

MEMORANDUM

September 22, 2009

TO: Management and Fiscal Policy Committee
FROM: Dr. Costis Toregas, Council IT Adviser
SUBJECT: Kennedy Cluster Broadband Pilot

Expected to attend:

Charles L Short, Special Assistant to the County Executive
Don Kress, Kennedy Cluster Project Coordinator (MCPS)
Cary Kuhar, Director, Director of Infrastructure and Operations (MCPS)
Fran Brenneman, Director of School and Community-Based Services (HHS)
Carol McKenzie, Assistant Director, Mid-County Regional Center (RSC)
Mitsuko R. Herrera, Cable Administrator (DTS)
John Castner, Network Service Manager (DTS)

Summary of staff recommendations to the MFP Committee:

- 1. Encourage the Cable Communications Office and other relevant agencies to continue the planning for this effort and to implement the pilot project as soon as practical.*
- 2. Provide the Committee with a budget and timeline for the requested pilot once all parameters are known.*
- 3. Finalize Public Private Partnership discussions for the pilot, as well as for an ultimate full-county roll out of this effort.*

Background Information

The Committee met on June 22, 2009 to review progress on the establishment of a pilot project aligned with the Kennedy Cluster effort that would explore the provisioning of broadband services to school children once they left school in the afternoon- at home or elsewhere. In order to further explore options for this project, Council member Ervin met with several stakeholders on July 20 and provided a written follow up letter requesting explicit strategies; this letter is on ©1-3.

The Cable Communications administrator has prepared a document titled “Kennedy Cluster broadband Pilot” which is on ©4-14.

Staff observations

1. The Committee discussed the notion of the pilot project as a way to reach students, but also siblings and parents at home so that the benefits of a broadband connection investment would impact on parent/student/teacher communications, but also on resume writing, job seeking and other activities of family members. This aspect of benefit should not be left out of any ultimate plan, as it is needed and also because it would provide more justification for the start up costs.
2. The benefit of wireless solutions is that end users do not need to be pre-identified; registration to receive the service might be imposed, but the front end work to provide service to a specific student can be bypassed, thus simplifying efforts underway to identify students and perhaps significantly reducing cost estimates for an ultimate solution.
3. The broadband signal availability should not be limited to home locations. Recreation and community centers, social clubs, branch offices and other community gathering spots can be equally effective, and more cost-effective.
4. The training aspect for using broadband access to benefit a family member is non-trivial and must be carefully developed and deployed. This is where community partnerships are essential for deploying cost-effective solutions.
5. The percentages cited in the MCPS analysis do not correspond well with national statistics suggesting that the ranges of households having PCs or Internet access are much lower. As an example, the Census Bureau found that nationally, 61.6% of all households reported Internet use at home in 2007, a number much lower than the reported 86.8% in the Kennedy cluster student homes. Therefore the efforts of MCPS reported on ©10 to verify and sharpen the estimates are welcomed.
6. The initiatives around Public Private Partnerships, under which both governmental and private organizations would provide some resources and take some project risk are to be commended and should be continued aggressively.

7. The Cable Communications Administrator asked the Committee to consider criteria under which students would be provided free or subsidized broadband service at home. The pilot effort will provide the Committee with community response issues on which to base such a decision, but the offer should be made to all students who can receive the signal, and not limited to any pre-arranged grouping. Governmental provision of broadband for educational purposes is an accepted element of many “best practice” communities with WiFi systems who do not have to make such choices today.



MONTGOMERY COUNTY COUNCIL
ROCKVILLE, MARYLAND

VALERIE ERVIN
COUNCILMEMBER
DISTRICT 5

August 6, 2009

Ms. Mitsuko Herrera, Cable Administrator
Office of Cable and Communication Services
100 Maryland Ave.
Rockville, MD 20850

Dear Mitsi,

I am writing to follow up on our discussion, which took place on July 20, related to technology issues and future initiatives that I would like your office to pursue. While I understand that resources are limited for all departments and agencies, I believe that this is even more reason to evaluate how we allocate future resources, especially when various groups are performing similar activities.

My ultimate goal is to achieve efficiencies of scale by using state-of-the-art technology. Below are two initiatives that I would like to get your feedback on and to develop an action plan for how we can begin these projects. I have copied Councilmember Trachtenberg, Chair of the Management and Fiscal Policy Committee (MFP), on this letter, and I am requesting that both of these issues be discussed in the MFP Committee, which is currently scheduled for September 24.

Kennedy Cluster WiFi

Problem

The Council provides support to each child in the Montgomery County Public School System through an operating budget of more than \$2 billion. This support comes to an abrupt end when the child leaves the school grounds. A federal study of the National Assessment of Educational Progress, known as "the nation's report card," shows that despite higher scores for both black and white students, the achievement gap has remained largely unchanged. As you know, the Kennedy Cluster Project is a collaborative effort between county government, Montgomery County Public Schools, and community organizations to create a laboratory where the typical rules that often divide government departments can be suspended with the goal of identifying and addressing the underlying causes of the achievement gap between African-American students and their white peers.

Since factors both inside and outside of the classroom impact children, a multi-faceted approach is needed to address the achievement gap. A key component to closing this gap is technology. Current technology permits support to “stretch” from the school grounds to the home, where not only the child but also siblings and parents can take advantage of this investment.

Possible solution

Every school is provided with broadband connections. These connections can be transmitted over the air by WiFi antennas (called access points or APs) forming a network pattern called a mesh. The signal can be picked up by any modern laptop outfitted with a WiFi “radio” which is standard. This way, there is no need to pre-identify recipients, since the signal is provided to all.

Similar solutions exist in West Palm Beach, Florida, Corpus Christi, Texas and other jurisdictions. This approach has been attacked by some in the telecommunications industry as encroachment on their profitable Internet service model, but best practices show that this technology can be considered an educational element of government service.

Funding

Public private partnerships (PPPs) can be shaped to deploy this system. Creative partnerships with non-profit organizations or corporate donors could be created to provide Internet services to children in need and could potentially create jobs in economically stressed areas of the county. FiberNet can also be used to create connections, especially in places like recreation and community centers. APs are low cost and can establish secure, targeted and effective networks of service.

Scope of pilot

A pilot project in the Kennedy cluster of schools could extend for a two block radius of a single school, and if successful, can easily be expanded by adding APs to the network. Partnerships should also be created to train households on Internet connections, and usage and hardware can be provided by the school system. Resident volunteer efforts can help scale up the pilot quickly.

Montgomery News

Problem

Local news outlets provide limited coverage of county issues. The Montgomery County viewing area has nearly one million residents, most of whom are eager to follow news in the region. There seems to be no current organization that can move in and take advantage of this market.

At the same time, the manner in which the Cable Fund (over \$17.5 million) is distributed to stakeholders does not support unified programming efforts, but instead funds individual organizations for achieving individual goals. Given current budget constraints continued attacks on the Cable Fund can be expected, unless projects that produce results are given high priority and communicated to all who are impacted by the outcome.

Possible solution

Channel 16 has established a state-of-the-art studio using virtual studio technology that would facilitate a county- or state-wide collection, production and broadcast of news. Each of the PEG channels also has a competitive advantage in some aspects of news program production, such as engineers, producers, news sources, and local content. These assets could be interwoven into a collaborative news program supported by the Cable Fund and carried out by the PEG members.

Funding

Current Cable Fund allocations could be reallocated to support a two-tiered approach: an infrastructure element that would serve all PEG members with basic services and the technology required by all users. A portion of individual PEG programming support may be used to explore the feasibility of this concept.

Scope of pilot

A pilot effort could involve a two-hour, daily show using feeds from all of the current PEG members. If successful, this programming could be expanded for longer time periods. There may also be an opportunity to partner with other news outlets in the region.

I know that by working with your office, we can push forward innovative ideas and cost-effective approaches that benefit all of our residents. The current economic challenges facing the county requires all of us to think creatively to ensure residents are getting the most out of every dollar we spend. I am convinced that we can all succeed by working with our partner institutions. I look forward to following up with you on these issues at the Management and Fiscal Policy Committee meeting on September 24.

Sincerely,



Valerie Ervin

cc: Phil Andrews, President, Montgomery County Council
Duchy Trachtenberg, Chair, MFP Committee
Nancy Navarro, Councilmember, MFP Committee
Chuck Short, Special Assistant to the County Executive
Steve Emanuel, Director, Department of Technology Services
Costis Toregas, Legislative Analyst, County Council



DEPARTMENT OF TECHNOLOGY SERVICES

Isiah Leggett
County Executive

E. Steven Emanuel
Chief Information Officer

MEMORANDUM

September 22, 2009

TO: Management and Fiscal Policy Committee

FROM: Mitsuko R. Herrera, Cable Communications Administrator, 
Office of Cable and Communications, Dept. of Technology Services

SUBJECT: MFP – Kennedy Cluster Broadband Pilot

I. Executive Summary

Multiple County department and agencies are working to meet the goals of the Kennedy Cluster Project Implementation Plan. Broadband access outside of the classroom was not part of the November 2008 Implementation Plan, but at the request of Council and the County Executive, these same agencies have investigated the technical feasibility and potential public-private partnerships to provide more broadband access for students.

- An estimated 488 Kennedy Cluster students do not have Internet access at home and 354 students do not have a computer at home, based on MCPS surveys of third, fifth, sixth, eighth, ninth and eleventh graders at the five Kennedy Cluster schools.
- Extending FiberNet using wireless access points to an apartment complex or to a few blocks near a FiberNet site may cost \$118,000 plus internal staff costs, and may reach more students who have broadband at home than those without broadband at home. This estimate includes public-private partnerships to cover some costs and may be lower if Wi-Fi mesh network access points can be mounted on apartment buildings and use in-building power.
- Public-private partnerships are being explored to provide commercial broadband service to specific students.
- A federal grant and partnership with Project Reboot will be used to supply 100 computers to Kennedy Cluster students as part of the Broadband Pilot project.
- The Council may want to consider what criteria will be used to determine which students will be provided free or subsidized broadband service at home, as well as potential community reaction among similarly situated families who pay for broadband access at home.

II. Kennedy Cluster Project

A. Background

The Kennedy Cluster Project is a collaboration between Montgomery County Public Schools (MCPS) and Montgomery County Government to address the academic achievement gap among a pilot group of African-American families with children within the Kennedy High School Cluster. Pursuant to a 2009 Memorandum of Understanding, the Montgomery County Board of Education, Montgomery County Government, Montgomery County State's Attorney and Maryland Department of Juvenile Services have pledged to work collaboratively to break down institutional discrimination, reduce educational and social disparities, and address issues associated with poverty and its impact on school performance.

The Kennedy Cluster Project is a subset of the Kennedy High School Cluster. Students attend:

- John F. Kennedy High School
- Argyle Middle School
- Bel Pre Elementary School
- Georgian Forest Elementary School
- Strathmore Elementary School

Geographically, students reside in the Silver Spring 20906 zip code (Aspen Hill/Wheaton):

- | | | |
|---|-----|---|
| • North of Randolph Rd. | | • North of Bel Pre Rd. |
| • East of Georgia Ave. | | • East of Leisure World |
| • South of Bel Pre Rd. | and | • South of Norbeck Rd. |
| • West of Northwest Longbranch
(Anacostia River Tributary) | | • West of Wintergate Dr./Longmead
Crossing Dr./Layhill Rd. |

B. Objectives

In November 2008, the Kennedy Cluster Project created an Implementation Plan that was approved by the Kennedy Cluster Project Leadership Team, which was comprised of:

- Charles L. Short, representing County Executive-Isiah Leggett
- Hon. Valerie Ervin, Chair, Council Education Committee
- Hon. Nancy Navarro, (former) President, Board of Education (now Councilmember)
- Dr. Jerry D. Weast, Superintendent, MCPS

The Implementation Plan contained seven prioritized objectives and associated activities, cost estimates, timelines, designated responsible departments and agencies, and expected results. The "✓" symbol below denotes an accomplished objective component. Projected cost and responsible departments and agencies are listed below in parentheses.

Objective #1: Increase Use of Equitable Practices

- a) ✓ Develop cultural competency for employees and non-profits (\$TBD)(HHS/OCP/REC)

- b) Include Kennedy Cluster secondary schools in the MCPS Professional Learning Communities Institute (\$0)(MCPS)
- c) Evaluate alternative staffing strategies (\$0)(MCPS)

Objective #2: Improve Student Health & Well-Being

- a) Expand Linkages to Learning to all project middle and elementary schools (\$1,122,591 – start-up year; \$1,358,956 – 2d year)(HHS/MCPS/Vendors)
- b) ✓ Schedule fall vision and hearing screenings for 775 students (\$0)(HHS)
- c) Assess need for immunization clinics in schools (\$0)(HHS)
- d) ✓ Expand Summer Meals Program (\$115,000 annually)(MCPS)

Objective #3: More Parent Engagement

- a) Provide Parent Outreach Coordinator at each targeted school (\$303,811 annually)(MCPS)
(This has been provided at Georgian Forrest.)

Objective #4: More Students Ready to Learn

- a) Increase universal pre-school opportunities for all 3- and 4-year olds (\$516,522)(HHS/ESC/MCPS)

Objective #5: Sustained Collaboration Among Partners in Providing Information and Communication That Work with Kennedy Cluster students

- a) ✓ Conduct resource fairs (\$44,600)(HHS)
- b) Co-locate Gilchrist and Rocking Horse Centers (\$TDB)
- c) ✓ Develop Inter-Agency MOU for information sharing (\$0)(HHS/MCPS)
- d) ✓ Continue operation group meetings (\$0)(HHS)

Objective #6: Rich Out-of-School Environment for Students

- a) Fully operationalize Excel Beyond the Bell (EBB) (\$345,330+)(Collaboration Council/REC/HHS/CUPF)
- b) Provide refurbished computers (\$20,000)(MCPS)
- c) ✓ Heighten focus on the County's Positive Youth Development Initiative through the existing Kennedy Cluster community-based collaborative (Community Outreach and Education) (\$15,000)(Mid-County RSC/MCPD/MCPS/HHS/REC/Collaboration Council/MCPL)
- d) Create Summer Youth Employment Program (\$80,000)(REC/DED/OHR)
- e) Evaluate use of programmed after-school space (\$60,000)(REC/CUPF)
- f) Expand activity bus services (\$28,649)(MCPS)

Objective #7: Decrease Involuntary Housing-Related Factors that Lead to Student Mobility

- a) ✓ As a component of the Housing First Initiative, collaborate with landlords, property managers and property management firms to engage them in activities that will help them effectively intervene with tenants who are in danger of being evicted. (\$0)(HHS/SNH)
- b) Collaborate with HHS Homeless Services to provide housing support for families (\$101,757)(HHS/SNH)

C. Budget

The total projected cost for the Kennedy Cluster project was \$3,139,645. Due to significant County budget shortfalls, the Council was able to allocate the following funding:

- FY08: \$250,000 to MCPS and HHS for implementation and strategic planning.
- FY09: \$52,000 for MCPS Project Coordinator
- FY10: \$52,000 for MCPS Project Coordinator

In addition, HHS received a Federal grant for the County's Positive Youth Initiative Program. As part of this program, the Kennedy Cluster received \$65,786 for program staffing and costs associated with community outreach efforts. This grant funding expires September 30, 2009.

III. Kennedy Cluster Broadband Pilot

A. Background

In 2009, the County Executive and the MFP committee asked the MCPS Office of the Chief Technology Officer (OCTO) and the County Department of Technology Services to evaluate the technical and economic feasibility of providing broadband service to Kennedy Cluster students outside of the classroom. The County Executive recommended that shared computer labs in residential buildings not be excluded as a possible alternative and the MFP committee requested that wireless delivery options be explored. In July 2009, the MFP committee recommended that a pilot program plan be developed to provide broadband service and computers to 100 students as an initial step.

The Office of the County Executive, County Departments of Health and Human Services, Mid-County Regional Services Center, Technology Services, and MCPS OCTO, have taken the following actions to develop a pilot plan:

- Compiled available broadband data and initiated follow-up student surveys
- Analyzed technical and operational feasibility
- Performed residential multi-dwelling unit site visits and contacted landlords
- Estimated projected costs
- Explored public-private partnerships
- Applied for American Recovery and Reinvestment Act (ARRA) broadband grant funding

The Broadband Pilot working group considered the following means of delivering broadband service to students:

- Wi-Fi emanating from a FiberNet site
- Extend FiberNet to provide Wi-Fi in a residential complex with high student density
- Extend FiberNet to an HOC property on-site public computer room
- Complimentary or subsidized commercial broadband service

B. Kennedy Cluster Student Characteristics

As a threshold matter, the Broadband Pilot working group sought to answer the following questions:

- *How many Kennedy Cluster students do not have broadband access at home?*
- *Where in the Kennedy Cluster do students without broadband access live?*

Questions regarding Internet access and home computers are included in MCPS's annual survey of school support services and the US Census asks whether a household has a computer. But neither of these surveys asks respondents to distinguish between low-speed Internet access, which may enable e-mail and slow-loading Internet searches, versus high-speed broadband access that enables robust Internet searches, web-streaming, and downloading of large files. In addition, the ability to complete some surveys on-line may skew results by making it easier for respondents with home computers and broadband access to participate in such surveys versus other respondents.

1. Overall At-Home Internet and Computer Access

An analysis of MCPS 2008-09 Supporting Services survey and enrollment data released August 1, 2009, suggests the following conclusions regarding Kennedy Cluster student at-home Internet and computer access and computer use data.

- **488 students do not have Internet access at home** in the Kennedy Cluster. Thus, the percentage of students without Internet access at home in the Kennedy Cluster is 82% higher than the County average (13% v. 7.3%).
- **354 students have no computer at home** in the Kennedy Cluster. Thus, the percentage of students without a computer at home in the Kennedy Cluster is 100% higher than the County average (9.6% v. 4.8%).
- The percentage of students who strongly agree or agree with the following questions is slightly higher in the Kennedy Cluster as compared to the County:
 - "I can use my school's computers before or after school." (62.4% v. 59.0%)
 - "I often use computers to do school work." (65.4% v. 64.7%)
 - "Computers help me do a better job on school work." (77.7% v. 74.7%)
- The percentage of students who strongly disagree or disagree with the following questions is slightly lower in the Kennedy Cluster as compared to the County:
 - "I can use my school's computers before or after school." (22.9% v. 23.4%)
 - "I often use computers to do school work." (28.7% v. 29.5%)
 - "Computers help me do a better job on school work." (14.7% v. 16.5%)

Survey data is attached. In addition to the three questions listed above, students were asked, "Do you have an Internet connection (i.e., can access the Web) from your home computer?" and "Is there a computer in your home?" Students were not asked about the speed or performance of their home broadband connection or computer. MCPS surveyed third, fifth, sixth, eighth, ninth, and eleventh graders with a 77% participation rate in the Kennedy Cluster reaching 36% of all Kennedy Cluster students (80% and 46% respectively, County-wide). Bel Pre Elementary School has students enrolled in kindergarten through second grade, so they were not among the surveyed students. Survey participation among high school and middle schools students

(83% and 76%) was higher than participation among elementary school students (58% and 53%). Students completed on-line surveys in school computer labs between November 2008 and January 2009. Responses from students who did not attend school on the day each class met in the computer lab may not be included in the survey results and some students may not have answered all questions.

With those caveats, it appears from the survey that Kennedy Cluster students use computers and have Internet and computer access at rates similar to other County students. However:

- The percentage of Kennedy Cluster students without Internet and computer access is significantly higher than other County students.
- County students without broadband and computer access may be concentrated in regions like the Kennedy Cluster.

2. Target Students Concentrated in Apartment Complexes

The five school principals in the Kennedy Cluster identified five apartment complexes as likely to have high concentrations of Kennedy Cluster students:

- Peppertree Apartments – 191 KC students
- Cinnamon Run Apartments at Peppertree – 121 KC students
- Ridgewood Apartments – 77 KC students
- Strathmore House Apartments – 64 KC students
- Georgian Court Apartments (HOC Property) – 60 KC students

During the week of September 7, 2009, MCPS school staff (principal, assistant principal, counselor) individually surveyed Kennedy Cluster students residing in the Cinnamon Run Apartments to determine whether students had a computer at home and Internet access. 208 MCPS students reside in Cinnamon Run, 121 attend Kennedy Cluster schools, and all of those 121 students were surveyed. However, in these surveys, only students who answered yes to the question, “Is there a computer in your home,” were asked, “Do you have an Internet connections (i.e., can access the Web) from your home computer?”

	Cinnamon Run Students	Students with a Computer at Home				Internet Access Among Cinn. Run Students with Computer at Home			
		Cinnamon Run	Kennedy Cluster	Mont. Co. HS, MS, ES		With Internet Access at Home	Without Internet Access at Home		
Kennedy HS	27	22	82%	92%	96%	20	91%	2	9%
Argyle MS	13	10	77%	94%	95%	9	90%	1	10%
Bel Pre ES	16	11	69%		94%	6	55%	5	46%
Georgian Forest ES	47	27	57%	86%		20	74%	7	26%
Strathmore ES	18	10	56%	89%		9	90%	1	10%
TOTAL	121	80	66%	90%	5%	64	80%	16	20%

The percentage of students without computers at home is significantly higher among Cinnamon Run students as compared to all Kennedy Cluster or County students, especially among elementary school students. This could suggest unreliability in survey data or that students without computer access are clustered in multi-dwelling units such as Cinnamon Run. By comparison, in the Kennedy High School 2005 Census Update Survey, computer ownership is

high across different household structures and median incomes.

- Single-family dwelling households reported 2004 median incomes of \$97,630 and 88% computer ownership.
- Multi-family dwelling households reported 2004 median incomes of \$38,585 and 84% computer ownership.

Moreover, the Cinnamon Run survey results suggest that among households with computers, there is a very high Internet access rate. In light of this contradictory data:

- MCPS will perform a more comprehensive survey of broadband and computer access and attempt to identify the specific number and addresses of all students without broadband access.

3. Broadband Access Conclusions

The MCPS student survey data suggests that targeted broadband deployment is necessary for the Kennedy Cluster Broadband Pilot to be successful.

- The estimated number of Kennedy Cluster students without broadband access (488) may be concentrated among a handful of apartment buildings.
- A FiberNet Wi-Fi broadband pilot should be targeted to provide service to an apartment complex with a high concentration of students without broadband access at home.
- Given the relatively small number of students without broadband access at home, an individually-targeted complimentary or subsidized commercial solution may be the most secure, manageable and cost effective solution.
- MCPS is in the process of surveying students to identify specific students without broadband or computer access, and their addresses, so that the actual scope, location, and concentration of students without broadband or computer access can be determined.

C. Broadband Pilot Models

The working group examined the technical feasibility and cost of providing FiberNet wireless or wireline, and commercial wireline or wireless broadband service to Kennedy Cluster students without broadband access at home.

1. Wireless FiberNet

The working group examined suggestions to provide wireless broadband service by placing a Wi-Fi mesh network in a Kennedy Cluster neighborhood. In addition to Wi-Fi access points, a Wi-Fi mesh network would require:

- mounting infrastructure 20 and 30 feet from the ground
- power source
- backhaul connection
- high-speed Internet connection
- line of sight between wireless access points
- limited tree cover

Power is commonly obtained by mounting Wi-Fi access points to a street light pole, traffic signal infrastructure, or to a building, and then drawing power from where it is available at low marginal costs. Alternatively, solar power cells can be installed. The presence of mature trees may also disrupt the ability of wireless access points to communicate with each other to create a mesh network capable of penetrating apartment buildings. In such cases, end users commonly purchase special antennae with long leads to pick-up the network signal through a network-facing window of the home. DTS has the ability to provide backhaul and Internet access through public-private partnerships.

a. Wi-Fi Mesh from a FiberNet Site

Within the Kennedy Cluster, there are six locations connected to FiberNet: Kennedy High and Argyle Middle Schools, two fire stations, one police station, and MNCPPC Brookside Gardens. However, based on the relatively small number of students who stated they do not have Internet access at home, adding wireless access points to these sites may result in duplicate provisioning of broadband access to students who already have broadband at home and too little provisioning of broadband service to students who do not have broadband.

b. Wi-Fi Mesh to an Apartment Building Complex

Based on information provided by school principals, the working group searched student address databases to determine the number of students living in each of the five apartment complexes identified as having high concentrations of Kennedy Cluster students, and further performed site visits to identify a technically advantageous apartment complex. Unfortunately, all of the apartment complexes pose technical challenges to the success of the project.

- Each complex is comprised of several two-, three-, or four-storied buildings, thus requiring additional wireless access points to reach all apartments.
- There is no available infrastructure on which to mount a Wi-Fi mesh network. Permission from building owners to mount on the building, or installation of new poles and a power supply will be required.
- Tall trees surrounding the buildings will need to be trimmed.

Based on the student database and site surveys, **Cinnamon Run Apartments at Peppertree** was identified as the best potential candidate. Cinnamon Run is a seven-building complex that is home to 121 Kennedy Cluster students. 16 of 80 students with home computers do not have broadband access at home (20%), 41 students do not have a home computer (34%), and a significant percentage of those 41 students may not have broadband access. Thus, there are potentially 57 Kennedy Cluster students residing in Cinnamon Run without broadband access at home. Pending a Radio Frequency analysis of Wi-Fi signal propagation within the apartment complex, it may be feasible to mount Wi-Fi mesh network access points on the buildings for approximately \$118,000. This estimate includes equipment provided through public-private partnerships, but may be lowered further through additional partnerships with building owners. The pilot would require \$7,000 in annual maintenance, unknown customer service support costs, and potential Internet access costs in future years.

- **Mounting & Power.** Efforts are underway to obtain permission from the building owner to mount the Wi-Fi access points on the buildings and use in-building power. Obtaining such permission could potentially reduce infrastructure mounting costs.

- If permission cannot be obtained, approximately eight 20-foot poles will need to be installed and powered. It may cost \$9,800 per pole, or \$78,400 total, depending on how power is provided at the pole.
- Vendors to install poles and mount wireless access points have not expressed interest in donating their services.
- **Equipment.** Equipment vendors have expressed interest in donating wireless access point equipment but sales staffs have since turned over.
 - If the equipment is not donated, the total costs are estimated to be \$16,000 for routing and bridging equipment and \$20,000 for wireless access points.
- **Internet Access.** One vendor has expressed interest in providing free Internet service for the pilot.
- **Maintenance and Operation.** Based on the Bethesda and Silver Spring Wi-Fi hot spot costs, the Kennedy Cluster pilot site would require \$7,000 in annual maintenance.
 - Budget resources for use of internal County DTS staff have not yet been determined.
 - Service level agreements and budgets for service outage repairs and customer service support will need to be developed.
 - Password protection and the ability to update credentials will need to be explored to determine whether the pool of potential users should be limited either to contain operational support costs, increase network capacity, or minimize impact to commercial wireless providers.
- **Computer Equipment.** Computers, wireless air cards, and potentially, printer costs, would increase the pilot cost.
 - *Mid-County RSC has contracted with Project Reboot to supply 100 computers for the pilot using the federal grant noted above.*
 - Due to budget shortfalls, MCPS has had to extend the replacement cycle for student computers and therefore cannot donate old computers.

In sum, installing a Wi-Fi mesh network may require a significant investment, as well as an operating cost commitment, to provide service to a limited number of students where the number of students without broadband access may change over time.

c. FiberNet to HOC Property

Approximately sixty MCPS students reside at the Georgian Court Apartments. This property is owned by the Housing Opportunities Commission. Housing Choice Voucher participants, earning \$10,000 to \$13,000 annually, are eligible to live in this property. The County submitted competitive grant applications for broadband infrastructure and public computer applications under the American Recovery and Reinvestment Act. As part of these applications, the County requested funding to extend FiberNet to this property, and to provide eight new computers with appropriate software for the Georgian Court public computer lab.

2. Commercial Broadband Service

The County has been in contact with commercial broadband providers to determine if they would be willing to donate broadband service to a limited number of Kennedy Cluster students. The County is working with vendors to determine:

- Whether DSL service could be provided to Cinnamon Run.
- Whether terrestrial or satellite wireless broadband could be provided using the Project Reboot computers.

Overall, the working group determined that commercial wireless broadband may be more feasible and useful. Many students change residences over the school year or may reside in multiple residences, such as under a joint custody arrangement, during the year. Therefore, having a commercial wireless card that could travel with the student or be turned in easily may be a better solution than hard-wiring specific homes for cable modem service. DSL is being considered, however, because it may not require any additional wiring.

IV. Next Steps

- The next step will be to complete the surveys of Kennedy Cluster students to determine the number of students without broadband access and where they are concentrated within the Kennedy Cluster.
- 100 computers for students without computer will be available within the next few weeks.
- The County will continue to seek to build public-private partnerships with commercial broadband service providers.
- Additional work to add wireless access points to FiberNet will be placed on hold pending results of the additional student surveys.
- The Council may want to consider what criteria will be used to determine which students will be provided broadband service and what community reaction may be among similarly situated families who pay for broadband access at home.

MCPS 2008-09 Survey of Supporting Services -- Student Results

ACCESS AT HOME & AFFIRMATIVE COMPUTER USE	KENNEDY CLUSTER	Number of Students	Survey Participation Rate	# of Survey Responses	Est. # of Surveyed (3d/5th 6th/8th 9th/11th)	% of Total School Students Surveyed	Internet Access at Home		Computer at Home		Computer Use (% Strongly Agree and Agree)						
							Survey %	Extrapolated School Total	Survey %	Extrapolated School Total	I can use my school's computers before or after school	Extrapolated School Total	I often use computers to do school work.	Extrapolated School Total	Computers help me do a better job on school work	Extrapolated School Total	
	Kennedy HS	1,552	83%	718	865	56%	90.7%	1,408	91.5%	1,420	76.0%	1,180	73.6%	1,142	82.4%	1,279	
	Argyle MS	765	76%	172	226	30%	89.9%	688	93.5%	715	77.3%	591	78.9%	604	86.2%	659	
	Bel Pre ES (K-2)	477	Not Available -- No 3rd or 5th Graders*					80.9%	386	87.5%	417	38.5%	184	48.6%	232	67.5%	322
	Georgian Forest ES	495	58%	81	140	28%	76.9%	381	86.4%	428	39.5%	196	47.6%	236	67.9%	336	
	Strathmore ES	398	52%	52	100	25%	84.8%	338	88.5%	352	37.5%	149	49.6%	197	67.1%	267	
	TOTAL	3,687	77%	1,023	1,331	36%	86.8%	3,199	90.4%	3,333	62.4%	2,291	65.4%	2,411	77.7%	2,863	
ACCESS AT HOME & AFFIRMATIVE COMPUTER USE	ALL COUNTY SCHOOLS	Number of Students	Survey Participation Rate	# of Survey Responses	Est. # of Surveyed (3d/5th 6th/8th 9th/11th)	% of Total School Students Surveyed	Internet Access at Home		Computer at Home		Computer Use (% Strongly Agree and Agree)						
							Survey %	Extrapolated School Total	Survey %	Extrapolated School Total	I can use my school's computers before or after school	Extrapolated School Total	I often use computers to do school work.	Extrapolated School Total	Computers help me do a better job on school work	Extrapolated School Total	
	High School	63,382	82%	16,422	20,027	32%	94.7%	60,023	95.8%	60,720	78.9%	50,008	76.9%	48,741	80.4%	50,959	
	Middle School	30,713	86%	17,526	20,379	66%	93.7%	28,778	95.2%	29,239	57.8%	17,752	65.1%	19,994	76.3%	23,434	
	Elem School	44,416	73%	16,833	23,059	52%	89.1%	39,575	94.4%	41,929	31.4%	13,947	47.1%	20,920	65.6%	29,137	
	TOTAL	138,511	80%	50,781	63,465	46%	92.7%	128,375	95.2%	131,887	59.0%	81,707	64.7%	89,655	74.7%	103,530	
WITHOUT ACCESS AT HOME & NEGATIVE COMPUTER USE	KENNEDY CLUSTER	Number of Students	Survey Participation Rate	# of Survey Responses	Est. # of Surveyed (3d/5th 6th/8th 9th/11th)	% of Total School Students Surveyed	No Internet Access at Home		No Computer at Home		Computer Use (% Strongly Disagree and Disagree)						
							Survey %	Extrapolated School Total	Survey %	Extrapolated School Total	I can use my school's computers before or after school	Extrapolated School Total	I often use computers to do school work.	Extrapolated School Total	Computers help me do a better job on school work	Extrapolated School Total	
	Kennedy HS	1,552	83%	718	865	56%	9.30%	144	8.50%	132	12.3%	191	20.2%	314	10.9%	169	
	Argyle MS	765	76%	172	226	30%	10.10%	77	6.50%	50	12.0%	92	18.7%	143	7.6%	58	
	Bel Pre ES (K-2)	477	Not Available -- No 3rd or 5th Graders*					19.10%	91	12.50%	60	40.5%	193	43.9%	209	22.9%	109
	Georgian Forest ES	495	58%	81	140	28%	23.10%	114	13.60%	67	45.7%	226	45.1%	223	23.1%	114	
	Strathmore ES	398	52%	52	100	25%	15.20%	60	11.50%	46	35.3%	140	42.6%	170	22.7%	90	
	TOTAL	3,687	77%	1,023	1,331	36%	13.2%	488	9.6%	354	22.9%	843	28.7%	1,059	14.7%	541	
WITHOUT ACCESS AT HOME & NEGATIVE COMPUTER USE	ALL COUNTY SCHOOLS	Number of Students	Survey Participation Rate	# of Survey Responses	Est. # of Surveyed (3d/5th 6th/8th 9th/11th)	% of Total School Students Surveyed	No Internet Access at Home		No Computer at Home		Computer Use (% Strongly Disagree and Disagree)						
							Survey %	Extrapolated School Total	Survey %	Extrapolated School Total	I can use my school's computers before or after school	Extrapolated School Total	I often use computers to do school work.	Extrapolated School Total	Computers help me do a better job on school work	Extrapolated School Total	
	High School	63,382	82%	16,422	20,027	32%	5.3%	3,359	4.2%	2,662	11.1%	7,035	17.8%	11,282	12.0%	7,606	
	Middle School	30,713	86%	17,526	20,379	66%	6.3%	1,935	4.8%	1,474	22.7%	6,972	30.2%	9,275	15.6%	4,791	
	Elem School	44,416	73%	16,833	23,059	52%	10.9%	4,841	5.6%	2,487	41.3%	18,344	45.8%	20,343	23.5%	10,438	
	TOTAL	138,511	80%	50,781	63,465	46%	7.3%	10,136	4.8%	6,624	23.4%	32,351	29.5%	40,900	16.5%	22,835	

* Bel Pre is a K-2 elementary school. Average of Georgian Forest and Strathmore Elementary School percentages were used to estimate Broadband and Computer Access and Computer Use. Source: MCPS student surveys completed November 2008 to January 2009. Students completed on-line surveys using school computer labs.