GO COMMITTEE #11
April 20, 2015

Worksession

MEMORANDUM

April 16, 2015

TO: Government Operations and Fiscal Policy Committee

FROM: Dr. Costis Toregas, Council IT Adviser

SUBJECT: Digital Infrastructure Strategic Plan

On April 2, 2015, Councilmember Hans Riemer, the Committee's Lead Member for Digital Government, shared his vision for a Digital Infrastructure future for Montgomery County with the County Executive, and requested the development of a Strategic Plan that would help get us there (see ©1-7).

This vision includes several elements:

1. Open access networks in White Oak (and elsewhere).
2. Identify federal labs' needs for ultra high speed connections (beyond 100 GB/sec) and recruit entrepreneurs to respond to such needs.
3. Open FiberNet to private sector use.
4. Support fiber-ready building development through code and certification changes.
5. Build and lease "middle mile" fiber with Purple Line, BRT, etc.
6. Secure e-rate funds for library broadband.
7. Address rural broadband gap.
8. Address the low income broadband gap.
9. Strategically deploy public WiFi.

A Strategic Plan could pull together these diverse and seemingly unrelated objectives in a coherent initiative that would organize funding requirements along a timeline, prioritize efforts, and focus on winning strategies. To advance this plan, Councilmember Riemer suggests the creation and utilization of an Advisory Task Force comprised of experts in the communications, finance, and technology fields to advise both the Council and the Executive. Public/Private partnerships and new organizational models would all be explored in this rapidly changing, important field.

The Department of Technology Services' (DTS) latest Strategic Plan, which can be found at http://www.montgomerycountymd.gov/dts/stratplan.html, does not currently have a digital infrastructure element; developed in 2009, its chapters currently include:

2009-2012 Strategic Plan

1. Introduction
2. Mission
3. Vision
4. Focus on Enterprise
5. Innovation
6. Governance
7. Resources and People
8. Next Steps
9. Appendix I - Acronym List

A Digital Infrastructure Strategic Plan could become an element of the DTS "Enterprise" Strategic Plan, which would then ensure that its action steps would find resource, development, and deployment support in the normal course of funding technology efforts through the budget process.

The Committee will want to weigh in and add their perspectives to this important document.

MONTGOMERY COUNTY COUNCIL
ROCKVILLE, MARYLAND

HANS RIEMER
COUNCILMEMBER AT-LARGE

April 2, 2015

The Honorable Isiah Leggett
Montgomery County Executive
101 Monroe Street, 2nd Floor
Rockville, MD 20850

Dear County Executive Leggett:

I would like to share my thoughts on an issue that I believe we can work closely on: **improving Montgomery County's digital infrastructure.**

As you stated in your inaugural address, broadband can be a key plank in the County's economic development strategy. I applaud your *UltraMontgomery* initiative and look forward to working with you to move it forward as quickly as possible. Montgomery County has been successful in attracting, creating and retaining high-tech businesses and jobs but we must constantly strive to maintain our leadership position. Our strengths in the life, earth, bio and cybersecurity sectors are significant, and the presence of federal agencies, such as the FDA, NIST, NIH, NOAA, and others helps ensure that we have one of the most specialized and highly educated workforces in the world. To maximize these assets, it is imperative for the County to plan for the current and future infrastructure needs of these industries and ecosystems.

If we are serious about attracting high-tech jobs and businesses, we must be equally serious about providing robust digital infrastructure, because our growth sectors require access to super high-speed broadband networks just as manufacturers require access to high-quality roads, rail, and ports.

Broadband is also a quality of life issue for our residents. Many residents have contacted me with their concerns about cost, customer service, and availability of broadband offerings in the County. While a good portion of Montgomery County is served by more than one provider, existing service isn't good enough and the options too few.

To tackle these challenges, I am requesting that your administration develop a **Digital Infrastructure Strategic Plan** to create a framework for growing and using super high speed networks in Montgomery County. The Plan should take stock of the County's current communications assets and develop a strategy to leverage them for economic growth and gains in quality of life. It should identify opportunities for true Public/Private Partnerships, under which not only the risk of joint investments, but the rewards of a partnership can be shared. It should be forward-looking and prepare the County for future advances in technology and the economic activity surrounding them. It should also be iterative, meaning that the plan would evolve over time, and pull together the different departments and agencies that must contribute to its success.

While much of this strategic thinking is already occurring in various places within and outside of the County Government, there has not yet been a concentrated and centralized effort to bring it all together. I believe that bringing all this great thinking under one tent will create synergies that could not exist disparately. It will also

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present the County's decision makers with a clear and detailed strategy to stay on the leading edge of technology and communications within the region, nationally, and globally.

To lead the drafting of the plan as well as ensure its continued relevancy, I suggest creating an on-going advisory task force comprised of experts in the communications, finance, and technology fields to provide continued guidance to the County Executive and County Council on broadband issues, and the necessary organizational development issues that will surely follow. We must be prepared to "think outside the box" and not be constrained by current organizational assignments and incentives. Many structures might be relevant to execute this vision, and we should think about them before investing in the technology itself. For example:

- A new broadband authority with governmental powers could be established
- A private entity could provide desired services under a Public/Private partnership agreement
- a municipal enterprise model is exemplified by Stockholm, which created a company wholly owned by the city that owns and manages the totality of broadband infrastructure, which is then leased to private and other concerns[1]

A task force pulling together the wealth of knowledge inside and outside government could be the kind of independent voice to help us craft the way forward.

While not exhaustive, here are specific issues that the Strategic Plan could address.

1. Open-access / publicly owned, high speed fiber network in White Oak (and elsewhere)

According to the County's original RFP for White Oak[2], the joint development will create a "World Class Bio/Life Sciences, Education, and Research Community where the brightest and best regulators, researchers, professors, students and medical professionals can meet and share ideas, research and information that will lead to continuing technological, scientific and medical advancements."

A necessary condition to fulfill this vision is broadband. That is why at my urging the Council added the following language to the White Oak Science Gateway Master Plan:

> "An important component of the infrastructure and community facilities for the White Oak Science Gateway will be a high speed, highly reliable, highly secure communications fiber network connecting buildings inside the district and then connecting the district itself to major research centers in the region, across the country and internationally."

The County's existing financial interest in this development makes it an excellent candidate for deploying a publicly-owned or public-private network. Under this concept, the County would take the lead in laying conduit and fiber that supports the White Oak Science Gateway Master Plan. The County would lease conduit space to the big commercial broadband providers (Verizon and Comcast) and lease fiber capacity to smaller providers (RCN, Level3, Zayo, and the like). If there is sufficient demand, the County itself could operate a broadband wide area network (WAN) that competes with other broadband providers.

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[1] For more information on this enterprise model, see here: https://www.stokab.se/In-english/

[2] For more information on the White Oak Science Gateway plan see: http://www.washingtonpost.com/local/maryland-news/montgomery-county-council-approves-white-oak-science-gateway-plan/2014/07/29/33ad8932-168f-11e4-9e3b-7f2f110c6265_story.html

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This approach has numerous advantages. First, it stimulates more *competition* for broadband service, which increases choice, puts downward pressure on prices, and puts upwards pressure on quality. Second, it avoids the need for providers to build *duplicative infrastructure*. Third, the network would also be open to *services provided by County Government* as well as utilities, such as Pepco or a microgrid. Fiber is an essential ingredient for smart grids. Fourth, it allows us to better *leverage our large investment in FiberNet*.

The County could recoup its original investment by leasing out conduit space and excess fiber capacity. It could also charge fees for access to its own network. Moreover, the fact that the property is essentially a greenfield means lower total costs since the buildings, equipment, and infrastructure can be designed from the beginning with the ultra high-speed network in mind. Put simply, we won't have dig a road up again or retrofit buildings. The existing conduit that carries the FiberNet strands can probably be used for part, if not the whole of this network, thereby significantly reducing the startup costs for the venture. White Oak would be the proof of concept, but this could also be done in the Greater Seneca Science Corridor, Silver Spring, Bethesda, and elsewhere throughout the County, helping to form what Bruce Katz of the Brookings Institution calls "Innovation Districts."[3]

For each of our innovation districts, the County should play a leadership role in forming collaborative partnerships with major federal institutions, non-profit, and private-sector companies to leverage ultra high-speed connections. Specifically, the County will need a better understanding of how federal agencies, such as the FDA and NIH, could use the next-gen applications made possible by ultra high-speed networks. Then, the County should use these partnerships to attract businesses to build those applications in each innovation district. The challenge is great, but the reward will be substantial, sustainable growth in the County's economic base. I invite you to read my white paper, "Moving Montgomery Forward with Gigabit Speed Networks" where I explore this concept further.[4]

This is not a new concept. Our neighbors to the northeast, Howard County, are already providing internet service to about 20 companies on their fiber networks, and the building owners are marketing the units as highly connected spaces.[5] Arlington, VA is embarking on a similar venture; they are considering leasing middle-mile dark fiber in their business corridors.[6]

2. Working with federal labs (FDA, NIST, NIH, DOE, NOAA, etc) to identify future needs for ultra high-speed connections (100+ gigabit) and recruit entrepreneurs to respond to those needs with applications.
After conversations last fall, we received a proposal from U.S. Ignite, a nonprofit partnership led by technology industry leaders with inspiration from the White House Office of Science and Technology and the National Science Foundation, launched to help develop the "next generation" of internet applications running on ultra-fast networks. Under their proposal, U.S. Ignite would convene the decision makers within our major federal institutions (FDA, NIST, NIH, DOE, NOAA, HHS, etc.) and identify how they could use 100+ gigabit speed applications to better accomplish their mission. Working with the Montgomery County Department of Economic Development, U.S. ignite would then match these needs with entrepreneurs and businesses who can meet

[3] "Innovation Districts" are defined as ""geographic areas where leading-edge anchor institutions and companies cluster and connect with start-ups, business incubators and accelerators. They are also physically compact, transit-accessible, and *technically-wired* and offer mixed-use housing, office, and retail." (emphasis is mine). See Katz, Bruce and Julie Wagner, "The Rise of Innovation Districts: A New Geography of Innovation in America," Brookings Institution, May 2014
[4] Read the full white paper here: http://www.councilmemberriemer.com/fiber/
[5] For more on this initiative, see this interview with CIO of Howard County, Chris Merdon: http://muninetworks.org/content/transcript-community-broadband-bits-episode-133
[6] Please see the Arlington Board agenda packet on February 6 for additional information: http://arlington.granicus.com/MetaViewer.php?view_id=2&event_id=770&meta_id=128278

them. This proposal holds great potential for White Oak/FDA and GSSC/NIH/NIST in particular but also Silver Spring/NOAA, Bethesda/NIH, and many others.

In the short-term, I urge you to accept U.S. Ignite's proposal so we can begin work immediately. Over the medium-term, however, the economic development work done with U.S. Ignite should form a core part of the Digital Infrastructure Strategic Plan.

3. Opening FiberNet to private sector use

FiberNet is one of the County's most valuable assets. All told, close to $80 million in County funds have been invested into FiberNet. It has been a good investment, too. One study found that FiberNet has been instrumental in helping the County avoid at least $54 million in costs over the last 15 years that we would have incurred if we had purchased commercial network services.[7] We are projected to avoid another $54 million in the next five years.

Fibernet holds great promise in both the public and private sectors. On the public side, FiberNet is poised to deliver next-generation services, including cloud computing, VOIP, wireless, and others, for the County, MCPS, and other agencies. FiberNet can also be utilized to bring ultra high-speed connectivity to private sector entities in our research corridors (White Oak and Great Seneca, to start). There are, of course, legal, financial, and other considerations that must be addressed to use FiberNet in this way, but I am confident that these challenges are ultimately surmountable.

Thus, I applaud your commitment to launching *UltraMontgomery*, which contemplates ultra high-speed networks that will power economic growth and vitality in the County for years to come. I am particularly encouraged by planning work being done for gigabit level connections in Great Seneca on Medical Center Drive as well as in the White Oak Science Gateway through the general development agreement. As a beginning step, I look forward to reviewing CTC's broadband market study with you in the next months to identify the opportunities and challenges in *UltraMontgomery*. *UltraMontgomery* can and should be a cornerstone of the Digital Infrastructure Strategic Plan.

There are, however, operational issues that are holding FiberNet back from achieving its promise. This is why Councilmember Navarro and I introduced a special appropriation to fund a Network Operations Center for FY15, which passed the Council on January 27, 2015. While I do appreciate your recommended partial funding of the NOC for FY16, I will be working to secure full funding as contemplated by our special appropriation. To put it plainly, installing and fully funding a NOC is a necessary condition for moving forward with *UltraMontgomery* as well as providing county government and agencies with the highest level of service.

4. Creating new building codes and certifications for fiber-ready buildings

The last mile connections—from the street to inside the building—are often the toughest and most expensive to make. In part for this reason, one provider often "owns" or has exclusive access to all the network infrastructure within a building. This is anti-competitive; high lease and capital costs raise barriers to entry to other providers. This limits choice and has deleterious consequences for service quality. Fortunately, there are several ways the County could stimulate, require, and/or incentivize building owners and real-estate developers to help us achieve more and better broadband service.

First, we should incentivize building owners to disclose their network infrastructure to prospective tenants. Not only will tenants have access to this critical information as they analyze which space suits their needs, but the

[7] Data from a Montgomery College report before the ITPPC

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County will be able to collect, aggregate, and synthesize the data for marketing and matchmaking purposes. A conceivable outcome of this initiative could be a Broadband-Ready certification from the County that would work similarly to the County's Green Business Certification Program and/or New York City's Broadband Map.[8]

Second, the County could require or incentivize new (and significantly renovated) buildings to include large enough and redundant broadband access points with multiple entries and egresses. Just as new buildings are required to build sufficient sewer infrastructure, these same buildings can be required to be designed to facilitate sufficient broadband. The County could also prohibit provider-owned or exclusive access broadband infrastructure within new or significantly renovated buildings. On the other hand, incentives and education may be sufficient to meet our goals, without imposing new requirements.

The Strategic Plan should make policy recommendations, such as these, that improve broadband access within buildings.

5. Building and leasing out more "middle mile" fiber with the Purple Line, BRT, etc

The large transit and road projects coming down the pike, such as the Purple Line, CCT, and BRT among others, provide an excellent opportunity to simultaneously bolster the "middle-mile" fiber backbone in the County. The goal is to "dig once" and lay broadband infrastructure while major transit and road projects are underway.

The Purple Line is particularly attractive for this approach and I commend your administration for advocating to include additional fiber and conduit in the Purple Line ROW. Additional cost savings may be achieved by combining this proposed broadband network with the CIP funds programmed for lighting conduit on the Capital Crescent Trail.

A corollary of "dig once" policies is to negotiate for conduit to be installed in coordination with utility work (Pepco, Washington Gas, Verizon, Comcast, and WSSC) or road resurfacings. The Agency Project Coordination (APC) tool is a good example of the benefits to traffic, quality of life, and minimized costs that thoughtful planning and collaboration can have. This model, and perhaps even the APC tool, could be used to strategically lay more conduit when streets are already dug up.

6. Securing FCC Universal Service funds for library broadband

While we have restored many of the funding cuts to the library system forced on us by the Great Recession, there is still much more we can do to improve this vital service offering to our residents. This is particularly the case for internet access, which is one of the most sought after resources our libraries offer.

The Universal Service Program for Schools and Libraries (E-Rate), administered by the FCC, provides federal dollars (in the form of discounts) for improvements to telecommunication and information services of eligible schools and libraries. Montgomery County Public Schools receive about $11 million annually through the E-Rate program. It is my understanding, however, that the County Library system has not yet applied for these funds, even though they are, by all accounts, eligible, a position that I think should be revisited. A recent rule by the

[8] The New York City Broadband Map, a program run by the New York City Economic Development Corporation, is "an interactive map that provides an up-to-date view of the availability of broadband infrastructure in NYC commercial buildings." Building owners and ISPs are encouraged (but not required) to provide data on their broadband infrastructure. See more here https://nycbbmap.com/ and here http://wiredscore.com/

FCC increased the potential federal money available to the Montgomery County Library System.[9] By one estimate, the County would qualify for as much as $1.25 million in E-Rate funding.

In these tight fiscal times, we simply can't afford to leave that much money on the table. After all, Montgomery County residents are already paying for this program through their telecommunications providers' contributions to the Universal Service Fund, yet they are not receiving the full benefit. Therefore, I respectfully request that your administration make every effort to secure the E-Rate dollars that are due to the libraries. This additional support could then be used to strengthen the WiFi and wired connectivity at our libraries.

6. Addressing the rural broadband gap

As you know, the County's 93,000 acre Agricultural Reserve is one of our Country's greatest treasures. According to the County's Cable Office, there are over 2,291 properties in the Agricultural Reserve without access to wireline broadband. A broadband connection to the internet is increasingly essential to the economic, communication, and entertainment needs of residents and businesses there, and the county has an obligation to support the viability of the ag reserve for the future.

Fortunately, the County has many tools at its disposal that could make a meaningful impact on rural broadband. First, the County should explore rural broadband deployment strategies with Comcast through the current franchise renewal negotiations. Similar discussions should be held with the other cable franchisees based on the merits of the proposition.

Second, a more costly but perhaps necessary option would be to design financial programs for qualified residents of the Agricultural Reserve. Expedited and/or cost free, property tax credits, and low interest loans or grants should be considered. These subsidies would combine with efforts to aggregate the demand within the Agricultural Reserve to make the broadband service affordable for the residents and profitable for the providers.

Third, the County should also consider extending and making available broadband service directly via FiberNet, at affordable rates. While there are certainly capital costs to this strategy, some costs will be recouped through the fees charged to new customers. There are also U.S. Department of Agriculture Grants for which we may be eligible to defray the costs of deploying broadband in the Agricultural Reserve. As announced in President Obama's new broadband initiative[10], the USDA is now accepting applications for their Community Connect Grants[11], which help fund broadband deployment into rural communities where it is not currently economically viable for private-sector investment only; they are also opening a revamped loan program to achieve the same end.

7. Addressing the low-income broadband gap

One of the most exciting new applications of the county's public broadband capacity can be found in Montgomery County Public Schools, where the school district is pursuing a vision of providing all students a Chromebook as well as implementing Google Apps for Education. I have strongly supported this implementation

[9] The FCC recently increased the E-Rate cap of $2.30 per sq. ft. of library space to $5.00 per sq ft. for Urban Library Systems, which Montgomery County would qualify for. See the E-Rate Modernization Order here: http://www.fcc.gov/page/summary-e-rate-modernization-order

[10] The fact sheet on President Obama's broadband initiative can be found here: http://www.whitehouse.gov/the-press-office/2015/01/13/fact-sheet-broadband-works-promoting-competition-local-choice-next-gener

[11] More information on the USDA Community Connect Grants is found here: http://www.rd.usda.gov/programs-services/community-connect-grants

and it is one of the reasons I was so concerned to get the Network Operations Center (NOC) up and running immediately, since the NOC will protect the quality of broadband service. At the same time, we should all be concerned that, as using technology becomes a more essential part of the education environment, children who do not have access to resources at home will face disadvantages. While our private sector providers such as Comcast have initiatives to address this concern, our county and MCPS should work together on a plan to better understand the need and how to meet it.

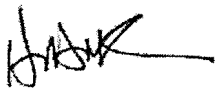
8. Strategically deploying public WiFi

Finally, the Digital Intrastructure Strategic Plan should identify and prioritize additional places for the deployment of public WiFi. The County already provides open and secure public WiFi in many locations, including libraries, schools, HOC buildings, many County buildings and civic centers, and Veterans Plaza in Silver Spring, among others. Yet, the plan should consider further deployment of public WiFi in high-density public spaces as well as on RideOn buses and in shelters. Not only can public WiFi help activate many of our community places and buildings, but it also can make broadband more affordable and widely available to our residents, particularly those without the means to purchase the service.

The above issues are examples of what a full-fledged Digital Infrastructure Strategic Plan could address. I trust that robust and ongoing collaboration between the Council, the Executive, non-profits, federal institutions, and the private sector can bring to light many more innovative ideas and strategies. The possibilities are truly endless.

I look forward to working closely with you on this initiative.

Sincerely,



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