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## MEMORANDUM

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**TO:** PAUL BERLANT  
EXECUTIVE OFFICER, MARIN GENERAL SERVICES AUTHORITY

**FROM:** DICK NIELSEN, SR. ENGINEER, CBG COMMUNICATIONS, INC.

**SUBJECT:** UPDATE ON THE WIRELESS BROADBAND PILOT PROJECT

**DATE:** November 5, 2008

**CC:** TOM ROBINSON, EXECUTIVE VICE PRESIDENT, CBG COMMUNICATIONS, INC.

CBG Communications, Inc. (CBG), on behalf of the Marin General Services Authority (MGSA) has been involved in a project over of the past few months working with Golden Gate Transit (GGT, part of the Golden Gate Bridge District) on a wireless broadband on busses pilot project. The GGT has developed a pilot project whereby they have deployed a wireless broadband system serving riders on two of its longer bus routes (route 72X and Route 75). This pilot project's goal is to determine if internet access aboard its busses may increase ridership: specifically on these longer routes and potentially aboard all of its busses serving all of its routes (and potentially Marin Transit routes as well) if the pilot is successful. It was determined that cooperation between the MGSA and the GGT may be fruitful for both entities in determining the value to riders, citizens and agencies of mobile internet access outside of more traditional wired access. In addition, this study will help determine how a wireless broadband network might benefit the citizens of Marin County while creating new, and enhancing existing, connectivity for governmental agencies, including those employees working remotely in the County.

## **Status of GGT Pilot Project**

As previously outlined in a memo to Paul Berlant sent on September 3, 2008, CBG, during the last week in July, 2008, performed testing of the Wi-Fi system operating on the GGT's route 72X and Route 75 busses. The busses are outfitted with cellular-based equipment operating on Sprint's cellular network for backhaul from the busses to the internet. The busses have equipment installed that gateway this backhaul network to a Wi-Fi network that allows riders to access the internet while commuting.

Based on our testing, it was found that users could perform numerous Internet enabled tasks such as accessing files from their employer's network and searching the web for research. In addition, access to the Internet allows personal and business functions such as reading and sending e-mails, online banking and shopping as well as reading, listening to or watching updated news stories. In addition, riders could enjoy entertainment via the Internet such as watching videos and listening to radio stations.

CBG, in cooperation with the GGT, developed two surveys that can be taken by persons utilizing the bus network. The first survey is designed to gather initial demographic information from the users while the second survey gathers information and opinions on the usability and value of the network. This second survey can only be taken after participants have completed the demographic survey and can be taken by users on a weekly basis. Each person that fills out the survey will receive 1 free bus pass per week for their participation.

The demographic survey has taken some time to implement in part because the vendor supplying the broadband system had to redesign and perform programming changes to the GGT splash page so riders would see the survey when they first signed onto the network. The survey went live on or about Friday October 24, 2008. As of Thursday October 30<sup>th</sup>, 18 people have taken the initial demographic survey and have agreed to complete the weekly usage survey.

## **Benefits of the Surveys**

Based on the numerous applications that are enabled by the bus network, we developed surveys to better understand what demographic groups gain the most value from the network and what

specific applications they utilize while riding the bus. The surveys include demographic based questions as well as the following:

- Date, Bus route # and time logged in
- Experience of any outages during the time desired to access the Wi-Fi system
- Upload and download speed that is obtained while on the bus (if known)
- Different types of applications utilized while connected to the Wi-Fi system on the bus
- Importance of being able to access the internet on the bus
- Top reason as to why it is important to have the ability to access the internet on the bus
- Other buses, bus routes, bus stops, transit centers or other modes of public transportation where the user would like to see Wi-Fi service available
- Other public locations besides public transportation where the user would like to see Wi-Fi service available
- Overall satisfaction level with the Wi-Fi service on the bus
- Other comments about the experience with Wi-Fi service on the bus today

## **Findings to date**

The goal of the network testing in July, 2008 was to determine how riders on the equipped busses could potentially utilize the network to allow them to be fully productive mobile internet users while spending as much as 2 hours going to work and 2 hours commuting home on the bus (4 hours total out of a 24 hour day). The findings of this testing indeed showed that riders could utilize many internet based applications such as e-mail, file transfers, web surfing and various forms of Internet information gathering. These applications could potentially increase the riders' productivity while minimizing time needed for these tasks while not riding the bus.

The survey results will show how the network performs with multiple riders on line at the same time and what specific applications are being utilized by these riders. This will demonstrate how the network benefits the riders and thus what value the riders perceive from the network. From these findings we will be able to translate the GGT Wi-Fi enabled network, utilizing a cellular based network for backhaul, into networks that can be utilized by MGSA member agencies in

both a mobile environment as well as for remote stationary applications. As discussed in the September 3, 2008 memo, mobile applications could include setting up a cellular connection at a disaster site or during a major event and then utilizing Wi-Fi technology to offer connectivity to critical employees located in the area. Some of the remote applications could include network access for Public Works employees working in areas that do not have ubiquitous internet access options today, such as Western portions of Marin County. Remote sites could be established at facilities such as pump stations, stream gauging stations and precipitation gauge stations. These remote locations could be served by a cellular network connection for monitoring purposes while providing the backhaul for a Wi-Fi or other wireless network.

### **Next Steps**

Based on findings from the surveys, the MGSA will better understand what applications can be utilized on a network similar to the GGT's pilot network and therefore who within the County would benefit from additional remote and mobile network connectivity. Applications available via a MGSA-member run network such as the GGT's network might include: Citizens in remote areas where Internet access would be offered for the first time, employees including Public Safety and Public Works employees who would gain additional network access and potentially improved performance over what is available today, and many others. The survey results may also help promote the benefits of such a network and motivate employees to utilize mass transit and become involved in the Green Commute program. It is anticipated that feedback from the surveys will be completed before the middle of December with a Report on the findings being submitted by the end of December.

Please don't hesitate to contact me if you have any questions or need additional information.