

DEPARTMENT OF PUBLIC WORKS

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ALL AREA CODES ARE 415

December 17, 2008

Farhad Mansourian, RCE
Director

MERA Board of Directors
371 Bel Marin Keys Blvd., Suite 100
Novato, CA 94949

Re: MERA Operational Committee Recommendations.

Dear Directors,

The MERA Operations Staff was tasked to investigate/perform the following issues and tasks:

- 1) System coverage issues,
- 2) System capacity during day to day and storm operations,
- 3) Growth in the number of mobile and portable radios,
- 4) Training of all radio users.

1) Coverage

Coverage issues were noted in the North, West and South county areas. The coverage problems came to light following the commencement of day-to-day operations in all areas of the county. The consulting firm DeltaWrx was hired to survey review and document these problems. In addition they were tasked to work with Motorola to provide cost effective coverage solutions. The proposed coverage solutions were divided into "Short Term" and "Longer Term" solutions:

Short Term

- Replace the receive antenna at Sonoma Mountain to improve coverage in the North County area. - The antenna was replaced and Novato Fire noted an improvement in coverage.
- Review system simulcast timing parameters and change if necessary. - The system timing parameters had been previously optimized and no changes were required.
- Add receiver amplifiers at the North County and Tiburon sites. - Amplifiers were added as requested.

Longer Term

- Develop a new MERA site at the proposed Verizon Cellular site in the Tomales area - The establishment of this site would provide substantial coverage improvement in the West Marin area. The anticipated cost for this option is \$2,000,000. No new radio channels are required as the "Bodega" channels would be moved to this new location. No new mobile and portable programming would be required.
- Install a new 5 channel Intelre-repeater system at Twin Peaks in the San Francisco area to improve coverage in the Southern Marin and GGNRA areas. The anticipated cost for the hardware to implement this option is \$500,000. The Twin Peaks solution requires five new radio channels be licensed in the San Francisco area. The negotiation for these new channels could approach \$1,000,000, if any can be identified. All mobile and portable radios would need to be reprogrammed.
- Install a fixed, single channel "extender" on Angel Island to improve coverage in the Southern Tiburon area. The option would install a fixed single talkgroup channel extender for limited operations. The cost of this option is estimated to be \$120,000. A single new radio channel would be required and all mobile and portable radios would need to be reprogrammed. The single channel extender would be shared by all radio users in the Tiburon area.

2) Capacity

A trunked radio system derives its efficiency from pooling all of its resources (radio channels) and allocating them when and where they are needed. The trunking concept allows there to be less radio channels than there are operational needs (talkgroups). Allocation of the radio channels is based on the probability that not everyone will actually talk on the radio at exactly the same time. On a typical day the MERA system handles approximately 12,000 to 13,000 radio transmissions, approximately 40 hours of radio air-time, and experiences 26 to 30 seconds of busy time. A typical day has approximately 60 talkgroups registered on the system available for use. A talkgroup can be a dispatch group, a command group, a tactical group, a maintenance group or any other predetermined function. Each talkgroup occupies from one to five radio channels depending on the type of call and the location of the radio listeners. See exhibit "A" for more details on trunking concepts.

During the floods of January 4, 2008, the number of radio transmissions doubled, the amount of air-time doubled, the number of registered talkgroups doubled, and the busy time increased by over 2,000 times. Sometimes, Law and Fire radios experienced lengthy wait times, with non-law and fire radios being completely dropped off of the system due to their lower priority. System capacity was exceeded by over 20%. Storms and flooding are the prime examples of conditions which can result in severe loading of the system, but busy conditions are not limited to storm days only.

On May 16, 2008 system busy conditions affected the entire system for nearly four hours. The result of a structure fire that broke out in the Novato area, Novato Police Department providing traffic control, a task force operation was underway in Southern Marin and various medical and hospital communications were underway.

While busy conditions may last for only a few hours, they could be extended to days or weeks during a catastrophic event. During system busy periods, even higher priority Fire and Law radios experience busy conditions. Essential services such as all DPW's, Marin County Transit, Humane Society, Marin Center, Marin Fair, all agency administration channels, radio maintenance, parks, and community service districts are effectively kicked off the system and cannot communicate.

The Operations committee members and DPW staff have identified an alternative to eliminate most of the busy conditions outlined above. The alternative not only expands the number of channels on the East and West portions of the MERA system, but reaches outside of the box and incorporates solutions external to the MERA network itself while retaining the desired level of interoperability required for MERA members. The recommended option:

- a. Adds 1 new radio channel to the "West" cell
- b. Adds 2 new radio channels to the "East" cell
- c. Transfers the day to day, in-house Jail traffic to a separate radio channel not on the MERA system while retaining interoperability
- d. Transfers the Marin County Transit day to day radio traffic to a separate radio channel not on the MERA system while retaining interoperability
- e. Utilizes the Fire Department VHF overlay system for at least 50% of the fire tactical radio traffic during designated 'busy' conditions.

The approximate cost of this option is \$2,000,000 which includes the negotiated cost of 5 new radio channels. All MERA members benefit from this option which lowers the anticipated number of busies to an acceptable level of under 3%, provides a dedicated channel for jail and a dedicated radio channel for Marin County Transit activities even when the MERA system is busy. This option allows for easy interoperability with the MERA network since everyone uses their existing mobiles and portables.

3) Growth in the number of mobile and portable radios

- The number of radios on the system is increasing by approximately six radios per month. Every new radio on the system increases the chance that additional talkgroups will be used and busy conditions will occur.
- The original system design calculations were based on 1,580 radios. The initial purchase was increased to 2,221 radios during the years from system

design to initial implementation. Today there are 2,796 radios in the system. This is an increase of 575 radios since the initial purchase.

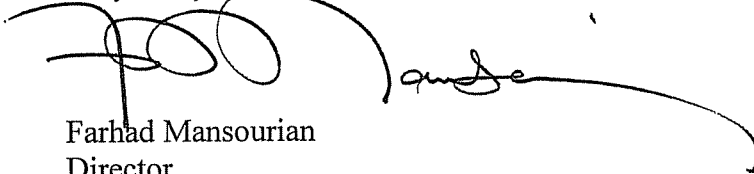
4) Training

- With great pleasure I want to report that over 2,500 radio users have been re-trained on the proper use of the system. The training included; a) an overview of basic system construction, b) the operation of mobile and portable radios during day-to-day and "storm" conditions, c) the proper use of talkgroups and incident command escalation procedures.
- Dispatcher training has been completed and is available for refresher training on the MERA website and other electronic methods.
- Supervisory scenario training is being prepared and reviewed. The updated training is scheduled for January 20 and 23, 2009.

Finances

The recommended projects will cost approximately \$4,000,000.

Very Truly Yours,

A handwritten signature in black ink, appearing to read 'Farhad Mansourian', with a long horizontal flourish extending to the right.

Farhad Mansourian
Director

cc: Maureen Cassingham
Shelly Nelson
Richard Chuck
Operations Committee Members

TRUNKING SYSTEM REVIEW EXHIBIT A