and landline), video, audio, television, and almost any type of data transmission, using a single seamless FTTP connection. That trend will continue as consumers are given an increasing array of a la carte choices for how they receive their various communication and data streaming choices. Subscribers receiving an array of services through a fiber connection will save money.

Comparisons

<u>DSL</u>**:** not only is the driving technology outdated, the old copper lines are susceptible to corrosion. DSL is also severely limited by distance; it can push a signal to a 3-mile maximum.

<u>Coaxial cable</u> offers a shared system, meaning that the signal strength is dependent on how much bandwidth is being drawn on by other users connected to that same line. Moreover, cable systems are designed primarily to push data down to the customer, a significantly different model than the emerging needs of telecommuting and interactive video which require high bandwidth for both downloading and uploading.

<u>Wireless service</u> is not as reliable as fiber optics and can be susceptible to weather conditions and the movement of outdoor equipment due to wind. Wireless also requires a direct line of sight, one without obstructions, to the source. While 5G is rumored to have the capacity to be as fast as fiber, reliability concerns and reliance on line of sight are inherent limitation.

<u>5G and low-orbit satellite</u> are years away from being widely available and will not meet the same reliability and capacity standards that fiber currently has.

Fiber is an excellent investment because the technology has been thoroughly vetted in real-world situations for decades, the infrastructure is sturdy and lasts many years without repair or upgrade, and bandwidth is easy and inexpensive to upgrade to almost unlimited capacity.

Broadband 101

SCEC BROADBAND BOOTCAMP ~ FEBRUARY 17, 2022

Christa Thorpe, Island Institute Community Development Officer

1

Broadband Bootcamp via Zoom
provided by Sunrise Economic Council
register at www.sunrisecounty.org

Session 3: March 3 (10am -12pm) Community engagement
[When and How do we start?]

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2

Broadband 101 Topics

- WHO
  - Public - Private - Partnerships

- WHAT
  - Technology and Terminology

Note the **Acronym Alerts!**

- WHERE
  - Mapping matters

- WHY
  - Broadband benefits

The rest of this bootcamp will help cover the WHEN and HOW

3

The WHO - State Players

- New agency charged with achieving the universal access of affordable high-speed broadband in Maine
- https://www.maineconnectivity.org/
- Acronym Alert! **MCA**

- Government org that has been supporting community broadband planning and administering grants since 2006
- https://www.maine.gov/connectme/

4

The WHO - Internet Service Providers = ISP

Wired networks

- **CABLE** Charter Spectrum▶

- **TELECOM** Consolidated communications TDS

- **FIBER** Axiom Pioneer Broadband fidium fiber internet

Wireless Networks*

- **CELLULAR**

- **SATELLITE**

verizon✓

redzone

STARLINK

*Generally **ineligible** for state funding subsidies*

5

The WHO - Technical Assistance = TA

3rd party partners (not ISPs or gov) who can help with broadband planning
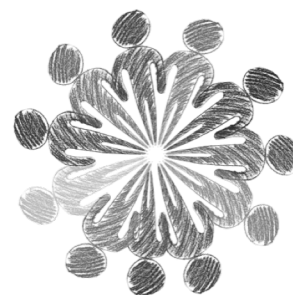
- **Your regional supports**

Sunrise County Economic Council   ISLAND INSTITUTE   MAINE Broadband Coalition

- **Consultants for hire**

Casco Bay Advisors, LLC Broadband/Telecom Consulting   mission broadband

6

The WHO - You!

Successful projects result from an engaged community, starting with a local champion or broadband committee...

Municipal official
(someone with political will to support broadband)

Telecommuter
(someone who depends on broadband)

Educator
(a librarian or someone who cares about educational opportunities)

From a local business
(or an individual from an industry that is important to the community)

Interacts with wide range of the community
(someone from the community center or other gathering place)

Other key individuals
(people who are integral to the fabric of the community)

7

The WHAT - Technology

DSL - copper/phone lines transmit data

Cable/coaxical - copper/TV infrastructure
Service degrades over distance
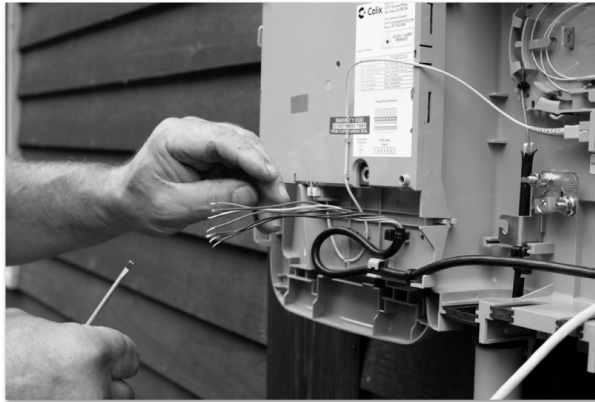
Satellite & Wireless - orbit or towers
Latency, weather, topography

**https://www.townofvinalhaven.org/sites/g/files/vyhlif3981/f/uploads/broadband
pdf**

8

4

The WHAT - Technology

Fiber Optics
speed of light
"future-proof"

FTTH = Fiber to the Home

FTTP = Fiber to the Premise

https://www.townofvinalhaven.org/sites/g/files/vyhlif3981/f/uploads/broadbandglossary.pdf

9

WHAT about those new-fangled technologies?

Starlink: One Mainer's Experience as a Beta Tester

Aren't wires old-fashioned?

Fiber and wireless are complementary technologies. Saying "the future is wireless, who cares about fiber" **is like saying we can have airplanes without airports**—those wireless signals need a wire in order to travel any real distance.
- Susan Crawford

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The WHAT - Terminology

Backbone - Maine's "Three Ring Binder"

Middle Mile / Backhaul
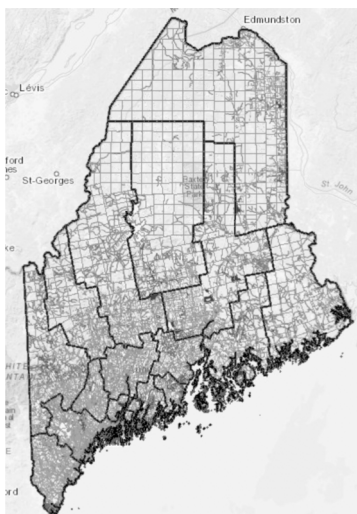
Last Mile / universal access

Municipal network

Make ready

https://www.townofvinalhaven.org/sites/g/files/vyhlif3981/f/uploads/broadbandglossary.pdf

11

The WHERE - Are you "served"?

Broadband = high-speed, reliable internet <u>defined</u> by Download/Upload speeds available

Maine State Definitions
Served = 100/100 Megabits per second
Unserved = Less than 50 Mpbs / 10 Mbps
Underserved = Less than 100/100 Mbps

*FCC <u>Definition</u> of Broadband = 25/3 Mbps
Federal Communications Commission

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Additional Resources

Article: Improving Access to Broadband Would Open Doors for Climate Solutions
Article: PPH - Policy Matters Maine Broadband History
NEA Report: Digital Equity for Students & Educators
Book: Susan Crawford, *Fiber: The Coming Tech Revolution and Why America Might Miss It* (Review)

MBC Digital Frontiers Webinars

- Smart and Connected Infrastructure for Regional Prosperity
- Municipally Owned Broadband Networks, Pt. 1 and Pt. 2
- Telehealth and Telemedicine

More to be added based on questions

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