AFFORDABLE HOUSING LOAN OFFICERS

BROADBAND HANDBOOK

RURAL LISC

Contents

Introduction

Broadband is an immensely powerful tool—and broadband access in general has become even more vital as the Covid-19 crisis has forced many Americans to work from their homes and most schoolchildren to attend virtual classrooms. Even after the pandemic, when children return to classrooms and many adults return to working away from home, broadband infrastructure will be an essential aspect of housing that meets the needs of its residents. While barriers to ubiquitous, affordable broadband remain, incorporating broadband into the early phases of building development can go a long way in ensuring access for all.

Having access to broadband in the home in particular is an immeasurable asset for our most vulnerable populations. With a home connection, an elderly citizen can connect with far-away family members to feel less isolated, a resident that has a disability can receive medical care in the comfort of their own home, and a single parent can engage in skills training or remote work without leaving their family.

Robust, affordable home broadband is an opportunity multiplier that can be leveraged to open a world of opportunities for residents to improve and enrich their lives, and to do so according to their own needs and goals. Incorporating broadband as a foundational aspect of housing is essential to creating communities in which residents can thrive.

2 What does the broadband landscape look like?

While broadband undergirds much of everyday life, the challenge to ensure available, affordable broadband for everyone still remains. The digital divide tends to follow the lines of existing inequities, meaning those who stand to benefit from the internet most are often those who are left behind. Just as affordable housing is essential infrastructure, building an ecosystem in which broadband is accessible to all is essential to building strong communities.

3.1 Broadband access

The Federal Communications Commission's (FCC) 2020 Broadband Deployment Report found that there are 18 million United States residents that do not have access to broadband as defined as fixed 25/3 Mbps service.[1] However, the number of residents without access is likely significantly higher than FCC data indicate.

FCC data are presented at the census block level, and the FCC considers a census block served if just one of the premises in the block could be served. The data thus tend to overestimate service availability, particularly for rural areas where one census block can span many square miles. FCC service data are also inconsistent for parks, wildlife reserves, and other non-populated areas. For example, if an ISP has extended service to a single visitors' center or building, FCC data may show a large unserved area around that location as being served.

Other data sets have indicated that the digital divide is much more significant than what is depicted by the FCC's data. For example, data released by Microsoft in 2019 found that 162.8 million people were not using the internet at broadband speeds.[2]

1 "Statement of Commissioner Jessica Rosenworcel, Dissenting," Federal Communications Commission, April 24, 2020, https://docs.fcc.gov/public/attachments/FCC-20-50A5.pdf

2 "Its time for a new approach to for mapping broadband data to better serve Americans," Microsoft, https://blogs.microsoft.com/on-the-issues/2019/04/08/its-time-for-a-new-approach-for-mapping-broadband-data-to-better-serve-americans/

The issue of broadband access does not affect all communities equally. While the FCC's data is flawed, it does reveal patterns in broadband availability throughout the United States. The 2020 Broadband Deployment Report found that 94.4 percent of the country's population had access to fixed 25/3 Mbps services, but 22.3 percent of those in rural communities and 27.7 percent of those living on Tribal lands lack service at that level. Only 1.5 percent of those in urban areas say the same.[3]

Rural communities face an economic challenge to attracting broadband investment: because of the high capital costs per user, rural areas struggle to attract private investment in capital infrastructure. The challenging economics result from the lack of density of potential customers—and, in many cases, the fact that homes are located far from arterial roads or on large parcels of land; long driveways or setbacks from the road greatly increase the cost to deploy infrastructure to those locations. Public funding has been and will continue to be a key component to enabling broadband buildout in the least-connected communities.

Despite high levels of broadband availability in urban markets, there are challenges specific to multi-dwelling units that can stymie broadband availability and competition in housing. In particular, building access and in-building wiring can be a challenge for potential partners if a building is not prepared for broadband infrastructure.

3.2 Digital equity

The availability of broadband, however, does not equate to ubiquity of access. There are several other factors that affect individuals' ability to use the internet, including the affordability of broadband services, the ability to access and maintain affordable internet-enabled devices, and access to digital skills training.

3.2.1. AFFORDABILITY OF SERVICE

Residential broadband service cost is a barrier for lower-income residents nationwide. A just-released, comprehensive "Adoption Gap Analysis" by the California Public Utilities Commission concluded that "the most constant and significant factor affecting adoption is income."[4]

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3 https://docs.fcc.gov/public/attachments/FCC-20-50A1.pdf
4 "Broadband Adoption Gap Analysis," California Public Utilities Commission, June 2019, https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Communications/Reports_and_Presentations/CDVideoBB/BAGapAnalysis.pdf (accessed June 2019).

Several cable and fiber providers offer low-cost products to qualifying low-income residents as a step to help close the digital divide. For example, Comcast has offered its Internet Essentials program since 2011. This product provides a wired internet connection for $9.95 per month. While such programs are a valuable option for low-income community members, they often include high barriers to enrollment, including complex eligibility requirements and application processes. Adoption rates of such programs among eligible households are typically extremely low. Community-based outreach and support initiatives can help to increase awareness of such programs and enrollment in low-income communities.

3.2.2. ACCESS TO DEVICES AND SKILLS TRAINING

There are several nonprofit and community entities that facilitate access to training and affordable internet-enabled devices.

In addition, access to affordable internet-enabled devices and the opportunity to develop digital skills are necessary to utilize the internet and incentivize broadband adoption. There are several nonprofit and community entities that can help facilitate access to these resources.

- **Alliance for Technology Refurbishing & Reuse**: This organization supports a network of nonprofit technology refurbishers and recyclers. The network includes 95 organizations across the country that help make no- and low-cost devices available to those in need.

- **PCs for People**: PCs for People is a nonprofit that helps make low-cost computers and affordable internet service available to qualifying low-income individuals and nonprofits.

- **TechSoup**: This organization provides software, hardware, and technology services to nonprofits, foundations, and libraries.

- **Local libraries:** Libraries are community anchor institutions and often offer opportunities for digital skills training and other support.

3 Why does broadband matter when developing affordable housing?

Today, a high-speed broadband connection is a requirement in order for residents to participate in virtually all aspects of life. The Covid-19 pandemic in particular shifted many essential services and resources online, and it is likely that this will remain true to a degree even once the pandemic is over. Long over are the days in which a broadband connection was a "nice to have" luxury—it is now joined the ranks of water and electricity as a "need to have" utility.

Just as other utilities are incorporated into a building's design from the very beginning, broadband infrastructure should also be accounted for early in the process. In addition to supporting a strong quality of life for residents, incorporating broadband into a building's design makes financial sense as it allows for the avoidance of future, more costly retrofitting.

4.1 Resident quality of life

Broadband enables access to an entire universe of opportunity. A few of the countless uses for broadband in everyday life include the following:

- Distance learning and education. Over the past year, secondary and higher education have shifted online in some capacity, whether through full remote learning or hybrid education models. While this was a necessary adaptation due to the Covid-19 pandemic, schools across the country are beginning to embrace that remote learning will remain an aspect of education to some degree. For example, some school districts have said that in the future, inclement weather will call for a day of remote learning, as opposed to past practice of a cancelled school day. Increasingly it is clear that a reliable, high-capacity home internet connection is necessary not only to complete homework, but to participate in classroom learning.

- Workforce development and remote employment. In addition to supporting secondary and higher education, an internet connection can be a bridge to workforce development resources. The internet enables individuals to participate in upskilling and reskilling

programs on their own budget and schedule, creating the opportunity for workers to pivot more frequently and more quickly in today's fast-evolving global economy. A home internet connection also creates new paths for remote employment and self-employment, expanding opportunities for residents.

- Telehealth. Remote healthcare applications are becoming more commonplace, bringing opportunities for care into individuals' homes. These applications open up chances for more accessible healthcare for those who may not be able to travel to a doctor's office easily or safely.

- Civic engagement. As more and more government resources and communications move online, the internet is necessary in order to participate in civic society and interact with local, state, and federal government. For example, the internet enables enrollment in social services and participation in remote town hall events.

Because the internet enables so many opportunities, broadband access stands to benefit residents of affordable housing—those who may lack access to other resources—more than most.

4.2 Property value

The benefit of having broadband in the home is also reflected in property values. For example, one study conducted by the Fiber to the Home Council found that access to fiber broadband could increase a home's value by up to 3.1 percent, or about $5,537 for a typical home. That value is the approximate equivalent of adding a fireplace, half of a bathroom, or a quarter of a swimming pool to a home.[5] Another study that used a data set based in England found that disconnecting an average property from a broadband connection would depreciate its value by 2.8 percent.[6]

While affordable housing is of course dissimilar from privately owned housing, the value proposition is analogous. Private homes are worth more if they have broadband because that internet connection delivers immense value to the residents. Additionally, as we note below, the increased value parallels the cost that the owner of the property would incur to add a broadband connection in the future.

5 "Study Shows Home values Up 3.1 Percent With Access to Fiber," Fiber Broadband Association, June 29, 2015, https://www.fiberbroadband.org/blog/study-shows-home-values-up-3.1-with-access-to-fiber (accessed April 2021).
6 Gabriel Ahlfeldt, Pantelis Koutroumpis, Tommaso Valletti, Speed 2.0: Evaluating Access to Universal Digital Highways, *Journal of the European Economic Association*, Volume 15, Issue 3, July 2017, Pages 586–625, https://doi.org/10.1093/jeea/jvw013

4.3 Property longevity and future cost avoidance

It also pays to incorporate broadband considerations as a property is being designed. Not only does broadband add to the value of a property, but a proactive approach can save building owners from higher costs to retrofit a property later, and can incentivize partnerships by lowering risk for new entrants.

Typically, providing broadband service to multi-tenant housing requires three primary capital cost components:

1. Constructing outside fiber optics to the housing facility from the existing fiber network in the area to a termination point in the building

2. Constructing indoor wiring to create a network path from the fiber termination to each housing unit or wireless access point (WAP)

3. Network electronics

The cost of retrofitting buildings for broadband access can be high. For example, in one metropolitan city in the Midwest, the estimated capital cost to connect most city housing units—six campuses containing a total of 691 units—was between $1.04 million and $1.28 million.

Incorporating pathways from the public rights-of-way to a demarcation point in a building at the time of design can keep future broadband installation costs down. Just as conduit paths for other utilities like electricity are incorporated into a building design, conduit for broadband can follow the same route. This path typically would run from the building's utility room to the property line. The cost to a developer to include a 200-foot conduit path of this kind would be about $4 per foot for labor and materials combined, totaling about $1,000 in additional construction costs. If the same route were constructed later as a new entry path, it could cost between $1,500 and $10,000.[7]

In terms of in-building wiring, placing cable pathways or standardized cabling as a part of construction can reduce costs as well. For example, installing fiber as a part of a new building eliminates the need for conduit installation later. In addition, installing in-building wiring after construction creates noise, debris, and is disruptive to tenants. It also requires repairing walls and significantly more effort to maintain aesthetics upon project completion. Installation at the time of construction, in contrast, is a more streamlined and effective approach.

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7 "Facilitating Broadband Construction," Broadband Communities Magazine, January 2014,
   https://www.bbcmag.com/pub/doc/BBC_Jan14_FacilitatingConstruction.pdf

4 Initiatives to bring broadband access to affordable housing demonstrate the need to plan for broadband connections from the start.

There are several examples around the country of housing authorities that have engaged in engineering and cost estimation or facilitated the entry of new broadband providers. These projects, undertaken in jurisdictions of different sizes in various regions of the country, are just a handful of representative examples of broadband initiatives in housing. They illustrate the growing nationwide recognition among local leaders and other stakeholders that residents of affordable and public housing are underserved by broadband, and that action is necessary to ensure equitable access.

These examples also illustrate the many forms that broadband partnerships and initiatives can take. While each project is different, they all reflect a commitment to broadband as a critical infrastructure and one that is necessary for creating equitable communities.

Recent developments in Washington also point to a growing acknowledgement of broadband as essential infrastructure. The Coronavirus Aid, Relief, and Economic Security (CARES) Act, the 2021 Consolidated Appropriations Act, the American Rescue Plan Act, and the Bipartisan Infrastructure Legislation together have presented unprecedented amounts of funding for broadband initiatives, indicating a recognition of the singular importance of broadband access for all Americans for education, economic opportunity, health equity, and civic engagement.

Seattle provides free Wi-Fi and is studying service models

Seattle provides free Wi-Fi in 76 sites and continues to explore ways to use existing and planned fiber assets in order to expand free or low-cost broadband connections in targeted areas. The City designated digital equity zones deemed important to improving internet access for lower-income residents and has prioritized deploying additional Wi-Fi access points in those locations.

The City is also working on connecting Seattle Housing Authority properties to City fiber. Using City fiber for backhaul, the Housing Authority will be able to purchase bulk bandwidth at far less than it would pay a private ISP to offer service to households. At this time, the Housing Authority is considering providing free or low-cost service to the household. Meantime, the City is trying to increase awareness of low-cost service from discounted programs from local ISPs and is actively promoting the low-cost services offered by the two cable companies providing service to its facilities: Comcast and Wave.[10]

Wilson, North Carolina, retains low-income customers through a prepay model

Wilson, NC, provides an example of how to work with residents who have trouble making payments and keep them obtaining a paid service. The City runs Greenlight, a city-owned telecommunication service.[11] The City's public housing facilities were some of the first buildings connected to Greenlight's fiber network. In addition to providing free Wi-Fi in communal areas, Greenlight partnered with the Wilson Housing Authority to offer residents of all the units a 40 Mbps symmetrical broadband service for $50 per month. Greenlight adapted their usage monitoring app to serve as a prepaid broadband service. Prepaid customers add money to their account ahead of time, and a daily usage charge draws it down. The service is available to all customers and helped increase Greenlight's adoption rate in low-income areas from below 10 percent to above 25 percent.

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10 https://www.seattlehousing.org/the-voice/low-cost-internet-options (accessed November 2020).
11 Will Aycock (General Manager, Wilson Greenlight), telephone interview, October 28, 2020.

Baltimore plans a pilot project to extend fiber to public housing units

The Housing Authority of Baltimore City (HABC) owns about 7,000 housing units throughout the City and serves more than 20,000 residents. Nearly 80 percent of these housing units are located in 11 multi-dwelling complexes, each containing 100 or more individual residential units.[8]

The City is considering deploying City-owned fiber to public housing facilities to provide free broadband internet service to residents using cost-effective Wi-Fi technology, with a focus on the larger, higher-density housing complexes for initial phases. Capital cost estimates have been developed for the project, including one for a high-rise complex at $520 per unit and another at a low-rise development at $1,200 per unit. The City does not yet have an operational model; rather, the pilot will provide a "sandbox" for the Housing Authority to develop operational models and processes.

San Francisco's "Fiber to Affordable Housing" initiative provides free private service at modest cost to City

San Francisco's "Fiber to Affordable Housing" initiative provides a partnership model for providing free high-speed fiber or fixed-wireless internet access to buildings. The program—the result of more than 10 years of planning—is a result of a collaboration between the City and County of San Francisco (CCSF), the Mayor's Office of Housing and Community Development, and MonkeyBrains, local fixed wireless ISP. Through this collaboration, the City provides free, high-speed internet to low-income residents by leveraging existing municipal fiber resources and staff expertise. The housing authority pays $10 per month per unit to MonkeyBrains; service is free to residents.

In 2011, the Housing Authority had allocated $20,000 to create Wi-Fi networks in certain common areas of public housing facilities, but not to each unit. Then it engaged in a competitive, technology-neutral, bidding process and selected MonkeyBrains to provide free high speed (at least 100 Mbps) broadband service to each unit in newly renovated subsidized housing facilities.[9] MonkeyBrains offered free installation of wireless access points and wired access to each individual unit. Initial funding came from a grant from the mayor's office, and then the ISP managed to obtain a grant from the California Advanced Service Fund which allowed them to continue expanding the subsidized service beyond an initial pilot area.

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8 https://www.habc.org/media/1459/strategic-plan-community-workshop-no-1.pdf
9 https://muninetworks.org/content/transcript-community-broadband-bits-episode-264

In Austin, Google Fiber is not yet providing broadband to public housing

For two decades the City of Austin has engaged in a number of efforts to address digital inclusion, including seeking competitors to serve Housing Authority apartments. The City's efforts to address digital inclusion date to 2001, when the City launched its **Grants for Technology Opportunities (GTOP) Program**.[12] In 2015, City staff helped convene the Digital Empowerment Community of Austin with participation from more than 80 community stakeholders.

In terms of infrastructure, in recent years Google Fiber entered the market, putting pricing pressure on incumbents. Through a partnership with Google Fiber, the City's Housing Authority says it plans to eventually provide free residential broadband in public housing facilities.[13] However, although Google has committed to connecting the housing authority facilities, they will only do so when they are built out in the surrounding neighborhood. So far, the build-out has so far been focused on the neighborhoods with the greatest registered demand. The housing authority is working with other ISPs in the interim to provide more limited service to residents while they wait to see if Google Fiber will build in their areas.

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12 Grant for Technology Opportunities Program, *City of Austin,* **https://www.austintexas.gov/department/grant-technology-opportunities-program** (accessed November 2020).

13 Community Connections Program, *City of Austin,* **http://austintexas.gov/page/community-connections-program** (accessed November 2020).

Cambridge, Massachusetts, issued an RFP to private fixed wireless providers

In 2015, the Cambridge, Massachusetts Housing Authority (CHA), seeking ways to provide an alternative to the Comcast cable monopoly in its buildings, issued a request for proposals (RFP) offering rooftop rights at two CHA developments for fixed wireless internet services that could provide high-speed broadband services by mounting wireless receivers on the roof and using existing in-building wiring to reach individual units.

Under the RFP, the winning company was to own the rights to designated roof locations at two complexes, the 19-story Millers River apartments and the eight-story Roosevelt Towers development. NetBlazr, a local fixed wireless provider, was the winning bidder and now provides symmetrical service using in-building wiring at 100 Mbps at Roosevelt mid-rise and will offer at 200 Mbps or 500 Mbps at Millers River (the building is undergoing renovations that will include Cat 5 cabling, which can support the faster speeds). NetBlazr's low-income program offers a $20 discount to residents of public housing, resulting in the monthly pricing shown below.

NetBlazr's Monthly Pricing for Low-Income Consumers

Service	Cost
500/500 Mbps (Millers River)	$40
200/200 Mbps (Millers River)	$20
100/100 Mbps (Roosevelt)	$20

NetBlazr reports that four years into the program, it has only a handful of subscriptions in the Roosevelt mid-rise—potentially another cautionary lesson that even a low-cost new service may find relatively few takers among residents. (The Millers River project is still undergoing renovations and has no subscriptions yet.) The reasons for low uptake are not clear without doing market research. One potential issue in 2020 was that the City began aggressively providing mobile hotspots and Chromebooks to families of school-age children during the pandemic. Comcast is also available in the buildings, meaning families who qualify can get the company's Internet Essentials service for $10/month with speeds of 50 Mbps download, 5 Mbps upload (reflecting increased speeds that are effective March 1, 2021).

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