



EducationSuperHighway Comments for California's BEAD Initial Proposal, Volume 1

EducationSuperHighway welcomes the opportunity to comment on the California Public Utilities Commission's (CPUC) draft BEAD Initial Proposal, Vol 1. We appreciate the CPUC's efforts to solve the ongoing issue of broadband affordability in the state and the willingness to leverage innovative approaches to do so. We strongly encourage the state to adopt cost-effective solutions like [Apartment Wi-Fi](#), a managed Wi-Fi solution, to address the connectivity challenges of households living in multi-dwelling units (MDUs).

Nearly 1 of every 4 disconnected households in California live in an MDU¹, and a specific focus on the unique circumstances of these communities is necessary to reverse decades of underinvestment that prevents Californians from accessing essential services and reliable, high-speed internet as a 21st-century civil right. Effective policy adopted by the CPUC has the potential to direct this once-in-a-generation broadband funding into the communities where it will have the greatest impact.

EducationSuperHighway appreciates that the CPUC has made clear in its BEAD Initial Proposal, Volume 1 draft that the national broadband map does not fully represent the universe of unserved and underserved multi-family housing developments. The national broadband map identifies each multi-family housing development (or multi-dwelling unit - "MDU") as one Broadband Serviceable Location (BSL), which means that the map does not represent broadband availability of the individual units, significantly understating the number of unserved and underserved MDU's. Implementing an Apartment Wi-Fi program as part of the state's holistic approach to closing the digital divide provides an efficient and scalable approach to connecting hundreds of thousands of households to high-speed Internet. Apartment Wi-Fi not only satisfies several BEAD requirements, it is also a solution encouraged by the NTIA.

There are several scenarios where availability of broadband service at an MDU BSL does not equate to the same availability of broadband to all units within that location. This results in an overstatement of the availability of broadband service at multi-family housing locations and thus undercounts the true total of California residents who are unserved or underserved. Examples of these scenarios are summarized below:

- Internet Service Provider (ISP) offers a much more substantial service to the building manager's office or commercial space (e.g.: AT&T Fiber) than their inside wiring is capable of delivering to the residential units (e.g.: AT&T DSL).

¹ U.S. Census Bureau (2020) Public Use Microdata Samples ACS 5 Year. Retrieved 2021 from <https://www.census.gov/programs-surveys/acs/microdata.html>. Data sourced from Census ACS 5 Year 2020 Public Use Microdata Sample(PUMS). 22% of California unconnected households are within MDUs. MDUs are defined here as buildings with 10 or more residential units. Unconnected households are defined as households with either no internet at all, cell phone only internet and/or dial up only internet.



- ISP has fiber-to-the-curb or building, but has no inside wiring infrastructure to the unit.
- ISP is able to deliver fiber to the building (FTTB) within 10 days, but only offers business-class internet services and does not actually provide residential service.
- Technology at the MDU is not capable of delivering 25/3 or 100/20 across all households simultaneously. Example: provider offers 100/20 DSL service, but needs to use pair-bonding to achieve that speed. In a 100 unit MDU, 100 DSL lines would be bonded into 50 connections, leaving 50 households served and 50 unserved.
- Inside wiring infrastructure is in a state of disrepair and cannot support speeds of 100/20 Mbps. Many public housing and affordable housing MDUs are 30-40+ years old and wiring has not been adequately maintained.
- ISP's equipment is located in a Main Distribution Frame (MDF), Intermediate Distribution Frame (IDF), cabinet, pedestal, node or potentially the central office, and is not capable of delivering 25/3 or 100/20 across all households simultaneously without overbuilding the entire MDU.²
- Non-cellular, licensed Fixed Wireless Access (FWA) providers without existing equipment/service in the MDU could not meet the 10 day installation window. The individual household of an MDU does not have the ability to authorize a Licensed FWA provider to access rooftops, telco rooms, and run new wiring all the way to their unit. This would require an agreement with the building owner and possibly a permit.

EducationSuperHighway recommends that the CPUC consider the following feedback to its draft Initial Proposal, Vol 1:

Recommended language to include in response to Requirement 6

EducationSuperHighway applauds the CPUC on its forward-looking, expansive definition of CAIs in its Initial Proposal. ESH invites the CPUC to consider one further expansion of the definition of CAI: to augment the current definition of public housing by including *affordable housing (also known as low-income housing)* as well.

Concretely, this would change the CPUC's current CAI definition from "Public housing organizations: Public housing organizations were identified by contacting the Public Housing Agencies (PHAs) for California enumerated by the U.S. Department of Housing and Urban Development, as well as by contacting nonprofit organizations Public and Affordable Housing

² MDF and IDF are industry standard designations for racks of networking equipment, or switches, that help distribute the network throughout the property. If outdated they will not handle a high enough capacity to distribute the required bandwidth to each unit regardless of how large the backhaul signal coming into the property.



Research Corporation (PAHRC) and National Low-Income Housing Coalition, which maintain a database of nationwide public housing units at the National Housing Preservation Database (NHPD)” to:

Public housing organizations **and low-income housing**: Public housing organizations **and low-income housing** were identified by contacting the Public Housing Agencies (PHAs) for California enumerated by the U.S. Department of Housing and Urban Development, as well as by contacting nonprofit organizations Public and Affordable Housing Research Corporation (PAHRC) and National Low-Income Housing Coalition, which maintain a database of nationwide public housing units at the National Housing Preservation Database (NHPD), **as well as other sources.**” (emphasis added).

We propose the following definition for low-income housing, taken from the ongoing CPUC proceedings to define **low-income community housing** in its California Advanced Services Fund Broadband Public Housing Account Program:

“Low-income community” is a

a. A publicly supported housing development

b. Farmworker housing

c. Other housing development

d. Mobile home park

e. One or more Census block group(s), each with a median household income at or below 80 percent of the statewide median income or with median household incomes at or below the county-specific threshold designated as “low-income” by the Department of Housing and Community Development’s list of state income limits adopted pursuant to Section 50093.

C. “Other Housing Development” is (a) any multi-dwelling unit development in which all units are owned by the same entity(ies) and that has 80% or greater residential units that are “low-income;” (b) tribal housing, including developments funded with Housing and Urban Development (HUD) funding or through a Tribally Designated Housing Entity (TDHE).



Recommended language to include in response to Requirement 7

EducationSuperHighway endorses Optional Modules 2 and 3 as detailed in NTIA's BEAD Model Challenge Process, taking Optional Module 2 a step further in **reclassifying ALL MDU locations on DSL as "unserved"** (rather than "underserved"). We recommend states take an additional step and treat ALL MDUs labeled on the National Broadband Map as "served" by **cellular licensed fixed wireless as "unserved"** (rather than "underserved") locations.

Next, EducationSuperHighway endorses the Optional Area Challenge Module as detailed in NTIA's BEAD Model Challenge Process.³

Finally, EducationSuperHighway recommends that the CPUC include in its BEAD Initial Proposal a requirement that an MDU challenge **only requires a challenge by one or more units** of the unit count of the multi-dwelling unit listed in the Fabric within the broadband serviceable location.

[California Senate Bill 745](#) set a precedent in the state (although no longer in effect) by defining "unserved" as a housing development where *at least one housing unit* is not being offered broadband service. Therefore, this request is consistent with prior California state law.

From a network perspective, all units in an MDU rely on the same internal wiring. Therefore, it is reasonable to assume that if one unit in an MDU is "unserved" by a provider and a specific technology (e.g., coaxial cable), then other units attempting to access the internet with the same technology and provider will also be "unserved."

Furthermore, the newly-updated NTIA challenge process guidance⁴ would require two units worth of challenge information for MDUs of between 16 and 24 units, and at least three units for larger MDUs. This requirement places an undue burden on residents who are the least connected to file multiple submissions to local government or nonprofits to challenge on their behalf.

EducationSuperHighway recommends inserting the following language into Section 1.4.2.

Optional Module 2 – DSL served locations reclassified as unserved

As noted by way of the Optional Module 2 example in the Model Challenge Process, California

³ BEAD Model Challenge Process, Optional Area Challenge Module, see page 17

⁴ NTIA Model Challenge Process Guidance:

<https://www.ntia.gov/sites/default/files/2023-09/bead-model-challenge-process.zip>



will treat locations showing available qualifying broadband service (i.e., a location that is “served”) delivered via DSL as “unserved” if DSL is the only technology at the location satisfying the “served” requirements. According to the FCC, DSL has median download speeds under 30 Mbps and median upload speeds under 3 Mbps, which do not meet the definition of served.⁵

Marking these locations as unserved will facilitate the phase-out of legacy copper facilities and ensure the delivery of “future-proof” broadband service.⁶ *Note we have adapted Module 2 to treat these locations as “unserved” instead of “underserved” since all of the households in a MDU with DSL service experience different speeds based on the distance of the copper runs from the unit to the ISP’s facilities.* Providers try to overcome this limitation of DSL by pair-bonding copper wiring. In doing so, they effectively take 2 copper lines and turn them into one connection. As a result, only 1 of 2 households would have access to service; consequently, a substantial share of households would now be unserved.

Cellular Licensed Fixed Wireless served locations reclassified as unserved

The CPUC will treat as “unserved” locations that the National Broadband Map shows to be “served” where Licensed Fixed Wireless using cellular technologies (e.g., T-Mobile 4G/5G Home Internet) is the only technology at the location satisfying the “served” requirements. According to speedtest.net, as of March 2023, the median cellular internet speeds in the United States are approximately 80 Mbps download and 10 Mbps upload, which do not meet the definition of served.⁷

Additionally, cellular networks, by design, have a significant drop-off of data rates the farther a user is from the source (e.g. tower). Marketed data rates are often not reached at even only 1-2 miles from the cellular source. While these types of providers may not impose unreasonable data caps, they do impose throughput limits and deprioritization of traffic on data plans⁸. A heavy data user could be defined as a customer using as little as 50Gb of data in a single bill cycle. These customers can experience extreme data throttling (i.e., reducing bandwidth allocation) during periods of high demand when a network is congested; consequently, users will often experience inconsistent broadband service, including the inability to access speeds of 25/3 or 100/20 to meet the underserved or served requirements of the BEAD Program respectively.

⁵ Measuring Fixed Broadband 12th Report, see Chart 1.2

⁶ *BEAD Model Challenge Process*, Optional Module 2, see page 9

⁷ See, Speed Test Global Index ranking mobile and fixed broadband speeds from around the world on a monthly basis. available at <https://www.speedtest.net/global-index/united-states> (Last accessed May 5, 2023)

⁸ Examples can be found in Verizon’s documentation <https://www.verizon.com/support/broadband-services/> (Last accessed May 5, 2023)



The following language is directly from the websites of cellular fixed wireless providers Verizon and T-Mobile, showing their practices of providing inconsistent broadband service which may leave many households “unserved.”⁹

Verizon:

Lack of speed guarantees

- [Broadband Services Info](#) & [Terms of Service](#): Speeds and plans vary depending on address/location, equipment, and network connection
- Specific plan details are described in ["Important Plan Information"](#) which show most plans have a speed range that typically does not meet advertised speeds with only 1 plan claiming a range of upload speeds that meets BEAD served criteria of 20Mbps: "5G Home Plus plan with up to 1 Gig download speeds"

Lowering speeds based on:

- **Network load**
 - [Broadband Services Info](#): "On certain plans, we may prioritize your 5G and 4G LTE data behind other traffic. If the cell site you are connected to begins experiencing high demand during the duration of your session, your 5G and 4G LTE data speeds may be slower than the other traffic's. Once the demand on the site lessens, or if you connect to a different site not experiencing high demand, your speed will return to normal. Any such network management practices will be disclosed in the descriptions of impacted plans."
- **Video Streaming**
 - [Broadband Services Info](#): Video speeds may be slower....in order to optimize customers' video viewing experiences...Verizon limits the throughput speeds of such video downloads or streams over our 5G and 4G LTE networks (which may be below the 9 - 56 Mbps 5G and 4G LTE download speeds typically provided)
- **Data Usage**
 - From the [customer agreement](#): If the amount of a single mobile line's total monthly data use in a bill cycle exceeds the average amount of data consumed by the top 0.5% of users on our network during the preceding six-month period, we may reduce data speeds to your device to 4Mbps for the remainder of the cycle. If the amount of a single 5G Home Internet or LTE Home Internet line's total monthly data use in a bill cycle exceeds the average amount of data consumed by the top 0.5% of users on our network during the preceding six-month period, we may reduce data speeds for the remainder of the cycle to

⁹ Verizon and T-Mobile websites accessed the during the of October 23, 2023



(i) 5 Mbps for LTE Home, LTE Home Plus and 5G Home plans, and (ii) 15 Mbps for 5G Home Plus plans. We can also temporarily limit your Service for any operational or governmental reason.

T-Mobile:

Overview:

- *T-Mobile's terms of service make clear that speeds are not guaranteed, due to cellular technology limitations to the number of users and limited bandwidth causing congestion leading to lower speeds for users.*
- *Smartphones are prioritized over wireless internet (Wi-Fi) users.*
- *They also illustrate that certain video streams are "optimized", meaning downgraded, and that they even restrict access to certain TV streaming services.*
- *They reserve the right to implement other practices to ensure optimization, meaning additional throttling, deprioritization, etc.*

Sources:

<https://www.t-mobile.com/home-internet>

- *Not available in all areas. Delivered via 5G cellular network; speeds vary due to factors affecting cellular networks.*
- *During congestion, Home Internet customers may notice speeds lower than other customers due to data prioritization.*
- *Video streaming resolution depends on available speeds.*
- *Not compatible with some live TV streaming services.*

<https://www.t-mobile.com/responsibility/legal/terms-and-conditions>

- *Your experience on our networks may vary and change without notice depending on a variety of factors. You agree that we are not liable for problems relating to Service availability or quality.*
- *We prioritize the data usage of a small percentage of our heavy data users, below that of other customers.*
- *Customers whose data is prioritized lower may notice speeds lower than customers with higher priority in times and locations where there are competing customer demands for network resources.*
- *We prioritize smartphone and mobile internet (tablet) over Smartphone Mobile HotSpot (tethering) and wireless internet traffic on our network.*
- *We utilize streaming video optimization technology in our networks to help minimize data consumption while also improving the service experience for all customers.*
- *Additionally, we may implement other network practices, to ensure optimized network performance as technologies evolve.*



- *Devices also have varying speed capabilities and may connect to different networks depending on technology. Even within coverage areas and with broadband-capable devices, network changes, traffic volume, outages, technical limitations, signal strength, obstructions, weather, public safety needs, and other conditions may impact speeds and service availability.*
- *We engineer our network to provide consistent high-speed data service, but at times and at locations where the number of customers using the network exceeds available network resources, customers will experience reduced data speeds.*
- *At times and locations where the network is heavily loaded in relation to available capacity, however, these customers will likely see significant reductions in data speeds, especially if they are engaged in data-intensive activities.*

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WHERE, HOW, AND WHEN DOES MY SERVICE WORK?

These T&Cs describe the experience you can expect on our networks, including information about our reasonable network management practices, and the experience on our roaming partners' networks. Please check our coverage maps, which approximate our anticipated coverage area outdoors. Your experience on our networks may vary and change without notice depending on a variety of factors. You agree that we are not liable for problems relating to Service availability or quality. To provide the best possible experience for the most possible customers on T-Mobile or Sprint branded rate plans, for many Rate Plans, we prioritize the data usage of a small percentage of our heavy data users, below that of other customers. This threshold number is specified in your Rate Plan and is also periodically evaluated and may change over time. We also prioritize the data of customers who choose certain Rate Plans after the data for other T-Mobile or Sprint branded rate plans, but before customers who are prioritized as heavy data users. Customers whose data is prioritized lower may notice speeds lower than customers with higher priority in times and locations where there are competing customer demands for network resources. See your selected service or visit our Open Internet page at the link below for details. We prioritize smartphone and mobile internet (tablet) over Smartphone Mobile HotSpot (tethering) and wireless internet traffic on our network. We utilize streaming video optimization technology in our networks to help minimize data consumption while also improving the service experience for all customers. For example, a small number of Rate Plans experience video optimization via the Binge On feature. Some qualifying video providers may choose to opt-out of the Binge On program. For a list of opt-out providers visit [http://www.t-mobile.com/offer/binge-on-streaming-video.html# \[D11\]](http://www.t-mobile.com/offer/binge-on-streaming-video.html#[D11]) . The Binge On optimization technology is not applied to the video services of these providers, and high-speed data consumption will continue as if Binge On were not enabled. Additionally, we may implement other network practices, to ensure optimized network performance as technologies evolve. For example, some plans may offer gaming or audio streaming at standard or at high definition. Our Open Internet Policy, located at [www.T-Mobile.com/OpenInternet \[D12\]](http://www.T-Mobile.com/OpenInternet[D12]) , includes important information on these topics as well as information on commercial terms and performance characteristics (such as expected speed, latency, and network practices.)

WILL MY SERVICE VARY? WHAT FACTORS MAY AFFECT MY SERVICE?

As our customer, your actual Service area, network availability, coverage and quality may vary based on several factors, including your selected service, network capacity, terrain, weather, if you are on a private or public Wi-Fi network, using a non-T-Mobile device, or if your Device no longer supports network technologies compatible with or available on T-Mobile's network or the networks of our roaming partners. Outages and interruptions in Service may occur, and speed of Service varies. Devices also have varying speed capabilities and may connect to different networks depending on technology. Even within coverage areas and with broadband-capable devices, network changes, traffic volume, outages, technical limitations, signal strength, obstructions, weather, public safety needs, and other conditions may impact speeds and service availability.

We engineer our network to provide consistent high-speed data service, but at times and at locations where the number of customers using the network exceeds available network resources, customers will experience reduced data speeds. In those cases, customers who choose certain rate plans may notice speeds lower than customers on other T-Mobile or Sprint branded rate plans, which are prioritized higher on our networks. Further, to provide the best possible on-device experience for the most possible customers on T-Mobile or Sprint branded plans and minimize capacity issues and degradation in network performance, we may, without advance notice, take any actions necessary to manage our network on a content-agnostic basis, including prioritizing all on-device data over Smartphone Mobile HotSpot (tethering) data and, for the vast majority of Rate Plans, further prioritizing the data usage of a small percentage of heavy data users (as defined in their Rate Plans) and wireless internet, below that of all other customers in times and locations where there are competing customer demands for network resources, for the remainder of the billing cycle. This threshold number is periodically evaluated and may change over time.



Where the network is lightly loaded in relation to available capacity, a customer whose data is prioritized below other data traffic will notice little, if any, effect from having lower priority. This will be the case in most times and locations. At times and locations where the network is heavily loaded in relation to available capacity, however, these customers will likely see significant reductions in data speeds, especially if they are engaged in data-intensive activities. Customers should be aware that these practices may occasionally result in speeds below those typically experienced on our 5G or LTE networks. We constantly work to improve network performance and capacity, but there are physical and technical limits on how much capacity is available, and in constrained locations the frequency of heavy loading in relation to available capacity may be greater than in other locations. When network loading goes down or the customer moves to a location that is less heavily loaded in relation to available capacity, the customer's speeds will likely improve. Visit www.T-Mobile.com/OpenInternet for details and for current data amount subject to this practice.