Seattle
Information Technology

Best in Class Digital Services

Internet for All Seattle Report

September 2020

Contents

Letter from Mayor Jenny Durkan

As Seattle continues to respond and work to recover from the unprecedented COVID-19 health and economic crisis, the importance of reliable and affordable broadband internet has become more critical now than ever before. Applying for jobs, finding healthcare, accessing childcare, even communicating with our loved ones in times of need – all these tasks have moved online, making internet access and digital skills more critical than ever. And the COVID-19 pandemic has only intensified the need to address these disparities, as working from home and online schooling have become the norm.

Our 2018 Technology Access and Adoption Study shows that Seattle is one of the country's most connected cities, with over 95% of all households connected to the internet. However, that same study showed that there are barriers preventing true digital equity in Seattle. Black, indigenous, and People of Color, low-income households, households where English is not the primary language, and individuals living with disAbilities all have disproportionate limitations on access to quality, affordable internet in the home.

We know that access to technology is a race and social justice issue. As we work to create more opportunities for youth through major investments in workforce readiness programs and free college for all Seattle public school students, we must also strive to make sure that all our communities have access to high-speed internet and the skills they need to compete in our constantly-connected world. We know we must do everything we can to dismantle racial and socioeconomic inequalities and invest in the resources that empower diverse communities.

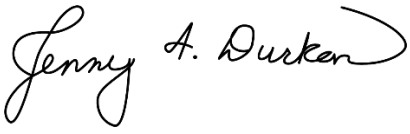
The Internet for All Initiative provides the City of Seattle a new roadmap and tangible action plan to close the digital divide and meaningfully increase the adoption of affordable, reliable broadband internet. I appreciate the leadership of Councilmember Alex Pedersen, Council President Lorena González, and Councilmember Debora Juarez who co-sponsored the Internet for All Resolution, the full commitment from City Departments, and collaboration with community partners, internet service providers, as well as the business and philanthropic community who have all come together to support this initiative.

As we continue to work to meet the immediate internet and technology needs of families, students, job seekers, and those working from home, the Internet for All Initiative will be a critical component of Seattle's long-term recovery as we build a more equitable city of the future.

I remain committed to making sure that Seattle continues to lead the way on digital equity and inclusion. We need the support of the entire community, and I invite both the private and public sectors to join us in this important work. If we want to continue to be the city that invents the future, that means leaving nobody behind, and helping those most impacted by digital inequity catch up and keep up.

A thriving city, where opportunities are equally accessible, depends on it.

Mayor Jenny A. Durkan

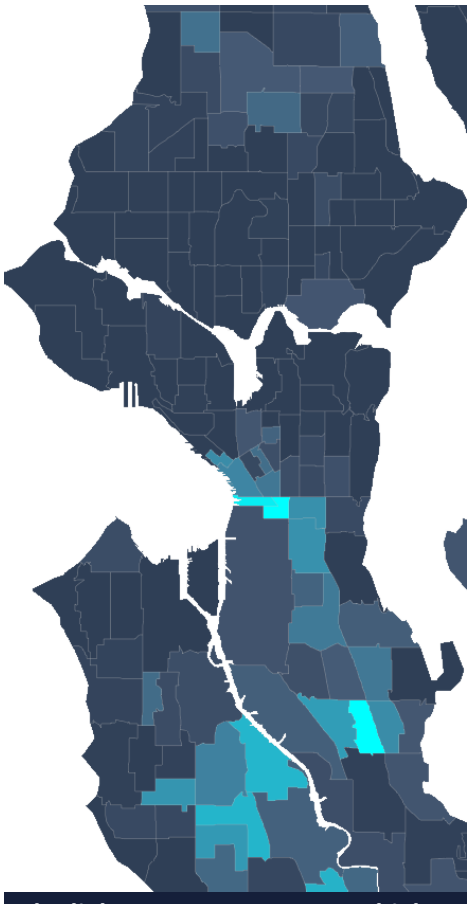


Executive Summary

The Internet for All Seattle Resolution (31956) (IFA) lays out a mission of "enabling all Seattle residents to access and adopt broadband internet service that is reliable and affordable." This mission furthers the City's long and ongoing commitments to equitably expanding access to residential broadband. At the crux of this legislation is a request that the Seattle Information Technology Department (Seattle IT) report to Council on its progress in meeting this objective by way of a gap analysis on broadband internet access, lessons learned from similar municipal efforts, and an Action Plan.

Seattle is one of the most "connected" cities in the country. In fact, the City's 2018 Technology Access and Adoption Study finds that 95% of Seattle households have internet access in the place where they live.[1] From 2013 to 2018, the City increased its proportion of connected residents from 85% to 95%. While the 2018 data concluded a 5% disparity in internet adoption which we estimate affects 17,000 households and 37,000 residents, the study indicated 4% using cellular data only for internet and 6% without an internet subscription. With access suspended to free internet at public sites because of COVID-19 and the limitation of a cellular data only device, the COVID-19 pandemic has amplified the gap disparity percentage.

In response to Section 4 of the IFA Resolution, this report will introduce these issues and highlight "proposed short-term solutions to increase access equitably, and a timeline for presenting subsequent reports to the Committee for the longer term, sustainable solutions of the Action Plan." The report also addresses linked issues of insufficient internet, devices, skills, and support.



The lighter areas represent a higher proportion of residents without internet in their home.

The gap analysis finds that internet adoption is lacking in specific geographic areas and is driven primarily by the affordability of broadband service.

According to the Federal Communications Commission's (FCC) definition of broadband[2], all of Seattle's 84 square miles are serviced by a broadband Internet Service Provider (ISP) such as Comcast, CenturyLink, or Wave. Geographically, service is distributed so that most of the City's population has some option for broadband internet. In many cases, the quality and speed of these services exceeds the minimum levels of service that the FCC uses to define broadband internet. Moreover, technological innovation has expanded the ways residents can access broadband internet. Instead of needing a "wired" connection with a cable and modem, residents can get broadband service wirelessly on a smartphone, tablet, or other connected device from the 4G LTE cellular networks. Wireless providers are currently densifying the existing 4G LTE networks and integrating emerging 5G networks which will further enhance wireless broadband quality in the future. Therefore, Seattle has a significant sustainable broadband internet infrastructure.

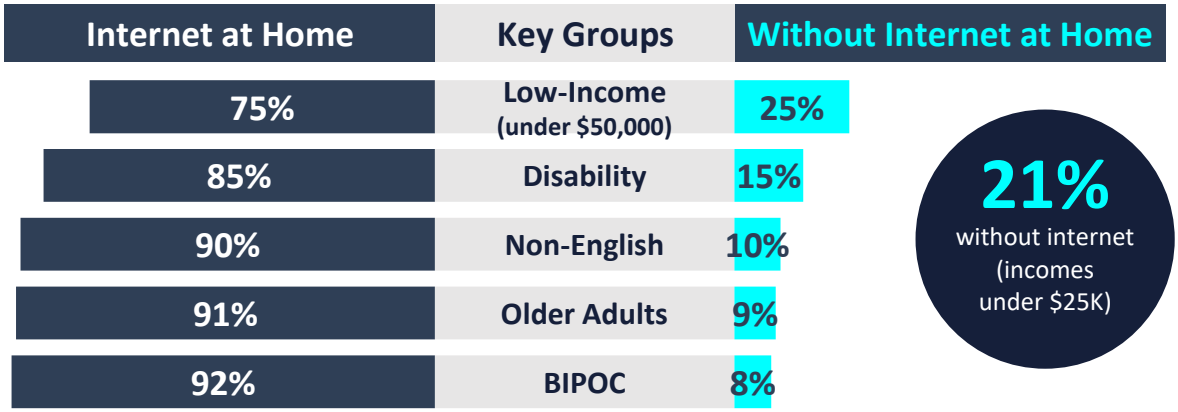
[1] 2018 Technology Access and Adoption Study

[2] The official FCC broadband definition is a minimum of 25 Mbps download and 3 Mbps upload.

Despite an extensive and robust broadband infrastructure, unfortunately, there is still a 5% gap in internet adoption for Seattle residents. By analyzing the City's recent 2018 Technology Access and Adoption Study augmented with Census American Community Survey data, and consistent with findings from similar research from King County, we find that this gap is concentrated geographically in certain areas of the City. Despite being in a service area for broadband internet, as the map above shows, areas of Central and South Seattle represent the largest portions of the 5% gap in internet adoption:

- **South Central Seattle (Pioneer Square, Yesler Terrace, and International District)**
- **South Seattle (New Holly, Rainier Valley, and Beacon Hill)**
- **West Seattle (High Point and South Park)**
- **Areas of downtown**
- **Lake City**

When we look at key demographic groups without internet in their home, we see those who are low-income, household members living with a disAbility, English is not their primary language, those with less formal education, Seattle Housing Authority households, older adults, and BIPOC (Black, Indigenous, and People of Color). COVID-19 has magnified the impact for these key groups and families requiring internet for work and schooling purposes.



To dig deeper into the numbers, the 2018 Technology Access and Adoption Study analyzed why despite the technological availability of broadband infrastructure, geographic areas remain under-connected. The table below summarizes these findings:

In 2018, for the 5% of households without internet, they cited the following reasons[3]			
61%	Say cost is a primary barrier to obtaining internet access.	16%	Don't know how to obtain internet access.
30%	Don't have a device to access the internet.	8%	Say the internet is too slow and/or unreliable.
20%	Don't have the credit or deposit requirements.	8%	Don't trust the internet or technology companies.

[3] 2018 Technology Access and Adoption Study

As illustrated in the table, overall cost, lack of a device, or lack of credit or money deposit are the primary reasons for households who do not currently have internet access in their residence. Additionally, 23% of residents have a limiting factor for not using the internet more for both internet adopters and non-adopters. The segmentation analysis suggests 11% of residents have a tangible barrier that restricts digital connectedness (this group is disconnected or inconsistently connected by choice or by circumstances) and 14% are digital skills limited (lack necessary skills to access and use the internet independently and confidently). While 92% of all households report having a desktop or laptop, 61% of low-income households who have internet at home have laptops, which have become the most valuable, versatile device for use at home and on the go. Therefore, the greatest barriers of access to broadband internet service in Seattle is not a lack of broadband infrastructure, but rather the affordability of internet service, devices, and digital skills.

Adoption constraints are especially challenging for residents with limited literacy, with limited English skills, with substantial debt, or without a home address or email. Many low-cost internet programs for low-income residents have limited in-person or phone sign up options. In addition to enrollment challenges many simply are not aware these programs exist. An Action Plan to increase access to broadband should first focus on affordability and targeted outreach to communities in areas of the City that are least connected. Reducing barriers to affordable broadband internet adoption will require collaboration between local government, the private sector, employers, educators, and community-based partners.

Speed Issue Feedback: COVID-19 has abruptly brought us to the point where the current 25/3 FCC standard for low-cost programs may be insufficient to support the capacity needs of some students and parents now simultaneously remote learning and teleworking from home.

Lessons learned from other municipal efforts provided guidance

An initial Action Plan to address disparities in affordable internet access and adoption was informed by an extensive review of efforts undertaken and best practices from other cities. Seattle is part of a select group of cities that have been recognized as a “National Digital Inclusion Trailblazer.” Initiated by the National Digital Inclusion Alliance (NDIA) in 2016, 15 cities across America have been designated with this distinction in promoting digital literacy and broadband access for underserved residents and serve as models for other local governments to tackle digital equity. In reviewing the digital equity and inclusion plans for the 15 “Trailblazer” cities with over 110 total items, the actions and recommendations were grouped into 12 common categories: 1) Internet Access, 2) Awareness, 3) Devices, 4) Digital Skills, 5) Digital Equity Fund, 6) Community Engagement, 7) Evaluation, 8) Digital Inclusion Coalition, 9) Inventory and Mapping, 10) Partnerships, 11) Advocacy and Policy, and 12) Digital Economy. In conjunction with other reports and news from across the country to improve broadband adoption, the following common threads were identified, especially for cities striving to close the remaining gap. The recurring takeaways closely aligns with our proposed strategies and actions.

- Collaborate across sectors to improve low-cost broadband options, including increased Wi-Fi access in strategic areas to reach the underserved population.
- Build awareness to ensure that all residents know about and can sign-up for available resources (low-income or free internet sources, devices, and digital skills training).
- Device programs to increase the number of families that can buy or receive free donated devices are equally as important as getting connected to the internet.
- Ensure digital literacy skills training programs are accessible and available.

Additionally, while there are key differences between Seattle’s technical landscape and other cities, the past

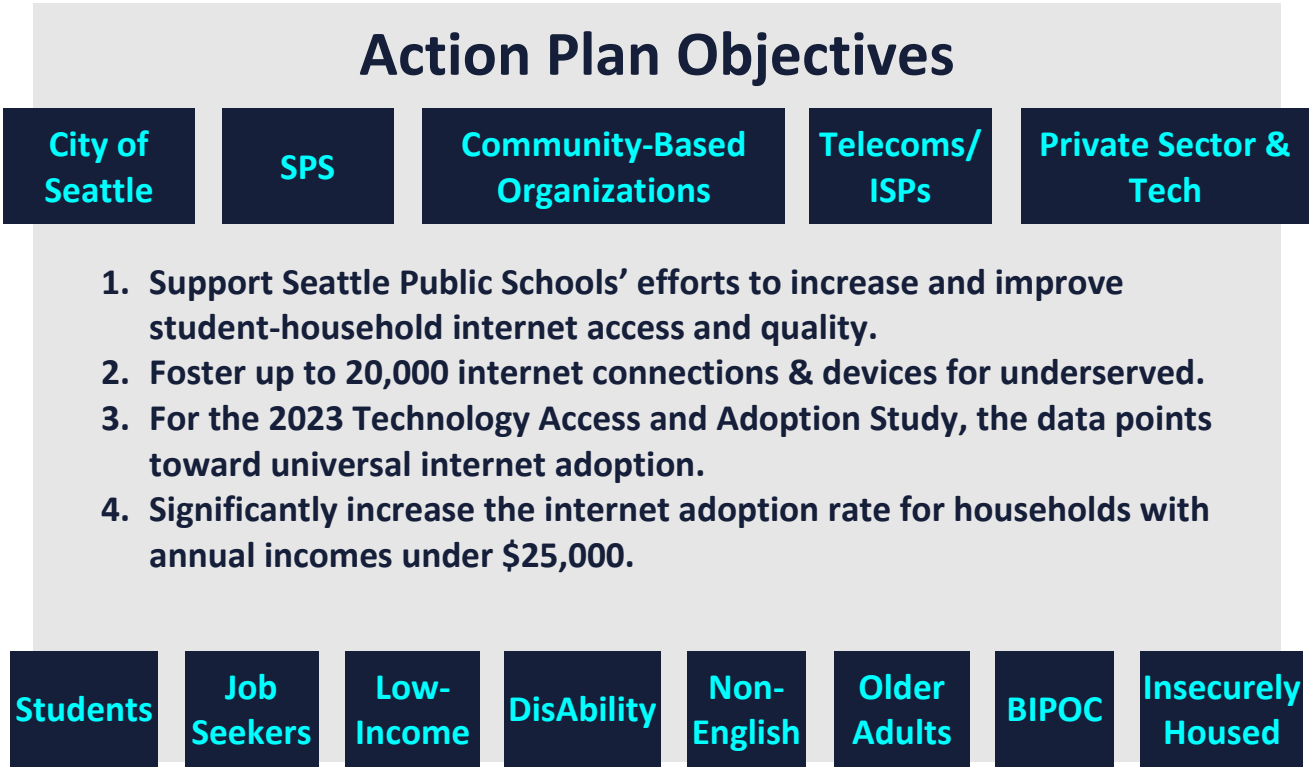
experiences and future plans in New York City, San Francisco, Kansas City, Chattanooga, Tacoma, and Anacortes provides insightful information. The lessons learned and best practices from these initiatives are discussed in greater detail in the body of this report.

Building from our gap analysis and the lessons learned from other municipalities, the City has developed an Action Plan leveraging current success to equitably improve residential access to affordable broadband

As part of this initial report, the IFA asked Seattle IT to develop an Action Plan to improve residential access to broadband. Drawing on conclusions from the gap analysis and lessons learned, Seattle IT developed a robust Action Plan in consultation with community partners, City department stakeholders, and internet service providers. While more formal data collection and outreach will strengthen our strategies, Seattle IT designed a plan that catalyzes current success to directly target the most significant barriers towards internet adoption.

More specifically, this plan builds on extensive community engagement conducted for the Digital Equity Initiative Action Plan, released in 2017, and the 2018 Technology Access and Adoption report. The plan also draws from recent COVID-19 response programs, like the City's "Digital Bridge" pilot project to equip low income job seekers with free laptops and broadband connectivity. With more time, this plan will adapt to the needs of key groups with the greatest internet disparity and focus on tangible internet adoption solutions for low-income households, student households, job seekers, those with low education or with disAbilities, older adults, and BIPOC communities. It is important to note that when collaborating on strategies, the City is barred by the Federal Telecommunications Act from directly regulating internet service. As a result, we examine opportunities to incentivize the market and leverage public-private-community partnerships.

While presented in more detail in the body of the report, the City's Action Plan is designed to address multiple ambitious objectives as detailed in the figure below.



ACTION PLAN

As per the IFA, Seattle IT has developed a detailed Action Plan driven by eight innovative, effective, and efficient strategies to equitably increase broadband access and adoption. The strategies are summarized below. This link provides direct access to the complete Action Plan outlined later in the body of this report with more detail for each proposed strategy along with a suggested timeline.

1. Increase awareness and adoption of low-cost internet programs and devices.

53%
Respondents unaware of low-income internet programs.

Most notable in the 2018 Technology Access and Adoption Study was only 23% of low-income households that qualify for low-income internet access programs are using those programs. Over half of respondents were not aware of any low-income programs and almost a quarter were aware of their existence but still not enrolling. We have a critical opportunity to increase communications and address enrollment barriers.

2. Expand no or low-cost connectivity options in targeted areas of the City.

Affordability is a key barrier to universal internet adoption in Seattle. Therefore, using data and building upon findings from the 2018 Technology Access and Adoption Study, 2017 Wireless Broadband Study, 2015 Digital Equity Action Committee, and consulting with affordable housing partners, we seek to target lower-income neighborhoods where residents cannot afford internet service and increase digital equity by leveraging the City's infrastructure to provide additional Wi-Fi or other solutions to help residents connect, and pursuing policies and processes to promote deployment of telecommunication infrastructure to allow more solutions to help them connect.. These areas will also be targeted for the promotion and expansion of no- or low-cost connectivity options.

3. Partner with organizations to deliver culturally relevant digital inclusion programs.

14%
Seattle residents report limited digital skills.

While affordability may be the major barrier to equitable broadband adoption, lack of access to internet-accessible devices and technical skills also play a significant role in why some residents remain unconnected. Partnering with organizations that support our communities in a holistic way is essential for reaching our diverse populations that need digital support.

4. Pursue private sector and philanthropic funding.

A lack of internet access has far reaching economic and social impacts to the City. As a result, a holistic and coordinated response across organizations and institutions is needed. The City cannot solve this problem alone and seeks private-sector and philanthropic funding to better meet its IFA objectives.

5. Champion legislation/policies to advance universal internet access and adoption.

The IFA provides us with an opportunity to refresh our legislative policy priorities and coordinated actions to creatively incentivize the market, spur competition, and address digital equity in low-income areas. The legislative policies that the City champions at the state and national level can help provide funding and support for local digital inclusion efforts—ensuring sustainable success.

6. Strengthen regional collaboration by forming an "Internet for All" Coalition.

While Seattle IT plans to conduct more extensive community outreach, all organizations we spoke with, both public and private, shared a commitment to close the internet adoption and digital equity gap. There are currently many disparate workstreams looking to advance our shared common goal—King County, State of Washington, Seattle Public Schools, community organizations, telecoms, and technology companies. We recommend the creation of an Internet for All Coalition to help advance the IFA Action Plan and structure coordination at all levels. The coalition would meet regularly to examine partnership opportunities, receive feedback, and discuss progress on strategies and actions. The Coalition design should be planned to leverage existing bodies, including the City's Community Technology Advisory Board, Innovation Advisory Council and Digital Equity Learning Network.

7. Advocate to ensure Internet Service Provider offerings meet residents' needs.

In response to the COVID-19 pandemic, all Seattle internet service providers participated in the FCC's "Keep Americans Connected" pledge not to terminate service to any residential or small business customer who could not pay their bills, to waive late fees, and to open its Wi-Fi hotspots to Americans who needed them. We commend all companies for supporting our neighbors in an unprecedented time. The pledge expired on June 30th, but as we move forward, we are listening to the appeal from residents and community advocates to work collaboratively with the ISPs to continue these positive efforts for the betterment of residents.

8. Examine new technologies to ensure best-in-class internet infrastructure and consumer choices.

We strive to have a best-in-class infrastructure for wired and wireless deployment that is scalable and ready for the next generation of technologies—leveraging opportunities to improve our internet infrastructure and technology options for residents. While our focus is on addressing affordability and adoption barriers to internet access, the ecosystem of broadband internet service delivery is continually making advancements. Technological innovations may provide new options for expanding internet adoption and affordability. The City will continue to review new technologies such as cellular 5G networks, low-orbit satellite internet, Wi-Fi 6, and Citizens Broadband Radio Service (CBRS) and work to encourage investment in, as well as identify barriers to deployment of advanced technologies that would expand internet access. We will also continue to explore opportunities to leverage network assets in Seattle City Light, Seattle Public Utilities, and Seattle Department of Transportation (SDOT)'s infrastructure as a platform for low-cost wireless broadband. SDOT will launch the updated right-of-way management system in November 2020 to better monitor conduit and fiber installation during street openings.

A timeline for implementing the City's IFA strategies

As requested in the IFA, this report includes a "timeline for presenting subsequent reports to the (Transportation & Utilities) Committee for the longer term, sustainable solutions of the Action Plan." A high-level timeline is provided below with more detail provided in the body of this report:

Timeline and Key Milestones for Internet for All
2020
Submit IFA report with an emphasis regarding gap analysis.
Support Seattle Public Schools' efforts to increase and improve student-household internet access and quality.
Continue engagement with private partners and community organizations.
Continue and start new actions to foster up to 20,000 internet connections & devices for underserved.
2021
With Council feedback on strategy and proposed actions, provide an updated report with further refinement of proposed actions.
Provide update on evaluation outcomes and status update for actions in operation.
Provide update on engagement with partners to develop "Internet for All fund".
2022-2023
Complete objective of fostering up to 20,000 internet connections & devices for underserved.
By the 2023 Technology Access and Adoption Study, the data points towards universal internet adoption.
Significantly increase the internet adoption rate for households with annual incomes under $25,000.

This concludes the Executive Summary

This Executive Summary has provided an overview of Seattle IT's response to the IFA. This section outlined the gaps our community is facing, providing insight to the barriers, and the status of our City's connectivity. It also sets the stage for more detailed research and strategies noted in subsequent sections. The remainder of the report addresses specific areas requested by the Council in more detail. For the reader's convenience, links to reference the detailed sections of the report, are provided below, or you can advance through the report in a more traditional page by page fashion.

Background & Internet Primer | **Gap Analysis** | **Lessons Learned**

Action Plan: Strategies | **Partnerships** | **Infrastructure** | **Resources** | **Evaluations**

Thank you for the opportunity to prepare the Internet for All report and challenge ourselves with additional ways to reach the City's long-standing vision of universal internet access and adoption for residents regardless of socioeconomic backgrounds.

Background and Internet Primer

The Internet for All Resolution, co-sponsored by Councilmember Alex Pedersen, Council President M. Lorena González, and Councilmember Debora Juarez, provided a framework to develop a roadmap to address internet access and adoption issues exacerbated by the COVID-19 pandemic.

As described in the resolution, the COVID-19 pandemic amplified the reality of inequitable and detrimental gaps in internet access, adoption, and affordability for underserved groups. COVID-19 has vividly illustrated how our digital networks are woven into every aspect of our personal and professional lives and serve as the critical backbone for our economy. Nationwide, home broadband traffic has increased approximately 20 to 40 percent since the beginning of COVID-19.

In reviewing the robust Action Plan to close the 5% gap of Seattle households without internet access, it is important to establish where Seattle stands to remove any misunderstanding. According to the most recent American Community Survey data regarding household internet access data, **Seattle ranked number one for households with cable, DSL or fiber broadband[4] and third for all broadband types.** Seattle's standing results from the City's long commitment to fostering the deployment of fiber broadband systems and supporting digital equity programs[5]. Despite our ranking compared to other U.S. cities, Seattle is not complacent, and we must continue to push forward on proactive internet strategies to meet the diverse needs of our communities.

We also need to be careful not to equate broadband internet *availability* with broadband internet *adoption*. While the City's current role does not include providing internet service as a utility directly to our residents, we remain focused on the continuous advancement in wired, wireless, and fixed wireless internet connectivity technologies and maintaining a best-in-class infrastructure for all types of telecommunication deployment. Seattle has three major fixed broadband ISPs for residents and businesses (Comcast, Wave, and CenturyLink) and an additional three smaller fixed broadband ISPs for multi-dwelling unit buildings (MDUs) and businesses (Atlas Networks, Wave G, and Google Fiber Webpass). Many Seattle neighborhoods and buildings have access to at least one competitive option for internet service, and more than 93% of Seattle is served by fixed broadband capable of offering gigabit broadband. Gigabit service is available from cable providers CenturyLink, Comcast and Wave, and Atlas Networks, Wave G, and Google Fiber Webpass in MDUs. Eighty-eight percent (88%) of Seattle residents purchase fixed broadband subscriptions with the remaining 4-7% using cellular (4G LTE) data service or free internet options.

When we closely examine the internet *adoption* gap and barriers for households without broadband of any type, the underlying problem is not our internet infrastructure and availability of broadband through market ISPs. The majority of residences and businesses in Seattle have access to at least one fixed broadband ISP, as well as wireless 4G LTE services. The key issue is service *affordability* at adequate service levels and a need for low-cost pricing for high-speed internet service levels provided at the low-income tier.

Depending on the ISP's service area, six low-cost internet programs – ranging from $9.95 to $20 per month – are currently available to low-income residents. However, speeds and wireless data caps for these low-cost programs are insufficient to support the internet capacity needs of students and parents now simultaneously studying and working from home during COVID-19 and videoconferencing for remote learning and teleworking. All the low-cost service programs meet the current standard for "broadband internet" of 25 Mbps downstream and 3 Mbps upstream ("25/3") set by the Federal Communications Commission (FCC) in 2015. Low-cost internet

[4] https://airtable.com/shr1kltU7o10a6Bje/tblBgvjtgtjFALxkp?backgroundColor=orange&viewControls=on

[5] See Appendix A Seattle's history of advancing digital equity and fostering best-in-class internet infrastructure

programs are at 25/3 for wireline programs (Comcast and Wave) and 4G LTE service for mobile hotspots offers 30-50 Mbps download and 4-13 Mbps upload. COVID-19 has abruptly brought us to the point where the current 25/3 FCC broadband standard may be insufficient to support the high-speed broadband connectivity needs of Seattle residents. To target service levels that will offer equity to low-income residents and be adequate for growing digital connectivity demands, plans are needed at the 50-100 Mbps level.

The following two tables further describe internet speeds (broadbandnow.com) and internet prices.

Internet Speed FAQ[6]		
Internet Speed	**Users**	**Speed Summary**
25 Mbps	1-2	Basic
100 Mbps	3-4	Average
200 Mbps	4-5	Fast
500 Mbps	5+	Very Fast
1000 Mbps	5+	Gigabit
Mbps stands for "Megabits per second."		

How Much Speed Do I Really Need?	
Minimum Speeds Required	**Activity**
1 - 5 Mbps	Check email and browse the web.
15 - 25 Mbps	Stream HD video content.
40 - 100 Mbps	Multiple video and audio conferencing occurring simultaneously (remote learning and teleworking). Stream 4K content and play competitive online games.
200 + Mbps	Stream 4K content, play online games, and download very large files.

Real-time internet speeds depend on several factors.
1. Is the user wired into the router or connected wirelessly through the access point? What is the distance from the wireless access point and surface materials (internal walls/obstacles) between the two points (should be centrally located if possible)?
2. If the router/access point is in a crowded area with other wireless networks, what channel is the access point set on? Channels 1, 6, and 11 are the best choices, but depending on other wireless networks in your vicinity, one of those channels might be a better option than the others.
3. How many devices are connected and in use simultaneously?
4. How many users are streaming from video service simultaneously?
5. The internet is a network of networks and traffic as a whole. Network traffic on the video platform/server.

[6] https://broadbandnow.com/

Internet Prices (unbundled & does not include costs for equipment) August 2020					
Tier	Speed[7] (download/upload)	Price (promotion)	Contract	Price (no promotion)	Notes
Comcast					
Internet Essentials (Low-Income Program)	25 Mbps 3 Mbps	n/a	n/a	$9.95	Eligibility Requirements. For *new* customers only.
Performance Starter+	25 Mbps 3 Mbps	$24.99	1-year contract	$50	1.2 TB Data cap
Performance Select	100 Mbps 5 Mbps	$34.99	1-year contract	$55	1.2 TB Data cap
Performance Pro+	200 Mbps 5 Mbps	$49.99	1-year contract	$70	1.2 TB Data cap
Blast! Pro+	300 Mbps 10 Mbps	$64.99	1-year contract	$80	1.2 TB Data cap
Extreme Pro+	600 Mbps 15 Mbps	$74.99	1-year contract	$90	1.2 TB Data cap
Gigabit	1,000 Mbps 35 Mbps	$84.99	1-year contract	$100	Available in all areas.
Gigabit Pro	2,000 Mbps 2,000 Mbps	n/a	2-year contract	$299.95	No Data cap Fiber internet Not available in all areas.
WAVE					
Simply Internet/ Internet First (Low-Income Program)	25 Mbps	n/a	n/a	$9.95	Eligibility Requirements. Open to *new* & existing customers.
High Speed 100	100 Mbps 5 Mbps	$39.95	2-year contract	$69.95	400 GB Data cap
High Speed 250	250 Mbps 10 Mbps	$49.95	2-year contract	$79.95	500 GB Data cap
Gig Speed Internet	940 Mbps 10 Mbps	$79.95	2-year contract	$99.95	Unlimited data
CenturyLink					
No Low-Income Internet Program Offered					
Up to 40 Mbps	1.5 – 40 Mbps	n/a	n/a	$49	Speeds depend on area system. Available in areas with copper network
Up to 100 Mbps	100 Mbps 100 Mbps	$49	n/a	$65	1 TB Data cap Available in areas with fiber network
Fiber Gigabit	940 Mbps 940 Mbps	$65	n/a	$85	Unlimited data Available in areas with fiber network

[7] Services are "up to" speed levels and actual speeds may vary based on device connection and other factors.

Gap Analysis

Note: The Gap analysis presented in the section below contains an extensive amount of research responding to each of the requests in Section 3A of the Resolution. For the reader's convenience, please use the links below to find the analysis that corresponds to those specific requests.[8]

> [Council requests] a succinct gap analysis that lists the no-cost and low-cost programs already available in The City of Seattle while quantifying the actual gaps in affordable internet access and adoption for Seattle residents, updated with available data regarding the 2020 experience of students in Seattle Public Schools. and City of Seattle's "Dig Once" policy and its implementation. –Section 3.A.- Resolution 31956

As requested by the Resolution, the City performed a gap analysis to better understand the *gaps* in affordable broadband access for Seattle residents. This included a quantitative analysis of residential broadband access in Seattle as well as a qualitative assessment of factors contributing to this inequity. Along with lessons learned from other municipal efforts, the gap analysis directly informed the strategies presented as part of the City's Action Plan. Importantly, this gap analysis sheds light on the groups of residents that are the least connected and thus deserve additional attention when addressing this digital divide. The Resolution wisely acknowledges that its

[8] This gap analysis leverages available data from the 2018 Technology Access and Adoption Study, 2020 King County Broadband Access Study, American Community Survey (2018 ACS 5-Year Estimates), and Seattle Public Schools surveys gathered during COVID-19. While we have conducted outreach to develop this report, we have not yet formally collected any additional data since the resolution was adopted on July 27, 2020.

commitment to a goal of ensuring residential broadband for all residents does not take place in a vacuum. Significantly, many institutions are operating to increase broadband adoption in Seattle. Since the City's work should build on top of these ongoing efforts, the Resolution noted that the City's gap analysis include a list of low- and no-cost internet programs currently available to residents. In presenting these options in the lists below, the City can better understand what current efforts it can leverage as part of its Action Plan as well as appreciate that even with all these programs, some residents remain under-connected and underserved. Within that context, this gap analysis will then quantitatively analyze residential broadband access and then discuss qualitative factors that explain those gaps. Lastly, this section will explore how these factors affect enrollment in Internet Programs and may be affected by Seattle's Dig Once Policy promoting broadband infrastructure development.

Low-Cost Internet Options:

Provider	Price	Service Area	Eligibility	COVID-19
Comcast *Internet Essentials*	• Home internet connection. • $9.95/month + tax. • Speeds up to 25/3 Mbps. • Free modem, installation and in-home Wi-Fi. • Access to 40 1-hour sessions of XFINITY Wi-Fi hotspots outside the home every 30 days.	Comcast network	Open only to new Comcast internet customers. National School Lunch Program, Public Housing Assistance, Medicaid, SNAP, SSI, LIHEAP, Women, Infants, and Children (WIC), and Temporary Assistance for Needy Families (TANF).	COVID-19: First 60 days of free service, apply by 12/31/2020. SPS Families and Students 6 months of service.
Wave *Simply Internet*	• Home internet connection. • $9.95/month + tax. • Speeds up to 25/3 Mbps. • Free modem, installation and in-home Wi-Fi.	Wave network	Open to current or new Wave customers. Qualify for Seattle Utilities Discount Program, low-income subsidized housing, or have child qualified for free or reduced school lunch program.	Program approval locally administered by Seattle IT Office of Cable Communications.
Wave *Internet First*	• Home internet connection. • $9.95/month + tax. • Speeds up to 25/3 Mbps. • Free modem, installation and in-home Wi-Fi	Wave or Wave G network	Open only to new Wave or Wave G customers. Qualifying low-income households, students in low income households, National School Lunch Program, Medicaid, SNAP, SSI, and others.	Program approval national COVID-19: Internet First announced April 6, 2020. First 60 days of free service, apply by 12/31/2020.
InterConnection Low-Cost Internet	• Mobile Hotspot internet connection • $11.95/month for service. • $99 (plus tax/shipping) one-time cost for Hotspot device purchase • Unlimited Sprint 4G LTE data through Mobile Citizen; no throttling or overage charges	T-Mobile service sold by Mobile Citizen under educational bandwidth agreement	DSHS recipient or income below 80% Area Median.	

Provider	Price	Service Area	Eligibility	COVID-19
PCs for People Low-Cost Internet	• Mobile Hotspot internet connection • $15.00/month for service. • $95 (plus tax/shipping) one-time cost for Hotspot device purchase • Up to 150 Mbps. • Can share Wi-Fi with more than one computer or other Wi-Fi enabled device at a time.	T-Mobile service sold by Mobile Beacon under educational bandwidth agreement	A potential recipient must be below the 200% poverty level or be currently enrolled in an income-based government assistance program	Added to City list of services during COVID-19 crisis.
Atlas Networks	• Home internet connection • $9.99/month 50/50 Mbps (go into effect 10/1) • $19.99/month 100/100 (go into effect 10/1) • $29.99/month gigabit/gigabit (go into effect 10/1) • Free installation • $6.00/month internet modem fee (or can use own personal internet modem).	Apartment buildings served by Atlas	Live in building's low-income units.	Check Atlas's 'building finder' to see if building has service.

Enrollment Data to Low-Cost Internet Programs

ISPs do not regularly share enrollment data with the City, and no other ISP offered enrollment data for this report. It would be advantageous to continue seeking this data from ISPs to enable more specificity in understanding community needs and allow for more targeted outreach to further the goals of IFA.

Comcast Internet Essentials: The low-income internet program launched in 2011 with a mission to connect people who are not connected. Over the life of the program it has connected more than 340,000 Washington residents, including more than 132,000 in King County.

No-Cost Internet Options:

Provider	Price	Service Area	Eligibility	COVID-19
Seattle Public Schools	• Limited duration sponsored free service • Mobile Hotspot internet connection for 1 yr. (T-Mobile/Mobile Beacon & Verizon) • Home connection – initial 6-months free (Comcast, Wave). Extension planning underway • Partial OSPI support	Seattle	Low-income household with Seattle Public School student	SPS distributed over 2000 hotspots to families and initiated sponsor cable broadband agreements, signing up hundreds of families.
City of Seattle	• On-site access to a computer and the Internet • Free of charge. • Site list here	City Community Centers (34 locations)	Open to general public	*Sites not open during COVID-19. See attachment - Brief Summaries of Support Provided by the Broadband and Community Technology Team during COVID-19.
Seattle Public Library	• On-site access to a computer and the Internet • Wi-Fi Hotspot devices for loan (check-out). • Free of charge. • Unlimited data • Site list here	City Libraries	Open to general public and some targeted to specific needy population via community partnerships SPL patrons can check out, take home easy-to-use Wi-Fi HotSpot devices. Reception same as any cell service.	*Sites not open during COVID-19. Additional devices added, in part through federal dollars, via State library and SP Foundation.
Seattle/Comcast/Wave "Access for All" Non-Profits	• 3rd Tier Business Class internet service connection provided by Comcast or Wave • Free of charge • Includes Wi-Fi which sites have option to make available to their clients	204 Seattle locations Service area: Comcast or Wave	Seattle non-profit organization: providing technology and/or digital literacy services to underserved, low income, or vulnerable populations.	City can annually allot 25 new site connections (20 Comcast, 5 Wave) Many Access for All sites use free connection to provide internet access to their client populations.

Overall Internet Adoption Gap:

Even with the efforts behind the programs listed above, some households remain unable to access residential broadband. The City finds that five percent (5%) of Seattle households reported not having internet. This quantitative analysis of the internet adoption gap further defines the inequities of residential broadband access and puts it into context of broader data on connectivity.

According to the 2018 Technology Access and Adoption Study, ninety-five percent (95%) of households reported internet access through wired or wireless services, including cable, DSL, fiber, cellular data, free hotspots, building or resident recreation centers, and free public Wi-Fi. Eighty-eight percent (88%) of Seattle residents purchase fixed broadband (cable, DSL, or fiber) through an internet subscription from an internet service provider.

The adoption gap continues to close based on the data trend from the last two Technology Access and Adoption studies. From 2013 to 2018, the City increased from 85% to 95%. In 2014, 37% of households with incomes less than $20,000 did not have internet access at home. While not an exact income match, in 2018, 21% of households under $25,000 were without internet—a 16% increase in internet adoption over 5 years for low-income residents.

How many Seattle households and residents do not have Internet at home?			
5%	17,575 Households	37,365 Residents	Seattle households without internet of any type in their home.
The household and resident number is estimated based on the official 2019 estimates for Seattle from the WA State Office of Financial Management.[9] Households: 351,503 on 4/01/19 | Population: 747,300 on 4/01/19			

Of the 95% of internet connected households, how many have a fixed broadband internet subscription?	
88%	Seattle households with fixed broadband internet subscription (e.g. Comcast, CenturyLink, Wave). The remainder rely on other means (e.g. cellular data plans).

What key groups are less likely to have internet in their home?[10]	
21%	**Seattle households under $25,000.** Living in poverty (at or below 135% of the Federal Poverty Level): 5 times more likely not to have internet access.
4%	**Seattle households $25,000 to $50,000** Living in poverty (at or below 135% of the Federal Poverty Level): 5 times more likely not to have internet access.
22%	**Seattle Housing Authority (SHA) Household** The 2018 Tech survey included a targeted sample of SHA owned apartment and multi-dwelling units. Specific data not gathered on other affordable housing.
20%	**High School graduate or less**

[9] https://www.seattle.gov/opcd/population-and-demographics/about-seattle#population

[10] Note: Percentages do not add up to 100% as multiple responses are possible.

15%	**Household Member Living with a Disability** Three (3) times more likely not have internet access.
10%	**Primary Language Other than English** Two (2) times more likely not have internet access.
9%	**Older Adults (65 years +)** 1.8 times more likely not have internet access.
8%	**Race/Ethnic Minorities/BIPOC** Non-White residents (members of race or ethnic minorities): 1.6 times more likely not to have internet access.
35%*	**Insecurely housed (living in temporary housing or homeless)** *Sample size is too small to provide reliable results. Sub-segment analysis warrants further research and/or a large sample size.

COVID-19 impact on groups without fixed broadband internet subscription

Those in lower socio-economic status geographic areas and those with a lower household income are significantly more likely to have no fixed broadband subscription and instead rely on other means to get access in their homes.

4%	Rely on cellular data plans alone.
13%	Households under $25,000 are cellular data plan only. More than double as likely (when compared to households with higher incomes) to rely on a cellular data plan as the only source of internet.
17%	Households under $25,000 use free internet access as one source of internet.
6%	Those living in South Seattle (District 2) rely on cellular data plans without having any internet subscription at all.
8%	Central Seattle residents (Districts 3 and 7) are the most likely to use free or public internet where they live.

Internet Access by Council Districts

	Internet access in place of residence	Without an internet subscription	Only cellular data plan	Free internet access
District 1 (West Seattle)	96%	5%	4%	4%
District 2 (Southeast Seattle)	93%	9%	6%	5%
District 3 (Central Seattle)	97%	5%	3%	8%
District 4 (Northeast Seattle)	97%	5%	2%	7%
District 5 (North Seattle)	95%	7%	3%	7%
District 6 (Northwest Seattle)	97%	4%	3%	4%
District 7 (Pioneer Square to Magnolia)	95%	6%	4%	8%

Fully Served Groups (2018 Technology Access and Adoption Study)	
99%	Of households with incomes of $50K or more have internet access.
98%	Of households with child(ren) aged 17 or younger have internet access
98%	Of households with child(ren) who attend Seattle Public Schools have internet access **Updated data from SPS in 2020 indicates a more significant gap*

What specific areas in Seattle require our attention to improve internet access?

To dig deeper into the data to highlight the groups of residents that remain most unconnected the City relied on findings from the 2018 Technology Access and Adoption Study. To ensure a robust gap analysis, the City augmented this research with additional data centered around the digital divide (a lack of internet access and/or digital skills). We summarize those findings highlighting those key residential groups below:

Dr. Roberto Gallardo of Purdue University Center of Regional Development created a metric called the Digital Divide Index (DDI). The DDI was designed as a descriptive and pragmatic tool to help policymakers and leaders understand this topic and rank geographic areas along a digital divide continuum. There are two main categories and scores that are used for the DDI index total score (Infrastructure and Socioeconomic scores). The DDI ranges in value from 0 to 100, where 100 indicates the highest digital divide.

Census tracts with the most digital need (based on the Digital Divide Index) include: South Central Seattle (Pioneer Square, Yesler Terrace, International District), and New Holly in South Seattle.			
South Central		New Holly	
Census Tract 92	DDI 49.0	Census Tract 110.02	DDI 37.5
Census Tract 85	DDI 47.7	Census Tract 110.01	DDI 47.6
Census Tract 91	DDI 53.9		
Census Tract 90	DDI 38.8		
Households in South Central Seattle and New Holly neighborhoods are significantly less likely to have internet access in the home. Residents living in these areas also have limited public resources for accessing the internet.			

Adequacy of Internet

The perceived adequacy of an internet connection is based on two factors:

- **The type of internet service**—fixed broadband subscription versus cellular data for internet or free/public access internet. 21% of fixed broadband subscribers say their internet is not fully adequate versus 34% and 36% for cellular data and free/public access internet.
- **Household income correlates with assessment of adequacy of the internet.** The higher the household income, the more likely internet is considered adequate.

Adequacy of Internet Access by Income		
Household Income	Rarely/Not Adequate	Sometimes Adequate
Less than $25,000	30%	15%
$25,000 - $49,999	10%	13%
$50,000 - $ 99,999	5.5%	11%
$100,000 +	2%	11.5%

What are the barriers to internet adoption?

To be able to directly address the gaps in residential broadband, it is important to dive deeper and identify the factors that contribute to this disparity. According to the 2018 Tech Access Survey, barriers to adopt internet include cost, lack of computer devices, personal credit issues, and awareness. **As a result, twenty-one (21%) percent of Seattle households with incomes under $25,000 do not have internet access in their place of residence compared to almost 100% for households making over $50,000.** Significantly, research shows that once a household's income reaches $50,000, differences in internet access can no longer be explained by income. The research below further explains the factors that contribute to a lack of residential broadband access before exploring enrollment into programs designed to promote broadband access within this environment.

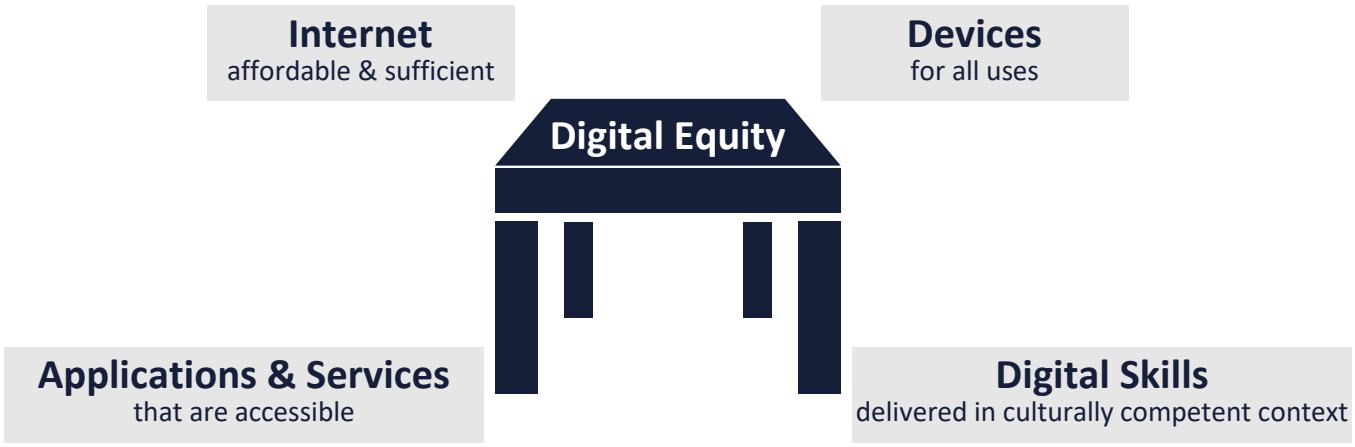
Top reasons for the 5% of households who do not have internet in their home	
61%	Say cost is a primary barrier to obtaining internet access.
30%	Don't have a device to access the internet.
20%	Don't have the credit or deposit requirements.
16%	Don't know how to obtain internet access.
8%	Say the internet is too slow and/or unreliable.
8%	Don't trust the internet or technology companies.

23% of all survey respondents cite the following reasons for not using the internet more	
57%	Internet service is too expensive.
34%	It is too slow / frustrating / internet does not work well.
26%	Service plans from internet service provider are confusing.
18%	Not interested or do not need / want to use it.
15%	I do not know how to use the internet.
12%	I do not have a device to access the internet.
7%	I have no time to learn about it or how to use it.
6%	I do not like what I would see or read on the internet.

Groups more likely to report barriers to using the internet more	
54%	Of those living at or below 135% of the Federal Poverty Limit
49%	Of Black residents of the city
38%	Of older adults (65 years of age or older)
33%	Of those living in South Seattle (Council District 2)
31%	Of Asian residents of the city
30%	Of those who live alone

Computer Devices and Digital Skills Gap

Internet is one aspect of the overall community digital equity gap to be addressed. Proper computing devices and digital skills training are equally as important as getting connected to the internet. Seattle and cities across the country have identified **four key elements of digital equity**: 1) affordable and sufficient internet, 2) devices appropriate for all uses, 3) accessible applications and services, and 4) digital skills and tech support delivered in a culturally competent context. Addressing the digital equity gap requires "intentional strategies and investments to reduce and eliminate historical, institutional and structural barriers to access and use technology."[11]



Significant disparities continue in which households have sufficient devices, particularly laptops which have become the most robust and flexible device for use at home or on the go. Moreover, lower-income households are more likely to have to share laptops and other devices. **Of those with any internet service at home, 61% of low-income households, at or below 135% of the federal poverty level, have laptops compared to 94% of households with incomes $75,000 or higher.**

"Many community members have identified that, in addition to access to internet, access to a computer is one of the biggest barriers they face regarding digital equity. While some families might have one computer, this is not sufficient for homeschooling and such when there are several kids in one household and more than one working parent that might also need access to a computer." – Alberto Rodriguez who leads the Duwamish Valley Program

14%
80,708
Residents report limited digital skills.

Skills & Use of Online Services

Digital skills are an important part of increasing residential broadband adoption as well as achieving broader digital equity goals. More than 14% of our residents report limited digital skills. That number is significantly higher for some economically disadvantaged groups, those with lower education levels, and limited English speakers. The research found that almost half of African/African American residents (49%) had below average online skills.

[11] From the National Digital Inclusion Alliance definition of digital inclusion and equity, developed with City of Seattle participation. https://www.digitalinclusion.org/definitions

Groups with Limited Digital Skills This segment tends to lack skills or confidence when it comes to technology and the internet. However, they are not limited by access – they all have internet where they live, and nearly all have a smart/mobile phone and computer in the household (HH), and they own their devices. Nearly all purchase their internet service.	
19%	Members of racial or ethnic minorities rely on someone else to help access the internet.
33%	People who live in households where English is not the primary language rely on someone else to help access the internet.
37%	Older adults (65+) rely on someone else to help access the internet.
38%	People who live in households where there is someone living with a disability rely on someone else to help access the internet.
34%	Households with less than $25,000 in annual income rely at least somewhat on others to access the internet.

Seattle Job Initiative – "Essential Employability Skills: Digital Literacy" (March 2020)

The Office of Economic Development developed two reports earlier this year regarding jobs, digital literacy, and preparing for the network economy. The network economy is heavily dependent on data and there will be a much higher need for proficiency with data management, analytics, and visualization across fields and occupations. The following are key excerpts from the reports:

- Individuals need digital access and basic digital literacy to even apply for and obtain entry-level employment.
- The data is clear: having essential digital skills increases one's chance of entering the workforce, retaining employment, and advancing to higher-paying jobs.
- First, most of the change in demand for digital skills (over 90%) is due to an increase in the digital content of existing jobs. In other words, occupations that scored low on the digital score in 2002 did not disappear, rather they now require higher levels of digital literacy.
- Second, these same occupations are responsible for the vast majority of the increased demand for digital skills in the workforce. Many former low-technology jobs now require middle-level digital skills and nearly all jobs require some digital skills, even entry-level jobs most accessible to those with limited educational attainment.
- In addition, many jobs that require little to no formal training or education also require essential computer skills.
- In 2020, there are 110,000 jobs in these sectors that require medium digital skills.
- The mean digital score for the Seattle-Tacoma-Bellevue region rose from 27 in 2002 to 43 in 2016 ranking the region eighth in the top 15 metro areas by digital score in the U.S. The Digital Score metric estimates the percentage of tasks in a specific job that are digital and the skill level of those tasks (basic,

intermediate, or advanced), that can be categorized as low, medium, and high digital skill jobs.

- Recommendation: Policymakers and educators—especially for the adult jobseeker population—need to focus on computer skills as basic as turning the computer on and off, navigating files and folders, web browsing, adding e-mail attachments, etc., along with middle skills needed to use standard office software and occupation-specific software and apps. These are now essential employability skills and are a pre-requisite to be successful at other job-related skills

Student Internet & Device Gap

Governor Jay Inslee's emergency order on March 13, 2020 closed all K-12 schools in Washington. With schools and families managing remote learning, every student must have access to reliable internet and computing devices. At the start of remote learning, Seattle Schools pivoted to provide a 1:1 device program for all grades and sponsored internet service for those in need. **Seattle Public Schools (SPS) have distributed 26,000 devices to students and over 2,300 internet hotspot devices and sponsored internet accounts**. They expect to have an additional 15,000 devices distributed by the end of September. For devices, students in Kindergarten through second are provided iPads and grades 3-12 are provided laptops. Students may use their own devices if they have them and SPS initial projections are that 15-20% of students in grades 9-12 and 10% of students in grades K-8 will not need school issued devices. Students also have the 9,000 Chromebooks that were provided by Amazon. Support for personal devices is limited. The District projects that 8400 laptops will need to be refreshed in the next 3 years. The student laptops are $500-700 dollars each so the cost would be as much as $4.2M-5.88M. All allocated student device money has been spent and these funds are not currently earmarked in the levy and would need to come from elsewhere.

Seattle Schools has addressed student internet needs through a combination of providing mobile hotspots and assisting families with fixed cable broadband service, primarily through the Comcast Internet Essentials program. SPS has provided 425 Comcast service sponsor (promo) codes, directed 60 families to Wave for sponsored service, and distributed 1108 Mobile Beacon Coolpad hotspots, according to data compiled by SPS on September 11**. Just in the new school year period of September 1st-11th, they distributed 481 hotspots and 156 Comcast Internet Essentials sponsor codes.** Since schools closed in March, they distributed 835 Verizon hotspots to be used to complete the school year and summer programs and have distributed some this fall. SPS continues to look at a variety of options to extend internet access to its students, including the provision of hotpots, Mobile Beacon Coolpads, and partnerships with internet service providers. **SPS reports that they are currently responding to 10-15 hotspot requests per day.** Sign-up events were held at some schools through the summer to enroll students and provide tech support. Now schools are transitioning enrollment to a combination of school-based assistance and tech support centers.

Additionally, they are providing Wi-Fi repeaters for those who express a need for extended coverage in their home. SPS verifies sponsorship, but families still need to complete applications with Comcast or Wave. SPS initially targeted hotspots for housing insecure students (McKinney-Vento), but found a need to expand this to those in the Wave area, for larger households for whom the 25/3Mbps cable broadband program connections may not be sufficient, and other reasons, including those likely to move frequently or those who are not eligible for the Comcast program. It was also found that some students in shelters were relying on Wi-Fi provided by the shelter and these were set-up only for one or two activity rooms, with better coverage needed in additional activity and sleeping rooms. A higher demand for hotspots has been evident leading into the school startup from families that were having challenges signing up for service or needed to get students connected before installations could be scheduled. Both the Comcast and Wave low-income programs have requirements for students/families to be free or reduced lunch eligible or qualify for other public assistance programs such as

Housing Assistance, Medicaid, SNAP or SSI. For Comcast, a household cannot have subscribed to Comcast Internet within the last 90 days and there are limitations if you have outstanding debt less than one year old. Currently, Comcast sends an installation package with their modem and Wave schedules a technician visit to ensure the service is installed and operational.

Both the Comcast and Wave low-income program cost $9.95 per month plus taxes and fees. The hotspot service is approximately $11-15 per month plus the cost of the modem ($60-100); specific cost varies depending on what agreement is available. Seattle Schools sees the need to continue sponsored internet to ensure students can participate in school. They have committed to a year of service on the hotspots, are ordering more, and are looking at cost and provider options. It will be critical to ensure families that they will have internet through the school year and address potential cost burdens on the families if the sponsorship lapses. The Washington State Office of Superintendent of Public Instruction (OSPI) has allocated $8.8 million statewide which will reimburse districts at the cable broadband program rate and/or provide sponsored accounts with providers. Details for this are still forthcoming.

Seattle Public Schools is opening with these mitigations and will closely monitor for at least the first 8 weeks of school. They will assess need to determine whether to continue beyond that. These locations provide hotspot, laptop and SPS device support, support with remote learning software (e.g., Seesaw, Schoology) and other educational resources, general technology resource information, and support with translation software (Microsoft translator, Talking Points, Linguistica) and additional English Language instructional support. Students and families can also call the school's tech support line at 206-252-0100 (Monday -Friday, 7:30 a.m. – 4:00 p.m.) or email laptops@seattleschools.org with any questions. They have seen high initial volumes of requests and are looking at additional use of volunteers to help with the centers and support requests. SPS is in discussion with sea.citi about continuing to provide additional volunteer support. SPS has also built out their online technology resources information, including how-to guides, and instructional videos in multiple languages. They have indicated a need to further develop these materials and promote their use.

FCC E-Rate Program for Schools:
The FCC's E-Rate program provides discounts for telecommunications and internet access to eligible schools and libraries. Seattle Public Schools qualifies to receive a 60% discount on eligible services. Because the majority of students are remote learning due to COVID-19, advocacy groups are petitioning changes to the E-Rate program to include home broadband connectivity for low-income student households. The legislative rationale is students are not in school right now but at home, therefore, the funds should be eligible to support home broadband for students. The FCC rule prohibiting schools and libraries to essentially share the Wi-Fi to surrounding neighborhoods has been temporarily waived in response to COVID-19.

Seattle Public Schools Needs Assessments and Surveys during COVID-19

Tracking the actual number of Seattle Schools' students needing internet and devices has been challenging and brought to light that there has not been a structure in place to ensure this is collected for every student. SPS is running a new "Tech Check" in September where teachers and staff are asking students about their technology status. The greater number of students and family members simultaneously doing video conferencing during COVID-19 has also surfaced the need to gauge and address adequate bandwidth. There will be additional data coming from the back-to-school Tech Check. The most recent estimates of internet need were contained in the

August SPS Home Digital Access Data report for the Washington State Office of the Superintendent of Public Instruction.

Grade Level	# of Enrolled Students	Adequate Internet for Remote Learning	Inadequate Internet for Remote Learning	No Internet
PK-5	26,920	22,882	1346	2607
6-8	12,229	10,395	611	1544
9-12	14,878	12,646	743	1949
Total	**54,027**	**45,923**	**2700**	**6100**

While this data is only an estimate, it indicates at least 8800 students still need adequate, reliable internet.

Seattle Public Schools (SPS) also conducted two surveys to assess internet access and device availability for its students during the COVID-19 remote learning period. Unfortunately, level of reliability is limited on both reports. Due to the significant variation between the two (SPS) surveys, and contrasted by findings from the 2018 Technology Access and Adoption Study and 2020 King County Broadband Access Study that report 98% of households with child(ren) who attend Seattle Public Schools have internet access, a precise disparity assessment of Seattle is not represented here based on available data.

- **Seattle Public Schools Remote Learning Stakeholder Survey (May 2020):** Seattle Public Schools invited all families, educators, school leaders, and central office staff to participate in stakeholder surveys to better understand continuous remote learning. SPS included the following note as part of the survey results:

  "The survey data summarized here is reflective of the subset of SPS stakeholders who opted to participate in the surveys and does not equitably represent the views of the total population of SPS. Respondents were overrepresented by white families and families from schools with lower percentages of students receiving Free and Reduced Lunch (FRL). Families from elementary schools also responded at a higher rate. Black families, Hispanic/Latino families, and families of students attending schools with a high percentage receiving FRL are under-represented in the survey data. The full report does however include fully disaggregated survey results that reveal important group differences by race/ethnicity, income (FRL), and grade band (elementary school, middle school, high school)."

  15,542 total responses from SPS families (SPS total enrollment is 53,627 students)
  3,247 total responses from SPS educators (SPS employs a total of 5,809 educators)
  64 total responses from SPS school leaders
  95 total responses from SPS central office staff
  24 interviews with the Remote Learning Steering Committee and Small Cabinet

96% of students have reliable internet or accessing through a smartphone.

2300 student households classified as homeless.

99% of students have reliable tablet, laptop, or computer.

- **Office of Superintendent of Public Instruction Survey (OSPI) (May 2020):** OSPI required districts to complete a survey regarding the services they are providing during school closures. The questions related to internet access and computer devices asked for estimates from the districts. The following percentages were provided by SPS to OSPI in May.

25% do not have a device (owned or loaned) adequate for online learning.

25% do not have sufficient internet for real-time video online learning.

- **Student Engagement Data:** According to data from Seattle Public Schools, between March and June, only 48% of kindergarten through fifth graders logged into Schoology, the district's learning management where teachers post assignments and announcements.

Sea.citi's Navigating the Digital Divide (July 2020) provides additional information on the gaps in skills and use of online service for Seattle Public Schools families: A recent report produced by sea.citi provided the following insights for computer and technical issues experienced by 391 Seattle Public Schools families during remote learning[12] in Spring 2020. After Amazon donated nearly 9,000 laptops to area families to support remote learning, sea.citi, a network of tech and innovation companies, drove the creation of the Family Tech Support Center (FTSC)—a public-private partnership between sea.citi, Seattle Public Schools (SPS), Alliance for Education, and technology companies.

Over the course of eight weeks, from May to mid-June, the Family Tech Support Center fielded approximately 2,500 calls, making 631 unique contacts with families through direct inbound and outbound calls to the FTSC. Outreach calls were made to an additional 997 families who received a donated laptop and whose children attend the district's highest-needs schools. Sea.citi oversaw a critical service need by providing a free, tech-support phone line to help SPS families with computer questions. At that time, approximately 300 calls were answered by more than 100 volunteers, many of whom were from the tech industry. FTSC ended normal operations on the last day of school (June 18).

The challenges were categorized into the following groups: 1) Access, 2) Setup, 3) Hardware Issues, 4) School Applications, 5) Communications, 6) General Applications, 7) No Computer, and 8) Connectivity. The following issues highlight the problems experienced by 391 families:

- Digital literacy support must be comprehensive and not take basic measures for granted.
- Technology tools from the district were often unfamiliar to families.
- True tech support issues were often complicated by other in-home complexities.
- Platforms used for content delivery created unexpected barriers.
- Decentralized education and multi-channel tech support made navigating challenges difficult.
- Established communication channels are less effective when divorced from in-person interactions at school buildings.

Sea.citi's report concluded, "*Based on the operations of FTSC and available data, it is reasonable to state that providing only laptops and internet access to students will not result in consistent and equitable learning, especially for low-income students or students of color… Providing solutions to internet connectivity does not*

[12] https://seaciti.org/wp-content/uploads/2020/07/SPSFTSCP_July142020.pdf

ensure that families will seek out these services, nor that families can adapt to remote learning… Solutions to these challenges must be developed by those most impacted by them and cannot rest solely with the school district."

"Dig Once" Policy & Implementation

The IFA gap includes consideration of the City of Seattle's "Dig Once" policy and its implementation. The resolutions states, "*consumer advocates report up to 90% of the cost of building out broadband infrastructure can be saved by following "dig-once" policies ensuring fiberoptic conduit is included whenever the City is undergoing construction in the public right-of-way or utility space*."

The City's policy defining the standards and procedures for pavement construction and ensuring the City's assets are restored appropriately is officially 15.32.050 – Coordinating projects and deferring construction in our Seattle Municipal Code. SMC Chapter 15.32 was updated in 2016 through Ordinance 125149. The ordinance included a number of changes, but most significantly: 1) required planned projects to be entered into the Seattle Department of Transportation (SDOT) right-of-way management system; 2) increased the membership of the Utility Coordinating Committee to also include Seattle Parks and Recreation, Seattle Department of Information Technology, Seattle Department of Construction and Inspections and representatives from utilities that construct, maintain or operate in the public place; and 3) increased the pavement opening moratorium from three to five years. All agencies performing work in the right-of-way that is planned at least six months in advance by law (SMC 15.32.050) must enter their project information into the SDOT dotMaps application.

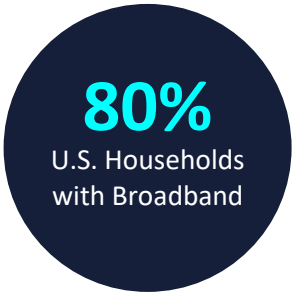
SDOT's right-of-way management system aims to help facilitate construction and minimize the frequency of street openings and disruption to neighborhoods and businesses. There are currently 2,667 "active" or "merged" projects in the dotMaps application. Among the 2,667 projects, 1,206 are considered overlapping—at the same place at the same time. There are additional opportunities for coordination with 1,792 of these projects occurring on the same block but at different scheduled times. In 2019, telecommunication companies accounted for 1,190 applications or 6% of all total applications.

Moving forward, SDOT is in the process of updating the enterprise right-of-way management system. The new system will launch in November 2020 and will collect more comprehensive information, including data for conduit installation. As part of the Action Plan, Seattle IT will work with SDOT to review implementation of the "Project and Construction Coordination (SMC 15.32.050)" policy to promote inclusion of conduit and fiber to provide more access to communications-enabling infrastructure.

Lessons Learned

In developing the report, we are closely monitoring other cities and drawing on innovative programs and strategies around the country. Since COVID-19, with greater interest from the private sector, philanthropic organizations, and community groups—cities have recently announced initiatives to further advance digital equity for all residents. Home broadband traffic has increased approximately 20 to 40 percent since the start of COVID-19[13]. As part of the research process, we reviewed the digital equity plans for other major cities and the extensive amount of reports examining broadband and municipal fiber systems. The following content and information for this section are presented in the following subsections:

1) What is the state of the internet infrastructure in the U.S.?
2) Recent News from Other Cities
3) Digital Equity Plan Review and Takeaways
4) Broadband and Municipal Fiber Broadband System Reports



What is the state of the internet infrastructure in the U.S.?

The high capital costs to deploy infrastructure and the required revenues leads most markets to be served by one or two ISPs. The limited consumer options for fixed broadband is the typical environment throughout the country with three out of four Americans having access to only one broadband provider offering speeds of at least 25 Mbps. Additionally, internet advocacy groups will point to the high prices for top-tier speeds, lack of infrastructure upgrades, "tier-flattening," and price increases as a result of the lack of competition and regulation. In 2015, the Federal Communications Commission (FCC) changed the standard of broadband internet from 4 Mbps to 25 Mbps downstream and 3 Mbps upstream. Last year, advocacy groups urged the FCC to update the speed standard to at least 100 Mbps. The FCC has estimated that it would cost an estimated $80 billion for a one-time fix to deliver broadband to everyone in the U.S. The following are statements expressing a contrast of opinion on the state of broadband in America and closing the broadband gap.

> **Former Chair of the FCC Tom Wheeler (May 2020):** "Tens of millions of Americans do not have access to or cannot afford quality internet service. The United States has an internet access problem, especially in rural areas. The existing program to extend broadband has become a corporate entitlement for incumbent telephone companies. At the same time, the United States has an internet affordability problem. Too many low-income Americans cannot afford broadband internet access… The solution to universal broadband in America is not to patch the old program, but to throw it out. The program now in place was designed for a telephone-oriented world, not the internet economy."

> **Information Technology & Innovation Foundation (July 2020):** "The historic COVID-19 pandemic offers a unique opportunity for policymakers to examine the successes and failures of the nation's broadband system...The jump in demand has seen peak traffic roughly 20 to 30 percent higher than before the pandemic... the increase in broadband traffic was within the anticipated growth in demand operators could already accommodate…with virtually no drop in performance. Nonetheless, the COVID-19 pandemic also amplified some glaring failures with U.S. broadband policy. A persistent digital divide continues to mean not everyone is connected, whether it be due to a lack of infrastructure in rural, uneconomic areas, or a variety of adoption hurdles throughout the country. This evidence from the pandemic should galvanize policymakers and civil society to shift the conversation toward productive gap filling, rather than continuing the tired old debates around issues such as net neutrality and municipal broadband."

[13] https://www2.telegeography.com/network-impact

Recent News from Other Cities

Even as the nation's first Google Fiber City, the **Kansas City Council** adopted a resolution[14] in June 2020 directing the City Manager to develop and implement public-private partnerships to effectuate digital equity for residents, students and small businesses in Kansas City, Missouri. Similar to the Internet for All Resolution, the City Manager will report to the City Council on the progress of the implementation of this effort no later than September 1, 2020 regarding the following three objectives: 1) Are able to subscribe to reasonably priced, reduced-cost or free internet and/or wireless services providing not less than the Federal Communications Commission's ("FCC") broadband definition of 25 Mbps download and 3 Mbps upload speeds; 2) Have access to free and/or low-cost personal computers, laptops, tablets and related hardware; and 3) Have access to training, education and technical support necessary to achieve economic mobility through distance learning, remote work, and entrepreneurship.

In early July, **New York City** announced an investment of $157 million to address digital equity and internet for 600,000 underserved residents—the largest sum made at the city level nationwide. New York City's Internet Master Plan Report revealed that 18% of households do not have a home internet or mobile internet connection with 40% of NYC residents only having internet access on their phones or at home, not both.

Another major city, **Chicago**, announced the Chicago Connected program to provide free internet service to 100,000 students in their households for a minimum of four years. The program is estimated to cost $50 million with the initial funding coming from philanthropic partners and CARES Act funding. According to a report, about 1 in 5 Chicago students lacks broadband access in their home.[15]

In **Baltimore**, where 2 in 5 households[16] do not have a wireline internet service, organizations are banding together to close the digital divide. The Baltimore Digital Equity Coalition brings together over 50 organizations representing nonprofits, parents and teachers, foundations, school leaders, and government. In May 2020, the Abell Foundation released a report documenting the significant digital divide in Baltimore with recommendations to increase access. Grassroot efforts are also underway with one project bringing internet to unconnected households one roof at a time. Project Waves is providing free internet through internet access points on rooftops. Referred to as a community internet service provider, it aims to connect 350 households by the end of 2020. Project Waves recently received grants from the Abell Foundation and the National Science Foundation.

In 2019, the City of **San Jose** announced the Digital Inclusion Fund with the goal of connecting 50,000 households over the next 10 years. The $24 million program includes public funding through 5G small cell usage fees and will need to raise private funding.

FCC Small Cell Order Appeal:
On August 12, 2020, the 9th Circuit Court rejected local governments' challenge to the FCC's Small Cell orders. The Court upheld the FCC's limiting of small cell pole attachment fees to a municipalities' costs, the application of federal shot clocks to non-zoning permits, and a ban on any moratoria on wireless deployments.

[14] Kansas City Legislation #200411
[15] Digital Equity in Education in the Coronavirus Era – Kids First Chicago | Metropolitan Planning Council April 2020
[16] https://www.abell.org/publications/baltimores-digital-divide-gaps-internet-connectivity-and-impact-low-income-city

In **San Antonio**, 38 percent of households have no fixed internet connection with some high schools seeing as much as 75% of students living in households without internet. As part of the mid-year budget review in June, San Antonio is investing $27 million from CARES ACT funding to build out infrastructure to ensure students are connected. The first pilot in the Connected Beyond the Classroom program is a point to multi-point wireless connection system built around a high school and will cover 16 square miles and six neighborhoods. The plan will connect to the city's fiber network and provide at-home equipment for households to connect to the wireless signal rather than hotspot devices—proposed as a longer-term and more cost-effective solution. Elected officials in San Antonio stressed that the project to connect students does not compete with private providers and the City would not itself be providing the internet.

In July, the City of **Chattanooga**, Hamilton County Schools, and the broadband division of Electric Power Board announced a partnership to provide free internet access to 17,700 households with students on the free or reduced lunch program. The HCS EdConnect initiative will cost $8.2 million and the program will connect more than 32,000 students with 100 Mbps symmetrical speeds.

Digital Equity Plan Review and Takeaways

Seattle is part of a select group of cities that have been recognized as a "**National Digital Inclusion Trailblazer**." Initiated by the National Digital Inclusion Alliance (NDIA) in 2016, 15 cities across America have been designated with this distinction in promoting digital literacy and broadband access for underserved residents. The "Trailblazer" cities serve as models for other local governments to tackle digital equity and inclusion efforts. **Seattle has been recognized as a Trailblazer city since the NDIA began recognizing them**. The other current 14 cities are: San Francisco, Austin, Boston, Chattanooga, Long Beach, Portland, San Antonio, District of Columbia, Louisville, Provo, Salt Lake City, Detroit, New York City, and Kansas City. The majority of these cities, like Seattle, have digital equity and inclusion plans, conduct survey research, allocate funding for programs, and are taking steps to improve the affordability issue of broadband service. Appendix F contains an inventory of all the proposed actions in the digital equity plans for the cities.

In reviewing the digital equity and inclusion plans for the 15 "Trailblazer" cities with over 110 total items, the following actions and recommendations were grouped into 12 common categories: 1) Internet Access, 2) Awareness, 3) Devices, 4) Digital Skills, 5) Digital Equity Fund, 6) Community Engagement, 7) Evaluation, 8) Digital Inclusion Coalition, 9) Inventory and Mapping, 10) Partnerships, 11) Advocacy and Policy, and 12) Digital Economy. Additionally, in conjunction with other reports and news from across the country to improve broadband adoption, the following common threads were identified, especially for cities striving to close the remaining gap. The recurring takeaways closely aligns with our proposed strategies and actions.

- Prioritize residents with lower incomes.
- Build awareness to ensure that all residents know about resources (low-income or free internet sources, devices, and digital skills training).
- Increase Wi-Fi access in strategic areas to reach the underserved population.
- Leverage all forms of wireless technologies to bridge gaps in internet access.
- Device programs to increase the number of families that can buy or receive free donated devices are equally as important as getting connected to the internet.

- Ensure digital literacy skills training programs are accessible and available. Providing digital skills training, technical assistance, and in-language support increases the likelihood of internet adoption.
- Adoption of low-cost internet services require reduction of sign-up barriers, community outreach and engagement with trusted community representatives/organizations, and sign-up facilitation.
- Develop local broadband mapping tool—incorporating local broadband access and adoption mapping and data metric tools with other equity tracking data to analyze access and adoption issues and measure progress.
- Spur strategic partnerships for affordable, high-quality internet access.
- Partner closely with digital equity non-profits and volunteer groups.
- Establish central leadership and accountability for digital equity.
- Advocate for consumer protection and digital equity funding at the national level.

Additional Project & Plan Review Information

San Francisco, California:

A decade ago, the city of San Francisco leveraged 170 miles of existing fiber to create the Community Broadband Network. The City became its own ISP, providing wireless broadband to low-income households in partnership with non-profits and Internet Archive. The Community Broadband Network provides Wi-Fi at 38 Housing Authority sites, 24 Senior Technology Centers, and a number of non-profit run sites that serve low-income populations. The City also worked closely with digital equity non-profits and volunteer network consultants.

In 2018, San Francisco started the Fiber to Housing program to provide free, high-speed internet to low-income households by leveraging existing municipal fiber resources and private sector partnerships. The program is a collaboration between the City and County of San Francisco's Department of Technology, the Mayor's Office of Housing and Community Development, and Monkeybrains, one of the local internet service providers. In 2019, the City connected over 1,500 low-income families with free internet and is on course to provide internet to 1,600 more households in 2020. The free internet is delivered through fiber-optic and ethernet cabling in the affordable housing unit and through an open Wi-Fi network.

Seattle's Existing Fiber Assets
Over the past 20 years, Seattle worked collaboratively with King County, the University of Washington, and neighboring cities to construct extensive publicly-owned fiber optics to connect public facilities in the City and county—bringing together a consortium of 20 public entities that share ownership, responsibility, and use of the fiber. This approach was innovative, efficient, and revolutionary, enabling cost savings relative to leased circuits and much higher bandwidths.

However, the current agreement and setup is not conducive to private sector use of the assets, which was not considered at the time the collaboration began. Though the City owns substantial fiber, challenges arise about which assets can be used for non-public purposes and multiple agencies control various parts of the assets.

New York City, New York:

- **New York City's LinkNYC Project**: In 2012, New York City issued an RFP to reimagine the thousands of phone booths across New York City's five boroughs as Wi-Fi hotspots. The result was a city partnership with a consortium of tech companies called CityBridge, a public-private partnership replacing the payphones with fiber-connected LinkNYC hotspot kiosks. CityBridge would generate revenue through advertisement on the terminals, guaranteeing the city at least $500 million over the 12-year franchise agreement. The buildout parameters included the city providing sidewalk real estate and access to the underground conduit in exchange for tech companies designing, installing and maintaining the hotspot terminals, and connecting them to the fiber network.

  The majority of people using the kiosk to access free Wi-Fi are not physically near the terminal, but instead sign on to the LinkNYC hotspot network with their own device from up to 150 feet away. The kiosks provide speeds up to 300 Mbps and with each terminal having a fiber connection, bandwidth can scale based on demand growth. The kiosks support hundreds of Wi-Fi users at a time and are equipped with Hotspot 2.0 technology, allowing users with Hotspot 2.0 enabled devices to automatically connect to nearby hotspots and have automatically encrypted browsing.

  At the time of the 2017 case study, the report stated the LinkNYC consortium had figured out a way to use advertising revenue to subsidize an extensive, free Wi-Fi network. Sidewalk Labs, a subsidiary of Google, operates the kiosks. While the information collected is anonymous, the system collects data points for devices that connects to the network, allowing companies to provide targeted advertisement. The study stated, "Cities will be able to choose whether or not to include advertising, but if they do, Sidewalk Labs will install the screens, place the ads and split the estimated $60,000 in annual ad revenue from each kiosk with partnering cities. If Sidewalk's financial predications are accurate, ad-enabled kiosks can become revenue positive for cities in just two years."

  As of March 2020, reports indicate the project is financially delinquent. The plan envisioned 7,500 hotspot kiosks, but only 1,800 kiosks have been installed with installations stopping in 2018. The thousands of remaining kiosks that have not been installed were meant to provide service to low-income neighborhoods. In a testimony, the commissioner for New York City's Department of Information Technology and Telecommunications stated the city may consider suing to enforce terms of the contract, with CityBridge paying $2.6 million of the $32.3 million owed in 2019 and none of the $43.7 million owed for 2020, despite collecting $105 million from advertising. The dispute between the city and the consortium has unfolded publicly, with CityBridge denying the narrative and stating they have encountered problems with installation largely due to the rules and bureaucracy of the city. Link also provides kiosk networks in Philadelphia (LinkPHL) and Newark (LinkNWK).

- **New York City's Internet Master Plan** was noted earlier with the news of a $157 million investment to connect underserved residents with internet. Among all the plans reviewed, New York City's plan released January 2020 stands out in scope and vision. Citywide, 18% of residents or 1.5 million New Yorkers have neither a mobile connection nor home broadband connection. The plan is a decades-long focus on more equitable internet and network expansion throughout the five boroughs. The following are key excerpts from the plan:

  "*Based on the data and analyses contained in this Master Plan, the City has determined that universal broadband calls for an open access fiber optic infrastructure built out to nearly every street intersection with an aggregation point in every neighborhood. Leveraging City real estate assets and public rights-of-*

way will allow network operators to extend fiber optic infrastructure from the intersection to a pole or building and deliver service using any of a number of potential technologies. This new infrastructure will support the rapid and equitable deployment of multiple choices for service."

"It will prioritize and optimize "open access" or "neutral host" infrastructure, which can be shared by multiple operators to lower costs, increase competition, minimize physical disruption to the city, and incentivize private-sector investments to reach and serve customers."

"The planned infrastructure, were it to be built entirely new throughout the whole city and rely on the open access conduit system in Manhattan and in the Bronx, is estimated to cost $2.1 billion. The Master Plan prioritizes infrastructure development for neighborhoods that have low levels of commercial fiber service and where new construction opens the way for new providers and services."

"This fiber network will be overlaid with a neutral radio access network capable of providing mobile wireless service throughout every neighborhood… The Master Plan prioritizes mobile wireless infrastructure in low-income areas where New Yorkers are most dependent on mobile service, as well as in areas where commercial broadband deployment is already placing the greatest burden on City assets."

"Currently, the entirely private model is the status quo in New York City. Private companies that wish to provide internet service build out their own networks. On the other end of the spectrum, the entirely public model would require the City to function as a municipal ISP, providing all network infrastructure and operations, to the exclusion of private investment. Between the two extremes lies a series of delivery models that are described as public-private partnerships (P3). Two main models of public-private partnership that lead to long-term public ownership of infrastructure are Revenue Opportunities and Operating Contracts."

- **NYC Mesh**: The community-driven project started in 2012 with the goal of building a large scale, decentralized digital network using wireless mesh technology. The neutral network system works by having wireless routers on rooftops connecting with other nodes to form a network. The NYC Mesh map shows a total of 505 nodes, 54 hubs, and 2 supernodes. Other cities with community wireless mesh networks include Philadelphia, Baltimore, Pittsburgh, Detroit, Portland, St. Louis, Houston, and Seattle.

Kansas City, Missouri:

The public-private partnership Wi-Fi system in Kansas City is more limited in scope compared to the LinkNYC project. In 2016, Kansas City, Sprint, and Cisco announced free public Wi-Fi to Kansas City's 2.2-mile streetcar line and a fiber network along the corridor to support the city's Internet of Things (IoT) sensors. The city provided utility power, access to right-of-ways, fiber optic cable, and equipment and backhaul capabilities to Cisco. Cisco sublicensed some of these assets to build out the Wi-Fi network in the downtown corridor and Sprint shared the capacity of the network with the city in exchange. The city uses the bandwidth capacity for free public Wi-Fi, internet enabled kiosks, and the installation of IoT sensors on streetlights, cameras for public safety, and water and trash monitoring sensors.

In 2011, Kansas City was the first location to receive Google Fiber service and in response incumbent ISPs provided faster speeds and competitive pricing. Google Fiber provides one giga-bit-per-second speeds at approximately $70 per month. Because of Google's entry, customers benefited from the additional private competition but only about 80 percent of Kansas City is covered by Google Fiber. A 2015 NPR article pointed to some Kansas City neighborhoods where only one in five households had any type of internet connection and

Google Fiber was not available in some low-income housing projects. The city and community organizations looked at other options for low-income neighborhoods by using millimeter wave (mmWave) wireless technology to extend the reach of existing fiber backbone in order to provide free high-speed service to residences covering three to four square miles. The mmWave radios serve as the wireless backhaul from the main fiber lines and works well as point-to-point on top of buildings. From there, the connection is distributed through the local area network system in the building or Wi-Fi Access Points. The Urban Neighborhood Initiative has coordinated most of the effort with a minimal role by the City. Kansas City hopes to apply similar setups in other underserved areas if the pilot is successful.

Anacortes, WA[17]: Anacortes (population approximately 18,000) is the first city in Washington[18] to become an ISP (called 'Access' Anacortes Fiber Internet), and the first city in North America to deliver high-speed internet through its system of water lines. In 2018, the Anacortes City Council adopted Resolution 2013, outlining the Council's vision to build a municipal fiber optic internet system and prepare a business plan. Included in the budget for 2019-2020 was funding for a $3 million, two-year pilot project in three areas of the City covering 1000 buildings. Additional funding would be sought in future years to expand the network in the city if the three pilot locations demonstrated the feasibility of the project's financial, technical, and logistical framework. Delivering FTTP to the entire community of 5,500 utility customers will cost approximately $15 million and will take until 2023 to construct.

Anacortes calculated that a 35% take-rate, or 1,925 premises, will provide sufficient revenue to meet their goals. As of July 2020, 6-months into deployment, the overall take-rate is 16.5% for the municipal internet service. The city estimates it will take about 15-20 years to recover costs. The service will cost residential customers $39 per month for 100 megabit-per-second service and $69 for gigabit speeds. Businesses will pay $89 or $149 per month for those speeds.

Support for the system grew from the fact that businesses and residents had few options for internet access and wanted access to more reliable connections and faster upload speeds. Neither Comcast (cable lines) and Frontier (copper DSL lines) were interested in upgrading their infrastructures to improve service quality and Anacortes searched for other private sector providers to improve connectivity in the community. After considering the financial situation and the desires of the community, Anacortes decided the better option was to offer services directly to the public. The city had constructed a fiber optic network linking its water treatment plant, wastewater treatment plant, and the various pump stations and other facilities to support the water and wastewater utilities for the purpose of telemetry and control of utility systems. With the finding that businesses and residents had an existing need for internet access at symmetric gigabit or higher speeds, the city proceeded with a city-owned fiber-optic-based network to promote competition among internet service providers that could both provide low-cost connectivity options for those with low incomes and offer commercial and residential customers connectivity options superior to existing choices. The city looked at potential federal grants but would not qualify because available speeds in the city meet the FCC's defined broadband speeds of 25 Mbps download and 3 Mbps upload.

While Anacortes' municipal internet solution is compelling, it is not a good model for Seattle given our already competitive internet service environment and private-sector networks capable of offering gigabit service levels across the City.

Chattanooga, Tennessee: The official utility is called the Electric Power Board of Chattanooga (EPB), providing electric and internet service for Chattanooga and other nearby cities. Promoted as "Gig City", Chattanooga has received the most notoriety for a municipal FTTP system of significant size. EPB Fiber Optics service began in 2009

[17] https://www.anacorteswa.gov/436/Fiber-Project-Background
[18] https://www.cityofanacortes.org/1105/Fiber-News-Updates

and now serves over 100,000 customers on its 9,000-mile fiber optics network. It has gone through the legal tribulations when it successfully petitioned the FCC in 2015 to preempt state municipal broadband laws, which was appealed and then overturned by the courts in 2016. However, Chattanooga is not a financial template that cities can follow unless federal funding is made available to cities. The planning costs was financed by a $50 million loan from EPB's electric power operations; $220 million in local revenue bonds was financed for construction; and the project received $111.5 million in federal stimulus from the U.S. Department of Energy to promote the deployment of smart grids. Applying the cash-flow positive rate of $2 million from 2010 to 2014, the project cost would be repaid in 412 years.

Tacoma, Washington: On April 1, 2020, the Click! Network transferred operational control to Rainier Connect. While the City of Tacoma retains ownership of the network, Rainier Connect will now provide video and broadband services. The November 2019 news release approving the agreement with Rainier Connect stated, "*The 21-year-old retail cable TV and wholesale internet service has not been a financially viable enterprise for the City for several years. Over the last few years, Tacoma Public Utilities staff and policymakers have engaged in extensive public outreach to get input on policy goals and have conducted considerable due diligence reviewing multiple business models to inform their decision to pursue a public-private partnership that would retain and maintain the Click! Network*."

Additionally, in 2019, the City of Tacoma won an appeal in a lawsuit by ratepayers who argued Tacoma Power funds have illegally subsidized Click, the city's internet and cable network. The City Attorney's office said in a statement, "*The Court of Appeals ruled today that prior use of Tacoma Power revenues to support Click! Cable TV and internet services was lawful. … Although the City is pleased with the decision, the plaintiffs may seek review of the decision by the State Supreme Court and if that court accepts review the litigation will continue*." The Judge ruling against the majority decision stated Click loses about $5 million a year[19].

Broadband and Municipal Fiber Broadband System Reports

There are hundreds of reports and sites regarding America's broadband infrastructure and research into municipal broadband systems. Two recent reports by the Congressional Research Service[20] and Benton Institute for Broadband and Society[21] highlights local approaches to address the digital divide and an agenda for this decade to connect our entire nation. Respectively, the two recently released reports in April 2020 and October 2019 are titled "Selected State and Local Approaches as Potential Models for Federal Initiatives to Address the Digital Divide" and "Broadband for America's Future: A Vision for the 2020s." The Congressional Research Service report describes the following approaches that may serve as models for future federal broadband initiatives: 1) Broadband infrastructure deployment, 2) Public-private partnerships for broadband buildout, 3) Leveraging existing infrastructure assets, 4) Broadband adoption fund, 5) Broadband mapping, 6) Broadband Feasibility, 7) Digital Equity and digital inclusion, 8) Gigabit broadband initiatives, and 9) Homework gap. The Benton Institute for Broadband and Society sets a new national broadband agenda focused on four areas: 1) Advancing Broadband Deployment, 2) Promoting Broadband Competition, 3) Encouraging Broadband Adoption, and 4) The Special Role of Community Anchor Institutions. These reports serve as important resources in comparing our strategies and agenda with the policy recommendations occurring at the national level.

[19] http://www.courts.wa.gov/opinions/pdf/D2%2051695-1-II%20Unpublished%20Opinion.pdf
[20] https://crsreports.congress.gov/product/pdf/R/R46307
[21] https://www.benton.org/publications/broadband-policy2020s

Municipal Fiber Broadband System

The Institute for Local Self-Reliance tracks community broadband networks throughout the country[22]. There are 63 municipal networks serving 125 communities with a publicly owned fiber-to-the-premise (FTTP) network. The majority of municipal FTTP networks are small in terms of total population. There is no comparable FTTP municipal broadband system that have been deployed that is similar to Seattle's geography and population of 747,300 and 351,503 households. Given Seattle's robust infrastructure, and the cost prohibitive nature of a municipal broadband system—this is not a recommended strategy, especially in light of the City's financial pressures.

Municipal fiber network speeds start at 100 Mbps, with the capacity for 1 Gbps symmetrical and 10 Gbps. The buildout of FTTP system occurs over many years and the research reveals many projects are not completely citywide. Municipal broadband systems employ several different service models. Many branch off from the existing electric power utility—providing both power and internet and a smart grid as part of its infrastructure upgrade. Some states prohibit the direct sale of retail broadband service to residents and as a result, while the system is owned by the city, private ISPs provide the retail services. Washington State has several Public Utility Districts (PUD) that provide a hybrid public/private municipal broadband network. Given Washington State law, the PUD is publicly owned, but private Internet Service Providers provide the retail services. This municipal wholesale and ISP retail service model is also used in states without regulations.

In Seattle, the feasibility of the City providing 1 Gigabit-per-second (Gbps), data-only service to residences and businesses was most recently considered in the 2015 Municipal Broadband Feasibility Study. Seattle's market and broadband infrastructure was compared to other cities that have attempted municipal broadband. The report highlighted the City of Chattanooga, one of the most widely cited successful municipal broadband examples, which received nearly one-third of all capital build-out costs from the federal government. However, this federal funding is no longer available to municipalities for this purpose.

Assessing the financial feasibility of the City of Seattle building and sustaining a municipal fiber network, the City Budget Office found that, "While a municipal broadband system is an exciting prospect, it would not be prudent to pursue a business model that relies solely on subscriber revenues and a pledge of the City's full faith and credit to support the necessary debt financing. Such an approach would put the City's General Fund at significant financial risk should the endeavor falter or fail." Ultimately, the Feasibility Study concluded that the City of Seattle could not finance the build out of a $500–$665 million City-owned and operated municipal broadband utility funded only by rate-payer revenue (Appendix G).

These constraints are not unique to Seattle, though. Nationally, the greatest impediment to a municipal fiber system is the finances. A study in 2017 by the University of Pennsylvania Law School's Center for Technology[23], focused on the financially solvency of municipal broadband systems and concluded that the majority of public broadband municipal fiber networks are unable to cover their build and operating costs through subscriber revenue. The study identified 88 municipal fiber projects, of which, 20 of them reported separately from their respective electric utility.

The financial data analyzed in the study concluded, "***Municipal fiber is not an option for the 86 percent of the country that is not served by a municipal power utility.*** *Of the 20 municipal fiber projects that reported the results of their municipal fiber operations separately, eleven generated negative cash flow. Unless operations improve*

[22] https://muninetworks.org/communitymap
[23] https://www.law.upenn.edu/live/files/6611-report-municipal-fiber-in-the-united-states-an

substantially, these projects cannot continue to operate over the long haul, let alone cover the capital costs needed to establish operations. Of the others, five are projected to take more than 100 years to recover their costs, and two others are projected to take over 60 years. Only two are on track to break even, and one of those is based on a highly urban, business-oriented model that few other cities are likely to be able to replicate, and the other includes data from two years of stronger performance when it offered only DSL service."

There is no municipal fiber system template to follow; the details of each major municipal broadband network project reveal they are difficult to compare and duplicate because of unique and fortuitous circumstances. When exploring solutions that enable universal internet access the option of municipal broadband is always a key interest. While some cities in the nation have chosen to build municipally-owned broadband infrastructure to support internet services to the community, it is important to know that **these municipalities often faced underinvestment from incumbent service providers and did not have even one incumbent provider that offered gigabit broadband service**; this created a market need to be filled. Seattle does not have these same issues. The following table summarizes findings from the research.

Fiber-to-the-Premise Findings
1 Gbps (internet data only) is the key gap in existing service to single-family and business customers—providing a substantial market distinction for consumers versus existing ISPs.
Large municipality deploying FTTP against incumbent ISPs should consider only operating in new areas when a sufficient number of customers have already committed to subscribe.
High infrastructure costs are a significant barrier to entry for new service providers, favoring existing service providers who have built-out networks.
Customers are sensitive to price. The market response of existing service providers will affect the financial feasibility of new service.
Market is moving away from bundled service (internet data, cable, and phone) to internet data only. More services are becoming available as "over-the-top" services (Amazon Prime, HBO Max, Disney Plus). Streaming services are projected to increase from a penetration rate of 41.2% in 2020 to 46.1% by 2025[24].
If a municipality enters the competitive broadband market, it is highly advised to deploy a FTTP system in order to maximize the high upfront capital costs, future-proof speed capacity demands, support wireless deployment, and be in the optimal position to achieve the take rate necessary to pay for the system. A fiber-to-the-premise system will presently provide 1 Gigabit-per-second (Gbps) speeds, but the fiber infrastructure could conceivably support data speeds of 10 Gbps to 100 Gbps.
FTTP buildout could potentially lead City to leverage fiber assets for small cell (5G) deployment that are likely required on every city block.
Rethink use and opportunities of fiber buildout through water lines and light poles. Deploying in the "power space" rather than the "communication space" would reduce construction costs.

[24] https://www.statista.com/outlook/206/109/video-streaming--svod-/united-states

Explore feasibility of network virtualization to inexpensively allow retail service providers to compete for users and provide innovative services over a public network without any requirement for new hardware at the customer's home or business. Case Study: Ammon, Idaho
The associated benefits of economic development, education, research, and innovation as a result of deploying an advanced FTTP broadband system.

Action Plan

In 2015, the City launched an updated Digital Equity Initiative with four strategies to increase broadband access and champion technology access and affordability for all: 1) Digital Skills Training, 2) Internet Connectivity, 3) Devices & Technical Support, and 4) City Website & Online Services. While these strategies are ongoing, the Internet for All (IFA) Seattle Action Plan provides us with a great opportunity to reevaluate our current position and invigorate new citywide strategies to support our residents during and after the COVID-19 crisis. While we have made significant progress, we know there is a lot more to do to empower and connect residents currently without internet. We must ensure that all residents—regardless of socioeconomic background—are equitably connected to high-speed internet for accessing critical information and its benefits.

It is not hyperbole to state the internet could be considered the most powerful platform in the history of the planet. Our reliance on the internet has recast public opinion and attentiveness on issues of disparity during COVID-19. Every day the world is becoming more digital; the internet is a gateway to information, learning and teleworking livelihood.

The following strategies and actions were informed by an assessment of community needs aligned with the data identifying households with the greatest needs and an equity lens. In order to achieve equitable access and universal adoption, we recommend focusing attention on residents with the greatest disparity in internet adoption. Taking a Race and Social Justice Initiative approach, IFA centers our strategies and action on low-income households, BIPOC communities especially youth, older adults, people with disAbilities who have limited or no internet/device access, and where English is not the primary language. The IFA Action Plan considers three phases to advance these strategies:

PHASE 1	**Actions for immediate implementation. Implementation requires minimal modifications to existing program operations. Priority focus are students and job seekers during COVID-19 and economic recovery.**
PHASE 2	**Short-term implementation actions that require additional time to complete resource estimate and planning before implementation. Continue focus on students and job seekers.**
PHASE 3	**Long-term implementation actions that require significant planning; one-time and ongoing annual cost estimates; modification and integration with existing programs; and strategic planning for a best-in-class, scalable telecommunication infrastructure.**

The following list of eight strategies and proposed actions is ambitious. **Closing the remaining internet adoption gap will require a robust ground game—sustainable and focused solutions that combines private sector investments with support from community-based organizations and the City.** Programs like the Digital Bridge project demonstrate a comprehensive, scalable approach, by providing devices, internet access, technical assistance, in-language support, and career development**.** Many factors are involved to achieve the targeted outcomes, but most importantly we must: 1) leverage strong ties and partnerships with trusted community-based organizations focused on providing access and assistance with low-income internet services; 2) pursue policies and work with the private sector to encourage investment in, and remove barriers to, infrastructure deployment and adoption of internet services; and 3) develop an ongoing structure for coordinated communications, planning, and action between key agencies (e.g., SPS, SPL, City, and community-based organization partners).

Underlying Principles & Implementation Guidelines for Action Plan:

To reach the goal and expedite universal access and adoption of internet centered on low-income households, BIPOC communities, youth, older adults, non-English speakers, and people with disAbilities, all programs and infrastructure upgrades should be guided by the following principles and guidelines.

Partner with existing community-based organizations, private sector, education, and workforce anchor institutions. As trusted leaders in the community, they will serve as more effective conduits in disseminating information to key groups.

Language Access:

- Translate outreach materials into City's tier 1 (Cantonese (written: Traditional Chinese), Korean, Mandarin (written: Simplified Chinese), Somali, Spanish, Tagalog, Vietnamese) and tier 2 (Amharic, Cambodian/Khmer, Laotian, Oromo, Russian, Tigrinya, Ukrainian) languages. Applications can be complicated, technical assistance and assistance in language may be needed.
- Partner with ethnic media outlets on internet outreach communications.
- Partner with organizations to provide in-language support for outreach and enrollment.
- Work with Department of Neighborhoods Community Liaisons for in-language outreach and coordination.
- Utilize Language Line translator assistance on outreach calls.

Ensure the City's digital resources and communications are accessible to all.

- Apply a Race and Social Justice equity assessment and project planning tool to technology applications and services that will be used by our disability and/or BIPOC community members.
- Adopt minimum accessibility standards for all digital resources to meet the needs of people with disAbilities.
- Provide training so staff understand and utilize accessibility standards.
- Update the 'Community Guide to Accessible Meetings and Events' to include virtual meeting platforms.
- Inventory City websites, online resources (e.g., applications, forms, documents, Seattle Channel), and digital tools (e.g., Webex) and assess accessibility for people with disAbilities, smartphone users, and users with limited bandwidth. Prioritize accessibility updates for immediate and midterm resolution.

ACTION PLAN – THE 8 STRATEGIES

The following eight strategies and actions were developed in consultation with community partners, City department stakeholders, and internet service providers. We welcome additional feedback and are working collaboratively with Council and stakeholders to target and refine the recommendations. The actions below are proposed with additional collaboration required with our partners and stakeholders. This ongoing collaboration will serve to solidify and plan for more concrete steps towards implementation.

Strategy 1. Increase awareness and adoption of low-cost internet programs and devices.		
Action 1.1	Phase 1	**Ramp up the City's outreach and engagement about low-income programs for residents and nonprofits**. Prioritize outreach to reach low-income households, BIPOC, students, and job seekers. Leverage the City's website by adding content on pages that engage low-income residents, such as the Affordability portal, the main Utility Assistance Program, Fresh Bucks, and others. Leverage City staff that engage directly with priority communities: ○ DON Community Liaisons to share content and develop in-language videos or audio voice overs ○ SPL staff to answer phone calls to inform patrons about broadband options ○ HSD staff to promote content through digital forums, such as their Aging and Disability Service sponsored community coffee hours ○ FAS' Mobile Customer Service Center vans Conduct outreach through partner organizations and existing networks, such as affordable housing communities, faith institutions, and digital navigators. Conduct outreach through low-tech channels, such as mailings and phone calls. Continue to provide information to the City's Utility Discount Program enrollees about low-income discount programs offered by internet service providers.
Action 1.2	Phase 1	**Explore working with other public agencies so they can refer people to low-cost internet programs.**
Action 1.3	Phase 1	**Partner with Seattle Public Schools to promote and support internet sign-up events.** Continue to support internet sign up events in priority digital equity zones. Explore opportunities to work with organizations and digital navigators.
Action 1.4	Phase 3	**Explore one-stop portal for enrollment/verification in all low-income programs, including access to internet (using Affordable Seattle model/website).** Implement a cloud-based, integrated system so that it is easy and simple for residents to access all affordability programs from one platform, including mobile app enrollment capabilities.

Strategy 2. Expand free or low-cost connectivity options in targeted areas of the city.		
Action 2.1	Phase 1	**The Seattle Public Library will deploy Wi-Fi 6 outside all branches in Q4-2020.** Coverage is expected to extend to 150 feet outside the building, depending upon environmental conditions.
Action 2.2	Phase 1	**Continue to provide access to public computer kiosks and Wi-Fi in many of our City's community centers, libraries, and certain City-owned facilities.** Explore expansion of hours as part of economic recovery effort once locations are allowed to reopen to the public.
Action 2.3	Phase 1 & Phase 2	**Develop GIS Mapping Application for public Wi-Fi.** **Publish dynamic GIS Wi-Fi map of City public sites.** Conduct a marketing campaign to promote availability. While the majority of these locations are temporarily closed to the public due to COVID-19, the GIS mapping links to additional Wi-Fi strategies. Include crowdsource capability for identifying non-City outdoor Wi-Fi available to the public. Either develop a crowdsource app for identifying other non-City facility outdoor Wi-Fi and/or encourage the use of Openwifispots.com, which identifies almost 350 free hotspots at coffee shops, restaurants, hotels, and other businesses across the City. **Develop a "Seattle Digital Equity Atlas" using existing data layers to identify opportunities to strategically deploy Wi-Fi.** Improve data reporting on use of current city Wi-Fi and cross-reference existing infrastructure and community need. Enhance ITD's data system for reporting on guest Wi-Fi to provide monthly reports on levels of Wi-Fi use. Develop a system to integrate this with SPL data and other Wi-Fi provider data and map it to provide public information and data driven strategic planning for meeting future needs.
Action 2.4	Phase 1	**Leverage 5G Wireless Technology** Continue to ensure equitable roll-out of small cell attachments to support high-speed broadband access in underserved neighborhoods. Identify and remove barriers to deployment of infrastructure needed for 5G technology, including installation of fiber and small cells. Explore policies, strategic partnerships, and leverage existing city assets to encourage investment in, and expedite the deployment of, 5G technology. Advocate and partner with carriers for low-cost internet plans and free public Wi-Fi.
Action 2.5	Phase 1	**Conduct Wi-Fi assessment for small businesses and HSD community providers** To ensure sufficient bandwidth, partner with HSD to assess the broadband capacity at critical community service sites, including homeless shelters, nutrition sites, senior living facilities, senior centers, and others. Ensure connectivity for older adults, low-income and insecurely housed residents. Partner with OED to assess small business needs.

Strategy 2. Expand free or low-cost connectivity options in targeted areas of the city.		
Action 2.6	Phase 2	**Partner with Seattle Public Schools to increase hotspot devices available for distribution to students to enable remote learning.**
Action 2.7	Phase 2	**Partner with Seattle Public Library to expand the hotspot devices program to address high-priority resident needs.** Expand the SPL hotspot program that provides devices for extended loan periods to target populations, including Seattle Public Schools families, unemployed job seekers, and insecurely housed residents living in Tiny Home Villages.
Action 2.8	Phase 2	**Explore new models to distribute hotspot devices through partnership with BIPOC organizations.** Building off the success of the SPL hotspot program, explore partnership opportunities with other City departments and non-City organizations who could loan hotspot devices to BIPOC communities.
Action 2.9	Phase 2 and Phase 3	**Upgrade Wi-Fi access points in Seattle Parks & Recreation Community Centers.** Complete upgrade of all SPR Community Center Wi-Fi systems. Expand coverage area with exterior Wi-Fi Access Points. Currently, 16 locations have been upgraded to meet the needs of Parks and Recreation teen hubs and childcare. Additional funding is needed to upgrade the remaining 18 sites. The Wi-Fi provided inside Community Center facilities averaged 48,000 connections per month in 2019.
Action 2.10	Phase 2	**Work with Seattle Public Schools to examine feasibility of expanding Wi-Fi system to the exterior in safe public use locations.** Interior Wi-Fi is currently restricted to staff and students with SPS logins. SPS was able to boost interior Wi-Fi access point radio signals to provide some expanded coverage near entryways at select schools but would need to add exterior access points to significantly expand coverage to outdoor areas.
Action 2.11	Phase 2	**Support a Seattle Community Cellular Network.** Explore and support the development of a Community Cellular Network, which uses cellular (LTE) technologies in the recently opened Citizens' Band Radio Service (CBRS) spectrum. A nonprofit, the Local Connectivity Lab (LCL), and the University of Washington are currently implementing the Seattle Community Cellular Network to share free or low-cost broadband access in higher-need areas throughout the city.
Action 2.12	Phase 2	**Explore public agency partnerships to expand Wi-Fi coverage in digital equity zones.** Explore partnerships with other public agencies to add public Wi-Fi. Work with the UW, area universities and colleges, Port of Seattle, and others to expand the availability of public Wi-Fi around public facilities (e.g. Wi-Fi at all transit stops). Ask the federal Government Services Administration to open public Wi-Fi at the Beacon Hill Veterans Administration and other

Strategy 2. Expand free or low-cost connectivity options in targeted areas of the city.		
		federal facilities.
Action 2.13	Phase 2	**Explore mobile public Wi-Fi buses or vans in strategic locations at strategic times.** Add mobile hotspots to buses or vans. Include tech support and workshops in coordination with training partners. Seattle Goodwill is currently standing up a similar program using vans and connectivity from T-Mobile. This action could also support internet access for the unhoused community through mobile service vans that go to encampments. Consider adding mobile hotspot capacity to FAS's existing Mobile Customer Service Center van and deploy van to strategic locations in need of Wi-Fi capacity (e.g., unhoused community encampments).
Action 2.14	Phase 2	**Examine expansion of HSD Social Connectivity tablet distribution pilot to include Wi-Fi hotspots.** Install Wi-Fi hotpots in senior housing facilities to provide building-wide Wi-Fi access for residents. This expands HSD's Social Connectivity project currently underway to distribute tablets to isolated older adults.
Action 2.15	Phase 2 & 3	**Develop proposal to strategically deploy more public Wi-Fi in digital equity zones.** Digital Equity locations identified in the City's 2017 Public Wi-Fi Study and 2018 Technology Access and Adoption Study include Yesler Terrace, High Point, South Park, Rainier Vista, Othello, Rainier Beach, Lake City, SW Roxbury Street Corridor, 23rd Avenue Corridor, New Holly, and International District. These digital equity locations are deemed important to improving access to the internet for lower-income residents and were informed by findings from the 2015 Digital Equity Action Committee, Technology Access and Adoption Study, and consultation with the Mayor's Office of Policy and Innovation, Human Services Department, and the Seattle Housing Authority. Information gathered from the "Seattle Digital Equity Atlas" will guide and refine the digital equity zone locations. Project planning has not occurred, and funding would need to be secured. There may be infrastructure in place that could be leveraged to deploy Wi-Fi in high need areas.
Action 2.16	Phase 3	**Explore a digital version of the Adopt-A-Highway program to fund publicly available Wi-Fi.** The City could consider the innovative approach of creating a digital version of the long-standing, widely supported Adopt-A-Highway program to fund publicly available Wi-Fi. This option could allow for the City to incur costs for initial infrastructure build-out and seek private sponsorship to cover ongoing costs related to operations, support, and service. The Wi-Fi guest screen could possibly include advertisement. Research feasibility of sponsored Wi-Fi to develop and sustain availability. Explore increasing public Wi-Fi at low or no cost to the City through models that are supported by advertising and other revenue-generating streams. The City needs to examine the business feasibility and public policy implications of these models and engage the community to determine how these approaches would work in Seattle.

Strategy 2. Expand free or low-cost connectivity options in targeted areas of the city.		
Action 2.17	Phase 3	**Explore development of sponsored internet kiosk program.** The public can access the Wi-Fi signal from a kiosk up to 150 feet away and will just need to sign on to the hotspot network. Internet kiosks can provide speeds up to 300 Mbps and support hundreds of Wi-Fi users at a time. The kiosks would each need to have a fiber connection and be equipped with Hotspot 2.0, allowing users with Hotspot 2.0 enabled devices to automatically connect to nearby hotspots and enjoy automatically encrypted browsing. (Case study: New York City's LinkNYC hotspot kiosks) Explore possible partnerships with other public agencies.
Action 2.18	Phase 3	**Foster development of discounted wireless data service products that utilize mobile infrastructure.** Approach cellular service providers to develop low-income data service plans that offer similar service levels and price to low-cost wireline service programs (e.g., *Internet Essentials*, *Simply Internet*).
Action 2.19	Phase 3	**Explore feasibility of providing City fiber backhaul to strategic low-income housing locations to support free or low-priced fixed wireless internet service to residents.**
Action 2.20	Phase 3	**Support a model for low-income housing buildings to provide an activated high-speed internet service connection to all units.** Explore the provision of an active high-speed internet service connection to all residential units in Seattle Housing Authority and other low-income multi-family housing buildings and support efforts to allow federal funding to cover the costs of implementation and provision of service. Target service levels to meet *future* broadband needs (i.e., min 100 Mbps). This model would eliminate barriers vulnerable populations face in navigating registration for ISP service programs, meeting eligibility criteria for low-cost programs, and paying monthly ISP bills. It would also allow for bulk pricing to support higher speeds offered for lower overall prices.

Strategy 3. Partner with organizations to deliver culturally relevant digital inclusion programs.		
Action 3.1	Phase 1	**Develop a citywide asset map/directory of community-based organizations delivering digital equity programs.** Partner with DON, OED, OIRA, ITD, DEEL, ARTS, HSD, SPR, SPL to develop inventory.
Action 3.2	Phase 1	**Support community-driven internet adoption solutions through open, competitive grant programs.** Identify and support innovative, community-led digital inclusion projects through the Technology Matching Fund and other grant programs. Leverage this process to broker support

		from other partners. Adapt City grant guidelines to issue rapid response grants that serve priority populations and allow digital equity expenditures.
Action 3.3	Phase 1	**Continue effective, scalable programs that address adoption barriers beyond internet access, such as digital literacy and devices.** Examples include: • OIRA's Ready to Work Program, • Interagency Digital Skills Steering Committee, • The Seattle Public Library's "Your Next Job" pilot, • OED's Digital Bridge for Unemployed Workers pilot, • HSD's Intergenerational Digital Literacy pilot, • Seattle Center's Digital Studio pilot.
Action 3.4	Phase 2	**Support digital navigators through a train-the-trainer model to provide 1:1 device, connectivity, and technology support.** Often those most in need of tech assistance have barriers that are best addressed with 1:1 support by trusted community members or someone they are already interacting with. Hotlines are useful, but often not accessed by those most in need of support (language barriers, etc.). Utilizing a train-the-trainer model could more effectively bring language-accessible assistance by digital navigators directly to the community.

Strategy 4. Pursue private sector and philanthropic support.		
Action 4.1	Phase 1	**Evaluate ways to increase the supply of refurbished devices to low-income residents.** Promote donations of refurbished computers for low-income residents. Develop agreements with local nonprofit refurbishers, such as InterConnection and Friendly Earth, to provide free or low-cost equipment to low-income residents. Leverage the City's Surplus Computer Program managed by FAS and HSD.
Action 4.2	Phase 1	**Support promotion of donations from the City's COVID-19 donation webpage to solicit support for internet adoption.**
Action 4.3	Phase 2	**Partner with a nonprofit organization or foundation to manage an "Internet for All fund".** Develop a process for the City to accept money and donations for digital equity projects. Explore partnership with United Way of King County to create a model like the Cleveland Foundation's Digital Excellence Initiative. Create a "Round Up for Digital Equity" program to solicit donations at checkout in grocery stores.
Action 4.4	Phase 2	**Develop a device and internet hotspot sponsorship program.** Explore partnership opportunities to fund donations of devices and internet service to be distributed to individuals through community-based organizations.

		Target donations to low-income areas. Scale donations to sponsor entire buildings. (e.g. Amazon donated 8,200 Chromebook laptops to elementary school students in Seattle Public Schools) (e.g. Donate a Hotspot https://sws.seattleschools.org/schoolinvolvement/donate_a_hotspot)
Action 4.5	Phase 2	**Explore partnership with local banks to direct Community Reinvestment Act (CRA) support toward broadband.** Explore partnership with local banks that have Community Reinvestment Act (CRA) obligations to direct investments toward internet adoption in prioritized areas. Broadband projects are eligible to receive CRA funding.
Action 4.6	Phase 2	**Partner with corporate and philanthropic donors to secure support for Internet for All.**

Strategy 5. Champion legislation/policies to advance universal internet adoption.		
Action 5.1	Phase 1	**Review implementation of the "Project and Construction Coordination" policy to evaluate installation of conduit/fiber for projects in the right-of-way management system.** Review projects for inclusion of conduit and fiber to provide more access to communications-enabling infrastructure. *This is Seattle's "Dig Once" policy. Link to the coordination requirements and Seattle Municipal Code 15.32.050.
Action 5.2	Phase 1	**Advocate for state and federal Digital Equity Act and similar legislation that will provide funding and support for state and local digital inclusion action.** Collaborate with key advocates, including other local government CIO's, broadband and digital inclusion leaders, National League of Cities, National Digital Inclusion Alliance, U.S. Conference of Mayors, the City's Boards and Commissions, and representatives of BIPOC, AARP, consumer, and similar organizations.
Action 5.3	Phase 3	**Explore methods to address inadequate broadband connectivity in older apartment and condo buildings, due to insufficient internal telecom infrastructure, building upon the City's B4B-*Build for Broadband* initiative to foster competitive, high-speed broadband in multi-dwelling units buildings.**
Action 5.4	Phase 3	**Explore a policy requiring internet access in all new affordable housing investments.** Develop a policy requiring and incentivizing buildings funded with affordable housing dollars to include internet access to each unit, particularly in high displacement areas or areas with low access to internet.

Strategy 6. Strengthen regional collaboration by forming an "Internet for All" Coalition.		
Action 6.1	Phase 1	**Establish an Internet for All Coalition to help advance the Action Plan.** The coalition will meet regularly to examine partnership opportunities, receive feedback, and discuss progress on the strategies and actions. The coalition will be comprised of members from Seattle IT, City departments, City Council, Seattle Public Schools, Community Technology Advisory Board, community-based organizations, technology companies, public agencies, and telecommunication companies. The group will meet regularly for the first year from September 2020 to September 2021 and reevaluated thereafter.
Action 6.2	Phase 3	**Review opportunities to coordinate with other public entities on long-term wired and wireless infrastructure expansion.** This may include Port of Seattle, Seattle Public Schools, Sound Transit, University of Washington, and other public agencies.

Strategy 7. Advocate to ensure Internet Service Provider offerings meet residents' needs.		
Action 7.1	Phase 1	**Request aggregated enrollment data for low-cost internet programs.** The enrollment data will provide key metrics for the IFA evaluation dashboard. The low-income internet sign-up data would be represented in its aggregated form by census tract. The City is not requesting raw data that could cause concerns related to privacy, or proprietary and competitive information. The data could go through an intermediary organization. We are proposing to develop a GIS dashboard displaying recent internet subscription data from the American Community Survey and other tech surveys. Coupled with internet sign-up data for census tract areas with a high internet adoption disparity, the dashboard would allow the City and its partners to effectively monitor implementation.
Action 7.2	Phase 1	**Request to extend and improve ISP COVID-19 mitigations.** Examples include: • Extend Comcast's no-cost Internet Essentials beyond first 60 days. • Extend use of Verizon and AT&T wireless phones as hotspots. • Continue and expand free Wi-Fi access in low-income neighborhoods. • Waive 90-day waiting period for low-income eligible households. If household is eligible, immediately shift over to low-income pricing to align to need. • Increase speed level on the low-income price tier from 25 Mbps to 50-100 Mbps. • Continue free use of phones for hotspots on wireless service. • Foster development of wireless low-income programs.

Action 7.3	Phase 1	**Sponsor hotpots to high priority populations.** Advocate that ISPs provide Utility Discount Program customers with internet hotspot devices.
Action 7.4	Phase 1	**Enhance the "Access for All" Program benefits.** Appeal to ISPs to increase number of nonprofits eligible each year for the "Access for All" program that provides free high-speed internet service connections to eligible non-profit organizations located in Seattle. Consider expansion and service improvements at existing locations by providing 3rd tier business class service bandwidth, replacing old equipment, and adding Wi-Fi repeaters. Through the partnership and agreements with Comcast and Wave, the City can allot 25 new site connections annually (20 Comcast, 5 Wave). Many "Access for All" sites provide free internet access to their client populations.
Action 7.5	Phase 2	**Promote consumer protections for low-cost programs.** Develop materials to educate and protect consumers enrolled in low-cost programs from raised fees and contract issues. Continue collaboration with national associations to advocate for federal development of consumer protections for internet services.
Action 7.6	Phase 3	**Explore process to auto-enroll people in low-cost programs such as Supplemental Nutrition Assistance Program (SNAP) and other non-City programs serving priority populations.** Provide a mobile app option for enrollment.

Strategy 8. Examine new technologies to ensure best-in-class internet infrastructure and consumer choices.	
Action 8.1	**Continually monitor other municipalities of comparable sizes to examine the financial feasibility of a municipal fiber-to-the-premise broadband system.**
Action 8.2	**Monitor and research use of technologies including Wi-Fi 6, Satellite Internet, 10G Platform, G.Fast, Citizens Broadband Radio Service (CBRS), Microsoft Airband, and WiMax.**
Action 8.3	**Examine opportunities to leverage network assets in Seattle City Light, Seattle Public Utilities, and Seattle Department of Transportation's infrastructure as a platform for low-cost wireless broadband delivery.**

Partnerships

Strategic partnerships will be critical to implementing the IFA Action Plan, including with the business community, internet service and telecommunication companies, philanthropic organizations, Seattle Public Schools, state and local nonprofits, and academia. Additionally important is the continued collaboration with City boards and departments including, but not limited to, the Community Technology Advisory Board, Seattle Information Technology, Seattle City Light, Seattle Public Utilities, Seattle Department of Transportation, Office of Economic Development, Department of Education and Early Learning, Office of Immigrant and Refugee Affairs, Seattle Parks and Recreation, and the Seattle Public Library.

City Departments and Agencies

City departments and agencies are key stakeholders in the success of this endeavor. We gathered feedback from 19 departments and agencies to develop this report, including Office of Arts & Culture (ARTS), City Budget Office (CBO), Department of Education and Early Learning (DEEL), Department of Neighborhoods (DON), Finance and Administrative Services (FAS), Human Resources (SDHR), Human Services Department (HSD), Seattle Information Technology (ITD), Office of Economic Development (OED), Office of Film + Music (OFM), Office of Immigrant and Refugee Affairs (OIRA), Office of Sustainability & Environment (OSE), The Seattle Public Library (SPL), Seattle Center (CEN), Seattle Office for Civil Rights (SOCR), Seattle Department of Transportation (SDOT), Seattle City Light (SCL), Seattle Public Utilities (SPU), and Seattle Parks and Recreation (SPR).

To deepen the internal city collaboration, a “Digital Equity Champions” group formed, initiated by DON, OIRA and ITD. The goals of the group are to share digital equity work being done throughout the City, identify internal and external collaboration opportunities and to ensure a coordinated response.

State and Local Nonprofits

Local nonprofits and community-based organizations providing direct services to BIPOC and other communities in need play an essential role in enabling universal internet adoption. They are trusted ambassadors to deliver front-line services to our hardest-to-reach, most vulnerable residents.

Seattle has a strong network of community-based organizations with experience providing technology adoption programs. Some of these organizations have been providing services since the City began work on digital inclusion in the mid-1990’s. These front-line organizations respond to Seattle’s ever-changing populations and technology needs.

The City has nurtured ongoing engagement with these groups through the Digital Equity Learning Network of Seattle & King County (DELN). The DELN is a collaboration of community-based organizations, public/private institutions, and individuals invested in digital equity in our region. The DELN provides opportunities to connect to share resources, create partnerships, and gain knowledge of best practices. Local networking sessions began in 2019 and have gained traction with 138 nonprofit organizations, 10 institutions, 10 telecom representatives, 4 local governments and 3 corporations, actively involved in exploring solutions for digital equity.

National Nonprofits

The National Digital Inclusion Alliance (NDIA) is a unified voice for home broadband access, public broadband access, personal devices and local technology training and support programs. The NDIA combines grassroots community engagement with technical knowledge, research, and coalition building to advocate on behalf of people working in their communities for digital equity. It works collaboratively to craft, identify and disseminate

financial and operational resources for digital inclusion programs while serving as a bridge to policymakers and the general public. The City is an active affiliate of NDIA.

The Schools, Health & Libraries Broadband (SHLB) Coalition is a nonprofit advocacy organization based in Washington, D.C. The SHLB strives to close the digital divide by promoting high-quality broadband for anchor institutions and their communities.

Business Community

Seattle is home to a thriving business community, known for technology innovation and leadership. Technology advancements are transforming the future of work in our area, making digital access and skills essential for a robust workforce.

The City has partnered with private companies to amplify funding for community-based digital inclusion programs, including Verizon's $25,000 to ITD's Technology Matching Fund this year, Facebook's $50,000 to ITD's Technology Matching Fund in 2017 and 2018 and Comcast's $50,000 to OED's current "Digital Bridge" pilot.

Local technology leaders have supported digital equity, not only by providing funding, but also by supporting digital literacy, donating refurbished devices, and contributing technical expertise. For example, sea.citi - a network of tech and innovation companies building relationships between community, government, and innovation workers - leveraged the sector's expertise to offer tech support to Seattle Public School families to prepare them for online learning. Members of the Mayor's Innovation Advisory Council (IAC) used their skills to develop affordableseattle.org, an online resource to help low-income residents find low-cost internet information and other benefits.

Technology industry organizations, like Washington Technology Industry Alliance (WTIA) and sea.citi, foster civic engagement programs and opportunities for members. The City will continue to engage with our business community to seek further private/public partnership opportunities.

Internet Service and Telecommunication Companies

Internet service providers and telecommunication network operators deliver the internet connectivity to homes and businesses across Seattle. They have been, and continue to be, central partners in efforts to realize a vision of IFA. During this COVID-19 period wireline, wireless, and neutral host carriers have all engaged in supporting the Seattle community through commitment to the FCC's COVID-19 'Keep Americans Connected" Pledge, increasing service level speeds on low-cost programs, device donations, working with Seattle Public Schools on new sponsored service models, and providing support to community-based organizations working to meet digital inclusion needs. Seattle's internet and telecommunication companies have also actively engaged with the City on IFA Action planning and have expressed interest in exploring continued partnership opportunities to advance IFA goals. The City will continue working closely with these companies on efforts to close the digital divide.

Philanthropic Organizations

Local philanthropies play an important role in filling the gaps between public and private sector investments. 'All In WA', a coordinated statewide relief effort, has launched a Digital Equity Fund to raise money to provide computer devices to students. The Technology Alliance, a statewide, non-profit organization of leaders from Washington's technology-based businesses and research institutions, has put together a Task Force to make short-term and long-term recommendations on: (1) internet connectivity for students; (2) support for schools' IT infrastructure; (3) improving online platforms; and (4) effective online teaching. The Bill & Melinda Gates

Foundation has provided a grant to review online learning platforms – see the results here.

The City looks to collaborate with financial institutions, All In WA, United Way of King County, and the diverse network of grant makers in Philanthropy Northwest on this initiative.

Academia

The University of Washington (UW) is an important partner in the City's work of advancing digital equity. UW Information School's Technology and Social Change Group (TASCHA) helped develop the City's 2016 Digital Equity plan, created evaluation and impact indicators, conducted research on digital skills standards for diverse communities and refugee women in technology, and provided Capstone students to work on digital equity projects. TASHCA is currently a partner in the City's Digital Bridge project to help unemployed workers. The opportunities to work collaboratively with TASHA and other UW departments will continue going forward.

Seattle University's Center for Civic Engagement (CCE) has also been a partner in advancing digital equity. CCE has assisted with digital skills training programs in the Yesler and Central District communities. CCE, along with the university's Education department and Law School, offer potential future partnership opportunities.

Seattle Colleges is an active partner with the City on workforce development, including collaborating on a project with OED, ITD, SPL, UW, and the Seattle Jobs Initiative to analyze and improve intake and assessment of digital skills and career pathways and referral. Seattle Colleges has secured a National Science Foundation grant to develop tech career pathways from high school to college. Since the COVID-19 crisis began, the Colleges have been assisting their students with devices and services.

Seattle Public Schools (SPS)

Seattle Public Schools is a central partner in IFA efforts and has existing long-term partnerships with multiple City departments. The City has supported out-of-school digital skills programs for students and training for parents/guardians through the Technology Matching Fund and at SPR Community Centers. During COVID-19, as SPS pivoted to address the closure of schools and students sheltering at home requiring distance learning, they ramped up their device distribution program. Early collaboration with ITD to promote low-cost internet options evolved into ITD working closely with SPS to develop sponsored internet service agreements with Comcast and Wave and organizing internet sign-up events. The City also provided technical assistance for connectivity and Wi-Fi at Mary's Place, Solid Ground, and Seattle Chinatown International District Preservation and Development Authority (SCIDpda) properties, sites providing housing or temporary shelter to student families. SPS has marketed City digital inclusion resources, and the City has promoted and amplified SPS internet events and resources for families through our communication channels. SPS has also used data the 2018 Technology Access and Adoption survey for planning and the City has communicated about Wi-Fi availability.

SPS has developed their own partnerships for funding (via the Alliance for Education), technical support (via sea.citi), and equipment (with some support from Amazon). Additional support for internet service sponsorship will be coming from the state OSPI, though that will probably not cover all of SPS student internet needs and longer-term solutions are needed for summer and beyond.

The City continues to align with the needs of Seattle Public Schools' families and community-based organizations that assist immigrant and refugees and other families. OIRA is assisting to develop information for families in multiple languages.

Based on SPS and City partnership work done during the pandemic, it will be critical to ensure coordinated

communications and collaboration between all the points of contact in SPS and the City to maximize investments of staff time and resources towards IFA and sufficient engagement with the families who need these services.

Seattle Housing Authority (SHA) and Affordable Housing Providers

SHA continues to be a strong partner for digital equity in Seattle. They established a Digital Equity Subcommittee, developed strategies for encouraging home broadband connectivity, partnered with community based organizations for digital skills training and device distribution, and created over 10 computer labs in their public housing communities, including the Special Technology Access Resource (STAR) Center, the first assistive technology computer center in a housing authority property in the nation. SHA represents 17,000 households, housing over 37,000 residents in 8,000 SHA owned apartments and single-family homes, and through the issuance of 10,000 housing choice vouchers. Nearly 80 percent of residents are children, elderly or disabled. One in 10 students enrolled in Seattle Public Schools lives in SHA-supported housing.

SHA executive leadership is aligned and very committed to the City's efforts to provide home-based broadband to residents living in SHA housing. They are committed to working to address federal regulatory and funding barriers moving forward, necessary for inclusion of home internet as a federal rent-reimbursable utility. Housing choice voucher recipients live in privately managed/owned buildings and therefore are not under the control of SHA. These private properties would not be included as supported by federal funding for internet service.

As of December 31, 2019, there are 17,767 existing City-regulated affordable homes in Seattle, in addition to the 8,000 SHA owned properties. Twenty nonprofit organizations own and/or manage most of these properties and have agreements with the City, including Artspace Projects, Inc., Bellwether Housing, Capitol Hill Housing, Catholic Housing Services, Compass Housing Alliance, Delridge Neighborhood Development Association, El Centro de la Raza, Full Life Care, Interim Community Development Association, Low Income Housing Institute, Mercy Housing Northwest, Mt. Baker Housing Association, Mt. Zion Madison Street Properties, Pike Place Market PDA, Seattle Chinatown International District PDA, SeaMar Community Health Centers, Sound Generations, South East Effective Development, Urban League of Metropolitan Seattle, and YWCA of Seattle, King and Snohomish Counties.

These affordable housing providers are committed to serving residents who are low-income, BIPOC, immigrants and refugees, living with disAbilities, older adults, and those experiencing homelessness. Connecting with affordable housing partners in establishing ubiquitous internet access to residents living in their communities will be vital for mental stability, access to healthcare, COVID-19 resources, and social interaction. Many residents living in these communities are also enrolled in job training and other education programs and need access to home internet and devices, as well as having children who are in remote learning environments.

Community Technology Advisory Board (CTAB)

The Community Technology Advisory Board provides valuable feedback to the City by making recommendations to the Mayor and the City Council on issues of community-wide interest relating to information and communications technology. CTAB's Digital Inclusion (DI) subcommittee provides funding recommendations annually for the Technology Matching Fund grant program. In 2020, the DI subcommittee began researching a telehealth project pilot for older adults living in low-income housing buildings. Due to the need for physical distancing for vulnerable populations, older adults do not feel safe leaving their homes for daily activities, including accessing healthcare. For this pilot, the DI subcommittee designed a project for telehealth education, laptops/tablets, service connectivity, and digital literacy training. The subcommittee is partnering with Seattle

Housing Authority (SHA), the City's Aging and Disability Services Case Management Program, and the SHA Resident Action Council, to pilot the project in one SHA building. The SHA Resident Action Council has applied to the King County COVID-19 Response Fund for a $25,000 grant to purchase laptops, 6-months of internet service connectivity, and digital literacy training to assist residents in accessing online telehealth services.

Regional and State Governments

King County: The King County Council legislated $1.695 million in CARES ACT funding for digital equity. They have finalized two grant programs and grant vehicles and will soon award designated funds to community-based organization and K-12 organizations. The City served on the County's Broadband Access Study Project Steering Committee and closely collaborated with King County on their recently published broadband report, which was based on and included the City's 2018 Technology Access and Adoption data. The City has had continual dialogue with King County about digital equity strategies and expects to continue this going forward. Some data development, infrastructure and solutions may be best delivered countywide for greater impact and to reach residents who come into Seattle for work, have family or practice faiths here, or use resources across boundaries. White Center is an area of common interest. Our community-based organization partners are increasingly delivering services in Seattle and other parts of South King County in particular. King County is a critical partner in health and social service delivery, equity work, transit and emergency preparedness, public safety, and communications systems. They have expressed interest in strengthening the partnership and community impacts by working together on Internet for All and digital equity solutions.

Washington State: The City is continuing to work closely with the State Broadband Office in the Department of Commerce, the Governor's Office, and legislators on sharing digital equity needs and resources, internet strategies, legislation, and policy. The City worked with Representative Gregerson and others on a proposed state Digital Equity Act in 2019 and expect new legislation coming forward that could help with Internet for All and digital equity. The State Broadband Office led the deployment of multiple new public Wi-Fi spots in unserved areas outside Seattle during COVID-19. ITD participates on the I-ACT Keep Washington Connected internet access crisis response team with representatives from the Governor's Office, State Agencies, the Legislature, the Tribes, and other stakeholders. This group is working on digital inclusion proposals. ITD's Digital Equity Program Manager is on the newly forming WA State Broadband Strategy Group, led by the State Broadband Office. The WA State library has been the channel for federal COVID-19 relief funds granted to The Seattle Public Library for additional hotspots. OSPI has received 10% of the total ESSER/CARES act funding allocated to WA and is distributing $8.8 million to connect 60,000 families to the internet through agreements with internet providers, $2.5 million to provide to the Educational Service Districts to support professional development for educators in effective online instruction, and $8.1 million to be provided to community based organizations working via competitive grants to support school districts in serving students in remote learning. The Governor sought telecommunication and internet service provider company pledges following the end of the FCC 'Keep America Connected' pledge and continues to encourage private sector partnerships to support student and other digital inclusion needs. The Department of Commerce is proposing additional support for broadband deployment and adoption in the 2021 budget decision package. As most broadband focus is on adding infrastructure to reach unserved rural areas, it is important to maintain a voice for urban populations in need. Additional federal relief and other funds are funneled through the state and our partnership will continue to be critical; having projects ready to implement will better position the City and others for federal funds.

Port of Seattle: The Port has fiber infrastructure, as well as facilities along the waterfront, and is a potential partner for internet deployment solutions.

US Department of Commerce Broadband USA: ITD has a strong relationship with the Broadband USA program of the National Telecommunications Infrastructure Administration. ITD helped develop a City and State Digital Inclusion Learning Network group. Broadband USA provides information on funding, data, and other resources.

Infrastructure

The state of Seattle's broadband infrastructure is among the best in the nation, and private telecommunication companies continue to actively invest in our city to increase system capacity to support increasing demands. Consequently, a vision of universal internet access in Seattle is not limited by infrastructure or availability of service; Seattle currently benefits from widespread deployment of high speed and even gigabit speed broadband infrastructure to serve residential and commercial internet needs[25]. This is including our public housing multifamily buildings which are all served by local wireline cable operators to provide high-speed internet service.

As stated earlier, when exploring solutions that enable universal internet access the option of municipal broadband is always a key interest. While some cities in the nation have chosen to build municipally-owned broadband infrastructure to support internet services to the community, it is important to know that **these municipalities often faced underinvestment from incumbent service providers and did not have even one incumbent provider that offered gigabit broadband service**; this created a market need to be filled. Seattle does not have these same issues. Since the last study of a municipally-owned broadband system in 2015, which determined the City could not finance the $500-665 million capital construction costs or operate a system in a manner where rates would cover costs, the competitive service landscape has *increased* with CenturyLink upgrading its legacy system to fiber-to-the-home covering 53% of the city with gigabit service.

As a municipality, Seattle has made significant public investment to advance broadband internet access via Wi-Fi for our residents and visitors. Public Wi-Fi service is currently provided at 76 specific sites in the City of Seattle. This includes all libraries, 26 Parks and Recreation Community Centers, Dakota Place, City Hall, Seattle Center, King St Station Office of Arts and Cultural Affairs, Justice Center, and other city facilities. Seattle Public Library (SPL) is currently planning to upgrade their Wi-Fi system, including enhancements for external Wi-Fi, and project this to be completed by year end.

Considering Seattle's existing internet infrastructure environment, the need for targeted infrastructure expansion aligns with efforts described under IFA Strategy 2 to *Expand free or low-cost connectivity options in targeted areas of the city.* On-going exploration and planning for proposed Actions 2.9 through 2.20 will help prepare potential "shovel-ready" projects that could be used to seek federal and state funding opportunities to expand affordable services to low-income residents. It is important to note that federal and state broadband infrastructure funding opportunities normally focus eligibility on rural communities and other unserved areas. While Seattle would not be considered an unserved community, specific Seattle IFA projects could align with federal and state digital equity funding opportunities.

Seattle Internet Infrastructure Detail

The following information provides detail on the current state of Seattle's internet infrastructure and the provision of services to the community through **wireline** and **fixed-wireless** providers, **cellular** providers, **Wi-Fi** services, and **other technologies** supporting improved internet connectivity.

Wireline Internet Service

Seattle has five (5) wired internet service providers (ISP) offering 100+ Mbps service to residents and businesses.

[25] Seattle does have very limited pockets where broadband infrastructure has not been updated and service depends on legacy telephone system wiring which provides sub-broadband speeds between 1.5-12 Mbps. Older apartment and condo building with inadequate internal wiring can also be limited to slower internet service. In these cases, residents and businesses rely on wireless hotspots or satellite service for higher speed internet connectivity.

All Seattle neighborhoods have one, and many have 2, and some have 3 wired ISP options. See the *Seattle Cable Internet Service* map (Appendix C). The available options depend upon whether living in a single-family residence or an apartment or condo (multiple dwelling unit buildings "MDUs"). For MDUs, the building size, age of wiring infrastructure, and building owner agreements with ISPs will impact the available service options.

Two ISPs offer *asymmetrical* service (i.e., download speeds faster than upload speeds) and three offer *symmetrical* service (i.e., equal download and upload speeds).

- **Comcast**: Provides service to 94% of Seattle, offering service in all neighborhoods except parts of Beacon Hill and the Central Area. Service is provisioned over a hybrid fiber/coaxial (HFC) network that is typical of cable systems in major metropolitan areas and provides asymmetrical internet service speed up to 1 Gigabit. Because bandwidth within a neighborhood is shared rather than dedicated, speeds may be significantly decreased by one's neighbors' simultaneous use of their cable modems. Comcast is actively investing in adding more fiber into its network, running fiber deeper into Seattle neighborhoods to increase system reliability and capacity. Comcast is also expanding its network to reach further into the part of Beacon Hill and Central Area where its system is not deployed.

- **CenturyLink**: Provides service to 53% of Seattle, offering service in parts of all neighborhoods. Service is provisioned over a fiber network which provides symmetrical internet service speed up to 1 Gigabit. CenturyLink is Seattle traditional telephone company and has its original telephone (copper) network serving 100% of Seattle. Starting in 2015 CenturyLink invested in upgrading much of its legacy network to fiber. Since that original fiber build, CenturyLink has not increased its footprint but has continued to make fiber upgrades within the footprint.

- **Wave**: Provides service to 12% of Seattle, covering neighborhood areas of Capitol Hill, Beacon Hill, the Central District, Queen Anne, Eastlake and the International District. Like Comcast, service is provisioned over an HFC network which provides asymmetrical internet service speed up to 1 Gigabit and Wave has continued to incorporate innovations in electronics and upgrade their infrastructure to keep up with increasing user demands.

- **Wave G**: A subsidiary company of Wave that uses a fiber network to provide internet service to MDUs and businesses. Wave G service is not available to single family residence home. The fiber system provides symmetrical service from 100 Mbps to Gigabit service. Wave G service is expanding through contract with Seattle MDU building owners. Service is available in over 200 buildings in the Downtown Seattle, Capitol Hill, Central, Ballard, and Queen Anne areas.

Fixed-Wireless Internet Service

- **Atlas Networks**: Seattle's only remaining local ISP, operating out of Belltown. It uses a fixed-wireless network to provide symmetrical Gigabit internet service to MDUs; Atlas service is not available to single family residence home at this time. Their fiber/Ethernet based system provides symmetrical Gigabit services. Atlas service is expanding through contract with Seattle MDU building owners. Service is available in over 250 buildings in the Downtown Seattle, Industrial District, Capitol Hill, First Hill, Fremont, Queen Anne, and International District areas.

- **Google Fiber Webpass**: Uses a fixed-wireless network to provide symmetrical Gigabit services internet service to MDUs. Google Fiber Webpass service is not available to single family residence home. The fiber system provides symmetrical Gigabit services. Google Fiber Webpass service is expanding through

contract with Seattle MDU building owners. Service is available in over 80 buildings in the Queen Anne, Capitol Hill, and Downtown Seattle area.

Cellular Internet Service (4G LTE / 5G)

Seattle residents have internet access available via cellular service from three (3) primary providers, AT&T, T-Mobile/Sprint, and Verizon. The providers operate using networks that are comprised of wireless facility infrastructure owned and managed either by the service provider, leased from a neutral-host network owner, or some combination of the two. Comcast is also offering a wireless phone service, using spectrum leased from a wireless carrier.

Residents have wireless internet connectivity through cellular networks on data plans purchased from their cell phone service provider. Smartphone users can also avoid using their limited cellular data plan by accessing the internet through Wi-Fi networks that are providing access from a wireline connection in a specific area. Cell service is mobile, whereas Wi-Fi service is limited to the signal range of the Wi-Fi equipment.

Seattle wireless cellular provider systems currently offer 4G LTE services and are evolving to the next generation of wireless networks ("5G"). Unlike prior generations of wireless service, 5G networks will not replace 4G networks; 4G LTE will remain available as 5G networks are deployed offering new technologies that will enable ultra-high speed, low latency connectivity and hyper efficient 'self-healing' networks.

5G networks are in the infancy stage in Seattle. Each service provider has a unique combination of technologies that will constitutes their "5G" networks, but all service models have the same goal of increasing the connectivity capacity and speeds wireless networks can offer. Once 5G networks are more fully developed, 5G wireless service is projected to allow for mobile internet connectivity comparable to a highspeed wireline internet connection. If achieved, and if mobile data plans did not include restrictive data caps, this ultra-fast cellular service would provide residents with a truly competitive internet options to traditional wireline options.

Cellular wireless networks are engineered to deliver outdoor mobile connectivity and cell signals can be degraded and weakened indoors. This is particularly an issue in large multi-dwelling unit buildings where indoor amplifiers and signal repeaters may be installed to provide reliable indoor cell phone technology.

Wi-Fi Internet Access

Public Services: Wi-Fi provides an opportunity for those with devices to connect to the internet, as well as other fixed devices in a location to connect (e.g. public computer/information terminals). For low-income residents (especially housing insecure), publicly available Wi-Fi may be their only source of available internet. Lower-income residents with limited data and pay-as-you-go plans use public wi-fi to extend their access to internet when their service is used up, throttled, or they cannot afford more data. Wi-Fi locations are also reported to serve as communication lifelines for those fleeing domestic violence or similar situations where other internet availability is limited or they need to get online in a safer, more anonymous environment.

Wi-Fi internet requires a connection back to a modem and provider, either via fixed line (e.g. fiber), point-to-point wireless, or via cellular service (e.g. mobile Wi-Fi communications vehicles or personal loaner hotspots/Mi-Fi devices or phone hotspot sharing). Some locations provide extended Wi-Fi coverage through mesh networks or stringing a line of access points (e.g. via cabling down a corridor or wireless connections – which also reduces throughput). During COVID-19, some temporary housing and community service organizations found that Wi-Fi in a community room did not provide sufficient signal for students to fully connect from rooms down the hall or up a floor. This would require additional infrastructure.

- **Internet at Public Facilities**: Public Wi-Fi is currently provided at 76 specific sites in the City of Seattle. Appendix C includes a map displaying the locations. This includes all libraries, 26 Parks and Recreation Community Centers, Dakota Place, City Hall Seattle Center, King St Station Office of Arts and Cultural Affairs, Justice Center and other city facilities. Seattle Public Library (SPL) is planning to upgrade their Wi-Fi system, including enhancements for external Wi-Fi. They project to be completed by year end. The Seattle Parks and Recreation (SPR) Community Center facilities provide internet inside buildings with some exterior bleed out of the coverage near entryways. SPL also provides computer terminals at all sites. Seattle Parks and Recreation provides a single computer terminal at most community centers. Monthly use of Wi-Fi averaged above 48,000 connections per month last year. The federal Veterans Administration hospital and medical grounds on Beacon Hill does not currently provide public Wi-Fi. We have not surveyed other federal and non-City public facilities.

- **Education campuses:** Seattle Public Schools provide Wi-Fi access to students inside their buildings. During COVID-19, they have amplified the signals to provide extended service further from building entries. This is not as robust as the Wi-Fi on campus for the University of Washington, Seattle Colleges, and other private colleges. The Seattle Schools and higher education locations are currently configured to provide access to students and staff only.

- **Internet at Community Based Organizations and Anchor Institutions**: The Wi-Fi available at community-based organizations is usually provided in learning areas, community rooms and similar limited interior spaces for use by clients and/or low-income housing building residents. The City's Access for All cable broadband sites have been a valuable source of internet to provide this access, though we do not have confirmation from the companies and recipient organizations that all sites are receiving the full business service with updated modems. During COVID-19, these infrastructure issues have emerged: shelter and temporary housing facilities need additional access points installed to reach client rooms or other spaces, exterior coverage is seldom provided currently though the need increased with COVID-19, and we do not collect data currently to identify which sites and to what extent coverage is provided. Organization staff without qualified IT staff are not trained to measure speed and to adjust wiring and access points to facilitate coverage. Complaints of slow speed can be the result of interior Wi-Fi set up and building issues rather than the broadband connection and service. There is an opportunity going forward to improve tracking of these sites' Wi-Fi service and to assist these organizations in improving Wi-Fi service quality and coverage. Health clinics and hospitals' Wi-Fi availability has not been mapped.

Private Services During COVID-19, Comcast opened up the commercial segment of its system Wi-Fi spots for public use. This system has been a useful resource but requires users to be in close proximity and to distinguish between the public network and their private network with the same name, and availability is dependent on businesses keeping their modems on. A City agreement with Wave provided outdoor public Wi-Fi at 23rd & Union and 23rd & Cherry. These locations may still be operative, but the agreement expired in 2019, and there is no current guarantee of service. Wi-fi is also provided in the interior of some stores, such as Starbucks and McDonalds, but there is no current reliable mapping of these sites and expectations of purchases limits use. Anecdotally, we have also heard of building owners adding Wi-Fi (e.g. in South Park). Partnering with existing properties and planned developments, especially in Equitable Development, CDBG, Community Reinvestment Act funding and similar investments provides an opportunity to expand area coverage.

Other Technologies Supporting Improved Internet Connectivity

The digital economy continues to drive innovation and improvements to high-speed internet connectivity. Notable emerging technologies include Satellite Internet, Wi-Fi 6, CBRS, G.Fast, 10G Platform, and Microsoft

Airband. Advancements through these technologies are being monitored and explored with IFA planning to ensure the array of available options are considered as solutions to meet diverse connectivity needs across the City, and to promote competitive consumer choices.

- **Satellite Internet**: Satellite internet technology has historically had three challenges to providing high-speed, reliable internet service: signal latency, bandwidth limitations, and high deployment (and service) costs. These challenges are being addressed by companies like Starlink, Kuiper, and OneWeb investing to deploy Low earth orbit (LEO) satellites with greatly reduced latency (from 600+ ms to 25+ ms) and deployment costs (from 22K mile to 1.2K mile orbits). Latency for 4G networks averages around 50ms and 5G could potentially reach 1ms. While satellite broadband service is targeted to serve the large global populations without access to traditional broadband infrastructure, it will also target connectivity for transportation systems including aircraft, boats and land vehicles, and could prove a viable future option for urban customers as well. Starlink (operated by SpaceX) has launched 597 satellites and reports needing between 400 and 800 satellites in orbit to begin to roll out minimal coverage. Starlink targets to offer private beta service in August 2020 with Seattle as a potential beta market. Kuiper (operated by Amazon) received FCC approval in July 2020 to deploy and operate a constellation of 3,236 satellites. There is no target date for offering service. OneWeb has launched 74 satellites to date and has applied with the FCC to launch a constellation of up to 48,000 satellites.

- **Wi-Fi 6**: Wi-Fi 6 is the industry name for the Wi-Fi standard 802.11ax that launched in 2019 and introduced significant improvements to improve home Wi-Fi performance. The improvements primarily come from smarter ways to handle requests for connectivity from multiple devices. Wi-Fi 6 will improve each user's average speed by at least four times in congested areas with a lot of connected devices, which will be beneficial in residences and businesses with a lot of devices connected to Wi-Fi, or those living in a dense apartment complex. Wi-Fi 6 requires purchase of new routers designed to take advantage of improved speeds and throughput.

- **CBRS**: Citizens Broadband Radio Service (CBRS) refers to spectrum in the 3.5 GHz to 3.7 GHz range that the FCC has designated for sharing among three tiers of users: incumbent users, priority access license (PAL) users and general authorized access (GAA) users. The GAA tier is unlicensed spectrum that users can access for free as long as they do not interfere with incumbents or licensees. Wireless carriers are expected to incorporate CBRS to enhance their networks with mid-band spectrum, especially in dense urban areas. Both wireless carriers and cable companies could use CBRS to deliver fixed wireless access internet services. Businesses and large enterprises will be able to use the spectrum to potentially build their own 4G or 5G private wireless networks. CBRS is also expected to outperform Wi-Fi for in-building use.

- **G.Fast:** G.Fast technology increases the internet speed capacity, up to Gigabit service, that can be delivered over a building's legacy telephone service copper wiring. The technology is a solution developed to upgrade services in older multi dwelling unit buildings (MDUs); it is not used for single family residences. G.Fast requires a direct fiber connection to the building and each building must be assessed to determine whether a G.Fast solution is viable based on the condition of the interior copper wiring to units. There are currently no Seattle MDUs using this technology. Seattle IT tracks its evolution and works to get information to older building owners through the IT's Build for Broadband (B4B) Initiative. The B4B webinar on G.FAST TECHNOLOGY is available here.

- **10G Platform**: 10G is the cable broadband technology platform that can handle more data from more devices 10 times faster than today's fastest cable broadband networks. The foundation for 10G

technology already exists with the capacity of the cable networks that now deliver 1 GB speeds to homes and businesses. The cable industry has developed the new DOCSIS 4.0 standard for delivering broadband across hybrid fiber-coaxial networks. The current DOCSIS 3.1 standard provides for one-tenth of the download speed to be provided as upload—meaning a 100 Mbps download product typically has a 10 Mbps upload speed. DOCSIS 4.0 will be able to deliver as much as 6 Gbps upload speeds to go along with the 10 Gbps download speeds. This would allow a cable company to offer a symmetrical 1 Gbps bandwidth product – something that is not possible today and that puts cable networks at a disadvantage compared to fiber networks.

- **Microsoft Airband:** The Airband Initiative focuses on technology utilizing unused broadcast frequencies between TV channels (known as TV white spaces) to help deliver enhanced connectivity coverage in locations where laying cables isn't possible, or that face challenging geographies and low populations. Airband targets to eliminate the rural broadband gap and Microsoft aims to expanding high-speed internet to 3 million Americans living in unserved areas by 2022.

City and other Government Owned Fiber Infrastructure

Since 1996, the City has formed a fiber partnership with approximately 20 other government and public education agencies and has installed, manages and maintains 740 miles of municipally owned fiber from Tolt Dam and Cedar Falls to Olympic to Snohomish County Paine Field and Administration Building in Everett. Seattle continues to engage experienced commercial Internet Service Providers, exploring opportunities for improved Internet access in the city. These providers can lease unused fiber optic cable owned by the City of Seattle, known as "dark fiber", to help expand their service.

Resources

The Resolution requests that the Action Plan include a discussion of resources including "A budget estimating the public and private resources required to implement the Action Plan efficiently, which may include experienced consultants to assist the Seattle Information Technology Department".

The City will pursue public-private and philanthropic contributions, future federal funding opportunities (assuming internet access is an eligible expense, as it is in the CARES Act), and state funding to provide devices and/or funding for internet service and skills training.

As this is an initial report, the City will need to conduct additional outreach with philanthropic and private partners to discuss the resources needed for relevant Action Plan strategies. At this time, the City is looking at the financing of relevant Action Plan items as they fit into one of the three categories below:

1. **Existing resources in budget.**
2. **Requires additional time to complete resource estimate for new action.**
3. **Funding for Action Plan items leverages our philanthropic partnerships.**

Key items from the Action Plan are summarized into these categories in the tables below:

Action Plan Item	Description	Phase	Funding
1.1	Ramp up the City's outreach and engagement about low-income programs for residents and nonprofits.	1	Existing resources in budget
1.4	Explore one-stop portal for enrollment/verification in all low-income programs, including access to internet (using Affordable Seattle model/website).	2	Requires additional time to complete resource estimate for new action
2.1	The Seattle Public Library will deploy Wi-Fi 6 outside all branches in Q4-2020.	1	Existing resources in budget
2.3	Develop GIS Mapping Application for public Wi-Fi.	1 and 2	Requires additional time to complete resource estimate for new action
2.6	Partner with Seattle Public Schools to increase hotspot devices available for distribution to students to enable remote learning.	3	Leveraging our philanthropic

			partners
2.7	Partner with Seattle Public Library to expand the hotspot devices program to address high-priority resident needs.	3	Leveraging our philanthropic partners
2.9	Upgrade Wi-Fi access points in Seattle Parks & Recreation Community Centers.	2 and 3	Requires additional time to complete resource estimate for new action
2.11	Support a Seattle Community Cellular Network.	2	Requires additional time to complete resource estimate for new action
2.13	Explore mobile public Wi-Fi buses or vans in strategic locations at strategic times.	2	Requires additional time to complete resource estimate for new action
2.14	Examine expansion of HSD Social Connectivity tablet distribution pilot to include Wi-Fi hotspots.	3	Leveraging our philanthropic partners
2.15	Develop proposal to strategically deploy more public Wi-Fi in digital equity zones.	1 and 2	Requires additional time to complete resource estimate for new action
2.16	Explore a digital version of the Adopt-A-Highway program to fund publicly available Wi-Fi.	2	Requires additional time to complete resource estimate for new action
2.17	Explore development of sponsored internet kiosk program.	2	Requires additional time to complete resource estimate for new action

2.19	Explore feasibility of providing City fiber backhaul to strategic low-income housing locations to support free or low-priced fixed wireless internet service to residents.	2	Requires additional time to complete resource estimate for new action
2.20	Support a model for low-income housing buildings to provide an activated high-speed internet service connection to all units.	2	Requires additional time to complete resource estimate for new action
3.3	Continue effective, scalable programs that address adoption barriers beyond internet access, such as digital literacy and devices.	1	Existing resources in budget
3.4	Support digital navigators through a train-the-trainer model to provide 1:1 device, connectivity, and technology support.	2	Requires additional time to complete resource estimate for new action
4.3	Partner with a nonprofit organization or foundation to manage an “Internet for All fund”.	3	Leveraging our philanthropic partners
4.4	Develop a device and internet hotspot sponsorship program.	3	Leveraging our philanthropic partners
5.1	Review implementation of the “Project and Construction Coordination” policy to evaluate installation of conduit/fiber for projects in the right-of-way management system	1	Existing resources in budget

The table above reflects Action Plan items seeking to bolster the already significant City efforts to promote digital equity and inclusion. The following table lists many of these current efforts:

Current City of Seattle Digital Equity Initiatives

Depts. leading the initiative	Focus area	Initiative/Program Name
ITD	Digital skills, devices for individuals, devices for organizations, public internet access for participants, some internet for individuals.	Technology Matching Fund
ITD /SPR/FAS/ ARTS/CEN/ SPL	Public internet access – Wi-Fi	Public internet access provided via Wi-Fi and computer kiosks
ITD	Internet for organizations for access & training	'Access for All' Program
ITD	Low-cost internet programs for low-income residents	Low-Cost Internet Outreach
ITD	Data on skills, internet, devices, applications, and barriers to use	Technology Access & Adoption Community research and Digital Skill Sets for Diverse Users Research
OED/ITD	Digital access, literacy, and career development for unemployed workers and youth.	'Digital Bridge' for unemployed workers and 'YTECH Digital Pathways'
OED	Skills and devices	GrowHire Healthcare Foundations Training, STEEP, WorkSource System Alignment, Seattle Jobs Initiative, Youth Employment Grants, Digital Skills intake and assessment project
SPL	Internet for individuals	Hotspot Loan Program
SPL	Internet, digital skills, public computers	Student and Workforce Development Support
HSD	Internet, digital skills, public computers	Senior Center technology labs and training programs; aging network provider technical assistance
HSD	Devices, skills, internet	Devices for older clients, devices for homebound clients programs, City Surplus Computer program, youth employment and development programs, Food Access Opportunity Fund, and Utility Discount Program outreach

HSD	Digital equity and inclusion	Community Guide to Accessible Meetings and Events and Language Line Interpretation Application Pilot
ARTS	Devices, Skills	Grants for community-based organizations and individual artists that support digital access-type classes
OFM	Advocacy	Seattle Music Commission's Youth + Community Committee
ARTS	Digital skills, public computers for artist use	Artist Support Programs
CEN	Digital Skills	Seattle Center Digital Studio
OED/SDHR/ OIRA	Digital Skills	In-Language Call Center
OIRA	Outreach	Community Outreach & Engagement and Language Access
OIRA	Digital skills, devices for program	Ready to Work Program
OIRA	Advocacy	New Citizens Program and Immigrant and Refugee Commission

Implementation

The Seattle Information Technology Department (ITD) is the lead department for the Internet for All initiative. This work aligns closely with the City's current Digital Equity Plan to address digital skills training, internet connectivity, devices, and technical support. Implementation will be coordinated by ITD's Digital Equity Team and supported by staff from ITD, as well as other departments throughout the city. The Digital Equity Team will be responsible for meeting regularly with project leads to monitor progress on the strategies and actions, and to report regularly to City stakeholders on progress.

Evaluations

The resolution requests a plan to implement both a near-term *process* evaluation, to ensure effective implementation of Internet for All Seattle, and a long-term *outcomes* evaluation to assess the effectiveness of Internet for All Seattle once implemented.

- The *process* evaluation should provide suggestions for improvements so that corrective action can be taken to maximize the opportunities for successful implementation.
- The *outcome* evaluation should describe lessons learned that can be made available to other cities so that Internet for All can benefit other parts of the State of Washington and the nation.

Evaluating Outcomes

In a subsequent report provided to the Transportation and Utilities Committee, Seattle IT (ITD) will provide near and long-term baseline metrics and performance measures for the effective implementation of the Action Plan objectives. The baseline metrics include connectivity, devices, and digital skills training. The team will consult with stakeholders and partners to determine available, reliable, and sustainable measurements. As part of the City's strategy, ITD is proposing development of an online dashboard, along with GIS mapping, to show progress towards universal internet adoption.

Internet for All Dashboard with GIS Mapping

- Use online dashboard to allow the City and its partners to effectively monitor implementation through analysis of census tract data for households without internet, data from the 2018 Technology Access and Adoption Study, feedback from community-based organizations and stakeholders, internet sign-up data from Seattle Public Schools, and requested aggregated internet sign-up data from internet service providers.
- Track strategies and actions with status updates occurring quarterly.

Explore feasibility of cloud platform to facilitate data collection from community-based organizations and other partners.

- Partnering with community-based organizations is a critical component of our strategies and actions. Closing the remaining internet adoption gap requires targeted outreach, efficient coordination, and a unified system to measure progress for internet sign-ups, computing devices, and digital skills training. The City cannot solve a problem with a very specific scope with unreliable data. The City needs to examine the feasibility of utilizing a platform to track ongoing communication with community-based organizations, where data can be inputted, and progress can be monitored.

Appendix A:

Seattle's history of advancing digital equity and fostering best-in-class internet infrastructure:

The City of Seattle has been at the forefront of advancing digital equity resources and policies. Because of the Telecommunication Act, cities are restricted by federal law from regulating internet service. As a result, the City examines opportunities to incentivize the private market, create public-private partnerships, and work collaboratively with telecommunication companies and community partners.

The City has recognized the need for high-capacity infrastructure since 2004, when the Mayor and Council first convened a Task Force, with broad stakeholder representation, to evaluate the City's "technology future" to ensure Seattle's broadband future. Since that time, the City has fostered a regulatory and competitive environment that has spurred broadband providers to invest in higher-capacity infrastructures throughout Seattle. The City's work to foster digital inclusion started even earlier, in 1996, and in 2015 the City launched a new Digital Equity Initiative to help Seattleites have access to and proficiency using internet-based technologies.

The City has a record of thinking outside-the-box to advance digital equity programs, consumer protections, and reducing regulatory barriers for the purpose of building more fiber and promoting internet competition.

- The City began its digital equity programs in 1994-5 by enabling residents to contribute content to a Public Access Network electronic bulletin board and opened the City's first public computer labs. This was followed in 1996 by the creation of a Citizens Literacy and Access Fund and a Community Technology Planner position.

- Since the inception of the Technology Matching Fund in 1997, the program has awarded more than $5.7 million in grants to over 360 projects that support technology access and digital literacy.

- In 1999, the Cable Customer Bill of Rights was enacted to ensure that cable television customers in Seattle would get competent, responsive service from the cable companies. Seattle is one of a few cities that have a Cable Customer Bill of Rights for its residents.

- In 2000, the City in collaboration with its Community Technology Advisory Board, developed a set of Goals for a Technology Healthy Community that led to the first community survey. That survey has been updated and repeated periodically resulting in a series of Technology Access and Adoption Reports to inform City and community digital equity strategies. It has been replicated by other cities and helped inform King County's first survey in 2019.

- In 2010, the City established the groundwork that would lead to low-income internet discount programs like Comcast's *Internet Essentials* and Wave's *Simply Internet*.

- A new Seattle Digital Equity Initiative, under the leadership of the City's Community Technology Program staff, pulled together representatives from non-profits, advocates, the private sector, City departments, education sector, and others to update the city's digital inclusion plans. The resulting vision and priorities were released in 2017 and continue to guide strategies to enable greater broadband connectivity and adoption—in particular for disadvantaged communities and residents.

- Ordinance 123931 (2012): Allowed for the use of excess capacity of the City's fiber optic cable network to

support the provision of high-speed internet services.

- Ordinance 124598 (2014): Reduced barriers for new market entrants by removing historical administrative requirement the City had imposed to create an environment competitive for companies to build fiber extensively throughout the City. Incentivized new smaller communication cabinets that are necessary for the delivery of 1 gigabit-per-second (Gbps) service.

- Ordinance 124736 (2015): Modernized the Cable Code to encourage a more competitive cable market. The update improved competition and customer service by eliminating cable franchise districts in favor of a more flexible provision that opens the entire City to competition. The code included new requirements to ensure equity and build-out service to low-income households, enhanced call answering standards and reporting, and more flexibility and protections for residents and owners living in condos and apartments.

- 2016 Buildout of Wi-Fi in Community Centers: With initial funding support from Google, the City built out public Wi-Fi inside Parks and Recreation Community Centers.

- The City of Seattle is constantly evaluating the current state of high-quality internet service–assessing the local and national broadband markets. We relentlessly study broadband options, including a municipal-owned fiber-to-the-premise internet system, new technologies and opportunities for Seattle to ensure that high-quality internet service is available to all Seattle residents and businesses.
    - 2017: Facilitating Equitable Access to Wireless Broadband Services in Seattle
    - 2015: Fiber-to-the-Premises Report
    - 2011: Seattle Community Broadband Initiative
    - 2009: Benefits Beyond the Balance Sheet: Quantifying the Business Case for FTTP in Seattle
    - 2008: Evaluation of Potential Risks and Benefits of Municipal Broadband
    - 2008: Broadband Telecommunications Report
    - 2007: Financial Feasibility of Building and Operating a Fiber Network in the City of Seattle

Appendix B:

Seattle Public Schools Survey Data to OSPI

Estimates reported from Seattle Public Schools to Office of Superintendent of Public Instruction (OSPI) for the week of May 17th through May 23rd:

https://public.tableau.com/profile/achievement.data.hidden#!/vizhome/ServicesProvidedDuringSchoolClosures/Notes?publish=yes

	Questions	SPS Response
1	Average number of devices needed per student (calculated)	.3
2	Average number of personal hotspots needed per student (calculated)	.18
3	Prior to the school closure, what percentage of your staff do you estimate had a district-issued device they could take home?	85%
4	Prior to the school closure, what percentage of your students do you estimate had a district-issued device they could take home?	15%

5	To fill one part of the gap, how many personal hotspots do you estimate are needed for staff (cellular service is available, but not broadband internet)?	1000
6	To fill one part of the gap, how many personal hotspots do you estimate are needed for students (cellular service is available, but not broadband internet)?	10000
7	To fill the gap, how many additional devices do you estimate are needed for staff use?	800
8	To fill the gap, how many additional devices do you estimate are needed for student use?	17000
9	What percentage of your staff do you estimate currently have a device (district-issued or owned by the staff) at home that is adequate for online learning?	90%
10	What percentage of your staff do you estimate currently have a district-issued device to use at home?	85%
11	What percentage of your staff do you estimate have reliable broadband (high-speed) internet connectivity adequate to support synchronous online learning (real-time video) from home?	90%
12	What percentage of your students do you estimate currently have a device (district-issued or owned by the student) at home that is adequate for online learning?	75%
13	What percentage of your students do you estimate currently have a district-issued device to use at home?	50%
14	What percentage of your students do you estimate have reliable broadband (high-speed) internet connectivity adequate to support synchronous online learning (real-time video) from home?	75%

Seattle Public Schools Enrollment Data **Source: https://www.seattleschools.org/district/district_quick_facts**		
53,627		Total Enrollment
28.5%	15,284	SPS Free and Reduced-Price Meal Eligible Students
20.6%	11,047	Non-English Speaking Background
11.7%	6,274	English Language Learners
13.7%	7,347	Special-Education
10.2%	5,470	Advanced Learner
9.0%	4,826	Highly Capable
4.1%	2,199	Experiencing Homelessness

How does Seattle's 2018 Technology Access and Adoption Study compare with other survey data?

The data aligns closely with the 2018 American Community Survey (ACS) & 2019 King County Technology Access and Use Study.

Computers and Internet Use Estimates from the 2018 ACS 5-Year Estimates for Seattle, WA						
Total Households	323,446			Less than $20,000		
With a computer	305,353	94.4%		• With a broadband internet subscription	25,204	64.2%
With broadband of any type	287,449	88.9%		• Without an internet subscription	13,916	35.4%
With Smartphone	274,621	84.9%		$20,000 to $74,999		
Desktop or laptop	289,870	89.6%		• With a broadband internet subscription	88,739	84.5%
Broadband such as cable, DSL, or fiber optic	264,079	81.6%		• Without an internet subscription	15,923	15.2%
Cellular data plan	232,893	72.0%		$75,000 or more		
Without an internet subscription	35,349	10.9%		• With a broadband internet subscription	173,506	96.8%
				• Without an internet subscription	5,510	3.1%

2019 King County Technology Access and Use Study[26]
The study combined survey data from the King County Broadband Technology Access and Use Study (2019) with the City of Seattle's Technology Access and Adoption Study (2018). A total of 8,183 surveys were collected across both research efforts. King County: 3,868 surveys | Seattle: 4,315 surveys

96%	817,034 Households	Households with internet access
4%	34,043 Households	Households without internet access
89%	Households with fixed broadband subscription (cable, DSL, etc.)	
4%	Cellular data plan with no other type of internet subscription	
98%	Internet Access in Home – Children in Household	
94%	Internet Access in Home – People of Color and Native People	
94%	Internet Access in Home – Living in MDU	
93%	Internet Access in Home – Older Adults (65+)	
87%	Internet Access in Home – Language other than English	

[26] https://www.kingcounty.gov/~/media/depts/it/services/cable/202002-Broadband-Access-Study.ashx?la=en

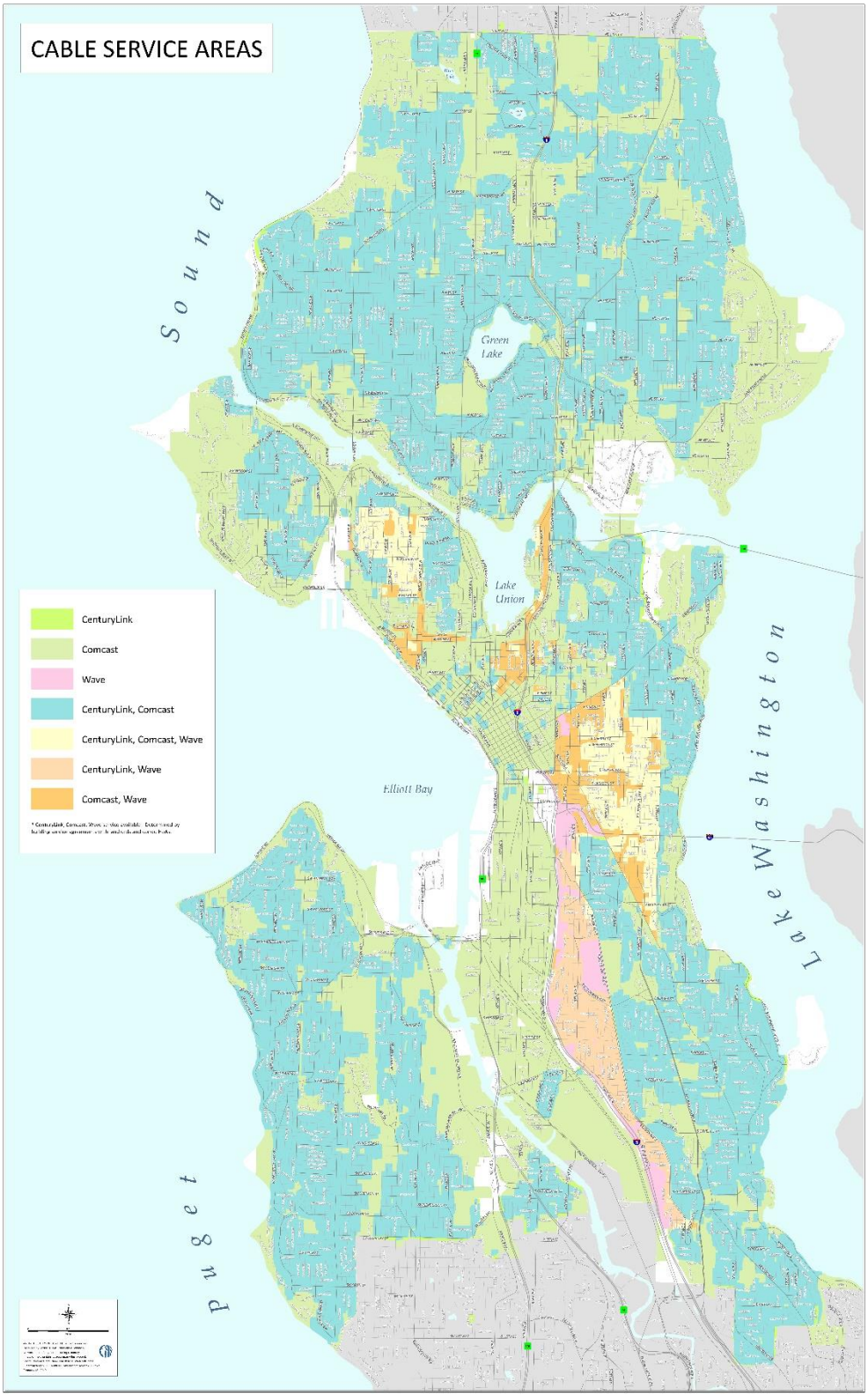
87%	Internet Access in Home – Living with a Disability
81%	Internet Access in Home – Low-Income (at or below 135% FPL)
81%	Internet Access in Home – Insecure Housing (Insecurely Housed or Homeless)
91%	With desktop or laptop
91%	With Smartphone
1%	No device/computer

Comparing internet and computer data between Seattle, King County, Washington State, and U.S. (2018 American Community Survey 5-year Estimates):

Computers and Internet Use Estimates from the 2018 ACS 5-Year Estimates				
	Seattle	**King County**	**Washington State**	**U.S.**
Broadband of any type	88.9%	90.2%	86.5%	80.4%
Cellular data plan	72.0%	73.2%	65.7%	57.8%
Broadband (cable, DSL, or fiber)	81.6%	82.3%	75.3%	67.9%
Without an internet subscription	10.9%	9.5%	13.1%	19.1%
Less than $20,000				
• With a broadband internet subscription	64.2%	66.5%	63.3%	54.2%
• Without an internet subscription	35.4%	32.9%	36.0%	45.3%
$20,000 to $74,999				
• With a broadband internet subscription	84.5%	85.6%	83.0%	77.5%
• Without an internet subscription	15.2%	14.0%	16.4%	21.9%
$75,000 or more				
• With a broadband internet subscription	96.8%	96.9%	95.6%	93.7%
• Without an internet subscription	3.1%	2.9%	4.2%	6.0%
Desktop or laptop	89.6%	88.9%	84.8%	77.9%
Smartphone	84.9%	84.7%	79.7%	75.9%
No Computer	5.6%	5.1%	7.3%	11.2%

Appendix C: Maps

Seattle Cable Internet Service Map



City of Seattle Public Access Technology Sites Map

Appendix D: American Community Survey Data

ACS Broadband Ranking by Cities

In 2013, the Census Bureau began collecting data measuring internet adoption as part of the annual American Community Survey (ACS). Using the most recent ACS One Year Estimates, the National Digital Inclusion Alliance[27] tabulated household internet subscription[28] data for 2018, ranking 623 communities. Seattle ranks first and third, among all cities in America with at least 250,000 households, for the *lowest* household percentages of the two categories— households without broadband of any type and households without cable, DSL, or fiber broadband. Note that these findings cover overall subscription, and do not include analysis of subpopulation differences.

Households without broadband of any type			Households without cable, DSL, or fiber broadband	
1. San Jose, CA – 6.89%	22,576/327,848		**1. Seattle, WA – 17.17%**	**58,030/338,002**
2. San Diego, CA – 7.13%	36,619/513,698		2. San Jose, CA – 17.65%	57,873/327,848
3. Seattle, WA – 8.65%	**29,222/338,002**		3. San Diego, CA – 18.34%	94,219/513,698
4. Austin, TX – 8.78%	34,271/390,395		4. San Francisco, CA – 19.94%	72,347/362,827
5. Portland, OR – 9.43%	25,796/273,607		5. Austin, TX – 20.60%	80,411/390,395
6. Charlotte, NC – 10.21%	34,282/335,918		6. Charlotte, NC – 22.02%	73,963/335,918
7. Nashville-Davidson, TN – 0.26%	27,985/272,826		7. Portland, OR – 22.33%	61,089/273,607
8. Fort Worth, TX – 10.82%	33,355/308,188		8. Denver, CO – 22.40%	69,502/310,324
9. San Francisco, CA – 10.95%	39,722/362,827		9. Boston, MA – 23.36%	64,170/274,674
10. Denver, CO – 11.25%	34,916/310,324		10. Washington, DC – 24.42%	70,206/287,476

[27] https://www.digitalinclusion.org/worst-connected-2018/

[28] ACS data is not an indication of the availability of home broadband service, but rather of the extent to which households are actually connected to it.

Appendix E: COVID-19 Digital Equity Response

City of Seattle's Recent Activity Related to COVID-19 Response to Support Digital Literacy, Internet Access & Adoption

- Digital Bridge Program: 200 refurbished laptops and 100 Wi-Fi hotspots with 1 year of service provided to COVID-19 impacted unemployed workers in retraining programs. 100 Comcast and Wave 1-year services agreements complete the fill laptop/internet needs.
- Internet access for student families in Chinatown International District.
- Supported OED-led effort in distributing refurbished laptops or desktops to assist displaced workers.
- Assisted staff for LIHI's Bitter Lake Facility in getting low-cost cable TV connections to its resident rooms.
- Facilitating laptop donations to the Big-Brained Superheroes Club, an after-school program supporting immigrant and refugee students.
- Created low-cost internet programs flyers reflecting'60 days free' COVID-19 offers translate into the City's top-6 languages for key communications (Amharic, Traditional Chinese, Korean, Somali, Spanish, and Vietnamese). SIT, DON and OIRA collaborated on widening dissemination and promotion of the information to diverse communities.
- Assisted 10 families to sign up for Wave's Simply Internet program while at the Beacon Hill International School's COVID-19 Response Team for a family support event.
- Sent 900 letters to Seattle residents new to the Utility Discount Program (UDP), who indicated they don't have internet services, to inform them of their eligibility for low-cost internet programs and how to apply for the programs.
- Collaborated with King County to exchange status reports and identify joint action opportunities for computer and broadband resources.
- Publicized telecom providers' pledge commitments to 'Keep Americans Connected'.
- Coordinated with MO, Comcast, SDOT and SCL to review and address a Comcast request to expedite permits identified as high priority to meet increased broadband capacity needs in certain areas and at certain government/medical facilities.
- Worked with SHA's Education Engagement Specialist for buildings in the Yesler Terrace redevelopment zone to alert the building residents to the new low-cost internet service option available with Wave's *Internet First* program.
- Updated the City's Affordability portal to include revised Wave and Comcast offerings and two additional options for mobile internet and refurbished computers.
- Collaborated with Mary's Place, Comcast, and Seattle Schools to address needs for improving internet access for students.
- Provided 500 printed sets of low-cost internet program flyers, in English and the City's tier one languages, for inclusion in the pre-event packets distributed for *Big Day of Play* throughout the City.

Appendix F: Digital Equity Plan Review from Other cities

Internet Access	
Bring affordable connectivity to affordable housing communities	San Francisco
Expand city-owned Wi-Fi hotspots.	Long Beach
Open Internet connections subsidized by the federal E-Rate program.	Long Beach
Pilot a mobile hotspot and device checkout initiative in under-served communities.	Long Beach
Expand free-to-low cost technology and Internet access available to low-income parents with children to all low-income Long Beach residents who qualify.	Long Beach
Negotiate with 5G providers to deploy infrastructure in Long Beach with a priority on communities with low Internet adoption rates.	Long Beach
Elevate the priority placed on residential connectivity in Long Beach's Master Fiber Plan.	Long Beach
Leverage the network shared by public institutions to extend free Wi-Fi service into low-income Neighborhoods	Portland
Leverage city/county assets and regulatory authority to incent broadband providers to expand low-cost Internet access.	Portland
Design and implement an affordable housing digital equity pilot project.	Portland
Design and implement a digital equity pilot project for the homeless community.	Portland
Develop a strategy for funding Internet services, devices and training in affordable housing projects.	Portland
Expand municipal broadband infrastructure as needed to reach into low- and moderate-income neighborhoods and communities.	San Antonio
Expand free Wi-Fi networks	San Antonio
Expand Access to Affordable Home Internet and Computer Hardware	District of Columbia
Engage ISPs and utilities to address equity	Louisville
Ensure public buildings serve as service backstops	Louisville
Direct the City Manager to develop an overall Three Year Roadmap to include increasing Digital Equity Access within the City. The Roadmap should address the three elements of Access, with emphasis on infrastructure for advancing a wireless network. The elements are: Broadband Infrastructure – Wireless/Wired, Device, Training on Basic Usage	Kansas City
Establishment of a program to provide free Internet services for recipients of Minor Home Repair & Weatherization Program benefits	Kansas City
Awareness	
Expand and promote low-cost Internet options	San Francisco
We will work with CCS students to explore ways to increase service delivery adoption of low-cost internet programs	Detroit
Marketing campaign on digital inclusion programs	Austin
Leverage digital inclusion partners' networks to promote digital inclusion	Austin
Integrate digital inclusion programs into online digital portals	Austin
Promote existing resources.	Long Beach
Increase Public Education and Awareness Efforts	District of Columbia

Work with Community Partners to sign eligible families up for low-cost home internet plans	Louisville
Three Year Roadmap promoting the use of the Internet for Education within the City.	Kansas City
Connect the three pillars: relevant content and services, hardware, and digital literacy	Salt Lake City
Devices	
Create a pipeline for device refurbishment and redistribution	San Francisco
human I-T is a nonprofit, social enterprise that focuses on collecting, refurbishing, and redistributing surplus technology	Detroit
We are working with the State and Poverty Solutions to develop a surplus technology policy proposal that will ensure Michigan technology stays in Michigan to address Michigan's digital divide	Detroit
Promote device refurbishment programs to provide inexpensive devices to low-income residents.	Austin
Expand participation of business, government and residents in computer recycling programs that repurpose devices for use by low-income residents.	Portland
Increase capacity of electronics donations programs	San Antonio
Provide low cost options for home computer purchases	San Antonio
Encourage businesses to donate used devices to help bridge gap	Louisville
Find partners to create computer refurbishment and repair clinics	Louisville
Work with Government and Community Partners to get computers to in-need families	Louisville
Digital Skills	
Recruit knowledgeable individuals within the community to provide small group or one on one sessions of training	Austin
Identify target communities to understand their unique digital literacy needs	Austin
Provide diverse language offerings for digital literacy training	Austin
Promote Digital Literacy: 1) Free technology training and IT support, 2) Provide one-on-one digital literacy training, and 3) Tech centers in digitally disconnected communities.	Long Beach
Expand availability of culturally specific digital literacy curriculum.	Portland
Expand basic and intermediate digital skills training	San Antonio
Expand Digital Literacy and Advanced Training Programs	District of Columbia
Establish an inventory of local digital literacy efforts	Louisville
Facilitate an expansion of digital skills course offerings	Louisville
Establishment of a technical assistance hotline for the city website	Kansas City
Digital Equity Fund	
Establish a Digital Equity Innovation Fund	San Francisco
Form a pool of sponsors	San Francisco
City will convene a core group of funders that have expressed interest in supporting digital inclusion efforts	Detroit

Recruit private sponsorships and donors	Austin
Digital Equity Fund	Boston
Negotiate with 5G carriers to contribute funding to Digital Inclusion initiatives.	Long Beach
Expand public and private funding for digital equity focused projects.	Portland
Direct the City Manager to establish a Digital Equity Fund, the purpose of which is to provide annual leveraging allocations for funding to non-profit organizations whose primary mission is to provide digital connectivity, digital literacy, and other digital skills. Pursue other funding opportunities for Digital Equity.	Kansas City
Develop funding to support digital equity programs	Salt Lake City
Community Engagement	
Community-led innovation challenges: Convene residents and community-based organizations in target neighborhoods to develop digital literacy challenges for pilots to help solve.	San Francisco
Build technology capacity of community-based organizations	San Francisco
Establishing a core group of volunteers from the Detroit community will help in virtually every aspect of digital inclusion.	Detroit
Digital Inclusion. Engage local stakeholders on an implementation committee to create a game-plan for increasing digital inclusion among all citizens and to offer everyone the benefits of an increasingly computer and web-based world.	Chattanooga
Strengthen the Digital Inclusion Network (DIN) as a diverse, countywide, community-based work group to guide, advocate for and support DEAP implementation.	Portland
Increase Technology Use by Generating Local Content	District of Columbia
Identification of opportunities to engage the business community and nonprofit partners.	Kansas City
Involve faith-based and community groups to reach people	Kansas City
Expansion of the City Employee Volunteer Program to encourage City employees to use City-paid volunteer time to support non-profits engaged in Digital Equity	Kansas City
Engage and include the community (ongoing stakeholder engagement, develop an interactive community dashboard or website to access information from the community and city government)	Salt Lake City
Evaluation	
Develop a Digital Equity Scorecard and Annual Reporting	San Francisco
Advance digital inclusion as a Community Advancement Network (CAN) goal that can be measured on the Community Dashboard	Austin
Facilitate ongoing program evaluation for program and service providers	Austin
Create a representative accountability group to oversee and advise on programming.	Austin
Identify City programs that can incorporate meaningful broadband efforts.	Long Beach
Collect broadband adoption data.	Long Beach
Evaluate programs and implement data-driven policies.	Long Beach
Request anonymized aggregate subscription data from service providers to broadband pricing and rate of adoption across the city, as well as maps of current and planned broadband and/or fiber infrastructure.	Long Beach
Compile connectivity data at Affordable Housing units.	Portland

Digital Inclusion Coalition	
Form a coalition for digital equity collaboration and input	San Francisco
Create a strong public-private partnership led by a board and executive committee of Chattanooga's most highly placed chief executives and civic leaders across the for-profit, non-profit, institutional, entrepreneurial, and philanthropic sectors.	Chattanooga
Engage business, community, neighborhood, and government leaders to take action on Digital Equity Action Plan implementation.	Portland
Kansas City Coalition for Digital Inclusion	Kansas City
Official National Digital Inclusion Alliance Digital Inclusion Coalitions: Digital Empowerment Community of Austin (DECA) Charlotte Digital Inclusion Alliance Kansas City Coalition for Digital Inclusion Technology Learning Collaborative (Philadelphia) Portland/Multnomah County Digital Inclusion Network	
Inventory and Mapping	
Expand existing digital inclusion inventory and mapping resource capabilities.	Austin
Develop a system for keeping the inventory and map robust and up-to-date.	Austin
Include contractual requirement for broadband providers to provide geodata maps. At service contract stages, broadband providers must commit to provide mapping of current fiber locations, forecast maps that show where future fiber is planned. This will help the City align projects with the Dig Once policy and give priority to infrastructure that promotes digital inclusion.	Long Beach
Create (or locate) web-based inventory of broadband service options (searchable by address) that identifies lowest cost options for residents	Long Beach
Create and maintain a searchable, web-based database of digital inclusion programs, services, activities and training tools for use by community organizations.	Portland
Establishment and mapping of a network of community learning centers to ensure that students have access to connectivity, equipment, training and support within walking distance of their home.	Kansas City
Review programs of City departments and compile a list of programs supporting the goals of the Digital Equity Strategic Plan	Kansas City
Partnerships	
The issues and opportunities at the core of technology, gig bandwidth, and entrepreneurship today are as much national and global as they are local. While Chattanooga has begun to play in larger arenas, urgent attention must be given to ramping up our potential to attract, solidify, and keep new partners in all sectors. An implementation committee should be named swiftly to continue working with existing partners and create new strategic partnerships to further our goals.	Chattanooga
Multi-sector partnerships for implementation of digital equity strategies	Salt Lake City
Advocacy/Policy	
Advocate for State Legislation on Equity and Local Control.	Long Beach
Support State and Federal legislation that protects consumer privacy and a free and	Long Beach

open Internet.	
Partner with Other Local Governments on Federal Issues.	Long Beach
Develop a digital equity lens for public officials to use when updating or creating public policy.	Portland
Addition of digital equity provisions in RFPs for Neighborhoods & Housing Services contracts	Kansas City
Addition of digital equity provisions in the Five-Year Consolidated Plan for the Neighborhoods & Housing Services Department	Kansas City
Consider affordable digital connectivity in the City's Five-Year Consolidated Housing Plan and Housing Policy and neighborhood Plans	Kansas City
Adoption of a resolution supporting a standard agreement for use when negotiating with all small cell, wireless communications and Internet service providers that includes some expectation of contribution to Digital Equity	Kansas City
Require all multi-family housing developers, including the Choice Housing Developments, and public facilities to include digital connectivity in the project plans.	Kansas City
Dedicate a portion of the revenue for small cell pole attachments and new small cell freestanding poles to support local non-profits that offer digital literacy training, refurbish and/or provide low cost equipment, or build networks for low income residents of Kansas City, Missouri.	Kansas City
Digital Economy	
Support initiatives to assist people from underrepresented populations to prepare for, find and create jobs in the technology economy.	Portland
Support STEAM initiatives for K–12 students.	Portland
Create a pathway for careers in the digital economy.	San Antonio
Promote and expand STEM education	San Antonio
Encourage development of employment-focused digital skills training programs.	Louisville
Establishment of a shared online learning center (i.e. the WikiKC Community Learning Center) with local partners to allow citizens to follow an educational and career path with a user experience that is the same regardless of which partner is providing the service.	Kansas City
Direct the City Manager to review and confirm home-based business regulations, to include zoning regulations, business license regulations, and other related regulations, to ensure compatibility with the current state of the digital economy.	Kansas City

Appendix G: City Budget Office Memo – City of Seattle Fiber-to-the-Premises Feasibility Study

City of Seattle
City Budget Office

MEMORANDUM

Date: **October 29, 2015**

To: **Seattle City Councilmembers**

From: **Ben Noble, Director**
City Budget Office

Michael Mattmiller, Chief Technology Officer
Department of Information Technology

Subject: **Response to broadband pilot**

Dear Seattle City Councilmembers,

We write in response to a green sheet that proposes to spend $5 million of General Fund resources to develop a municipal broadband pilot.

In pursuit of the Mayor's commitment to ensure that high-quality Internet service is available to all Seattle residents, the Department of Information Technology commissioned a study on the feasibility of the City building and operating a publicly-owned, gigabit-speed broadband network. The report, completed by CTC Technology and Energy, detailed facts about both capital and operational costs. The report and staff also compared Seattle's market and broadband infrastructure situation to other cities that have attempted municipal broadband, and found that Chattanooga, the most often cited example of a successful outcome, received nearly one-third of all capital build-out costs from the federal government; such funds are no longer available to municipalities for this purpose. The expert report and these facts led us to conclude that, at least at this time, pursuit of a municipal broadband network is not a wise use of limited General Fund resources.

City Budget Office
600 4th Avenue, 6th Floor
PO Box 94747
Seattle, WA 98124

Tel (206) 684-8160
Fax (206) 223-0022
Ben.Noble@seattle.gov

The capital costs required to build such a system range from $500 to $665 million, depending on variables related to construction; bonding to cover these funds would consume more than half of all outstanding debt capacity available to the City under state law. Operational costs, estimated to be in the range of $40 to $55 million annually, would also likely be difficult to cover from subscriber revenue. Unless a citywide network achieved a subscriber take-rate higher than the incumbent providers, the system would require a multi-million dollar General Fund subsidy to support operations, endangering existing basic government services. The study led to the conclusion that this option would pose an unacceptably high risk to the City's finances, particularly given uncertain revenues from subscribers in a highly competitive market with multiple established incumbents and delays due to potential legal challenges.

The CTC report also specifically called out pilots as an exercise that generally does not provide sufficient insight into whether the City could run a cost-effective, self-sustaining citywide network. Further, a pilot would be subject to the same likelihood of being challenged in court, adding to the cost and time delays a pilot would take. For these reasons, and the high risk any ensuing citywide network poses to the City's and the taxpayers' finances, a pilot is not a wise allocation of existing resources at this time.

The Mayor remains committed to expanding access to high-quality Internet service citywide, and has sponsored a Digital Equity Initiative, already underway under the leadership of the Community Technology Group in the Department of Information Technology. The Initiative pulled together representatives from non-profits, advocates, the private sector, City departments, and others, and continues to work on alternative strategies to enable greater broadband connectivity and adoption—in particular for disadvantaged communities and residents. The Mayor expects to receive its report in the coming months.

Further information about the financial and operational risk of a municipal broadband network were detailed in June by Budget Director Ben Noble, upon review of the CTC report, in a memorandum to CTO Mattmiller. That memorandum is attached for reference.

Cc: Kirstan Arestad

City of Seattle
City Budget Office

MEMORANDUM

Date: **June 8, 2015**

To: **Michael Mattmiller, Director**
Seattle Department of Information Technology

From: **Ben Noble, Director**
City Budget Office

Subject: **City of Seattle Fiber-to-the-Premises Feasibility Study**

I have had the opportunity to review the recently completed *City of Seattle Fiber-to-the-Premises Feasibility Study* and would like to offer the following observations regarding the potential impact to City finances and the implications for possible paths forward. The Mayor's interest in the development of an affordable and accessible broadband network is clear and unequivocal. As we search for the best strategies for pursuing this goal, we will need to consider the financial constraints facing the City and the competing priorities for municipal resources.

Financial Constraints – Debt Capacity Limits and Risk to General Fund Resources
The two most significant financial limitations apply specifically to the contemplated business model that would rely on subscriber revenues as the funding source to support the necessary capital investments and ongoing operational expenses of a broadband network. These constraints relate both to the debt needed to support capital investments and the risks to the City's limited operational resources.

Debt Capacity. Statutory limits on the City's debt capacity and competing demands for the capacity that remains place very real limits on the City's ability to finance a broadband system with General Obligation debt, as anticipated in the financial model presented in the report. Given the relative uncertainty of the revenue stream to be generated by subscriber revenues, it is apparent that a pledge of the City's full faith and credit would be required to sell the debt needed to finance the necessary capital investment. By state law, debt issued with such a broad pledge of City resources is limited to 1.5% of the City's total assessed value. After accounting for existing outstanding debt and the reserves maintained to address potential emergencies, the City currently has just over $1 billion of available capacity.

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With estimated capital costs of between $500 and $665 million, a broadband network could consume roughly 50 to 65% of the available debt capacity. While technically feasible, a bond issuance of this scale would significantly constrain the debt capacity available for such competing priorities as affordable housing, critical public safety facilities maintenance and upgrades (e.g., the Police Department's North Precinct) and other infrastructure needs such as bridges and roadways. Furthermore, issuing this much debt would likely have a negative impact on the City's debt rating, and thus increase the borrowing costs for all City capital projects.

Risk to General Fund Resources. Of potentially greater concern is the financial impact that a less-than-successful municipal broadband business could have on the City's General Fund. The report highlights that the City's entry into the broadband market will face stiff competition from well-funded incumbents, whose aggressive pricing strategies could thwart efforts to build a robust subscriber base for a municipal system. The financial analysis included in the report demonstrates that if the municipal network does not attract a sufficient subscriber base--an outcome which is more likely than is apparent, as success would require take-rates rivaling or surpassing those enjoyed by incumbents after years of large investments--losses could mount quickly. With fixed annual debt service costs of between $40 and $55 million, the capital investment needed to build a municipal network presents a substantial operational risk to the General Fund.

If the municipal effort were in fact to falter, the result would be immediate financial pressure on the City's General Fund. The General Fund represents the roughly $1.1 billion in annual resource that support basic City functions such as police, fire, parks and human services. Any attempt to rescue a faltering municipal effort would necessarily entail correspondingly large cuts to these and other existing City programs and priorities. The City's existing utilities do not create such risks because they are financially separated from the General Fund, operating as protected monopolies with secure revenue sources. A municipal broadband system would not enjoy this protection and would not have the secure revenue streams necessary to be financially independent. Instead, it would be entering a long-established, competitive marketplace served by multiple incumbents.

While a municipal broadband system is an exciting prospect, it would not be prudent to pursue a business model that relies solely on subscriber revenues and a pledge of the City's full faith and credit to support the necessary debt financing. Such an approach would put the City's General Fund at significant financial risk should the endeavor falter or fail.

Opportunities

The constraints identified above certainly do not imply that the City cannot play a role in achieving the Mayor's goal of expanding broadband services city-wide. The report highlights several other approaches that could help support such an expansion. For example, the potential to pursue state or federal funding, and to work in conjunction with the a partner outside of city government could provide necessary resources while reducing financial risks to the City's finances and to city residents more generally. It appears that joint private-public efforts are being pursued elsewhere in the Country, providing cities the opportunity to achieve broadband policy objectives in a financially sustainable manner.

Voter-approved funding for the project could provide another tool to advance the overall goal of broadband accessibility. Such funding would come in the form of a 60%-majority vote for long-term municipal debt to be repaid from property taxes. Debt issued in this form does not count against the limits described above. This approach would indeed limit risks to the General Fund since some or all of the capital costs would be paid from the levy and not from operating revenue. However, this would not eliminate the issue of risk altogether. The public's obligation to repay such debt via property taxes would remain whether the broadband business model proved successful or not, and operational costs could still put financial pressure on the General Fund should subscriber revenue did not achieve self-sustaining levels. Nonetheless, it is possible that this approach could help provide the resources needed to leverage other public funding or private capital, in pursuit of a more robust broadband network.