Counties of Amelia and Dinwiddie
Joint PPEA Request for Proposals
RFP-19-050719
BROADBAND PROJECT
June 11, 2019

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TITLE PAGE

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1. INTRODUCTION/COVER LETTER

June 11, 2019

Attn: Hollie R. Casey
County of Dinwiddie
14010 Boydton Plank Road
P.O. Drawer 70
Dinwiddie, VA 23841

RFP Number/Title – 19-050719/Broadband Project

Dear Ms. Casey:

Thank you for the opportunity to present the following proposal for the Broadband expansion project for Amelia and Dinwiddie Counties. Based on CAS Severn's (CAS) long and productive history with both Amelia and Dinwiddie Counties, we, along with our consortium partners are honored to have the opportunity to design a comprehensive Broadband solution that is second-to-none and will cover all of the commercial business and residential customers in both counties. Special attention has been given to rural locales where farmers are over looked. Broadband solution providers generally do not have a viable answer that is either practical or serviceable by the farming community and in addition, their recommendations are also not supported by the USDA and/or other state agencies geared to providing farmers the IoT solutions necessary.

On behalf of the Broadband Consortium (Consortium) partners (CAS, AER Wireless and Mage Networks), CAS is submitting the following proposal on behalf of and with their full knowledge, understanding and approval. Our solution specifically addresses the overall project goals for the design, construction, operation and maintenance of an affordable wireless internet/broadband network in 95% or more of the unserved and underserved areas of the Counties as identified.

Upon selection of our consortium to deliver our solution as the ISP serving the counties, we are committed to working with both counties and providing additional value related services to assist in applying for additional grant funds from the U.S Department of Agriculture, U.S Department of Housing and Urban Development, U.S Department of Commerce, FCC CAF and other State of Virginia sources for funding for both counties.

Our proposal reflects the teamwork that CAS, Aer Wireless, Mage Networks and its partners will employ in delivering a complete and innovative solution for Amelia and Dinwiddie Counties' broadband needs. Aer Wireless was founded to take advantage of new and innovative technologies from Mage Networks that has been recognized by the U.S Department of Commerce as an innovative and emerging technology that solves the vexing "Last-Mile" challenge to rural broadband affecting both Amelia and Dinwiddie Counties. While Aer Wireless is relatively new to the broadband sector, the proposed solution and proven technologies are backed by the most seasoned and highly regarded firms (and minds) in the broadband and telecommunications fields.

Our approach will rapidly provide the solutions that the counties are seeking to provide broadband services across the entire area using all of the available vertical assets in both counties without the

need for building new towers. Not only will we reach the final milestone cost effectively, we will use an approach that will serve to deliver the solutions in record time. The significant advantage of the wireless portion of our solution is both our confidence that performance will not degrade across either distance or terrain and our commitment to high quality internet service available for all subscribers.

Too many times not enough attention is paid to the core of the network and this tends to add significant CapEx and OpEx to the long term operation of the network These overages are avoided with the technologies and methodologies used by Aer Wireless and CAS as it relates to the core of the network; and on the infrastructure side, handling the all-important connectivity to the end-user. Coupled with these functional benefits is the imperative need to have a solid cyber security plan and instituted World-Class security solution to protect our customers.

Aer Wireless provides the most comprehensive and cost-effective solution for complete, high-speed internet coverage in any area, regardless of terrain, using Mage Networks' proprietary technology based on 802.11 Wi-Fi technology that is coined Wi-Fi 6, delivering up to 1 Gbps wirelessly.

Thank you in advance for your consideration of Aer Wireless, CAS Severn, Inc. and Mage Networks solutions and services.

Best regards,

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Commonwealth of Virginia Broadband Consortium

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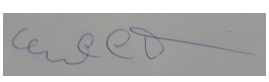
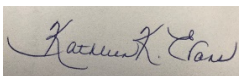
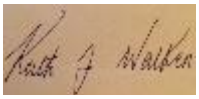
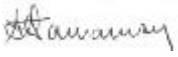





2. EXECUTIVE SUMMARY

Wi4ME LLC dba Aer Wireless (Aer Wireless/U. S. Partner for Mage Networks), CAS and Mage Networks are pleased to submit the following proposal in response to Amelia and Dinwiddie Counties' Request for Broadband Expansion. The Consortium of Aer Wireless, CAS and Mage Networks bring to the Counties a comprehensive solution for the architecting/design, implementation, operation, maintenance and, ultimately the deployment of a 21st century broadband network. ***Please refer to Figure #1, Network Flowchart, Page 9, below*** that will not only address your immediate needs but also the future requirements using state of the art technology. Specifically, the Consortium has assembled a team whose collective experience spans the globe. All partners are committed to delivering a design that will result in seamless and reliable broadband access with delivery at a minimum 25mbps download and 15mbps upload speeds. In many cases, 50-100 Mbps will be the standard across the expanded network. ***Please refer to Figure #2, Service Responsibilities/Partner Profiles and Roles, Page 11, below*.**

The Consortium's broadband expansion design for Amelia and Dinwiddie Counties is unique both at the core and at the last mile. At the core, Aer Wireless and our partner OVH provide the leading-edge, cloud-based solution for infrastructure as a service. At the last mile, our consortium member Mage Networks is providing its MagiNet™ proprietary technology that will effectively provide high speed broadband access for the last mile in those areas where low density populations, terrain and other physical challenges that prohibits other traditional technologies from being used to provide services. Mage Networks and Aer Wireless will also leverage all existing tower and fiber assets to ensure complete broadband coverage for the Amelia and Dinwiddie Counties, adding infrastructure only when deemed absolutely necessary. Our all-encompassing solution will address dead zones and because of the ease with which MagiNet™ will be deployed, interim broadband access will be provided as part of a rolling deployment across each county within 30 to 60 days following completion of network design.

As noted above and upon selection, we are committed to working with the counties to apply for additional funds from the U.S Department of Agriculture, U.S Department of Housing and Urban Development, U.S Department of Commerce, FCC CAF and other State of Virginia sources for funding for both counties. These services are not included in this RFP response and require further discussion. Meetings between Aer Wireless' CEO, Keith Walker and the Secretary of USDA, Sonny Purdue and the Secretary of HUD, Ben Carson are currently in process. The main objective of these meetings is to press the case for special attention to be given to farmers and the rural counties beyond the current agendas. Despite best efforts, there are still too many areas without adequate broadband services.

Aer Wireless is working with Powhatan County to deploy the proposed technology to aid their connectivity needs at the County headquarters. Aer Wireless and Mage are also working with an ISP in Mathews County to deploy the same technology to solve their broadband requirements.

As noted above, upon selection of our consortium to deliver our solution as the ISP serving the counties, we are committed to working with each county to apply for additional funds from the U.S Department of Agriculture, U.S Department of Housing and Urban Development, U.S Department of Commerce, FCC CAF new rounds and other State of Virginia sources for funding for both counties.

We will work closely with Amelia and Dinwiddie Counties' stakeholders during the design process to garner a deep understanding of the available resources in terms of both expertise and the existing infrastructure to provide a network with 100% coverage. In addition, we will also explore the long-term strategic vision for the County. This comprehensive solution will address the broadband needs of households, businesses, schools, public safety and first responders while addressing all residents and businesses who do not currently have any broadband access.

The delivered solution will also place an emphasis on ensuring that farmers are able to use broadband IoT solutions on their farms as envisioned by the USDA, the Commonwealth of Virginia and other Federal agencies. ***Please refer to Appendix 11, USDA Launches High-Speed Broadband e-Connectivity Resource Guide and Appendix 12, USDA Links.***

The implications of the Aer Wireless broadband design and deployment extend well beyond the immediate convenience of broadband access and will become the driver of economic development in both counties. What was learned was that the counties currently have no metrics/analytics on the visitors to the counties, and as part of the solution to be delivered we will provide the platform from Digital Lobby at no additional cost to the counties.

Additionally, Aer Wireless will work with the Amelia and Dinwiddie Counties' Economic Development to draw employees from within each County's population where possible and strive to complete many of Aer's hiring requirements for network deployment, maintenance and ISP operations. Many who leave to seek employment elsewhere due to the lack of broadband services do not expect to return, live and work in the County. The intended network will be a catalyst to attract residents and raise revenues within the respective counties with the increase in the property values.

Amelia and Dinwiddie Counties can be confident that the Aer Wireless design and deployment will be the **most** cost-effective solution for broadband coverage. As cities and municipalities strive towards becoming "next century", this solution will establish Amelia and Dinwiddie Counties as a North American leader for broadband expansion. It will address both the budgetary and infrastructure challenges where today, 4 in 10 rural Americans* having no broadband access at all. With the many historic sites in both counties, Aer Wireless has a unique solution to assist both counties in providing "SMART CITY" solutions that will provide metrics and other analytical information to the counties.

Simply put, the network design and deployment led by Aer Wireless will be a game changer for Amelia and Dinwiddie Counties.

We look forward to the opportunity in the near future to meet with the County shareholders and demonstrate the proposed broadband technology that will change the way you think about broadband solution deployments. In addition, we also invite the County shareholders to experience firsthand a Proof of Concept that is currently in progress in Virginia.

**SOURCE: FCC, 2016*

Figure #1: Network Flowchart

Figure #1: Network Flowchart also shows how all the various pieces will interact to provide customers with their desired services.

The flowchart above depicts the overall network flowchart that is unique in its design which was purposely designed to allow the customers, whether residents or visitors to self-provision their services. The network to be deployed will consist of delivering broadband services to residential and commercial customers, as well as having the ability to deliver broadband services to government buildings and other facilities such as schools, fire stations, and law enforcement agencies across the counties. Once the network is deployed and commissioned any person in the coverage area will automatically pick-up the Wi-Fi signal where they will get to use the Internet for a couple of minutes for free. After this period the user will be redirected to the website where they will be able to sign-up for the services of their choice. The resident or potential customer can order services for their device, home or business. Visitors will also be able to purchase Wi-Fi access which will provide access to broadband services via the WI-Fi access that they can purchase

Once the service is ordered and has to be delivered the installation team would go to the home or place of business and install the requested services. The Diagram above depicts the flow of service request and operations for the user from the time the customers selects the service/s, and how that request or service is provisioned, as well as how the customer use of that service flows across the broadband network. What is not shown is how the intended network can easily have SCADA systems seamlessly integrate with the broadband network, and set the stage for the perfect IoT (Internet of Things) platform.

Figure #2: Service Responsibilities/Partner Profiles and Roles

3. AER WIRELESS CONCEPTUAL DESIGN

Aer Wireless will provide the most comprehensive and cost-effective solution for complete high-speed internet coverage in any area, regardless of terrain.

The conceptual design, **(*Please refer to Figure #3, OVH Network Core Design, Page 13, below),*** is divided into the following areas:

Transport and Outside Plant

The outside plant is will consist of the novel MagiNet(TM) technology based on Wi-Fi coverage throughout the areas in the Counties. The outside plant will provide the connection of people, homes and businesses to the network, as well as providing Smart city based services.

The network will have multiple ingress points across the counties and thereby ensuring the network is redundant and has no single point of failure

The use of the easy to deploy MagiNet(TM) network will create a positive impact on the residents of Amelia and Dinwiddie Counties from the very beginning of the project. MagiNet(TM) will reach remote sites and provide interim service for areas that are awaiting fiber deployment. The units deployed during this phase will also be re-deployed to extend the reach of Fiber when it becomes un-economical.

The Network Core (OVH, Infrastructure and software as a service)

The core of the network where authentication, bandwidth management, network monitoring, security and other applications are performed is virtualized by the Aer Wireless core. That will significantly reduce the CapEx and the operational cost as well. This is achieved through the use of the OVH internationally recognized methodologies for private Cloud services thus making sure the County will not have to change out equipment every 2-3 years. The core is a private Cloud based Infrastructure as a service, SDN (Software Defined Network) and NFV (Network Functionality Virtualization) (i.e. reside in the Cloud). The capabilities are rapidly scalable depending on demand, which avoids over-spending on capital equipment in anticipation of the future demand. ***Please refer to Figure #3, OVH Network Core Design, Page 13, below.***

Figure #3: OVH Network Core Design

Figure #4: AER Wireless Tenant

Figure #5: DR Option

Backend Infrastructure as a Service
The OVH Cloud delivers the backend Infrastructure as a Service (IaaS), built upon OVH Hosted Private Cloud offering at its Vint Hill, VA datacenter in Fauquier County. This cloud-based datacenter will host Aer Wireless infrastructure and critical systems and platforms. The hosted Network Core will be purpose-built from ground up with no migration of existing resources necessary.

Please refer to Figure #1, Aer Wireless simplified Network Flowchart, Page 9, above and Figures #3, #4 and #5 Solution Design Diagrams on Pages 13-15, above.

OVH Hosted Private Cloud currently provides the full VMware SDDC (Virtual Machine Software Defined Datacenter) Stack including vCenter, ESXi, NSX with available vROPs and vSphere Replication add-ons. VMware vCenter will be the focal point for all management of Hosts, Clusters, Networking, Resources and VMs. The entire stack from the datacenter to the hypervisor is tightly integrated at each layer. This infrastructure will consist of the following resources:

- ✓ Server hardware infrastructure inclusive of all compute, (CPU/RAM), storage resources and server virtualization platform. 4 Host x 36c/72t, 2.3 Ghz, 768GB RAM, 24TB vSAN, vSphere Enterprise Plus 6.5
- ✓ Networking infrastructure internal to datacenter, including internal network security. 1.5Gbps, vRack
- ✓ Edge networking for internet and wide area integration including edge gateway security and VMware NSX Enterprise.
- ✓ Entry to OVH datacenter is through our network core protected by OVH's world class Anti-DDOS. At the Aer Wireless's tenant, networking is built on NSX software defined networking to include dynamic routing, firewalling, micro-segmentation, load balancing, and NFV. This architecture allows for a defense in depth methodology.
- ✓ Cross connectivity and circuit integration between carriers at a predetermined point of presence in the Ashburn, VA Equinix datacenter to the OVH Vint Hill, VA datacenter via vRack Connect Easy.
- ✓ Management and administration of all OVH provided resources.

The virtualization of the Network Core allows Aer Wireless to provide the counties with the most cost effective, efficient, flexible and nimble network. It eliminates significant capital expenditure in equipment and equipment obsolescence. It enables full automation of network functions and approaches zero downtime infrastructure for any equipment or application, thereby, reducing IT (information technology) expense and operational cost.

Automation - The Aer Wireless Network Core is automated from the initial provisioning of a brand-new environment, starting with the automated creation of a vCenter server, ESXi hosts, the connection between these components, firewall access and protection from the public internet to

these resources, distributed switch creation and configuration, user permission creation and provisioning.

After the initial provisioning, Aer Wireless can continually benefit from the OVH built-in automation through the OVH vCenter plug-in, which will allow Aer Wireless to continue to add or remove compute, storage, and public IP resources as necessary for its business for the County broadband network.

Monitoring - While consuming these resources, OVH continuously monitors the equipment used to host Aer Wireless infrastructure. Should a host encounter any issues, the impacted equipment is automatically replaced with a new resource, to return to normal operation as quickly as possible.

Network - With fiber-optic connections deployed and managed using Dense Wavelength Division Multiplexing (DWDM) devices, the OVH network offers a total capacity of 14 Tbps. All links between each datacenter is redundant, Aer Wireless can easily change route as necessary. For the customer's network,

Aer Wireless may use NSX (virtual networking and security platform) to its fullest. Aer Wireless can also manage vRack distributed switch and VLAN port groups. These port groups are configurable by Aer Wireless to control the way traffic is handled within its environment.

Since OVH has built an API to manage their products, including vRack, Aer Wireless can increase its network efficiency by using the OVH API to retrieve commands to automate or authorize certain tasks according to predefined conditions.

Anti-DDoS – OVH's free Anti-DDoS protection ensures Aer Wireless infrastructure remains accessible 24/7 through a network capacity of 14 Tbps and a combination of mitigation techniques, including packet analysis, packet mitigation, and server traffic vacuuming. This is a proven solution with broad industry recognition.
The OVH network can withstand, vacuum, and mitigate a high number of attacks. During the mitigation process, spread across seven datacenters and three continents, the attack vacuuming is reinforced. All OVH customers' Service Level Agreements are balanced and ensured in this way, and the service is safeguarded from disruption.

By default, ALL OVH servers are equipped with automatic DDoS attack mitigation that activates in the event of an attack (reactive mitigation). Customers also have access to permanent mitigation (permanent rules) as well as Network Firewall configuration.

OVH SLA GUARANTEES

The Network

- ✓ OVH guarantees 100% accessibility on the internal Private Cloud datacenter network, with the exception of scheduled maintenance work which customers will be notified of in advance.
- ✓ Private Cloud internet connectivity is guaranteed 99.95% of the time, with the exception of scheduled maintenance work which customers will be notified of in advance.

The Host Servers

- ✓ OVH guarantees 99.99% availability on the Private Cloud host servers. Any applications hosted on these servers will benefit from this availability, provided that the customer's infrastructure meets the minimum requirements.
- ✓ OVH provides a replacement host in less than 15 minutes if a host server goes down.

Storage

- ✓ OVH guarantees 100% availability on its storage systems. The system used provides a master datastore and a slave to take over in case it goes down.

Benefits to Aer Wireless and Amelia and Dinwiddie Counties

- ✓ A strategic, enterprise-grade, hybrid cloud platform and partnership for all vSphere workloads
    - Significant CapEx and OpEx savings
    - Rapid turn-up of Network Core…within 48 hours
    - Faster ROI of Network deployment
- ✓ Trusted and secure vSphere platform
- ✓ No application refactoring
- ✓ Application mobility / portability
- ✓ Infrastructure and Capacity on Demand / reduced acquisition times (months to minutes)
- ✓ NSX micro-segmentation capabilities for added East-West security and optimization of North-South traffic.
- ✓ Operational compatibility / datacenter management
- ✓ Eliminate outages due to capacity constraints
- ✓ Ability to optimize and normalize resource utilization to prevent resource overages
- ✓ Aligns to current and potential future investments in other VMware Solutions (NSX, vROps)
- ✓ Same VMware management tools and level of control available to Aer Wireless today
- ✓ Senior Cloud Architect to assist with security and networking design considerations, project planning and milestones.
- ✓ Dedicated Customer Support Manager to assist with onboarding and managing subscription services, provisioning, billing and support resolution.
- ✓ OpEx model for your datacenter
- ✓ Key Use Cases
    - Datacenter Extension
    - Datacenter Replacement
    - Disaster Recovery
    - Burst space (need more capacity)
    - Upgrades (HW, vSphere)

OVH has partnered with Aer Wireless to design a flexible, cost effective and secure IaaS cloud Network Core solution that can rapidly scale to meet the demands of its business and customers across the US and globally. Our strategic partnership is based on mutual trust and innovation, delivering disruptive technology that enables internet access EVERYWHERE.

Distribution Infrastructure / Transport

Also described as the outside plant/ infrastructure, it consists of fiber that provides IP bandwidth from carriers, microwave wireless back-haul by Fuze Wireless from Vint Hill, Ashburn and Culpeper datacenter and colocation facilities and the MagiNet™ Wi-Fi based technology by Mage Networks. The Cogent fiber delivers IP bandwidth that has points of connection to the Internet, to

the OVH Network Core via the "Meet-me Room" at the Equinix colocation facilities in Ashburn and Culpeper, VA and a third point at Vint Hill (Warrenton, VA). In addition, from each of the colocation facilities and the Vint Hill location, there will be a 1.2 Gbps wireless microwave backhaul connection back to the Aer Wireless offices that acts as a redundant network connection should the fiber (IP bandwidth) to the outside plant get disrupted. This redundancy to the outside infrastructure is critical as it eliminates any single point of failure on the overall network. The network in Amelia and Dinwiddie counties will be cross-connected to the core network via fiber based IP-Bandwidth.

4. MAGE NETWORK CONCEPTUAL DESIGN: OUTSIDE INFRASTRUCTURE

MagiNet™ Bandwidth

The MagiNet™ system delivers bandwidth in a consistent manner. Internet service suffers when the signal is too low (such as when you walk away from your Wi-Fi Access Point or when you have one bar on your cell phone), when the signal is degraded due to weather (you haven't moved but rain degrades your signal which was previously strong), and finally because the bandwidth is being shared by too many people. By design, MagiNet™ minimizes the bandwidth sharing by creating multiple paths for bandwidth to reach the end customer. The amount of sharing is called "over-subscription rate". Typically, networks are designed with over-subscription rates of 70-100. However, MagiNet™ is designed with oversubscription of 4-10 at most. Therefore, the experience the customers will get is of a far better overall performance than other networks. Putting it simply, what's the benefit of knowing that when you're at work or asleep at 3 am your network can provide you 100 Mbps, when at 7pm when you really need it, you're only getting 5 Mbps or less?. This will not be the case with the proposed network, customers will get the bandwidth they have paid for at all times.

New Bandwidth Injection

New Bandwidth Injection (NBI™) is a feature of MagiNet™ which permits additional bandwidth to be injected to the system to remove bottlenecks and increase overall capacity. MagiNet™ operates by dynamically creating paths through the network based on factors such as speed, latency, and response time. This is a significant change from traditional static routes where the paths, once programmed or discovered, are set.

The dynamic path created permits the network to automatically adjust to changes in utilization, data flow, and data rates. Thus, if a shorter or faster path to the Internet is injected into one area of the network, routes will adjust to utilize it over a further and more congested gateway. In practical terms this means that the capacity of the network can be significantly increased, when needed, by simply adding additional Internet connections.

Connection Redundancy

Connection redundancy is achieved via the same mechanism which makes NBI™ possible. If a network segment has multiple connections to the Internet, the end-users will automatically take the fastest and most direct route to the Internet. If, however, one of the Internet connections goes off-line, the end-users will automatically re-route to use another Internet gateway.

Future-proof by Incorporating New Technologies

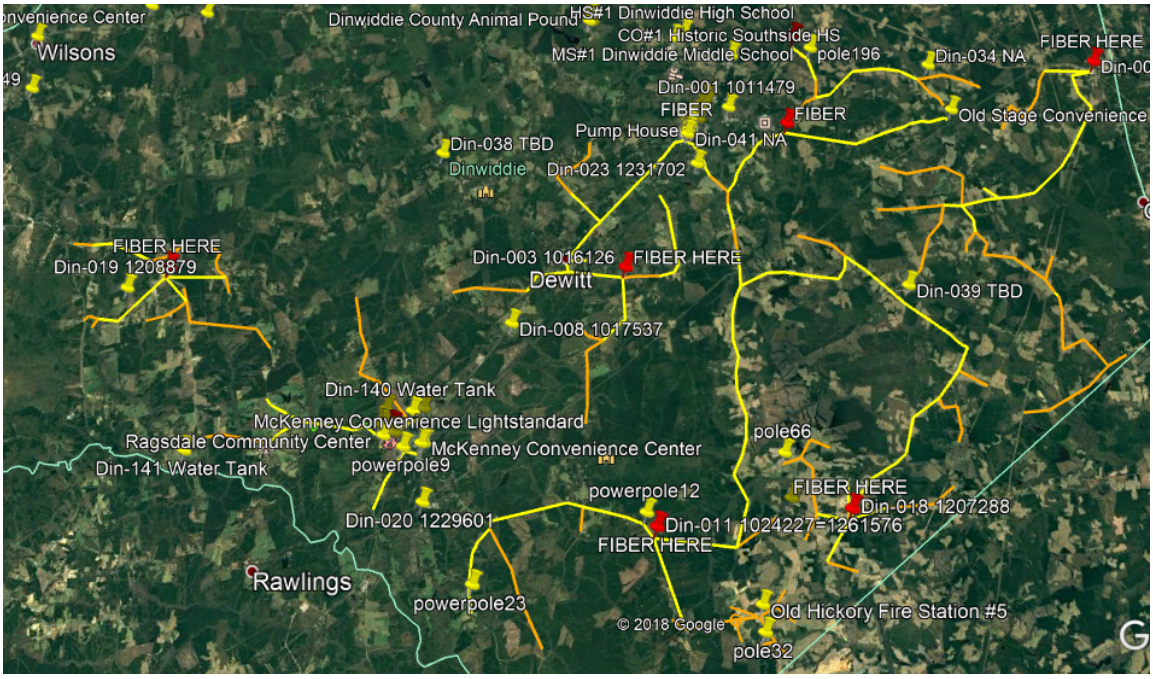
NBI™ also serves to future-proof the network against by making it possible to integrate emerging technologies into the network with minimal effort. For example, if a new super-high bandwidth radio is developed, that radio can be used to inject bandwidth into the MagiNet™ network. Additionally, if there is a network segment with end-clients in need of the super-high bandwidth, only the radio units within the identified network segment need to be upgraded. Any network segments in close proximity to the upgraded segment will also benefit as the MagiNet™ system will automatically adjust and route traffic via the new super-high bandwidth path.

Preliminary MagiNet™ Design

The combination of challenging terrain and dispersed rural agricultural area is a significant connectivity challenge for traditional connectivity services whether wireless, fiber or copper. However, it is ideally suited for Mage Networks' MagiNet™ technology. Rather than utilizing large broadcast towers which rely upon line-of-sight between the tower and end-client, MagiNet™ is designed to utilize low-cost relay nodes mounted to standard service poles and buildings. These relay nodes are eco-friendly in that they utilize very little power and can operate via solar panel if required. The relay nodes permit MagiNet™ networks to circumvent obstacles, provide for redundancy and to be implemented at a cost several times less than any other approach.

The below diagram shows the southern portion of Dinwiddie County and outlines how a MagiNet™ network will be constructed to account for the unique terrain and provide services to practically every residence.

Dinwiddie County



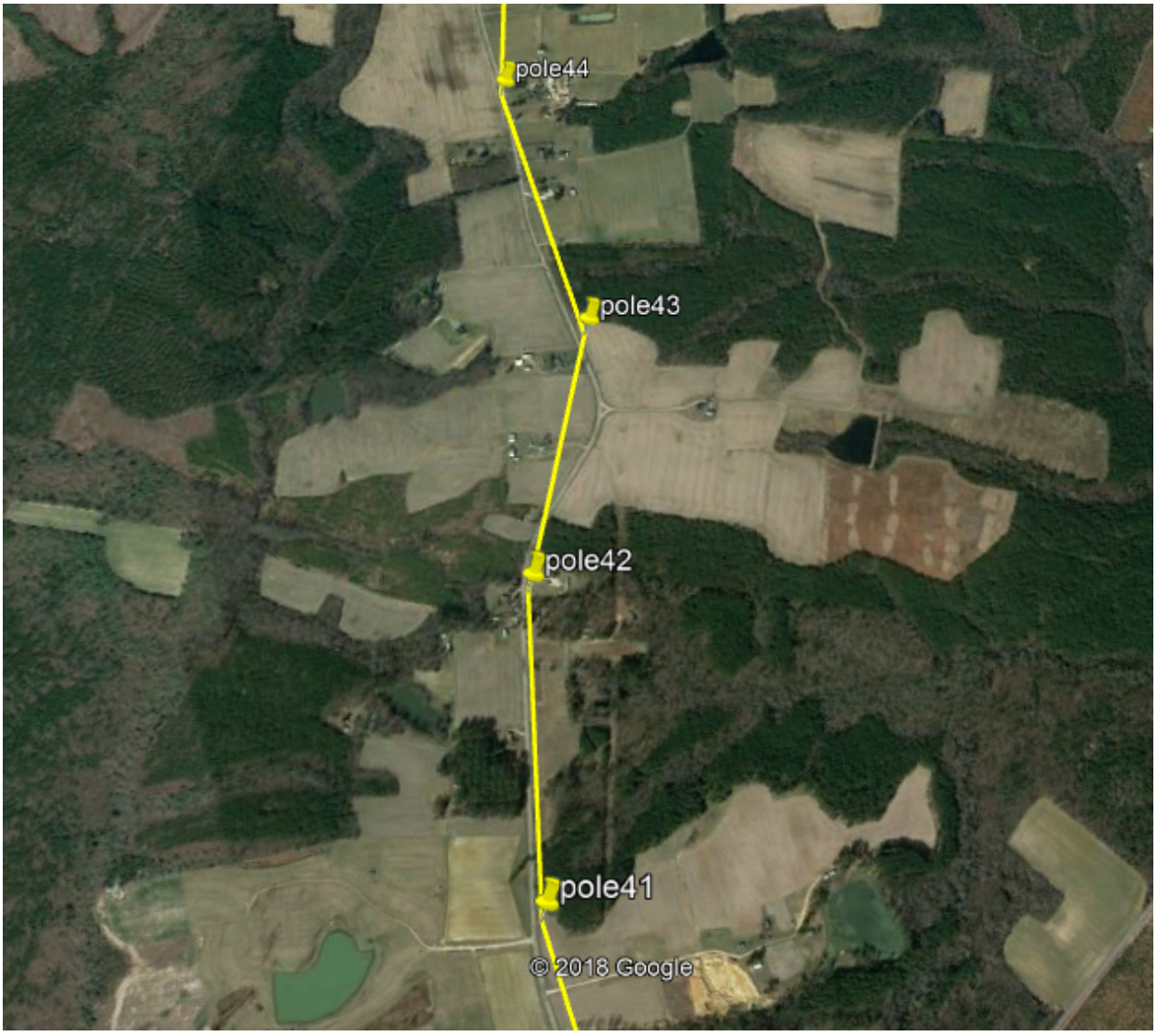
Similarly, the following diagram exhibits the central third of Amelia County and outlines how a MagiNet™ network will be constructed to account for the unique terrain and provide services to practically every residence.

Amelia County

In both diagrams, the yellow and orange lines represent 1000 Mbps and 100 Mbps data pipelines, respectively, to which the end-clients would connect. The MagiNet™ network is connected to the Internet at multiple fiber access points which provides both Internet New Bandwidth Injection (NBI™) where required but also operation redundancy. NBI™ is a feature of MagiNet™ where additional capacity is added to the network easily by the addition of new Data Pipelines without disrupting existing devices. NBI™ future-proofs the network against the emergence of more powerful wireless technologies. Essentially the new technologies become part of the MagiNet™.

Connecting End-clients to the MagiNet™ Data Pipeline

The below diagram depicts a data pipeline segment with four relay node sites identified as pole41 through pole44. The end-client connection to the data pipeline occurs at the relay nodes via aiming a small antenna, approximately the size of a large to-go coffee cup, at the relay node affixed with end-user communications equipment.



If an end-client is within half a mile of a relay node with end-user communication equipment, a connection can be established. This is a unique feature of MagiNet™ which reduces costs as not all relay nodes need to have customer MagiNodes™. However, since all relay nodes can be equipped with the equipment, the network can be easily adapted and expanded as requirements change.

MagiNet™ Obstacle Avoidance & Resiliency to Poor Weather

The utilization of short and precise relay-hops permits obstacles and landscape anomalies to be circumvented, thus addressing the traditional issue of a tower not having line-of-sight to an end-user. Furthermore, depending upon the distance and density, it is often possible to obtain a connection through foliage in places where traditional wireless would fail. The shorter relay-hops also ensure high data rates can be achieved even in adverse weather conditions. Simply stated, the shorter distances ensure less weather induced signal degradation.

MagiNet™ Equipment Recommendations

Infrastructure Equipment

The preliminary MagiNet™ design for Dinwiddie County utilizes approximately 268 relay poles to bring high-speed Internet services to well over 96% of households in the southern half of Dinwiddie County. Thus, it is estimated that 536 relays will be required to service the entire county.

The preliminary MagiNet™ design for Amelia County utilizes approximately 187 relay poles to bring high-speed Internet services to well over 96% of households in the central portion of Amelia County. Thus, it is estimated that 468 relays will be required to service the entire county.

It is important to note that although the population of Amelia County is less than that of Dinwiddie County, the terrain and lack of existing infrastructure, when compared to Dinwiddie County, translates to additional relay poles being required in some area. This increases the number of poles per capital required to service the county.

We are proud to disclose to you that the strong partnership between Mage Networks and AER Wireless has enabled us to provide the Commonwealth of Virginia Broadband Consortium with a price point that is below the price currently given to any global distributor of MagiNet™ equipment. This ensures the capital costs of your project are kept within your budget. ***Please refer to Cost Estimates under separate cover.***

Installation Time

The average hands-on time to install MagiNet™ is 3-hours per relay. ***Please refer to Cost Estimates under separate cover.***

Accessing the Network

In addition to the ability to cover the whole county despite the hilly terrain and trees that characterize Amelia and Dinwiddie Counties, the cost of deployment for the Aer Wireless solution will be significantly lower. While other companies will need to use highly skilled installation crews to deploy traditional solutions at the commercial and residential locations, Aer Wireless will avoid much of this associated cost and grant the customer immediate access to the network.
The installation of commercial or residential services can be performed either by Aer Wireless trained local electricians or by the customer, as the outdoor residential or commercial unit does not require a special skill set. The residential unit is bracketed on the outside of the home or building and the Ethernet cable extends into the home where it is connect to the Power over Ethernet (POE) unit. One end of the unit is plugged into the wall and the other has two Ethernet receptacles, one marked LAN that is connects to the laptop, desktop or wireless router. The other end is where the Ethernet cable from the outside equipment is plugged in and that is what provides the power to the outdoor unit.

Aer Wireless also intends to deploy outdoor Wi-Fi units in parks and areas of high traffic. Residents or visitors to the County, especially those that visit the public parks and trails will be able to immediately access the network by picking up the Wi-Fi signal and signing up for the package of their choice. The customer can then select the desired daily, weekly or monthly service package.

Aer Wireless will also deploy traditional Fixed Wireless Access technology from Cambium where it makes most sense. In those instances where a customer is connected using the Cambium unit, Aer Wireless will install this equipment themselves.

Pursuant to the County's objectives, Aer Wireless can provide the following performance:

- ✓ **Speed:** We can deliver at a minimum, consistent 25 Mbps download and 25 Mbps upload, although we advertise 15 Mbps upload everywhere across the entire county and a maximum of 1Gbps symmetrically. Unlike cell towers, those far or close will get equal speed and performance, instead of degrading speed over distance.

- ✓ **Deployment:** We can provide deployment in a fraction of the time of other infrastructures. In addition, we can give immediate "pain" areas service within a few days or a few weeks, depending on the speed of Amelia and Dinwiddie Counties approvals.

- ✓ **Stopgap Services:** We can provide Interim Wireless Service for areas with planned Fiber Construction.

- ✓ **Coverage:** We can reach through any terrain, trees, and non-line-of-sight areas and, while some homes will never have fiber, even those residents will receive reliable and high-speed service.

- ✓ **Consistency:** Our technology, since it is low to the ground, is almost without impediment by rain or snow.

- ✓ **Guaranteed Pricing:** Because we can commit and have the ability to reach all remote areas, Amelia and Dinwiddie Counties will attain the ability to charge ongoing set rates. Everyone pays the same rate.

HOW AER WIRELESS IS UNIQUE

While ISPs exist all over the United States, FCC data shows that 39% of the country's rural residents have *no access* to broadband, and that in Amelia and Dinwiddie Counties specifically, the number is 33.2%. (https://docs.fcc.gov/public/attachments/FCC-16-6A2.xlsx) While incumbent ISPs have not assessed these areas as being viable or profitable enough to provide service, we take a different approach. **At Aer Wireless, we believe in providing leading technologies to make connecting *any area* worthwhile.** Combining the patented technology under an exclusive arrangement with Mage Networks, virtualizing the core with OVH and carefully designing the network, delivery can be accomplished in as little as 30 days. Our approach and the technology used places Aer Wireless in a very unique and enviable position.

For discussion purposes, our proposed service levels are as follows:

- ✓ Low Service: Potential customers with no service at all or a low grade of service (0 – 5 Mbps).
- ✓ Moderate Service: Potential customers receiving a medium grade of service (5 – 25 Mbps)
- ✓ High Service: Potential customers receiving a high grade of service (over 25 Mbps)

How does Aer Wireless Win in all Three Service Level Zones?
Rural counties such as Amelia and Dinwiddie Counties currently include a blend of all three markets. While Aer Wireless can deploy or enhance networks using existing fiber, cable or existing wireless technologies wherever feasible, adding MagiNet™ to the mix ensures that the whole county will be part of the High Service Market.

Low Service Markets
In areas that currently have no or low service, Aer Wireless's use of MagiNet™ is the clear winner, and the only viable option. With as few as 3 subscribers in a given rural area (or even a single subscriber willing to pay installation fee or commit to a longer term), Aer Wireless can feasibly design and deploy MagiNet™ to provide 25-50 Mbps either up or download, which is ample service for the heaviest applications, such as streaming movies and uploading video. Because of MagiNet™'s flexibility, Aer Wireless can reach into no-service zones (e.g. valleys) quickly, without requiring permitting to build fiber or access towers.

Mid-Service Markets
In mid-grade markets, Aer Wireless can use MagiNet™ to offer better to similar service at the same pricing as other ISPs with traditional technology, but with much faster deployment. The Wi-Fi hot zones and value added services enhance the penetration into this market significantly.

High-Service Markets
There are many ISPs vying for dense urban markets. Aer Wireless will offer comparable data rates and performance, in addition to creating seamless outdoor Wi-Fi hot zones. Furthermore, MagiNet™ can provide interim wireless connectivity during the Fiber build-out phase. The equipment would be deployed starting in the zone of fiber coverage and extending into the yet un-built area. As the fiber extends its reach, the wireless equipment is removed and re-deployed in a rolling deployment.

What services can Aer Wireless actually provide?
In addition to the raw bandwidth improvements, Aer Wireless homeowners and county facilities internet subscribers will receive:

- ✓ Internet access at 25, 50, 75 and 100 Mbps and 1Gbps symmetrically across the whole county, while matching existing service when higher up to 1Gbps symmetrically.
- ✓ Deploy Wi-Fi zones over most of the public high traffic areas of the county. Offer automatic subscription to the hot zones for two devices per household.

Value Added Services

- ✓ Next-generation E-911 Emergency Services – to more accurately identify the location of the caller
- ✓ Voice services, residential and commercial (Digital VoIP) – reduces long-distance billings
- ✓ Commercial private area networks – for businesses or farms who need internal networks.
- ✓ Cyber security – Offer cyber services to Government entities and businesses across both counties
- ✓ Webroot – to provide data security services for businesses.
- ✓ Home security monitoring – to protect homes and property

- ✓ Television/Movies – High Speed data services capable of supporting Internet streaming services such as Netflix, Hulu and other on-demand video services.
- ✓ Softphone services –allows cell phone service for carriers not operating in the area
- ✓ UgoRound - municipality alert services for public emergency announcements directly to users' cell phones
- ✓ Additional revenue can be generated from non-subscribers by selling access to the Wi-Fi hot zones and the value added services separately.
- ✓ Collecting metrics and analytical data from visitors to both counties.
- ✓ Immediate stop-gap service for new businesses or subscribers who cannot wait for fiber connections but for whom fiber is in the longer-term plan
- ✓ Fast Uploads - Very high upload speeds for users requiring it
- ✓ Emergency Network (Broadband and Voice) serves as an excellent emergency network or portable network for events.

PROJECT OBJECTIVES

As outlined in the RFP, Amelia and Dinwiddie Counties is seeking the following from the selected vendor:

1. Provide seamless and reliable broadband access with defined performance, coverage area, and consumer pricing goals for the County.
2. Operate as an Internet Service Provider, ensuring last-mile solution options to enable these services.
3. Research and prepare all necessary FCC related forms and submittals required to provide services.

The preliminary design from Aer Wireless and Mage Networks Teams provide the network design, and upon selection, Aer Wireless and its consortium of partners will hit the ground running and receive input from County personnel to complete the detail design.

5. AER WIRELESS PRELIMINARY DESIGN (MAGE NETWORKS)

The following design, based on our previous research, will be the foundation of our detailed design.

Initial Considerations. Amelia and Dinwiddie Counties comprise a large number of farms, parks, schools, government buildings, fire stations, trails and is a very wooded which will interfere with most wireless signals.

In rural areas, a case against laying out fiber can easily be made. Fiber is seldom economical in rural areas, and can be as much as $20,000 per home (or per location) in sparsely populated areas. This figure of course decreases as the subscriber density increases, but it can cost organizations anywhere from $30,000 to well over $60,000 PER MILE to layout new fiber optic cable. Although fiber can provide almost unlimited broadband and can meet the demand for many years to come, it is slow in deploying and due to the high initial cost; it has a longer ROI.

We propose (in our network design) to use as much as the existing fiber access will allow and to complement the unserved areas with the Maginet wireless system. Our State of the Art Access systems can provide adequate bandwidth (1Gbps symmetrically) to serve small, rural communities and is ideally suited to serve these communities at a minimum cost. Furthermore, they are comparatively economical, easy to deploy and install and can be repositioned or redeployed if the need for local demand changes over time. In addition, license-free band operation may be perfectly suitable (no interference expected) in these rural areas on the ITU designated 2.4Ghz and 5.8Ghz for Wi-Fi.

The fiber access from the existing companies with capacity in the counties can be contracted from existing operators to provide the raw bandwidth for Point-to-point or Point-to-multipoint links that will carry the IP services and bandwidth to the local MagiNet™. These localized mesh networks will distribute the bandwidth to the last mile and will provide internet access to public buildings, schools, and first responder's facilities and residential customers.

For the purposes of this document, we will assume that most existing towers have some sort of adequate fiber access. We will also make the reasonable assumption that, in areas where a fiber connection is available, this connection can be leased or contracted to supply the necessary bandwidth to directly feed the local MagiNet™.

Final Design Considerations

- ✓ The above is a very preliminary feasibility study of the proposed network, taking into consideration the need for rapid deployment and low cost.
- ✓ All radio links are estimated and deemed possible upon cursory analysis. A proper link design using computer simulation is required for each link to establish final feasibility.
- ✓ MagiNet™ design will respond to the specific needs for each community or area served.
- ✓ A complete network design must include the lists of Fiber access points, equipment used and site visits/surveys to establish all necessary resources (towers, poles, energy, etc.)

- ✓ We believe that existing towers might be reused for the purpose of establishing dedicated microwave links. However, it may be necessary to install monopoles (antenna mounting poles) at remote locations and outdoor cabinets to house equipment, batteries, etc.

PROJECT DESIGN PROCESS

We propose a 3-part approach to developing the detailed design. This will allow for input from Amelia and Dinwiddie Counties early in the process, and time for revisions.

PART 1: REVIEW

Beginning where we left off with our previous needs assessment, we will need to review existing documents and infrastructure, and confirm direction from the county. Key stakeholders from Amelia and Dinwiddie Counties should be included.
We will seek answer to questions such as:

- ✓ What are the top priority rollout areas?
- ✓ How can a budget be utilized over a time period?
- ✓ Where temporary portable deployments be used for the areas later in the timeline?
- ✓ Key social, economic, environmental and transportation factors that will influence the rollout.

This will result in a memo of understanding, prepared by the Consortium, for sign-off by Amelia and Dinwiddie Counties, before we commence the detailed design.

PART 2: DEVELOPING DETAILED DESIGN

The team will distribute the approved memo of understanding document to all vendors, and then facilitate the following:

1. Team planning session. Vendors will participate in person and via web conference.
2. Preliminary conceptual design.
3. Gathering of specs and costs on each partner's solution.
4. Technical review and integration of all proposed infrastructure.
5. Develop visual graphics, costs and timelines for a proposed solution
6. Building of a presentation of the solution

PART 3: PRESENTATION

The proposed solution will be presented to the Amelia and Dinwiddie Counties Board of Supervisors. This presentation will include:

- ✓ Visual overview of complete solution
- ✓ Phased timelines for each location
- ✓ Phased budgets and payment schedule

Following this, revisions will be provided based on feedback from Amelia and Dinwiddie Counties, and the final document will delivered with all appendices – specifically:

- ✓ Equipment Specifications
- ✓ Installer Names/Detailed Schedules of each

DELIVERABLE: Detailed Design Plan for Broadband Expansion.
Once the plan is approved, contracts signed and deposits received, we can begin procurement.

6. AER WIRELESS CONCEPTUAL DESIGN DETAILS

Aer Wireless will provide the most comprehensive and cost-effective solution for complete high-speed internet coverage in any area, regardless of terrain.

As noted above, the conceptual design is divided into the following areas:

Transport and Outside Plant

Also described as the outside infrastructure, it consists of fiber that provides IP bandwidth from the owners of the existing fiber. In some instances the capacity may have to use microwave wireless backhaul from using MagiNet™ Wi-Fi based technology. The fiber providers will deliver IP bandwidth that has points of connection to the Internet, to the OVH Network Core via the "Meet-me Room" at the Equinix colocation facilities in Ashburn and Culpeper, VA and a third point at Vint Hill (Warrenton, VA). In addition, from each of the colocation facilities and the Vint Hill location, there will be a 1.2Gbps wireless microwave backhaul connection back to the Aer Wireless offices that acts as a redundant network connection in the event there is a disruption within the fiber (IP bandwidth) to the outside-plant in the event of damage. This redundancy to the outside infrastructure is critical as it eliminates any single point of failure on the overall network.

The fiber network will also provide ingress capacity to the microwave backhaul that extends from the colocation facilities and is dispersed throughout the County. The wireless microwave layer serves the dual functions to provide backhaul and ingress capacity across the entire County where it acts as a second layer of a three-layer network. Fuze Wireless will work with the fiber companies and Mage Networks to design and deploy the microwave layer of the network that will inter-connect with both the MagiNet™ and the fiber. Where there is no microwave availability to perform this function, fiber will be used; and where both exists, together will provide redundancy.

The Network Core

The virtualized Network Core (OVH) will provide authentication, bandwidth management, network monitoring, security and other applications. ***Please refer to Figure#3, OVH Network Core Design, Page 13, above***. The virtualization of the Network Core allows Aer Wireless to provide Amelia and Dinwiddie counties with the most cost effective, efficient, flexible and nimble network. It eliminates significant capital expenditure in equipment and equipment obsolescence. It enables full automation of network functions and approaches zero downtime infrastructure for any equipment or application, thereby, reducing IT (information technology) expense and operational cost. In addition, its capabilities are rapidly scalable depending on demand, which avoids over-spending on capital equipment in anticipation of the future demand.

Aer Wireless Network Core - OVH Cloud Design Overview

OVH Cloud will provide to Aer Wireless a secure and scalable cloud-based datacenter solution using nimbly delivered as Infrastructure as a Service (IaaS) to host their infrastructure and critical applications, built upon our Hosted Private Cloud offering at our Vint Hill, VA datacenter in Warrenton. The datacenter architecture will consist of the following:

Application/Database Host Layer

The OVH datacenter infrastructure tenant will host the Aer Wireless workloads dictated by Aer Wireless as critical to its service provisioning operations and which are not being hosted on third

party, public cloud platforms. This layer represents the heart of Aer Wireless' operational processing and will consist of the following workloads:

- ✓ Aradial
- ✓ Avaya Aura
- ✓ Cylance
- ✓ Splunk
- ✓ Directory/Network Services

Required workloads hosted by third party cloud providers and therefore not within the purview of OVH IaaS provisioning are as follows:

- ✓ Digitalk
- ✓ UgoRound

DMZ Layer

OVH will create a logical sub-network separating the Application Database network from internet traffic so its public facing resources are accessible from the internet while internal, operational resources remain unreachable from outside access. This will provide an additional layer of security to the application/database layer as it restricts the ability of unauthorized users to directly access internal servers and data via the Internet. The DMZ will host the following workloads:

- ✓ Esotech
- ✓ Fortinet Network Security
- ✓ MikroTik Networking

vRack Network Backbone

OVH's vRack (virtual rack – private LAN) technology will connect and isolate both the DMZ and Application/Database secure networks. vRack allows internal services to communicate privately and securely with each other over a dedicated software defined networking core (SDNC). vRack lives on OVH's low-latency network, with throughputs up to 3Gbps and up to 4,000 native VLANs.

Figure #1, Network Flowchart, Page 9, above also shows how all the various pieces of the design interact to provide customers with their desired services.

Wide Area Network Connectivity

OVH will provide several wide area network connectivity solutions depending upon communication requirements and system architecture. ***Please refer to Figure #3, OVH Network Core Design, Page 13, above.***

Internet Access

Through its core-networking infrastructure at the Vint Hill datacenter, OVH will provide redundant 1.5Gbps internet circuits out to the public internet. Internet security will be provided by VMware software defined edge routing, firewalling services included with OVH's NSX Enterprise offering and by Aer Wireless' Fortinet solution hosted within the DMZ layer. Internet connectivity is required for communication between the datacenter infrastructure, UgoRound workloads and Cylance's management platform.

VPN

Through its core-networking infrastructure at the Vint Hill datacenter, OVH will provide site-to-site VPN connectivity from Aer Wireless' tenant infrastructure to the Digitalk platform being hosted in the Equinix Miami NAP datacenter.

PoP to Datacenter Wide Area Connectivity

Using vRack Connect, OVH will provide wide area connectivity integration between the Vint Hill datacenter and their Point of Presence (PoP) at the Equinix Ashburn, VA datacenter via Aer Wireless' choice of telecom provider. The Ashburn PoP, being hyperlocal to Aer Wireless's main facilities and service distribution to Amelia and Dinwiddie counties' end user population, will serve as an integration point between access to Aer Wireless' production infrastructure and the dark fiber runs feeding wireless backhaul equipment required for the distribution of wireless services to dedicated endpoints. Additionally, a second dark fiber run will connect wireless backhaul and distribution wireless access points to outlying areas of Amelia and Dinwiddie counties end user population and the Equinix datacenter in Culpeper, VA.

Future-proof Vertical Integration

OVH believes in vertical integration. They build our own servers laser cutting and bending the sheet metal to their own server and rack designs. They have direct relationships with Intel, AMD, Nvidia, Super Micro and other manufacturers to get the best price, lead times and access to new products and technology. They build their own servers to specs to be the highest performance and with the least power consumption.

Patented Water-cooled Servers

OVH employs green technology using water to absorb 70% of the heat dissipation of their CPUs. They apply proprietary heat sync on the CPUs that uses water to transfer the heat rather than fans because water is a more efficient conduit for heat transfer than air. The 30% of Air-cooling that OVH uses ambient air – not chilled air. This method allows OVH to abstain from overly strict building codes for A/C forced air, raised flooring and the like, which again helps control costs and pass these savings back to our customers.

Proprietary Built and Owned Datacenters

Continuing the journey of innovation, they also build their own datacenters globally. OVH generally builds from scratch or take over old manufacturing warehouses. Inside OVH's datacenters are containers that they also build ourselves. The reason they build these containers is, so they can logically and physically group servers by type, and by their power, water, and network consumption further reducing operating costs and passing on the savings to all customers.

7. AER WIRELESS OUTSIDE INFRASTRUCTURE DESIGN

The following considerations are the foundation of our detailed design. This design is based on the engineering of Mage Networks "MagiNet".

Initial Considerations

Amelia and Dinwiddie counties comprise many small rural communities, farms and historic sites.

Aer Wireless broadband expansion network design will use as much as the existing fiber access as allowed and complement the unserved areas with the unique Mage Networks Wi-Fi system and a fixed (microwave) wireless access system. The MagiNet™ equipment is comparatively economical, easy to deploy and install, and can be repositioned or redeployed if local demand changes over time. In addition, license-free band operation may be perfectly suitable (no interference expected) in these rural areas.

The fiber access can be contracted from existing operators (e.g. Cogent) to provide the raw IP bandwidth for point-to-point or point-to-multipoint links that will carry the IP services and bandwidth to the local MagiNet™ (the End User Infrastructure). These localized mesh networks will distribute the bandwidth to provide internet access to residents, business, public buildings, schools, and first responder's facilities.

For the purposes of this document, we will assume that most existing towers have some sort of adequate fiber access. We will also make the reasonable assumption that, in areas where a fiber connection is available, that connection can be leased or contracted to supply the necessary bandwidth to directly feed the local MagiNet™.

PROJECT DESIGN PROCESS

We propose a three-part approach to developing the detailed design. This will allow for input from Amelia and Dinwiddie counties early in the process and time for revisions.

PART 1: REVIEW

Beginning where we left off with our previous needs assessment, we will need to review existing documents and infrastructure, and confirm direction from the County with key stakeholders from Amelia and Dinwiddie counties.

We will seek answers to questions such as:

- ✓ What are the top priority rollout areas?
- ✓ How can a budget best be utilized over a specified period of time?
- ✓ Will the County allow Aer Wireless to lay fiber across county property?
- ✓ Key social, economic, environmental and transportation factors that will influence the rollout.
- ✓ Clarity around billing for services to complete detail design

This will result in a memo-of-understanding prepared by Aer Wireless for sign-off by Amelia and Dinwiddie counties before we commence the detailed design.

PART 2: DEVELOPING DETAILED DESIGN

Aer Wireless will distribute the approved memo of understanding document to all vendors, and then facilitate the following:

1. Team planning session. Vendors will participate in person and via web conferencing.
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The proposed solution will be presented to the Amelia and Dinwiddie Counties' Boards of Supervisors. This presentation will include:

- ✓ Visual overview of the complete solution
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- ✓ Phased budgets and payment schedule

Following this presentation, revisions will be provided based on feedback from Amelia and Dinwiddie Counties, and the final document will be delivered with the appropriate appendices, specifically:

- ✓ Equipment specifications
- ✓ Installer names/Detailed schedules of each

DELIVERABLE: Detailed Design Plan for Broadband Expansion

Upon approval of our proposed plan, contracts signed and deposits received, Aer Wireless will begin procurement.

8. PRODUCT DESCRIPTIONS AND CAPABILITIES

Aer Wireless is bringing a number of technologies together to give Amelia and Dinwiddie Counties complete high-speed internet coverage. These include the following:

Aer Broadband

This is high-speed broadband internet access for residential and commercial customers anywhere, even in the most rural areas. Along with internet access in and around the home, customers have Wi-Fi access everywhere across the Aer Wireless network covering the geographical area. This network is compatible with the following operating systems: Android, iOS and Windows. Any ***IEEE*** 802.11 standard Wi-Fi-enabled device can be used to connect to it, including smartphones, tablets, desktops, laptops, PlayStation and Xbox. It also supports any Internet of Things (IoT) devices.

Aer Wi-Fi

The Aer Wireless network can be used residentially, as described above, but it is also ideal for providing Wi-Fi access in targeted locations, such as a farm, college campus, business park, shopping district or tourist destination, and in hard-to-reach areas such as trails. An Aer Wireless network can also bring Wi-Fi to a city or county that wants to provide public internet access everywhere. Citizens and businesses can take full advantage of IoT, Autonomous Driving Vehicles, Smart Homes, Telemedicine and so much more. Data is unlimited for all users, so it is perfect for streaming media, downloading songs or posting to social media from anywhere across the network.

Aer Phone

The speed and reliability of the Aer Wireless network makes it a perfect match for softphone (VoIP) services. Aer Phone can be purchased as an add-on service. Customers can make calls from anywhere they have access to Wi-Fi. If they are in an area where there is no Wi-Fi access, customers can still use the service by using the data channel on the mobile carrier's network (domestically and internationally), with no roaming charges, and not just from geographic areas served by Aer Wireless. The customers can make calls from any Wi-Fi-enabled device: smart phones, tablets, desktops, laptops, PlayStation and Xbox. The customer will have a choice of selecting up to four telephone numbers from a list of over 30 countries.

The Aer Wireless softphone service is E911 compliant. Plus, when a user calls 911, the caller can be located within 200 meters of the identified location, unlike a cellular network where the caller could be 1 to 5 miles from the nearest cell tower. If the user has location services turned on, emergency responders have the ability to access a call-back number and extract a user's GPS location, and if it is not turned on, the network can quickly determine the caller's location within a near radius.

Aer Business Suite

This includes all the features and benefits mentioned so far (including Aer Phone, with a subscription). With internet access from anywhere across the Aer Wireless network, this especially appeals to business owners, corporations, telecommuters, outside sales teams, and business professionals of any type who travel frequently. On-site or on the road, employees can maximize productivity with greater bandwidth, download speeds up to 400 Mbps and greater reliability.

Employees can access voice, video, IM, presence, mobile, and conferencing with a single identity. They can consolidate collaboration tools in one environment, including audio and web

conferencing, video, desktop applications, browsers and desktop sharing. Broadband and voice services are available on any Wi-Fi-enabled device: smartphones, tablets, desktops, laptops, PlayStation and Xbox.

Aer Auto Access

This is Wi-Fi connectivity within a vehicle, made possible with a small device provided by Aer Wireless that plugs into the vehicle's cigarette lighter, or directly wired into the car. Obstacles like vegetation, mountains and buildings do not block the signal in the way that they would with cell towers, so strong signals are guaranteed. Users can make calls using the softphone, and access the internet from the moving or stationary vehicle. This system can also access any available Wi-Fi network, not just from geographic areas served by Aer Wireless. For example, customers can access the internet near a building that has open Wi-Fi, such as a library, college campus, corporate campus, hospital, restaurant or coffee shop.

Aer Farm/Agriculture

Many rural areas are underserved or completely without broadband access. Aer Wireless provides internet access everywhere on the farm. Customers can take full advantage of agriculture-related IoT, including autonomous tractors, field-tending robotics and automated pesticide and fertilizer applications. Customers can reliably use emergency services to report an injury or medical emergency from isolated fields. In addition, the network can be used to increase security for animals, crops and equipment, and can be connected to video cameras with night vision.

E-911

Aer Wireless network includes enhanced 911 services with Aer softphone, for improved location accuracy. This service can be used with any digital device whether or not it has a SIM card. A user can use our softphone services on a Wi-Fi enabled non-SIM device to call E-911 and due to the network design and technology used, we are able to place the first responder within 200 meters of the caller. Typical mobile E-911 services place the caller between 1 to 5 miles from local from where the person actually calls.

Aer First-Comm

Aer Wireless offers a more reliable and robust emergency response system than AT&T FirstNet. Other first-responder networks rely on cell towers, which leave some areas without coverage and with a higher risk of dropped calls. Aer Wireless uses a new technology that does not rely on cell towers and instead is built on patented technology using the ***IEEE*** 802.11n wireless protocol.

Aer First-Comm can replace First Responder networks to provide law enforcement and emergency services with a back up to radio and cellular communications. The First-Comm network will work in remote areas, and survive loss of power with the use of battery backup. With extreme weather events such as hurricanes, it can be rapidly redeployed for immediate connectivity. Any damaged network equipment can be replaced within hours.

Aer Visitor

Aer Wireless can efficiently serve popular tourists destinations as small as a marina or as large as an island. Aer Visitor includes all the features and benefits of Aer Wi-Fi and Aer Phone, including unlimited international calls with no roaming charges. Services are available for purchase in various combinations (voice, Wi-Fi or both) and lengths of time (day, week or month). This

provides visitors with phone access in case of an emergency, or just for convenience. The visitor will pick up the Wi-Fi signal as soon as they step off the vessel, or arrive in the area where the network exists. The visitor will get to use the service for a few minutes before being re-directed to the Aer Wireless website to select the package of their choice.

Aer Security

Aer provides real-time 24/7 security monitoring of a residential or commercial location, with the ability to immediately establish two-way communications and video with the occupants of the premises.

Aer UgoRound

The Aer Wireless network keeps its customers connected to the UgoRound mobile app for emergency notifications. UgoRound sends geographically targeted, text-like messages regarding imminent threats to safety, or other communications that the government wants to. Government-approved messages are sent to customers based on their locations, which are displayed as an anonymous dot on a monitored screen. Signing up is easy, free and requires no personal information.

Aer Stream

Our media streaming service allows customers to stream entertainment content directly to televisions, smart phones, tablets, desktops and laptops. Customers can access more than 100 channels, television from several countries worldwide, and video-on-demand, upon completion of negotiated agreements with specific service providers such as Netflix. We also have included a Netflix subscription as an optional inclusion in one of our ISP pricing and service plans.

9. SPECIAL REQUIREMENTS

Aer Wireless strengths are based on a company founded to market and deliver a new Next-Gen network based on the technology developed by Mage Networks. However, given that incumbent ISPs thus far been unable to fully service Amelia and Dinwiddie Counties, it appears that a new approach and new technologies are indeed required, making our proposed innovation our true strength. Amelia and Dinwiddie's unique topography - full of trees, hills and twisting roads – is the exact topography in which Mage Networks' technology excels.

LEVERAGING COUNTY ASSETS

Because the proposed consortium brings a unique array of technologies, this means we can supply the best solution to fit within the existing infrastructure.

- ✓ **Existing Fiber:** Where fiber exists, our technology can extend it. This means that rather than laying expensive fiber to each location, one location with fiber can share bandwidth wirelessly with others around it. This saves money and time in deployment.

- ✓ **Cellular Towers:** Where towers exist, our technology can also extend it, and fill in the dark zones hidden from tower sight lines. This means getting better use from towers.

- ✓ **Planned Fiber**: Where adding fiber is affordable, Aer Wireless can deploy immediate, temporary high-speed wireless while fiber build-outs are being constructed. As the fiber is built, the wireless equipment can be rolled into other areas and reused in other places.

- ✓ **Planned Emergency and Cellular Towers**: Where adding towers is affordable, Aer Wireless can deploy immediate, temporary high-speed wireless while tower buildouts are being constructed. As the towers are built, the wireless equipment can be rolled into other areas and reused in other places. We anticipate very few added towers.

- ✓ **Where Nothing Exists:** Where nothing exists, Aer Wireless can blend technologies to get maximum cost efficiency – straight lines-of-sight can get towers or high-points, closest points could get fiber, and areas in trees or behind obstacles be reached using MagiNet™; the variety of options ensures the lowest cost for highest performance.

Normally, many other of the existing wireless technologies would have many special requirements, the primary being the need for new towers, with the attendant identification of sites for lines of sight, procurement of siting permits and lots of construction. Aer Wireless will be able to leverage County assets such as County buildings, water towers, schools, libraries, police and fire stations to be part of the wireless deployment. These locations will not only be served by the wireless link, they will also be focal points for various Data Pipelines providing service to the residents and businesses nearby. The wireless units to be deployed are small, lightweight units that are mounted on the side of buildings, on roofs, power poles, telephone poles, fence posts and even trees. The low power requirements make these units economical as they can be powered using solar panels and batteries. The overall amount of power used in deploying a MagiNet network is a fraction of that consumed by traditional wireless technology.

10. STATE CORPORATION CERFTIFICATES

CAS Severn, Inc. Business Certifications
Virginia State Corporation Number: F047688-9

FEIN: 52-1116968
DUNS: 038988648
GSA: GS-35F-0380V
SWAM: DMBE 9820

Aer Wireless
State Corporation Number: 82-1609420

Commonwealth of Virginia

State Corporation Commission

CERTIFICATE OF FACT

I Certify the Following from the Records of the Commission:

That WI4ME, LLC is duly organized as a limited liability company under the law of the Commonwealth of Virginia;

That the date of its organization is May 9, 2017; and

That the limited liability company is in existence in the Commonwealth of Virginia as of the date set forth below.

Nothing more is hereby certified.

Signed and Sealed at Richmond on this Date:
April 19, 2018

Joel H. Peck

Joel H. Peck, Clerk of the Commission

CISECOM
Document Control Number: 1804195525

Service Provider Identification Number has been applied for and will be received within timeframe required.

11. TRADE SECRETS/FREEDOM OF INFORMATION ACT

IX. FREEDOM OF INFORMATION ACT: TRADE SECRETS/PROPRIETARY INFORMATION IDENTIFICATION

IF NO PROTECTION IS NEEDED STATE "N/A" ON THE TABLE BELOW AND SIGN

Trade secrets or proprietary information submitted by any Proposer in connection with a procurement transaction shall not be subject to public disclosure under the Virginia Freedom of Information Act, however, the Proposer must invoke the protection of §2.2-4342(F) of the Code of Virginia, in writing, prior to or upon submission of the data or other materials, and must clearly and specifically identify the data or other materials to be protected, and state the reasons why protection is necessary. **The proprietary or trade secret material submitted must be identified by the Proposer on the table below. If the Proposer fails to identify any protected information on the table below, the Proposer by return of this form, hereby releases the County and all of its employees from any and all claims, damages, demands or liabilities associated with the County's release of such information, and agrees to indemnify it for all costs, expenses and attorney's fees incurred by the County as a result of any claims made by Proposer regarding the release of such information. By submitting its proposal, Proposer understands and agrees that any language seeking protection from public disclosure, any specific documents or information, unless identified on the table below, are null and void and of no legal or binding effect on the County.** The classification of line item prices, and/or total proposal prices as proprietary or trade secrets is not acceptable. If, after being given reasonable time, the Proposer refuses to withdraw such a classification designation, the proposal will be rejected.

SECTION / TITLE	PAGE NUMBER(S)	REASON(S) FOR WITHHOLDING FROM DISCLOSURE

PROPOSER/COMPANY NAME: _____

SIGNATURE_____

Please refer to Appendix 13, Signed Confidentiality Non-disclosure of Confidential Information.

12. CAS SEVERN, INC. FIRM

CAS Severn is a technology firm that provides comprehensive system solutions to many State and Local government, Federal and Educational information technology agencies as well as commercial businesses throughout the United States. Core competencies include defining enterprise architecture and infrastructure planning, development and deployment of existing and new standards, requirements definition as well as detail design, development and integration of software and hardware solutions. **Throughout the past 41 years, CAS' consultants, hardware and software engineers and subject matter experts have performed IT infrastructure and business process assessments, detailed analyses and formulated recommendations and implementation plans for a large number of clients. We are highly regarded in the Commonwealth of Virginia and have had the pleasure to serve most of the counties in Virginia.**

Since its inception in 1978, CAS Severn has been a total solution provider with a "best value" and "best practices" approach. The result is an excellent reputation, earned through our successful performance, for providing quality services and system solutions that exceed customer expectations, delivered on time and within budget. As expert practitioners in program management, we procure, configure, and maintain mission-critical information technology systems for many customers across a wide geographical expanse. The success of our operational philosophy is measured by feedback we have received: favorable evaluations, awards and follow-on contracts.

Corporate Name: CAS Severn, Inc.
Date Established: 1978
Number of Years in Business: 41
Type of Ownership: Privately Owned Maryland Corporation

Corporate Address
6201 Chevy Chase Drive
Laurel, MD 20707

Additional Locations
Richmond, VA
Virginia Beach, VA
Forest Hills, MD
Kansas City, KS
Albuquerque, NM
Denver, CO

Telephone:
800.252.4715
FAX:
301.776.3444

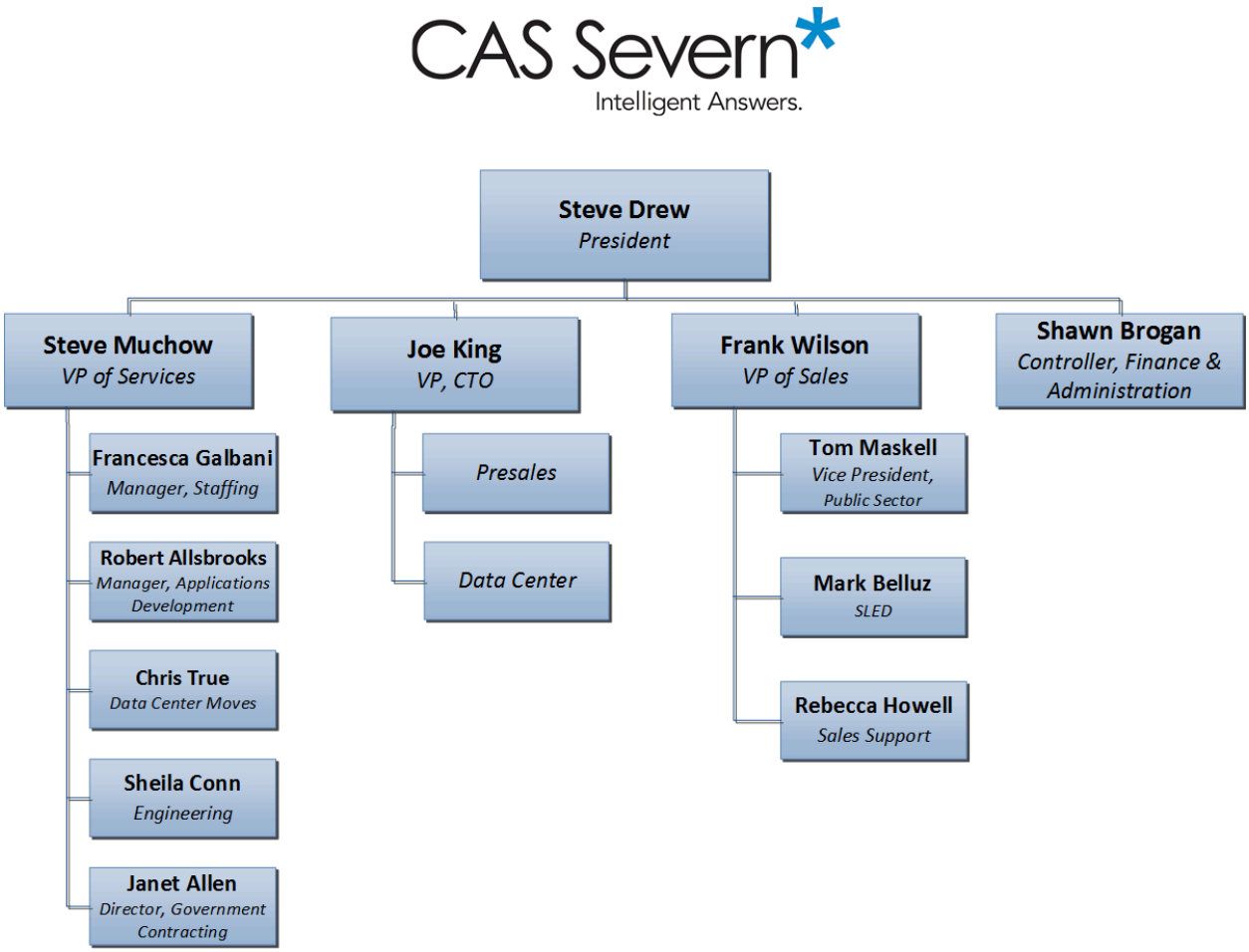
Full-Time Employees: 100+
Web site: www.cassevern.com

FEIN: 52-1116968
DUNS: 038988648
GSA #: GS-35F-0380V
Virginia Business: F047688-9
SWAM: DMBE 9820

CAS Severn has been implementing IT solutions throughout its history. We have established long-term relationships with key industry manufacturers. We are a Premier IBM, Dell and HPE Business Partner with subject matter experts and certified engineers with IBM and HP hardware and software. We are certified resellers of Cisco, Brocade, Juniper and HPE/Aruba networking systems and software. CAS Severn is also an authorized business partner for key software manufacturers such as Microsoft, VMware, Symantec, Red Hat and InterSystems to name a few. Our engineering

and technical staff maintains professional certifications with these manufacturers in an effort to insure that we provide qualified and best practice implementation services.

CAS Severn has completed numerous projects that have included detailed analysis, infrastructure modernization, business process re-engineering, strategic planning, and has helped our clients deploy IT business applications and infrastructure over its 41-year history. These projects are supported by our Software and Systems Engineering divisions. The approach proposed to support our customers is to partner with best and utilize these resources as needed. ***Please refer to the CAS Severn organization chart below.*** Also, a brief history of the company follows.



CAS Severn Brief History

When founded in 1978, Computer Applications Specialists (CAS) first served small, medium and large businesses in the Washington metropolitan area with custom application development for IBM midrange computers. In the early 1980s, CAS saw the opportunity to further its offerings by developing software application packages for retail, distribution and non-profit organizations. For CAS, a natural outgrowth of software development was staffing support. CAS has been providing staffing services for over 20 years.

In 1995, co-owners, Doug Gerstmyer and Carson Soule built and moved into CAS' current 31,000 square foot headquarters location in Laurel, Maryland. This was necessary to accommodate their substantial company growth. In 1998, CAS opened its second location in Richmond, VA to provide closer resources to customers in the southern Virginia.

In 2001, Severn Companies, Inc. became a wholly owned subsidiary of CAS. This joining of both companies expanded CAS' industry coverage model to include more public sector and Federal Government offerings. Severn Companies, Inc., a Delaware corporation, was founded in 1983 as a solutions provider to satisfy engineering, automation and financial needs of Government and industry. Since its founding, Severn has been awarded more than 300 Federal contracts for IT solutions and services. Both CAS and Severn Companies, Inc. were recognized as valued IT solutions provider and trusted advisors to the State and Local Government, Federal and commercial markets respectively. In April, 2019 CAS Severn, Inc. proudly celebrated its 41st year in business.

Amelia and Dinwiddie Counties will benefit from CAS Severn's proven leadership, partnerships, technical expertise, consistent performance and successful implementations supporting organization's IT goals. We always partner and/or have in place the necessary staff and management procedures to ensure the lowest risk and highest quality service.

CAS Severn has performed requirements analysis, infrastructure data gathering and strategic planning for our clients over the years. This work has also included reviewing business processes, business application needs, growth readiness assessments, operational health checks, and developing multi-year strategic and tactical plans with recommendations for implementations and detailed costs analyses.

CAS Severn is committed to the Commonwealth of Virginia municipalities as seen in our extensive customer base. The CAS Severn Public Sector team has the proven experience, knowledge, and expertise based on our analyses, recommendations, and implementations of both small and large systems. Our dedicated Virginia Public Sector following is based on our dedication, knowledge and service to our customers.

CAS Severn has been performing strategic initiatives for clients for decades, and continues to be re-engaged to scope and implement additional phases of work. CAS Severn's retention rate for clients is unsurpassed in the industry. This is due to the integrity with which CAS Severn does business, the top-tier resources that we employee, and the results we attain for our clients. In addition to the expertise to perform the assessments and recommendations, CAS Severn has the expertise to continue with the client through the execution of the strategic plan. Clients find this approach beneficial because CAS Severn remains engaged from assessment, to recommendations, and through delivery. Often CAS Severn is subsequently engaged to provide post-delivery support and supplemental resources and services to the client on an as needed basis.

CAS Severn's ability to provide this full spectrum of expertise and services, in addition to providing "*Intelligent Answers*" to their business and technology needs, establishes CAS Severn as a valued and trusted advisor and partner with our clients for the long term.

CONFLICT OF INTEREST DECLARATION

CAS Severn, Inc. declares that it does not have any conflicts of interest pursuant to The Virginia State and Local Government Conflict of Interest Act, Chapter 31 (§ 2.2-3100 et seq.) of Title 2.2.

13. AER WIRELESS: FIRM OVERVIEW

Officers of the Corporation
Keith J. Walker, CEO & CTO
Charmaine White, CFO
Craig C. Moore, Vice President of Human Capital

Aer Wireless™ deploys, operates, and maintains revolutionary, next generation, state of the art, high speed broadband networks that are more resilient, reliable and substantially more cost effective to address the lack of access, connectivity and customer demand for many communities, regardless of location – whether urban, rural, forest, or tropical topographies. At the heart of our network is a virtualized core with high-availability and disaster recovery with the leading global cloud provider OVH that provides IaaS and SaaS.

Aer Wireless utilizes a patented technology, through its partner Mage Networks (where there is an exclusivity agreement), through 802.11n, 802.11ac and 802.11ad, to deliver symmetrical broadband speeds for end-user customers up to 400 Mbps, 1.5 Gbps and 2 Gbps respectively, depending on the deployment model. Mage Networks has deployed several pilot projects in Canada where none of the local providers could deliver high speed broadband to the extremely rural and wooded areas of Waiporous, and Tabor - Alberta, Canada. Accordingly, Aer's networks have no dead-spots and seamlessly transfers various types of Internet traffic (voice, data, backhaul) with no interference. Our networks are self-healing, do not require traditional line of sight and as a result, do not require use of traditional cell or microwave towers. Our networks are ideal for the Internet of Things (IoT), Smart City implementation, Telemedicine, Intelligent Transportation Systems, Autonomous Driving and Vehicular Collision Avoidance Systems.

In addition to the next generation technology, our networks achieve significant power consumption advantages and usage is consistently measured between 2-8 Watts depending upon the deployed units. As a result, our networks support clean energy and can be deployed using solar power. Aer Wireless can enhance the utilization of mobile networks today, and we are open to working with existing broadband networks, ISPs, carriers, and/or forging strategic partnerships in the right business environment and circumstances. Aer Wireless also provides a connectivity solution for communities where there is no mobile signal and consequently no mobile service. This solution allows users to make and receive voice calls, text messages and video calls provided they have access to the Wi-Fi of the data backbone of any mobile network anywhere in the world, thus avoiding roaming charges. Aer's mobile connectivity solution also allows for the geo-location of callers who dial emergency services "911" and will place the first responders within 200 meters of the call instead of 1-5 miles from a tower as is the current case for fixed mobile callers.

Small Cell "Mesh" Deployment

An Aer Wireless network uses MagiNet™ Data Pipelines in a series of small hops where the locations are strategically selected and placed to distribute the data from central locations. These Data Pipelines carry multiple signals in multiple directions, intelligently choosing the best routes that will

avoid obstacles and interference with other Data Pipelines. The data automatically transfers on and off both wired and wireless connections to maximize efficiency. As a result, our networks provide Superior Speed & Reliability, Truly Unlimited Data and Cost Savings directly to our customers as follows:

Economic Value

- ✓ **Fast installation**, more reliable broadband services at a fraction of the cost of traditional infrastructure networks.

Sustainability

- ✓ Full Range: Will work with clean energy such as solar power using 8-11.5 panels due to low power consumption.

Product Obsolescence

- ✓ **Quad Play:** Bandwidth & capacity to support future demands in Broadband Internet Access, TV, Phone and Wireless services provisions

Inimitability

- ✓ Exclusive proprietary technology and more reliable than current technology including other mesh technologies. The technology is patented and copyrighted

Easy Low Cost Installation

- ✓ Easily deployable: low skill to install, connect/interconnect to any type of Internet; 2-5 weeks to deploy average network
- ✓ Very basic, low skilled labor needed to maintain network

High Barriers to Entry

- ✓ Technology is patented and copyrighted.
- ✓ Know-how of code creation
- ✓ Cannot be reversed engineered

Network Resilience

- ✓ High Capacity: adaptable & scalable with usage
- ✓ More Coverage: ability to access behind & around obstacles. Reach 100% of users. Network will withstand storms, and if damaged can rapidly deploy replacement units

Technological Advantage

- ✓ Seamless, high speed Internet connectivity everywhere via multi-hop Ad-hoc network
- ✓ Public Safety: ability for Law Enforcement & other first responders to access more multimedia connections and more reliably.
- ✓ Perfect for IoT, automated transportation, telemedicine and next generation and smart city applications.

This ability allows us to build a network anywhere to cover any geographic area. Our networks can span across a farm, a city or an entire island, county or country, without dead spots or the degradation in signal and quality that you see with 3G, 4G and 5G mobile networks, as well as fixed wireless networks.

No other provider can deliver a truly ubiquitous network, with faster speeds (up to 400 Mbps asymmetrically) or promise truly unlimited data. Delivery is available at a fraction of the cost of traditional internet service provider networks resulting in installation times that are measured in just days, weeks or months; not years

CONFLICT OF INTEREST DECLARATION

Aer Wireless declares that it does not have any conflicts of interest pursuant to The Virginia State and Local Government Conflict of Interest Act, Chapter 31 (§ 2.2-3100 et seq.) of Title 2.2.

PERSONNEL

AER Wireless commits to ensuring the following personnel are in place for the duration of the project design and deployment. Aer Wireless will also bring additional personnel onboard as determined.

KEITH WALKER, FOUNDER/CEO & CTO

Now in his third decade in the telecom, technology and wireless industry, Keith Walker's multifaceted skill set encompasses the planning, design, and deployment of telecom, data networking, wireless and call-centers, and informs his keen insight in the technology, telecom and wireless sectors. Mr. Walker spent his formative years honing his technical skills at GTE/GTEL (Verizon), AT&T, SBC, Sprint, MCI and Lucent Technologies, and played a significant role at Gric Communications (Silicon Valley) prior to and after the company's IPO.

Mr. Walker is a veteran of the United States Army 82nd Airborne Division and is the recipient of numerous military awards, including the coveted Company, Battalion, Brigade and Post Soldier of the Month and Runner-up Post Soldier of the Year award (Fort Belvoir). He also received two Congressional nominations to the U.S Military Academy at West Point. Mr. Walker is a graduate of Occidental College, California, where he earned a Bachelor of Arts degree in Diplomacy & World Affairs with an emphasis on East Asia. He went on to attend Claremont Graduate School, Peter F. Drucker Center for Management, and attended Taft University Law School completing his first year before being lured back into the tech sector.

CHARMAINE WHITE, CFO/MANAGING MEMBER

Charmaine White began her Wall Street career at Merrill Lynch, International Credit Department, first as a Commercial Paper Policy Coordinator and later as a Credit Analyst/Systems Specialist. In these capacities, she was introduced to the intricacies of the international financial markets. She went on to work at J.P. Morgan Chase in New York, as an Associate – Global Investment Banker, providing financial advice to large multinational clients in a broad range of industries. Her duties and responsibilities were in depth and ranged across the spectrum of financial analysis. As an Associate at J.P. Morgan Chase, she worked on the Global Derivative and Foreign Exchange Desk where she structured and traded derivatives and currencies. In the Mergers and Acquisitions group, Ms. White performed both quantitative and qualitative analysis to value businesses and transactions. As a member of the Latin America Multinational Group, she created and marketed financial solutions, as well as provided economic and political analysis, on the Latin American countries to large multinational corporations. In her stint on the Global Syndication Group, Ms. White managed the analysis and the process for the largest and only successful financing (US$550MM) to a Latin American country during that region's "currency contagion."

Moving to Springfield, Mass., with her family in 2001, she started and served as Principal Partner and Property Manager for Caadstone Property Management, with properties located in both New York City and Massachusetts. In 2008 Ms. White joined the New Leadership Charter School and became its Chief Executive Officer with the mandate of returning the institution to financially viability. Within a few short months, she curbed the deficit spending of the school, bringing it to a place of financial stability for the first time in its history. In 2013 the school was reabsorbed into the public school district and Ms. White, with this transition, expanded her real estate and property management business.

Currently, she serves as Chief Financial Officer for Aer Wireless, working with the team to provide broadband internet service to the underserved populations of rural America.

Ms. White holds the distinction of being the first student in Amherst College history to receive a Bachelor of Arts with a triple major in English, Economics and Political Science. She earned an MBA in International Marketing and Finance from Duke University's Fuqua School of Business Administration.

CRAIG MOORE, VP, GLOBAL HUMAN RESOURCES

Mr. Moore is responsible for overseeing all aspects of human resources strategy and execution and organizational planning and development for Aer Wireless. In addition, Mr. Moore oversees certain administrative functions for the company.

Prior to joining Aer Wireless, Mr. Moore spent more than 20 years in various executive-level human resources roles in multiple industries. Specifically in the telecommunications space while at TelePacific Communications, Mr. Moore led his region's planning, recruiting, training and retention for more than 500 employees in various areas within the United States.

Mr. Moore graduated from California State University, Fullerton with a Bachelor of Science in Criminal Justice. He is a veteran of the United States Navy, having served his country in the first Persian Gulf War

14, MAGE NETWORKS, INC.

PROJECT ROLE: Network Design Support and Technology Provider

DESCRIPTION OF BUSINESS

- ✓ Last mile; sparsely or remotely populated areas
- ✓ Non-line-of-sight areas (behind hills, through trees)
- ✓ Installations awaiting fiber — interim wireless high-speed service
- ✓ Seamless outdoor Wi-Fi in select areas
- ✓ Emergency response portable Wi-Fi

While Mage Networks Inc. was founded in July 2017, their team has a long history and many accomplishments in the wireless networking field. The underlying principles of their technology came from 3G and 4G Network patents for cellular data in which Founder Dr. Sayed El-Hamamsy, a holder of over 40 patents himself and former CEO of WiLan, was involved. Mage Networks brought together Dr. El-Hamamsy's "dream team" of core engineers from his many years in telecommunications, and the result has been the ground-breaking MagiNet™ network – a proprietary networking firmware that allows mesh to behave in a whole new way.

Mage's proprietary firmware allows high-speed broadband that creates "data pipelines" with short hops (1 - 3km) at low elevation (2-5m). These data pipelines maintain speed (50 Mbps up or down) over multiple hops (25 hops proven in field tests), and can tackle difficult terrain like hills and trees very well since they only need sight lines between a single hop at a time. By selling this "firmware-enhanced hardware" as easy, pre-designed and pre-configured networks, Mage ensures extremely fast deployment; in fact networks can be created in minutes or hours.

Although Mage today has a small team of engineers and marketing personnel based in Calgary, Alberta, it has immediate plans to open an office in the United States. Aer Wireless has been a key relationship for Mage since 2016, with both companies' founders working together to test markets and cooperate on business opportunities.

For the Amelia and Dinwiddie Counties Broadband Expansion, Mage Networks will also partner with Taylor Warwick Consulting; a recognized expert in the design and development of municipality-based broadband networks.

Taylor Warwick is focused on positively impacting the telecommunications environment in Canada and leveraging broadband ICT to strengthen Canadian capabilities in research, innovation, and entrepreneurship. With its unique blend of academic and applied innovation experience and business acumen, economic models, and engineering capabilities, Taylor Warwick has become a leading consultancy dedicated to helping clients develop, deploy, and operate world class ICT infrastructure and service sets to their developments and municipalities. In so doing, Taylor Warwick not only enables clients to optimize economic development opportunities, but to compete with the best in class, anywhere in the world.

Together, Taylor Warwick and the Olds Institute for Community & Regional Development (OICRD) successfully established the first and to date, only, sustainable community-based fiber-to-the-premise (FTTP) network in Canada: O-NET now offers every resident and business in Olds, Alberta, Gb/s services and a complete triple-play services portfolio. More importantly, the availability of the O-Net triple-play services portfolio to any community in Western Canada significantly reduces the risk to any community considering community fiber deployment on a utility basis. O-Net, in essence, changes the game.

Taylor Warwick recently completed a regional broadband strategy for the Calgary Regional Partnership — a regional economic development alliance encompassing three cities, twelve towns, eight villages, and four municipal districts. All recommendations were unanimously endorsed by their Board in September, 2016 and follow-up work is now underway at both the sub-regional and municipal levels.

Taylor Warwick also undertook an extensive program for the consortium of the five Northern Alberta Regional Economic Development Associations (REDAs) and the Northern Alberta Development Commission (NADC) developing options, strategies, together with sample designs and financials for regions that together spanned all of the Northern Alberta. These studies are available on the NADC website at http://www.nadc.gov.ab.ca/our-actions/initiatives/broadband-preparedness-project/.

Over the past four years, Taylor Warwick completed comprehensive regional broadband strategies for ten of the eleven Regional Economic Development Alliances (REDAs) in Alberta and worked with all eleven.

Craig Dobson heads up Taylor Warwick and his bio is included in the Project Personnel section below.

15. KEY PERSONNEL

AMELIA AND DINWIDDIE COUNTIES' BROADBAND EXPANSION PROJECT PERSONNEL TEAM

The Consortium commits to ensuring the following personnel are in place for the duration of the project design and deployment and will also bring additional personnel onboard as required.

DR. SAYED-AMR (SISSO) EL-HAMAMSY, CEO, Mage Networks Inc.
Chief Network Design Expert and Technical Advisor

One might expect that a man with 46 patents would be purely research-driven and not necessarily business-oriented. But Dr. Sayed-Amr (Sisso, pronounced SEE-so) El-Hamamsy's innovations have been so ground-breaking and fought-over in the technology world, that he has experienced every facet of business as well. After 15 years in Research & Development with General Electric, Sisso found his inner entrepreneur, and ventured out to develop private and public companies (most notably WiLAN – now with over 10,000 patents licensed around the globe), raise millions of dollars, arrange licenses to Fortune 100 Companies, and hire and manage hundreds of people. He also experienced the difficult sides of business: tech-bubble bursts, aggressive law suits to protect patents, partnership conflicts and bankruptcy, nonetheless emerging with a hard-won reputation for honesty, and fortunately, his health! Now with over 30 years in the technology sector, and as the CEO and President of Mage Networks, Dr. El-Hamamsy balances wise skepticism with still-passionate optimism as to exactly what he needs to do to drive Mage Networks toward global leadership in the wireless internet technology sector.

DR. AHMED N. ZAKI, Chief Network Engineer

Dr. Ahmed Zaki is, in the words of Dr. El-Hamamsy, "One of the best software engineers I have ever worked with, and that includes hundreds of engineers." Dr. Zaki is meticulous, follows rigorous procedures, has a deep understanding of wireless embedded firmware, and refuses kludge solutions as he strives to address root causes of any problem he encounters. Dr. Zaki earned a Bachelor of Science and Master of Science from Cairo University, Egypt in 2000 and 2005, respectively, and his PhD from the University of Calgary in 2010, all in Electrical and Computer Engineering. During the period from 2004 to 2005, Dr. Zaki worked with SysDSoft Inc. (Egypt) as a software engineer for embedded wireless telecommunications systems. In this capacity, he worked on the design and development of several wireless standards including WiMAX (IEEE 802.16) and CDMA EV-DO. From 2006 to 2010, Dr. Zaki pursued a PhD at the University of Calgary. His research focused on innovative radio resource management algorithms for 4G and LTE-Advanced telecommunications systems. Dr. Zaki is active in the development of many wireless communication and networking protocols for embedded systems. He and Dr. El-Hamamsy have worked together for over eight years in various companies, including SRD and Quattro Innovations.

DR. AMMAR AL MASRI, Telecommunications Software Developer

Network Design, Installation & Training

Dr. Ammar Al Masri is a dedicated, innovative wireless communications engineer with over 10 years of experience in wireless communications. Dr. Al Masri is an analytical professional specializing in wireless system modeling and system testing automation. He's a team-oriented leader skilled in managing complex projects in various environments.

Dr. Al Masri received his B.Sc. from Damascus University, Syria in 2007 in Electronics and Telecommunications Engineering. Dr. Al Masri received his M.Sc. and Ph.D. in Electrical and

Computer Engineering from the University of Calgary, AB, Canada in 2011 and 2016 respectively. His Master's degree research focused on innovative mobility management algorithms for VoIP services within heterogeneous wireless networks. Dr. Al Masri's current focus is the development of cutting edge mobility-aware traffic offloading algorithms in heterogeneous wireless networks. From 2016 to 2017, Dr. Al Masri worked at SAIT as a telecommunications researcher. He developed and automated test plans for various wireless communications protocols operating in Linux-based environment. He joined Mage Networks as a telecommunications software developer in April 2017, where he was a key developer of MagiLink™ firmware.

JACQUELINE DREW, VP Marketing, Mage Networks Inc.
Client Relations, Public Relations Support

Jacqueline Drew is one of Canada's most diverse and experienced marketing strategists and is proud to be in a consulting role as Mage Networks' VP of Marketing. Since founding her consulting practice, Tenato Strategy, Inc. in 1996, Ms. Drew has advised hundreds of businesses and non-profits in a vast array of industries. She has served on several boards and industry associations and was also a regular business columnist on Canada's national radio station, CBC, for four years. Ms. Drew and her team at Tenato spearheaded the development of Mage's business plan. What makes Ms. Drew unique as a marketing expert is that she understands both the strategic and tactical aspects of marketing. She has built a diverse marketing firm from the ground up, with capabilities that include market research, strategic planning, creative development, web development, online marketing, public relations, social media, sales training, sales management and more.

Ms. Drew holds a B. Comm, and MBA from the Haskayne School of Business, University of Calgary.

SCOTT EDEN, Independent Consultant
Network Design, Deployment and Infrastructure Integration

Scott A. Eden is an Information Systems professional with over 20 years of network infrastructure, wireless, and corporate management experience. He brings a perspective from a wide variety of companies and industries ranging from oil & gas to telecommunications to educational institutions. Mr. Eden has led Global IT and Wireless Operations for several multi-national companies, successfully designed and implemented large terrestrial wireless solutions, created the infrastructure to support over 2500 VSAT nodes, and successfully implemented the Systrus and CoBIT Lite governance models to meet regulatory guidelines.

As an active volunteer, serving on various committees and boards, Mr. Eden also holds an MBA from the Haskayne School of Business and a Bachelor of Science from Santa Clara University in California. He currently serves as the Chair of the Board of Directors for the Trico Centre for Family Wellness.

CRAIG DOBSON, Taylor Warwick Consulting, Principal

Craig Dobson has over 35 years of professional experience in the information and communications technology (ICT) industry, specializing in research, strategic technology, and business development. In his role as principal of Taylor Warwick, he provides unbiased guidance, strategies, and solutions to help developers, communities, telecom providers, and governments plan, finance, build, and operate broadband copper, fiber, and wireless networks for telecom, develop the partnerships they require to deploy services and manage on-going operations, and accrue the knowledge they need to support and capitalize on their broadband deployments.

Under contract to a national incumbent, Mr. Dobson provided an in-depth economic evaluation of five copper and fiber-based broadband access deployment scenarios for major regions of Canada. Mr. Dobson has provided executive leadership together with strategic, technology, and business planning services to TELUS, Bell Canada, TRLabs, the Agile All Photonics Network consortium, Western Economic Development Canada, Alberta Innovation and Science, and several start-up companies. As lead Strategist, Mr. Dobson completed a Global ICT Environmental Scan for TRLabs and Alberta Advanced Education and Technology (AET) in late 2009.

Mr. Dobson is a professional engineer and holds Master's degrees in both Science and Business Administration from Queen's University in Kingston. He is a Founding Director of Olds Fibre Limited and Principal of Taylor Warwick Consulting Limited.

16. REFERENCES

ENTITY	**Mage Networks & Aer Wireless - ZiPhi**	**Mage Network &. Aer Wireless- Phyir Wireless Ltd. (Cayman Islands)**
PROJECT TITLE	ZiPhi Proof of Concept & Full Country Deployment	Full Island Wide Deployment
SUMMARY	Proof of Concept was deployed in Ghana, and the network will be built out to cover the entire several cities. The network will be expanded and other elements consisting with the Aer Wireless Network core will be added that will look like the proposed network.	Deployment of Wireless Broadband network initially offering Wi-Fi access to tourist, and phased in full broadband wireless full wireless network similar to Amelia and Dinwiddie Counties (MagiNet™ , Fiber & wireless backhaul) for all three islands
DATES	June 2, 2019	June, 2019
CONTACT NAME	Dr. David Noye	Allen Bernardo
TELEPHONE NUMBER	404-717-3559	Cayman- 345-926-1223
EMAIL	drdanoye@gmail.com	allen.bernardo@harmonic.ky

ENTITY	**Mage Networks**	**Mage Networks**
PROJECT TITLE	Town of Taber, Alberta - Downtown WiliI Network	Christ the Redeemer School Division, Alberta – Terrestrial WAN Connection
SUMMARY	Mage Networks installed a seamless Wi-Fi network in the town of Taber, Alberta. This involved starting at the town office where a fiber Ethernet port was provided by the town, and hopping (8 hops) a data pipeline throughout downtown. Wireless areas were overlapped on the same network to provide seamless public Wi-Fi access throughout. Deployment took only 2 days, and today provides 50 Mbps up or download speeds; users can travel throughout the town without losing a Wi-Fi signal. Signal penetration also allows free Wi-Fi inside many businesses and cafes, attracting retail traffic.	Scott Eden and team created a wireless Wide-Area-Network (WAN) that connected 4 schools and the division office over a distance of over 28 kilometers. Working with Navigation Canada and the local municipalities, a freestanding 150-foot tower was erected on a hill between the towns of High River, Alberta, and Okotoks, Alberta. Smaller masts and towers were erected at each of the sites. Each site then connected with the tower via point-to-point connections. At the tower, the signals were amalgamated into a central switch responsible for routing and managing all data traffic. The largest challenge involved the creative use of signal frequencies and signal polarization to reduce interference at the central tower. The project was completed in July and August, in time for the start of the school year in September. The Wi-Fi solution enabled all schools within the division to be a component of a larger network. Perhaps more importantly, the connectivity brought the high-speed Internet connectivity to remote offices which, prior to this project, were limited to dial-up modem speeds.
DATES	Designed and Installed April, 2017. Currently Active	July/August, 1997
CONTACT NAME	Cory Armfelt, Chief Administrative Officer	David Clark
TELEPHONE NUMBER	403.223.5500 ext. 5523	403.938.2659
EMAIL	cory.armfelt@taber.ca	dclark@redeemer.ab.ca

ENTITY	**Taylor Warwick**	**Taylor Warwick**
PROJECT TITLE	Olds Institute for Community & Regional Development (OICRD)	Calgary Regional Partnership
SUMMARY	The Technology Committee of the OICRD saw the development of the Olds Connected Community Network as a key foundation for future economic development within Olds and the surrounding region. After a decade of intensive effort, three years of coordination and regulatory work by e-Commerce services and five years of on-going coordination and guidance by Taylor Warwick, in July, 2013, Olds became the first municipal fiber network in Canada with gigabit per second internet, voice, and IPTV services to very home and business in the community. **Services Provided:** Taylor Warwick undertook an extensive review of the available architectural, structural, and operational alternatives, resulting in the creation of a two-entity structure. Ownership and operations of the passive dark fiber infrastructure became the responsibility of the OICRD and a for-profit entity branded O-NET was established to light and operate the network and develop and run a full slate of triple play services. The overall blueprint for the operation was provided by the financial models and Business Plan developed by Taylor Warwick.	The Calgary Regional Partnership (CRP), in collaboration with local municipalities, Provincial staff and partner organizations in the Calgary Region sought to explore a range of very high speed (gigabit) broadband opportunities, needs, benefits and strategic approaches relevant to the Calgary Region and local municipalities within it. **Services Provided:** Taylor Warwick undertook a program of research, consultation, analysis, strategy-making, engagement and the development of options and proposals related to the extension and enhancement of broadband/digital connectivity networks and services to each and all municipalities within the Calgary Regional Partnership area (the Region), including an examination of strategic opportunities and implementation options for the region as a whole.
DATES	February, 2010 – March, 2011: Capital Structure; April, 2011 – July, 2012: Network and Services Development; August, 2012 – present – Member of the Technology Committee, OICRD (Volunteer) and Member of the Board, O-Net (Volunteer)	September 2015 – February 2018
CONTACT NAME	Joe Gustafson, Chair – OICRD Technology Committee and Chair Olds Fibre Limited (O-Net)	Bob Miller, Retired – Economic Prosperity Lead and Manager Calgary Economic Development Alliance (REDA) Calgary Regional Partnership
TELEPHONE NUMBER	403.556.0415	403-971-5938
EMAIL	joe.gustafson@O-Net.ca	curlymiller5@gmail.com

ENTITY	**Taylor Warwick**
PROJECT TITLE	Northern Alberta Broadband Project
SUMMARY	Realizing that advancing a robust, diversified economy in northern Alberta is highly dependent on having the necessary infrastructure in place to access markets, reduce cost of service delivery, and enhance the quality of life, with the support of Alberta Economic Development and Trade (EDT) and led by Alberta HUB, the Northern Alberta Development Council (NADC) together with the five Regional Economic Development Alliances (REDAs) spanning northern Alberta partnered to undertake this *Northern Alberta Broadband Preparedness Project*. The study was initiated to quantitatively evaluate the options available to enhance broadband infrastructure within the northern Alberta study area's 32 municipal districts and counties, 2 cities, 35 towns, 23 villages, 24 summer villages, 154 hamlets, 33 First Nations and 8 Métis settlements with a total of 456,811 residents in the study area. Services Provided: Taylor Warwick proceeded in four phases to complete this work: (1) Established the current state for each municipality, county, MD, First Nations Community, and Métis Settlement within the region. (2) Established the desired state for each of these communities. (3) Via a Gap Analysis, identified options & opportunities available to realize the desired state, estimated the related capital requirements, and used the results to inform the development of a regional broadband strategy. Based on the agreed upon strategy, for those areas most interested in moving forwarded, developed preliminary Business Cases on which further work, such as that proposed here for Big Lakes, could move forward.
DATES	September 2016 – August 2017
CONTACT NAME	Bob Bezpalko, Executive Director, Alberta HUB
TELEPHONE NUMBER	780.645.1155
EMAIL	bobbezpalko@albertahub.com

*CAS Commonwealth of Virginia Ref*erences

ENTITY	County of Powhatan	County of Culpeper	Spotsylvania County
PROJECT TITLE	Network Assessment	e911 Infrastructure Modernization	Network Development Projects
SUMMARY	Conducted an enterprise wide assessment of the County's primary data network. The recommended development of modern fiber WAN. The County has started that effort, and CAS continues to assist in consult and build out of the next generation network.	Designed and developed a modern, high performing hyper converged infrastructure with associated networking for a shared platform at e911/Dispatch between the Town and County of Culpeper.	Continually work with the County IS team for network related projects, from switch improvement to modernized infrastructure to support their CAD platform for Public Safety, to building out and modernizing their datacenter, and improvements on the secure video network for the Courts.
DATES	April, 2019 to Present	July, 2019	April, 2017 to Present
CONTACT NAME	John Wood	Thomas McKnight	Greg Hoskins
TELEPHONE NUMBER	804.598.1216	540.829.5501	504.507.7986
EMAIL	jwood@powhatanva.gov	tmcknight@culpeperva.gov	ghoskins@spotsylvania.va.us

17. SERVICE RESPONSIBILITIES/PARTNERSHIP PROFILES AND ROLES

ARADIAL TECHNOLOGIES

Project Role: Network Design Support and Technology Provider

- ✓ Provide AAA security
- ✓ Advanced billing for IP services for Aer Wireless
- ✓ Self Care — optional
- ✓ Captive portal — optional

DESCRIPTION OF BUSINESS

Established in 1997, Aradial is a leading provider of scalable and reliable billing, AAA, PCRF and ISP platforms for Wi-Fi, ISP (xDSL/FTTH), Mobile 3G and LTE, WiMAX and VoIP. It ensures operators can easily manage data services with advanced functions for authentication, policy control and charging.

The solution provides: AAA, CRM and customer care, real-time charging and policy control, automatic invoicing and provisioning for operators offering Data, Voice, Video, and Content. Aradial has become a leader for Public Wi-Fi and Wi-Fi offload in large-scale deployments with 800+ operators in more than 70 countries.

Aradial RADIUS server and Aradial Billing Software have been servicing ISPs since 1997. High-end ISPs with millions of subscribers and smaller providers can easily integrate Aradial into their IT and Network infrastructures.

Aradial offers products that open a whole new set of possibilities for broadband ISPs, Hotspots, LTE, WiMAX, VoIP, ASPs, Wireless LAN and Mobile Operators.

Aradial's customers and partners include some of the world's largest corporations, institutions, telecommunications carriers, billing companies and internet service providers.

- ✓ Designer and provider of Billing, AAA, PCRF and ISP platforms
- ✓ Policy control servers for IP services
- ✓ Targets multiple vertical markets, primarily ISP, ADSL, WiMAX, wireless LAN, VoIP, Cable/MSO and mobile
- ✓ Experienced personnel from top networking and billing companies
- ✓ Private, self-funded, profitable

Aradial provides:

- ✓ Carrier grade RADIUS server / AAA
- ✓ Carrier grade DIAMETER server — optional
- ✓ Telecom Convergent Billing Software
- ✓ Converged Prepaid and Postpaid Billing Software
- ✓ Aradial PCRF based on RADIUS or DIAMETER — optional
- ✓ Aradial Policy Controller - PCRF - QoS controller — optional
- ✓ Advanced Portal and Self Care
- ✓ Tiered role-based administration
- ✓ Prepaid Cards

- ✓ VoIP Calling Cards
- ✓ Refillable top-up voucher cards to refill existing user account
- ✓ Credit Card Payments System
- ✓ VoIP Interconnect System
- ✓ WiMAX CSN
- ✓ LTE compliancy
- ✓ IPv6 support

Aradial software benefits are:

- ✓ Easy installation
- ✓ Easy implementation
- ✓ Easy to operate
- ✓ Easy to customize
- ✓ Full compliance to standards and devices
- ✓ High performance
- ✓ High Availability and reliability
- ✓ Scalability

PROJECT PERSONNEL FOR AMELIA AND DINWIDDIE COUNTIES' BROADBAND EXPANSION

YISHAI LEVANONI, CTO: Project Implementation

Yishay Levanoni brings 30 years of extensive experience in software development and design of complex and scalable IT products. From 2008 until today, Mr. Levanoni serves as Co-founder and CTO of Aradial Technologies, leading its technical team in developing leading AAA, realtime billing and PCRF products, which were sold to over 500 customers worldwide. From 2002 to 2008, Mr. Levanoni served as chief architect for Amdocs Billing product, leading a group of architect/designers in shaping the architecture and design of the Amdocs flagship product. From 1997 to 2002, served as co-founder and CTO of Extent Technologies, which developed a realtime Billing product to the wireless market. Extent's technology was sold to Formula Telecom Solution (FTS) and is now used as its next-generation product. Mr. Levanoni served in an Israeli Defense Forces Intelligence unit as a team leader for realtime intelligence software.

Mr. Levanoni received his Bachelor of Arts (summa cum laude) in Computer Science from the Technion and his Master of Science in Computer Science (cum laude) from Tel-Aviv University.

MOTI ALPEROVICH, Senior Team Leader

Moti Alperovich brings more than 25 years of experience in Developing AAA, policy control and billing systems and has worked with in top billing vendors like Amdocs. Additionally, Mr. Alperovich has worked in senior software development in Amdocs including development of the Amdocs core billing software (mostly with C++). He has also spent time in senior software development at Extent Technologies (mostly in C++).

Mr. Alperovich's first degree is in Computer Science, and following his extensive work experience he joined Aradial in 2003. Mr. Alperovich will lead the team of developers and implementation for Aer Wireless design and implementation component for Amelia and Dinwiddie Counties' Broadband Expansion. Mr. Alperovich brings the following skills and expertise to the team:

- ✓ AAA and Policy control advanced development expert

- ✓ Billing development expert
- ✓ AAA application Protocols: RADIUS, Diameter
- ✓ Wide experience in C++ programming, applications that involve Multithreading, Database, Web, network protocols, XML and C/S
- ✓ Experience on working within several platforms: Windows / Linux/ SunOs / HP
- ✓ Experience with working with Databases: Oracle, MS SQL, MySQL

SHARON SHECHTER, Senior Software Engineer

Sharon Shechter is an AAA and Policy control advanced development expert and billing development expert. Additionally, Sharon brings the following skills to the team:

- ✓ AAA application Protocols: RADIUS, Diameter
- ✓ Wide experience in C++ programming, application that involve Multithreading, Database, Web, network protocols, XML and C/S
- ✓ Java programming
- ✓ HTML development
- ✓ Experience on working within several platforms: Windows / Linux/ SunOs / HP
- ✓ Experience with working with Databases: Oracle, MS SQL, MySQL

REFERENCES

ARADIAL	
PROJECT TITLE	**Kurdistan Net**
SUMMARY	This ISP has more than 100,000 subscribers, and the Aradial license is for 100,000 concurrent sessions. Kurdistan Net utilizes Aradial's AAA, PCRF and billing products. Kurdistan Net reports that Aradial's excellent work and support has been a major factor in their successful launch of ISP/FTTH/Wi-Fi services and the growth of their business.
DATES	June 2016 – Ongoing
CONTACT NAME	Karwan T. Mohammed, Procurement Manager
TELEPHONE NUMBER	+964 750777-2222
EMAIL	karwan.talaat@o3-telecom.com
PROJECT TITLE	**Newroz Telecom**
SUMMARY	Newroz Telecom utilizes Aradial's AAA, PCRF and billing products. This Iraqi ISP has been especially pleased by Aradial's software performance, stability, professional services and excellent support. They describe Aradial as a solid and reliable supplier and experts in their field.
DATES	October 2014 – Ongoing
CONTACT NAME	Kamaran Gharib Ibrahim, IN Manager
TELEPHONE NUMBER	+964 750-451-1403
EMAIL	kamaran.gharib@newroztelecom.com
PROJECT TITLE	**Bezek International**
SUMMARY	Bezek International is an ISP in Israel that utilizes AAA products and network configuration for more than 1,000,000 concurrent connected subscribers. They report satisfaction with Aradial's technologies and support from the initial installation and implementation phase through Bezek International's changes and developments.
DATES	2012 – Ongoing

CONTACT NAME	Moshe Barelia, Head of Core Networks Engineering Department
TELEPHONE NUMBER	+ 972 3.6264570
EMAIL	Kobi.Golan@bezeq.co.il
PROJECT TITLE	**Sierra Wireless**
SUMMARY	Sierra Wireless is an IoT service provider based in Vancouver, Canada with more than 700,000 serviced subscribers and concurrent sessions. They report that Aradial has been providing their business with excellent support in the areas of RADIUS, billing services and network configuration. Sierra Wireless also reports that Aradial has been a major factor in their successful launch of wireless services.
DATES	February 2007 – Ongoing
CONTACT NAME	Didier Lahay, Director of Product Management, Cloud and Connectivity Services Business Unit
TELEPHONE NUMBER	Provided upon request
EMAIL	Provided upon request
PROJECT TITLE	**Interstate Telecommunications, Inc.**
SUMMARY	Interstate Telecommunications, Inc. is an IoT service provider based in Atlanta, GA with over 150,000 serviced subscribers and locations where the Aradial system is used. They report that Aradial has provided their business with excellent support in the areas of AAA, billing services and network configuration, and that they have been an influential factor in their successful launch of ISP/Wi-Fi services.
DATES	2013 – Ongoing
CONTACT NAME	Frank T. Zimmer, President
TELEPHONE NUMBER	770-781-4787
EMAIL	XXfrank@iti-ga.com

Please contact Yishai Levanoni at Yishai@aradial.com for contact information for the following additional references.

PROJECT TITLE	**CITY OF HOUSTON – USA**
SUMMARY	AAA installation for City of Houston municipality – WiMAX deployment.
PROJECT TITLE	**NASA – USA**
SUMMARY	Supporting the new Aeromacs for airports' labs.
PROJECT TITLE	**SEASIDE – USA**
SUMMARY	AAA installation for LTE and Wi-Fi for a WISP. Member of WISPA.
PROJECT TITLE	**RANCH WI-FI – USA**
SUMMARY	AAA and Billing installation for California-based WISP. Member of WISPA.
PROJECT TITLE	**DHI WIRELESS – USA**
SUMMARY	AAA and Billing installation.
PROJECT TITLE	**MTN UGANDA**
SUMMARY	Deployment of end to end Wi-Fi for Mobile operator including integration with their network for 3G offloading. The deployment is with Alvarion/Wavion and using MikroTik access controllers. Integration with Ericsson Voucher management system and Huawei IN.
PROJECT TITLE	**MTN RAUNDA**
SUMMARY	Deployment of end-to-end Wi-Fi for Mobile operator with Wavion/Alvarion servicing millions of users, including integration with their network for 3G

	offloading. Performed integration with Ericsson IN using RADIUS interface. Working for the past 4 years.
PROJECT TITLE	**DEKAL TELECOM**
SUMMARY	250,000 Wi-Fi subscribers in Jamaica with Altai networks using MikroTik OS controllers. Full Prepaid and Postpaid billing.
PROJECT TITLE	**PALAUNET – PALAU**
SUMMARY	Deployment of Wi-Fi and ADSL billing, replacing existing billing system. The postpaid remain in the legacy billing and ARCB is sending CDR files.
PROJECT TITLE	**BEZEQ ISRAEL**
SUMMARY	Dial-up, DSL, WiMAX, Wi-Fi and VoIP provider. 2,000,000 users and concurrent sessions. Wi-Fi deployed and ADSL in deployment.
PROJECT TITLE	**SAFARICOM KENYA**
SUMMARY	WiMAX services in a GEO redundant system for 20,000 subscribers.
PROJECT TITLE	**ORNAGE SENEGAL**
SUMMARY	270,000 Mobile, ADSL and Wi-Fi users licenses.
PROJECT TITLE	**TELRAD - LTE & WIMAX**
SUMMARY	Multiple end-to-end LTE deployments with Telrad including Wi-Fi.

Aradial has also installed over 500 hotspots/ billing systems worldwide:

- ✓ MTN Uganda – Wavion/Alvarion
- ✓ MTN Rwanda – Wavion/Alvarion
- ✓ Interstate USA
- ✓ Bell Aliant Canada
- ✓ Sealink Denmark
- ✓ Enter Point USA
- ✓ O'Fallon Wireless USA
- ✓ CSD Internet Ltd. UK
- ✓ Easy Kiosk - Australia
- ✓ PTK – Aruba networks
- ✓ Kewiko – Ruckus
- ✓ Jamaica Telecom - Altai
- ✓ Saudi Telecom - Altai
- ✓ Angola Telecom - Inspair
- ✓ Namibia Telecom -Nomadix
- ✓ BSNL – India - Nomadix
- ✓ MyPort Australia
- ✓ Paamul MX– Motorola + MTK
- ✓ SmartLink KW –Nomadix

CONFLICT OF INTEREST DECLARATION

Yoet Ltd., also known as Aradial Technologies, declares that it does not have any conflicts of interest pursuant to The Virginia State and

DIGITALK

Project Role: To make available to Aer Wireless the Consumer Cloud Service and the Carrier Cloud Service platforms

DESCRIPTION OF BUSINESS

Digitalk is an agile, experienced provider of innovative, cloud-based real-time communications platform-as-a-service solutions. Digitalk has been responsible for the delivery of hundreds of solutions globally, supporting billions of sessions each year. Their proven expertise, innovation and scale will allow Aer Wireless to successfully evolve and grow as customer demands change.

Digitalk will provide both the consumer and carrier VoIP platform that will deliver both the residential and commercial VoIP services, as well as the Carrier Cloud services that will act as the source for additional revenue generation through the termination calls from off-network providers seeking to terminate calls from other carriers. Digitalk will send CDRs to the billing platform of the SAP engine that will then use the CDRs to create the customer bills.

PROJECT PERSONNEL FOR AMELIA AND DINWIDDIE COUNTIES' BROADBAND EXPANSION

GIOVANNI TESAURO, CTO, VP Sales, Southern Europe and the Americas

Giovanni Tesauro has found success in one of the most competitive and rapidly changing marketplaces in Europe. In his career, he has always found himself having direct responsibility for customer satisfaction and commercial results.

His areas of expertise include:

- ✓ Strong customer orientation
- ✓ Business development and sales management
- ✓ A broad knowledge of TLC/ICT market, both fixed and mobile; familiar with the NFV/SaaS shift
- ✓ Consolidating his international experience with his unique contacts network in Europe, Latin America and United States
- ✓ Mature technical background
- ✓ Deep bid management experience
- ✓ Experience in start-up companies
- ✓ Experience in intercompany relationships and agreements
- ✓ Multilingual

PAUL BASSA, EVP Mobile Cloud

Paul Bassa has an extensive background in the telecom industry, working with both operators and vendors in a range of senior technical, consultancy and marketing roles to deliver innovative and successful products and solutions. His specialties are telecommunications product strategy and management. Prior to his current role, he was VP Product Marketing.

NATHAN COLMAN, VP Engineering

Nathan Colman manages the-day-to-day management of three teams developing value added services for the telecom market. Those teams comprise of a real time C/C++ development team, a .Net C# development team, and quality assurance. Mr. Colman reports directly to the CEO and

company owner. Responsibilities include overseeing all new product development, project management, staffing, and being part of the management team that focus and develops Digitalk's product strategy.

REFERENCES

To request references for the projects below, please contact Giovanni Tesauro, VP Sales, Southern Europe and the Americas; Giovanni.tesauro@digitalk.com; Phone: 646-924-4098.

DIGITALK	
PROJECT TITLE	**Broadband Telephony, Mobil VOIP**
SUMMARY	Dutch incumbent operator KPN provides both mobile and broadband services under its Telfort brand. As an ISP, Telfort can offer a full primary line residential IP telephony service to its customers. Telfort's previous solution, based on an open source platform, had many shortcomings in terms of features, reliability and scalability. In the absence of a suitable replacement solution, Telfort was unable to expand and its reputation in the market was being damaged. Digitalk's Broadband Telephony application was selected as a replacement solution to address Telfort's existing issues and provide the basis for future service and subscriber expansion. A staged process ensured a smooth transition to the new solution and the removal of the legacy platform. Telfort experienced an immediate increase in call success rates, followed by significant growth in total customer numbers and traffic volumes.
PROJECT TITLE	**Carrier Cloud Case Study**
SUMMARY	The customer wanted to reduce its equipment, training and support costs across its operations by consolidating its infrastructure on a single vendor platform for both retail consumer and wholesale carrier services. It also wanted to take full control of carrier routing and termination agreements and decisions, without limitations or penalties for using its preferred interconnects. Digitalk provided support for the customer's Carrier and Consumer requirements. Digitalk Carrier Cloud enables the customer both to take full control of its own carrier routing options and to offer international termination services to other operators and businesses. The service provider has fully achieved its ambition of consolidating all its wholesale and retail services. As a result, there is no longer a need to cross-train operations staff on different equipment or to engage with multiple vendors to address new service requirements, in turn reducing costs and speeding time to market for new requirements.

CONFLICT OF INTEREST DECLARATION

Digitalk declares that it does not have any conflicts of interest pursuant to The Virginia State and Local Government Conflict of Interest Act, Chapter 31 (§ 2.2-3100 et seq.) of Title 2.2

OVHCLOUD

PROJECT ROLE: Hyper-Scale Infrastructure-as-a-Service Cloud Provider for Aer Wireless
OVH Cloud will provide to Aer Wireless a cloud-based datacenter solution, delivered as Infrastructure as a Service (IaaS) to host their infrastructure and critical systems and platforms, built upon our Hosted Private Cloud offering at our Vint Hill, VA, datacenter in Fauquier County. The hosted solution will be built from scratch with no migration of existing resources necessary.

Please refer to Figure #1, Aer Wireless simplified Network Flowchart, Page 9, above and Figures #3, #4 and #5 Solution Design Diagrams, Pages 13-15, above.

OVH Hosted Private Cloud currently provides the full VMware SDDC Stack including vCenter, ESXi, NSX with available vROPs and vSphere Replication add-ons. VMware vCenter will be the focal point for all management of Hosts, Clusters, Networking, Resources and VMs. The entire stack from the datacenter to the hypervisor is tightly integrated at each layer. This infrastructure will consist of the following resources:

- ✓ Server hardware infrastructure inclusive of all compute (CPU/RAM), storage resources and server virtualization platform. 4 Host x 36c/72t, 2.3 Ghz, 768GB RAM, 24TB vSAN, vSphere Enterprise Plus 6.5
- ✓ Networking infrastructure internal to datacenter, including internal network security. 1.5Gbps, vRack
- ✓ Edge networking for internet and wide area integration including edge gateway security and VMware NSX Enterprise.
- ✓ Entry to OVH datacenter is through our network core protected by OVH's world-class Anti-DDOS. At the Aer Wireless's tenant, networking is built on NSX software defined networking to include dynamic routing, firewalling, micro-segmentation, load balancing, and NFV. This architecture allows for a defense in depth methodology.
- ✓ Cross connectivity and circuit integration between carriers at a predetermined point of presence in the Ashburn, VA Equinix datacenter to the OVH Vint Hill, VA datacenter via vRack Connect Easy.
- ✓ Management and administration of all OVH-provided resources.

OVH has partnered with Aer Wireless to design a flexible, cost-effective and secure IaaS cloud solutions that can rapidly scale to meet the demands of its business and customers across the United States and globally. This strategic partnership is one based on mutual trust and innovation, delivering disruptive technology that enables internet access everywhere.

DESCRIPTION OF BUSINESS

OVH was founded in 1999 as a web hosting provider and has since grown into a global Infrastructure as a Service (IaaS) company that focuses on helping organizations drive their growth. They are vertically integrated, and they have been building their own servers and datacenters since the early 2000s. OVH has been a pioneer of innovating technology solutions focused on delivering best-in-class technical expertise and cost-effective infrastructure since its inception.

Today, OVH is one of Europe's largest cloud companies, and 1.4 million customers worldwide rely on OVH services, and with our expansion into the U.S. market are quickly becoming a global leader

among cloud service providers. Their proprietary global fiber-optic network, green datacenters, continuous R&D, end-to-end supply chain management, and expert customer service all attest to the OVH difference. And because they maintain full control of the supply chain, they can provide the best products, with the best performance, at the best value for our customers.

In 2017, OVH increased its presence in the U.S. market and launched its first U.S. datacenter in Vint Hill, VA located in Fauquier County. OVH's second U.S. datacenter has recently launched in Hillsborough, OR. In tandem with this decision, OVH acquired vCloud® Air™ from VMware®, launching a new line of products and providing improved services on their own proprietary platform. With this acquisition, they have retained key vCloud® Air™ staff, and additionally OVH hired 1,000 people in 2017, bringing their total global team of experts to 2,500 employees.

OVH US has since launched the OVHcloud brand, a mid-to-enterprise-grade line of products that include:

- ✓ Hosted Private Cloud (built on VMware)
- ✓ Dedicated Servers (Bare-metal)
- ✓ Public cloud (built on OpenStack)

Key Differentiators

***Infrastructure is their Business*:** They build their own servers, manage their own global datacenters, currently 28 in total, and a 14 Tbps backbone network. They offer a secure and flexible generation of IaaS from private, hybrid to public clouds.

***Freedom to Build, Freedom to Choose*:** They support an open cloud approach by embracing open source technologies and supporting industry standards. Customers make a choice in their providers, platforms and connections.

***Innovation with Purpose*:** Innovating through each step in their global solution allows OVH to provide the best performance, security, servicing, automation and price in the industry.

OVH, AER WIRELESS/AMELIA AND DINWIDDIE COUNTIES' BROADBAND EXPANSION

In this collaboration with Aer Wireless, OVH will offer their best-in-class Hosted Private Cloud service. This solution consists of a full VMware vSphere, NSX, vSAN stack built on OVH proven and custom-built hardware. Aer Wireless' Hosted Private Cloud solution currently provides the full VMware SDDC Stack, including vCenter, ESXi, NSX, vSAN with available vROPs and vSphere Replication add-ons. The entire stack from the datacenter to the hypervisor is tightly integrated at each layer.

Beyond VMware based cloud services, OVH offers a public cloud built on OpenStack, bare metal, industry leading 3rd party enabled DR and backup offerings such as Veeam & Zerto. DDOS security offered at no cost with global recognition for being proven and effective.

Components

Hardware – Their hardware uses the latest Intel, AMD, Nvidia, and Super Microprocessors and components. From a performance perspective, memory footprints are larger, they use the latest chipsets (Intel Gold and Platinum) that have much higher CPU speeds, and they also have denser core counts. From a storage perspective, they provide vSAN and full flash SSD storage for increased IOPs and reduced latency from VM down to the storage subsystem.

Datacenter – The building structure is a cast-in-place concrete frame with a concrete roof deck and precast concrete perimeter wall panels. Servers are racked in custom made containers "mini datacenters" equipped with innovative cooling and redundant electrical feeds. The modularity helps to scale the datacenter capacity.

Power usage effectiveness is rated at 1.2 PUE. They have deployed redundant incoming power supply (lines A & B). Power cables and data cables are separated, cables are located above the containers. The datacenter fiber connections are currently 2 diversified paths without single point of failure, a 3rd coming.

Fire protection is a fully monitored automated detection, supporting audible and visual alarms. They employ monitoring of internal temperature, fire detection and suppression system, access control system, and cooling system.

Gated facility and security booth, with access and fencing with 24-hour presence by security guard patrols. Pre-programmed, centrally controlled access cards issued to all approved visitors and staff limiting access to authorized areas. All entry and exit points covered by mantraps and CCTV.

Automation – The solution is automated from the initial provisioning of a brand-new environment, starting with the automated creation of a vCenter server, ESXi hosts, the connection between these components, firewall access and protection from the public internet to these resources, distributed switch creation and configuration, user permission creation and provisioning.

After the initial provisioning, clients can continually benefit from built-in automation through the OVH vCenter plug-in, which will allow Aer Wireless to continue to add or remove compute, storage, and public IP resources as necessary.

Monitoring – While consuming these resources, OVH continuously monitors the equipment used to host the enterprise infrastructure. Should a host encounter any issues, OVH will simply and automatically replace impacted equipment with a new resource, to return to normal operation as quickly as possible.

As for monitoring up the stack, OVH provides access to several tools. In addition to providing customers with their own vROPS instance, they support any vSphere supported monitoring tool as well.

OVH also provides several of their own tools to ensure availability and transparency. To start, OVH vScope is a monitoring tool for Hosted Private Cloud designed by OVH. Aer Wireless can instantly view the number of cores and VMs, the CPU and RAM load, and the network traffic on every host. Other tools are OVH status page with visibility down to Aer Wireless's racks. OVH also provides a network weather map.

Network – With fiber-optic connections deployed and managed using Dense Wavelength Division Multiplexing (DWDM) devices, the OVH network offers a total capacity of 14 Tbps. All links between each datacenter are redundant, so routes are easily changed if necessary. For the customer's network, they may use NSX to its fullest and enjoy what they know already. Aer Wireless can also manage vRack distributed switch and VLAN port groups. These port groups are configurable by Aer Wireless to control the way traffic is handled within their environment.

vRack – With vRack (virtual rack – private LAN) technology, Aer Wireless's OVH services can be connected, isolated, or spread across one or multiple secure private networks. Using their unique network technology, Aer Wireless can build complex private infrastructures on a global multi-datacenter scale.

vRack allows OVH's services to then communicate privately and securely with each other over a dedicated VLAN. No more worrying about connecting or renting racks in a datacenter. Aer Wireless will have all the services and switches needed, with guaranteed delivery, installation, and hardware maintenance. vRack lives on OVH's low-latency network, with throughputs up to 40 Gbps, depending on the plan. OVH gives each customer up to 4,000 VLANs.

Since OVH has built an API to manage their products, including vRack, Aer Wireless can increase its efficiency by using the OVH API to retrieve commands to automate or authorize certain tasks according to predefined conditions.

vRack Connect – With vRack Connect, Aer Wireless can connect its business network to our private OVH network located in an OVH datacenter in a completely isolated and secure manner. This will allow us to bring our own dedicated circuit to an OVH Point of Presence (PoP) and connect to Aer Wireless's OVH environments either through a Layer 3 termination, or Layer 2, which will allow Aer Wireless to share the same VLAN space from on premise to the cloud.

vRack Connect can accommodate up to 4 x 10Gbps connections bound in LACP Configuration for up to 40Gbps throughput. A single connection to a single PoP can allow Aer Wireless's access to each of its OVH environments across multiple datacenters - thanks to its vRack Backbone.

Anti-DDoS – OVH's free Anti-DDoS protection ensures that the Aer Wireless infrastructure remains accessible 24/7 through a network capacity of 14 Tbps and a combination of mitigation techniques, including packet analysis, packet mitigation, and server traffic vacuuming. This is a proven solution with broad industry recognition.

The OVH network can withstand, vacuum, and mitigate a high number of attacks. During the mitigation process, spread across seven datacenters and three continents, the attack vacuuming is reinforced. OVH's customers' Service Level Agreements are balanced and ensured in this way, and the service is safeguarded from disruption.

By default, ALL OVH servers are equipped with automatic DDoS attack mitigation that activates in the event of an attack (reactive mitigation). Aer Wireless also has access to permanent mitigation (permanent rules) as well as Network Firewall configuration.

As a global hyper-scale provider, OVH is responsible for the monitoring and maintenance of its infrastructure up to and including the hypervisor level of a customer's environment. OVH is also responsible for the patching of the vSphere environment at both the Hypervisor and vCenter levels. In the cases where a customer is leveraging an OVH "Bare Metal" server, OVH is responsible for maintaining the infrastructure up to and including the hardware level.

In addition to provisioning the infrastructure resources and maintain the stability and reliability of its areas of responsibility, OVH provides the following services, monitors and maintains its infrastructure in the following manner:

Network

- ✓ Provide IP management
- ✓ Provide public IP address block
- ✓ Performance Monitoring and Capacity Monitoring
- ✓ Schedule network device repair activity with Customer in accordance with Change Management procedures
- ✓ Identify network problems
- ✓ Install and test needed replacement parts for network devices.
- ✓ Conduct performance and functional testing on network devices, software/firmware

Virtualized Server Infrastructure

- ✓ Performance Monitoring and Capacity Monitoring
- ✓ VMware vSphere management
- ✓ ESX Host configuration
- ✓ Hardware validation and purchasing
- ✓ New server provisioning
- ✓ Server resource upgrades
- ✓ Physical server installation
- ✓ Server hardware failure remediation
- ✓ Server infrastructure incident management
- ✓ Hypervisor & vSphere level patch management

Storage

- ✓ Performance Monitoring and Capacity Monitoring
- ✓ Storage architecture and design
- ✓ Storage budget planning and spending
- ✓ Installation and Configuration
- ✓ Provisioning
- ✓ Upgrades
- ✓ Incident response

PROJECT PERSONNEL FOR AMELIA AND DINWIDDIE COUNTIES' BROADBAND EXPANSION

CRAIG TAYLOR, BA, MCSE, VMware VCP – OVH Project Director, OVH US
Senior Strategic Technical Account Manager

As the OVH Senior Technical Account Manager, Craig Taylor's primary role is to provide white-glove account support including managing, building and developing trusted advisor relationships with key stakeholders including C-Level customer executives, Line of Business leaders and IT Directors to ensure that the customer continues their standardization on OVH technology.

Mr. Taylor:

- ✓ Manages the Top Tier 1 Strategic Accounts for the Client Success Team and Team Segment Lead for U.S. Public Sector.
- ✓ Customer advocate and world-class liaison
- ✓ Proactively expanded adoption of vCloud Air solutions within strategic accounts by driving relationships at every level, both internally and externally to influence positive change
- ✓ Provides project leadership, coordination and architectural guidance for the customer's major OVH initiatives

Mr. Taylor has over 20 years of experience in the IT industry, serving in many technical and strategic account management roles. Mr. Taylor obtained his Bachelor of Arts prior to entering the field of Information Technology where he obtained his MCSE and VCP certifications, among others while in technical delivery and pre-sales roles. In his first IT role in 1998, he travelled the globe providing pre/post-sales project implementation support for Financial Management Solutions. He then transitioned to the same role in the field of document and records management for a leading vendor in that space. That firm was acquired by an EMC in 2002 so when his team was dissolved, he parlayed a lead role in pre-sales engineering for another leading vendor in that same space until that vendor was acquired by HP in 2007. He was recruited by VMware in 2008 where he won top merits in pre-sales engineering on the Civilian Team prior to taking the lead Engineering Role in the Federal Channel and making the move to Senior Account Manager on the vCloud Air Team. OVH acquired the vCloud Air Business Unit in May of 2017, where Mr. Taylor continued to manage the top accounts in the Public Sector Business Unit.

NATHAN MILLS, CCNA, CCNA Security, ITIL – Senior Cloud Architect, OVH US; Consulting Cloud Architect

Nathan Mill's role in this project is to be a trusted post-sales advisor and a keystone for involving technical OVH groups. Mr. Mills began his IT career 12 years ago, building complete networks and machines from the ground up for dental offices with a focus on Digital Radiological Imaging. He then moved to a local bank (Mile High Banks) where he performed as "Jack of All Trades" in a very small technology group that handled all in-house IT needs of the bank from Exchange to AD, power outages to telecom, and servers to desktops. After several years at Mile High Banks Mr. Mills then moved to Webroot, where he worked for five years, supporting internal staff by managing deployments of company-wide EUC security, backup, legal, and server side EUC hardware systems. Mr. Mills became very interested in virtualization from his work in EUC and System Administration tasks, so he moved across the street to VMware where he worked for almost three years on the vCloud Air team. Mr. Mills excelled at this position and moved from Customer Support Engineer to Cloud Services Architect and then to his current position of Cloud Consulting Architect within that time.

After his time at VMware, vCloud Air was purchased by OVH and Mr. Mills has continued his legacy of high touch service for all OVH customers with which he interacts. Mr. Mills currently supports customers in achieving their goals in enterprise cloud and sustained, and stable cloud tenancy. He helps customers achieve this by providing them with architectural validation, technological expertise, and research on the behalf of all involved organizations. Mr. Mills also provides expert level advisement to both customers and internal Subject Matter Experts within OVH. Additionally, he provides proactive planning as well as incident oversight during the project lifetime by leveraging his experience in systems administration as well as enterprise and EUC support.

REFERENCES

Please note: *Contact Brett Rinker, Strategic Sales Specialist, OVH,(brett.rinker@corp.ovh.us or phone: 202-869-1865) to request reference calls before contacting the customer references below. Thank you.*

OHV	
PROJECT TITLE	**DC Water Disaster Recovery**
SUMMARY	DC Water takes pride in providing world-class water utility. They uphold their mission statement by surpassing their expectations in an environmentally friendly and ethical manner. The DC Water team highly favors protecting their client's information by implementing state-of-the-art information technology and cloud-based disaster-recovery solutions. The DC Water team has been successfully utilizing disaster recovery on the vCloud Air platform and are looking forward to repointing their solution to the OVHcloud platform. The DC Water innovative and strategic IT team selected vCloud Air on OVHcloud platform because of OVH's reputation as a secure cloud backup/disaster-recovery service. DC Water received a unique solution that provided them with cost savings, data protection, along with operational efficiency. The DC Water team is currently in the process of migrating their disaster recovery solution to an exclusive environment at an OVH owned and operated datacenter in Vint Hill, VA, in Fauquier County. The OVH team will continue to provide them with a highly effective disaster recovery solution along with utmost security provisions. The DC Water and OVH partnership is based on tactical importance of management on both sides. OVH brings to the table a ground-breaking datacenter design and effective experience in implementing and supporting cloud-based services. OVH, much like DC Water, expects to exceed expectations by building partnerships based on trust and vigilant cooperation to provide a highly positive experience for our patrons.
DATES	July 2016 – Present
CONTACT NAME	Dotun Olawunmi, Manager Infrastructure Services
TELEPHONE	202-787-2652
EMAIL	Dotun.Olawunmi@dcwater.com
PROJECT TITLE	**San Francisco Public Utilities (SFPUC) Datacenter Extension and Disaster Recovery**
SUMMARY	SFPUC provides retail drinking water and wastewater services to the City of San Francisco, wholesale water to three Bay Area counties, green hydroelectric and solar power to Hetchy electricity customers, and power to the residents and businesses of San Francisco through the CleanPowerSF program. SFPUC hosts workloads for monitoring and processing energy trading for the city of San Francisco. Due to industry regulations, they cannot do this over the public internet. They used an IPSEC VPN to comply with the rules.

	The vCloud Air on OVH service is highly critical for them. No downtime flexibility is allowed 24/7. SPFUC has been so successful with their service in the OVH cloud, they now plan to double their cloud environment, and extend their solution and services to five other states.
DATES	May 2015 – Present
CONTACT NAME	Simoun Sy, Principal Engineer
TELEPHONE	415.551.4376
EMAIL	ssy@sfwater.org
PROJECT TITLE	**City of Fremont Hybrid DR Replication (L2E)**
SUMMARY	City of Fremont, located in the southeast side of the San Francisco Bay, is the fourth most populous city in the Bay Area. With over 220,000 residents, City of Fremont constantly strives to nurture their residents and businesses. Their strong driving force is innovation and strategic growth. City of Fremont's challenge was they were growing out of their disaster recovery environment in late 2017 and needed a more flexible, easy-to-manage disaster recovery solution to support their complex hybrid environment. The account team addressed these challenges by proposing Dedicated DR with Hybrid Cloud Manager (HCM). By leveraging HCM in their Dedicated DR environment they could stretch multiple layer 2 networks with ease and flexibility. Having the peace of mind that City of Fremont can fail over their most critical hybrid environments in an event there is a disaster is a great accomplishment in helping them meet their business goals and objectives. City of Fremont values the OVH Account team as we are engaged with them on a bi-weekly basis to ensure the service continues to be successful in meeting their needs. They look forward to continuing their growth with us as we work towards migrating them to the OVH Datacenter.
DATES	January 2017 – Present
CONTACT NAME	David C. Yu, Information Technology Services
TELEPHONE NUMBER	510-494-4826
EMAIL	dyu@fremont.gov
PROJECT TITLE	**Charter Communications Datacenter Extension**
SUMMARY	Charter Communications (NASDAQ: CHTR) is America's fastest growing TV, internet and voice company. They are committed to integrating the highest quality service with superior entertainment and communications products. Charter is at the intersection of technology and entertainment, facilitating essential communications that connect more than 26 million residential and business customers in 41 states. Their commitment to serving customers and exceeding their expectations is the bedrock of Charter's business strategy and it's the philosophy that guides our 94,000 employees. Today, thanks to the vCloud Air solution, Charter has an integrated IT environment. The data is hosted in one of our highly secure datacenters they maintain, eliminating concerns about privacy and security. The solution is easy to manage, giving Charter IT staff, the control required.
DATES	December 2016 – Present

CONTACT NAME	Randy Link, Enterprise Engineering
TELEPHONE	704-973-7469
EMAIL	Randolph.link@Charter.com

CONFLICT OF INTEREST DECLARATION

OVH declares that it does not have any conflicts of interest pursuant to The Virginia State and Local Government Conflict of Interest Act, Chapter 31 (§ 2.2-3100 et seq.) of Title 2.2.

UGOROUND

DESCRIPTION OF BUSINESS

UgoRound Australia Pty. Ltd. is a Sydney-based venture, founded by a team of Israeli and Australian tech enthusiasts. Their proprietary cloud platform helps city corporations and public services agencies connect with their citizens. They leverage the significant growth in mobile smart phone devices to provide relevant and contextual alerts to those affected in geofenced locations. The Aer Wireless network will allow the citizens of both counties to have more reliable access to UgoRound's government-issued alerts.

Geo-Messaging and Emergency Communications to provide cities and authoritative agencies a quick and simple way to send alerts to citizens based on their geolocation.

PROJECT PERSONNEL FOR AMELIA AND DINWIDDIE COUNTIES' BROADBAND EXPANSION

YANIV FELDMAN - Co-Founder and Chief Delivery Officer, Project Director

Yaniv Feldman has more than 10 years of experience in the Business Intelligence industry. Yaniv masters a broad range of industries and functions and has specialized in leading significant business transformation revolving around data and analytics in large organizations in Australia, India and Israel. Mr. Feldman is a certified Scrum Master with extensive experience leading Agile software implementation projects.

Prior to UgoRound, Mr. Feldman worked as a Lead Consultant in Qlik (Sydney, Australia), a prime vendor in Enterprise BI and Visual Analytics. In this role Mr. Feldman led BI implementation projects and programs with six figure budgets with various Enterprises and Government Agencies in the Australian market, overseeing the work of up to 10 implementation consultants. Working for a software vendor, Mr. Feldman acquired technical architecture proficiency with Qlik's products as well as the ability to technically support the process of enterprise software sales (Pre-Sales). He has been a top contributor to the SAP and Qlik online communities and led ground breaking projects integrating Qlik technologies with SAP achieving international recognition for that.

Mr. Feldman served as an officer in an elite technology unit in the Israeli Air Force and holds a Bachelor of Science degree in Industrial Engineering and Information Systems from Ben-Gurion University of the Negev.

Mr. Feldman brings to UgoRound his track record of enterprise software and technical delivery. His passion is to transform and influence people and organizations with software solutions, data and factual insights. He lived and worked in Israel, India and Australia and excels in working with groups and individuals from various cultural backgrounds.

CONFLICT OF INTEREST DECLARATION

UgoRound Australia PTY. LTD. declares that it does not have any conflicts of interest pursuant to The Virginia State and Local Government Conflict of Interest Act, Chapter 31 (§ 2.2-3100 et seq.) of Title 2.2.

18. CERTIFICATES OF ATTESTATION

CAS Severn, Inc., Aer Wireless and Mage Networks, Inc. declare that they do not have any conflicts of interest pursuant to The Virginia State and Local Government Conflict of Interest Act, Chapter 31 (§ 2.2-3100 et seq.) of Title 2.2.

CAS Severn, Inc., Aer Wireless and Mage Networks, Inc. declare that neither the firm nor its partners on the project are currently debarred or suspended by any federal, state or local government entity, nor have its principals operated as another entity that is so debarred or suspended.

Please refer to Appendix 15, CAS, Aer Wireless and Mage Networks Certificates of Attestation

19. PAST DEPLOYMENTS

MagiNet™ demonstrated and executed a successful network deployment test last fall and again recently in Alberta, Canada. Please refer to references above. In addition, Mage Networks has been recently delivered in Liberia by the local carrier and in Ghana, by Dr. Noye, a well-known technology scientist.

Aer Wireless would like to assure Amelia and Dinwiddie counties that scaling to the requirements stated in the RFP are within the norm of our recommended technologies and based on our thorough tests of all proposed components, successful demonstrations, proof of concepts and success rates, all elements and features of this solution have been tested and proven.

For a nominal fee, the Consortium suggests a small "Proof of Concept" that would easily be expanded into the final network thereby assuring the counties the broadband solution that will scale to meet and exceed your expectations.

MagiNet™, a new technology, currently has a few municipal deployments, and completed a proof of concept demonstration network that was deployed last fall at Fauquier County. The validation included a 6 mile demonstration network, which was deployed and un-deployed within only a day.

- ✓ **Town of Taber, Alberta:** This is a seamless outdoor Wi-Fi network, installed in the downtown retail zone of a rural town of approximately 12,000 residents. The network involved taking a fiber feed from the nearby town hall (a new, dedicated and secure feed was installed in the town hall) , and hopping (4 hops) a wireless data pipeline all through the downtown, along which overlapping radii of high-speed Wi-Fi combine to give seamless Wi-Fi throughout the town, at very high speed. Town feedback has been very positive and Taber is currently placing an order to expand the network into its festival grounds.

- ✓ **Brazeau County, Alberta** (installed June 19, 2018) This is a seamless outdoor Wi-Fi network, covering the county building's parking lots and the adjacent sports park in a rural town of approximately 7,000 residents. The network takes a fiber feed from the county building (a new, dedicated and secure feed was installed in the town hall) , and hopping a wireless data pipeline all through the sports park, along which overlapping radii of high-speed Wi-Fi combine to give seamless Wi-Fi throughout the playing fields, at very high speed. Pending a satisfactory testing period, the Reeve of the county plans to expand the network to give free high-speed Wireless coverage to 5 hamlets of Brazeau County.

- ✓ **Town of Nanton, Alberta (Demonstration Network):** This was a demonstration of our technology which was used to create a wireless data pipeline to provide high speed Wi-Fi in a very rural area, about 6 miles outside the town of Nanton Alberta. The network involved taking a fiber feed from a home inside town and hopping a wireless data pipeline 5 hops. As per a demonstration video (https://youtu.be/QElIn3kZ47E)

Mage Networks' technology is innovate and the team assembled for Amelia and Dinwiddie Counties are uniquely qualified and experienced as can be seen in detail in Mage Networks' vendor profile. Aer Wireless specifically notes that at the time of this proposal it has secured additional agreements as noted below. These profiles highlight the tremendous capabilities being assembled to deliver a complete solution to Amelia and Dinwiddie Counties.

- ✓ Saudi Arabia where Aer Wireless and Mage – Providing a solution offering broadband network equipment and services in a new city that is being built in Saudi Arabia.

- ✓ Phiyr Wireless (Cayman Islands) – Installing a proof of concept after which it is expected that these networks will be expanded out into full network.

- ✓ Phiyr Wireless (Cayman Islands) – Installing a proof of concept broadband network starting first with providing Wi-Fi access in Georgetown, and 30-days thereafter expand the network to cover the full length of Seven-Mile Beach and the entire island. By Q'3, 2020 the network will extend to cover Little Cayman and Cayman Brac, offering the same services proposed within this RFP Response to Amelia and Dinwiddie counties.

- ✓ NEWCO- Shreveport, Louisiana- Deploying a broadband network and a smart City network combined to deliver broadband services to the identified communities as part of a STEM project under U.S Department of Housing.

- ✓ Regulatory entity in. a Dutch speaking Caribbean Island to deploy a sustainable broadband wireless network covering the entire island.

- ✓ Redwire, Inc. (Oklahoma) – Aer Wireless worked with Redwire, Inc., a successful recipient of FCC CA II award to design and architect a broadband network that will be deployed this year.

- ✓ Allentown Digital Inclusion Initiative – Aer Wireless will be installing a broadband network to support 20,000 residents providing the same services proposed within this RFP response to Amelia and Dinwiddie counties.

20. EXISTING CUSTOMER BASE

Aer Wireless is excited to partner with Amelia and Dinwiddie Counties as the first Broadband customer in the Commonwealth of Virginia. Several of our partners noted below have thousands of customers in Virginia and many more globally.

- ✓ Aradial serves more than 100 million customers.
- ✓ InfoSys - although specific numbers are not available, Infosys serves customers in 45 countries.
- ✓ OVH is the world's third largest hosting provider, serving 1.4 million clients in 138 countries.

21. INTERNET SERVICE PLANS

Aer Wireless is pleased to provide commercial and residential subscribers with cost-competitive, comprehensive monthly internet services. Please note that these are estimates and the final service plan pricing will be confirmed as part of the final network design. These prices are subject to any state and local taxes.

With Mage Networks' cost-effective state-of-the-art technology in the end user infrastructure, Aer Wireless will provide a minimum internet service speed of 25 Mbps to Amelia and Dinwiddie counties' residential and customers. This connectivity, in some situations and locations, can be provided as part of the design phase, connecting residents and/or businesses prior to full network deployment.

The proposed services include antivirus protection from Webroot. Aer Wireless will provide an SLA to all its commercial and residential customers.

Please refer to Cost Estimate, Monthly Subscription Pricing, Under Separate Cover.

22. PROJECT DESIGN PHASE

The detailed costs to deliver the design for the Amelia and Dinwiddie counties broadband expansion are provided under separate cover.

Significant cost efficiencies in the design phase will be achieved through Aer Wireless' approach to wireless connectivity and fiber network design and deployment. Our partners, Mage Networks, B-Quad and Express Technologies, provide rapid design and deployment in tandem. As a result, the broadband expansion proposal is projected to generate revenue sooner than traditional network deployments. This revenue will serve to offset design and deployment costs, thus reducing the duration on ROI for the County's capital investment.

Design Phase Deliverables include:

- ✓ Review of all information/reports developed to date for Amelia and Dinwiddie counties.
- ✓ Kick off meeting with the Amelia and Dinwiddie counties team (in-person and/or via web conference).
- ✓ Team planning sessions (in person and/or via web conference).
- ✓ Review preliminary conceptual design considering new information.
- ✓ Perform site surveys using portable equipment, including identification of power sources and availability throughout the County (at least 600 sites will be visited for wireless in addition to all survey requirements for fiber installation, etc.).
- ✓ Identification of backhaul infrastructure, redundancy and locations for MagiNet™ data pipeline relays.
- ✓ Development of all in-person presentation materials including in-person presentation of the final detailed design including incorporation of any requested changes.
- ✓ Development of detailed network development costs, including all equipment (fiber, wireless units, etc.) infrastructure building where needed (physical expansion of datacenter, permits, etc.) to successfully deploy the final design.
- ✓ Create complete bill of materials for equipment, including backup power and solar power as required.
- ✓ Create phased deployment project plan timeline based on County identified priorities.
- ✓ All travel and out-of-pocket expenses.

Should the scope of the design phase change beyond what is described within this submission, a revised cost estimate for review and approval.

Please refer to Cost Estimate under separate cover.

The terms of payment for the design phase are as follows:

- ✓ 50% upon the signing of the agreement
- ✓ 30% upon mid-way through the process as determined based on discussions with Amelia and Dinwiddie counties in the kick off meeting
- ✓ 20% upon the delivery of the presentation of the final detail presentation.

The Broadband Consortium is focused on ensuring that the detailed design phase and associated deliverables are delivered on time and within budget.

23. PROJECT AWARD AND TIMELINE

All partners have indicated that based on their extensive experience the design phase would require a minimum time of approximately 2 months to complete. The Consortium will continue to refine the design and deployment plan following the formal award and work simultaneously to ensure the design process is dynamic and to continue to evolve the design, the deployment plan and final network costs.

Through the design process, Aer Wireless will deliver a detailed designs sufficient to provide a project plan and detailed deployment. Aer Wireless will continue to refine design details as the parties negotiate and allow for public hearings should they be required.

Project Award Timeline

Task	Description	Team Members	Timeline
Part 1: Review	• Review secondary materials. • Consultation with the County. • Review preliminary conceptual design considering discussions and new information.	All Partners	1 Week
Part 2: Develop Detailed Design			
Core Network	• Core network design and testing the connectivity.	OVH & Aer Wireless	1 Month
Wireless Network	• Perform site surveys using portable equipment • Identify availability of power. 600 sites will be visited. • Select locations of Data Pipeline Relays with multiple options in some areas. • Identify the units used at every Relay point. • Create complete bill of materials for equipment including backup power and solar power as required. • Create deployment timeline based on County identified priorities.	Fuze Wireless & Mage Networks	1 Month
System Integration	• Configure and test all subsystems to ensure proper performance.	CAS Severn	1 Month
Fiber Infrastructure Access	• Phase 1 through 3 Detailed Design. Note: Fiber design has 7 phases. The cost and timeline are reduced by performing that work in parallel with network deployment and operation.	Mage Networks & Fuze	1 Month
Broadband Services Design and Development	• Design and include broadband services with the Core and System Integration.	Aer Wireless	1 Month
Part 3: Presentation	• Technical review and integration of all proposed infrastructure with the rest of the team. • Preparation of presentation. • Presentation and discussion. • Addressing questions raised in presentation.	ALL	1 Week 1 Week 1 Day 2 Days
Delivery of Design, Deployment Plan and Costs			
Overall Timeline	• Many of the above design sections will occur simultaneously.	ALL	2.5 Months

Detailed Network Design Estimates

Aspect	Description	Time Estimated
Part 1: Review	▪ Review info gathered by Aer Wireless. ▪ Team planning session. Participate in person and via web conference. ▪ Review Preliminary conceptual design in light of new information.	10 Hours 8 Hours 4 Hours
Part 2: Detailed Design Development	▪ Perform site surveys using portable equipment (along with Fuze Wireless). ▪ Select a couple of alternative locations of Data Pipeline Relays. ▪ Identify the units used at every Relay point. ▪ Create complete bill of materials for equipment including backup power and solar power as required. ▪ Create deployment timeline based on County identified priorities. ▪ Technical review and integration of all proposed infrastructure with the rest of the team. ▪ Building solution presentation.	240 Hours 40 Hours 10 Hours 10 Hours 10 Hours 8 Hours Included
Part 3: Presentation	▪ On Site Final Presentation/Address appropriate changes as necessary.	16 Hours
Travel	▪ Site Survey Trips ▪ Travel Expenses are included. ▪ In the event that the project scope changes, additional travel charges may apply.	The Consortium will track and invoice travel and other material expenses at actual cost. Additional travel expenses, if any, will be invoiced monthly.

24. OWNERSHIP, OPERATION AND MAINTENANCE

Aer Wireless will operate and maintain the network.

The team will use its world-class services to monitor and maintain the core elements of the network, as well as handle the security of the network core. Initially, Infosys will provide customer service support through their customer service centers. This will give Aer Wireless time to properly interview and hire the requisite personnel for the customer support center, in keeping with the information provided by the Economic Development Departments of both counties.

Aer Wireless and Mage Networks, working with OVH will provide the necessary security services through a SIEM based on Forti-SIEM and the World-Class security services provided by OVH network and platform performance monitoring. Aer Wireless will have a Network Operation Center where an internal team will have a dashboard view of the entire network. This team will also be responsible for the operations and maintenance of the MagiNet™ (Wi-Fi) network, and the backhaul portion of the network as well.

25. IMPACTS OF THE SOLUTION

The Amelia and Dinwiddie Counties broadband expansion will positively impact the County from a social, economic, environmental and transportation perspective. At the outset, Aer Wireless's broadband solution will result in a true 21st century "Smart City" across the entire county. This state of the art network will empower the businesses, farmers, government and residents to take full advantage of the Internet of Things, both on the individual and industrial levels. Aer Wireless will work closely with all partners to ensure that all land use plans and County ordinances are followed, and all project logistics identified to ensure permits are received in a timely manner. This also includes, where appropriate, opportunities to meet with the public in a town hall manner to share proposed plans.

Positive Impacts

Social impact

Our network will generate a positive social impact by providing residents and visitors of Amelia and Dinwiddie Counties with fast, stable and reliable wireless internet broadband connectivity for business, education and pleasure. It provides the convenience of seamless connectivity, whether a person is indoors or outdoors, at home or in the community, on hiking trails or in public spaces. This positions Amelia and Dinwiddie Counties as a desirable place to live, attracting new residents to the area.

Educational opportunities will be readily accessible for school children while in school and after hours from home, enhancing online learning and home schooling consistent with that available to children and families in connected communities. This enhances the quality of life for the entire family as parents and children can spend time together at home.

For members of the work force and high school graduates, the Aer Wireless network provides opportunities for distance-based learning allowing them to complete upgrade certificates and university courses online. It has long been documented that the through increasing access to higher education the overall economic growth of a community improves, and for Amelia and Dinwiddie Counties this will future-proof its economic growth for generations to come. No longer will those seeking higher education be forced to leave due to poor or no broadband access, creating a viable community and improved quality of life for the County ensuring younger generations are able to find opportunities that allow them to remain in the County.

Public Safety Impacts

The Aer Wireless Broadband network ensures law enforcement has full reliable, communications across the entire County where they do not have communications today. Additionally, the network will deliver consistent, reliable communications capabilities to first responders. In times of weather disasters such as Hurricane Irma and the recent California wildfires witnessed the failure of current first responder networks. The Aer Wireless broadband solution can be rapidly re-deployed after these events to return connectivity to first responders ensuring public safety.

Schools, fire stations, and other first responders will have access to 1Gbps of broadband capacity. Overall next-Gen E-911 services will be provided throughout the county more reliably and accurately than currently provided by existing ISPs, WISPs and mobile carriers.

Aer Wireless offers a more reliable and robust emergency response system. Other first-responder networks rely on cell towers, which leave some areas without coverage and with a higher risk of dropped calls. Aer Wireless uses MagiNet™, which does not rely on cell towers, can replace or overlay existing first responder networks, to provide law enforcement and emergency services with a back-up to traditional wired, radio frequency and cellular communications. Our First-Comm network will work in remote areas, and in conditions like wind, severe rain or loss of power. It is quick and cost-effective to deploy, and if equipment is damaged it can be replaced in hours.

The Aer Wireless network keeps its customers connected to the UgoRound mobile app for emergency notifications. UgoRound sends geographically targeted, text-like messages regarding imminent threats to safety. Government-approved messages are sent to customers based on their location, which is displayed as an anonymous dot on a monitored screen. Signing up is easy, free and requires no personal information.

Aer Wireless will provide communications in those areas of the County where mobile subscribers currently do not have services by using Aer Wireless soft phone or allowing those non-subscribers to log-on to Aer Everywhere Wi-Fi service and use their carrier's VOiP service.

Economic Impacts

Amelia and Dinwiddie Counties will be competitively positioned to attract large corporations due to the availability of reliable broadband and potential for the industrial IoT. The County will have the most cutting-edge broadband solution of any county in America. The seamless connectivity throughout and state of the art technology will allow Amelia and Dinwiddie Counties to establish itself as "Silicon Valley" of the east, greatly enhancing the potential to attract tech-sector businesses. This will grow not only the business tax base but also attract a highly skilled workforce and associated income base.

Along with creating jobs for those who are employed by Aer Wireless, this broadband expansion will create jobs at OVH, the Amelia and Dinwiddie Counties-based provider of our data center. They have committed to investing $47 million to establish their North American headquarters and first U.S. data center at the Vint Hill Business Park. As Aer Wireless expands throughout Amelia and Dinwiddie Counties, our increasing demand for data storage will lead to increased revenue for OVH and their need to hire additional staff.

Growth of the tax base will also be fueled by small and medium-based businesses including home-based businesses and other entrepreneurial ventures as a result of the county's high quality broadband network. A strong regional economy will attract people to the county, increasing demand for housing and other businesses creating further opportunities and economic growth, ensuring real estate value will, at a minimum, be maintained and new housing developments added ideally evolving Amelia and Dinwiddie Counties into one of the most livable places in America.

As part of the Internet of Things, farmers will have broadband availability for farm equipment and other machinery seeing cost savings when compared to using satellite services allowing them to take advantage of the latest farm technologies in a cost-effective manner.

Environmental Impacts
At the outset, providing connectivity to homes will reduce air pollution as residents will be able to telecommute and will no longer have to travel to hot-spots for broadband access. We will also use all existing physical assets such as community centers, schools and fire stations to deploy the network without having to build new towers.

The Mage Networks MagiNet™ components do not require major construction and will leverage existing infrastructure. Where possible, the units will be powered by solar panels. Additionally, when it is not possible to use solar, the units are lower in power consumption reducing environmental impact and operating costs.

In total, the overall broadband network proposed by Aer Wireless will deliver reliable high-speed connectivity with lower network to overall power consumption.

Adverse Impacts
While every effort will be made to mitigate potential adverse impacts, the teams identifies the following:

Construction during the installation of additional fiber can be disruptive to the terrain resulting in road work and other disruption of the ground. Where feasible, modern installation techniques for fiber will be used to mitigate these impacts minimizing disruption of normal day-to-day activities of the residents as the systems are installed, such as traffic delays. The installation of the network assets will not noticeably affect the aesthetics of the areas where the fiber or other outdoor infrastructure will be installed.

Aer Wireless will work with the local and County-wide agencies to mitigate any adverse impact to the County property, or any private property. By working with local agencies and NGOs Aer Wireless will endeavor to keep every commitment made, such as creating more jobs for County residents. Additionally, Aer Wireless will follow fair hiring practices and vet all Making sure all company executives hired and assigned to the Broadband Expansion project are highly qualified and share consistent values with both the company and Amelia and Dinwiddie Counties.

26. FINANCIAL INFORMATION

Please refer to Financial Statements, CAS Audited Financial Statements, Under Separate Cover.

Please refer to Financial Statements, Aer Wireless Financial Statements, Under Separate Cover.

Please refer to Financial Statements, Mage Networks Financial Statements, Under Separate Cover.

27. APPENDICES

Appendix 1	Aer Wireless Overview
Appendix 2	Aer Wireless Deck
Appendix 3	Aer Wireless Business Value Proposition
Appendix 4	Aer Wireless Network Topolgy
Appendix 5	Mage Networks Overview
Appendix 6	Mage Networks MagiNet Data Pipeline
Appendix 7	Mage Networks Warranty
Appendix 8	UgoRound Datasheet
Appendix 9	UgoRound First To Know Alert Solutions for Municipalities
Appendix 10	UgoRound First To Know Alert Solutions for Universities
Appendix 11	USDA Launches High-Speed Broadband e-Connectivity Resource Guide
Appendix 12	USDA Links
Appendix 13	Signed Confidentiality Non-disclosure of Confidential Information
Appendix 14	CAS Severn, Aer Wireless and Mage Networks Signed Addendum #1 and Addendum #2
Appendix 15	CAS, Aer Wireless and Mage Networks Certificates of Attestation

UNDER SEPARATE COVER

CAS SEVERN, INC. FINANCIAL STATEMENTS

AER WIRELESS FINANCIAL STATEMENTS

MAGE NETWORKS FINANCIAL STATEMENTS

COST ESTIMATES