Bridging the Digital Frontier: An Analysis of Massachusetts' Broadband and Fibre Optic Infrastructure Initiatives and Impediments

Vernard Mercader

Executive Summary

The Commonwealth of Massachusetts is engaged in a multi-faceted and sustained effort to enhance its internet and fibre optic infrastructure, with a pronounced focus on rectifying historical connectivity disparities in its western regions. Spearheaded by the Massachusetts Broadband Institute (MBI), these initiatives leverage significant state and federal investments, most notably through the Broadband Equity, Access, and Deployment (BEAD) Program and various digital equity grants. The strategy encompasses not only the deployment of physical "middle-mile" and "last-mile" infrastructure, exemplified by the MassBroadband 123 network and subsequent Last Mile programs, but also a comprehensive approach to digital equity, addressing affordability, device access, and digital literacy.

Despite considerable progress, particularly in connecting previously unserved towns in Western Massachusetts, formidable roadblocks persist. Chief among these are systemic issues related to utility pole attachments, characterised by protracted delays, excessive costs, and an outdated regulatory framework. These impediments significantly hinder the pace and economic feasibility of network expansion by both public and private entities, threatening to dilute the impact of unprecedented federal funding. Other challenges include the complexities of ensuring equitable adoption even where infrastructure exists, the financial and operational hurdles for smaller municipalities seeking to establish their own networks, and the evolving dynamics of private ISP competition.

This report analyses the Commonwealth's current efforts, delves into specific initiatives within Western Massachusetts municipalities, and provides an in-depth examination of the critical roadblocks. It underscores the necessity for regulatory reform, continued strategic investment, and robust local-state collaboration to achieve true universal broadband access and digital equity across Massachusetts.

Chapter 1: The Commonwealth's Drive for Universal Broadband: Statewide Initiatives and Funding

The Commonwealth of Massachusetts has demonstrated a long-term commitment to ensuring robust and equitable internet access for all its residents and businesses. This commitment is primarily actualised through the Massachusetts Broadband

Institute (MBI), which orchestrates a range of programs and leverages substantial state and federal funding to bridge the digital divide. The strategy has evolved from foundational infrastructure projects to a more holistic approach encompassing digital equity.

1.1 The Massachusetts Broadband Institute (MBI): Mandate and Strategic Vision

The Massachusetts Broadband Institute (MBI), established in August 2008 through "An Act Establishing and Funding the MBI" (the "Broadband Act"), operates as a division of the Massachusetts Technology Collaborative (MassTech).[1] This nearly two-decade-long endeavour underscores the understanding that achieving universal broadband is not a short-term project but a sustained strategic priority for the Commonwealth. MBI's core mission is to make affordable, high-speed Internet available to all homes, businesses, schools, libraries, medical facilities, government offices, and other public places across Massachusetts, thereby bridging the digital divide.[1]

While its mandate is statewide, MBI's investments have historically centred on addressing the acute connectivity needs of the western and central regions of the state. A cornerstone of this effort was the deployment of the MassBroadband 123 network, a significant middle-mile infrastructure project primarily serving these areas.[1] Subsequently, MBI has been instrumental in supporting the development of "Last Mile" networks, which connect end-users in these often hard-to-serve communities to the broader internet. The persistent focus on Western and Central Massachusetts implies a recognition of unique and enduring geographical, demographic, or economic challenges in these regions that market forces alone have failed to adequately address, thus necessitating continuous and targeted state intervention. The rural character, challenging terrain, and lower population density common in these areas translate directly to higher deployment costs and a diminished return on investment for private Internet Service Providers (ISPs), creating a classic scenario where public investment becomes essential.[2]

MBI operates through a collaborative model, working closely with the Governor's Administration, the state legislature, municipalities, broadband service providers, and other key stakeholders [1] This multi-partner ecosystem is indicative of the complex coordination required to tackle the digital divide. The Institute leverages both state and federal funding sources, including significant capital from the American Rescue Plan Act (ARPA) and the Bipartisan Infrastructure Law's BEAD Program, to launch infrastructure expansion initiatives and a growing portfolio of digital equity programs.[3]

The MBI's role and strategic focus have evolved considerably since its inception. Initially concentrated on building foundational infrastructure like MassBroadband

123 and facilitating Last Mile connections, its activities have broadened to address the multifaceted nature of digital inclusion.[1] This evolution reflects a deeper understanding that physical access to infrastructure, while necessary, is not sufficient to ensure that all residents can benefit from the digital economy. Consequently, MBI now champions comprehensive digital equity programs aimed at tackling barriers related to affordability, access to internet-enabled devices, and the development of digital literacy skills.[3] This progression from focusing on the "supply-side" (infrastructure) to also addressing the "demand-side" (adoption and use) demonstrates a maturation of the state's strategy and a learning curve developed over years of engagement with the complexities of the digital divide. The MBI's role as a central coordinating body for these diverse funding streams and programs is crucial for navigating the complexities of federal grants and ensuring alignment with overarching state goals.[3] However, with the substantial influx of new funding, particularly from the BEAD program, the capacity of MBI to manage, oversee, and disburse these resources with maximum efficiency and transparency will be paramount to achieving the Commonwealth's ambitious connectivity objectives without undue delay.[13]

1.2 Flagship State Programs

Massachusetts has implemented several flagship programs under the guidance of MBI and other state agencies to systematically address broadband gaps and promote digital equity. These programs range from completing the "last mile" of infrastructure in unserved areas to deploying new federal funds for comprehensive connectivity and ensuring that all residents can afford and use high-speed internet.

1.2.1 The Last Mile Completion Efforts

The "Last Mile" programs have been a cornerstone of Massachusetts' strategy to bring broadband to its most underserved areas, primarily concentrated in Western and Central Massachusetts. These initiatives were designed to connect individual homes and businesses in towns where incumbent providers had not extended service. The program targeted 53 specific "Last Mile Towns," comprising 44 completely unserved and 9 partially underserved communities.[6] This precise identification of target towns indicates a data-informed approach to pinpointing areas of acute need.

A key feature of the Last Mile efforts was a flexible framework, developed by MBI, the Commonwealth, and the Executive Office of Housing & Economic Development (EOHED). This framework permitted a variety of project models, including multi-town collaborations, locally-owned municipal networks, and partnerships with private industry.[1] Technology choices were also flexible, provided that projects met core standards for speed, affordability, and long-term sustainability. This adaptability was

crucial for tailoring solutions to the diverse geographic and demographic landscapes of the targeted towns.

Significant state investment underpinned these efforts, including a $50 million appropriation in 2014, [2], with total state investment reaching approximately $59 million by August 2023.[15] MBI administered the Flexible Grant Program, which provided grants to private providers to build, own, and operate networks in Last Mile towns. Concurrently, EOHED managed the Last Mile Infrastructure Grant Program, supporting towns that opted to build municipally-owned broadband networks.[1] An administrative shift in 2017 saw some funds managed directly by EOHED, suggesting an adaptive approach to program oversight.[16]

The program has achieved substantial progress. As of August 2023, 48 of the 53 targeted towns had completed their Last Mile projects, with an additional 5 municipalities having some premises connected but not yet fully complete.[11] Earlier status reports from February 2023 indicated 46 of 53 towns were fully operational.[17] The overarching goal was to provide broadband access to at least 96% of residences in each participating town.[6]

The impact of these programs is tangible. LeverettNet, a municipal network in Leverett, was the first Last Mile project to connect to the MassBroadband 123 middle-mile network, serving as an early model.[20] The Broadband Extension Program, completed in September 2018, successfully extended broadband access to over 1,300 previously unserved homes and businesses in nine partially served towns by working with existing cable providers like Comcast.[6] Comcast also partnered on several other last-mile projects, demonstrating the viability of public-private collaborations.[19]

The high completion rate of the Last Mile program underscores the effectiveness of targeted public investment in areas that are commercially unattractive to private capital alone. However, the multi-year timeline and considerable cost per town also highlight the inherent difficulties and expense of rural broadband deployment. While the program was designed to address market failure [2], and its success in connecting the vast majority of targeted towns is evident [11], the duration of these projects (planning often predating 2016 and extending to near completion in 2023-2024 [11]) and the $59 million investment for a relatively small number of towns [15] illustrate the significant per-unit cost and lengthy timeframes involved. These are critical considerations as the state embarks on larger-scale initiatives like the BEAD Program.

Furthermore, the 96% coverage target [6], while ambitious and largely met, implicitly acknowledges that reaching the final 4% of premises can be disproportionately expensive and challenging. These "last of the last mile" locations will likely require even more innovative or costly solutions, a pertinent lesson as the BEAD program

aims for universal service. The "flexible framework" [11] that allowed for different project models (municipal, private partnership) was a key strategic decision. A comparative analysis of the outcomes, costs, and sustainability of these varied models within the Last Mile program could offer invaluable insights for structuring future BEAD subgrants and ensuring the most effective use of public funds.

1.2.2 The BEAD Program in Massachusetts: Planning and Initial Implementation

The federal Broadband Equity, Access, and Deployment (BEAD) Program represents a cornerstone of Massachusetts' current strategy to achieve universal high-speed internet access. The Commonwealth has been allocated $147.4 million through this program, [13], with the Massachusetts Broadband Institute (MBI) serving as the administering agency.[13] The primary goal of BEAD is to fund infrastructure projects that will connect the remaining Broadband Serviceable Locations (BSLs) currently classified as unserved (lacking access to speeds of at least 25 Mbps download and 3 Mbps upload) or underserved (lacking access to speeds of at least 100 Mbps download and 20 Mbps upload).[13] MBI has articulated a commitment to achieving universal service through this initiative.[13]

To operationalise the BEAD funding, MBI undertook a rigorous planning process, developing an Initial Proposal (Volumes I and II), both of which received approval from the National Telecommunications and Information Administration (NTIA) by July 2024, and a Five-Year Action Plan.[12] These documents delineate the state's strategic approach to BEAD implementation. A critical precursor to fund deployment was the BEAD Challenge Process, conducted in the summer of 2024 and approved by NTIA in December 2024.[13] This process allowed stakeholders to challenge the accuracy of existing federal broadband maps, ensuring a more precise identification of eligible BSLs. The process saw significant engagement, with 33,665 challenges formally entered, and a total of 48,114 when including pre-challenge modifications and Multiple Dwelling Unit (MDU) challenges.[13] This robust participation underscores the necessity of granular, locally-informed data in broadband planning, as initial federal maps often lack the precision required for effective state-level fund allocation. The "How's Your Internet?" initiative was an integral part of this data refinement effort.[25]

The subgrantee selection process for BEAD funding has also seen notable developments. Round 1 of the BEAD Deployment Phase was launched on January 15, 2025.[13] This round attracted five applications from four private providers and one tribal nation, with proposals collectively covering over 50% of the state's BEAD-eligible locations, predominantly with fibre-to-the-home (FTTH) deployments, though some areas were proposed for hybrid fibre-coax (HFC) networks.[28]

Significantly, MBI announced that it would not proceed with a second formal grant solicitation round.[13] This decision was attributed to the strong response received through the state's Gap Networks Grant Program (another ARPA-funded initiative) and the outcomes of BEAD Round 1. Instead, MBI will engage in direct negotiations with eligible entities—including those that did not participate in Round 1 or the pre-qualification process—to address the remaining unserved and underserved BSLs.[13] This approach allows for the consideration of various technologies, including fibre-optic, HFC, fixed wireless, and Low Earth Orbit (LEO) satellite solutions, to find cost-effective ways to reach the most challenging locations. This pragmatic shift to direct negotiations suggests an effort by MBI to expedite coverage for the remaining, likely more fragmented or difficult-to-serve BSLs. While this offers flexibility for tailored solutions, it also necessitates a high degree of transparency in the negotiation and selection process to ensure public funds are used optimally. The inclusion of diverse technologies in these negotiations also signals a recognition that FTTH may not be universally feasible or cost-effective for every last BSL.

The relatively small number of applicants in BEAD Round 1, despite covering a significant portion of locations, might indicate a limited pool of providers capable of undertaking large-scale BEAD projects, or it could reflect the success of prior state programs in already addressing many unserved areas. Massachusetts already boasts high overall broadband availability, with over 98% of BSLs having access according to some metrics.[23] The direct negotiation phase will be critical in ensuring competitive value and comprehensive reach for the areas still lacking adequate service.

A strong emphasis on affordability is embedded within Massachusetts' BEAD implementation. Subgrantees will be required to offer a low-cost service plan priced at or below $30 per month, inclusive of all fees.[23] Bonus points are awarded in the selection process for plans offered below this threshold, with the highest points for free service offerings.[23] This focus directly addresses a primary barrier to adoption identified in numerous digital equity assessments and reflects a key lesson from past infrastructure efforts: availability alone does not guarantee equitable access. MBI will also determine an Extremely High Cost Per Location Threshold (EHCPLT) after evaluating Round 1 applications, which will guide subsidy levels for future projects.[13]

Beyond infrastructure, BEAD non-deployment funds will support digital equity planning and initiatives such as the "Front Door Program," which will utilise Digital Navigators to assist residents with connectivity, devices, and digital skills.[22]

1.2.3 Advancing Digital Equity: The Statewide Plan and Associated Programs

Recognising that infrastructure is only one piece of the connectivity puzzle, Massachusetts has developed a comprehensive State Digital Equity Plan (SDEP).

This plan, created by the Executive Office of Economic Development (EOED) and MBI, received approval from the NTIA in March 2024.[3.] It serves as the Commonwealth's strategic roadmap for addressing disparities in online access, digital skills, and the affordability of internet services. The SDEP specifically targets "covered populations" identified as facing significant digital equity barriers: low-income households, aging individuals, incarcerated individuals (excluding those in federal facilities), veterans, individuals with disabilities, individuals with language barriers (including English learners and those with low literacy levels), members of racial or ethnic minority groups, and individuals residing in rural areas.[3]

The plan identifies several key barriers to digital equity, including the lack of affordable and reliable internet service, the inability of some residents to purchase necessary connected devices, an absence of adequate digital literacy skills, challenges with the online accessibility and inclusivity of public resources and services, and insufficient awareness regarding online privacy and cybersecurity.[3] This comprehensive understanding of the multifaceted nature of digital exclusion informs the state's programmatic responses.

To implement the SDEP, Massachusetts was awarded $14.1 million from the federal State Digital Equity Capacity Grant Program, part of the Digital Equity Act.[4] Additionally, state-level American Rescue Plan Act (ARPA) funds, through initiatives like the Broadband Innovation Fund, are being channelled towards digital equity efforts.[4]

Several key programs operationalise the SDEP's goals:

- **Launchpad Program:** This $9.44 million competitive grant program, funded by the Digital Equity Capacity Grant, supports non-profit organisations and public sector entities in strengthening digital access and adoption for residents.[22] It prioritises projects in specific geographies like Barnstable, Bristol, and Worcester Counties, as well as Gateway Municipalities. Funded initiatives include establishing Wi-Fi access in affordable housing and low-income neighbourhoods, modernising internet infrastructure in public spaces, distributing devices (new and refurbished), and providing cellular hotspots to individuals experiencing economic hardship.
- **Residential Retrofit Program:** This program is dedicated to improving internet infrastructure within public and affordable housing complexes, aiming to upgrade wiring in approximately 22,000 units to enhance connectivity for residents.[39] As of March 2025, $10.4 million had been invested in this program.[22]
- **Municipal Digital Equity Planning & Implementation Programs:** MBI offers crucial support to local governments by providing access to free consultant services for the development of municipal digital equity plans.[21]

Municipalities can opt for short-term planning charrettes or more comprehensive, long-term plan development processes. Upon completion of these plans, municipalities become eligible for implementation grants of up to $100,000 to execute their tailored digital equity projects. This strategy of empowering municipalities and local organisations is a significant strength, as these entities are often best positioned to understand and address the specific nuances of digital inequity within their diverse communities, particularly in regions like Western Massachusetts.

- **Digital Equity Partnerships Program:** MBI provides funding to a cohort of qualified organisations to implement a suite of digital equity projects across the state, aligning with legislative goals.[5]
- **Asset Inventory & Resource Lists:** To facilitate collaboration and awareness, MBI maintains a publicly accessible database of over 650 organisations that provide various digital equity programs and services throughout Massachusetts [12]

The focus on "Gateway Municipalities" within programs like Launchpad [35] signifies a targeted effort to address digital inequity in urban centres that, despite generally having infrastructure, often face substantial adoption barriers due to socioeconomic factors. This complements the infrastructure-focused initiatives in more rural "last mile" areas, ensuring a balanced approach to achieving digital equity across different types of communities within the Commonwealth.

1.3 MassBroadband 123: The Backbone Infrastructure

The MassBroadband 123 network stands as a foundational element of Massachusetts' strategy to enhance internet connectivity, particularly in its western and central regions. This extensive fibre-optic "middle-mile" network spans approximately 1,200 miles (variously cited as 1,000 to 1,200 miles).[1] Its primary purpose is to connect over 120 communities in these regions to the broader internet, acting as open-access infrastructure that local service providers can utilise to offer services to end-users. It also serves as a critical building block for the numerous "Last Mile" networks subsequently developed to reach individual homes and businesses.[1] The network directly connects over 1,100 community anchor institutions (CAIs), including schools, libraries, healthcare facilities, and public safety offices.[2]

The development of MassBroadband 123 was a significant undertaking, jointly funded by the Commonwealth of Massachusetts and the federal government. State contributions included an initial $40 million in state bonds, [1], with later figures citing $44.3 million in state funds.[15] The federal portion, amounting to $45.4 million, was sourced from the National Telecommunications and Information Administration's (NTIA) Broadband Technologies Opportunities Program (BTOP), a component of the

American Recovery and Reinvestment Act of 2009.[1] The total project cost was in the range of $85 million to $90 million.

Deployment and construction of the network occurred primarily between 2013 and 2014.[15.] Currently, the MassBroadband 123 network is operated by a third-party entity, Local Linx.[15] The network's importance is highlighted by the fact that LeverettNet, a pioneering municipal fibre network in Western Massachusetts, was the first such local network to connect to MassBroadband 123, demonstrating its enabling role for last-mile solutions.[6]

The construction of MassBroadband 123 represented a crucial public investment that significantly de-risked and facilitated subsequent last-mile deployments by both municipalities and private providers in the often-challenging terrains of Western and Central Massachusetts. Without this shared middle-mile backbone, the capital expenditure and logistical complexity required for individual entities to connect to the internet core would have been substantially higher, likely rendering many last-mile projects economically unviable. The "open-access" nature of MassBroadband 123 [6] is a deliberate policy choice designed to foster competition at the retail service level. By allowing various ISPs to lease capacity on the network, the intent was to increase consumer choice and drive down prices. The actual extent to which this intended competition has materialised across all 120 connected communities, and the diversity of ISPs actively utilising the backbone, would be key indicators of its long-term success in achieving this specific policy goal.

Furthermore, the substantial federal co-investment through the BTOP program [2] underscores the efficacy of federal-state partnerships in tackling large-scale infrastructure deficits. This historical collaboration provides a relevant precedent and potential lessons for the current implementation of the BEAD program, which similarly relies on a combination of federal funding and state-level coordination and investment.

1.4 Funding the Future: Federal and State Investment Landscape (ARPA, IIJA, State Capital)

The current landscape of broadband and digital equity funding in Massachusetts is characterised by an unprecedented influx of resources, primarily driven by significant federal initiatives, complemented by ongoing state capital investments. This financial surge presents a "once-in-a-generation opportunity" [6] to make transformative progress in closing the digital divide, but it also brings the immense challenge of deploying these funds effectively and expeditiously, particularly given that some federal funds have stringent expenditure deadlines (e.g., ARPA Capital Projects Fund resources are generally expected to be spent by the end of 2026 [17]).

Key federal funding streams include the American Rescue Plan Act (ARPA) and the Infrastructure Investment and Jobs Act (IIJA). The IIJA is the source of the $147.4

million allocated to Massachusetts through the Broadband Equity, Access, and Deployment (BEAD) Program for infrastructure projects [13], and an additional $14.1 million from the State Digital Equity Capacity Grant Program under the Digital Equity Act.[4] These federal programs are pivotal to the state's "Internet for All" strategy.

The Commonwealth of Massachusetts has also demonstrated a continued commitment to supplementing these federal efforts with its own resources. Historically, state bonds funded the MBI's creation with an initial $40 million [1] and contributed significantly to the Last Mile programs, with investments totaling approximately $59 million by August 2023.[15] More recently, state-level ARPA funds established a Broadband Innovation Fund.[4] Furthermore, the Future Tech Act (HB 4889) allocated $30 million for a competitive matching grant program designed to assist municipalities and tribal governments in building fibre broadband infrastructure and related projects, with priority given to unserved or underserved areas.[54] The existence of such state-level programs provides flexibility, allowing the Commonwealth to target specific state priorities or fill gaps that federal funds might not fully cover, as well as providing necessary matching funds for federal grants like BEAD.

The Massachusetts Broadband Institute (MBI) is the central agency responsible for managing and deploying the majority of these federal and state funds earmarked for broadband expansion and digital equity initiatives.[4] This centralised coordination is vital for ensuring strategic alignment and avoiding fragmentation of efforts.

Specific programs benefiting from this complex funding matrix include:

- **Gap Networks Grant Program:** This $145 million program, funded through ARPA's Coronavirus Capital Projects Fund (CPF), is designed to deploy broadband infrastructure in areas that currently lack adequate service.[21] The first round awarded $45 million in grants [22], and the strong response to this program has influenced MBI's strategy for BEAD subgrantee selection.[29]
- **Launchpad Program:** Utilizes $9.44 million from the Digital Equity Capacity Grant to fund non-profits and public sector entities.[22]
- **Municipal Digital Equity Planning & Implementation Programs:** Supported by a combination of MBI resources, state ARPA funds, and Digital Equity Capacity Grants.[36]
- **Residential Retrofit Program:** Has seen investments such as $10.4 million announced in March 2025 to improve infrastructure in affordable housing.[22]

Massachusetts is strategically layering these various funding sources to address the multifaceted nature of the digital divide, targeting infrastructure deficits, affordability concerns, device accessibility, and digital literacy needs. The success of this "braided funding" approach hinges on meticulous coordination, clear strategic

alignment across programs, and robust oversight to maximize impact and ensure accountability.

1.5 The "Internet for All" Blueprint

"Internet for All" serves as the overarching banner for Massachusetts' comprehensive strategy to achieve universal broadband access and digital equity. This vision, championed by the MBI, is rooted in the commitment to bring affordable, reliable, high-speed internet to every home in the Commonwealth, thereby empowering all residents to fully participate in modern economic, civic, and social life.[5]

The operational blueprint for "Internet for All" is primarily defined by two critical documents: the Statewide Digital Equity Plan (SDEP) and the BEAD Initial Proposal (Volumes I & II).[5] These plans were not developed in isolation; they are the product of extensive stakeholder engagement, including a statewide listening tour, a public survey, and a formal public comment period, reflecting an effort to incorporate diverse perspectives from community leaders, residents, and digital stakeholders across Massachusetts.[5] This bottom-up approach is crucial for building buy-in and ensuring that the resulting strategies genuinely reflect actual community needs, particularly for diverse and often overlooked populations, potentially leading to more effective and locally relevant solutions than a purely top-down directive.

These guiding documents are strategically aligned with federal requirements under the Bipartisan Infrastructure Law, specifically the Digital Equity Act (which funds the SDEP implementation) and the BEAD program (which funds infrastructure deployment).[12] This alignment ensures that Massachusetts can effectively leverage federal resources to achieve its state-specific goals. The "Internet for All" plan, therefore, focuses on two main pillars: expanding high-speed internet access infrastructure through BEAD-funded projects, and concurrently implementing digital equity programming as outlined in the SDEP. This includes initiatives related to digital literacy training, ensuring access to affordable internet-enabled devices, improving internet affordability, enhancing public Wi-Fi availability, and more.[4] The tandem development and implementation of infrastructure and equity measures signify an integrated strategy, aiming not just to build networks but to ensure they are used effectively and equitably.

A practical example of the plan's commitment to data-driven, community-informed decision-making was the "How's Your Internet?" initiative.[25] This public feedback mechanism was designed to gather on-the-ground data regarding internet service quality and availability directly from residents. This information was then used to compare against and refine the official FCC broadband maps, thereby informing the BEAD Challenge Process and ensuring a more accurate identification of areas genuinely in need of investment.

While the "Internet for All" plan provides a robust and holistic framework, its reliance on federal programs like BEAD and the Digital Equity Act means that Massachusetts' progress is intrinsically linked to federal timelines, regulations, and funding priorities. Any significant shifts, delays, or changes in interpretation at the federal level could directly impact the state's ability to execute its plan as envisioned, introducing an element of external dependency and potential risk.

Chapter 2: Western Massachusetts: A Deep Dive into Regional Efforts and Infrastructure Projects

Western Massachusetts, encompassing Berkshire, Franklin, Hampden, and Hampshire counties, has long been a focal point of the Commonwealth's broadband initiatives due to its unique geographical and socio-economic characteristics. The region's often rural nature, challenging terrain, and lower population density have historically resulted in significant gaps in internet service, necessitating targeted state intervention where market-based solutions have proven insufficient.[1]

2.1 Tailoring Statewide Programs for Western Massachusetts

Statewide broadband programs have been consistently tailored or have had a disproportionate impact on addressing the needs of Western Massachusetts. The MassBroadband 123 middle-mile network, a foundational piece of infrastructure, primarily serves communities within this region, providing the necessary backbone for further connectivity.[1]

The Last Mile programs, which targeted 53 towns lacking adequate broadband, were predominantly focused on municipalities in Western and Central Massachusetts.[2] This direct application of a major state program brought essential connectivity to many of the region's most isolated areas.

Digital equity initiatives are also being actively implemented with a Western Massachusetts focus. MBI's Digital Equity Partnerships Program includes collaborations with organisations specifically serving the region, such as the Western MA Alliance for Digital Equity (affiliated with Baystate Health) and the broader Alliance for Digital Equity.[3] Furthermore, the Municipal Digital Equity Planning grants have been awarded to numerous Western Massachusetts towns. For instance, the Franklin Regional Council of Governments (FRCOG) has facilitated these planning services for towns like Gill, Leverett, and Shutesbury.[39] Other municipalities, including Longmeadow [57] and the larger Gateway City of Springfield [21], are also engaged in developing localised digital equity plans with state support. The Launchpad Program, another MBI initiative, specifically prioritises counties like Worcester (which includes parts of Central/Western MA) and Gateway Cities within Western Massachusetts, such as Springfield and Holyoke [35], directing resources

towards urban areas that may have infrastructure but still face significant adoption barriers.

The federal BEAD Program, while statewide in scope, will inherently direct significant infrastructure investment towards the remaining unserved and underserved BSLs, many of which are in Western Massachusetts.[12] The direct negotiation phase for BEAD subgrants will further allow MBI to target specific, lingering connectivity needs in Western Massachusetts municipalities with tailored solutions.[13]

Regional Planning Agencies (RPAs) play a vital role in this ecosystem. FRCOG, the Central Massachusetts Regional Planning Commission (CMRPC) [46], and the Pioneer Valley Planning Commission (PVPC) [60] act as key partners and intermediaries, delivering MBI's digital equity planning services and other technical assistance to smaller, rural municipalities in Western Massachusetts. These RPAs often possess the regional expertise and capacity that individual small towns may lack, enabling them to effectively participate in and benefit from complex state programs.

The evolution of the state's strategy in Western Massachusetts is apparent: from broad regional infrastructure (MassBroadband 123) to highly localised last-mile connectivity solutions, and now to nuanced digital equity planning at the individual town and community level. This progression reflects an increasingly granular understanding of the diverse challenges within the region. While substantial progress has been made on the infrastructure front through the Last Mile completions, the ongoing digital equity planning efforts in numerous Western Massachusetts towns [21] underscore that barriers to adoption—such as affordability, digital skills, and device access—remain prevalent even where physical networks exist. This reinforces the critical importance of the Statewide Digital Equity Plan's multifaceted approach to ensure that connectivity translates into meaningful use.

2.2 Municipal Fibre Grant Program: Impact in Western Cities

The Commonwealth offers a Municipal Fibre Grant Program to directly support cities and towns in developing and expanding their own fibre optic infrastructure. These grants provide crucial seed funding or gap financing, enabling municipalities, particularly in Western Massachusetts, to undertake projects that private ISPs might not prioritise. The program demonstrates flexibility by funding a variety of project types, catering to different stages of municipal network development, from creating entirely new networks to extending existing ones or building in redundancy for critical services.

The following table details awards from the FY2022 Municipal Fibre Grant Program to municipalities located in Western Massachusetts, illustrating the types of projects funded [61]:

Municipality	County	Grant Amount	Project Description	Notes
Amherst	Hampshire	$295,925	Extension of the existing municipal fibre network	Supports ongoing municipal efforts to enhance local connectivity.
Colrain	Franklin	$400,000	Creation of a redundant municipal fibre network for the towns of Colrain, Charlemont, Heath, Leyden and Rowe	A significant multi-town collaborative effort aimed at improving network resilience, a key concern for rural areas.[62]
Dalton	Berkshire	$60,844	Creation of a new municipal fibre network	Enables a smaller town to initiate its own fibre infrastructure.
Easthampton	Hampshire	$250,000	Creation of a new municipal fibre network	Illustrates initial state support for a municipal project that later transitioned to a private partnership with GoNetSpeed.[7]

Municipality	County	Grant Amount	Project Description	Notes
Egremont	Berkshire	$12,493	Extension of its existing municipal fibre network	Likely funds a specific, targeted expansion or upgrade.
Hampden	Hampden	$250,000	Expansion of the town's fibre infrastructure	Supports the growth of an existing municipal fibre footprint.
New Salem	Franklin	$12,730	Installation of environmental and security monitoring equipment for the New Salem Municipal Light Plant's fibre network	Funds specific ancillary equipment for an existing MLP-operated network, highlighting diverse needs.
Northampton	Hampshire	$250,000	Expansion of the city's existing fibre infrastructure	Complements Northampton's broader exploration of municipal broadband solutions and MLP formation [7]
Pittsfield	Berkshire	$205,089	Expansion of the city's	Supports a larger Western MA city in

Municipality	County	Grant Amount	Project Description	Notes
			existing fibre infrastructure	enhancing its municipal network capabilities.

Source: Compiled from data in.[61]

The case of Easthampton, which received a $250,000 grant for a new municipal network [61] but later opted for a private build-out with GoNetSpeed [7], is particularly instructive. It demonstrates that initial grant funding does not always guarantee that a project will proceed as a purely municipal endeavour. Local political decisions, the emergence of attractive private ISP proposals, and the perceived complexities of a full municipal build-out can alter a project's trajectory. This raises important considerations for how the state structures such grant agreements and defines success, especially if the "municipal" aspect is later diminished or abandoned in favour of private solutions.

The relatively modest grant amounts awarded to some towns (e.g., Egremont and New Salem receiving just over $12,000 each [61]) suggest that these particular grants were likely intended for very specific, incremental improvements, planning phases, or design work, rather than funding comprehensive network build-outs, which typically run into millions of dollars (e.g., GoNetSpeed's private build in Easthampton is a $3.6 million project [7]). This underscores the common reality that municipalities often need to strategically combine funding from various state, federal, and local sources to realise extensive municipal fibre networks. The more recent Future Tech Act (HB 4889), which allocates $30 million for a competitive matching grant program to assist municipalities and tribal governments in building fibre infrastructure, [54], may offer a pathway to larger-scale funding for such ambitious local projects.

2.3 Case Studies in Local Connectivity

Several municipalities in Western Massachusetts have embarked on distinct paths to improve local internet connectivity, offering valuable case studies. These examples illustrate different models of deployment, funding, and operation, as well as the unique challenges and successes encountered at the local level.

2.3.1 LeverettNet: A Model of Municipal Success?

Leverett, a small, rural town of approximately 1,800-2,000 residents in Franklin County, stands out as a frequently cited example of successful municipal broadband deployment in Western Massachusetts.[20] Before its initiative, residents relied on

inadequate internet options like dial-up, satellite, or slow DSL services, which hampered economic activity, education, and overall quality of life, making it difficult to attract new residents.[20] Incumbent providers had shown no interest in upgrading services, citing low population density as economically unviable.[65]

In response, Leverett embarked on an ambitious project to build LeverettNet, a town-owned Fibre-to-the-Home (FTTH) network delivering symmetrical gigabit-speed connectivity to every premise.[7] The network is operated by a publicly controlled Municipal Light Plant (MLP), a legal entity that allows Massachusetts municipalities to run utilities [66] Planning for LeverettNet commenced around 2008, with the town becoming an early participant in the MassBroadband 123 middle-mile project, which provided essential backbone connectivity.[6] A pivotal moment came in April 2012, when the Leverett Annual Town Meeting approved a general obligation municipal bond issue with overwhelming 90% support to finance the construction of the town-wide FTTH network.[69] The build-out involved installing approximately 39 miles of aerial fibre optic cable along all town roads, connecting roughly 800 locations using an Active Ethernet architecture, which provides a dedicated fibre strand to each subscriber.[69]

Funding for LeverettNet was a blend of local commitment and state support. Residents approved a modest property tax increase to service the bond debt.[66] The initial average yearly tax impact per household was calculated at $219, but this was later reduced to around $100 per year following successful refinancing efforts.[67] The Commonwealth also contributed over $800,000 in "Last Mile" grant funds and paid for a $40,000 planning study that helped define the project's objectives.[20]

The impact of LeverettNet has been transformative. The network achieved a high take-rate shortly after launch, with 650 of 800 households subscribing initially, a figure that later rose to 80-85%.[20] Residents reported significant benefits, including improved access to medical information, enhanced educational opportunities for students, and increased ability for local small businesses to engage in the global economy.[20] The availability of reliable, high-speed internet also made the town more attractive, and residents expressed high levels of satisfaction, with some describing the service as "thrilling".[20] The network proved particularly resilient and beneficial during the COVID-19 pandemic, enabling a smooth transition to remote work and learning.[65] A local non-profit arts centre also reported cost savings after switching to LeverettNet.[67]

LeverettNet's operational model is noteworthy. The MLP operates independently of the town's political infrastructure and is mandated by state law to charge subscribers no more than the actual cost of providing service.[66] The town strategically chose to outsource network operations, internet service provision, and maintenance to private vendors, with no direct paid staff for LeverettNet itself, thus keeping overheads low.[67] This model also provided flexibility; LeverettNet was able

to switch its ISP contractor (from Crocker Communications to OTT Communications) to secure lower monthly rates for its subscribers, a testament to the benefits of public control focused on community welfare rather than profit maximisation.[67] For added resilience, LeverettNet established a peering agreement with the neighbouring town of Shutesbury to ensure network continuity in case of a fibre cut.[65]

Several key factors contributed to LeverettNet's success: sustained and dedicated local leadership (the volunteer Leverett Broadband Committee met weekly for four years), strong community engagement and widespread support (evidenced by the Town Meeting vote and high subscription rates), meticulous upfront planning (including the state-funded feasibility study and research into other municipal solutions), and the strategic leveraging of state and federal investments like MassBroadband 123 and Last Mile grants.[20] The decision to build an FTTH network directly to each location, rather than a fibre-to-the-curb model, ensured a ready-to-operate system from the outset.[69]

While LeverettNet is often hailed as a model, its leaders caution that their specific approach may not be universally replicable. Each community must conduct its thorough assessment of local conditions, including road miles, housing density, and financial capacity, to determine the most viable path forward.[67] Nevertheless, Leverett's experience demonstrates that even small, rural communities can achieve universal, high-quality fibre connectivity with strong local will, community backing, and effective partnerships with state and federal entities.

2.3.2 Whip City Fibre (Westfield G&E): Regional Collaboration and Expansion

Whip City Fibre, a division of Westfield Gas & Electric (WG+E), the municipal utility serving the city of Westfield in Hampden County, has emerged as a significant force in expanding fibre optic connectivity across Western Massachusetts.[7] This initiative represents a successful model of a larger, established municipal utility leveraging its existing infrastructure, expertise, and resources to not only serve its own community but also to assist smaller, often neighbouring, towns in deploying their own FTTH networks.

The model employed by Whip City Fibre involves WG+E managing the build-out of municipally-owned fibre optic network infrastructure and subsequently offering ongoing administrative and technical support to partner towns.[7] Within Westfield itself, WG+E has utilised a "fiberhood" approach, prioritising network expansion to neighbourhoods that demonstrate the highest levels of resident interest.[57] The service offers symmetrical gigabit speeds (1 Gbps download/1 Gbps upload) to residential customers in Westfield for approximately $69.95 per month, with business service tiers also available.[57]

Whip City Fibre's reach extends far beyond Westfield. It currently serves or has contracted with approximately 20 other municipalities throughout Western Massachusetts, effectively creating a regional fibre collaborative.[7] Notable partner communities include West Springfield, East Longmeadow, and several member towns of the WiredWest cooperative, such as Becket, New Salem, Rowe, Washington, Windsor, and Heath.[7] Projections indicate that Whip City Fibre aims to help connect around 12,400 households across these 20 towns over a ten-year period.[71]

The financing for these ambitious expansions has come from multiple sources. The City of Westfield issued a $15 million bond to fund the expansion of its own network.[71] Additionally, WG+E successfully secured $10.2 million from the Federal Communications Commission's (FCC) Connect America Fund Phase II (CAF II) auction, specifically to extend fibre networks into 20 nearby communities.[73] This proactive pursuit of diverse funding streams has been crucial to its regional expansion.

Whip City Fibre has cultivated a reputation for being customer-oriented, a characteristic often attributed to its status as a municipal utility not solely driven by profit maximisation. Reports suggest a successful track record and high levels of customer satisfaction among its users.[75] The utility also played a role in the state's broader Last Mile efforts, being one of the entities that received MBI grant applications in 2017 to serve unserved towns.[18] During the COVID-19 pandemic, Whip City Fibre partnered with MBI to establish critical Wi-Fi hotspots in communities with poor existing connectivity. [71]

The Whip City Fibre model offers significant advantages, particularly for smaller municipalities that may lack the independent capacity or expertise to design, build, and operate their own FTTH networks. By partnering with an experienced municipal utility like WG+E, these towns can achieve economies of scale, benefit from shared technical knowledge, and reduce the inherent risks associated with large infrastructure projects. This inter-municipal collaboration, anchored by a strong and capable lead utility, presents a potentially replicable strategy for other regions facing similar rural connectivity challenges.

The partnership between Whip City Fibre and the WiredWest member towns is particularly illustrative.[70] After WiredWest's initial, more centralised regional ownership model encountered obstacles with MBI, this collaboration provided a pragmatic path forward. It allows individual towns to retain ownership of their local network infrastructure while outsourcing the complex operational aspects to an experienced municipal provider, thereby mitigating administrative burdens and operational risks for the smaller communities.

2.3.3 WiredWest: The Trajectory of a Regional Cooperative

WiredWest emerged as a grassroots initiative, a municipal cooperative formed by a consortium of towns in Western Massachusetts with the ambitious goal of creating a regional Fibre-to-the-Home (FTTH) network.[7] The cooperative's core objective was to address the pervasive lack of adequate broadband in the region by enabling member towns to collectively reduce the administrative burdens, financial costs, and operational risks associated with network deployment through economies of scale and shared resources.[70] At its peak, the cooperative involved or had interest from around 40-44 towns, indicative of the widespread need and desire for better connectivity.[7] The plan was to offer various service tiers, including gigabit speeds.[78]

However, WiredWest's journey has been marked by significant challenges, most notably a protracted conflict with the Massachusetts Broadband Institute (MBI), particularly during the administration of Governor Charlie Baker. MBI expressed concerns regarding WiredWest's proposed business plan and its regional ownership structure, preferring that individual towns retain sole ownership of the infrastructure within their respective boundaries and establish direct grant relationships with the state.[7] This divergence in approach led to MBI pulling its support for WiredWest's original model, resulting in funding delays and causing many towns to withdraw from the cooperative to pursue alternative paths.[74] The initiative, which had garnered considerable local momentum and pre-subscriptions [77], "crashed and burned" in its initial expansive form according to some reports.[7]

Despite these setbacks, WiredWest continues to exist, albeit in a modified and smaller-scale form. It currently serves a core group of charter member towns: Becket, New Salem, Rowe, Washington, and Windsor, with the town of Heath having recently joined this group.[7] In its current operational model, these member towns own their local fibre networks, and WiredWest, as a cooperative, contracts with Whip City Fibre (Westfield G&E's broadband arm) to operate these networks and provide internet and phone services to customers.[70] This arrangement allows towns to benefit from Whip City Fibre's operational expertise while WiredWest handles aspects of regional coordination and advocacy.

The services delivered through this revised model have been positively received in operational towns. For example, the Town of Washington has completed its network construction, delivering "superfast" internet connections and clear digital phone service. The project exceeded its initial take-rate goal, and resident satisfaction is reportedly high, with one Washingtonian describing the new service as "like a new world at our house".[70] Similarly, towns like Becket and Heath are actively accepting sign-ups for service.[70] Subscribers in WiredWest towns can also apply for federal affordability programs like the Affordable Connectivity Program (ACP) and Lifeline.[70]

The WiredWest experience offers several important lessons. It highlights the significant political and policy risks inherent in large-scale, multi-jurisdictional public infrastructure projects, particularly when they depend heavily on state agency approval and funding. Changes in state administration priorities or fundamental disagreements over operational and ownership models can severely impact or even derail promising grassroots initiatives. The current, more streamlined WiredWest model, which involves individual town ownership of networks coupled with a partnership with an experienced municipal operator like Whip City Fibre, represents a pragmatic adaptation to these earlier challenges. While not the original grand vision of a cooperatively owned regional network, this hybrid approach still enables member towns to achieve the core goal of FTTH connectivity under local control, leveraging external operational expertise. The positive outcomes and high satisfaction reported in towns where this model is now active, such as Washington [70], suggest that resilient and adaptive strategies can ultimately succeed in delivering essential broadband services, even after navigating considerable adversity.

2.4 The Role of Private Internet Service Providers in Western Massachusetts

Private Internet Service Providers (ISPs) play a multifaceted role in the Western Massachusetts broadband landscape, encompassing incumbent providers with long-standing presence, new entrants deploying competitive fibre networks, and partners in state-led connectivity initiatives. Companies like Comcast (Xfinity) and Charter Communications (Spectrum) are the major incumbent cable broadband providers in many parts of Western Massachusetts.[7] Verizon also has a historical presence, primarily offering Digital Subscriber Line (DSL) service and limited Fibre Optic Service (FiOS), though it has faced criticism for a perceived lack of widespread fibre upgrades in the region.[87] The coverage provided by these incumbents has often been incomplete, particularly in the more rural and sparsely populated areas, leading to the "last mile" problem that state programs have sought to address.

In recent years, the region has seen the emergence of new private fibre providers, most notably GoNetSpeed. This company is actively expanding its fibre network into several Western Massachusetts cities, including Easthampton, Northampton, Pittsfield, Springfield, Holyoke, Westfield, Chicopee, West Springfield, Agawam, and Ludlow.[7] GoNetSpeed typically positions itself as a competitive alternative, offering faster and more reliable fibre-optic services compared to the existing offerings from incumbent providers.[7] Gateway Fibre is another new entrant making inroads, for example, in Northampton.[64] The arrival of these new fibre-centric ISPs signifies a potentially significant shift in the competitive dynamics of the more densely populated areas of Western Massachusetts, offering consumers increased choice. However, their investment focus tends to be on these more commercially viable cities rather than the most remote rural communities that were the primary targets

of the Last Mile programs. This suggests a tiered market reality where new private investment is drawn to areas with sufficient population density, while public funds and initiatives remain crucial for connecting the hardest-to-reach locations.

Private ISPs have also been integral partners in state-led efforts to bridge connectivity gaps. MBI's Last Mile programs, particularly the Flexible Grant Program, have provided funding to private companies to design, build, own, and operate networks in unserved towns.[11] For instance, Comcast has partnered with MBI on projects in towns like Middlefield, Montgomery, Tolland, and Worthington, while Charter has undertaken similar projects in Hancock, Hinsdale, and Lanesborough, among others.[6] These public-private partnerships demonstrate that state incentives can effectively bridge the economic viability gap for private providers, enabling network extensions into areas that are marginally uneconomical without such support. This pragmatic approach leverages the operational capabilities and existing infrastructure of private companies to achieve public connectivity goals.

The issue of competition, or often the historical lack thereof, is a recurring theme in Western Massachusetts. Many communities, especially in rural areas, have long experienced ISP monopolies or duopolies, leading to widespread dissatisfaction with service quality, pricing, and customer support.[7] Municipal broadband efforts and the welcoming of new private entrants are frequently direct responses to this lack of a competitive marketplace.

Private providers are also expected to be key participants in the ongoing BEAD program, both through applications submitted in Round 1 and in the direct negotiation phase that MBI is now pursuing to cover remaining unserved and underserved locations.[13] However, a significant challenge impacting private ISP expansion, and indeed all network deployment, is the issue of utility pole attachments. Companies like GoNetSpeed have been particularly vocal, engaging in aggressive lobbying and formal regulatory petitions to address what they describe as excessive delays and costs associated with accessing utility poles in Massachusetts.[14] Charter Communications has also highlighted the critical importance of efficient pole access and make-ready work for timely network deployment.[103] The resolution of these pole-related impediments, discussed further in Chapter 3, could significantly accelerate private fibre deployment and enhance competition, potentially reducing the need for direct public subsidies in some areas.

2.5 Emerging Initiatives and Current Project Status in Key Western Massachusetts Cities

Across Western Massachusetts, various municipalities are at different stages of planning and implementing improved internet and fibre optic infrastructure, reflecting diverse local priorities, resources, and market conditions.

Springfield, the region's largest city, is actively exploring the feasibility of a municipal fibre network.[59] The city, in partnership with the Pioneer Valley Planning Commission (PVPC), secured a $102,000 MBI grant to develop a comprehensive digital equity plan and a blueprint for enhancing high-speed internet access.[21] A key challenge in Springfield is not the absence of infrastructure—Comcast provides widespread cable coverage—but rather the affordability of existing services for many residents, alongside needs for device access and digital skills training.[60]

Northampton has also been proactive. Following a strong resident vote in favour of creating a Municipal Light Plant (MLP) for broadband purposes, the city commissioned a market and feasibility study from the firm Design Nine.[7] The city is considering various models, such as building and leasing out its own fibre network or partnering with a private ISP.[7] While Northampton recently welcomed Gateway Fibre as a new private competitor offering FTTH services, city officials have indicated that the option of a full municipal network remains under consideration.[64] Northampton also received a $250,000 state municipal fibre grant to expand its existing fibre infrastructure.[61]

The city of **Easthampton** presents a notable case study in shifting strategies. After initially pursuing a municipal network, supported by over $150,000 in taxpayer money for feasibility studies and design work, plus a $250,000 state municipal fibre grant [7], the city ultimately pivoted. It entered into a partnership with GoNetSpeed, a private ISP, which committed to fully funding a $3.6 million citywide fibre build-out.[7] This decision was reportedly influenced by GoNetSpeed's commitment to cover all construction costs, the prospect of a faster deployment timeline, and the city's desire to avoid incurring municipal debt.[7] This "tale of two Easthamptons" highlights the allure of private capital and expedited timelines, which can sometimes overshadow the potential long-term benefits of public control over critical infrastructure, a dynamic likely to recur as new private ISPs expand their footprint.

In **Longmeadow**, a Municipal Fibre Task Force was established in October 2023 to explore options for enhanced connectivity.[57] Following a May 2024 town vote overwhelmingly approving the creation of an MLP, the Task Force recommended that the town partner with the South Hadley Electric Light Department (SHELD), which operates the Fiberspring municipal fibre service, for the planning, design, and build-out of a town-wide fibre optic network.[58] Further town meeting votes are required to formally create the MLP and authorise funding for design and engineering work. The Task Force had also considered Whip City Fibre and Entry Point as potential partners.[57]

West Springfield approved a $1.8 million municipal broadband pilot project to be operated by Whip City Fibre, targeting specific neighbourhoods.[57] However, the launch of this pilot has been significantly delayed due to ongoing pole attachment issues with incumbent utility owners Verizon and Eversource.[90] This situation

underscores how pole access problems can stall even well-planned projects with secured funding and partnerships, making it a critical systemic issue for the entire region.

Chicopee is another community looking towards municipal solutions, driven by frustration with existing services from Verizon (DSL) and Charter (cable).[101] The city already possesses some fibre backbone infrastructure and is exploring a partnership with Holyoke Gas & Electric (HG&E), which, like SHELD, has experience with municipal fibre operations (FiberSpring).[57]

The town of **Otis**, in Berkshire County, already has an established FTTH network operated through its MLP.[21] With infrastructure in place, Otis is now focusing its efforts on digital equity, specifically addressing issues of affordability, digital literacy training, and device access for seniors and students who may be unable to utilise the existing network effectively.[21]

Many of the smaller, rural "hilltowns" across Western Massachusetts, such as Leyden, Becket, Plainfield, Windsor, Rowe, Washington, and Heath, have pursued FTTH networks, often as part of the WiredWest cooperative and in partnership with Whip City Fibre for network operation.[70] Other towns in this category have worked through MBI's Last Mile programs, partnering with providers like Charter or Comcast to extend service.[6] For example, Plainfield Broadband successfully built its network in partnership with Westfield G&E, even navigating challenges related to potential overbuilds from FCC RDOF-funded projects.[72]

This diversity of approaches across Western Massachusetts municipalities—from full municipal builds and public-private partnerships to a focus on digital equity in already-connected towns—reflects the varied local political landscapes, financial capacities, and existing market conditions. It also highlights a growing trend where established MLPs with fibre expertise, such as Westfield G&E (Whip City Fibre) and South Hadley ELD (Fiberspring), are becoming key enablers for smaller neighbouring towns. This inter-municipal utility partnership model appears to be a viable and increasingly popular strategy, offering a locally rooted alternative to relying solely on large private ISPs or requiring every small town to develop network capabilities from scratch.

Chapter 3: Identifying the Hurdles: Roadblocks and Impediments to Broadband Expansion

Despite significant investment and focused efforts, the path to universal, high-quality broadband in Massachusetts, particularly in its western regions, is obstructed by several critical roadblocks. These impediments range from complex infrastructural challenges and regulatory inefficiencies to economic and social factors that hinder

both network deployment and equitable adoption. Addressing these hurdles is paramount to realising the full potential of ongoing and future broadband initiatives.

3.1 The Pole Attachment Predicament: A Critical Bottleneck

The process of attaching new fibre optic cables to existing utility poles is a fundamental requirement for widespread broadband deployment, especially in areas like Western Massachusetts, where aerial construction is often more feasible than underground trenching.[103] However, this process in Massachusetts has become a major bottleneck, characterised by extensive delays, exorbitant costs, and a complex, often inefficient regulatory environment. This "pole predicament" affects not only municipal broadband projects but also the expansion efforts of private ISPs seeking to enter or expand in the market. The sheer volume of complaints, detailed testimonies from various stakeholders, and the formal inquiry initiated by the Department of Public Utilities (DPU) and the Department of Telecommunications and Cable (DTC) underscore the systemic and critical nature of this issue.[97]

Delays in Access and Make-Ready Work:

A primary complaint from entities attempting to deploy fibre is the extraordinary length of time it takes to gain access to utility poles. GoNetSpeed, a private ISP actively building out fibre in Massachusetts, has reported that the entire process, from application to final attachment, can take up to four years in the Commonwealth.14 This timeline stands in stark contrast to neighbouring New England states such as Connecticut, Maine, New York, and Rhode Island, where similar processes are often completed in a matter of months, or at most, under two years. GoNetSpeed specifically noted that it often waits more than a year just for the initial survey and engineering results from pole owners in Massachusetts.92 This stark difference strongly suggests that regulatory and procedural efficiencies in other states could be adopted in Massachusetts to significantly accelerate deployment.

The municipal fibre pilot project in West Springfield, undertaken in partnership with Whip City Fibre, offers a concrete example of these delays. Despite having funding and a plan, the project was put on hold due to protracted delays by the incumbent pole owners, Verizon and Eversource, in completing the necessary "make-ready" work (the physical preparation of poles to safely accommodate new attachments). Progress on make-ready was reported to be stuck at around 25% completion with little clear explanation for the hold-up.[90] Nationally, such pole attachment delays have been estimated to cost Americans between $491 million and $1.86 billion

every month in foregone economic benefits, attributed to what economists term the "hold up problem", where pole owners can exert market power.[90]

Excessive Costs and Cost Allocation Disputes:

Beyond delays, the costs associated with pole attachments in Massachusetts are a major concern. GoNetspeed has asserted that make-ready costs in the Commonwealth are often more than double the average costs incurred in Connecticut and Maine.98 The company has pointed to unusually high make-ready estimates from Massachusetts pole owners, often inflated by demands for extensive pole replacements, and a lack of detailed, itemised cost breakdowns, making it difficult for attachers to verify the reasonableness of charges. It has also been reported that initial cost estimates can end up being significantly lower than the final invoiced amounts.94

Pole owners frequently deny or delay access or impose what attachers deem economically unfeasible rates and terms. A common point of contention is the shifting of costs—such as for pole replacements (even those due for routine replacement or necessitated by pre-existing violations) and ongoing upkeep—to the new attacher.[90] For example, the town of Charlemont reportedly faced a potential shortfall of nearly a quarter-million dollars because MBI had undercounted the number of poles requiring attachment, with individual pole fees potentially as high as $400 each.[105] One report indicated that 22 towns in Massachusetts collectively spent nearly $11 million on make-ready work in preparation for building their own networks.[105]

Outdated and Inefficient Regulatory Framework:

Many stakeholders argue that Massachusetts' current regulatory framework for pole attachments is outdated and contributes to the delays and high costs. The state lacks clear, enforceable timelines for each stage of the pole attachment process, modern procedures like One-Touch Make-Ready (OTMR), and robust enforcement mechanisms to ensure pole owner compliance.92 The existing state regulations (220 CMR 45.00) are primarily complaint-driven, an approach seen as inadequate to proactively address systemic issues.93

Massachusetts is one of the states that has "reverse-pre-empted" the FCC's authority over pole attachments. This means that federal pole attachment rules, which include more streamlined processes and timelines, do not automatically apply; instead, the state regulates its own process.[94] Furthermore, the shared jurisdiction over pole matters between the DPU and the DTC has reportedly led to instances of conflicting policies and created a "void in effective regulation," allowing pole owners to operate with minimal accountability regarding timelines and costs.[93]

Proposed Reforms and the DPU/DTC Joint Notice of Inquiry:

In response to these widespread concerns, various stakeholders, prominently GoNetspeed (operating as CRC Communications), CTIA (The Wireless Association), and municipal advocates, have called for significant reforms. Key proposed changes include:

- **Adoption of One-Touch Make-Ready (OTMR):** This process allows a new attacher's approved contractor to perform all simple make-ready work in the communications space of a pole in a single visit, significantly speeding up the process.[92]
- **Establishment of Clear Timelines:** Mandating specific, enforceable deadlines for each step of the application, survey, engineering, cost estimation, and make-ready process.[92]
- **Use of Qualified Contractors:** Allowing attachers to use pre-approved or their own qualified contractors to perform survey, engineering, and make-ready work, especially when pole owners lack resources to meet timelines.[92]
- **Fair Cost Allocation:** Implementing clear cost-causation principles, ensuring that attachers are not unfairly burdened with costs for pre-existing pole issues or replacements that benefit the pole owner or other existing attachers. Municipalities argue they should not be liable for costs associated with using poles for public initiatives or relocations due to public works.[93]
- **Streamlined Processes:** Simplifying procedures for common tasks like overlashing (adding a new cable to an existing strand) and service drops.[93]
- **Temporary Attachments:** Permitting temporary attachments, compliant with safety codes, to mitigate extensive delays in permanent make-ready work.[92]
- **Accelerated Dispute Resolution:** Creating faster, more efficient mechanisms for resolving disputes between attachers and pole owners.[104]
- **Pole Top Access:** Clarifying and guaranteeing access to pole tops for wireless attachments, which is often optimal for wireless deployment.[114]

Recognizing the severity of these issues, the DPU and DTC jointly issued a Notice of Inquiry (D.P.U. 25-10/D.T.C. 25-1) in January 2025.[97] This inquiry aims to explore utility pole attachment processes, conduit access, the persistent problem of "double poles" (where old poles are not removed after new ones are installed), and related considerations for work conducted on public rights-of-way. The explicit goal is to gather information that will inform a subsequent rulemaking proceeding to update the state's pole attachment regulations (220 CMR 45.00 et seq.). The Departments solicited comments and data from a wide range of stakeholders, including investor-owned utilities (Eversource, National Grid, Unitil), traditional telephone companies (Verizon), municipal lighting plants (MLPs), attachers (like cable and broadband companies), and state and local government entities.

GoNetspeed submitted extensive comments, incorporating its earlier November 2024 rulemaking petition (D.P.U. 24-188/D.T.C. 24-5), which detailed its negative experiences and proposed specific rule changes modelled on FCC regulations and

successful practices in other states.[97] CTIA also filed comments supporting reforms like OTMR and enforceable timelines.[114] The Massachusetts Municipal Association (MMA) highlighted municipal concerns, particularly the lack of enforcement for timely double pole removal (statutorily required within 90 days but often ignored), the financial burden of pole-related costs on municipalities, and the need for improved engagement with pole data systems like NJUNS.[111] The MMA stressed that municipalities should not be held liable for costs to use utility poles for municipal attachments or for relocations necessary for public projects or safety. The "double pole" issue, as highlighted by the MMA, is a visible manifestation of inefficient pole management, creating safety risks, aesthetic blight, and further project delays, indicating that the problem extends beyond just new attachments to the overall lifecycle management of this critical infrastructure.

The fact that major pole owners like Verizon, Eversource, and National Grid have reportedly expressed support for OTMR or similar streamlined processes in some contexts or other jurisdictions [97] offers a potential avenue for consensus. However, their actual practices in Massachusetts, as evidenced by delays experienced by projects like West Springfield's, suggest that stated positions may not always align with on-the-ground realities, or that internal resource constraints and existing financial incentives within the current Massachusetts framework may perpetuate delays. The DPU/DTC inquiry must rigorously examine these discrepancies.

Impact on BEAD Program Implementation:

The pole attachment quagmire poses a direct and significant threat to Massachusetts' ability to effectively utilise its $147 million in federal BEAD funding.14 The BEAD program has a strict four-year timeline for subgrantees to complete network construction and begin providing service after receiving funds.14 If pole access continues to take years, it will be exceedingly difficult for BEAD-funded projects to meet these federal deadlines. MBI itself acknowledged this risk in its BEAD Initial Proposal, noting that project completion times are dependent on acquiring permits and make-ready licenses, the timing of which is often beyond the applicant's control.14 The DPU/DTC Joint Inquiry is therefore a critical undertaking. However, the timeline for the inquiry itself—initial comments, technical sessions, reply comments, followed by a separate rulemaking process—could be lengthy. Any substantial delay in implementing meaningful reforms could mean that a significant portion of the BEAD deployment window is consumed by navigating the existing, inefficient pole attachment system, thereby jeopardising the timely and cost-effective use of these federal funds.

3.1.1 The DPU/DTC Joint Notice of Inquiry (Docket D.P.U. 25-10/D.T.C. 25-1): Stakeholder Arguments and Cost Implications

The Joint Notice of Inquiry (NOI) initiated by the Massachusetts Department of Public Utilities (DPU) and the Department of Telecommunications and Cable (DTC) in January 2025 (D.P.U. 25-10/D.T.C. 25-1) has become a focal point for discussing the pervasive issues surrounding utility pole attachments, conduit access, and right-of-way (ROW) management in the Commonwealth.[97] The inquiry aims to gather comprehensive input that will inform a future rulemaking process to update existing regulations (220 CMR 45.00 et seq.), which govern these critical infrastructure elements. The Departments explicitly directed major utility pole owners—investor-owned electric distribution companies (EDCs) like Eversource (NSTAR Electric), National Grid (Massachusetts Electric Company and Nantucket Electric Company), Unitil (Fitchburg Gas and Electric Light Company), and the traditional telephone incumbent Verizon—to participate and provide data.[107] Input was also solicited from municipal lighting plants (MLPs), state and local entities managing public ROWs, attaching entities (such as cable television and broadband providers), and the general public.

Key Arguments from Stakeholders:

- **GoNetspeed (CRC Communications, LLC):** As a competitive fibre builder, GoNetspeed has been one of the most vocal proponents for reform. Their comments, incorporating their prior rulemaking petition (D.P.U. 24-188/D.T.C. 24-5), emphasise the drastic difference in deployment timelines and costs between Massachusetts and neighbouring states with modernised pole attachment rules.[93] They argue that Massachusetts' current complaint-driven system is ineffective, lacks enforceable timelines, and allows pole owners to impose unreasonable delays and costs, thereby stifling competition and hindering the deployment of advanced broadband services.[14] GoNetspeed advocates for the adoption of FCC-like rules, including One-Touch Make-Ready (OTMR), defined "shot-clock" timelines for each stage of the process, rules for the use of qualified contractors, fair cost allocation principles, and streamlined processes for overlashing and temporary attachments.[92] They highlight that such reforms are not novel and have been successfully implemented in a majority of other states, including those in New England, leading to faster and more cost-effective broadband buildouts.[97] GoNetspeed also points out that major pole owners like Verizon, Eversource, and National Grid have, in various forums or other jurisdictions, expressed support for aspects of these reforms, such as OTMR.[97]
- **CTIA – The Wireless Association®:** Representing the wireless communications industry, CTIA's comments also push for reforms that align Massachusetts' processes with federal FCC standards and best practices

from other states.[114] They specifically call for the implementation of "shot clock" timelines for make-ready work, the adoption of OTMR with attacher self-help provisions, accelerated dispute resolution processes, and clarification of rules regarding access to pole tops for wireless antenna attachments, which is crucial for 5G and future wireless deployments.[114] CTIA argues that these measures are essential to expedite broadband deployment and meet the growing demand for wireless data. They caution against mandating a public pole database due to potential security and competitive concerns.[117]

- **Massachusetts Municipal Association (MMA):** The MMA, representing cities and towns across the Commonwealth, brought forward the unique challenges municipalities face due to current pole management practices.[111] A primary concern is the widespread issue of "double poles" and the lack of effective enforcement of the 90-day removal deadline for old poles. This not only creates safety and accessibility hazards (e.g., for ADA compliance) and aesthetic blight but also delays municipal construction projects, thereby increasing costs.[111] The MMA strongly argues that municipalities should not be held financially liable for the costs of utility pole replacements, expansions, or relocations, particularly when these are necessary for public works projects, to ensure ADA compliance, or for municipal initiatives like fibre networks, street lighting, or fire alarm systems. They advocate for regulations that allow municipal enforcement of double pole violations, including the ability to fine pole owners or remove poles themselves, and for clarification that municipalities should not pay to use utility poles or ROWs for essential municipal functions.[111] The MMA also noted inconsistent engagement with the National Joint Utilities Notification System (NJUNS) by both municipalities and utility companies, hindering effective coordination.[111]

Cost Implications Highlighted in the Docket:

The NOI and submitted comments consistently underscore the significant cost implications of the current pole attachment regime:

- **Direct Make-Ready Costs:** Attachers, including new broadband providers and municipalities, face substantial and often unpredictable make-ready costs. These can include charges for surveys, engineering, labour to rearrange existing attachments, and, critically, the full cost of pole replacements if a pole is deemed inadequate to support new attachments, even if the pole was already old or in poor condition.[93] GoNetspeed, for instance, stated that make-ready costs in Massachusetts are often more than double those in neighbouring states and that pole owners provide insufficient itemization to justify these charges.[94]

- **Increased Project Costs Due to Delays:** The lengthy delays inherent in the current process directly translate to increased project costs. Extended timelines mean higher labour costs, prolonged equipment carrying costs, and potential loss of deployment momentum. For BEAD-funded projects with fixed timelines, these delays and associated cost overruns can jeopardize project completion and the ability to serve all intended locations.[14] As cited by The Pew Charitable Trusts, a Virginia delegate noted that original per-mile construction costs of $30,000 had escalated to $90,000, partly due to pole-related issues.[104]
- **Cost of Double Poles to Municipalities:** The MMA highlighted that the failure to remove double poles in a timely manner can delay municipal construction projects, leading to increased costs for taxpayers.[111]
- **Impact on Affordability and Competition:** High deployment costs, exacerbated by pole attachment issues, are ultimately passed on to consumers in the form of higher subscription prices or limit the entry of new competitors who could drive prices down.[97] GoNetspeed argued that reduced deployment costs facilitate competitive FTTH deployments, ensuring lower-priced alternatives are available.[14]
- **Foregone Economic Benefits:** Nationally, one study estimated that every month of delayed broadband expansion due to pole owner "hold up" (market power abuse) costs Americans between $491 million and $1.86 billion in lost economic activity.[90] While not specific to Massachusetts, this illustrates the macroeconomic scale of the problem.
- **Pole Attachment Rental Fees:** While the NOI also touches upon annual pole attachment rental rates [107], the primary focus of concern in many comments is on the upfront, non-recurring charges and delays associated with make-ready work. However, ensuring that rental rates remain reasonable and cost-based, using methodologies like the FCC's cable rate formula (which Massachusetts currently uses for cable but could clarify for all attachers), is also crucial for long-term affordability of network operation.[97] Some testimony from other states (New York) indicates significant proposed increases in annual pole attachment rates by utilities, which, if mirrored in Massachusetts, could further escalate operational costs for broadband providers.[121]

The DPU/DTC inquiry is thus tasked with navigating these complex arguments and cost factors to develop a revised regulatory framework that can balance the legitimate interests of pole owners with the urgent public need for accelerated, cost-effective, and equitable broadband deployment across the Commonwealth. The outcomes of this proceeding will have profound implications for the success of the

BEAD program and the broader goal of achieving universal digital connectivity in Massachusetts.

3.2 Financial and Operational Burdens on Municipalities

Municipalities in Western Massachusetts, particularly smaller and more rural towns, often face substantial financial and operational burdens when attempting to improve or establish local broadband infrastructure. While state and federal grant programs provide crucial financial assistance, they rarely cover the entirety of project costs, leaving towns to secure significant local funding, often through bonding, which can impact property taxes and require broad resident approval.[66]

The initial capital outlay for designing and building a fibre-to-the-home (FTTH) network is considerable. For example, Easthampton's abandoned municipal project had already incurred $150,742 in taxpayer money for design work before the city pivoted to a private provider, and GoNetSpeed's subsequent private build was estimated at $3.6 million.[7] Leverett's successful FTTH network was financed by a municipal bond issue, initially projected to add $219 per year to the average household's property tax bill, though this was later reduced through refinancing.[67] For many smaller towns with limited tax bases, raising such capital, even with partial grant funding, represents a major financial undertaking and potential risk.[8] Investors can be reluctant to underwrite municipal broadband networks, viewing them as unproven and risky compared to traditional utilities, which can make bonding more challenging or expensive.[8]

Beyond initial construction, ongoing operational and maintenance (O&M) costs present another hurdle. These include expenses for network repairs, pole license fees (if not waived or covered), insurance, managing cash reserves, and administrative overhead such as accounting, legal services, and potentially hiring staff to oversee operations if not outsourced.[67] While models like LeverettNet's, which utilizes volunteer oversight and outsources ISP functions, aim to minimize O&M costs [67], these ongoing expenses must still be covered, typically through subscriber revenues. Setting appropriate subscriber rates that cover these costs while remaining affordable for residents, especially in sparsely populated areas with fewer potential customers, is a delicate balancing act.[79] The WiredWest cooperative model was partly conceived to help member towns spread these administrative costs and achieve economies of scale that would be difficult for individual small towns to realize alone.[70]

The technical and administrative capacity required to plan, procure, oversee construction, and manage a broadband network can also strain the resources of small municipalities, which often operate with limited staff.[37] Navigating complex grant applications, managing vendor contracts, and ensuring compliance with various regulations demand specialized expertise that may not be readily available

in-house. This is where partnerships with entities like MBI, regional planning agencies, or experienced municipal utilities like Whip City Fibre or SHELD become invaluable, providing technical assistance and operational support.[39]

The failure of some municipal broadband projects nationally, often due to overly optimistic revenue projections, underestimation of costs, or unsustainable business models, serves as a cautionary tale.[123] While proponents argue that municipal networks can offer better service and inject competition, opponents raise concerns about financial sustainability and the potential for taxpayer bailouts if projects do not meet financial targets.[124] This underscores the critical need for thorough, independent feasibility studies and robust business planning before municipalities commit significant public funds.[7] The experience of WiredWest, which faced scrutiny from MBI over its financial model [7], highlights the importance of rigorous financial vetting.

3.3 Challenges in Rural and Low-Density Deployments

Deploying fibre optic and other high-speed internet infrastructure in rural and low-density areas of Western Massachusetts presents a unique set of challenges that often deter private investment and necessitate public intervention. These challenges are primarily rooted in the economics of network construction and operation in sparsely populated regions.

High Per-Premise Construction Costs:

The cost to deploy fibre optic cable is largely driven by linear distance. In rural areas, homes and businesses are often spread far apart, requiring significantly more miles of cable to connect the same number of subscribers compared to urban or suburban settings.8 This results in a much higher per-premise construction cost. As noted by Bentley University students advising MBI on the Last Mile, running fibre to isolated homes in sparsely populated areas is costly for service providers.9 This fundamental economic reality means that the return on investment for private ISPs is often insufficient to justify building out networks in these areas without subsidies.7 Leverett, for example, found that incumbent providers were unwilling to serve the town because its population density was deemed too low to be profitable.65

Difficult Terrain and Make-Ready Complexity:

Western Massachusetts is characterised by hilly and sometimes mountainous terrain, extensive forestation, and varied geological conditions.10 This can complicate both aerial and underground construction. Aerial deployment, the more common method, relies on utility poles, and the make-ready process (preparing poles for new attachments) can be more complex and time-consuming in rural areas with older infrastructure or extensive tree cover requiring trimming.103 Underground construction, while offering more protection from weather, can be prohibitively

expensive in areas with rocky soil or extensive bedrock.105 These geographical factors add to the overall cost and timeline of rural deployments.8

Lower Revenue Potential:

With fewer potential subscribers per mile of network, the revenue potential for ISPs in rural areas is inherently lower than in denser markets.8 This makes it harder for providers to recoup their substantial upfront investment in infrastructure. Even if a high percentage of households subscribe (a high take-rate), the absolute number of subscribers may still be insufficient to make the network profitable under traditional commercial models. This was a core challenge that the WiredWest cooperative aimed to address by aggregating demand and centralising operations across multiple small towns 79

Workforce and Contractor Availability:

Deploying fibre networks, especially in geographically challenging rural areas, requires a skilled workforce of line crews, splicers, and technicians.130 The current nationwide push for broadband expansion, fuelled by programs like BEAD, is placing immense strain on this specialised workforce, with estimates suggesting a need for around 170,000 new workers nationally.130 Rural areas may face greater difficulty attracting and retaining these skilled workers and qualified construction contractors, potentially leading to project delays or increased labour costs. The time involved in splicing terminals, which can take 4-5 hours per terminal in a dispersed rural town, highlights the labour-intensive nature of last-mile connectivity. 130

Sustainability of Small Networks:

Once built, small rural networks must be financially sustainable in the long term. This requires generating enough revenue to cover ongoing operational and maintenance costs, as well as any debt service if the network was financed through bonds.79 For very small towns, achieving this sustainability can be difficult without ongoing subsidies or by being part of a larger operational cooperative that can achieve economies of scale in areas like backhaul provision, technical support, and administrative functions.79 The MBI's Last Mile programs required projects to meet core sustainability standards 11, recognising this long-term challenge.

Accurate Mapping and Identifying Remaining Gaps:

Even with significant progress, pinpointing the exact locations of remaining unserved or underserved premises in rural areas can be challenging. As noted in the Massachusetts Broadband Strategic Plan, existing federal coverage data has often been insufficiently detailed or accurate, particularly for identifying "pocket locations along town edges and low-density areas".6 This makes it difficult to precisely target final infrastructure investments. The state's efforts, including the BEAD Challenge Process and initiatives like "How's Your Internet?" 25, aim to improve mapping

accuracy, which is crucial for ensuring that funds reach the truly unserved in these remote areas.

These deployment challenges collectively underscore why achieving universal broadband coverage in rural Western Massachusetts has been a persistent issue and why state and federal programs, offering financial subsidies and flexible deployment models, have been essential.

3.4 Competition and Market Dynamics

The competitive landscape for internet services in Western Massachusetts is a critical factor influencing availability, pricing, and quality of service. Historically, many parts of the region, particularly less densely populated areas, have been characterised by limited competition, often dominated by a single cable provider or facing a duopoly of cable and slower DSL services.[7] This lack of robust competition has been a primary driver for municipal broadband initiatives and efforts to attract new private providers.

Incumbent Provider Dominance and Consumer Dissatisfaction:

In many Western Massachusetts communities, incumbent providers like Comcast (Xfinity) and Charter (Spectrum) have long held significant market share.7 While these companies provide essential broadband services, their dominant market position has, in some instances, led to consumer dissatisfaction regarding pricing, service reliability, customer support, and the pace of network upgrades.7 Residents and local officials have often expressed frustration with the perceived high cost of services relative to the quality or speed offered, particularly when few or no alternative providers are available.63 This sentiment has fuelled movements in towns like Fairhaven, Quincy, and Northampton to explore municipal broadband as a means to introduce competition and gain more local control over this critical infrastructure.63

Emergence of New Private Competitors:

A positive development in recent years has been the entry and expansion of new fibre-optic providers, such as GoNetSpeed and Gateway Fibre, into select Western Massachusetts markets.7 These companies are typically building new, all-fibre networks and marketing themselves as offering superior speeds, reliability, and customer service compared to incumbents. GoNetSpeed's expansion into cities like Easthampton and Northampton, for example, directly challenges existing providers.7 The arrival of such competitors can stimulate the market, potentially leading to better service offerings and more competitive pricing from all providers in those areas. However, as previously noted, these new private investments tend to concentrate in more densely populated urban and suburban areas where a return on investment is more readily achievable, often leaving the most rural and sparsely populated areas still reliant on older technologies or public initiatives.

Municipal Broadband as a Competitive Force:

Municipal broadband networks, whether operated directly by a town (like LeverettNet 20) or through partnerships (like towns working with Whip City Fibre 57), are often established with the explicit goal of introducing competition and providing a public alternative to incumbent private ISPs.7 Proponents argue that these locally controlled networks are more accountable to residents and can offer more affordable, higher-quality services because they are not solely driven by profit motives.7 The presence of a viable municipal option can incentivise incumbent providers to improve their services and pricing to retain customers. However, the path to establishing municipal broadband is fraught with challenges, including significant upfront investment, operational complexities, and, in some cases, opposition from incumbent providers who may view municipal networks as unfair, government-subsidised competition.123

State and Federal Policy Influence:

State and federal policies play a significant role in shaping market dynamics. Grant programs like MBI's Last Mile initiatives and the federal BEAD program can alter the competitive landscape by funding network buildouts in areas previously ignored by private capital, thereby enabling new service options (either public or private).11 The "open-access" philosophy behind infrastructures like MassBroadband 123 is intended to lower barriers to entry for multiple retail service providers, fostering competition on that shared backbone.6 However, the effectiveness of open-access policies in generating robust retail competition depends on various factors, including the terms of access and the willingness of multiple ISPs to serve the last mile.

Conversely, regulatory hurdles, such as the pole attachment issues discussed extensively, can stifle competition by making it excessively costly and time-consuming for new providers (both public and private) to deploy their networks.[92] Laws in some states [132] can also erect barriers to municipal broadband.[123]

The Massachusetts Broadband Coalition, formed by over 25 cities and towns, emerged partly due to concerns about the lack of ISP competition and a desire to explore collaborative solutions, including public-private partnerships for shared, open-access networks.[55] This indicates a proactive approach by municipalities to collectively address market failures.

Affordability and the ACP:

The end of the federal Affordable Connectivity Program (ACP), which provided subsidies to low-income households, has implications for market dynamics.22 While the ACP was active, it helped make internet service more affordable for hundreds of thousands of Massachusetts families.17 Its termination may increase pressure on ISPs (both private and public) to offer their own low-cost plans or for the state to find alternative affordability solutions, as reflected in the BEAD program's requirement for

a low-cost service option.23 Proposed state legislation to cap broadband rates for low-income households has faced pushback from ISP trade groups concerned about rate regulation.85

Overall, the market dynamics in Western Massachusetts are evolving. While historical limitations on competition persist in some areas, the combination of new private fibre entrants, ongoing municipal broadband efforts, and significant public investment through programs like BEAD has the potential to reshape the landscape, ideally leading to more choices, better services, and more affordable options for residents and businesses. However, realising these potential hinges on addressing underlying infrastructure impediments like pole attachments and ensuring that policy frameworks continue to support a diverse and competitive ecosystem.

3.5 Digital Equity and Adoption Barriers

Beyond the physical deployment of infrastructure, achieving true digital connectivity requires addressing a complex array of digital equity and adoption barriers. Even in areas where high-speed internet is technically available, significant portions of the population may remain disconnected or unable to fully utilise online resources due to issues of affordability, lack of appropriate devices, insufficient digital literacy skills, and concerns about online safety and privacy. These challenges are prevalent across Massachusetts, including in Western Massachusetts, and are a central focus of the Statewide Digital Equity Plan (SDEP) and associated MBI programs.[3]

Affordability:

The cost of internet service is a primary barrier to adoption, particularly for low-income households, ageing individuals on fixed incomes, and other vulnerable populations.3 Data from the 2021 American Community Survey (ACS) indicated that 15% of Massachusetts households earning between $20,000 and $75,000 reported not having a home internet connection, a figure significantly higher than the 3% for households earning over $75,000.17 The SDEP for Western Massachusetts (Berkshires and Connecticut River Valley) specifically notes that internet cost is a major barrier for low-income households.3 The end of the federal Affordable Connectivity Program (ACP), which provided a monthly subsidy, has exacerbated affordability concerns for many families.22 State initiatives, such as the BEAD program's requirement for subgrantees to offer a low-cost plan (at or below $30/month) 23, and local efforts to promote affordable options, are crucial in mitigating this barrier.

Device Access:

Lack of access to adequate internet-connected devices, such as computers, laptops, or tablets, is another significant hurdle.3 Over 450,000 households in Massachusetts (16.5%) do not have a computer.17 Low-income households are less likely to have sufficient devices, often relying on smartphones, which can limit their ability to

perform complex online tasks like job applications or accessing educational content.3 Individuals with disabilities may face additional costs for assistive technology.3 Programs like MBI's Launchpad, which includes device distribution and refurbishment initiatives 35, and the planned Statewide Device Network 3, aim to address this gap by making devices more accessible and affordable. Local efforts, such as libraries circulating Chromebooks and hotspots 60, also play a vital role.

Digital Literacy and Skills:

The absence of necessary digital literacy skills prevents many individuals from effectively and safely using the internet and digital devices, even if access and affordability are addressed.3 Approximately 25% of unemployed job seekers receiving support through Mass Internet Connect requested digital literacy support, and an estimated 14,000 Gateway City households with school-age children have at least one adult who may need such support.17 Ageing individuals, individuals with disabilities, and those with language barriers often report particular difficulties with digital skills.3 The SDEP emphasises tailored training materials and the deployment of Digital Navigators through a Statewide Digital Navigator Corps to provide personalised assistance.3 Local libraries and community organisations are key providers of digital literacy training.49 For example, the town of Otis, despite having an FTTH network, is focusing on training for seniors and students who lack the skills or equipment to use it.21

Online Accessibility, Privacy, and Cybersecurity:

Concerns about online privacy, cybersecurity (such as scams and hacking), and the accessibility of public online resources also act as barriers to adoption and meaningful use.3 Ageing individuals and low-income households express significant concerns about online safety 3 Individuals with disabilities often face challenges with the accessibility of websites and online government services, particularly for those with visual impairments.3 The SDEP includes measurable objectives to improve awareness of online privacy and cybersecurity measures and to enhance the online accessibility and inclusivity of public resources and services.3

Disparities Among Underserved Populations:

Digital equity barriers are often more pronounced among specific "covered populations" as defined by the Digital Equity Act. In Massachusetts, individuals in majority Black communities have a lower home broadband adoption rate (69.6%) compared to those in majority white neighbourhoods (80.9%).17 Rural residents in Western Massachusetts face unique challenges related to service reliability and provider choice, while ageing individuals in these areas struggle with equipment and digital literacy.3 The state's digital equity programs are designed with these specific disparities in mind, aiming to provide targeted support and resources.3 The

Municipal Digital Equity Planning Program, for instance, requires participating municipalities to address the needs of these covered populations.37

Addressing these interconnected adoption barriers requires a sustained, multi-pronged approach that integrates efforts across state agencies, municipalities, community organisations, libraries, and educational institutions. The success of Massachusetts' "Internet for All" vision depends not only on building out robust infrastructure but also on ensuring that every resident has the means, skills, and confidence to participate fully in the digital world.

3.6 Workforce Development and Availability

The ambitious goals for broadband expansion in Massachusetts, fuelled by significant federal and state investment, are intrinsically linked to the availability of a skilled workforce capable of designing, deploying, and maintaining these advanced networks. The nationwide surge in broadband projects, particularly fibre optic deployments, has created unprecedented demand for specialised labour, presenting a potential bottleneck if not proactively addressed.[130]

Increased Demand for Skilled Labour:

Estimates suggest that nationally, a new workforce of around 170,000 fibre optic installers and broadband construction workers will be needed to build the networks currently in planning stages due to programs like BEAD and ARPA.130 This demand surge is occurring concurrently with the retirement of many experienced technicians who have spent their careers in the telecommunications field.130 While Massachusetts-specific workforce demand figures are not detailed in the provided materials, the scale of planned infrastructure work, including BEAD-funded projects and ongoing private deployments, will undoubtedly require a substantial number of skilled personnel.

Specific Skills Needed:

The deployment of fibre optic networks requires a range of specialised skills. Line crews are needed for the physical installation of aerial and underground cables, a task that can be particularly challenging in the varied terrain of Western Massachusetts.130 Fibre optic splicers are essential for connecting the numerous segments of fibre and terminating them at distribution points and customer premises. This splicing work can be time-consuming; for example, connecting a single terminal in a dispersed rural area might take a technician four to five hours, and a project serving 100 homes could require as many as 150 hours of splicing work alone.130 Network engineers, project managers, and technicians skilled in operating and maintaining active network equipment are also crucial.

Training and Upskilling Initiatives:

Recognising this challenge, efforts are underway to train and upskill the necessary workforce. Organisations like Corning are offering specialised training programs, often with a strong emphasis on hands-on learning, to equip individuals with skills in splicing, laying fibre, and other essential deployment tasks, enabling them to join deployment teams immediately upon course completion.130 The Massachusetts State Digital Equity Plan also identifies workforce development as an area for advisement and initiative, suggesting a state-level awareness of this need.17 The BEAD program itself includes labour standards as part of its subgrantee selection criteria 23, which may indirectly encourage investment in workforce training and apprenticeship programs by grant recipients.

Efficiency in Deployment:

Alongside training new workers, increasing the efficiency of the current workforce is also critical. Innovations in deployment techniques and materials, such as pre-connectorized fibre optic systems (e.g., Corning's FlexNAP™), can significantly reduce the time and labour required for network construction.130 These systems can increase deployment speeds from a few hundred feet per hour for traditional splicing methods to several thousand feet per day. Pre-connectorized systems also reduce the likelihood of human error and offer better protection against environmental damage, further enhancing efficiency and network reliability.130 Promoting the adoption of such efficient technologies can help mitigate some of the pressures caused by workforce shortages.

Challenges in Rural Areas:

Attracting and retaining a skilled broadband workforce can be particularly challenging in rural areas of Western Massachusetts. These regions may compete with more urban areas for a limited pool of trained technicians and contractors. The logistical complexities of working in dispersed, geographically challenging environments can also add to labour costs and project timelines.

Ensuring a sufficient and well-trained workforce is a critical enabling factor for Massachusetts to successfully execute its broadband expansion plans. This will likely require coordinated efforts between state agencies, educational institutions, industry stakeholders, and labour organisations to develop and scale up training programs, promote careers in telecommunications, and adopt efficient deployment practices. Failure to address potential workforce shortages could lead to delays in project completion and increased costs, undermining the goals of programs like BEAD.

Chapter 4: The Path Forward: Strategies for Overcoming Impediments

To realize the Commonwealth's vision of universal, equitable broadband access, particularly in historically underserved regions like Western Massachusetts, a concerted effort is needed to address the identified roadblocks. This involves regulatory reforms, strategic financial planning, enhanced local capacity building, and continued multi-stakeholder collaboration.

4.1 Regulatory Reform for Pole Attachments

The evidence overwhelmingly indicates that Massachusetts' current pole attachment regime is a primary impediment to timely and cost-effective broadband deployment. Addressing this requires comprehensive regulatory reform by the Department of Public Utilities (DPU) and the Department of Telecommunications and Cable (DTC). The ongoing Joint Notice of Inquiry (D.P.U. 25-10/D.T.C. 25-1) provides a critical opportunity for such reform.[97]

Key Recommendations for Pole Attachment Reform:

1. **Adopt Clear and Enforceable Timelines:** Implement "shot-clock" timelines for each stage of the pole attachment process, from application submission to survey, engineering, cost estimation, make-ready work, and final approval. These timelines should be modelled on successful FCC rules and practices in neighbouring states like Connecticut and Maine, where deployment is significantly faster.[92] Lack of such timelines is a core issue highlighted by GoNetspeed and others.[92]

2. **Implement One-Touch Make-Ready (OTMR):** Adopt OTMR rules that allow a new attacher's pre-approved, qualified contractor to perform all necessary survey and simple make-ready work in the communications space of a pole in a single visit.[92] This is widely supported by competitive providers and has been shown to reduce delays and costs. Major pole owners have reportedly supported OTMR in other contexts.[97]

3. **Establish Fair and Transparent Cost Allocation Principles:** Revise regulations to ensure that make-ready costs are allocated based on cost-causation principles. New attachers should not bear the full cost of replacing poles that are already old, deteriorated, or non-compliant due to previous attachers' actions.[93] Pole owners should be responsible for bringing their existing plant up to code. Municipalities should not be charged for pole access or relocations related to essential public services or ROW improvements.[111] Detailed, itemised cost estimates from pole owners should be mandatory.

4. **Streamline Dispute Resolution:** Create an expedited and effective dispute resolution process for pole attachment issues, similar to models in states like

Maine.[104] This would provide a quicker path to resolving conflicts over timelines, costs, or terms of access.

5. **Facilitate Use of Qualified Contractors:** Allow attachers to use their own qualified and insured contractors, or a list of DPU/DTC pre-approved contractors, to perform make-ready work when pole owners cannot meet established timelines or prefer to outsource.[92]
6. **Address Double Pole Removal:** Implement stricter enforcement mechanisms for the timely removal of double poles (within the statutory 90-day limit), including potential fines for non-compliant pole owners or allowing municipalities to remove them and bill the owner, as suggested by the MMA.[111] This would improve public safety, aesthetics, and prevent delays to other projects.
7. **Permit Temporary Attachments:** Allow for National Electrical Safety Code (NESC)-compliant temporary attachments to mitigate long delays in completing permanent make-ready work, enabling service provision sooner.[92]
8. **Clarify Pole Top Access:** Affirm the rights of wireless providers to access pole tops for attachments, where technically feasible and safe, to support the deployment of 5G and other wireless technologies.[114]

The DPU/DTC must act expeditiously on the findings of their NOI. Given the critical BEAD deployment timelines [14], any prolonged delay in rulemaking could significantly undermine the Commonwealth's ability to leverage these federal funds to their fullest potential.

4.2 Ensuring Financial Viability and Support for Municipal Initiatives

Municipalities, especially smaller ones in Western Massachusetts, require ongoing support to overcome the financial and operational hurdles associated with broadband projects.

Key Recommendations:

1. **Sustain and Expand Grant and Technical Assistance Programs:** Continue state funding programs like the Municipal Fibre Grant Program and the technical assistance offered through MBI and Regional Planning Agencies.[37] Consideration should be given to increasing grant amounts for full build-outs where feasible, or structuring grants to cover critical planning, design, and initial operational phases. The new $30 million matching grant program under the Future Tech Act is a positive step in this direction.[54]
2. **Facilitate Regional Collaboration and Shared Services:** Encourage and support inter-municipal collaborations, such as the model where established MLPs like Whip City Fibre or SHELD provide operational services to

neighbouring towns.[7] This can help smaller towns achieve economies of scale and access specialised expertise they lack individually. State programs could offer incentives for such regional partnerships.

3. **Develop Best Practices and Financial Models for Municipal Broadband:** MBI and EOHED could develop and disseminate standardised feasibility study guidelines, financial modelling tools, and best-practice case studies (like LeverettNet [20]) to help municipalities make informed decisions and develop sustainable operational plans. This can help avoid pitfalls experienced by some municipal projects nationally.[124]
4. **Support for Navigating Bond Financing:** Provide resources or technical assistance to help municipalities navigate the complexities of issuing bonds for broadband projects, potentially including guidance on attracting investors or leveraging state bond bank mechanisms if appropriate.[8]

4.3 Enhancing Digital Equity and Driving Adoption

Closing the digital divide requires more than just infrastructure; it necessitates a sustained focus on making internet service affordable, providing access to devices, and building digital skills across all populations.

Key Recommendations:

1. **Aggressively Implement the Statewide Digital Equity Plan (SDEP):** Ensure timely and effective rollout of all programs outlined in the SDEP [3], including the Launchpad Program [35], Residential Retrofit Program [40], Municipal Digital Equity Implementation grants [37], and the development of the Statewide Device Network and Digital Navigator Corps.[3]
2. **Promote Low-Cost Service Options:** Actively monitor and enforce the BEAD program's requirement for subgrantees to offer affordable broadband plans.[23.] Explore state-level initiatives to supplement or replace the federal ACP if a successor program is not established, ensuring vulnerable populations can afford service. Consider the merits and challenges of proposed legislation for state-mandated affordable plans.[22]
3. **Expand Device Access Programs:** Scale up efforts to provide low-cost or free refurbished or new devices to underserved populations, leveraging partnerships with non-profits, businesses, and community organisations, as envisioned in the Launchpad program and the Statewide Device Network.[3]
4. **Strengthen Digital Literacy Training:** Invest in culturally competent and accessible digital literacy programs tailored to the needs of different covered populations (seniors, individuals with disabilities, English language learners,

etc.).[3] Support libraries, community centres, and non-profits in delivering this training. The Digital Navigator model is key here.[3]

5. **Improve Accessibility of Online Public Services:** Ensure all state and municipal government websites and online services are fully accessible, particularly for individuals with disabilities, and are user-friendly for those with limited digital skills.[3]
6. **Foster Local Digital Equity Ecosystems:** Continue to support municipalities in developing and implementing their local digital equity plans through MBI's planning and implementation grants.[37] Encourage the formation of regional digital equity coalitions.[3]

4.4 Streamlining Deployment in Rural and Challenging Areas

Addressing the unique challenges of deploying broadband in rural and low-density areas of Western Massachusetts requires tailored strategies.

Key Recommendations:

1. **Maintain Flexibility in Technology Choices for BEAD Negotiations:** As MBI enters direct negotiations for remaining BEAD-eligible BSLs, continue to allow for a range of technologies (fibre, fixed wireless, HFC, LEO satellite) where FTTH may be prohibitively expensive or difficult to deploy.[13] The EHCPLT will be crucial in guiding these decisions.[13]
2. **Promote "Dig Once" Policies:** Strengthen and enforce "dig once" policies that require the installation of broadband conduit during road construction or other utility work to reduce future deployment costs.[23]
3. **Support Innovative Deployment Techniques:** Encourage the use of cost-saving and efficiency-enhancing deployment methods, such as pre-connectorized fibre systems [130], in state-funded projects.
4. **Accurate Data and Mapping:** Continue to invest in accurate, granular broadband mapping, building on the BEAD Challenge Process and initiatives like "How's Your Internet?" [13], to precisely identify remaining service gaps in rural areas.
5. **Workforce Development for Rural Deployment:** Partner with community colleges, vocational schools, and labour unions to develop training programs for broadband technicians, specifically targeting recruitment from and for rural areas of Western Massachusetts to address potential workforce shortages.[17]

4.5 Fostering a Competitive and Sustainable Market

A healthy broadband ecosystem benefits from robust competition and sustainable operational models.

Key Recommendations:

1. **Continue to Support Competitive Entry:** While implementing pole attachment reforms (which will naturally aid private competitors), the state should continue to foster an environment that encourages new private ISPs to enter and expand in Massachusetts markets, particularly in areas with limited choice.
2. **Monitor and Evaluate Public-Private Partnerships:** For projects involving partnerships between public entities and private providers (e.g., some Last Mile projects, potential BEAD subgrants), establish clear performance metrics, oversight mechanisms, and clawback provisions to ensure public funds achieve their intended outcomes and that service commitments are met.
3. **Support Open Access Principles Where Appropriate:** For publicly funded backbone or middle-mile infrastructure, continue to promote open-access principles to allow multiple retail providers to compete, maximising consumer choice and utilisation of the infrastructure.[6]
4. **Evaluate Long-Term Sustainability of Municipal Networks:** For towns operating or planning municipal networks, provide ongoing guidance and support to ensure their long-term financial and operational sustainability, drawing lessons from successful models like LeverettNet and Whip City Fibre.[57]

Conclusions

The Commonwealth of Massachusetts, through the Massachusetts Broadband Institute and various partner agencies, has established a comprehensive and evolving strategy to achieve universal broadband access and digital equity. This strategy is underpinned by significant, long-term state investment and, more recently, a historic influx of federal funding. Western Massachusetts has been, and continues to be, a primary focus of these efforts, reflecting the persistent challenges of deploying and ensuring the adoption of high-speed internet in its diverse urban and rural communities.

Substantial progress has been made, particularly through the Last Mile programs, which have brought foundational connectivity to dozens of previously unserved towns, and through ongoing digital equity initiatives that are increasingly tailored to local needs. The MassBroadband 123 network serves as a critical middle-mile

backbone, enabling many of these subsequent last-mile connections. The current implementation of the BEAD program and the Statewide Digital Equity Plan, under the "Internet for All" banner, represents the next major phase in this endeavour, aiming to connect the remaining unserved and underserved locations and tackle the persistent barriers to adoption, such as affordability, device access, and digital literacy.

However, the path to achieving these ambitious goals is fraught with significant impediments. The most critical and systemic roadblock is the dysfunctional utility pole attachment process. Extensive delays, exorbitant and often opaque costs, and an outdated regulatory framework in Massachusetts severely hinder the ability of both public and private entities to deploy fibre optic networks in a timely and cost-effective manner. This issue not only stifles competition and inflates project costs but also poses a direct threat to the Commonwealth's ability to effectively utilise its substantial BEAD allocation within the mandated federal timelines. The ongoing DPU/DTC Joint Notice of Inquiry into pole attachments is a crucial opportunity for comprehensive reform, and its outcomes will be pivotal.

Beyond pole attachments, other challenges include the financial and operational burdens on municipalities, especially smaller ones, seeking to establish or expand local broadband networks; the inherent difficulties of rural and low-density deployment; ensuring robust and fair competition in the ISP market; and the complex, multifaceted task of overcoming digital equity and adoption barriers even where infrastructure is available. Workforce development to support the scale of planned deployments also emerges as a key consideration.

The case studies from Western Massachusetts—LeverettNet's municipal success, Whip City Fibre's regional collaborative model, WiredWest's adaptive journey, and the varying approaches of cities like Springfield, Northampton, and Easthampton—illustrate the diverse strategies being employed and the localised nature of both challenges and solutions. They underscore that there is no one-size-fits-all answer, and that flexibility, strong local leadership, community engagement, and strategic partnerships are essential ingredients for success.

Moving forward, Massachusetts must prioritise swift and meaningful regulatory reform of the pole attachment process. Continued state support for municipal initiatives, coupled with robust implementation of the Statewide Digital Equity Plan, is vital. Strategic utilisation of BEAD and other funds, informed by accurate data and tailored to local contexts, will be key to connecting the last remaining unserved and underserved areas. By addressing these multifaceted challenges with determination and collaborative innovation, Massachusetts can continue its progress towards ensuring that all its residents and businesses can fully participate in and benefit from the digital age.

Works cited

1. About MBI - Massachusetts Broadband Institute, accessed on May 6, 2025, https://broadband.masstech.org/about-mbi
2. Massachusetts Broadband Institute Broadband Planning Assistance Grant Solicitation | MassCyberCenter, accessed on May 6, 2025, https://masscybercenter.org/massachusetts-broadband-institute-broadband-planning-assistance-grant-solicitation
3. broadband.masstech.org, accessed on May 6, 2025, https://broadband.masstech.org/sites/default/files/2024-03/MA%20SDEP%20FINAL_3.26.24.pdf
4. Massachusetts Receives $14.1 Million in Federal Funding to Expand Digital Access | Mass.gov, accessed on May 6, 2025, https://www.mass.gov/news/massachusetts-receives-141-million-in-federal-funding-to-expand-digital-access
5. Massachusetts' State Digital Equity Plan Approved by National Telecommunications and Information Administration | Mass.gov, accessed on May 6, 2025, https://www.mass.gov/news/massachusetts-state-digital-equity-plan-approved-by-national-telecommunications-and-information-administration
6. Massachusetts Broadband Strategic Plan, accessed on May 6, 2025, https://broadband.masstech.org/sites/default/files/2022-10/MassBroadbandStrategicPlan-2022-07.pdf
7. The Wired, Wired West: The Collapse of Public Internet in Easthampton and the Struggle to Connect Massachusetts' Overlooked Communities - The Shoestring, accessed on May 6, 2025, https://theshoestring.org/2023/10/04/the-wired-wired-west-the-collapse-of-public-internet-in-easthampton-and-the-struggle-to-connect-massachusettss-overlooked-communities/
8. Accessing rural broadband to bridge the digital divide - CSG East, accessed on May 6, 2025, https://csg-erc.org/accessing-rural-broadband-to-bridge-the-digital-divide/
9. Life, Liberty and the Pursuit of Broadband | Bentley University, accessed on May 6, 2025, https://www.bentley.edu/news/life-liberty-and-pursuit-broadband

10. State Agency At Odds With Western Mass. Broadband Group - WAMC, accessed on May 6, 2025, https://www.wamc.org/new-england-news/2015-12-04/state-agency-at-odds-with-western-mass-broadband-group
11. Last Mile Programs | MBI - Massachusetts Broadband Institute, accessed on May 6, 2025, https://broadband.masstech.org/last-mile-programs
12. Massachusetts Internet for All | MBI, accessed on May 6, 2025, https://broadband.masstech.org/internetforall
13. Broadband Equity Access & Deployment (BEAD) Program | MBI, accessed on May 6, 2025, https://broadband.masstech.org/bead-program
14. COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TELECOMMUNICATIONS AND CABLE AND DEPARTMENT OF PUBLIC UTILITIES In the Matter of th - Mass.gov, accessed on May 6, 2025, https://www.mass.gov/doc/dtc-24-5-crc-communications-petition-for-rulemaking/download
15. Commonwealth of Massachusetts, accessed on May 6, 2025, https://broadband.masstech.org/sites/default/files/2024-05/BEAD%20Five%20Year%20Action%20Plan%20%28Revised%20-%20October%206%2C%202023%29.pdf
16. Massachusetts Towns Can Bypass State Agency MBI, Access Grants, accessed on May 6, 2025, https://communitynetworks.org/content/massachusetts-towns-can-bypass-state-agency-mbi-access-grants
17. How Massachusetts is Closing the Broadband Gap By Using State and Federal Funds and Why That May Not Be Enough, accessed on May 6, 2025, https://cpu.nmsu.edu/current-issues-presentations/KCharles%202023%20Current%20Issues%20Presentation.pdf
18. RFP for Last Mile Grants to Provide Broadband Service to Unserved Towns in Western Massachusetts | MassCyberCenter, accessed on May 6, 2025, https://masscybercenter.org/rfp-last-mile-grants-provide-broadband-service-unserved-towns-western-massachusetts
19. Agreement Reached To Extend Broadband Coverage In Nine 'Partially Served' Western Massachusetts Towns | Mass.gov, accessed on May 6, 2025, https://www.mass.gov/news/agreement-reached-to-extend-broadband-coverage-in-nine-partially-served-western-massachusetts-towns
20. Leverett Highlights Impact of Municipal Broadband Network at Launch Event | MBI, accessed on May 6, 2025,

https://broadband.masstech.org/news/leverett-highlights-impact-municipal-broadband-network-launch-event

21. Massachusetts Broadband Institute Continues to Narrow Digital Divide - BusinessWest, accessed on May 6, 2025, https://businesswest.com/blog/massachusetts-broadband-institute-continues-to-narrow-digital-divide/
22. Massachusetts - Broadband Breakfast, accessed on May 6, 2025, https://broadbandbreakfast.com/massachusetts/
23. Massachusetts BEAD Program Tracker & Resources - CostQuest Associates, accessed on May 6, 2025, https://www.costquest.com/ntia-bead-program-dashboard-3/massachusetts/
24. Public Resources related to BEAD Plans and Milestones - BroadbandUSA, accessed on May 6, 2025, https://broadbandusa.ntia.doc.gov/public-resources-related-bead-plans-and-milestones
25. Massachusetts Launches Internet Feedback Initiative - Broadband Breakfast, accessed on May 6, 2025, https://broadbandbreakfast.com/massachusetts-launches-internet-feedback-initiative/
26. State and Territory Challenge Process Tracker | Internet for All, accessed on May 6, 2025, https://www.internetforall.gov/state-and-territory-challenge-process-tracker
27. Challenge Process Updates, Lead For America Graduation, Digital Inclusion Awards and More. - Constant Contact, accessed on May 6, 2025, https://myemail-api.constantcontact.com/Challenge-Process-Updates--Lead-For-America-Graduation--Digital-Inclusion-Awards-and-More-.html?soid=1108996851776&aid=dL1cY-Xdkhw
28. State-by-State BEAD Bids Reveal Varying Degrees of ISP Participation, accessed on May 6, 2025, http://broadbandbreakfast.com/state-by-state-bead-bids-reveal-varying-degrees-of-isp-participation/
29. Massachusetts Broadband Institute: No Need for Round 2 BEAD Grant Solicitation, accessed on May 6, 2025, https://www.benton.org/headlines/massachusetts-broadband-institute-no-need-round-2-bead-grant-solicitation
30. Massachusetts Broadband Institute: No Need for Round 2 BEAD Grant Solicitation, accessed on May 6, 2025, https://www.telecompetitor.com/massachusetts-broadband-institute-no-need-for-round-2-bead-grant-solicitation/

31. Daily Digest 4/23/2025 (BEAD) | Benton Institute for Broadband & Society, accessed on May 6, 2025, https://www.benton.org/newsletter/daily-digest-4232025-bead
32. Connecting Massachusetts with Affordable Broadband, accessed on May 6, 2025, https://www.benton.org/blog/connecting-massachusetts-affordable-broadband
33. Massachusetts' Digital Equity Plan Accepted | Internet for All, accessed on May 6, 2025, https://www.internetforall.gov/news-media/massachusetts-digital-equity-plan-accepted
34. MBI seeks feedback on Internet for All plan - Massachusetts Municipal Association (MMA), accessed on May 6, 2025, https://www.mma.org/mbi-seeks-feedback-on-internet-for-all-plan/
35. Launchpad Program | MBI - Massachusetts Broadband Institute, accessed on May 6, 2025, https://broadband.masstech.org/launchpad-program
36. Massachusetts Broadband Institute Introduces $9.44 Million Launchpad Program, accessed on May 6, 2025, https://broadbandbreakfast.com/massachusetts-broadband-institute-introduces-9-44-million-launchpad-program/
37. Municipal Digital Equity Planning Program | MBI - Massachusetts Broadband Institute, accessed on May 6, 2025, https://broadband.masstech.org/municipal
38. Municipal Digital Equity Planning Program accepting applications, accessed on May 6, 2025, https://www.mma.org/municipal-digital-equity-planning-program-accepting-applications-2/
39. Municipal Digital Equity Planning Services – FRCOG, accessed on May 6, 2025, https://frcog.org/project/municipal-digital-equity-planning-services/
40. Massachusetts Broadband Institute | MBI, accessed on May 6, 2025, https://broadband.masstech.org/
41. Massachusetts Broadband Institute Debuts $9.44 Million Launchpad Program, accessed on May 6, 2025, https://www.rsinc.com/massachusetts-broadband-institute-debuts-9-44-million-launchpad-program.php
42. Mass Broadband Institute Promoting Programs to Improve Broadband Access in Affordable Housing - Massachusetts Healthy Ageing Collaborative, accessed on May 6, 2025, https://mahealthyagingcollaborative.org/mass-broadband-institute-promoting-programs-to-improve-broadband-access-in-affordable-housing/

43. Massachusetts Invests $10.4 Million to Expand Statewide Broadband Access, accessed on May 6, 2025, https://broadbandbreakfast.com/massachusetts-invests-10-4-million-to-expand-statewide-broadband-access/
44. Broadband Initiatives | Cape Cod Commission, accessed on May 6, 2025, https://www.capecodcommission.org/our-work/broadband-initiatives/
45. Gloucester Digital Equity Plan, accessed on May 6, 2025, https://gloucester-ma.gov/1470/Digital-Equity-Plan
46. Digital Equity Planning - CMRPC - Central Massachusetts Regional Planning Commission, accessed on May 6, 2025, https://cmrpc.org/regional-collaboration-community-planning/regional-services/digital-equity-planning/
47. Digital Equity Planning - SRPEDD, accessed on May 6, 2025, https://srpedd.org/justice-equity-and-community-development/digital-equity-planning/
48. Digital Equity Plan | North Andover, MA, accessed on May 6, 2025, https://www.northandoverma.gov/889/Digital-Equity-Plan
49. Massachusetts Broadband Institute Expands Municipal Planning Program to 16 Additional Cities and Towns Statewide | MassTech, accessed on May 6, 2025, https://masstech.org/news/massachusetts-broadband-institute-expands-municipal-planning-program-16-additional-cities-and
50. Barnstable Digital Equity Plan - Cape Cod Commission, accessed on May 6, 2025, https://www.capecodcommission.org/our-work/barnstable-digital-equity-plan/
51. Whately Digital Equity Plan, accessed on May 6, 2025, https://www.whately.org/community-development/files/digital-equity-plan
52. Gill Digital Equity Report, accessed on May 6, 2025, https://gillmass.org/files/2025-0127_Gill_Digital_Equity_Report_final.pdf
53. Massachusetts Technology Park - National Telecommunications and Information Administration, accessed on May 6, 2025, https://www2.ntia.gov/files/masstech_case_study_report_order_number_d10pd18645.pdf
54. States Are Banking on BEAD Funds to Fill Broadband Gaps, accessed on May 6, 2025, https://www.ncsl.org/state-legislatures-news/details/states-are-banking-on-bead-funds-to-fill-broadband-gaps
55. Massachusetts Broadband Coalition Is Formed With Focus on Public Private Partnerships - Institute for Local Self-Reliance, accessed on May 6, 2025, https://ilsr.org/articles/massachusetts-broadband-coalition-is-formed/

56. Massachusetts broadband institute | Welcome to Community Networks, accessed on May 6, 2025, https://communitynets.org/tags/massachusetts-broadband-institute

57. Final Report - Longmeadow, MA, accessed on May 6, 2025, https://www.longmeadowma.gov/DocumentCenter/View/9441/Municipal-Fiber-Task-Force-Final-Report

58. Municipal Fibre Task Force - Longmeadow, MA, accessed on May 6, 2025, https://www.longmeadowma.gov/1503/Municipal-Fiber-Task-Force

59. Springfield, Mass., Explores Municipal Fibre Network - GovTech, accessed on May 6, 2025, https://www.govtech.com/network/springfield-mass-explores-municipal-fiber-network

60. New Funds Aimed at Closing Internet Gaps in Springfield, Mass. - GovTech, accessed on May 6, 2025, https://www.govtech.com/network/new-funds-aimed-at-closing-internet-gaps-in-springfield-mass

61. Municipal Fibre Grant Recipients | Mass.gov, accessed on May 6, 2025, https://www.mass.gov/info-details/municipal-fiber-grant-recipients

62. Recommendations - Public Infrastructure in Western Massachusetts | Mass.gov, accessed on May 6, 2025, https://www.mass.gov/info-details/recommendations-public-infrastructure-in-western-massachusetts

63. Municipalities Across Massachusetts Move Toward Muni Broadband | Welcome to Community Networks, accessed on May 6, 2025, https://communitynets.org/content/municipalities-across-massachusetts-move-toward-muni-broadband

64. Northampton, MA Welcomes Gateway Fibre, Hasn't Ruled Out Municipal Network, accessed on May 6, 2025, https://communitynetworks.org/content/northampton-ma-welcomes-gateway-fiber-hasnt-ruled-out-municipal-network

65. Leverett, Massachusetts: A Case Study in Future Proofing - Next Century Cities, accessed on May 6, 2025, https://nextcenturycities.org/leverett-massachusetts-a-case-study-in-future-proofing/

66. New Case Study of Leverett, Mass, Muni Network | Welcome to Community Networks, accessed on May 6, 2025, https://communitynetworks.org/content/new-case-study-leverett-mass-muni-network

67. Leverett's fibre-optic system a model for rural towns - AP News, accessed on May 6, 2025, https://apnews.com/2cb520d38ec74cfcaec922ef8cd334aa

68. After A Decade Of Waiting For Verizon, Town Builds Itself Gigabit Fibre For $75 Per Month, accessed on May 6, 2025, https://www.techdirt.com/2015/12/29/after-decade-waiting-verizon-town-builds-itself-gigabit-fiber-75-per-month/
69. Planning for LeverettNet began as early as 2008, when Massachusetts created the Massachusetts Broadband Institute (MBI), charged - Town of Leverett, MA, accessed on May 6, 2025, https://www.leverett.ma.us/files/MLP_history.pdf
70. WiredWest, accessed on May 6, 2025, https://wiredwest.net/
71. Westfield ma | Welcome to Community Networks, accessed on May 6, 2025, https://communitynetworks.org/tags/westfield-ma
72. Plan Fail: How Pai Imperilled a Rural Town's Fibre Network | Free Press, accessed on May 6, 2025, https://www.freepress.net/blog/plan-fail-how-pai-imperiled-rural-towns-fiber-network
73. wired west | Welcome to Community Networks, accessed on May 6, 2025, https://communitynetworks.org/tags/wired-west
74. Whipping Up Better Internet In Western MA | Welcome to Community Networks, accessed on May 6, 2025, https://communitynets.org/content/whipping-better-internet-western-ma
75. FAQ - Rowe - Whip City Fibre, accessed on May 6, 2025, https://www.whipcityfiber.com/rowe/faq/
76. FAQ - Washington - Whip City Fibre, accessed on May 6, 2025, https://www.whipcityfiber.com/washington/faq/
77. New Berkman report highlights co-op's challenges to build a better fibre optic network, accessed on May 6, 2025, https://hls.harvard.edu/today/new-berkman-report-highlights-co-ops-challenges-to-build-a-better-fiber-optic-network/
78. Berkman Center Releases Report on WiredWest Cooperative, MBI, accessed on May 6, 2025, https://communitynets.org/content/berkman-center-releases-report-wiredwest-cooperative-mbi
79. Page 3 - WiredWest, accessed on May 6, 2025, https://wiredwest.net/page/3/
80. Project Reference Information – WiredWest, accessed on May 6, 2025, https://wiredwest.net/project-overview/project-reference-update/

81. Shoot-Out Over the WiredWest: MBI Pulls Funding in Massachusetts Saga, accessed on May 6, 2025, https://communitynets.org/content/shoot-out-over-wiredwest-mbi-pulls-funding-massachusetts-saga

82. Wired West - Mount Washington, MA, accessed on May 6, 2025, https://mountwashington-ma.gov/departments/broadband-committee/wired-west/

83. WiredWest - Stop the Cap!, accessed on May 6, 2025, https://stopthecap.com/category/providers/wiredwest/

84. open access | Welcome to Community Networks, accessed on May 6, 2025, https://communitynetworks.org/tags-44?page=41

85. Massachusetts Low-Income Broadband Bill Gets Pushback | Welcome to Community Networks, accessed on May 6, 2025, https://communitynetworks.org/content/massachusetts-low-income-broadband-bill-gets-pushback

86. How can there only be one internet provider? : r/massachusetts - Reddit, accessed on May 6, 2025, https://www.reddit.com/r/massachusetts/comments/1hm14l5/how_can_there_only_be_one_internet_provider/

87. This Western Mass. town rejected Comcast and built its own broadband network - The Boston Globe : r/technology - Reddit, accessed on May 6, 2025, https://www.reddit.com/r/technology/comments/ab6quw/this_western_mass_town_rejected_comcast_and_built/

88. Comcast rejected by small town, residents vote for municipal fibre instead | Hacker News, accessed on May 6, 2025, https://news.ycombinator.com/item?id=18664044

89. Fearing competitive disadvantage, Great Barrington explores high-speed Internet connectivity - The Berkshire Edge, accessed on May 6, 2025, https://theberkshireedge.com/fearing-competitive-disadvantage-great-barrington-explores-high-speed-internet-connectivity/

90. Verizon Pole Attachment Issues Delay West Springfield, MA Fibre Plan, accessed on May 6, 2025, https://communitynetworks.org/content/verizon-pole-attachment-issues-delay-west-springfield-ma-fiber-plan

91. Verizon Pole Attachment Issues Delay West Springfield, MA Fibre Plan, accessed on May 6, 2025, https://communitynets.org/content/verizon-pole-attachment-issues-delay-west-springfield-ma-fiber-plan

92. GoNetspeed Blasts Massachusetts for Broadband Delays Caused by Outdated Pole Attachment Rules, accessed on May 6, 2025, https://broadbandbreakfast.com/gonetspeed-blasts-massachusetts-for-broadband-delays-caused-by-outdated-pole-attachment-rules/

93. Reverse Preemption Roundup: Petition for Rulemaking Invites Massachusetts Regulators To Improve Pole Attachment Access for Broadband Providers | Davis Wright Tremaine, accessed on May 6, 2025, https://www.dwt.com/blogs/broadband-advisor/2024/11/telecom-pole-access-petition-in-massachusetts

94. GoNetspeed: Pole Regs in Massachusetts Threaten BEAD Success - Broadband Breakfast, accessed on May 6, 2025, https://broadbandbreakfast.com/gonetspeed-pole-regs-in-massachusetts-threaten-bead-success/

95. Continued Utility Pole Issues Demonstrate Need for Additional Action - Connect The Future, accessed on May 6, 2025, https://connectthefuture.com/continued-utility-pole-issues-demonstrate-need-for-additional-action/

96. GoNetspeed Blasts Massachusetts for Broadband Delays Caused by Outdated Pole Attachment Rules, accessed on May 6, 2025, http://broadbandbreakfast.com/gonetspeed-blasts-massachusetts-for-broadband-delays-caused-by-outdated-pole-attachment-rules/

97. COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF PUBLIC UTILITIES DEPARTMENT OF TELECOMMUNICATIONS AND CABLE Joint Notice of Inquiry - Mass.gov, accessed on May 6, 2025, https://www.mass.gov/doc/dpu-25-10dtc-25-1-crc-communications-comments/download

98. www.dwt.com, accessed on May 6, 2025, https://www.dwt.com/-/media/files/advisories/communications/19871993.pdf?rev=f4b0f0f2e4b245f3977975efd8560444&hash=E51A00921C2B94D8B32B97FC1400542C

99. Flexible Grant Program | MBI - Massachusetts Broadband Institute, accessed on May 6, 2025, https://broadband.masstech.org/last-mile-programs/flexible-grant-program

100. Solution to an ISP monopoly in my rural town, how do i fix this? : r/networking - Reddit, accessed on May 6, 2025, https://www.reddit.com/r/networking/comments/kbsaw5/solution_to_an_isp_monopoly_in_my_rural_town_how/

101. Possibilities, Challenges, Risks : Chicopee, Massachusetts, Considers A Muni - Community Broadband Bits Podcast 335, accessed on May 6, 2025, https://communitynetworks.org/content/possibilities-challenges-risks-chicopee-massachusetts-considers-muni-community-broadband

102. Board of Selectmen Minutes - Working Meeting - Town of Becket, accessed on May 6, 2025, https://www.townofbecket.org/board-selectmen/minutes/board-selectmen-minutes-working-meeting-2

103. Partnering to Accelerate Broadband Deployment in Massachusetts - Charter Policy, accessed on May 6, 2025, https://policy.charter.com/partnering-to-accelerate-broadband-deployment-in-massachusetts

104. Broadband Expansion May Hinge on States' Processes for Attaching Lines to Utility Poles, accessed on May 6, 2025, https://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2025/03/broadband-expansion-may-hinge-on-states-processes-for-attaching-lines-to-utility-poles

105. Massachusetts Law To Remove Pole Attachment Fees For Muni Broadband Projects Stalled, accessed on May 6, 2025, https://communitynetworks.org/content/massachusetts-law-remove-pole-attachment-fees-muni-broadband-projects-stalled

106. The Commonwealth of Massachusetts —— - Town of Rehoboth MA |, accessed on May 6, 2025, https://www.rehobothma.gov/sites/g/files/vyhlif4911/f/news/d.p.u._25-10_d.t.c._25-1_-_memo_on_tech_sessions_and_additional_comment_dates_4.10.25.pdf

107. Department of Public Utilities/ Department of Telecommunications and Cable Notice of Inquiry and Request For Comments - Marshfield, MA, accessed on May 6, 2025, https://www.marshfield-ma.gov/news_detail_T6_R256.php

108. Electronic Distribution List in Inquiry on Pole Attachments and Conduit Access on Public Rights of Way, DPU 25-10/DTC 25-1 - Longmeadow, MA, accessed on May 6, 2025, https://www.longmeadowma.gov/AgendaCenter/ViewFile/Item/5489?fileID=32391

109. The Commonwealth of Massachusetts —— - Mass.gov, accessed on May 6, 2025, https://www.mass.gov/doc/dpu-25-10dtc-25-1-joint-order-opening-inquiry/download

110. Joint Notice of Inquiry by the Department of Public Utilities and the Department of Telecommunications and Cable | Town of Rehoboth MA, accessed on May 6, 2025, https://www.rehobothma.gov/town-administrator-board-selectmen/news/joint-notice-inquiry-department-public-utilities-and

111. MMA Testimony D.P.U. 25-10/D.T.C. 25-1.docx - Mass.gov, accessed on May 6, 2025, https://www.mass.gov/doc/dpu-25-10dtc-25-1-massachusetts-municipal-association-comments/download

112. The Commonwealth of Massachusetts —— - Chelmsford, MA, accessed on May 6, 2025, https://www.chelmsfordma.gov/AgendaCenter/ViewFile/Item/4451?fileID=8576

113. State seeks input on utility poles and rights of way - Massachusetts Municipal Association, accessed on May 6, 2025, https://www.mma.org/state-seeks-input-on-utility-poles-and-rights-of-way/

114. Before the COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF PUBLIC UTILITIES and DEPARTMENT OF TELECOMMUNICATIONS AND CABLE Joint No, accessed on May 6, 2025, https://docs.publicnow.com/viewDoc.aspx?filename=78772\EXT\DFDDBD1259C483DE122B524BD247E8DEF3697A89_ABF8B22A80BD6D6BAE2D49B0D911ED5E2B386155.PDF

115. ADVANCING POLE ATTACHMENT POLICIES TO ACCELERATE NATIONAL BROADBAND BUILDOUT | Connect The Future, accessed on May 6, 2025, https://connectthefuture.com/wp-content/uploads/2021/11/Advancing-Pole-Attachment-Policies-To-Accelerate-National-Broadband-Buildout-National-Report.pdf

116. Pew Report on Pole Attachments - POTs and PANs, accessed on May 6, 2025, https://potsandpansbyccg.com/2025/04/01/pew-report-on-pole-attachments/

117. Before the COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF PUBLIC UTILITIES and DEPARTMENT OF TELECOMMUNICATIONS AND CABLE Joint No - Mass.gov, accessed on May 6, 2025, https://www.mass.gov/doc/dpu-25-10dtc-25-1-ctia-comments/download

118. Pole attachment delays threaten $52 billion in federal broadband expansion funds, accessed on May 6, 2025, https://wirelessestimator.com/articles/2025/pole-attachment-delays-threaten-52-billion-in-federal-broadband-expansion-funds/

119. Pew: States Should Collect Data on Utility Poles - Broadband Breakfast, accessed on May 6, 2025, http://broadbandbreakfast.com/pew-states-should-collect-data-on-utility-poles/

120. GEORGETOWN MUNICIPAL LIGHT DEPARTMENT - Mass.gov, accessed on May 6, 2025, https://www.mass.gov/doc/dpu-25-10dtc-25-1-gmld-comments/download

121. BEFORE THE PUBLIC SERVICE COMMISSION OF NEW YORK In the Matter of Tariff filing by Rochester) Gas and Electric Corporation, accessed on May 6, 2025, https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={90EE1196-0000-C81C-B759-771E70DA9FFE}

122. BEFORE THE PUBLIC SERVICE COMMISSION OF NEW YORK In the Matter of Tariff filing by New York State) Electric and Gas Corporation, accessed on May 6, 2025, https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={60E91196-0000-CB3C-84B8-0C4641FF5C74}

123. Municipal Broadband Remains Roadblocked In 16 States - BroadbandNow, accessed on May 6, 2025, https://broadbandnow.com/report/municipal-broadband-roadblocks

124. Broadband 101: The Dangers of Municipal Broadband - Consumer Choice Center, accessed on May 6, 2025, https://consumerchoicecenter.org/follies-of-municipal-broadband/

125. Municipal Broadband: Background and Policy Debate - CRS Reports, accessed on May 6, 2025, https://crsreports.congress.gov/product/pdf/R/R44080/14

126. Municipal Broadband: Background and Policy Debate - FAS Project on Government Secrecy, accessed on May 6, 2025, https://sgp.fas.org/crs/misc/R44080.pdf

127. Should States Fund Municipal Broadband and Cooperatives?, accessed on May 6, 2025, https://rockinst.org/blog/should-states-fund-municipal-broadband-and-cooperatives/

128. The Cambridge Broadband Task Force Date, accessed on May 6, 2025, https://www.cambridgema.gov/-/media/Files/citymanagersoffice/files/broadbandtaskforce/broadbandtaskforcereccomendationsandtilsonreport92216.pdf

129. Broadband Deployment Best Practices: Navigating Challenges, accessed on May 6, 2025, https://www.sertexbroadband.com/whitepaper/broadband-deployment-best-practices/

130. Meeting Fibre Broadband Workforce Challenges Through Training and Efficiency, accessed on May 6, 2025, https://www.telecompetitor.com/meeting-fiber-broadband-workforce-challenges-through-training-and-efficiency/

131. BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA COMMENTS OF NEXT CENTURY CITIES ON ASSIGNED COMMISSIONER'S R, accessed on May 6, 2025, https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M404/K292/404292675.PDF

132. Defining Municipal Broadband Roadblocks, accessed on May 6, 2025, https://broadbandnow.com/report/defining-municipal-broadband-roadblocks

133. Municipal broadband | public internet networks | Allconnect.com, accessed on May 6, 2025, https://www.allconnect.com/blog/municipal-broadband

134. Communities form new coalition to facilitate broadband efforts - Massachusetts Municipal Association (MMA), accessed on May 6, 2025, https://www.mma.org/communities-form-new-coalition-to-facilitate-broadband-efforts/

135. Leverett Starts to Light Up in Massachusetts | Welcome to, accessed on May 6, 2025, https://mail.communitynets.org/content/leverett-starts-light-massachusetts

136. Massachusetts - BroadbandUSA, accessed on May 6, 2025, https://broadbandusa.ntia.doc.gov/node/187