

**New Urbana Institute  
Broadband Feasibility Study  
On Behalf of Arlington County Virginia  
Final Report  
December, 2020**



## Executive Summary

The New Urbana Institute is pleased to provide this report detailing the findings of our Feasibility Study for offering broadband internet services to residents of both the Gates of Ballston and Arlington View Terrace communities in Arlington County. We offer our thanks to the people of Arlington County and the Arlington Housing Corporation for their support and guidance throughout the process.

We have several objectives for the Feasibility Study that are detailed below. In summary, our objectives are:

- Determine alternatives for utilizing Arlington County’s fiber “middle mile” to deliver and serve broadband internet capability to the Gates of Ballston and Arlington View Terrace communities. Focus on serving students above all other user groups - ensuring they can have a seamless educational experience in a remote, digital environment.
- Estimate the cost of implementing and servicing the broadband capabilities.
- Define a program of community involvement in the technical and service capabilities
- Develop an implementation plan for the two communities that can also serve as a template for future community installations

### Defining Broadband Service Level and Network Options

With a focus on the student experience driving our design, the first task was to define a service level goal. While there are technical definitions of broadband service (e.g., Federal standard of 25 Mbps down and 3 Mbps) we designed to a more subjective principle. Our research showed that on average there were two residents in each of the 405 units. If one of those was a student, we wanted to ensure that each could have a seamless, simultaneous video conferencing experience throughout a day. We also saw that in some of the units, up to three students lived in each unit and wanted to ensure that they could each have a seamless video conferencing experience during the school day as well.

There are various network approaches to meet the target service requirement and designed and created cost estimates for four:

Approach	Backhaul	Inside Wiring	CPE
“All Fiber”	Fiber to every building	Ethernet to every unit	Wifi modem/router
“Hybrid”	Fiber to majority of buildings. Fixed wireless	Ethernet to every unit	Wifi modem/router



	to remaining.		
“All Wireless”	Fixed wireless to every building.	Ethernet to every unit	Wifi modem/router
“CBRS”	Outside CBRS/ Private LTE coverage of all buildings	N/A	CBRS managed modem with Wifi Router

Each approach can meet the target service level and each has both advantages and disadvantages:

Approach	Advantages	Disadvantages
“All Fiber”	<ul style="list-style-type: none"> <li>• Most bandwidth for longest future</li> <li>• Minimal GoB architectural impacts</li> </ul>	<ul style="list-style-type: none"> <li>• Not cost competitive</li> <li>• Large construction impacts on hardscape (e.g., parking lots, streets)</li> </ul>
“Hybrid”	<ul style="list-style-type: none"> <li>• High bandwidth potential</li> <li>• Cost competitive</li> <li>• Fiber where affordable</li> </ul>	<ul style="list-style-type: none"> <li>• Some GoB architectural impacts (~10 rooftop radios) Periodic replacement requirement of fixed wireless equipment</li> </ul>
“All Wireless”	<ul style="list-style-type: none"> <li>• High bandwidth potential</li> <li>• Cost competitive</li> <li>• Short implementation timeframe</li> </ul>	<ul style="list-style-type: none"> <li>• Higher GoB architectural impacts (~44 rooftop radios)</li> <li>• Periodic replacement requirement of fixed wireless equipment</li> </ul>
“CBRS”	<ul style="list-style-type: none"> <li>• Bandwidth scalable with radio coverage</li> <li>• Mobile solution. Seamless coverage of both outside and inside environment.</li> <li>• Can work directly with CBRS LTE devices</li> <li>• Potential for partnership with wireless carriers for usage diversion - 5G offload</li> <li>• Additional Wireless services that can be deployed, IOT, Security, VLAN</li> </ul>	<ul style="list-style-type: none"> <li>• Some GoB architectural impacts (~13 radios on light posts throughout complex)</li> <li>• Less bandwidth per dollar invested than other solutions</li> <li>• CPE market less mature</li> </ul>



It is worth noting that each solution is scalable. Each can be built completely or incrementally at whatever pace is desired. Overall, the Hybrid, All Wireless, and CBRS approaches are each cost competitive and have strong advantages.

## **Delivering Broadband in a Community Environment**

NUI believes that delivering a broadband capability to a low-income community is as much a people challenge as it is a technology challenge. Success with an offering will include not just the technical ability but also citizens who trust the capability and are able to understand it and use it with little to no technical support. Therefore providing the broadband service should involve not just processes required to fix technical issues but also capabilities to assess and train citizen users as well as deal with their questions in as local a way as possible.

As part of our research for the Feasibility Study, we learned a significant amount from talking with representatives from [EmpowerCLE](#) in Cleveland Ohio. EmpowerCLE has been providing broadband internet access to unserved and underserved communities in Cleveland for more than two years. We are using their service model to define the scope of what it means to provide the service:

- Build awareness for and trust of the offering: create enthusiasm for the offering within the community through outreach and trust building efforts.
- Assess and train citizen users: assess individual users' digital knowledge and provide basic training on network and computing before turning on their service.
- Provide “Level 1”, “Level 2”, and “Level 3” service capabilities. These are typical terms for tiers of service used at an Internet Service Provider:
  - Level 1 - Answer direct questions from customers by phone, email, and chat. Manage customer status changes. Route more complicated network questions to other service tiers.
  - Level 2 - Respond to and fix technical issues on the premise. Perform periodic maintenance and technology refresh.
  - Level 3 - Monitor the network components for issues. Respond to requests for help from Levels 1 and 2 support. Proactively notify Levels 1 and 2 of issues as they occur.

The amount of Level 1 service is a choice all service providers must make but we believe high quality service in this citizen user environment comes from providing knowledgeable representatives who are as local as possible. To that end, we recommend creating and using an “Ambassador” program for both Tier 1 and Tier 2 service. The EmpowerCLE service function is staffed with young professionals who grew up in the areas they now serve. They bring both knowledge and trust to each citizen they interact with. Our network partner Novation Networks also has a great deal of experience training locally hired network technicians. We plan to hire and train staff from the community or as near to the area as possible and have them



work from their own home or from within the GoB Community Center to be as close as possible to their user base. Additionally, we plan to tap into the local workforce development funding as well as national apprenticeship funding from Wireless Infrastructure Association (WIA) to train and support local technicians for the community network.

### Overall Cost to Build and Serve

As part of the study, we estimated the cost to create the broadband capability and operate it for it's first year. Summary economics are as follows\*:

	All Fiber	Hybrid	All Wireless	CBRS
Total Build Cost	\$832,000	\$574,000	\$485,000	\$562,000
Per Unit	\$2053	\$1416	\$1197	\$1396

\* Rounded from actuals presented later in study

There are multiple cost components to operating the network and serving the customer base. Some are required and some are optional - all of the following are recommended for the best citizen customer experience:

	Monthly Range Low-High	Annual Range Low-High	Comments
Internet Access	\$1000-\$3000	\$12,000-\$36,000	1 Gbps to 3 Gbps
Tier 3 Support	\$650-\$1550	\$7800-\$18,600	Service provider SLA
Tier 2 Support	\$1000-\$2000	\$12,000-\$24,000	TBD based on actual needs
Tier 1 Support	\$6000-\$10,000	\$72,000-\$120,000	Coverage, language support, channels
NUI Operations	\$1500-\$2500	\$18,000-\$30,000	Management, legal, financial
Total Cost to Serve	\$10,150-\$19,150	\$121,800-\$228,600	

### Implementation Factors

Implementation for both the network and customer operations can happen in four to six months. The network build under all recommended approaches is straightforward with no major



unresolved questions. There will be an architectural review process for the Gates of Ballston given it's historical designation but that is understood and can take as little as two months. A complete project plan will be provided in advance and the Novation Deployment Team and their partners will work hand in hand with the Property Management and Maintenance personnel to ensure that impact on residence is minimal.

## **Summary and Recommendations**

The New Urbana Institute is very pleased to have the opportunity to be a part of this exciting effort to help bring affordable, high quality broadband service to the underserved and lower income citizens of Arlington County Virginia. The Gates of Ballston and Arlington View Terrace are two great neighborhoods to begin the journey.

Our specific recommendations for the program components are as follows:

- For the network:
  - Implement the CBRS solution for the Gates of Ballston and Arlington View Terrace. CBRS is an exciting technology that offers a truly mobile, community based solution that offers potential funding opportunities in the future. It is scalable and won't require the complexity of inside wiring for either of the two neighborhoods.
- For the service:
  - Use locally sourced hires as part of an Ambassador's Program to both perform customer and technical service. Use the program as a platform to create trusted customer relationships as well as to develop career skills in telecommunications for young adults who might not have the same opportunity elsewhere.
  - Choose the highest level of service investment possible to ensure the most confidence in the service in its early stages.

The remainder of the Feasibility Study report and appendices provide detail for the summary written above.

Please send questions or requests or further information at [info@nuinstitute.org](mailto:info@nuinstitute.org).



## Feasibility Study Objectives, Work Program, and Schedule

Following are the detail objectives of the study as detailed in the grant agreement:

- Determine alternatives for providing broadband internet access to defined low income users living at the Gates of Ballston (GoB) and Arlington View Terrace (AVT) housing complexes. GoB consists of 465 units across 44 buildings - our scope includes the 358 units set aside for low income residents. For our purposes, AVT consists of 47 units across six buildings. AVT's largest building is slated to be torn down and replaced beginning spring of 2021 and is out of scope for this study.
- Define key requirements such as service levels, bandwidth and security applicable to the service.
- Determine alternatives for operating the network and providing customer service for end users post implementation.
- Estimate implementation, operation, and service costs for the alternatives and work with Arlington County to determine the preferred implementation alternative.
- Develop and submit a final plan for implementation of the network, operations, and service components of the plan.
- Develop a "Community Engagement and Development Program" that would enable the training and support of community resources in the network support and maintenance.
- Develop an implementation template that can be used to provide similar service at other Arlington County locations.

With those objectives, our work plan was as follows:

1. Network Alternatives Design
2. Network Operations Design
3. Customer Service Design
4. Budget estimation
5. Final Report Creation

Once we established the main network alternatives and target customer service outcomes, we followed an iterative process designing the network and thinking about specific customer management implications of each network design.

Active communication with Arlington County and Arlington Housing Corporation was also critical to the program success.



## Network Plan

### Network Plan

When creating the network plan, we set out to meet our objective of providing the county with several alternative viable network plan options. We met this objective by providing All-Fiber, All-Wireless, Hybrid, and CBRS Private LTE network construction plans.

Each network plan includes connecting the Arlington County dark fiber to an MDF in the Gates of Ballston Community Center and to an MDF in the basement of 1429 S Rolfe St for the Arlington View Terrace property.

Each network plan also includes having an access point inside each apartment unit for both Gates of Ballston and Arlington View Terrace. We reached the decision to include an AP in each unit, instead of an AP per hallway design, for several reasons. Our RF analysis concluded that an AP in each hallway would not provide a strong enough signal to reach the back rooms/patios of the units at both properties. Furthermore, exposing two APs near each other in a hallway would cause significant interference and would exacerbate the issue of having too weak a signal. Our RF analysis found that an AP in each unit provided strong coverage throughout all the rooms/patios and protected each AP from interference with other units. Another reason we decided to include an AP in each unit is to aid customer support, tracking the number of registered devices per household, and monitoring bandwidth use per household. Each unit will have a separate IP and MAC address and can be a managed service by NOC. Also, by enabling each unit with wifi within the apartment, the walls and structure of the apartments themselves help manage the RF signal and SSID visibility to other units. These were the most important reasons guiding our decision to include an AP in each unit in all network plans.

### Target Bandwidth Service Levels

Each network alternative will support a range of capacity well above the Federal minimums for broadband service. Each alternative starts with the baseline (50 down/5 up) referenced below. See each network alternative description for further detail about individual capacity.

Performance tier	Speed
Minimum	≥ 25/3 Mbps



Baseline	≥ 50/5 Mbps
Above Baseline	≥ 100/20 Mbps
Gigabit	≥ 1 Gbps/500 Mbps

Source: Rural Digital Opportunity Fund defined broadband levels

### All-Fiber Network Plan

**Gates of Ballston** – The all-fiber design includes boring, digging and trenching fiber under heavy traffic roads, parking lots, sidewalks, and grass spaces to connect the Gates of Ballston properties with fiber at a termination point in each basement, then wiring from the basement to a router/modem in each apartment unit. We designed it to use the shortest possible footage of fiber by employing a “ring design” that connected each basement building-to-building. While fiber is the highest bandwidth and typically most resilient build design, this option is also considerably the most expensive because of the need to get fiber under hard surfaces such as roads and parking lots in and around the Gates of Ballston. The total fiber footage required for GoB is over 11,000 feet.

**Arlington View Terrace** – The Arlington View Terrace all-fiber design included laying aerial fiber along utility poles, terminating in each basement and then wiring to a router/modem in each apartment unit. By avoiding costly boring and trenching, the AVT all-fiber design cost is comparable to the all-wireless design.

This network alternative can support up to and beyond Gigabit capacity.

### All-Wireless Network Plan

**Gates of Ballston** – The all-wireless design was created using point-to-point and point-to-multipoint mmWave Siklu antennas to provide high-speed broadband internet to each of the buildings. These units are Point to Multipoint (PTMP) with built in diversity and path routing for redundancy and availability. This build design includes mounting one or more antennas on each of the building’s rooftops to carry internet from the Community Center to the rest of the buildings via wireless connections from antennas on each building. From the antennas, the connection is led through a power over ethernet into a switch and then internal ethernet wiring to an AP router/modem in each apartment unit. One of the elements of this design is mounting one or more antennas to each of the buildings and while there are stealth design options, this could be



an unwanted aesthetic. This option is considerably less expensive than the all-fiber option and comparable to the hybrid and CBRS private LTE designs.

**Arlington View Terrace** – The all-wireless design for Arlington View Terrace uses point-to-point and point-to-multipoint mmWave Siklu antennas connecting from rooftop to rooftop to provide high-speed broadband internet to each of the buildings. This network plan connects the Arlington fiber to a termination point in 1429 S Rolfe St then wires the connection up to an antenna on the rooftop, which then links with the antennas on each of the other rooftops to create a mesh network. From the antennas, the connection is led through a power over ethernet into a switch and then internal ethernet wiring to an AP router/modem in each apartment unit.

This network alternative can support up to Gigabit capacity.

### **Hybrid Network Plan**

**Gates of Ballston** – The hybrid plan for Gates of Ballston includes using both fiber and wireless connections to provide high-speed broadband internet to each of the buildings. This design retains the cost-savings of the all-wireless design while limiting the aesthetic drawbacks by using fiber to connect buildings where it is most cost-effective and using wireless connections for the gaps that would be cost-prohibitive to connect using fiber (i.e. over parking lots and roads). This reduces the number of antennas from 44 in the all-wireless design to 10 in total for the hybrid design. This option is priced comparably to the all-wireless and CBRS private LTE network plans.

**Arlington View Terrace** – We found it would be unnecessary to build a hybrid plan for this property because using both fiber and wireless would not yield any significant cost-benefit.

This network plan can support up to Gigabit capacity.

### **CBRS Private LTE**

**Gates of Ballston** – This network plan includes using 13 CBRS private LTE base station antennas strategically located throughout the Gates of Ballston properties. Then connecting to each unit by an outside CPE and user access point. This design would provide complete outdoor coverage of the property, a unique feature of this network plan, while also providing total indoor coverage. The base stations would be connected to the MDF in the Community Center using underground fiber cabling. The base stations can be stealth built as light posts on the Gates of Ballston property in order to negate any aesthetic issues. This plan is priced comparably to the hybrid and all-wireless network plans.

**Arlington View Terrace** – This network plan includes using 3 CBRS private LTE base station antennas located along S. Rolfe St. The base stations would be connected using aerial fiber from the MDF in 1429 S Rolfe St. The signal from the base stations then connects to CPE user



access points at each of the units. This design would provide complete outdoor coverage of the property, a unique feature of this network plan, while also providing total indoor coverage. This plan is priced relatively higher than the hybrid and all-wireless plans because of the lack of scale at this property. These costs could be mitigated by using a ramped roll out plan of the CPE user access point equipment.

Our analysis shows this network plan will support between Baseline/Above Baseline capacity.

### **Managing Network Service Levels**

The network will be a managed network and we will have several options available for aspects of the service. Several that we discussed during the study were:

- **Prioritization of bandwidth for students:** we recommend doing this at the household level - identifying which households have students and prioritizing their traffic over non-student households.
- **Service throttling and site black-listing:** if we determine bandwidth is being used excessively for non-student purposes, we could choose to either throttle household service for those households or black-list specific non student related sites. We would only do this after seeing user traffic.

## Customer Management

As outlined in the Executive Summary, NUI believes that delivering a broadband capability to a low-income community is as much a people challenge as it is a technology challenge. For creating the recommended Tier 1 service approach, we kept several objectives in mind:

- Make the citizen user experience as comfortable as possible. Create as much trust as possible in the offering and the technology.
- Make the capability as local as possible. Local, consistent resources help create relationships with users that are not possible with large shared call center resources.
- Enable Digital Literacy Programs that help adoption and excitement about the community network and its capabilities.

After researching other Internet Service Providers (for-profit and nonprofit), we defined the scope of the Customer Service function as follows:

- Build awareness for and trust of the broadband offering:
  - Create enthusiasm for the offering within the community through outreach and trust building efforts. This is akin to a typical Marketing function without the formal sales aspect. This will involve creating marketing materials, holding information sessions and walking potential users through the offering and service.
- Assess and train citizen users:
  - Each user will come to us with a different level of knowledge as to what an Internet Service Provider is, what network components are and how to effectively use the internet for school and work. Our goal will be to assess each user's capabilities and provide some basic digital literacy training before they begin to access the internet in their apartment.
- Provide "Level 1" Customer Service:
  - These are the more traditional ISP customer service functions.
  - Perform customer activation, deactivation, and updates on the network.
  - Answer direct questions from customers by phone, email, and chat.
  - Route more complicated network questions to other service tiers.

Each communication channel provided for Tier 1 customer service is a choice. In our research we found that providing a chat and email channel is a welcome option for many citizens who speak English as a second language and are more comfortable writing than speaking on the phone.

### Language Support

Language support is also a consideration for Tier 1 customer service design. There are five languages spoken across the two communities: English, Spanish, Amharic, Arabic, and



Mandarin. English and Spanish are the most commonly spoken at Gates of Ballston and Amharic is also used a good amount at Arlington View Terrace. Given the initial scale of users, it would not be cost effective to support having staff hired and available to speak all five languages. Our ideal customer service Ambassador will speak English and Spanish and have third party support for additional languages if required.

### Remote Call Center vs. Local Service Staff

As part of the program, we assessed the options of using remote call center staffing versus hiring local staff as Tier 1 customer support.

Approach	Advantages	Disadvantages
Remote Call Center*	<ul style="list-style-type: none"> <li>• Potential for variable cost model at lower scale - pay by the minute used.</li> <li>• Better time of day and day of week coverage under variable cost model.</li> <li>• Staffing and most of infrastructure is taken care of by call center.</li> </ul>	<ul style="list-style-type: none"> <li>• Shared staff model uses large pools of potential reps. All answers and procedures have to be written in advance. Reps must follow scripts.</li> <li>• Potential for cost overruns based on lack of predictability of early problems.</li> </ul>
Local Staff	<ul style="list-style-type: none"> <li>• Can be hired from within or near the community being served.</li> <li>• Personal relationships with customer base.</li> <li>• Can learn typical customer issues specific to community without worrying about script management.</li> <li>• Cloud infrastructure is readily available and installed for specific community needs.</li> </ul>	<ul style="list-style-type: none"> <li>• Less time of day and day of week coverage at lower scale.</li> <li>• Ideal candidate must be found. Have to deal with potential turnover internally.</li> </ul>

\* See Appendix 1 for list of reviewed call centers

We recommend hiring and using local resources and augmenting that if possible for Time of Day and Day of Week coverage with call center resources if the budget allows. We believe that



local customer service Ambassadors can be the greatest asset in the program for successful usage by citizen users.

### **Infrastructure Requirements for Local Ambassadors**

Local Ambassadors will require the infrastructure needed to support them in their jobs. Fortunately, many companies have emerged in the last decade who specialize in providing cloud based solutions for this function.

- Customer Relationship Management (CRM)/Chat/Telephony platform: This is the core required platform. NUI has experience with one of the most popular, Zendesk, and recommend it for this capability. The CRM capability houses the main interfaces and databases for tracking each customer interaction. There is a chat plug-in that will be put into the landing page for our service. Lastly, integrated telephony allows the rep to use their computer and software to receive and make phone calls.
- Translation Line: We can support additional languages when needed through use of a language line service such as [Language Line](#). It is a variable cost, straightforward service that allows a rep to have a three way call with an interpreter.

### **User Assessment and Digital Literacy Training**

A benefit of using local Ambassadors is that they can also coordinate the assessment and digital literacy training for new users. While there are many entities that specialize in training, most are relatively expensive, for-profit companies that specialize in higher level skill development. As part of the Feasibility Study, we assessed companies that focused on our target citizen user and had either free or low cost services.

The partner we recommend using in our program is called NorthStar. [Northstar](#) is a program of [Literacy Minnesota](#) and has a platform that seeks to assess skill levels before training so that the person can start at the right level. There is a relatively small fee that will cover all likely first year users.

Where appropriate, we can also guide users to other free digital literacy, web-based training services. For example, both [Microsoft](#) and [Google](#) both have good libraries that are suited for this effort.



## **Ambassador Program**

Given the requirements and targeted approach for Tier 1 service, our plan is to create an “Ambassadors Program” with the goal of hiring local resources to serve in that role. This has been a key part of the EmpowerCLE program success and we plan on replicating that here in Arlington County.

We created a job description (Appendix 2) for our Ambassador role. When hired, each Ambassador will go through training on the various components of their role:

- CRM/Chat/Telephony platform (through Zendesk)
- Network Operations Console (through chosen NOC provider)
- Digital Literacy Assessment and Training (through Northstar)

Post training, our Ambassadors will work to define each anticipated Tier 1 customer call type and also create the informational material we will use to promote the service to potential users.

### **Balancing Staffing, Service Levels and Pace of Implementation**

As part of the study, we built a detailed staffing model for the Tier 1/Ambassador service level. A choice will need to be made about the rate of adoption that will determine the staffing requirements of the function in the first year.

If we bring on customers as fast as we can build and test the network, then we will need more Ambassadors early and fewer later in the year. The two ends of this spectrum are that you could need five early on and less than one at the end of the year versus needing about two resources throughout the year by smoothing the rate of adoption.

Either is possible but if we decide to bring on users quickly NUI will likely need to hire more temporary Ambassadors to fill the spike in demand.

## Projected Program Financials

Following are summary financial projections for the program - first for the network and process build components and the second for service operations and maintenance.

### Network Build Estimates

	All Fiber	Hybrid (1)	All Wireless (2)	CBRS	CBRS Notes
<b>GOB Build</b>					
<b>Inside</b>					
GT radios (3)	\$146,000	\$146,000	\$146,000	\$62,000	CBRS CPE
GT cabling	\$141,000	\$141,000	\$141,000	\$58,500	CBRS Engineering
Total	\$287,000	\$287,000	\$287,000	\$120,500	
<b>Outside</b>					
BCD Fiber	\$460,000	\$10,000	\$10,000	\$62,500	Fiber links
GT Fiber		\$152,000		\$39,000	Networking Equipment
Siklu		\$40,000	\$105,000	\$212,000	CBRS Radios
Total	\$460,000	\$202,000	\$115,000	\$313,500	
Build Total	\$747,000	\$489,000	\$402,000	\$434,000	
GoB Units	358				
GoB Per Unit	\$2,087	\$1,366	\$1,123	\$1,212	
<b>AVT Build</b>					
<b>Inside</b>					
GT radios	\$13,713	\$13,713	\$13,713	\$11,100	CBRS CPE
GT cabling	\$30,909	\$30,909	\$30,909	\$26,000	CBRS Engineering
Total	\$44,622	\$44,622	\$44,622	\$37,100	



<b>Outside</b>					
Novation Fiber				\$22,000	Fiber links
GT Fiber (4)	\$20,000	\$20,000		\$25,000	Networking Equipment
Siklu			\$18,000	\$23,253	CBRS Radios
Total	\$20,000	\$20,000	\$18,000	\$70,253	
Build Total	\$64,622	\$64,622	\$62,622	\$107,353	
AVT Units	47				
AVT Per Unit	\$1,375	\$1,375	\$1,332	\$2,284	
<b>Customer</b>					
Customer (5)	\$20,000	\$20,000	\$20,000	\$20,000	
Customer Total	\$20,000	\$20,000	\$20,000	\$20,000	
Grand Build Total	<b>\$831,622</b>	<b>\$573,622</b>	<b>\$484,622</b>	<b>\$561,353</b>	
Overall Per Unit	<b>\$2,053</b>	<b>\$1,416</b>	<b>\$1,197</b>	<b>\$1,386</b>	

- (1) Hybrid GoB model includes 10 Siklu radios
- (2) All Wireless GoB model includes 44 Siklu radios
- (3) Quote includes Ruckus gear. Aruba is nearly identical. Cisco is an additional ~\$16K.
- (4) Assumes fiber can be run over telephone poles
- (5) Customer facing website, Tier 1/2 process creation, promotional materials, EULA/other legal

### On-going Operations

Run	Monthly	Annual	Notes
Assessment, Training, Tier 1	\$6,000	\$72,000	1 loaded FTE, chat, free training materials*



Support (Lower)			
Assessment, Training, Tier 1 Support (Upper)	\$10,000	\$120,000	2 loaded FTEs, chat, language support, paid training materials*
Tier 2 Maintenance/On-site Break Fix	\$1,000	\$12,000	Variable estimate. Novation trained local resources.
Tier 3 Support	\$646	\$7,755	Guest-Tek Bronze @ \$1.25/apartment/month (90 second max wait time)
ISP	\$3,000	\$36,000	\$1k/1 Gb pipe, \$3k/3 Gb, \$3.3k/5 Gb, \$4.1k/10 Gb.
New Urbana Operations	\$1,500	\$18,000	Management, back office (e.g., accounting), legal
<b>Total Lower</b>	<b>\$12,146</b>	<b>\$145,755</b>	
<b>Total Higher</b>	<b>\$16,146</b>	<b>\$193,755</b>	
<b>Total Households</b>	517		
<b>Run cost per household lower</b>	\$23		
<b>Run cost per household higher</b>	\$31		
* Smoothed for budgeting (doesn't address new customer spike). Also does not include service for devices other than apartment CPE.			
** For CBRS - 1st year of NOC coverage included. Successive years are ~\$3/unit/year.			



## Appendix 1 - List and Detail of Reviewed Call Centers

- Time Communications:
  - Introduction from John Coulter
  - This is the most likely candidate for spillover minutes.
  - Been in business since 1972. Parent company is [Arvig](#) - fiber network [broadband supplier](#) in Minnesota, ND, SD. Work with Sprint, ATT, Verizon on fiber implementation. Have a fiber network in Minneapolis providing capacity.
  - Work that they do for Arvig:
    - Overflow Tier 1 during the day
    - Taking messages and routing back
  - They also work with State of Minnesota broadband initiative. Bought Northstar fiber about 5 years ago. Build offerings for MDUs based on 5-7 year contract for ISP services in those buildings.
  - Don't do Spanish but partner with someone who does
  - Will use our CRM
- Teledirect -
  - HQ in Sacramento, California
  - Main focus healthcare, financial services, and insurance but also do non-profit and telecom
  - Call with Jamie:
    - Company profile:
      - Less than 500 employees - about 400 agents
      - Medium-sized call center
      - One call center in Sacramento - everyone works from home
    - Do have customers that are close - lots of other tier 1 trouble-shooting for customers
    - Agents work off a script - they don't go off the cuff - that's where some of the personal touch is lost
    - Different level of service:
      - Shared agents - 400 agents - 24/7 coverage - typically do not interact with customer's CRM.
      - Semi-dedicated solution - core group of 10-12 that handle about 8 accounts - more complex - use client's CRM. M-F, 6-8 hours. Can use shared model for overflow.
      - Dedicated - you pick the number and they support your business only
    - Channels:

- Can support chat with dedicated agents - haven't found a successful solution to provide chat with shared environment - have tried it before - doesn't work out for customer because you're paying by the minute.
    - Haven't run into the chat issue
  - Language:
    - Customers use English account and Spanish account
    - Use translation line for other ones: dial a translation line and get a 3 way call to complete the conversation.
  - Pricing:
    - Will send me pricing for all three options
  - For entities that are just getting started:
    - Clients don't know what to expect
    - Keep things simple and small as much as possible
- [Answer Connect](#)
  - Has Technology service line (among about 10 industries)
  - From call:
    - Can integrate with most CRMs. Use Zapier for integration.
    - Some clients provide internet service and AC does some Tier 1 support.
    - Billing by minute
    - Lowest is \$149/month for 100 minutes
    - One time setup fee of \$49
    - Have to create scripts. AC onboarding team customizes scripts.
    - **Call centers are in 8 states around the US. Do not assign permanent reps.**
    - Can support a chat channel
    - Do support Spanish
    - Thinks tier 1 support calls would be 5-6 minutes
- [Five Star Call Centers](#) (turned in to [AnswerPro](#)) -
  - Non-profit line of business
  - ND, SD, KS, and OK call center locations. 80% of agents are at home.
  - Call with John Coulter:
    - You're in an interesting situation
    - Usually my recommendation is to "take the volume in house"
    - Hire a content writer and can always hire an entity to deal with overflow
    - 5 Star supports Tier 1 through Tier 3
    - On a dedicated project they look for 5 or more agents. For a shared they look for \$15K-\$20K (20K minutes).
    - Recommendations for CRM:
      - Zendesk and Ring Central for integration with phone capabilities

- Five Star referred us to [Answer Pro](#):
  - Call center with two locations: Omaha and Mission, KS
  - All agents work remotely
  - Some on coasts
  - Have been in business since 1956
  - Tom used to work for Cox so has
  - A lot of work is in the medical field - e.g., nurse triage work
  - Can take a message and send email/text/phone to right person
  - Minimum is 100 minutes for \$100/month. Pricing goes down as minutes go up.
  - Maximum is 30K minutes for about \$.85/minute.
  - Interact with our systems
  - Support Spanish. Can use Language Line for any other language.
  - Are people assigned?
    - No... agents follow protocol assigned to campaign
    - No one trained to “think on their own”
    - To start, would train a handful of agents on our protocol
  - Industry standard is that 80% of calls are handled within 30 seconds
  - Once call volume increases and becomes predictable, you will want to go to a dedicated model - usually around 5 people busy for 7 hours/day.
  - Price includes telephony but doesn’t include CRM
  - They use Zoho internally
  - Send a report every day
  - North of 500 clients that they support.
  - On their reps:
    - Neutral accent state
    - Trained “with compassion”
    - Have Spanish and interpretation of Amharic
- [SAS \(Specialty Answering Service\)](#) -
  - Focuses on small business and deals with non-profits
  - Inbound specialist.
  - Outsources chat to partners.
  - *More of a problem router than a problem solver*
  - CRM based on Salesforce
  - Lot of people use ZenDesk and Zoho
  - Can access without logging in or password access
  - English and Spanish - four call center locations
  - Business model based on minutes or per call (but only per call when they’re very short calls)

Entities researched but not interviewed:



- [Non-Profit Advisors](#) -
  - Specifically target non-profit work
  - Full service consulting and services shop
  - Geared towards inbound and outbound campaign management
- [Continental Message](#) -
  - advertise for non-profit
  - Geared for small business
  - Has “Technology” service line
  - Pricing based on minutes used - how do you align incentives?
- [Signius Communications](#) -
  - Mostly answering service based in NY. Not a good fit.
  - Largest of this list with 12 locations all in the US
- [Telvista](#) -
  - Locations in Mexico and Dallas, TX
  - Too big for us - they target minimum of 25-50 seats

## Appendix 2 - Community Ambassador Job Definition

### New Urbana Institute Community Ambassador Job Description

#### Objectives

New Urbana Institute seeks to hire and train enthusiastic and helpful people to become Community Ambassadors for our broadband internet service in the communities we serve. With our partner Novation, they have agreed to help sponsor two selected community members (young adults) to participate in the Broadband Training. Training conducted as part of the National Warrior Workforce.

#### Community Ambassador Job Description

- Our Community Ambassador will serve three roles for our customers:
  - Reach out to community residents to communicate who we are and the goals and scope of our broadband capability,
  - Assess and train basic digital literacy skills and
  - Serve as a first line representative for questions and issues customers have with their broadband service.
- Specific responsibilities include:
  - Build awareness and acceptance of our program among target citizens:
    - Develop promotional/explanatory materials
    - Schedule and host awareness building events
    - Develop relationships with target customers and capture within CRM database
  - Assess digital literacy skills:
    - Administer assessments
    - Score and record results
  - Deliver basic digital literacy training:
    - Either in person/instructor led or virtual
    - Deliver pre-prepared modules for basic concepts such as computer and network basics
  - Answer calls and inbound chat requests regarding service issues:
    - Triage inbound issue
    - Recommend actions to solve issue and if unresolved,
    - Transfer issue to next tier of technical support - either by phone or through software platform.
  - Key skills include:
    - Great patience and enthusiasm for the program and our mission of closing a critical digital infrastructure gap.
    - An ability to explain our program and build enthusiasm among our target citizen user group.



- Strong understanding of digital literacy including: computer basics (Apple specifically), networking basics (Wifi), Google Suite productivity tools (e.g., Gmail, Docs, Sheets)
  - Ability to handle inbound and outbound (return) calls.
  - Research and resolve account inquiries via phone.
  - Provide feedback to management regarding necessary changes and updates.
  - Ability for ongoing training and knowledge development.
- Work location:
    - Ambassadors will work primarily from their own residence and within the communities they serve.
    - They will also spend time in the community center within the complex that they serve.

### **NUI Community Ambassador Target Hiring Criteria**

- High school diploma or equivalent in work experience and demonstrated knowledge.
- Bilingual - English and Spanish - desired. English-Amharic also desired.
- 1-2 years of experience working in a fast-paced team-based retail, hospitality or customer service/tech support call center environment is preferred.
- Experience using Google Productivity tools (e.g., Gmail, Docs, Sheets)
- Ability to learn and adapt to new software technologies.
- Strong working knowledge of pc-based internet and software applications.
- Ability to communicate effectively via telephone by utilizing active listening and clearly speaking to customer.
- Sense of urgency, when appropriate, and follow through.
- Typing and/or keyboarding.
- Meet or exceed all published standards measured monthly and year-to-date.
- Maintain acceptable levels of discretion, teamwork and commitment, endeavoring to exceed expectations in all.
- Maintain and promote a positive attitude while meeting productivity goals.

### **Compensation:**

- Full-time: \$15/hour plus benefits
- Part-time: \$15/hour

