# STATEWIDE EMERGENCY COMMUNICATIONS BOARD

April 25, 2016
3:00 P.M.
Chair: Mark Dunaski
Public Safety Interoperable Communications Conference
Terry Haws Exhibit Hall
St. Cloud River's Edge Convention Center
*Call in Number: 1-888-742-5095*
*Call in code: 2786437892#*

## MEETING AGENDA

**Call to Order**

**Approval of Today's Agenda**

**Approval of Previous Meeting's Minutes**

**Announcements**

**Reports of Standing Committees:**

***Operations and Technical Committee (Glaccum)***

1. EF Johnson VP400 and Motorola APX 8000 Radio Testing Results — ***Action Item***
2. Marshall County Participation Plan — ***Action Item***
3. Change Management Standard — ***Action Item***
4. SOAR/Change Management — ***Action Item***
5. Standard 2.17.0 Multigroup/Announcement — ***Action Item***
6. Standard 3.32.0 Statewide Interoperable Plain Language Policy — ***Action Item***
7. Mille Lacs County Participation Plan Amendment — ***Action Item***

***Interoperability Committee (Thomson)***

***Legislative & Government Affairs Committee (Workman)***

***Steering Committee (Hartog)***

***IPAWS Committee (Seal)***

***NG911 (Pankonie)***

***Interoperable Data Committee (Risvold)***

- Report on FirstNet Consultation Project 2016 Goals
- FirstNet Update

***Finance Committee (Gerlicher)***

**Reports – Other**

- ARMER Project Status Report (MnDOT OSRC)

- ECN Update (Mines, DPS ECN)
    - Status of SECB Initiatives
        - GIS Project
        - Text-to-911
        - 7.19 Upgrade
        - FirstNet

## Old Business

## New Business

## Adjourn

# STATEWIDE EMERGENCY COMMUNICATIONS BOARD

## MEETING MINUTES

March 24, 2016

**Attendance**
**Members:**

| MEMBER/ALTERNATE | REPRESENTING |
|---|---|
| Mark Dunaski (Chair)/Jackie Mines | DPS |
| Mukhtar Thakur/Tim Lee/Jim Mohn | MnDOT |
| Thomas Baden/Ed Valencia | MNIT |
| Rodmen Smith/Dan Kuntz | DNR |
| Rochelle Schrofer/Tim Boyer | MN State Patrol |
| Vince Pellegrin/Thomas Humphrey | METC |
| Bill Droste/ Vacant | League of MN Cities, Metro |
| Eric Anderson/Pat Novacek | League of MN Cities, Greater MN |
| Liz Workman/vacant | Assoc. of MN Counties, Metro |
| Jim McMahon/vacant | Assoc. of MN Counties, Greater MN |
| Chris Caulk/Darlene Pankonie | MSA, Metro |
| Dan Hartog/Scott Turner /Jeff Marquart | MSA, Greater MN |
| Mike Gamache/Andrew Johnson | MESB |
| Mike Risvold/vacant | MN Chiefs of Police Assoc., Metro |
| Cari Gerlicher/Dave Thomson | MN Chiefs of Police Assoc., Greater MN |
| Ulie Seal/Vacant | MN Fire Chiefs Assoc., Metro |
| T. John Cunningham | MN Fire Chiefs Assoc., Greater MN |
| Joe Glaccum (Vice Chair)/vacant | MN Ambulance Assoc., Metro |
| Brad Hanson/Paul McIntyre | MN Ambulance Assoc., Greater MN |
| Jeff Jelinski/Nancy Schafer | Central MN ESB/Northeast ECB |

Also in attendance:
Cathy Anderson DPS-ECN
Carol-Linnea Salmon, DPS-ECN
James Stromberg, DPS-ECN
Rick Juth, DPS-ECN
Jill Rohret, MESB
Carrie Oster, Motorola
Scott Wosje, Northland Business Solutions
Joe Reichstadt, Metro Transit
John Hunt, FirstNet

DRAFT

## CALL TO ORDER

Commissioner Dunaski calls the meeting to order at 12:32 p.m.

## APPROVAL OF AGENDA

Chair Dunaski calls for a motion to approve the agenda.

***Thomas Humphrey makes a motion to approve the agenda.***
***Jim McMahon seconds the motion.***
***The motion carries to approve the agenda.***

## APPROVAL OF PREVIOUS MEETING MINUTES

Chair Dunaski calls for a motion to approve the previous meeting minutes.

***Liz Workman makes a motion to approve the February meeting minutes.***
***Jeff Jelinski seconds the motion.***
***The motion carries to approve the minutes.***

## ANNOUNCEMENTS

Chair Dunaski announces that Commissioner Ted Bearth passed on in March. On behalf of the board, Chair Dunaski presents a letter to Mike Gamache, representative from the MESB, expressing appreciation for the contributions of Ted Bearth during his tenure on the board and extending condolences to his colleagues and family.

The April board meeting will be held on Monday, April 25th at 3:00 p.m. at the St. Cloud Convention Center during the Statewide Interoperable Communications Conference. There will be a Meet and Greet with the SECB Board immediately following the board meeting. Chair Dunaski encourages members to participate in the conference.

## REPORTS OF STANDING COMMITTEES

### OPERATIONS AND TECHNICAL COMMITTEE REPORT (GLACCUM)

Chair Glaccum introduces the North Memorial logging solution request. The AIS and Verint logging solution, as presented in the meeting materials, is necessary to become compliant with the upcoming Motorola upgrade.

***Mike Risvold makes a motion to approve the North Memorial logging solution request.***
***Humphrey seconds the motion.***
***The motion carries, with Chair Glaccum abstaining.***

Chair Glaccum introduces the Stearns County request for a requested site addition, as presented in

the meeting materials. A requested site means that a site will key up if there is traffic on that particular talkgroup whether someone is affiliated to it or not. Requested sites are watched closely for loading on the system. Stearns County is aware of that and the Central Region ESB had no issues and neither did MnDot from a loading perspective.

***On behalf of the OTC, Chair Glaccum makes a motion to approve Stearns County request for a requested site.***
***Dan Hartog seconds the motion.***
***The motion carries.***

Chair Glaccum introduces proposed changes to the following three standards, as presented in the meeting materials.

Standard 1.1.0 Operational Management. The recommended changes are language clean up and nothing substantial was changed.

Standard 3.16.2 Use of Statewide 800MHz STAC 1-12 Talkgroups – Air Ambulance Emergency Landing Zone Coordination. The recommended change of note has to do with the language of STACS. Some areas do not have all of the STACS in their radios so the new language is capturing that the radios should go to the highest STAC for a scheduled event and for an unplanned event they should go to the first STAC that is available. Other changes were language clean up.

Standard 3.28.0 Use of Statewide Emergency Management Talkgroup SEMTAC. Language clean up, no substantial changes.

***On behalf of the OTC, Chair Glaccum makes a motion that the three standards be approved as submitted.***
***Bill Droste seconds the motion.***
***The motion carries.***

Chair Glaccum introduces a revision to the Minnesota Dispatchers Communications Best Practice Guide, as submitted in the meeting materials.

Glaccum adds that there a couple of additional recommended changes that can be approved at this meeting or sent back to the committee. One is that the reference to Standard 3.40.0 does not list the correct title and that should be corrected. The other is that it was suggested by the Metro Region that for a planned event the standard would say to contact the MESB rather than the state duty officer.

***On behalf of the OTC, Chair Glaccum makes a motion to approve the Minnesota Dispatchers Best Practices Guide as presented and with the two corrections listed above.***
***Jelinski seconds the motion.***

Chair Dunaski asks if there are concerns from the sheriffs about the SECB publishing this guide for dispatchers. Chair Hartog is not aware that there are concerns in Greater Minnesota.

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Chair Dunaski asks how often the guide will be updated.
Glaccum does not believe there is a requirement in standard for how often it must be updated but his belief is that it will be reviewed on an annual basis.

***The motion carries.***

## INTEROPERABILITY COMMITTEE

Chair Thomson introduces a Standard 3.46.0 Ontario-Minnesota Interoperability Standard. It is a new standard which establishes procedures for interoperable communications between Ontario and the border areas of Minnesota. It is based upon a memorandum of understanding dated June 18, 2015, and establishes many of the responsibilities identified in this standard. A consolette owned by the Province of Ontario and programmed with an Ontario trunked-VHF talkgroup was installed in the MnDOT-owned and maintained radio tower site located in International Falls. The connection can be enabled and disabled by the Minnesota State Patrol Dispatch. Any public safety representative in Minnesota may request that the Minnesota-Ontario patch be enabled by contacting the State Patrol. If Ontario would like to enable the patch, they also have to contact the Minnesota State Patrol. Plain English shall be used and codes shall not be used. The Statewide Interoperability Coordinator (SWIC) is responsible for supervising and managing this standard.

***On behalf of the Interoperability Committee, Chair Dave Thomson makes a motion to approve Standard 3.46.0.***
***Humphrey seconds the motion.***
***The motion carries.***

## LEGISLATIVE & GOVERNMENT AFFAIRS COMMITTEE (WORKMAN)

Chair Workman reports that she, Jill Rohret, and the MESB lobbyist met with Representative Tony Cornish, Chair of the Public Safety and Crime Prevention Policy and Finance Committee. Representative Cornish was receptive to the concerns regarding accelerating the effective date for sales tax exemption for joint powers boards, instrumentalities of local government and special taxing districts.

Jill Rohret reports that the two bills, SF 2249 and HF 2387, have both been heard by their respective houses and were both laid over for possible inclusion. She explains that it is not clear what they would be included in because last year the tax committee went into conference but didn't complete a tax bill. Technically the committees are still in conference and how this might be worked into a final bill is unsure. Both of the committees appeared supportive.

Workman adds that this may be backdated to January 2016 with a onetime reimbursement for back purchases or the new date could be July of this year.

Chair Dunaski thanks Chair Workman and the others for taking the time to meet with Representative Cornish.

## STEERING COMMITTEE (HARTOG)

Chair Hartog introduces the SECB Strategic Plan and gives an overview of contents. He reads the three overarching goals, as presented beginning on page 12 of the Strategic Plan. The Strategic Plan will be reviewed by the Steering Committee every November for progress made.

***On behalf of the Steering Committee, Chair Hartog makes a motion to approve the SECB Strategic Plan as submitted.***
***Droste seconds the motion.***

Chair Dunaski commends the Steering Committee, Jackie Mines and ECN staff on creating a fine document. If the committee reviews it and takes the next steps and reports back to this body every January it will truly keep the momentum and the work going.

***The motion carries.***

Chair Hartog adds that the Steering Committee is discussing busies on the system, particularly in the metro area, and is putting together a workgroup on the topic with regional representation.

## IPAWS COMMITTEE (SEAL)

Chair Seal reports that the IPAWS Committee continues to work with HSEM and ESN on rolling IPAWS out across the state. There has been good progress in the north and central regions. The southern region is lagging a bit. There have been eight workshops since November and with a total of 184 participants. Four of the workshops were in the southern region. Counties with class 1 rail traffic without IPAWS have been identified and the committee will be focusing there as well.

Chair Dunaski adds that this work has been tied to the railroads and the pipelines through HSECM to leverage funds through a special revenue account to help mitigate and respond to incidents on the railroads and pipeline systems. A report HSEM had commissioned last year about readiness in Minnesota found that one of the areas that needed work was effective communication with citizens. This is a good fit for the work of IPAWS which can alert citizens that are living in an area or are passing through to Shelter in Place, for example, in case of an accident. Chair Seal and the IPAWS Committee are teaming up with Jackie Mines from ECN and Joe Kelly from HSEM to focus on the rail lines and pipelines to leverage the available funding to get the equipment and the training that is needed to push IPAWS out to those areas.

## NG911 COMMITTEE (PANKONIE)

No report.

## INTEROPERABLE DATA COMMITTEE (RISVOLD)

Chair Risvold reports that the IDC met by conference call and had updates on FirstNet and had a presentation from Motorola. There were no action items.

John Hunt from FirstNet reports that the FirstNet RFP process is well underway and FirstNet is looking forward to selecting the vendor. That will happen in the November timeframe. The bids for the RFP are due on April 29. The spring SPOC meeting will be held on April 12 and 13 in Virginia.



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Several FirstNet team members will be attending the Minnesota Interoperability Conference in St. Cloud at the end of April and will be contributing to several panels and presentations.

Chair Risvold adds that FirstNet and the IDC are looking for technical subject matter experts who would like to be on FirstNet Consultation Task Teams. Anyone who would like to volunteer is encouraged to do so. The first workgroup topic will be on quality of service and priority and preemption.

### FINANCE COMMITTEE REPORT (GERLICHER)

No report.

## REPORTS – OTHER

### ARMER PROJECT STATUS REPORT (MNDOT OEC)

Mukhtar Thakur reports on the ARMER Project status, as presented in the meeting materials. There are 326 sites on the air, eleven sites under construction, and four sites delayed due to land acquisition issues. These four are all in the Northeast and the land acquisition issues are challenging.

Chair Dunaski asks if there is an impact to public safety due to the sites delayed by land acquisition challenges. Thakur responds that the sites delayed are in sparely populated areas and he has not seen any impact to public safety.

Discussion about the sites with land acquisition difficulties. Some of the issues are areas of cultural or historical significance, environmental factors and expense of bringing in electricity.

### ECN UPDATE

Jim Stromberg reports that Jackie Mines sends her regrets that she was not able to attend the meeting and reports that ECN projects are on track and there is nothing significant to report. Cathy Anderson reports on Wireless E-9-1-1 Routing Management (WERM). This is an application for 9-1-1 call routing which will automate much of what has been done manually up to now. It has taken several years to get to the point of roll-out, which is expected to happen in May. Anderson and Dana Wahlberg have been conducting WERM training for PSAP personnel and points-of-contact throughout the state.

## OLD BUSINESS

None.

## NEW BUSINESS

None.

**Meeting Adjourns at 1:18 p.m.**



DRAFT

**Minnesota Department of Transportation**

**Office of Electronic Communications**
Mailstop 730
1500 West County Road B2
Roseville, Minnesota 55113-3174
651-234-7892

Statewide Emergency Communications Board
Operations and Technical Committee

March 15, 2016

RE: ARMER System Subscriber Radio Testing

The following radio was tested for acceptance of use on the ARMER Radio system, March 15, 2016 using the "Subscriber Unit Test Procedure" dated March 2010:

EF Johnson VP400, Model # 242-5770, S/N 517071409020824

The radio passed the required test procedure, a copy of the results is included, and is hereby presented to the OTC for approval of use of said radio on the ARMER network.

The testing was performed by the following individuals:

Adam Bjorklund- Rice County Sheriff's Office
Thomas Bredemus, MNDOT
Bradley Hibben, MNDOT
Nate Timm -Washington County Sheriff's Office

Bradley Hibben
Radio Engineer 1
DOT Radio Operations Center
Office of Statewide Radio Communications
Brad.Hibben@state.mn.us

Tom Bredemus
Radio Engineer 1
DOT Radio Operations Center
Office of Statewide Radio Communications
651-234-7895 Thomas.Bredemus@state.mn.us

Statewide Emergency Communications Board
Operations and Technical Committee

March 15, 2016

Re: ARMER System Subscriber Radio Testing

The following radio was tested on March 15, 2016 on the ARMER Radio system using the "Subscriber Unit Test Procedure" dated March 2010:

Motorola APX 8000 Portable Radio

The testing was performed by the following individuals:

Thomas Bredemus, MnDOT
Bradley Hibben, MnDOT
Nate Timm -Washington County Sheriff's Office
Adam Bjorklund- Rice County Sheriff's Office

The test results were as follows:

Motorola APX 8000 Portable Radio S/ N 579CRR5566
Result: ***Pass***, test results are attached.

At this time we would like to present the Motorola APX 8000 Portable Radio to the OTC for their approval for use on the ARMER network.

Regards,

Tom Bredemus

# Marshall County, Minnesota

# ARMER Radio System Participation Plan

January 2016

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# ARMER Participation Plan

## 1. Introduction

### A. ARMER System Application – Marshall County

Marshall County, Minnesota, and the city and county agencies within the county, request approval for participation in and use of the State of Minnesota Allied Radio Matrix for Emergency Response (ARMER) radio system. The county and its agencies plan to be "Full Participants" in the ARMER system, and will migrate all primary voice communications services to the network, once fully implemented.

The county requests that this application and plan be reviewed and approved by the following agencies:

- ☐ Northwest Minnesota Regional Advisory Committee (NW RAC)
- ☐ Northwest Minnesota Regional Radio Board (NW RRB)
- ☐ State of Minnesota Radio Board Operations and Technical Committee (OTC)

Marshall County's plan has been developed based on the requirements and operational standards established for participation in and use of the ARMER radio system.[1] The county desires to contract as required with the Northwest Regional Radio Board and the State of Minnesota Department of Transportation (Mn/DOT) for use of the ARMER system once approved.

A list of the local city and county agencies within the county that plan to be included in the use of this system is provided in Section 1.D of this planning document.

### B. Project Summary

Marshall County, Minnesota, and the public safety entities within Marshall County have developed a plan for the replacement of the existing VHF public safety radio systems currently used by those agencies. A radio system analysis was conducted in 2009, which presented options for either continued VHF radio operations, or a migration to the 800 MHz ARMER system.

The primary goals of a new radio communications system are:

- ☐ Provide improved radio system reliability, coverage, and capacity
- ☐ Replacement of the existing aging VHF radio system equipment
- ☐ Provide expanded county and region wide interoperability between public safety agencies, whether utilizing VHF or 800 MHz radio systems

[1] All endnotes are attached at the end of the report (Attachment 3) under the heading of "References."

After a thorough review of the options available, the county has determined that an eventual migration to the 800 MHz ARMER radio system, utilizing the system's multi-site, digital, and Trunking technologies would best meet the county agencies radio communications goals, and will provide the required level of interoperability between public safety agencies in the region.

***The County's migration to ARMER is anticipated to be a 2 or 3-Phased approach, as follows:***

- Phase 1: This initial phase may occur in 2016, and would include the Marshall County Sheriff's Office law enforcement operations migrating to the ARMER system on a full-time basis. The Sheriff's Office currently has an inventory of ARMER-capable multi-band (800 MHz and VHF) portable radios, which were purchased with grant funding over the past few years. These radios are capable of P25 Trunking operation on the 800 MHz ARMER radio system. New mobile radios will be needed for law enforcement to migrate operations to the ARMER system.

  The county's dispatch center currently utilizes newer Zetron IP/Max radio control consoles, which are connected to two 800 MHz RF control stations, operating on the various Northwest Region talk groups. Additional RF control stations would be purchased and installed to allow the existing consoles to communicate on the new talk groups established for Marshall County operations.

  Fire and EMS operations would continue to operate on existing VHF systems, which are relatively new. However, a small number of ARMER-capable 800 MHz portable radios would be obtained for each Fire/EMS agency to allow use of the ARMER system and interoperability with neighboring county Fire/EMS agencies (outside of Marshall County).

- Phase 2: This phase will be dependent on funding options available over the next few years:

  Fire/EMS operations would migrate to ARMER operations; all agencies would obtain a number of 800 MHz mobile and portable radios, which would be used in conjunction with existing VHF radios. The quantity of 800 MHz radios would not be a full inventory to replace all VHF radios, but would equip all primary response units with new radios.

- Phase 3: Will be considered a long-term plan, and again be dependent on agency needs and grant funding options. EMS and Fire operations would fully migrate to ARMER operations, which could include a full inventory of 800 MHz ARMER radios.

  An upgrade to an MCC7500 dispatch console may also be considered in the future as a long-term option, but there are no plans to do so at this time.

The primary points of contact for this project are:

Sheriff Jason Boman
Marshall County Sheriff's Office
208 Colvin Ave. Suite 1
Warren, MN 56762
218-745-5411 Phone
jason.boman@co.marshall.mn.us

Rey Freeman
RFCC
13517 Larkin Drive
Minnetonka, MN 55305
952-541-0747 Phone
rfreeman@isd.net

## C. Jurisdictional Coverage of System

The radio system is intended to provide radio communications throughout the entire geographic area of Marshall County, Minnesota. Marshall County is located in the northwest area of Minnesota, covering 558 square miles, with a population of approximately 10,000 people. The terrain of Marshall County is relatively flat, with ground elevations ranging from 1,100 feet in the western areas to 1,600 feet in the southeastern area.

## D. Entities and Users Participating in the Planned System

It is the intent of Marshall County and the agencies within to implement a shared radio system that will incorporate both public safety and additional governmental agencies. The list contains all of the agencies planning to participate in the system at this time.

| **Participating Public Safety Agencies** | |
|---|---|
| Marshall County Sheriff's Office | Oslo Fire and Rescue |
| Alvarado Fire and Rescue | Stephen Fire Department |
| Argyle Fire and Rescue | Stephen Ambulance |
| Grygla Fire and Rescue | Viking Fire and Rescue |
| Middle River Fire Department | Warren Ambulance/NVHC |
| Middle River Ambulance | Warren Fire Department |
| Newfolden Fire and Rescue | Marshall Co Emergency Management |
| **Participating Public Works and School Departments** | |
| Marshall County Highway Department | Local School District |
| | |

## E. Existing VHF System Configuration

All existing Marshall County voice radio systems operate on VHF (150-160 MHz) frequencies, providing radio channels for law enforcement, fire, and Emergency Medical Service (EMS)/ambulance operations. The dispatch center is physically located at the Marshall County Sheriff's Office in the city of Warren, Minnesota.

The existing Marshall County radio system consists of multiple VHF base and repeater stations located at different tower sites around the county. The following primary tower sites are used for the Marshall County system.

- Marshall County Sheriff's Office
- Grygla area (east end of county)

All radio equipment located at the tower or other remote sites is controlled from the dispatch center via leased telephone circuits or VHF radio link through control stations.

The primary VHF radio system infrastructure equipment used by the county is a variety of newer base and repeater stations. Most stations are in good operating condition, and are operating on narrowband (12.5 kHz) radio frequencies. A 2-position Zetron IP-Max PC-based radio control console is used in the Marshall dispatch center.

The radio system consists of separate VHF channels and base/repeater stations for Sheriff/law, and fire/EMS operations, which are located at the tower sites noted above, as well as at various fire halls throughout the county. The Sheriff/law radio network consists of multiple law repeater channels and sites, along with local Minnesota Statewide Emergency Frequency (MNSEF/VLaw31) and point-to-point stations. The fire/EMS radio networks consist of multiple independent stand-alone base stations located at various tower sites around the county, which also provides tone-and-voice paging capabilities. The radio users and dispatchers manually select the proper tower site based on the radio or service location.

# 2. ARMER System Technical Review

## A. System Design

During the local ARMER system implementation planning process, work was done to determine what type of configuration would be appropriate for the Marshall County radio system. Since the basic structure of the ARMER system as a multicast digital trunked radio system will meet the needs of Marshall County agencies, they plan to utilize the system in this planned multicast configuration.

Primary planning factors:

- System infrastructure and equipment plans
- Tower site planning
- 800 MHz channel requirements
- 800 MHz talk group requirements
- Quantity of end user radios
- Tower site and Public Safety Answering Point (PSAP) connectivity

Specific details of how these system parameters will be addressed are provided in this section of the document.

### i) System Infrastructure and Tower Site Planning

The ARMER system plan that exists for the Marshall County area includes seven tower sites within the county borders, as well as additional sites outside the county borders that will provide some level of coverage within the county. The following sites are planned for within Marshall County:

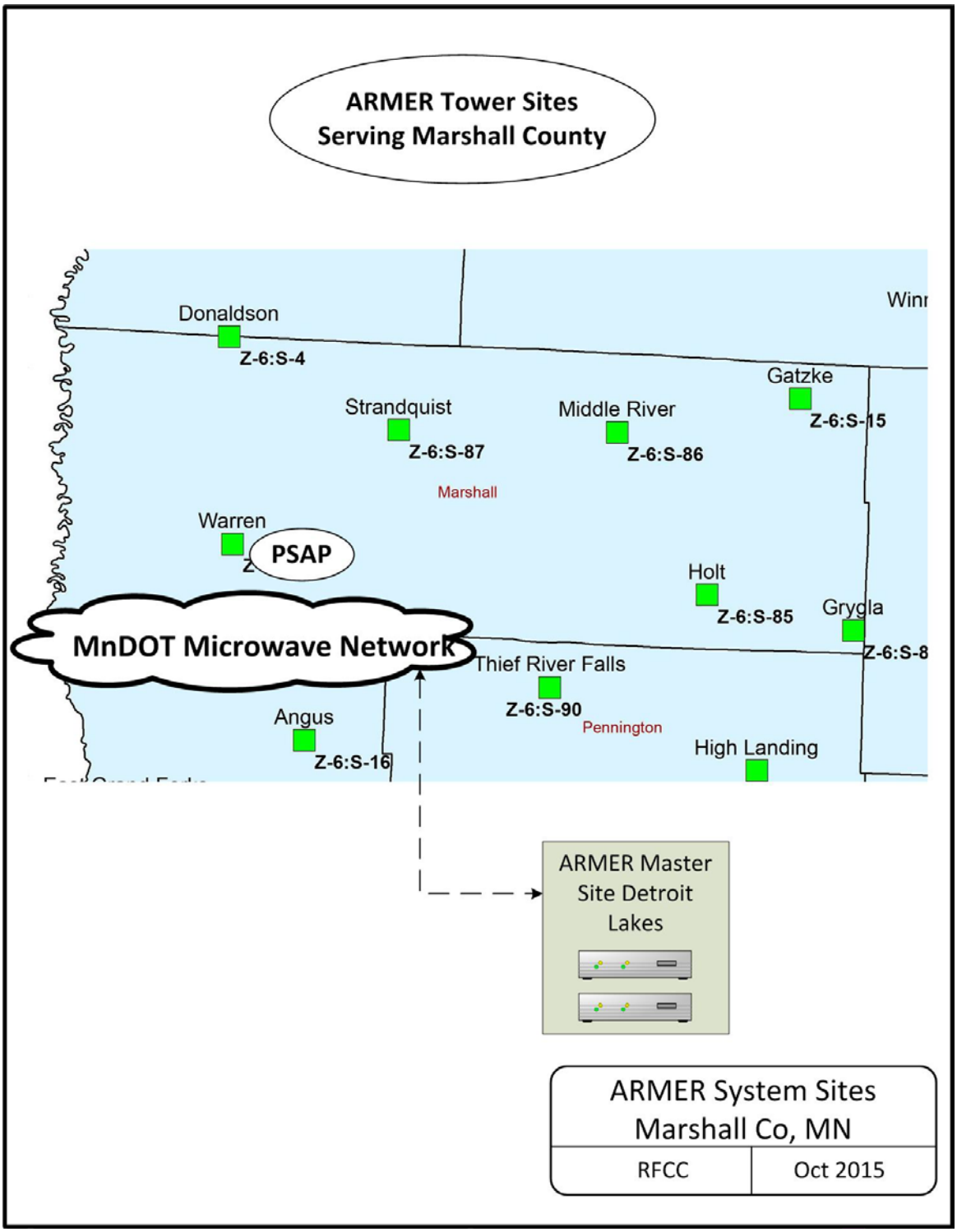
| | | | |
|---|---|---|---|
| Warren | Holt | Strandquist | Grygla |
| Donaldson | Middle River | Gatzke | |

The following sites are located outside of but near the county border and will provide coverage within Marshall County:

| | | | |
|---|---|---|---|
| Thief River Falls | Angus | East Grand Forks | |

Refer to the diagram on the next page for a high-level overview of the ARMER tower site details for the proposed system implementation for Marshall County.

## Marshall County ARMER System Architecture



### ii) Local Equipment Additions and Enhancements

The ARMER planning study conducted for Marshall County determined that no additional local enhancement, tower sites (coverage), or channel capacity are required or planned. The ARMER tower sites planned for Marshall County and surrounding areas are expected to provide the required level of reliable coverage for the county's agencies, and no additional tower sites should be needed.

A review of the number of radios planned for use in Marshall County, along with the number of talk groups and expected radio traffic levels was conducted to determine if any additional 800 MHz channel capacity will be needed at the local ARMER tower sites. Considering these factors, and the resulting traffic loading calculations included in this ARMER Plan, no channel expansion should be needed at the ARMER sites serving the county.

### iii) PSAP Console Planning and Logging

The Marshall County dispatch center currently utilizes a two-position Zetron IP PC-based radio console control system. This console system is now connected to the county's existing VHF system equipment, as well as two (2) 800 MHz RF control stations, for use on the NW Region talk groups, as well as some statewide talk groups.

Phase 1 of the implementation plan, which may occur in 2016, will retain the existing Zetron PC consoles, and install additional RF control stations for access to the new talk groups established for Marshall County.

Phase 3 of the implementation plan, which is considered a long-term option (and is dependent on funding), will replace the existing consoles with a new Motorola MCC7500 console system for use with the ARMER system. The county would notify the NW Region, SECB and OTC at the time a Phase 3 transition was being planned. There are no plans for this option in the near future.

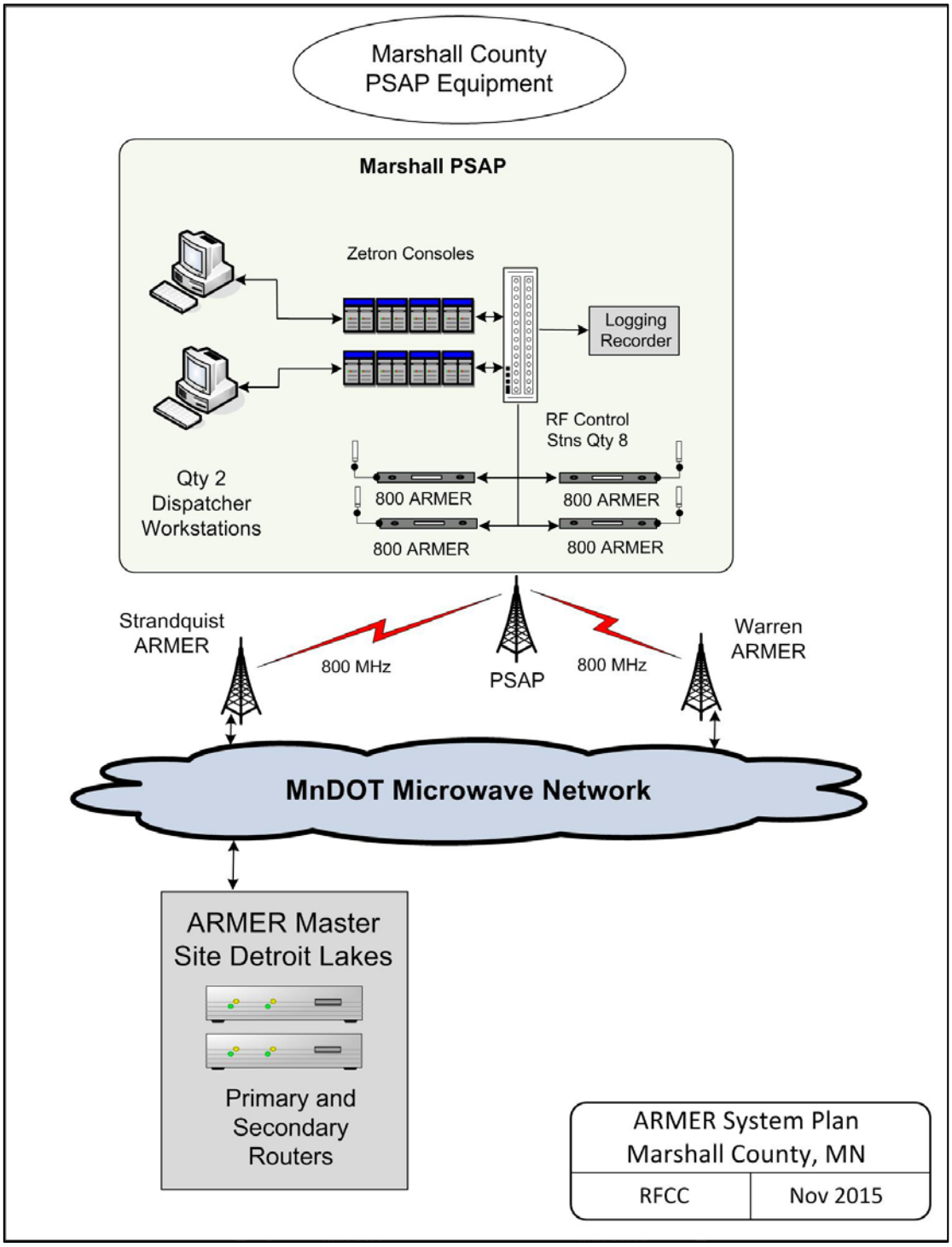
**No Conventional Channel Gateway (CCGWs) ports are required for the county's initial PSAP implementation.** The dispatch center will continue to use its existing local voice logging recorder for the recording of ARMER and conventional channel radio traffic. A limited number of ARMER talk groups will be recorded at the PSAP, and will be handled via local 800 MHz RF control stations.

### iv) PSAP Connectivity

Connectivity between the Marshall County dispatch center and the ARMER system is required for operation of the system talk groups, as well other non-trunked conventional channel resources.

This will be accomplished via the 800 MHz RF control stations planned for the PSAP. No direct microwave or fiber optic link would be implemented until such time that a Phase 2 or 3 installation were to occur.

## Marshall County PSAP ARMER Architecture



### v) Subscriber Radios

The 800 MHz subscriber (mobile and portable) radio inventory planning work conducted with Marshall County agencies has identified the following maximum estimated quantities of radios to be utilized on the system:

| Agency Type | Mobile | Portable | Base |
|---|---|---|---|
| Law Enforcement | 16 | 17 | 8 |
| Fire/EMS | 101 | 213 | 10 |
| Public Works | 0 | 2 | 0 |
| **Totals** | **117** | **232** | **18** |

A maximum total of 367 mobile and portable radios, and control bases would be implemented in the system, if all existing public safety VHF radios are replaced with new 800 MHz radios. This includes the total potential for three year (or more) growth for the agencies within the county. A detailed inventory of the "minimum" and "maximum" mobile, portable and control stations being planned by Marshall County and cost estimates is provided on the next page. Also shown are the estimated minimum and maximum quantities being considered, dependent on agency needs and funding available. Agencies throughout the county will be able to use this opportunity to purchase and implement standard radio types for use within the system, which will promote user commonality and interoperability between the various agencies.

# Marshall County MN ARMER Mobile/Portable Cost Estimate Worksheet

| Total of 800 MHz Mobile and Portable Radio Equipment Required for System Implementation | | | | | | | | | | | Totals | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Agency** | **Dual Band Mobile @ $6,000** | **Mid-Tier Mobile Radios w/DES @ $4,000** | **Mid-Tier Mobile Radios no DES @ $3200** | **Mid-Tier Mob Radios Dual Control @ $3800** | **Dual Band Portable @ $6,000** | **Mid-Tier Port Radios w/DES @ $3,300** | **Mid-Tier Port Radios no DES @ $2500** | **Low-Tier Mobile Radios @ $2,200** | **Low-Tier Portable Radios @ $2,100** | **800 Mhz RF Control Stations @ $6,000** | **Total Agency Radio Equipment Costs (Minimum)** | **Total Agency Radio Equipment Costs (Maximum)** |
| Marshall County Sheriff (min) | | 15 | | | 2 | | | | | 4 | $ 96,000 | |
| Marshall County Sheriff (max) | | 15 | | | 2 | | | | | 4 | | $ 96,000 |
| Marshall County Sheriff (existing) | | | | | 13 | | | | | 4 | | |
| Emergency Mgmt (min) | | 1 | | | | 2 | | | | | $ 10,600 | |
| Emergency Mgmt (max) | | 1 | | | | 2 | | | | | | $ 10,600 |
| **Law Agency Totals (min)** | **0** | **16** | **0** | **0** | **15** | **2** | **0** | **0** | **0** | **8** | **$ 106,600** | |
| **Law Agency Totals (max)** | **0** | **16** | **0** | **0** | **15** | **2** | **0** | **0** | **0** | **8** | | **$ 106,600** |
| Alvarado Fire/Rescue (min) | | | 7 | | | | | | 8 | 1 | $ 45,200 | |
| Alvarado Fire/Rescue (max) | 2 | | 10 | | 2 | | 14 | | | 1 | | $ 97,000 |
| Argyle Fire/Rescue (min) | | | 8 | | | | | | 10 | 1 | $ 52,600 | |
| Argyle Fire/Rescue (max) | 2 | | 10 | | 4 | | 26 | | | 1 | | $ 139,000 |
| Grygla Fire/Rescue (min) | | | 8 | | | | | | 12 | 1 | $ 56,800 | |
| Grygla Fire/Rescue (max) | 2 | | 8 | | 4 | | 21 | | | 1 | | $ 120,100 |
| Middle River Fire (min) | | | 7 | | | | | | 10 | 1 | $ 49,400 | |
| Middle River Fire (max) | 4 | | 7 | | 15 | | 5 | | | 1 | | $ 154,900 |
| Newfolden Fire/Rescue (min) | | | 8 | | | | | | 10 | 1 | $ 52,600 | |
| Newfolden Fire/Rescue (max) | 2 | | 10 | | 4 | | 27 | | | 1 | | $ 141,500 |
| Oslo Fire/Rescue (min) | | | 9 | | | | | | 7 | 1 | $ 49,500 | |
| Oslo Fire/Rescue (max) | 2 | | 13 | | 4 | | 14 | | | 1 | | $ 118,600 |
| Stephen Fire (min) | | | 12 | | | | | | 16 | 1 | $ 78,000 | |
| Stephen Fire (max) | 2 | | 12 | | 4 | | 24 | | | 1 | | $ 140,400 |
| Stephen Ambulance (min) | | | | 2 | 2 | | | | | 1 | $ 25,600 | |
| Stephen Ambulance (max) | | | | 2 | 2 | | | | | 1 | | $ 25,600 |
| Viking Fire/Rescue (min) | | | 5 | | | | | | 15 | 1 | $ 53,500 | |
| Viking Fire/Rescue (max) | 1 | | | | 4 | | 15 | | | 1 | | $ 73,500 |
| Warren Ambulance (min) | 2 | | | | 2 | | | | | | $ 24,000 | |
| Warren Ambulance (max) | 2 | | | | 2 | | | | | | | $ 24,000 |
| Warren Fire (min) | | | 7 | | | | | | 18 | 1 | $ 66,200 | |
| Warren Fire (max) | 2 | | 10 | | 4 | | 20 | | | 1 | | $ 124,000 |
| **Fire/EMS Agency Totals (min)** | **2** | **0** | **71** | **2** | **4** | **0** | **0** | **0** | **106** | **10** | **$ 553,400** | |
| **Fire/EMS Agency Totals (max)** | **19** | **0** | **80** | **2** | **47** | **0** | **166** | **0** | **0** | **10** | | **$ 1,158,600** |
| Marshall County Highway Dept | | | | | | | | 2 | | | $ 4,300 | $ 4,300 |
| Marshall County Transit | | | | | | | | | | | $ - | |
| **Public Works Agency Ttls** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** | **$ 4,300** | **$ 4,300** |
| **GRAND TOTALS max)** | **2** | **16** | **71** | **2** | **19** | **2** | **0** | **2** | **106** | **18** | **$ 664,300** | |
| **GRAND TOTALS min)** | **19** | **16** | **80** | **2** | **62** | **2** | **166** | **2** | **0** | **18** | | **$ 1,269,500** |

| | |
|---|---|
| **Total Radios (min)** | **238** |
| **Total Radios (max)** | **367** |

### vi) System Talk group Planning and ID Requirements

Marshall County agencies have conducted several radio implementation meetings to discuss talk group requirements and have developed a preliminary fleet map for the implementation of the new system for county agencies. In addressing this issue, the following basic outline will be considered:

- Primary and secondary dispatch talk groups for law enforcement
- Primary and secondary dispatch talk groups for fire service
- Primary and secondary dispatch talk groups for EMS service
- Individual dispatch talk groups for non-traditional public safety agencies
- Countywide talk groups for special events
- Countywide talk groups for interoperability
- Individual talk group(s) for each participating agency
- Non-trunked tactical talk groups for "Scene of Action" use

Refer to Attachment 1 for a copy of the preliminary Marshall County fleet map. It is estimated that 36 talk groups will be required for Marshall County agencies within the system.

A total of 367 ARMER system IDs are expected for the Marshall County implementation, which includes three year estimated totals:

- 357 for mobile and portable subscriber units total expected on the system for all agencies
- 10 for PSAP operations

### vii) 800 MHz Frequency Planning

The ARMER system sites within Marshall County will operate in a trunked multicast mode of operation. The state has planned for a group of five 800 MHz frequency pairs to be implemented at each site, and these channels will be shared by all users of the system/sites in the area. These users will include:

- Marshall County agency users
- Neighboring county agency users
- State of Minnesota agency users

The county recognizes that in a trunked radio system it is important that the tower sites be established with a sufficient number of 800 MHz channels to ensure that all radio users are able to access the system when needed for both routine and emergency radio communications traffic. However, a balance must be established between providing a sufficient number of channels and the cost of implementing those channels, as well as the increasingly limited number of 800 MHz frequencies available for the channels.
With a maximum radio inventory of approximately 367 local radio units planned for this system, it is expected that the planned five channels will be sufficient at the Marshall County ARMER sites.

When neighboring county and state radios are added to this total, it is possible that a greater number of channels would be needed at the sites. To better calculate the expected traffic loading the Marshall County

radio would have on the local tower sites, the industry-standard Erlang-C process has been used in this plan to determine the expected voice traffic on the ARMER system. This process can be used for both telephone and radio networks, where a shared and limited number of communications paths (trunks) are used to handle the voice traffic.

A full discussion of how this process works is beyond the scope of this plan; however, several critical factors are used to determine the expected radio traffic usage of the tower sites:

- Number of local (Marshall County) radios
- Number of neighboring county agency radios that are likely to use any given tower site
- Number of State of Minnesota agency radios that are likely to use the sites
- Number of 800 MHz radio channels available at the site(s)
- Estimation of how many radios are in use/service at a point in time
- Average radio transmission length of time (in seconds)
- Average expected number of transmissions from the radios (per hour)

When these radio inventory and usage parameters are entered into the Erlang calculation formula, a resulting Grade of Service (GOS) parameter is generated, indicating the calculated or expected availability of the radio system channels for the radio users. This GOS number could also be viewed as a "likelihood of getting a busy signal" when pressing the transmit button on a radio. The lower the number, the better GOS.

Public Safety Wireless Network (PSWN), the governmental agency which establishes operational standards and recommendations for public safety radio communications, has established a minimum GOS for these radio systems at "equal or less than two percent."

In other words, there should be less than a two percent chance that a radio user's transmission would be blocked by the system due to radio traffic levels. This could also be viewed as "greater than 98 percent" chance of a radio user's transmission being properly handled by the system when needed. This two percent GOS is considered a "Standard Busy Hour" level of usage. It should be noted that many agencies have elected to move beyond the PSWN recommendation and a common goal in Public Safety today is a GOS of 1 or better.

The parameters used for the Marshall County radio traffic calculations are as follows:

- Quantity 357 Marshall County radios (three year maximum)
- Quantity 100 neighboring county radios (interoperability use in Marshall County)
- Quantity 100 State of Minnesota agency radios
- 33 percent estimate percentage of how many radios are in use/service at one time
- 8 seconds average radio transmission length of time (in seconds)
- .51 average expected number of transmissions from the radios (per hour)
- 1.5 seconds average busy time (in seconds)

The GOS is then calculated for each site, based on the number of radio channels planned for the sites, to show the impact of the differing number of channels that would be implemented at the sites.

This formula does not necessarily incorporate any parameter for the number of talk groups being planned for use by the local county agencies. The number of talk groups can have a dramatic effect on system loading, as the larger the number of talk groups, the greater potential for spreading the traffic among the RF channels. Nonetheless, it remains the most reliable method for calculating radio traffic levels.

The table shown below contains the predicted 800 MHz radio channel and tower site traffic loading for typical operational radio activity for the sites that are located within Marshall County, based on the parameters in the previous data table:

**Predicted 800 MHz Standard Voice Channel Traffic Loading for Marshall County**

| | **Number of Voice Channels Normal Conditions** | | | | |
|---|---|---|---|---|---|
| **Site and GOS** | **1** | **2** | **3** | **4** | **5** |
| Warren | 28.9% | 3.4% | 0.3% | 0.0% | 0.0% |
| Gatzke | 23.2% | 2.3% | 0.1% | 0.0% | 0.0% |
| Grygla | 23.2% | 2.3% | 0.1% | 0.0% | 0.0% |
| Donaldson | 25.7% | 2.7% | 0.2% | 0.0% | 0.0% |
| Middle River | 23.2% | 2.3% | 0.1% | 0.0% | 0.0% |
| Strandquist | 25.7% | 2.7% | 0.2% | 0.0% | 0.0% |
| Holt | 24.1% | 2.4% | 0.2% | 0.0% | 0.0% |

One channel at each site is allocated as the Control Channel, which is not used for voice and not reflected in the table above. As shown, a GOS of better than one percent is achieved with three channels per site (highlighted in yellow), less that the total quantity being installed by the state at each of the county sites. This would indicate that no additional channels should be needed at the county sites.

The above calculations are again based on the PSWN "Standard Busy Hour" calculations, and do not account for the increased traffic loads that would be expected during emergency periods (tornado, large fire, multiple events). PSWN has established a recommendation of an additional 20 percent capacity for these events. Refer to the following table for the predicted ARMER system traffic loading and GOS for the Marshall County sites when the PSWN 20 percent additional emergency operations data is incorporated into the usage calculations.

**Predicted 800 MHz Voice Channel Traffic Emergency Loading for Marshall County**

| | Number of Voice Channels Emergency Conditions | | | | |
|---|---|---|---|---|---|
| **Site and GOS** | **1** | **2** | **3** | **4** | **5** |
| Warren | 55.1% | 10.8% | 1.6% | 0.2% | 0.0% |
| Gatzke | 46.3% | 8.1% | 1.1% | 0.1% | 0.0% |
| Grygla | 46.3% | 8.1% | 1.1% | 0.1% | 0.0% |
| Donaldson | 49.7% | 9.1% | 1.3% | 0.1% | 0.0% |
| Middle River | 46.3% | 8.1% | 1.1% | 0.1% | 0.0% |
| Strandquist | 49.7% | 9.1% | 1.3% | 0.1% | 0.0% |
| Holt | 48.0% | 6.1% | 0.7% | 0.0% | 0.0% |

As shown, three voice channels remain adequate to maintain the minimum recommended GOS during emergency traffic periods at all sites. The State of Minnesota will be implementing four voice channels at all sites, so no additional channels should be needed at the ARMER sites. Because of the typical number of talk groups planned by Marshall County agencies, we do not believe that Marshall County's implementation will have a significant impact on the system loading at the remaining sites, and should not be a factor requiring additional RF channel capacity. This also includes additional future capacity for the local sites in the event that other governmental agencies (schools, transportation) elect to join the system in the future.

The State of Minnesota has obtained the 800 MHz frequency assignments for the basic five channel configuration needed for the seven tower sites within Marshall County. The table on the following page is the current available 800 MHz frequency data for the Marshall County ARMER tower sites. The channels listed as "Marshall Co." have been assigned to Marshall County via the state's 800 MHz NPSPAC channel plan, and while they have not yet been assigned to a specific site, they could be used for the system at some point. Channels and sites with a "PS" listed have been assigned a non-NPSPAC 800 MHz channel.

**800 MHz Frequency Assignments for ARMER Sites in Marshall County**

| Site | Chan 1 | Chan 2 | Chan 3 | Chan 4 | Chan 5 |
|---|---|---|---|---|---|
| Marshall County | 94 | 122 | 142 | 195 | 215 |
| Warren | 78 | 111 | 224 | PS | PS |
| Gatzke | 10 | 62 | 125 | 162 | PS |
| Grygla | 18 | 86 | 149 | 168 | PS |
| Donaldson | 8 | 66 | 182 | PS | PS |
| Middle River | 6 | 76 | 184 | 223 | PS |
| Strandquist | 60 | 82 | 190 | 221 | PS |
| Holt | 32 | 72 | 134 | 181 | PS |

**(PS = Public Safety/Non-NPSPAC channels)**

### viii) Legacy VHF Equipment

The county will continue to operate and control a number of existing or updated VHF radio system channels, for local paging and interoperability. Emergency paging for fire and EMS operations is currently conducted via county-owned VHF system(s). These existing systems will be retained and modified or expanded as needed for improved paging coverage. This expansion will very likely include a relocation of some equipment to ARMER tower sites for improved coverage and reliability.

In addition, the existing law enforcement VHF repeater channels may be utilized for local interoperability between VHF and 800 MHz radio system users.

## B. Coverage Review

### i) Design Parameters

The overall system design and resulting communications coverage of the ARMER system can be affected by the following goals and concerns:

- Desire to obtain in-building coverage as best as possible in more densely populated areas of the county
- Need to cover the geographic area with a reasonable number of tower sites
- Cost of developing new tower sites, including structures, land acquisition, Federal Aviation Administration (FAA)/FCC/National Environmental Policy Act (NEPA) considerations, as well as local zoning
- Availability of and costs associated with existing and planned tower sites

The existing and planned tower sites planned for this project are being provided by the State's ARMER network. The coverage goal for Marshall County is 95 percent "on-the-street/outdoor" reliability to a portable radio with a standard antenna held at a height of five feet above ground level.

### ii) Coverage Propagation Mapping

Early in the planning for this project, preliminary coverage modeling and propagation analysis was done to determine if the basic tower site planning assumptions were valid and could be expected to result in a system that would meet Marshall County's coverage needs.

These coverage maps were generated with the RadioSoft© ComStudy2© software program. The modeling for the coverage analysis was done with the Longley-Rice propagation models. The coverage maps were done for portable talk-in and talk-out usage, as this is the most difficult coverage scenario. If the basic system design shows the portable goals are attainable, then mobile coverage should not be a concern.

Provided below are the parameters used for the coverage modeling:

| **Site Parameters** | **Value** |
|---|---|
| Transmit Antenna Gain | 9 db, omnidirectional |
| Transmit Output Power (into main line) | 35 watts |
| Transmission Line Size (tower over 300 feet) | 1.25 inch Heliax® |
| Transmission Line Size (tower under 300 feet) | 7/8 inch Heliax® |
| Transmission Line Length | Based on tower height |
| Receive Antenna Gain | 9db, omnidirectional |
| Receive Tower Top Amplifier Gain | 5db |
| Receive Transmission Line Size | 7/8 inch Heliax® |
| Receive Transmission Length | Based on tower height |
| **Field Unit Parameters** | **Value** |
| Type of Unit | Portable radio |
| Environment | Outdoors, on-street |
| Antenna Height | 5 feet |
| Transmit Power | 3 watts |

Preliminary coverage maps for portable radio talk-in and talk-out are shown on the following pages. The color coding for these maps is:

- Light Green: Reliable signal coverage 40 dBu or greater
- Yellow: Reliable signal coverage 33 dBu or greater
- Red: Marginal signal coverage 19 dBu or greater
- White: No useable coverage expected 10 dBu or less

Five predicted-coverage maps are provided in this plan; all maps utilize all tower sites within and outside of the county that provide coverage in the target service area:

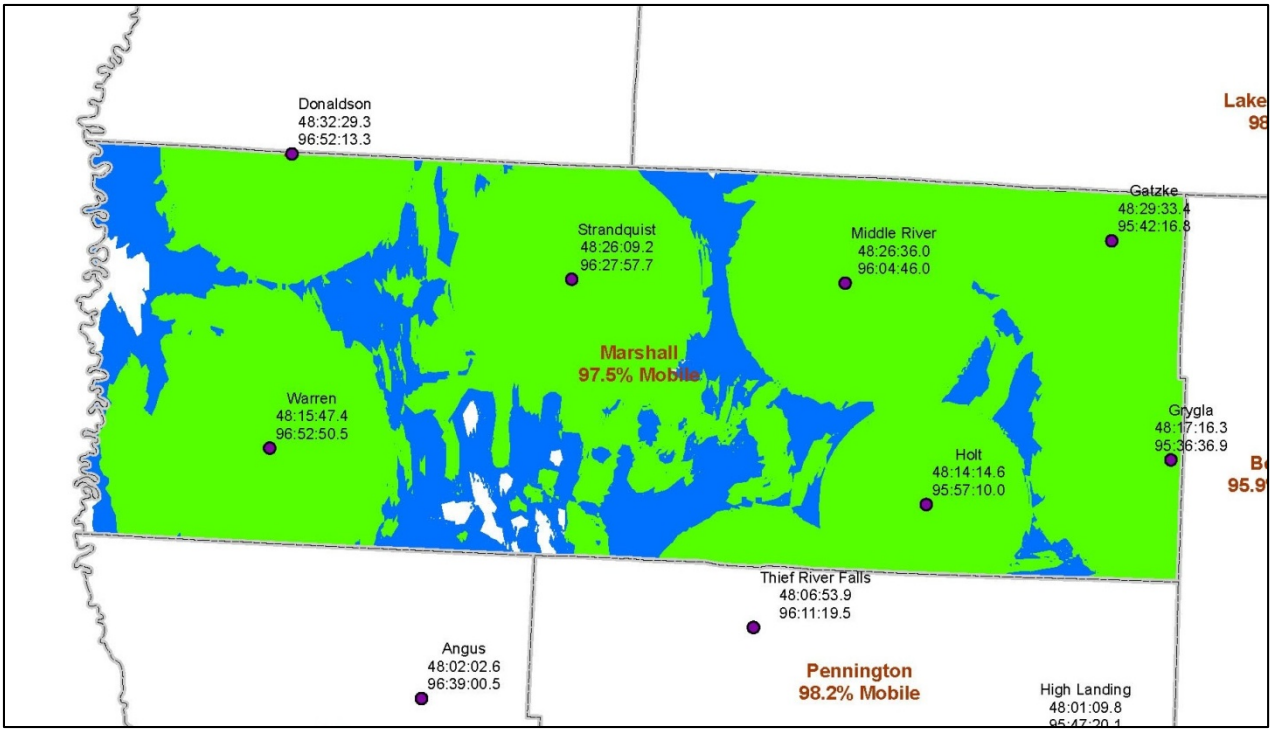
1. State of Minnesota prepared coverage map for Marshall County (from 2008).
2. Mobile (vehicle-mounted) radio coverage (prepared by RFCC)
3. On-Street portable radio coverage
4. In-building countywide coverage
5. In-building coverage in the City of Warren area

As shown in the predicted coverage maps on the following pages, the potential coverage for the system, using the selected sites and parameters is very good and is expected to meet the project coverage goals. The first map presented in this plan is the predicted coverage map provided by the State of Minnesota for the Marshall County geographical area.

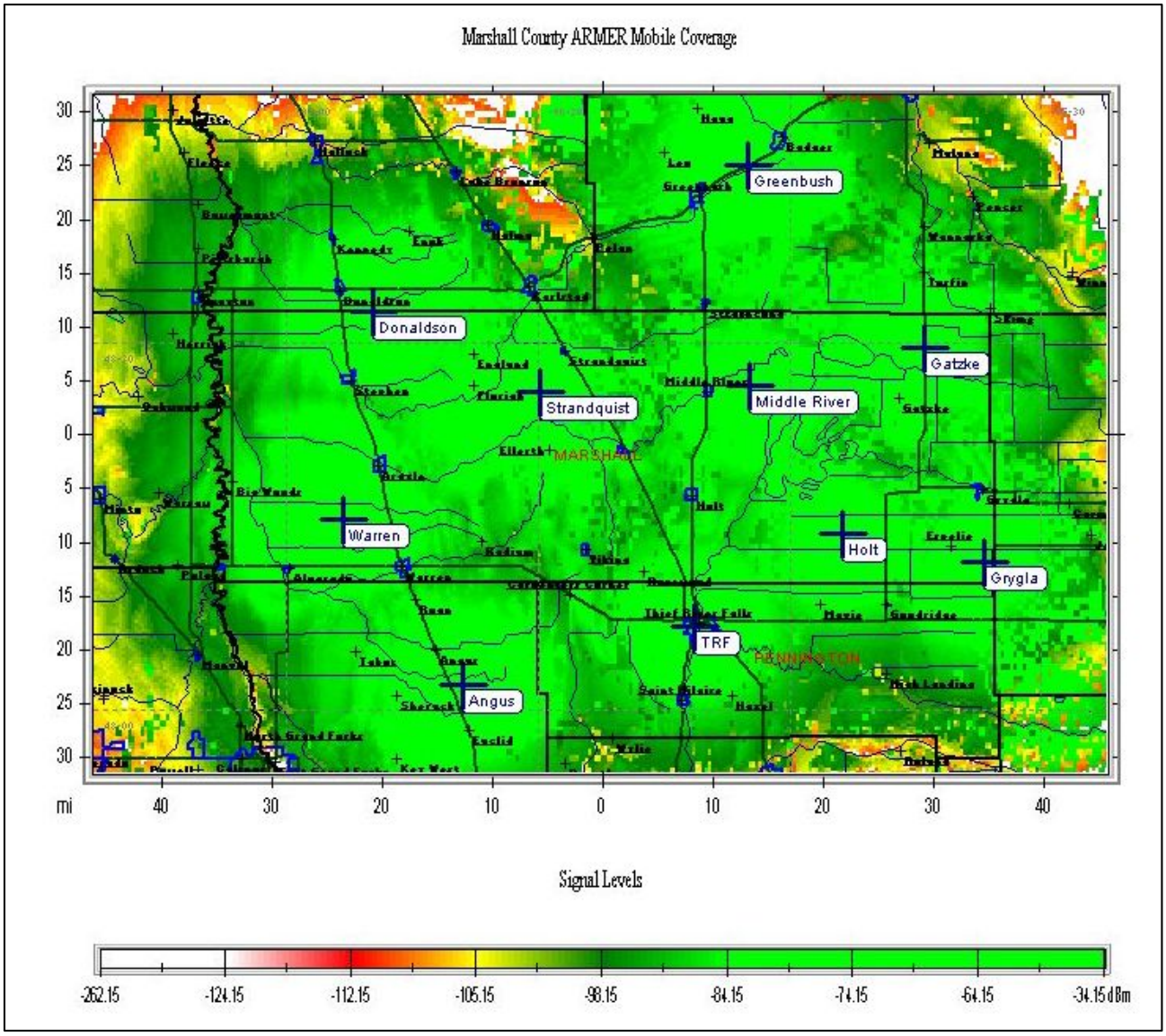
All maps were created using RadioSoft© ComStudy2© software program, and the modeling for the coverage analysis was done with the Longley-Rice and Okumura propagation models. The modeling parameters used by the State and RFCC are similar, however a somewhat different color-coding scheme is used. The State's maps use green areas represent a 40 dBu level of radio signal, which can generally be translated into a level where reliable portable and mobile radio coverage can be expected. The areas shaded in blue represent a 33 dBu level of radio signal, which typically reflects mobile (vehicle-mounted) radio coverage.

The areas shaded in white reflect a lower level of signal where coverage cannot be predicted, and can be interpreted to represent very weak areas of coverage. The only areas of the county where this is predicted to exist are in the far west and east corner of the county, and are not expected to be problematic.

**Map 1:** Marshall County Predicted ARMER Coverage
(Originally provided by the State of Minnesota in 2008; this map is provided for reference only, and is considered outdated due to some changes in tower site locations that have been established since the time of original publication).

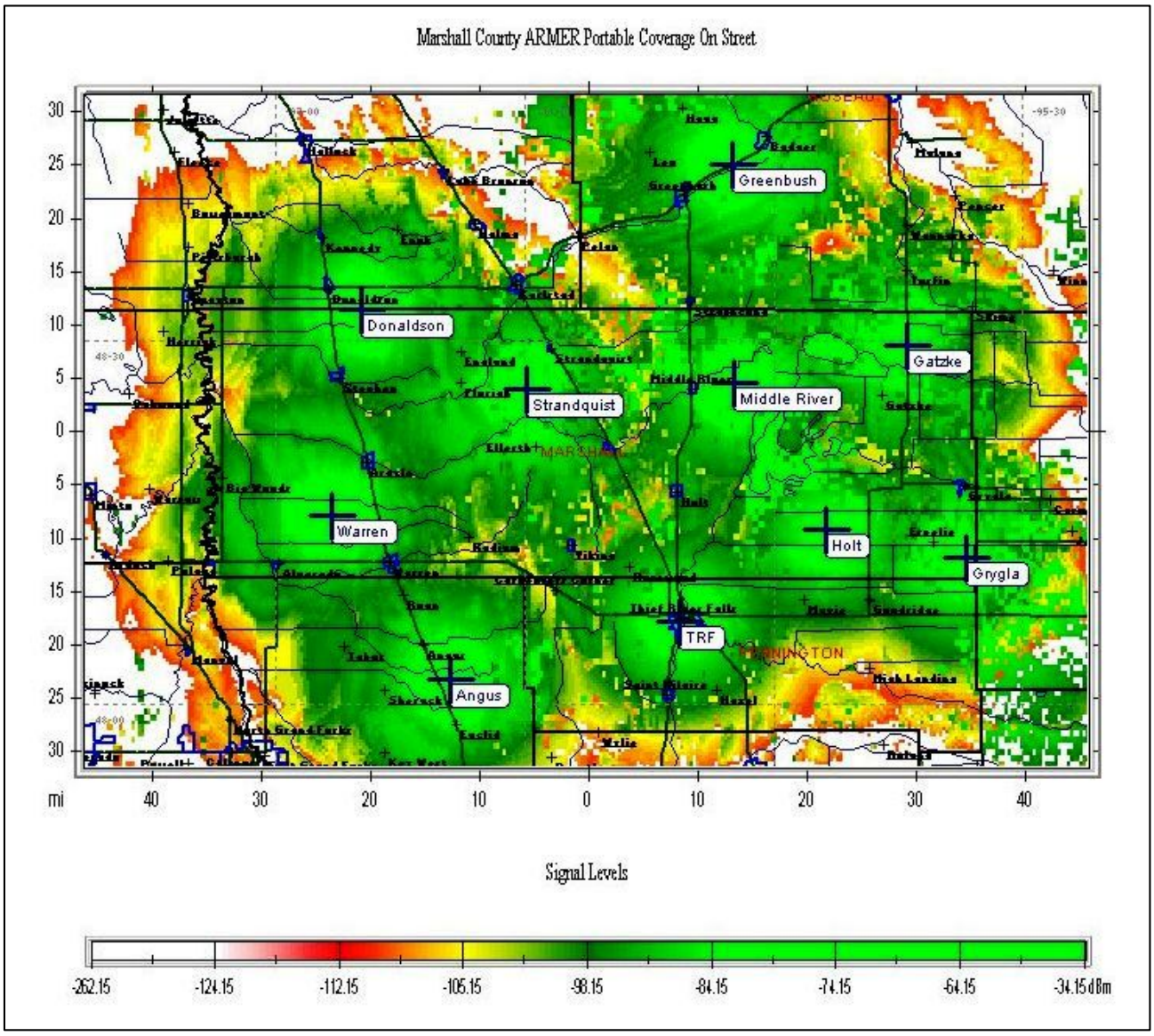


**Map 2:** The map shown below, prepared by RFCC for the county's ARMER planning process, demonstrates the predicted coverage to be expected for Mobile (vehicle-mounted) radios from the ARMER tower sites to be located within Marshall County, including the first-tier sites outside the county borders.



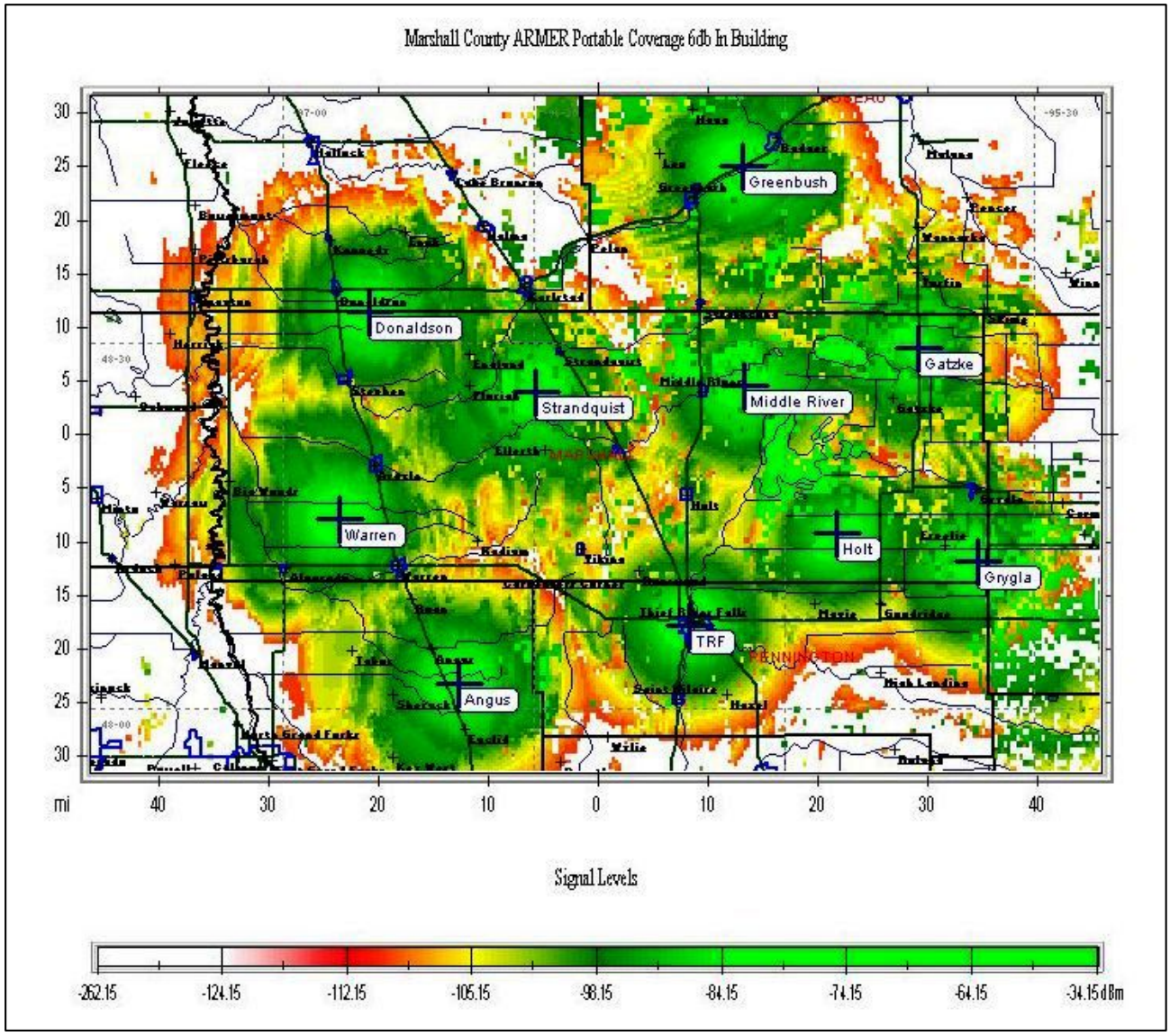

The predicted mobile radio coverage throughout most of the county is excellent with the planned tower sites, and coverage within the county is enhanced by tower sites outside of the county borders.

**Map 3:** The map shown below demonstrates the predicted coverage to be expected for portable (handheld) radios "On Street/Outdoors" from the ARMER tower sites to be located within Marshall County, including the first-tier sites outside the county borders.



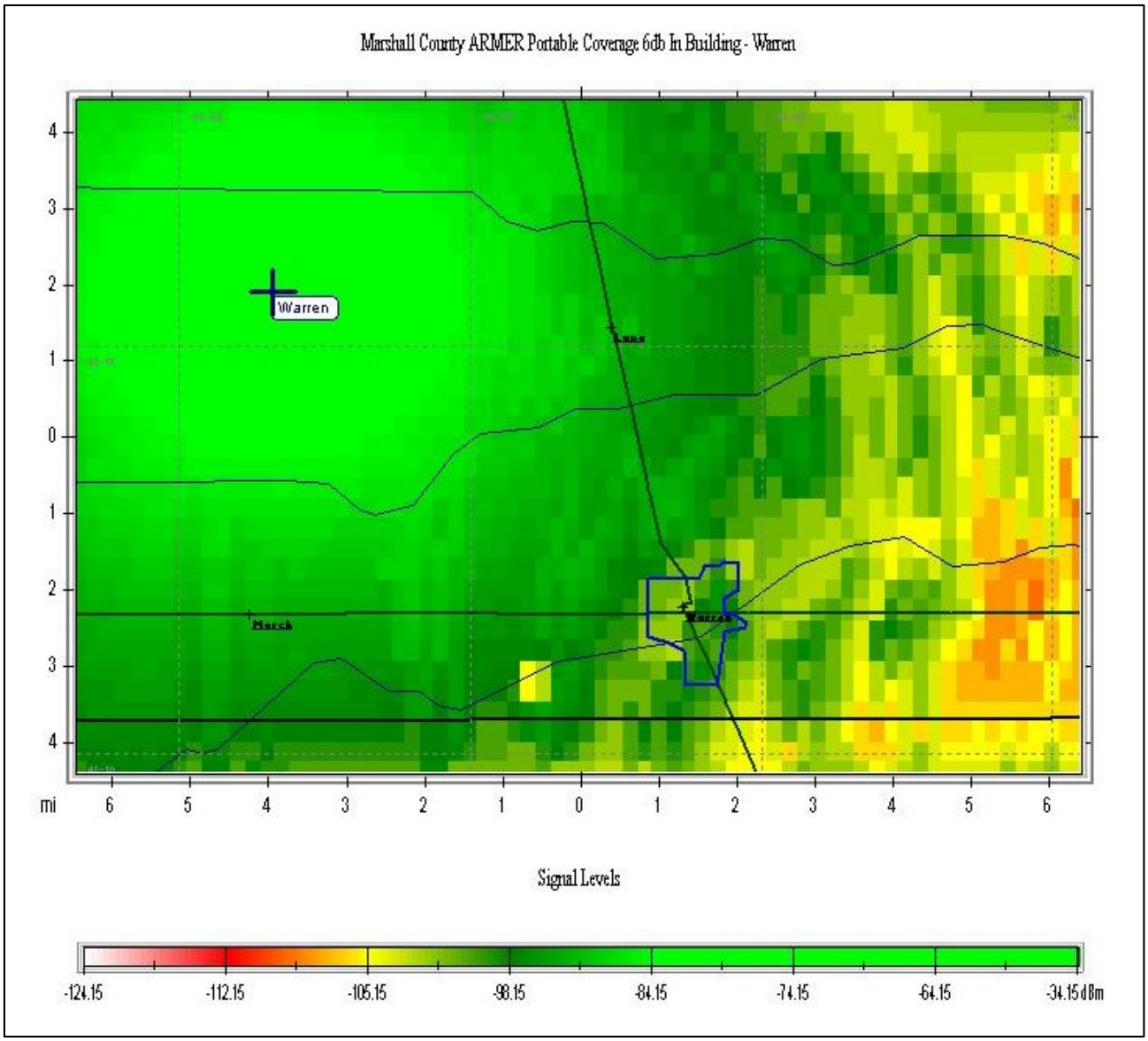

The predicted portable radio coverage throughout most of the county is very good with the planned tower sites, and coverage within the county is enhanced by tower sites outside of the county borders.

**Map 4:** The map shown below demonstrates the predicted in-building (6db loss) coverage to be expected for portable/hand held radios in Marshall County from the ARMER system when all tower area sites in the region are included in the calculations.




The predicted 6db in-building coverage for Marshall County is good in most areas, including the city of Warren (county seat). Refer to the map on the next page for more detail of the predicted coverage in the Warren area.

**Map 5:** This map demonstrates the predicted in-building (6db loss) portable radio coverage to be expected in the City of Warren (county seat) area from the ARMER system when all tower area sites in the region are included in the calculations.




The blue lines on the map indicate the city limits of Warren, and the dark blue lines indicate highways and main roads. The predicted in-building coverage should be good within the city, although this will depend on the type of building involved. The closest ARMER tower site (Warren) is 7 miles from town, but the terrain is relatively flat, allowing good signal propagation.

## C. Contingency Planning

In planning for ARMER system migration and connecting to the ARMER system the following failure modes are being addressed:

1. Loss of connectivity between the dispatch center and the ARMER system.
2. Loss of microwave network (to ARMER tower sites), which will result in the system reverting to site trunking mode.

The primary method of redundancy for Marshall County operations will be the implementation of multiple 800 MHz RF control stations at the main PSAP location. This would typically include one control station for each primary public safety discipline, such as:

- ☐ Law operations
- ☐ Fire operations
- ☐ EMS operations

If scenario 1 occurs, the PSAP loses direct connectivity with the ARMER network, and talk group access and control is lost. The control stations will allow the PSAP staff to access the county-specific and system interoperability talk groups over the air and function much like a mobile or portable radio.

If scenario 2 occurs, (local ARMER sites lose connectivity to the master site in Detroit Lakes, or the master site experiences a failure), the sites will revert to a Site Trunking mode, which results the sites operating independently from each other. The effect on field units is that they can only communicate with each other if they are in range of the same tower site. If they are not, communication is not possible. This is due to the local sites and network operating in a multicast mode of operation (rather than simulcast).

The resulting effect on the dispatch center is the same; however, Marshall County will be implementing multiple RF control stations at the dispatch center, with access to several of the tower sites within the county. The challenge with this approach is that the number of stations could be cumbersome and difficult to manage, depending on the number of talk groups incorporated in the backup station plan.

No final determination has been made for Marshall County as to the specific number of 800 MHz RF control stations that will be implemented at the PSAP, but a final plan will be based on the county's final implementation planning.

## D. Training

ARMER system implementation and associated operational standards require that all personnel who will be using the system receive proper training on the use, capabilities, and features of the system. Trunked radio systems, including the ARMER system, have operational requirements that differ from traditional conventional repeater systems, and it is necessary that dispatchers and end users be trained on the capabilities and proper operation of the system.

Marshall County agencies recognize this need, and are planning to enlist the services of independent contractors recognized by the state as proficient in the operation of the ARMER radio system. The program will include training for the following workgroups and functions:

- Radio end user training
- PSAP dispatchers
- Local system administrator
- Interoperability

Funding for the end user and dispatcher training has been included in the project budget.

## E. Interoperability

The need for interoperability exists on multiple levels within public safety radio operations. Establishing or enhancing interoperability at each of these levels has been a primary consideration in Marshall County's decision to migrate to the ARMER system. The areas specifically addressed are:

**Internal:** Between the many agencies within the general jurisdictional are of Marshall County (i.e. law enforcement, fire service, and EMS agencies). The implementation of a common 800 MHz trunked radio system for all public safety agencies, as well as other units of local government, should resolve most interoperability communications issues that may currently exist. To make the ARMER system work effectively will require careful fleet map planning and the proper training of all radio system users.

**External:** Between the county agencies and other public safety (law, fire, and EMS) and government agencies operating both within and sharing borders with Marshall County, to include the following:

- Kittson County agencies
- Roseau County agencies
- Polk County agencies
- Pennington County agencies
- Beltrami County agencies
- Minnesota State Patrol, Mn/DOT, Department of Natural Resources (DNR) enforcement, and fire agencies
- Federal law enforcement and fire agencies

Most of the agencies within the Northwest Region of Minnesota have been moving forward with the ARMER participation planning and implementation process, which will improve communications

interoperability for those agencies. Marshall County is currently bordered by county agencies operating both on 800/ARMER and VHF systems, which will require a combination of solutions to ensure reliable communications between all agencies in the region, regardless of radio system type. Marshall County will have neighboring agencies operating on both types of systems for the foreseeable future.

- ***Fire Interoperability with Polk County:*** *A potentially important Interoperability issue to be highlighted in this plan is the need for extended ARMER tower site use in the geographical areas outside of Marshall County, specifically between Marshall County and East Grand Forks. The Alvarado Fire Department has a Mutual Aid agreement with the East Grand Forks fire department to provide fire service coverage in the far northwest areas of Polk County, and responds to calls for service in these areas. The Alvarado department is often closer and can provide quicker response times than East Grand Forks or other Polk County fire agencies.*

  ***In these situations, it may happen that the preferred ARMER tower site is outside of the first ring of ARMER sites allowed for use by Marshall County radios. As such, extended tower site use permissions may be needed for Marshall County fire agencies.***

- North Dakota agencies, which border the west side of Marshall County, will remain on VHF long-term. As such, Marshall County agencies will need to retain VHF capabilities for interoperability with these agencies.

To accommodate communications between agencies that may operate with Marshall County that are not on the ARMER system in the short-term using legacy system technology, access to the ARMER radio system, a variety of interconnectivity options will be needed:

- The most basic requirement will be for Marshall County to continue operation of their VLaw31 155.4750 MHz base station. This can be patched to an 800 MHz talkgroup via the PSAP console system when required.
- Some of the existing Marshall County Law Enforcement repeater channels will be retained, and will become local "interoperability" channel resources, capable of being patched to the ARMER system, to allow local VHF radio users a simple and effective link to county agencies operating on the ARMER system.

## F. Standards

The primary technology standard applied to this project is that of the Project 25 (P25) ARMER system. The P25 standard is specifically for digital radios systems for public safety. In this case, the Phase 1 Frequency Division Multiple Access (FDMA) standard is currently in use.

Marshall County will adopt and comply with the standards published by both the State Radio Board and the Northwest Minnesota Regional Radio Board. Use of these standards will ensure that users in Marshall County will adopt the same naming conventions, talkgroup usage, and other operational and technical standards that are in use throughout the state.

## G. Alarms and Monitoring

Mn/DOT – ARMER will have the primary tower site alarm monitoring for sites in the county.

## H. Maintenance

Maintenance of the primary ARMER tower sites within Marshall County will be handled by the Mn/DOT staff. Marshall County will contract with a local authorized service facility for maintenance of any additional 800 MHz system equipment planned for the Marshall County implementation, including the PSAP equipment.

## I. System Administration

Local system administration for Marshall County will be the responsibility of the Marshall County Sheriff's Office.

## J. Other Local Enhancements

The primary local enhancements to the planned system implementation are:

- ☐ No tower site or 800 MHz channel expansion local enhancements are planned for this system implementation

## 3. Project Costs and Budget

Funding for implementation of the ARMER system within Marshall County is being considered from three different sources:

- Local bonding
- Local levy
- Grant opportunities

Grant funding has been received for the purchase of a number of 800 MHz portable radios for the Sheriff's office. Funding for the remaining system infrastructure equipment has not yet been finalized, but is being reviewed by the county and considered for year 2016 or beyond.

**Project Cost Estimates:**

| Item/Category | Estimated Costs (Phase 1) | Estimated Costs (Phase 2) | Estimated Costs (Phase 3, long term plan) |
|---|---|---|---|
| Zetron Console Modifications and 800 MHz RF Control Stations | $71,000 | NA | NA |
| MCC7500 Console and Connectivity (Future, long term) | NA | NA | $375,000 |
| 800 MHz Subscriber Radios (Law Enforcement) | $106,600 | NA | NA |
| 800 MHz Subscriber Radios (Fire & EMS – see Notes below) | $ 88,000 | $470,700 | $599,900 |
| Project Management | $ 10,000 | $ 5,000 | $20,000 |
| **Grand Total Estimated Costs** | **$275,600** | **$475,700** | **$994,900** |

***Notes: The Phase 1 costs shown for Fire/EMS agencies provides two 800 MHz ARMER-capable portable radios to each agency for basic ARMER system use.***

***Phase 2 provide a significant number of 800 MHz ARMER mobile and portable radios for all Fire/EMS agencies within the county.***

***Phase 3 ultimately provides a complete replacement of all VHF radios with new ARMER-capable radios.***

# 4. Project Implementation

## A. Schedule

The implementation of the ARMER radio network for an organizational group the size of Marshall County, with the number of agencies, tower sites, and quantity of radios being planned, is typically expected to require a 12-month period to complete. This process will encompass several work categories, including:

- ☐ Preliminary planning processes and approvals
- ☐ Funding approvals
- ☐ Detailed project planning and final system design
- ☐ Establish contract with vendor for equipment and services
- ☐ FCC licensing
- ☐ Equipment installation and configuration
- ☐ Radio user training
- ☐ System cut over

On the following page is an estimated schedule for the implementation of the ARMER system for Marshall County agencies. Please note that the schedule only tentative at this time, and is subject to many factors, including Marshall County securing the funding to move forward with the project.

## B. System Cut Over Plan

Marshall County would continue to utilize their existing VHF radio systems during the installation of the ARMER system equipment, as well as 800 MHz RF control stations on the ARMER system. The PSAP console equipment would be configured to operate both systems (legacy VHF and ARMER) until the ARMER system, as well as mobile and portable radios, are fully programmed, installed, and radio users trained for use of the new system.

Due to the expected overlap in timing with neighboring agencies, and the conversion from VHF to ARMER, the need for VHF radios will continue for several years. As such, county agencies will retain VHF radios in many vehicles, along with the new 800 MHz ARMER radios.

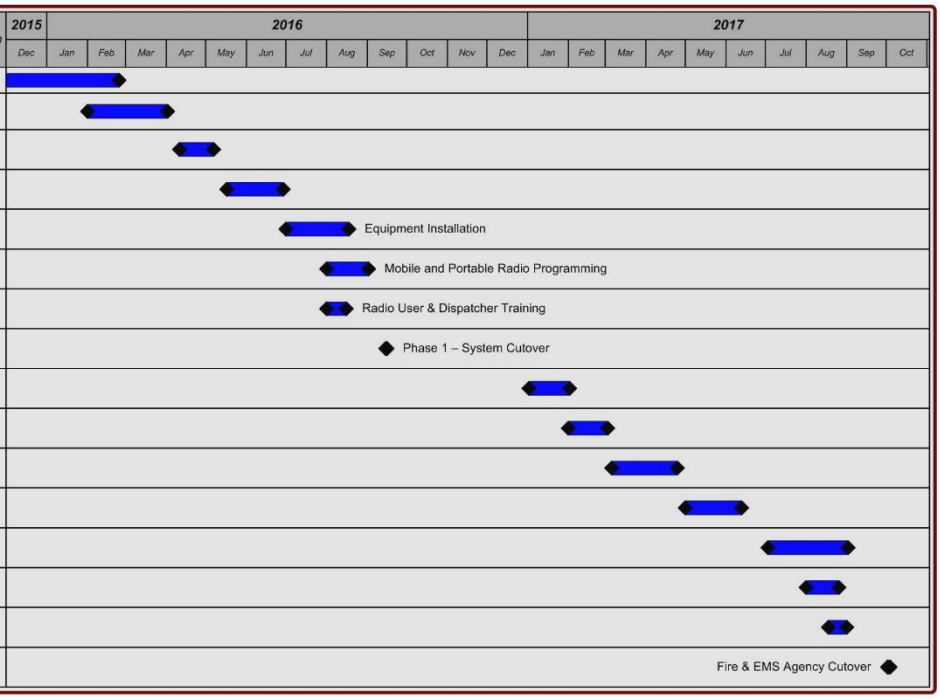
## Marshall County Draft Implementation Schedule

Implementation of the ARMER system for an agency typically requires 12 to 18 months from start to completion if new PSAP console equipment is required, and also depends on the number of radios and agencies involved in the process.

The Marshall County ARMER implementation will be a "phased" process, as discussed earlier in this plan. The County is planning the Phase 1 implementation for 2016. The Phase 2 implementation (Fire and EMS agencies) will be considered in 2017, depending on the funding options available for the purchase of the required equipment. The Phase 1 process will allow the county's law enforcement agencies to migrate quickly, to be followed by fire and EMS agencies as funding allows for the purchase of new ARMER-capable mobile and portable radio equipment. No plans for MCC7500 consoles in dispatch are included in this schedule.

**Marshall County Proposed ARMER Radio System Project Schedule**

| ID | Task Name | Start | End | Duration |
|---|---|---|---|---|
| 1 | ARMER Participation Plan Development | 7/6/2015 | 2/24/2016 | 33.6w |
| 2 | **ARMER Plan Approvals (RRB, SRB/OTC)** | 2/1/2016 | 4/1/2016 | 9w |
| 3 | **Phase 1 System Design & Planning** | 4/11/2016 | 5/6/2016 | 4w |
| 4 | Order Equipment from Vendor | 5/17/2016 | 6/28/2016 | 6.2w |
| 5 | Equipment Installation | 7/1/2016 | 8/17/2016 | 6.8w |
| 6 | Mobile and Portable Radio Programming | 8/1/2016 | 9/1/2016 | 4.8w |
| 7 | Radio User & Dispatcher Training | 8/1/2016 | 8/15/2016 | 2.2w |
| 8 | **Phase 1 – System Cutover** | 9/15/2016 | 9/15/2016 | .2w |
| 9 | **Phase 2 – Fire & EMS Radios** | 1/2/2017 | 2/1/2017 | 4.6w |
| 10 | Order Equipment from Vendors | 2/1/2017 | 3/2/2017 | 4.4w |
| 11 | Equipment Order Processing & Mfgr | 3/6/2017 | 4/24/2017 | 7.2w |
| 12 | Equipment Delivery | 5/1/2017 | 6/12/2017 | 6.2w |
| 13 | Radio Installations | 7/3/2017 | 9/1/2017 | 9w |
| 14 | Radio Programming | 8/1/2017 | 8/25/2017 | 3.8w |
| 15 | Radio User Training | 8/18/2017 | 8/31/2017 | 2w |
| 16 | **Fire & EMS Agency Cutover** | 10/2/2017 | 10/3/2017 | .4w |




**Revised 1-6-2016**

## Attachment 1: Marshall County Fleet Map

| | Law Enforcement Operations | TG Alias |
|---|---|---|
| 1 | Marshall County Law 1 | MH Law 1 |
| 2 | Marshall County Law 2 | MH Law 2 |
| 3 | Marshall County Law 3 Encrypted | MH Law 3E |
| 4 | Marshall County Law 4 Car-to-Car | MH L4 C2C |
| 5 | Marshall County Emergency Management/EOC | MH EM/EOC |
| 6 | Marshall County Law Admin | MH LW Adm |
| | **Fire and EMS Operations** | **TG Alias** |
| 7 | Marshall County Fire 1 | MH Fire 1 |
| 8 | Marshall County Fire 2 | MH Fire 2 |
| 9 | Marshall County Fire 3 | MH Fire 3 |
| 10 | Marshall County Fire 4 | MH Fire 4 |
| 11 | Marshall County Fire Admin 1 | MH FR Adm 1 |
| 12 | Marshall County Fire Admin 2 | MH FR Adm 2 |
| 13 | Marshall County EMS 1 | MH EMS |
| 14 | Marshall County EMS Admin | MH EMS Adm |
| | **Local Interoperability** | **TG Alias** |
| 15 | Marshall County Announcement Group | MH ANNC ALL |
| 16 | Marshall County Emergency Button | MH EMER |
| 17 | Marshall County Emergency 911 | MH 911 |
| 18 | Marshall County Public Safety Statewide Roam | MH PS Roam |
| 19 | Marshall County All Statewide Roam | MH All Roam |
| 20 | Marshall County Public Safety Common 1 | MH Com 1 |
| 21 | Marshall County Public Safety Common 2 | MH Com 2 |
| 22 | Marshall County Public Safety Common 3 | MH Com 3 |
| 23 | Marshall County Public Safety Common 4 | MH Com 4 |
| 24 | Marshall County Event 1 | MH Event 1 |
| 25 | Marshall County Event 2 | MH Event 2 |

## Attachment 1: Marshall County Fleet Map (continued)

| | Public Works and Schools | TG Alias |
|---|---|---|
| 26 | Marshall County Highway Operations 1 | MH Hwy 1 |
| 27 | Marshall County Highway Operations 2 | MH Hwy 2 |
| 28 | Marshall County Transit | MH TRNST |
| 29 | Future Public Works 1 | MH PW 1 |
| 30 | Future Public Works 2 | MH PW 2 |
| 31 | Future Public Works 3 | MH PW 3 |
| 32 | Marshall County School Transportation 1 | MH School 1 |
| 33 | Marshall County School Transportation 2 | MH School 2 |
| 34 | Marshall County Future Use 1 | MH Future 1 |
| 35 | Marshall County Future Use 2 | MH Future 2 |
| 36 | Marshall County Future Use 3 | MH Future 3 |

All regional and statewide interoperability talk groups will be incorporated into Marshall County radios as defined by ARMER standards.

## Attachment 2: References

1. State of Minnesota "Local Agency and Regional Planning and Contracting for ARMER Participation" dated September 8, 2008, as published at www.srb.state.mn.us
2. Federal Engineering "Radio System Needs Assessment and Alternatives Report for Marshall County" December, 2009
3. RadioSoft™ ComStudy2™ Terrain Database
4. ARMER Status Map, as posted at http://www.srb.state.mn.us/ dated April 2, 2014
5. Region 22 (Geographic State of Minnesota) 800 MHz Regional Planning Committee "Regional Band Plan" as filed with the FCC, General Docket 87-112; 800 MHz NPSPAC Plan Amendment WT Docket No. 20-55; NPSPAC PR Docket No 93.130 dated June 2009

**REQUEST FOR SPECIAL**
**WIDE AREA SITE ACCESS**
**FOR AN ARMER TALKGROUP**

**Talkgroup/ Announcement Group Name(s):** Marshall County All Statewide Roam (MH All Roam)

If Announcement Group List all Contained Talkgroups: _____

**Sites Requested:**

☒ Statewide (Requires Statewide Radio Board Approval)

☐ Other (Specify Sites or Regions):

**Talkgroup Owner Agency (Include Point of Contact Information):**

| | |
|---|---|
| Agency Name: | Marshall County Sheriff's Office |
| Contact Name: | Sheriff, Marshall County (Jason Boman) |
| Address: | 208 Colvin Ave, Suite 1 |
| | Warren, MN 56762 |
| Phone: | 218-745-5411 |
| Email: | Jason.boman@co.marshall.mn.us |

**Talkgroup or Announcement Group Type (Check all that Apply):**

☐ Shared

☐ Private

☒ Special Roaming Only Talkgroup – Occasional Use.

☐ Special Operations Tactical Talkgroup – Occasional Use. **If yes,** describe or list the counties or regions covered by a mutual aid agreement, memorandum of understanding, joint powers agreement, incident response plan or other relevant agreements here: _____

☐ Main Dispatch or Tactical Talkgroup – Day to Day Use. If yes, applicant must demonstrate that the users of this talkgroup conduct their "Normal Day to Day Business Operations" throughout the requested coverage area. Describe or list the counties or regions where the users of this talkgroup conduct their "Normal Day to Day Business Operations" here: _____

** For additional information, please refer to: State Standard 2.9.0 and State Standard 2.11.0*

**Describe the users, entities or agencies that will operate on this talkgroup:**

*The "MH All Roam" talk group is intended to allow all Marshall County agency personnel (public works, public safety, school transportation) using the ARMER network the ability to contact Marshall County dispatch when outside of the Marshall County geographical service area, primarily if emergency assistance is needed.*

**Describe the type of operations that will occur on this talkgroup:**

*The most likely use of this talk group would be by school buses when transporting students to and from sporting and band events outside the Pennington County geographical operating area.*

**Describe the anticipated frequency, duration and extent of use of this talkgroup:**

*The use of this talk group will be very minimal, perhaps one trip a week, again primarily for communications with Marshall County dispatch if emergency situations are encountered and support is needed (bus breakdown, bad weather, student illness, etc). There will NOT be any routine dispatch or operational traffic on this talk group. Cell phones will remain a primary communications resource, but there remain many areas of poor cell phone coverage in the rural areas of Minnesota.*

**Describe why the Statewide Shared Incident Response talkgroups or other shared roaming talkgroups are not suitable to meet these operational requirements:**

*It is unlikely that the Marshall County PSAP would be monitoring the various Statewide Shared Incident Response or Roaming talk groups, and the purpose for which Marshall County units would need to communicate would not necessarily appear to fit the intended use of those talk groups.*

Talkgroup Owner Agency Authorized Official – Signature & Date

Jason Boman, Sheriff – Marshall County MN
Printed Name and Title

** For additional information, please refer to: State Standard 2.9.0 and State Standard 2.11.0*

**REQUEST FOR SPECIAL**
**WIDE AREA SITE ACCESS**
**FOR AN ARMER TALKGROUP**

**Talkgroup/ Announcement Group Name(s):** Marshall County Public Safety Statewide Roam (MH PS Roam)

If Announcement Group List all Contained Talkgroups: _____

**Sites Requested:**

☒ Statewide (Requires Statewide Radio Board Approval)

☐ Other (Specify Sites or Regions):

**Talkgroup Owner Agency (Include Point of Contact Information):**

| | |
|---|---|
| Agency Name: | Marshall County Sheriff's Office |
| Contact Name: | Sheriff, Marshall County (Jason Boman) |
| Address: | 208 Colvin Ave, Suite 1 |
| | Warren, MN 56762 |
| Phone: | 218-745-5411 |
| Email: | Jason.boman@co.marshall.mn.us |

**Talkgroup or Announcement Group Type (Check all that Apply):**

☐ Shared

☐ Private

☒ Special Roaming Only Talkgroup – Occasional Use.

☐ Special Operations Tactical Talkgroup – Occasional Use. **If yes,** describe or list the counties or regions covered by a mutual aid agreement, memorandum of understanding, joint powers agreement, incident response plan or other relevant agreements here: _____

☐ Main Dispatch or Tactical Talkgroup – Day to Day Use. If yes, applicant must demonstrate that the users of this talkgroup conduct their "Normal Day to Day Business Operations" throughout the requested coverage area. Describe or list the counties or regions where the users of this talkgroup conduct their "Normal Day to Day Business Operations" here: _____

** For additional information, please refer to: State Standard 2.9.0 and State Standard 2.11.0*

**Describe the users, entities or agencies that will operate on this talkgroup:**

*The "MH PS Roam" talk group is intended to allow Marshall County public safety agency personnel the ability to contact Marshall County dispatch when outside of the Marshall County geographical service area. It may also be used for two or more Marshall County public safety personnel to communicate with each other when operating outside of the county geographical area (and outside the operational range of an SOA channel).*

**Describe the type of operations that will occur on this talkgroup:**

*The two most common uses of this talk group are 1) Prisoner transports, and 2) Communications between two or more Marshall County field units when outside of the county geographical operating area.*

**Describe the anticipated frequency, duration and extent of use of this talkgroup:**

*The use of this talk group will be minimal, perhaps twice a week, primarily for prisoner transport. There will NOT be any routine dispatch or operational traffic on this talk group.*

**Describe why the Statewide Shared Incident Response talkgroups or other shared roaming talkgroups are not suitable to meet these operational requirements:**

*It is unlikely that the Marshall County PSAP would be monitoring the various Statewide Shared Incident Response or Roaming talk groups, and the purpose for which Marshall County units would need to communicate would not necessarily appear to fit the intended use of those talk groups.*

Talkgroup Owner Agency Authorized Official – Signature & Date

Jason Boman, Sheriff – Marshall County MN
Printed Name and Title

** For additional information, please refer to: State Standard 2.9.0 and State Standard 2.11.0*

To: SECB Operations and Technical Committee
From: Jim Stromberg, ARMER Program Manager
Date: April 12, 2016
Subject: Change Management Standards Revision

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In November 2011 the OTC asked the ECN to work with the regions to explore updating the Change Management Standards. A working group was created and drafted the attached standard for your consideration. It is meant to replace the two existing standrds, nos. 1.5.2 and 1.8.0.

Membership is the working group was solicited from all regions and MnDOT. I moderated the discussions and the group members are listed below. The majority of the work was done during one in-person meeting. Refinements were dileberated by email exchanges.

| | | |
|---|---|---|
| Neil Dolan (NW) | Heath Landsman (SW) | Mike Peterson (SE) |
| Bruce Hegrenes (NE) | John Matz (SW) | Jim Mohn (MnDOT) |
| Micah Myers (CM) | Keith Ruffing (SC) | Cathy Anderson (ECN) |
| Al Fjerstad (CM) | Adam Kruger (SC) | |
| John Gunderson (ME) | Rick Freshwater (SE) | |

The new standard is the result of a fresh look at Change Management. The main differences between the new standards and the existing standrads are:

- One of the existing standards addressed system changes and the other addressed operational changes. The processes were similar and referenced the same flow chart. The proposed standard combines system and operational changes into one standard.
- The current standards were complex and necessitated a flow chart. The proposed standard is cleaner and does not implement a flow chart.
- The current standards define major and minor changes and prescribe the process for each path. The proposed standard establishes one set of criteria and, if met, the proposal should follow the change management process.
- The proposed standard provides more detail regarding timing of proposals, particularly as they relate to budgeting.

The working group used the definition of a “major change” from the existing standrds to define change management criteria for the proposed standard. The new language reads as follows:

Changes that have one or more of the following impacts on the ARMER backbone or impacting more than one emergency communication regions are subject to the procedures prescribed in this Standard:

- Changes impacting the majority of users
- Changes mandating the placement of resources in communications equipment
- Changes requiring updated user training
- Changes requiring reprogramming of console and/or subscriber equipment
- Changes resulting in costs beyond routine maintenance costs

The work group believes that this change management propsed standard will meet the needs of all emergency communication regions and the state.

# Allied Radio Matrix for Emergency Response (ARMER)
# Standards, Protocols, Procedures

| | | |
|---|---|---|
| Document Section 1 | **Management of System** | **Status**: DRAFT |
| State Standard Number | **1.08.1** | |
| Standard Title | **Change Management** | |
| Date Established | | **SRB Approval**: |
| Replaces Document Dated | **1.08.0 (04/28/2011) and 1.05.2 (04/28/2011)** | |
| Date Revised | | |

## 1. Purpose or Objective

This standard sets forth the process for considering operational and technical changes to the ARMER backbone. This process should ensure that change requests are managed, vetted, timed to correspond with budgets, and efficiently implemented.

## 2. Technical Background

**Capabilities**

This standard relates to future changes to the ARMER backbone but, in and of itself, is not a technical standard.

**Constraints**

The ARMER backbone is defined by Minnesota State Statue 403.21, subd. 9 and its definition limits the scope of this standard. The statute reads:

> "System backbone" or "backbone" means a public safety radio communication system that consists of a shared, trunked, communication, and interoperability infrastructure network, including, but not limited to, radio towers and associated structures and equipment, the elements of which are identified in the region wide public safety radio communication system plan and the statewide radio communication plan under section 403.36.

## 3. Operational Context

The Statewide Emergency Communications Board (SECB) is responsible for:

- Ensuring that ARMER maximizes interoperability
- Establishing and enforcing performance and technical standards for ARMER
- Establishing and enforcing priorities or protocols that facilitate uniformity

The SECB adopts ARMER Standards, Protocols, and Procedures to achieve these goals. Changes to the ARMER system are sometimes necessary and those changes must receive due consideration for economic impacts, operational impacts, and other issues that may compromise the integrity and use of the system.

## 4. Recommended Protocol/ Standard

Changes that have one or more of the following impacts on the ARMER backbone or impacting more than one emergency communication regions are subject to the procedures prescribed in this Standard:

- Changes impacting the majority of users
- Changes mandating the placement of resources in communications equipment
- Changes requiring updated user training
- Changes requiring reprogramming of console and/or subscriber equipment
- Changes resulting in costs beyond routine maintenance costs

## 5. Recommended Procedure

Individuals or entities with a change suggestion that they believe may be subject to this standard should present their suggestion to the Operations and Technical Committee (OTC) of the SECB. Items brought directly to the SECB or to other committees of the SECB that appear subject to this standard should be directed to the OTC. Items may be brought to the OTC at any regular meeting.

After receiving a request to change the ARMER system, the OTC should make a determination if the suggestion is subject to this standard. If the OTC determines that the suggestion is subject to the terms of this standard, the OTC will ask the requestor to bring their request to specific entities for feedback and/or formal approval. The reviews shall scrutinize the change proposal by identifing pitfalls, considering variables, and identify alternatives. The OTC may establish a Workgroup to facilitate this process.

The OTC shall first assign the requestor to consult the Minnesota Department of Transportation (MnDOT) for technical review and the Emergency Communication Networks (ECN) for an operational and financial review of the request. The requestor may consult with MnDOT and the ECN prior bringing the request to the OTC and the input of MnDOT and the ECN may be provided when the request is first introduced.

Upon receipt of input from MnDOT and the ECN, the OTC will assign the requestor to consult the Finance and Steering Committees of the SECB and the Emergency Communication Boards of each potentially impacted region. The OTC may also require the requestor to consult other committees or workgroups of the SECB or any other entitiy the OTC deems necessary.

The OTC *may* consider and grant provisional authority (subject to SECB ratification) for portions or the entire change request to be enacted. Temporary authority will allow for prompt implementation and may provide data about the proposal to assist with a permanent decision.

The requesting entity should consult each of the entities identified by the OTC about their change request and follow through with those entities as directed. The requesting entity may modify their original request based on new information or suggestions received. The requesting entity should provide a status update to the OTC within six months and every three months afterward.

Upon return to the OTC, the requesting entity should provide a report detailing their follow up. Modifications to the original request may be offered. Supporting materials such as meeting minutes or letters of approval should be submitted at this time. Relevant parties should be present for testimony. The OTC may then commence deliberations about the request. Approved requests should be forwarded to the SECB for consideration.

Requesting entities may appeal decisions by the means provided in standard 7.3.0.

Suggestions approved by the SECB should be jointly managed by MnDOT and the ECN. Generally, MnDOT will manage technical items and the ECN will manage operational items. Concerns raised but not fully satisfied during the process should be considered as the change is implemented.

The ECN will be responsible for tracking requests subject to this standard.

The following points related to timing should be followed during the implementation of this standard:

- Change suggestions may be submitted to the OTC at any time and this standard may be applied at any time.
- The process established in this standard should be expected to take at least six months so change suggestions subject to this standard should be submitted at least six months prior to consideration.
- Approved changes involving reprogramming of consoles or user equipment may be held up to two years so that multiple changes may be consolidated into one reprogramming.

A timeline should be followed to ensure adequate timing to prepare and request funding. In the below table, Change Management matters follow a four-year timing cycle and letters represent years:

- Year AAAA: 2016, 2020, 2024, …
- Year BBBB: 2017, 2021, 2025, …
- Year CCCC: 2018, 2022, 2026, …
- Year DDDD: 2019, 2023, 2027, …

| | |
|---|---|
| January 1, AAAA | If allowing six months for this process, this is the last day to submit changes subject to the Change Management standard to the OTC for consideration in the CCCC/DDDD Minnesota budget. |
| July 1, AAAA | Deadline for the SECB to approve requests subject and for the ECN to know financial needs to be considered for the CCCC/DDDD Minnesota Budget. |
| July 1, AAAA to January 1, BBBB | ECN to obtain Governor's approval of ECN budget and to prepare budget request for state legislature. |
| January 1, BBBB to May 1, BBBB | ECN to present budget request to legislature. |
| June 1, BBBB | State legislature approves budgets. |
| July 1, BBBB to June 30, CCCC | Fiscal Year CCCC of CCCC/DDDD budget. |
| July 1, CCCC to June 30, DDDD | Fiscal Year DDDD of CCCC/DDDD budget. |

When the requirements of this standard cannont be met by an entity, the entity must apply for a waiver and that waiver must be considered by the OTC.

**6. Management**

The OTC with administrative support from the ECN is responsible for supervising and managing this process.

# Allied Radio Matrix for Emergency Response (ARMER)
# Standards, Protocols, Procedures

| | | |
|---|---|---|
| Document Section 1 | **Management of System** | **Status:** Complete |
| State Standard Number | **1.8.0** | |
| Standard Title | **System Change Management** | |
| Date Established | | **SRB Approval:** 04/28/2011 |
| Replaces Document Dated | | |
| Date Revised | **02/04/2011** | |

## 1. Purpose or Objective

The purpose of this standard is to establish the procedure for managing and approving moves, additions, upgrades, and other changes to the ARMER system backbone.

## 2. Technical Background

- **Capabilities**
- **Constraints**

## 3. Operational Context

Among other responsibilities, the Statewide Emergency Communications Board (SECB) is responsible for:

- Defining the backbone of the system and the standards for system backbone performance necessary to ensure system wide development that maximizes interoperability throughout the system.
- Establishing and enforcing performance and technical standards for the operation of the system backbone.
- Establishing and enforcing priorities or protocols for the system that facilitate statewide uniformity.

The Standards, Protocols, and Procedures have been developed by ARMER participants through statewide and regional committees and boards and have been adopted by the SECB. Periodically, changes to the ARMER State Standards or the ARMER backbone will be required to maintain optimum system backbone operations. Those changes must receive due consideration for state and local economic impacts, operational impacts, and other issues that may compromise the integrity and use of the system backbone before those changes can be implemented.

Additions and changes to the Standards, Protocols, and Procedures that affect standard operating procedures (SOPs) are governed by State Standard 1.5.2. Additions and changes

to a requesting entity's participation plan are governed by State Standard 1.10.0. Some additions and changes could need to be evaluated under more than one process.

## 4. Recommended Protocol/ Standard

All requests for changes to the Standards, Protocols, and Procedures or any other change that affect the system backbone shall be submitted, evaluated, and approved through this change management procedure, depicted in Figure 1.

## 5. Recommended Procedure

Change proposals may be submitted at any time. Proposals should be submitted through the proposer's contracting entity (State Standard 1.9.0), a Regional Radio Board (RRB), or the Minnesota Department of Transportation (MnDOT). Change proposals should be submitted on a standard form provided on the SECB website and shall include a proposed implementation plan.

MnDOT will collect suggestions for changes from the RRBs and present the collected suggestions to the next scheduled meeting of the Operations and Technical Committee (OTC), who shall determine if the proposed changes are major or minor.

Minor changes have the following characteristics:

- They do not result in measurable impacts to the performance of the system backbone.
- They do not impact users of the system backbone with additional training effort or changed operational procedures.
- They do not create costs to the backbone or users beyond routine maintenance costs.

Major changes are all changes that are not minor. Major changes require a more rigorous review, because they are likely to require the expenditure of fiscal and human resources on the system backbone and by the system users. Examples of major changes are:

- vendor software upgrades that require backbone connected hardware to be replaced
- implementation of a new radio technology that forces subscriber unit reprogramming
- backbone technology improvements that cost more than the maintenance budget can accomplish

Minor changes may be referred to the Statewide System Administrator for evaluation and recommendation. The Statewide System Administrator shall perform the necessary evaluation and recommend an action to the OTC. The OTC may elect to vet the request through additional committees, the RRBs, or other user groups. Upon receipt of a recommendation from the OTC, the SECB may approve or deny the requested change.

Major changes shall be held by the OTC until such time as the OTC determines that the number and importance of proposed major changes warrants the initiation of a major change process. Depending upon the nature of the change request, the OTC may elect to direct MnDOT to notify stakeholders that a major change cycle is beginning through a notice published on the SECB website and be distributed to the regional leadership. The solicitation period should last at least three months to allow sufficient time for regional committees to meet and forward ideas through their RRBs.

At the close of the solicitation period, MnDOT will coordinate with the major change proposers to present their requested changes to the OTC. Change proposals will be made available for public review on the SECB website at least one week prior to the OTC meeting

The OTC shall consider the proposed changes and determine which proposals have sufficient need and benefit to warrant further evaluation. If the OTC determines that a change proposal does not warrant evaluation and rejects the proposal, the proponent of the change request may appeal the decision, per State Standard 7.3.0.

MnDOT staff, supplemented with other resources as required, will assess the requests forwarded by the OTC. The assessment should include:

- conformance with the Plan and the technical and operational standards previously adopted by the SECB
- previous experience with the change on the ARMER system
- how the change will affect operations
- the extent of programming and infrastructure changes
- the merit or benefits of the proposed change
- the cost of the proposed change including operational and maintenance costs
- how long will the change take to accomplish
- what other alternatives could accomplish the requested change
- impact on future system capacity and development plans
- legislation needed

The results of the assessment will be distributed by MnDOT to the System Administrators for additional review and comments. If contradictory issues are identified by the System Administrators, the request shall be returned to the OTC for reconsideration of necessity and benefit.

MnDOT will summarize the changes recommended and create a change proposal, including transition steps and schedules. The change proposal should be vetted at all RRBs. MnDOT, along with regional representatives to the SECB Committees and working groups, will be responsible for facilitating discussions and gathering comments. MnDOT will summarize all comments received.

If there is a cost to the change proposals, MnDOT and the Division of Emergency Communication Networks (DECN) will first pass the recommendations through the Finance

Committee, who will be responsible for determining how the costs should be allocated and securing RRB agreement in any regional or local costs.

Once the cost allocation is approved, or if there are not costs to allocate, MnDOT and the DECN will present the change proposals to the OTC for review and recommendation.

The SECB shall review the recommendations of the OTC and may approve the change recommendations, reject the change recommendations, or return the recommendation to committee for further review.

MnDOT or other responsible entities will implement the change plan. Activities in this phase may include construction of new infrastructure, replacement of existing infrastructure, hardware and software upgrades, programming, or other activities required by the plan. The change plan may also involve multiple changes on different implementation schedules.

MnDOT will report on the status of the implementation to the SECB.

## 6. Management

The OTC and MnDOT will manage the process for major technical change requests. The Statewide System Administrator will manage minor change request process.

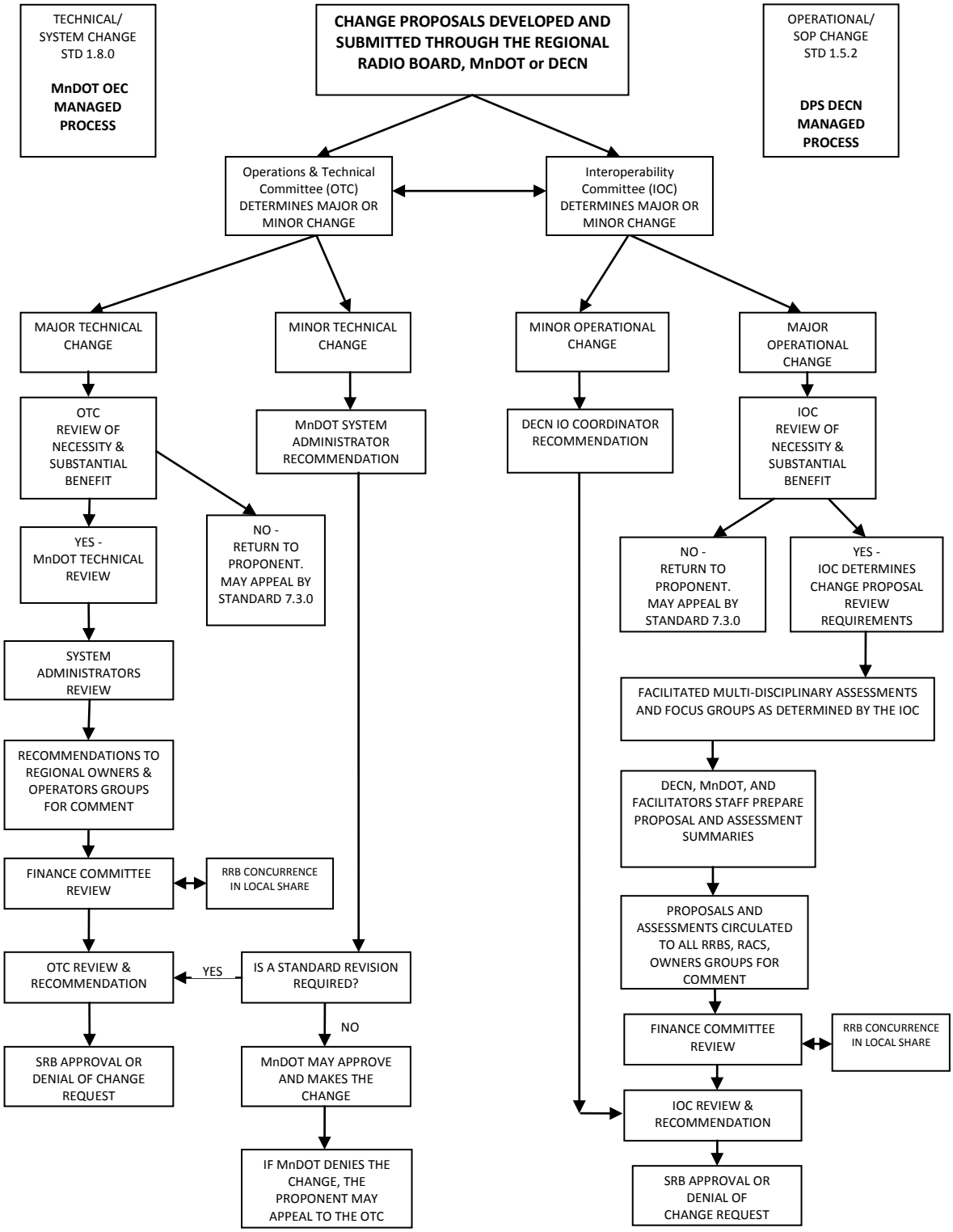


Figure 1 Change Management Process

# Allied Radio Matrix for Emergency Response (ARMER)
# Standards, Protocols, Procedures

| | | |
|---|---|---|
| Document Section 1 | **Management of System** | **Status:** Complete |
| State Standard Number | **1.5.2** | |
| Standard Title | **Changes to Operational Standards** | |
| Date Established | **3/19/2001** | **SECB Approval:** 4/28/2011 |
| Replaces Document Dated | **3/3/2005** | |
| Date Revised | **03/01/2011** | |

## 1. Purpose or Objective

The purpose of this standard is to set forth the process by which changes to the system backbone operating procedures will be solicited, evaluated, and adopted for implementation.

## 2. Technical Background

- **Capabilities**
- **Constraints**

## 3. Operational Context

Among other responsibilities, the Statewide Emergency Communications Board (SECB) is responsible for:

- Defining the backbone of the system and the standards for system backbone performance necessary to ensure system wide development that maximizes interoperability throughout the system.
- Establishing and enforcing performance and technical standards for the operation of the system backbone.
- Establishing and enforcing priorities or protocols for the system that facilitate statewide uniformity.

The ARMER Standards, Protocols, and Procedures, developed by ARMER participants throughout the state, have been adopted by the Statewide Emergency Communications Board. Periodically, changes to the ARMER Standards will be required to maintain optimum system backbone operations. Those changes must receive due consideration for state and local economic impacts, operational impacts, and other issues that may compromise the integrity and use of the system backbone before those changes can be implemented.

Additions and changes to the ARMER backbone or the technical ARMER Standards, Protocols, and Procedures are governed by State Standard 1.8.0, "System Change Management." Additions and changes to a requesting entities' participation plan are

governed by State Standard 1.10.0, "Requesting Participation and Participation Plan Changes." Some additions and changes could need to be evaluated under more than one process.

## 4. Recommended Protocol/ Standard

All operational changes to the ARMER Standards, Protocols, and Procedures that impact system users or require a change must be evaluated and approved through this change control procedure, as depicted in Figure 1.

## 5. Recommended Procedure

Whenever possible, major operational changes will be made on an 18-24 month cycle. This will allow users to match their subscriber radio maintenance cycle to the major change cycle and minimize the number of times that major changes need to be incorporated. The SECB will determine when a new change planning process needs to be initiated. Minor changes may be made at any time.

**Solicit & Evaluate**

- Change proposals may be submitted at any time. Proposals should be submitted through the proposer's contracting entity (State Standard 1.9.0), a Regional Radio Board (RRB), or the Minnesota Department of Transportation (MnDOT). Change proposals should be submitted on the form provided on the Statewide Emergency Communications Board website and shall include a proposed implementation plan.

- The Division of Emergency Communication Networks (DECN) will collect suggestions for changes from the Regional Radio Boards and MnDOT. DECN will present the collected suggestions at the next scheduled meeting of the Interoperability Committee (IOC), who shall determine if the proposed changes are major or minor.

  Minor changes have the following characteristics:
  - Minor changes affect a relatively minor number of users or are contained to one radio region.
  - Minor changes generally do not contain mandates for other users.
  - Minor changes do not require significant retraining of other users.
  - Minor changes do not have a cost to other users.

  Major changes have one or more of the following characteristics:
  - Major changes impact the majority of users in multiple radio regions.
  - Major changes mandate the placement of resources in communications equipment.
  - Major changes require revisions to operational procedures.
  - Major changes require updated user training.

- Major changes require reprogramming of console and subscriber equipment.

Examples of major changes include mandating the placement of statewide resources in consoles and subscriber units, mandating the creation of national IC zones in subscriber units, and the creation of a statewide vehicle pursuit standard.

- Minor changes may be referred to the Statewide Interoperability Coordinator for evaluation and recommendation. The Statewide Interoperability Coordinator shall perform the necessary evaluation and recommend an action to the Interoperability Committee. The Interoperability Committee may elect to vet the request through additional committees, the Regional Radio Boards, or other user groups. Upon receipt of a recommendation from the Interoperability Committee, the SECB may approve or deny the requested change.

- Major changes shall be held by the Interoperability Committee until they determine that the number and importance of proposed major changes warrants the initiation of a major change process. At that time, the Interoperability Committee will direct DECN to notify stakeholders a major change cycle is beginning. This will be done through a notice published on the Statewide Emergency Communications Board's website and distribution to the regional leadership. The solicitation period should last at least three months to allow sufficient time for regional committees to meet and forward ideas through their Regional Radio Boards.

- At the close of the solicitation period, DECN will schedule presentations by the major change proposers to the Interoperability Committee. Change proposals will be made available for public review on the Statewide Emergency Communications Board website at least one week prior to the Interoperability Committee meeting.

- The Interoperability Committee shall consider the proposed changes and determine which proposals have sufficient need and benefit to warrant further evaluation. If the Interoperability Committee determines that a change proposal does not warrant evaluation and rejects the proposal, the proponent of the change request may appeal the decision. (State Standard 7.3.0, "Appeal Process.")

    - Change proposals selected for further evaluation shall be assessed to discover and document the impacts of each proposed change, including the impacts of the proposed transition plan. The Interoperability Committee may exclude any of the following assessments or may add other assessments, depending upon the nature and complexity of the change proposals. For complex assessments, DECN may be authorized to utilize a professional facilitator for focus groups of discipline specific users (police, fire, EMS) to expedite the process.
    - Tabletop scenarios through Homeland Security Emergency Management (HSEM)

    - State Communications Interoperability Plan (SCIP) conformity review
    - Tactical Interoperability Communications Plan (TICP) conformity review
    - Cost/benefit analysis
    - MnDOT technical review for backbone impacts
    - Operations and Technical Committee review and comment
    - Training needs assessment
    - Other stakeholder review groups

- The assessment process must be completed within 90 days of receipt of the request for assessment. Input received after 90 days may still be considered, but consideration is not guaranteed. The request for assessment from the Interoperability Committee is not asking for a recommendation on the change proposal but is meant to review how the proposed change will impact operations, finances, training, etc.

- Once all assessments are received or 90 days has passed, DECN and MnDOT staff and the facilitator will assemble the comments and prepare a summary document for public review and comment.

**Plan and Approve**

- The completed change proposals should be vetted by all the radio board regions. The discipline associations (Police Chiefs, Fire Chiefs, Sheriffs, Minnesota Ambulance Association, state agencies, etc.) and other interested stakeholders shall be notified of the pending changes and shall be afforded an opportunity to provide comments. DECN and MnDOT, along with regional/discipline association representatives to the SECB Committees and working groups, will be responsible for facilitating discussions and gathering comments. DECN and MnDOT will provide a summary of all comments received.

- If there is a cost to the change proposals, DECN and MnDOT staff will pass the recommendations through the Finance Committee, who will be responsible for determining how the costs should be allocated, securing Regional Radio Board agreement in any regional or local costs.

- Once the cost allocation is approved, or if there are not costs to allocate, DECN and MnDOT staff will present the change proposals to the Interoperability Committee for final review and recommendation. DECN and MnDOT summary shall include a draft change plan addressing comments received.

- The Interoperability Committee shall review the comments, recommend approval or denial of each change proposal, and create a change plan for approval by the Board.

- The change plan, including transition steps and schedules, will be made available for review and comment at the Regional Boards prior to presentation to the Statewide Emergency Communications Board.

- The SECB shall review the recommendations of the OTC and the Interoperability Committee and may approve the change recommendations, reject the change recommendations, or return the recommendation to committee for further review.

**Create & Implement**

- This phase will vary in length, depending upon the transitional plan adopted by the Board. The change plan may also involve multiple changes on different implementation schedules.

- Activities in this phase may include code plug development, radio programming, procedure writing and implementation, training development and implementation, physical construction, equipment replacement, or other activities as outlined in the change plan. Entities named in the plan will be responsible for completing the changes in the plan as per the approved schedule and reporting their status, in writing, to DECN.

- DECN will report on the status of the implementation to the SECB.

## 6. Management

The Interoperability Committee and DECN staff will manage this process for major change requests. The State Interoperability Coordinator will manage the minor change process.

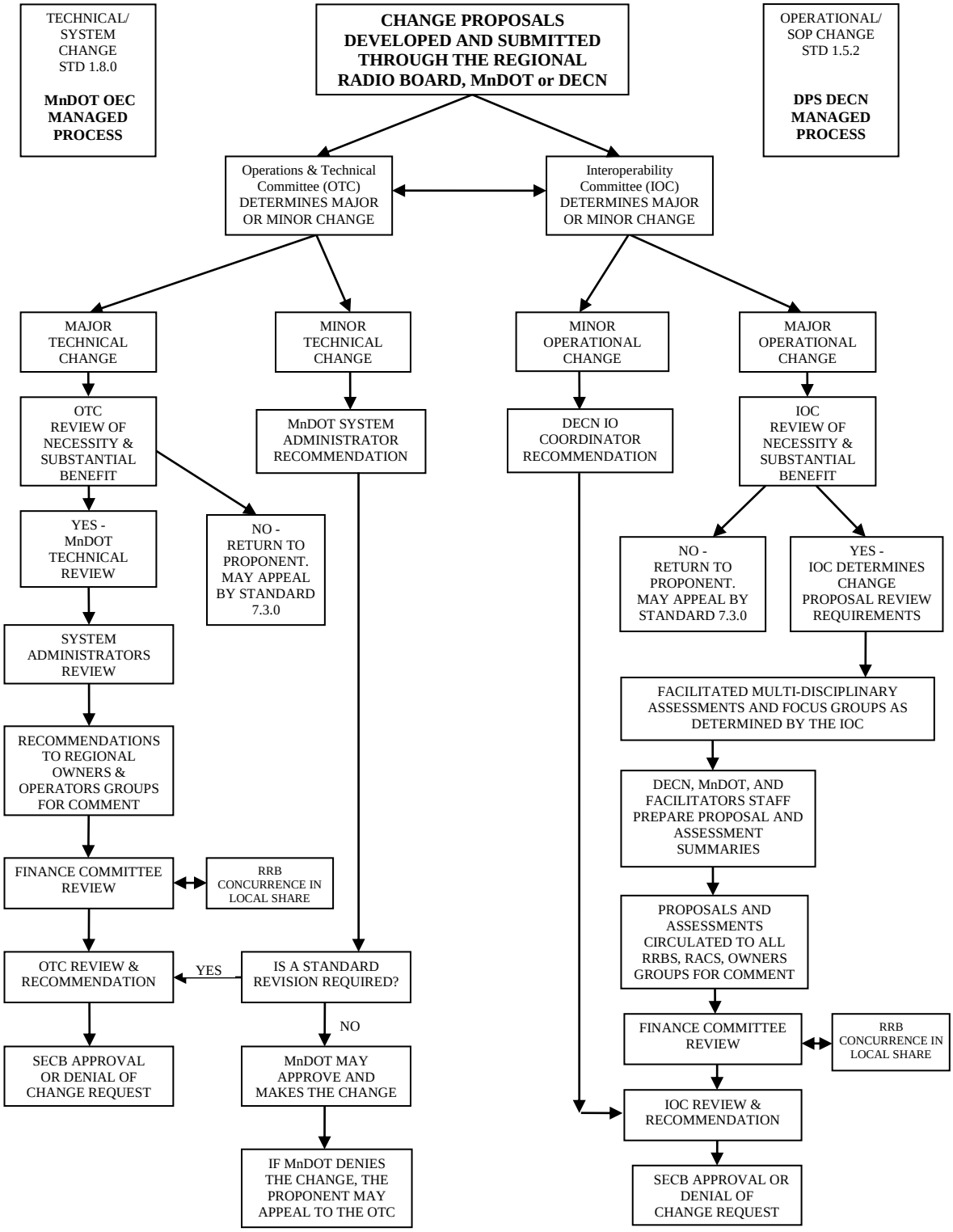


Figure 1 Change Management Process

To: SECB Operations and Technical Committee
From: Jim Stromberg, ARMER Program Manager
Date: April 12, 2016
Subject: SOAR (Scene of Action Repeater) Change Management Request

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On October 13, 2015, Kandiyohi and Stevens Counties requested of the OTC that the SECB consider changing the way one of Minnesota's Scene of Action (SOA) channels is used. The goal of the request is to enhance ARMER coverage in rural communities where in-building ARMER coverage suffers by repurposing a statewide simplex "Scene of Action" channel to be used as a repeated channel. The request has come to be known as SOAR (Scene of Action Repeater).

Because the proposed change would be both technical and operational and impacted all radios on the ARMER system, the request warrants review under the Change Management process prescribed in standards #1.5.2 and #1.8.2. During early discussions, Kandiyohi County withdrew its request. The remaining Stevens County request was conditionally approved by the OTC contingent on approval by the Interoperability Committee and that the request be considered through the Change Management process.

The SOAR request has remained idle while a call was put out for additional Change Management items and while the Change Management process was under review. This matter is now due for consideration.

The requested change would use the simplex Scene of Action channel SOA-3 as a repeated channel and would tie that channel in small geographic areas to a local ARMER talkgroup. Users in areas where ARMER coverage suffers and the SOAR solution is installed could switch to SOA3 and effectively communicate with ARMER users. The proposers reported that a BDA solution is problematic and a search for another pair of statewide-available frequencies yielded no results.

There are six 800 MHz SOA channels licensed in Minnesota and all are presently set up to be used in a simplex mode. Four of the SOAs (SOA-1 through SOA-4) are reserved for all users and should be installed in every ARMER radio. The remaining two are dedicated to the fire/EMS service, are known as FSOA-1 and FSOA-2, and should be installed in all fire/EMS service ARMER radios.

Repurposing SOA-3 to be used in a repeated mode on a local scale compromises statewide uniformity of that channel and could create confusion. The requestors have recommended that the

change be implemented statewide so that all users would have the same functionality and all areas could consider the same solution.

The use of SOAs is covered in Standard 3.15.0. The standard specifies that SOAs are to provide short-range, simplex interoperability. SOA-4 was earmarked for use at jail sally ports and was also identified as employed in the Strategic Technology Reserve SATCOW.

The Emergency Communication networks has reviewed this request and generally supports it. It appears to be a practical and cost-effective solution. The ECN recommends that the following items be considered as this matter is deliberated:

- Consider reassigning both SOA-3 and SOA-4 as repeated resources. The SOAR solution may work well in one town but may not be available in the next town because another repeater on the same frequencies may conflict with the first repeater.
- Two all-user simplex SOAs (SOA-1 and SOA-2) are probably adequate. The ECN does not know of any entities that routinely use three or more SOAs simultaneously. The SOAR solution using SOA-3 and SOA-4 would not preclude those channels from being used either repeated or simplex for an event under the guidance of a COML provided that the standard prescribed that they would be programmed both ways in all radios.
- Whether one or two SOAs are dedicated to a repeater, those channels should be renamed and dedicated to that function. Suggestions: SOAR1 & SOAR2 (repeated) and SOAR1D & SOAR2D (direct/simplex).
- Standard #3.15.0 should be updated if the SOAR suggestion is adopted.
- Action taken on SOAs may impact the Strategic Technology Reserve SATCOW. The SATCOW's technology staff and standard #3.33.3 should be consulted.
- If adopted, all ARMER radios in the state would need to be reprogrammed. Because of the limited geographical scope and infrequent use of SOAs, the ECN recommends that a very long window of time be provided for reprogramming to be completed.

# Allied Radio Matrix for Emergency Response (ARMER)

Change Proposal

## 1. Administrative Information:

**Type of Change (Technical or Operational):** Both Technical and Operational

**Date Submitted:** 01/12/16

**Submitter (e.g., Regional Radio Board or state agency):** Central Mn Regional Radio Board

**Change Sponsor (Individual) Contact Information:** Central MN RAC & Stevens County

**Summary of proposed change(s):** Local use of 8SOA3 during an emergency, training, exercises or special events.

Weak and no coverage areas that are low traffic, multi structure with poor or no portable coverage from the ARMER system will benefit from a SOAR. These areas are small in size and with too many structures to warrant an indoor BDA, and where Outdoor BDA will not penetrate the structures, yet these areas are critical enough for indoor coverage for emergency responders.

## 2. Existing SRB standards impacted:

New Standard written and included.

CM- 3.15.0 How to Use Scene of Action (SOA)

State- 3.15.0 - Use of 700 MHz and 800 MHz Statewide Scene of Action (SOA) Channels *effective 11/22/13*

3.24 RF Control Stations?

3.25.0 - Radio to Radio Cross Band Repeaters?

## 3. Scope of Change:

**Impact on users (e.g., majority of users, minority of users, number of counties/regions):** Potentially all

**Impact on the placement of resources in communications equipment (e.g., upgrades):**

The footprint of the SOAR must be contained to address immediate poor coverage area and not over extend beyond the intended coverage area.

**Impact on operational procedures (e.g., changes to operational standards):** New Standard (attached)

**Impact on user training (e.g., training required for compliance):**

Users would need to be instructed on where the talkgroup is located in their radio, how to use it, and informed of any pertinent ARMER standards. SOAR procedures will need to be addressed in the training of all personnel operating within the SOAR system. Training will cover the different on scene procedures utilized by all users. It is critical that all users are aware of the rules and procedures and limitation in utilizing the SOAR channel.

**Impact on reprogramming or configuration of end-user equipment:**

Subscribers: Use of SOA 3 as a repeater pair 853.950/808.950 with a NAC code of 293 operating in Project 25 Phase 1 and not utilizing any Encryption.

The need or necessity for the SOAR channel to be programmed into radios will be determined by each agency. If an agency opts to not place this channel into their radios they will be responsible for any limitations on their ability to communicate within the SOAR coverage area.

Consoles: Control Stations currently set up for Site Trunking would need to be reprogrammed (if made mandatory).

Other equipment:

## 4. Existing deficiencies, problems, needs addressed by the proposed changes:

The Hancock School, Hancock Police Department, Chokio Fire Hall, Chokio School and other buildings within these cities have limited to no indoor coverage. A SOAR repeater is designed for radio to radio coverage in a poor or no coverage area of the ARMER radio system, also giving the radio one talk group on the ARMER system. With a use of a gateway the SOAR would tie to the ARMER talk group, effectively improving coverage for one talk group and also increasing the radio to radio coverage in the affected area.

Once on the ARMER system a local dispatch agency will control and direct the traffic from the SOAR repeater.

5. **Expected improvements & benefits resulting from the change:**
   Interoperability

6. **Proposed implementation & transition plan including timeline, milestones and training:**

**Start and End Date:** Start date could begin immediately.

**Description of Implementation Plan:** Stevens County is in line for a 2016 Central MN grant, the Stevens County Board of Commissioners has approved this grant and the 50 % match required.

After OTC/Change Management approval: Application for a SOAR will be submitted from the agency to the CM ESB for approval. Application will include.

- Letter explaining reason for SOAR
- Intended coverage area, how they will limit coverage foot print
- Agency who will be responsible for SOAR and contact information
- FCC form 601, schedule D, schedule H showing SOAR location and coverage area will be attached with the application.
- Other SOAR's within a 30 air mile radius
- A Valid FCC License has been obtained

Local System Administrator will be responsible for ensuring that users follow the standards, protocol and procedures.

- Training
  SOAR procedures will need to be addressed in the training of all personnel operating within the SOAR system. Training will cover the different on scene procedures utilized by all users. It is critical that all users are aware of the rules and procedures and limitation in utilizing the SOAR channel.

7. **Preliminary assessments which have been completed (documentation attached):**

*System Tested:*

We have used a Quantar 800Mhz repeater with an antenna system low enough to give us town coverage, yet contain the signal to the areas that need indoor coverage and a small radius around the town.

A gateway system, consisting of two mobile radios, one on the 8TAC94 and the other on a County ARMER talk group as the interface, this was tested in Hancock and Atwater and both operational.

*Test Results:*

In both cases (Atwater and Hancock) we found no internal buildings that we could not penetrate using the 8TAC94 repeater. The Dispatch centers choose to use a lower County interop talk group which dispatch would monitor, and patch when required. All users inside and outside of the structures understand what channels and "talk groups" to use.

*Audio Delays:*

A concern of ours was if the audio delays in our system design would cause users on the 8TAC94, ARMER subscriber radios and dispatchers too much delay and make the system unusable. We did not find this to be the case, technically there is a slight delay, but not much more than what users experienced on a VHF repeater system.

8. **List of Attached proposed new or revised Standards, Plans or Best Practices Guides:** Proposed Standard Included

9. **Other Attachments:**

Draft Standard, Letter to OTC Dated 09/23/15 & Letter Dated 05/29/15

## 10. Tracking and Approvals:

**Submitter Approval:** 01-11-2016

Signature Date

**DECN Receipt:**

Signature Date

**OTC/IOC Determination of Need:**

Signature Date

**MnDOT/ECN Approval:**

Signature Date

**OTC/IOC Approval of Assessments:**

Signature Date

**Finance Committee Approval:**
(if required)

Signature Date

**Final SRB Approval:**

Signature Date

# Allied Radio Matrix for Emergency Response (ARMER)
# Standards, Protocols, Procedures

| | | |
|---|---|---|
| Document Section 1 | | **Status:** DRAFT<br>O & O: 12/10/15<br>RAC: 01/08/16<br>OTC: |
| State Standard Number | | |
| Standard Title | **SOA Repeater (SOAR) Standard** | |
| Date Established | **12/08/15** | **SRB Approval**: |
| Replaces Document Dated | | |
| Date Revised | | |

1. Purpose or Objective:
   A SOAR repeater is designed for radio to radio coverage in a poor or no coverage area of the ARMER radio system, also giving the radio one talk group on the ARMER system. With a use of a gateway the SOAR would tie to the ARMER talk group, effectively improving coverage for one talk group and also increasing the radio to radio coverage in the affected area. Once on the ARMER system a local dispatch agency will control and direct the traffic from the SOAR repeater.

2. Technical Background:
   Weak and no coverage areas that are low traffic, multi structure with poor or no portable coverage from the ARMER system will benefit from a SOAR. These areas are small in size and with too many structures to warrant an indoor BDA, and where Outdoor BDA will not penetrate the structures, yet these areas are critical enough for indoor coverage for emergency responders.

   - Constraints:
     The footprint of the SOAR must be contained to address immediate poor coverage area and not over extended beyond the intended coverage area.

3. Operational Context:
   SOAR shall be utilized for communications where a non reliable or no signal is present from the ARMER system.

4. Recommended Protocol/Standard
   Use of SOA 3 as a repeater pair 853.950/808.950 with a NAC code of 293 operating in Project 25 Phase 1 and not utilizing any Encryption.

   The need or necessity for the SOAR channel to be programmed into radios will be determined by each agency. If an agency opts to not place this channel into their radios they will be responsible for any limitations on their ability to communicate within the SOAR coverage area.

5. Recommended Procedure:
   Users when entering into the SOAR coverage area with the intent of using the SOAR system will notify the governing dispatch agency. The agency will be responsible for the use of the SOAR during the event.



DRAFT

Application for a SOAR will be submitted from the agency to their ESB for approval. Application must include.

- Letter explaining reason for SOAR,
- Intended coverage area, how they will limit coverage foot print
- Agency who will be responsible for SOAR and contact information
- FCC form 601, schedule D, schedule H showing SOAR location and coverage area must be attached with application.
- Other SOAR's within a 30 air mile radius
- A Valid FCC License must be obtained for every SOAR

6. Management:
The agency who is applying for the SOAR must follow local regional procedures for approval and will be responsible for its operation. Agency must forward the application to their ESB for approval. The region will forward application to OTC for their final approval.
If a SOAR will be within 30 air miles of another region, the ESB will notify the other region's ESB of its intent to implement a SOAR and its location.

Local System Administrators will be responsible for ensuring that users follow the standards, protocol and procedures.

- Training
SOAR procedures will need to be addressed in the training of all personnel operating within the SOAR system. Training will cover the different on scene procedures utilized by all users. It is critical that all users are aware of the rules and procedures and limitation in utilizing the SOAR channel.

DRAFT

# Allied Radio Matrix for Emergency Response (ARMER)
# Standards, Protocols, Procedures

| | | |
|---|---|---|
| Document Section 2 | **Configuration and Allocation** | **Status:** Complete |
| State Standard Number | **2.17.0** | |
| Standard Title | **Multigroup/Announcement** | |
| Date Established | **02/21/2001** | **SRB Approval**: 09/01/2005 |
| Replaces Document Dated | **09/01/2005** | |
| Date Revised | **03/14/2016** | |

## 1. Purpose or Objective

The purpose of this procedure is to set forth requirements for multigroups that are directly shared among agencies and for talkgroups *within* the multigroups that are shared between agencies. This documentation will further provide the using agencies information on the intent, purpose, operation, and behavior of the individual multigroup.

Multigroup communications have a large impact on the talkgroups that are contained within the multigroup, especially if the affected talkgroups are shared among separate agencies.

## 2. Technical Background

- **Capabilities**

There are two types of announcement groups: console-generated and pre-programmed.

A console-generated announcement group contains multi-selected individual talkgroups.

A pre-programmed announcement group is attached to other talkgroups that have been pre-programmed into a radio.

The intent of both announcement groups is to be used for multi-talkgroup type announcements.

The Emergency Call feature on the subscriber radio may be programmed to activate a multigroup. (i.e., use of emergency button to alert multiple talkgroups.)

A multigroup looks and behaves, for the most part, like a talkgroup. It can be programmed into console positions or subscriber radios and is activated the same as a talkgroup, by selecting a multigroup and transmitting.

After a multigroup call ends, there is a short period of "hang time" when a radio user can reply to the entire multigroup, even though the radio user has a single talkgroup selected within the multigroup.

- **Constraints**

A talkgroup does not have to belong to a multigroup. If the talkgroup is in a multigroup, the talkgroup can only belong to **one pre-programmed** multigroup.

There are multiple configurations that can be used to create a multigroup. Each configuration has its own limitations.

Console Generated – A dispatcher transmitting on a multi-select from the appropriate button will transmit in a super group across all talkgroups included in the multi-select, and all subscriber radios will receive the transmission. However, if a field unit keys up on one of the talkgroups selected in that multigroup, only other users selected to or scanning the field unit's talkgroup will hear the transmission.

Pre-Programmed – A pre-programmed multigroup is associated with existing talkgroups. When a dispatcher selects the multigroup and make an announcement, it will come across all talkgroups that have that multigroup associated with it.

If a subscriber selects a talkgroup that is active in a multiselect on the radio, the radio can monitor talkgroup activity for all the talkgroups associated with the selected multigroup **only** if the monitored talkgroup has an affiliated member in the same zone as the monitoring subscriber.

Subscriber radio programming software has a limited number of talkgroups per multigroup. The subscriber and infrastructure talkgroup-to-multigroup mapping must be programmed **identically between the system and the radio.**

Talkgroups within a multigroup may be engaged in an active call at the time a multigroup call is initiated. The multigroups can be individually programmed to handle this in different ways:

- The talkgroup calls can be interrupted, and then the multigroup call begins. This is called "Ruthless Preemption," and anyone whose "push-to-talk" (PTT) is still active for the talkgroup calls will be unaware their call has been interrupted.
- The multigroup call can be set up to wait until all of the contained talkgroup calls are complete before the multigroup call is initiated; however, this may cause delays in initiating the multigroup call.

Delays may also be caused by talkgroup calls initiated before the multigroup call is allowed to start.

## 3. Operational Context

The multigroup function is an available, user option feature of the system.

## 4. Recommended Protocol/ Standard

If an agency does not "own" the talkgroup it wishes to place within a multigroup, the agency must first obtain the permission of the owning agency.

Agencies must share multigroup information while fleetmaps are being planned and programmed into the system and subscriber radios. In addition to operational planning, this information is necessary to ensure that users are aware of the multigroup resource.

If an agency shares the multigroup or the associated talkgroups contained within a multigroup with other agencies, the owning agency shall be responsible for informing the sharing agency of the operational properties and guidelines for use of the multigroup.

- Information must be shared about the purpose and guidelines for use of the multigroup and interrupt mode, if active talkgroup calls will be terminated (ruthless preemption,) if the multigroup will wait until the talkgroup calls conclude, and any other operational information as needed.
- Multigroups may only be used for owned or shared talkgroups. Multigroups may not be used with regional interoperability resources (i.e., talkgroups/channels) as detailed in Section 3, "Interoperability Standards."

## 5. Recommended Procedure

Recommended procedures will be handled by the individual agencies as part of their fleetmap process.

## 6. Management

The System Administrators of the shared multigroup resource shall be responsible for managing their multigroups.

# Allied Radio Matrix for Emergency Response (ARMER)
# Standards, Protocols, Procedures

| | | |
|---|---|---|
| Document Section 2 | **Configuration and Allocation** | **Status:** Complete |
| State Standard Number | **2.17.0** | |
| Standard Title | **Multigroup/Announcement** | |
| Date Established | **02/21/2001** | **SRB Approval**: 09/01/2005 |
| Replaces Document Dated | ~~**12/04/2003**~~**09/01/2005** | |
| Date Revised | ~~**05/10/2003**~~**03/14/2016** | |

## 1. Purpose or Objective

The purpose of this procedure is to set forth requirements for multigroups that are directly shared among agencies and for talkgroups *within* the multigroups that are shared between agencies. This documentation will further provide the using agencies information on the intent, purpose, operation, and behavior of the individual multigroup.

Multigroup communications have a large impact on the talkgroups that are contained within the multigroup, especially if the affected talkgroups are shared among separate agencies.

## 2. Technical Background

- **Capabilities**

There are two types of announcement groups: console-generated and pre-programmed.

A console-generated announcement group contains multi-selected individual talkgroups.

A pre-programmed announcement group is attached to other talkgroups that have been pre-programmed into a radio.

The intent of both announcement groups is to be used for multi-talkgroup type announcements.

The Emergency Call feature on the subscriber radio may be programmed to activate a multigroup. (i.e., use of emergency button to alert multiple talkgroups.)

~~A multigroup contains talkgroups within it. Its purpose is to provide a way to make announcements to a number of talkgroups at the same time; therefore, it is also referred to as an "Announcement Group."~~

~~An announcement group is always pre-set~~

A multigroup looks and behaves, for the most part, like a talkgroup. It can be programmed into console positions or subscriber radios and is activated the same as a talkgroup, by selecting a multigroup and transmitting.

After a multigroup call ends, there is a short period of "hang time" when a radio user can reply to the entire multigroup, even though the radio user has a single talkgroup selected within the multigroup.

- **Constraints**

A talkgroup does not have to belong to a multigroup. If the talkgroup is in a multigroup, the talkgroup can only belong to **one pre-programmed** multigroup.

There are multiple configurations that can be used to create a multigroup. Each configuration has its own limitations.

Console Generated – A dispatcher transmitting on a multi-select from the appropriate button will transmit in a super group across all talkgroups included in the multi-select, and all subscriber radios will receive the transmission. However, if a field unit keys up on one of the talkgroups selected in that multigroup, only other users selected to or scanning the field unit's talkgroup will hear the transmission.

Pre-Programmed – A pre-programmed multigroup is associated with existing talkgroups. When a dispatcher selects the multigroup and make an announcement, it will come across all talkgroups that have that multigroup associated with it.

If a subscriber ~~subscriber~~ selects a talkgroup that is active in a multiselect ~~the multigroup mode~~ on the radio, the radio can monitor talkgroup activity for all ~~of~~ the talkgroups associated with the selected multigroup **only** if the monitored talkgroup has an affiliated member in the same zone as the monitoring subscriber.

Subscriber radio programming software has a limited number of talkgroups per multigroup. ~~is limited to 15 talkgroups per multigroup. The Zone Controller limit is 255.~~ The subscriber and infrastructure talkgroup~~-~~-to~~-~~-multigroup mapping must be programmed **identically between the system and the radio.**

Talkgroups within a multigroup may be engaged in an active call at the time a multigroup call is initiated. The multigroups can be individually programmed to handle this in different ways:

- The talkgroup calls can be interrupted, and then the multigroup call begins. This is called "Ruthless Preemption," and anyone whose "push-to-talk" (PTT) is still active for the talkgroup calls will be unaware their call has been interrupted.
- The multigroup call can be set up to wait until all of the contained talkgroup calls are complete before the multigroup call is initiated; however, this may cause delays in initiating the multigroup call.

Delays may also be caused by talkgroup calls initiated before the multigroup call is allowed to start.

## 3. Operational Context

The multigroup function is an available, user option feature of the system.

## 4. Recommended Protocol/ Standard

If an agency does not "own" the talkgroup it wishes to place within a multigroup, the agency must first obtain the permission of the owning agency.

Agencies must share multigroup information while fleetmaps are being planned and programmed into the system and subscriber radios. In addition to operational planning, this information is necessary to ensure that users are aware of the multigroup resource.

If an agency shares the multigroup or the associated talkgroups contained within a multigroup with other agencies, the owning agency shall be responsible for informing the sharing agency of the operational properties and guidelines for use of the multigroup.

- Information must be shared about the purpose and guidelines for use of the multigroup and interrupt mode, if active talkgroup calls will be terminated (ruthless preemption), if the multigroup will wait until the talkgroup calls conclude, and any other operational information as needed.
- Multigroups may only be used for owned or shared talkgroups. Multigroups may not be used with regional interoperability resources (i.e., talkgroups/channels) as detailed in Section 3, "Interoperability Standards."

## 5. Recommended Procedure

Recommended procedures will be handled by the individual agencies as part of their fleetmap process.

## 6. Management

The System Administrators of the shared multigroup resource shall be responsible for managing their multigroups.

# Allied Radio Matrix for Emergency Response (ARMER)
# Standards, Protocols, Procedures

| | | |
|---|---|---|
| Document Section 3 | **Interoperability Standards** | **Status:** Complete |
| State Standard Number | **3.32.0** | |
| Standard Title | **Statewide Interoperable Plain Language Policy** | |
| Date Established | **1/6/2009** | **SRB Approval**: 5/28/2009 |
| Replaces Document Dated | **05/28/2009** | |
| Date Revised | **03/14/2016** | |

## 1. Purpose or Objective

Plain Language (clear speech) Compatibility:
The ability of emergency management/response personnel from different disciplines, jurisdictions, organizations, and agencies to work together depends greatly on their ability to communicate with each other. The use of plain language is about the ability of emergency management/response personnel to communicate clearly with one another and effectively coordinate activities, no matter the size, scope, location, or complexity of the incident.

The use of plain language (clear speech) in emergency management and incident response is a matter of public safety, especially the safety of emergency management/response personnel and those affected by the incident. It is critical that all those involved with an incident know and utilize commonly established operational structures, terminology, policies, and procedures. This will facilitate the achievement of interoperability across agencies/organizations, jurisdictions, and disciplines, which is exactly what the National Incident Management System (NIMS) and the Incident Command System (ICS) is seeking to achieve.

## 2. Technical Background

- **Capabilities**

Integrated Communications
Incident communications are facilitated through the development and use of a common communications plan and interoperable communications processes and architectures. The ICS 205 Form is available to assist in developing a common communications plan. This integrated approach links operational and support units of agencies involved and is necessary to maintain communications and enable common situational awareness/interaction. Preparedness planning should address the equipment, systems, and protocols necessary to achieve integrated voice and data incident management communications

- **Capabilities**

N/A

## 3. Operational Context

Any communications between organizational elements during an incident should be in plain language in order to ensure that information dissemination is timely, clear, acknowledged, and understood by all intended recipients. Codes should not be used, and all communications should be confined to essential messages. The use of acronyms should be avoided during incidents requiring the participation of multiple agencies or organizations. Policies and procedures that foster compatibility should be defined to allow information sharing among all emergency management/response personnel and their affiliated organizations to the greatest extent possible.

Encryption or Tactical Language

When necessary, emergency management/response personnel and their affiliated organizations need to have a methodology and systems in place to encrypt information so that security can be maintained. Although plain language may be appropriate during response to most incidents, tactical language is occasionally warranted due to the nature of the incident (e.g., high-risk incident, such as active shooter.) The use of specialized encryption and tactical language should be incorporated into any comprehensive incident action plan (IAP) or incident management communications plan (IMCP).

The principal objection to the use of plain language by law enforcement is the possibility that sensitive information could be revealed to a suspect within hearing range of the responder, possibly endangering the safety of the responder. To address these concerns on a multi-agency response, tactical codes should be recognized and be a part of the IAP and IMCP to maintain responder safety. Examples may include the following:

- Immediate danger
- Backup/assistance
- Take subject into custody
- Hold for sensitive information

## 4. Standardized Policy

The use of plain language is about the ability of area commanders, state and local Emergency Operations Center (EOC) personnel, federal operational coordinators, and responders to communicate clearly with each other and effectively coordinate response activities, no matter what the size, scope, or complexity of the incident. The ability of responders from different jurisdictions and disciplines to work together depends greatly on their ability to communicate with each other.

It is required that plain language be used for multi-agency, multi-jurisdictional, and multi-discipline events, such as major disasters and exercises. Beginning in the fiscal year that starts on Oct. 1, 2006, federal preparedness grant funding is contingent on the use of plain language in incidents requiring assistance from responders from other agencies, jurisdictions, and functional disciplines.

Primary Intended Use

Multi-agency or multi-jurisdictional emergency response or exercise.

Best Practices Encouraged

The use of plain language in emergency response is matter of public safety, especially the safety of first responders and those affected by the incident. It is critical that all responders, including those

from other jurisdictions or states, as well as the federal government, know and utilize commonly established operational structures, terminology, policies, and procedures.

Incident Scope and Geographic Area
The shared, statewide incident response talkgroups are available for use anywhere the ARMER system provides geographic coverage, regardless of incident size or scale. Interoperability incidents may be localized or dispersed in area. Participating personnel and resources may be local, regional, statewide, or national. Incidents may be pre-planned or emergent in nature.

## 5. Standardized Procedure

While the NIMS Integration Center does not require plain language for internal operations, it is strongly encouraged. It is important to practice everyday terminology and procedures that will need to be used in emergency incidents and disasters. NIMS implementation is a long-term effort. Though it is not practical to expect a change of ingrained habits overnight, it is expected that over time, everyone will understand the importance of using plain language for day-to-day operations.

Unit Identification
When operating on the shared, statewide incident response talkgroups, users should initially identify in the following manner using plain language: Agency name and service branch or function designation, followed by call sign or unit number. Examples: "North EMS 512", "Elk River Police 512", "Washington County Public Works 512", "State Patrol 512", etc. Once established, ongoing communications between the same units may be shortened.

Use of 10-Codes and Acronyms
The use of 10-codes, signals, unique acronyms, and other codes should not be used on the statewide incident response talkgroups because there is no standardized set of codes. Plain language should be used in all cases.

## 6. Management

Violations (Noncompliance)
A violation or noncompliance to the Statewide Interoperable Plain Language Policy should be documented and sent to the appropriate Regional Emergency Communications Board (ECB) / Emergency Services Board (ESB) for review and, if necessary, be sent for follow-up to the Local System Administrator where the noncompliant entity is located.

The Local System Administrator will report back their findings to the ECB/ESB. This may be done in person at an ECB/ESB meeting or via letter to the ECB/ESB Chair.

Repeated violations by any one entity will require a representative of that entity to appear before the Regional ECB/ESB, where the Board will determine the appropriate action to be taken.

Variances and Exceptions
Encryption or Tactical Language – see #3, Operational Context.

# Allied Radio Matrix for Emergency Response (ARMER)
# Standards, Protocols, Procedures

| | | |
|---|---|---|
| Document Section 3 | **Interoperability Standards** | **Status:** Complete |
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- **Capabilities**

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The L~~l~~ocal System Administrator will report back their findings to the ECB/ESB. ~~RRB.~~ This may be done in person at an ECB/ESB ~~RRB~~ meeting or via letter to the ECB/ESB ~~RRB~~ Chair.

Repeated violations by any one entity will require a representative of that entity to appear before the Regional ECB/ESB~~Radio Board~~, where the Board will determine the appropriate action to be taken.

Variances and Exceptions
Encryption or Tactical Language – see #3, Operational Context.

*SHERIFF BRENT C. LINDGREN*
*MILLE LACS COUNTY*
*640 3rd St. S.E.*
*Milaca MN 56353*
*(320) 983-8250*
*FAX: (320) 983-8343 (Sheriff's Office, Civil Process)*
*FAX (320) 983-8270 (Dispatch)*
*FAX (320) 983-8419 (Jail)*

*"TO PROTECT AND SERVE"*

**ARMER Participation Plan Update**

Mille Lacs County, Minnesota March 7, 2016

**ARMER Participation Plan Update Request**

Mille Lacs County seeks approval to update their participation on the Allied Radio Matrix for Emergency Response (ARMER) backbone system. Mille Lacs County intends to put a six (6) channel ASR Site near the City of Wahkon, behind the Mille Lacs County Public Works Maintenance Garage (County Property) just west of the city of Wahkon on Highway 27.

This participation plan update has been prepared in accordance with the ARMER standards for requesting and configuring a change to the ARMER backbone. Mille Lacs County intends to work with Motorola, Granite Electronics, Central Minnesota Regional Emergency Services Board (CMESB) and the Minnesota Department of Transportation (Mn/DOT) on this project. Mille Lacs County seeks review and approval of this plan by the Central Minnesota O&O and Users Committee, Emergency Services Board (CMESB) and the Minnesota Department of Transportation. Mille Lacs County believes that: This participation plan update accurately reflects impacts on the ARMER system that would result from its implementation. This participation plan update is consistent with the capacity and operational constraints of the ARMER system. This participation plan update is consistent with the currently adopted plan and standards of the Statewide Emergency Communications Board. As this project proceeds through the approval and funding process within Mille Lacs County and the CMESB specific technical details will be part of this plan update contained in this Participation Plan Update to include, but not be limited to microwave connectivity, Shelter, Tower, Equipment, information etc.

**Project Background**

In 2011 Mille Lacs County came onto the Statewide ARMER system. It quickly became very apparent that we had very limited portable and mobile coverage in the Cities of Isle and Wahkon. The coverage that we did get was primarily mobile coverage from the Onamia and Borden Lake Sites. There was no portable in building coverage to speak of in the two cities. With this said, a decision was made in late 2014 to install an ASR somewhere in the area of Isle and Wahkon.

## Technical Design Plan

This section identifies the major technical elements of the Mille Lacs County ARMER Participation Plan Update. This plan presents information related to the system infrastructure architecture, site addition, site RF coverage, channel additions and frequency plan.

### Infrastructure

This plan section describes the system level requirements and topology of the Mille Lacs County regional radio system enhancement to the ARMER backbone. By adding this new site Mille Lacs County is enhancing ARMER mobile radio and in building portable coverage in the cities of Isle and Wahkon. This plan update proposes that Mille Lacs County will continue operate on the existing state ARMER sites within the county at Onamia and Pease and the ARMER system Zone Controller (zone 4 - St. Cloud). Duelm and Gilman are located outside of Mille Lacs County but are part of a Mn/DOT Simulcast system that also includes Pease which is located inside the county.

### Wahkon Site Addition and Data

The Wahkon Site will be a 180' free standing tower, with an equipment shelter. There will be 4.9GHz Microwave link from Onamia to Wahkon that will provide T1 connections for the ASR radio site along with additional capabilities for VHF paging.

There will be a 4FT DISH, on the Wahkon Tower, and, 6FT DISH, on the Onamia Tower which will provide a link to the Onamia MN/DOT backbone microwave. The microwave link has been designed for 5 nines reliability.

The Motorola ASR repeater equipment will consist of GTR8000 repeaters configured in a 6 pack rack. The two gateway routers will be connected to two T1 ports of the microwave that will allow MN/DOT to provide separate routes for these connections back to the Zone 4 controller in St Cloud.

This project is expected to be completed sometime in June of 2016. Anticipated coverage is shown on the attached maps for the Wahkon tower's ARMER radio coverage.

Sheriff Brent C. Lindgren

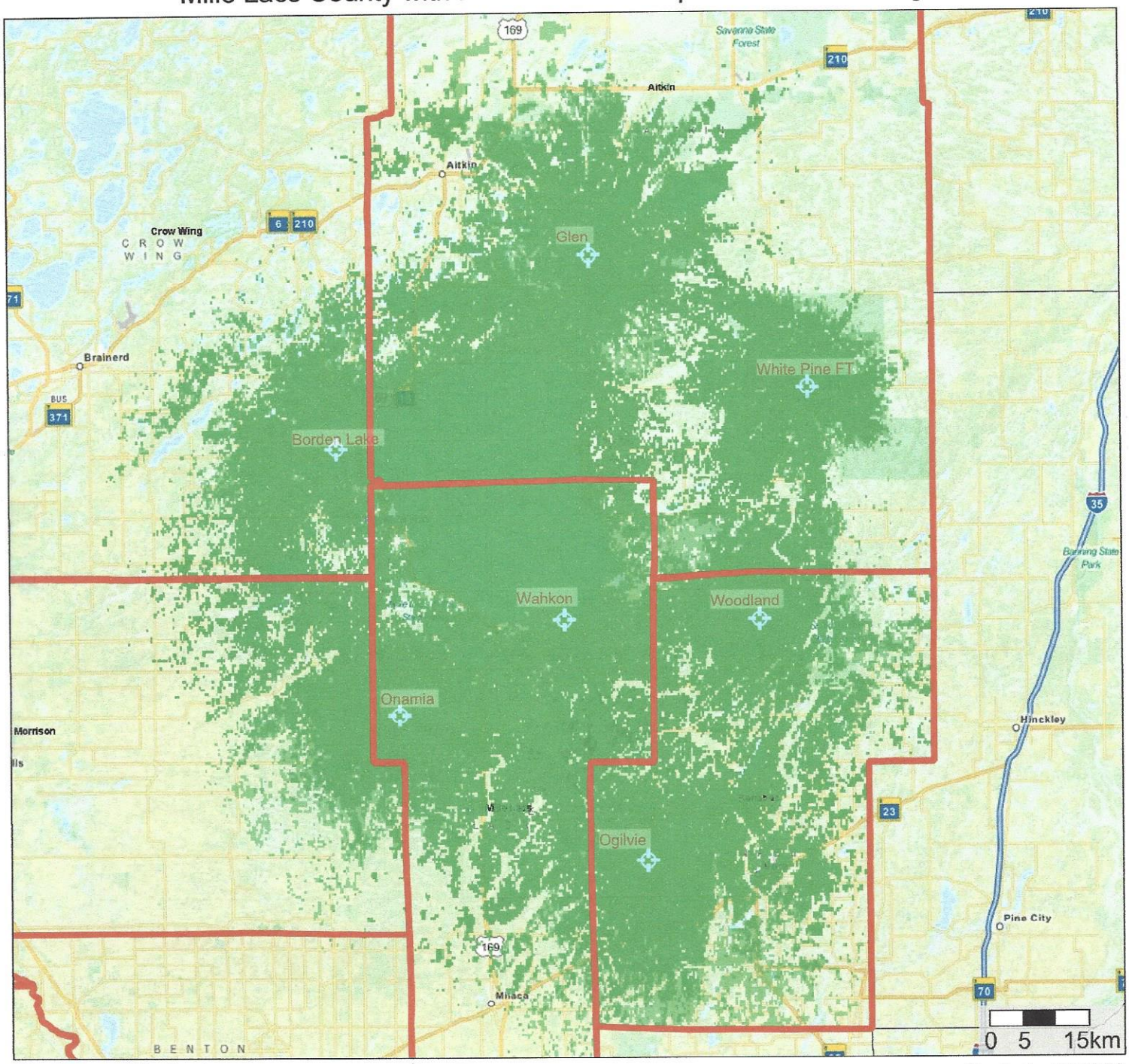
Date

3-7-16

MOTOROLA

PORTABLE

# Mille Lacs County with new Wahkon Site plus current coverage




Tiles Courtesy of MapQuest

Scale 1 : 825928

Legend

- 95% Area inbound Portable APX7000
- 95% Area outbound Portable APX7000

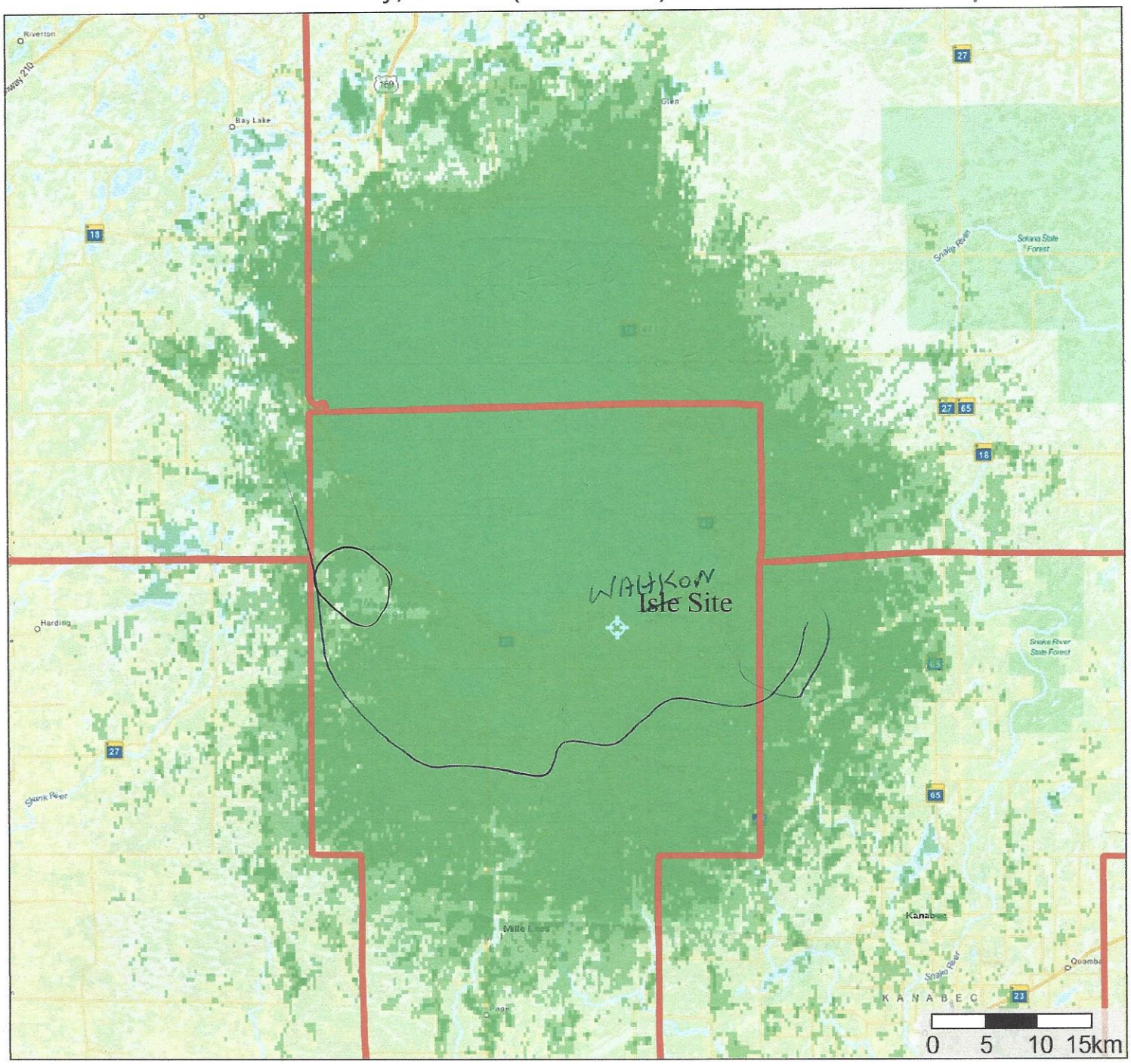
Analysis for an APX7000 portable at hip in a swivel, equipped with 1/2 wave flex whip antenna and Remote Speaker Mic, with 6 dB (Low) building penetration loss everywhere. 95% or more of the shaded area is covered at DAQ3.4.

Solution: Mille Lacs County ASR  Workspace: Mille Lacs  Design: Design 18 New Tower

Job ID: 1143253502.7.Design 18 New Tower plus  System version: 20150703, N/A, 1.66.1  Printed: 7/16/2015

MOTOROLA

# Mille Lacs County, ~~Isle~~ WAHKON MN (New Tower) Mobile-Radio Analysis - MOBILE




Tiles Courtesy of MapQuest

Scale 1 : 519329

Legend

- 95% Area inbound Mobile APX7500
- 95% Area outbound Mobile APX7500

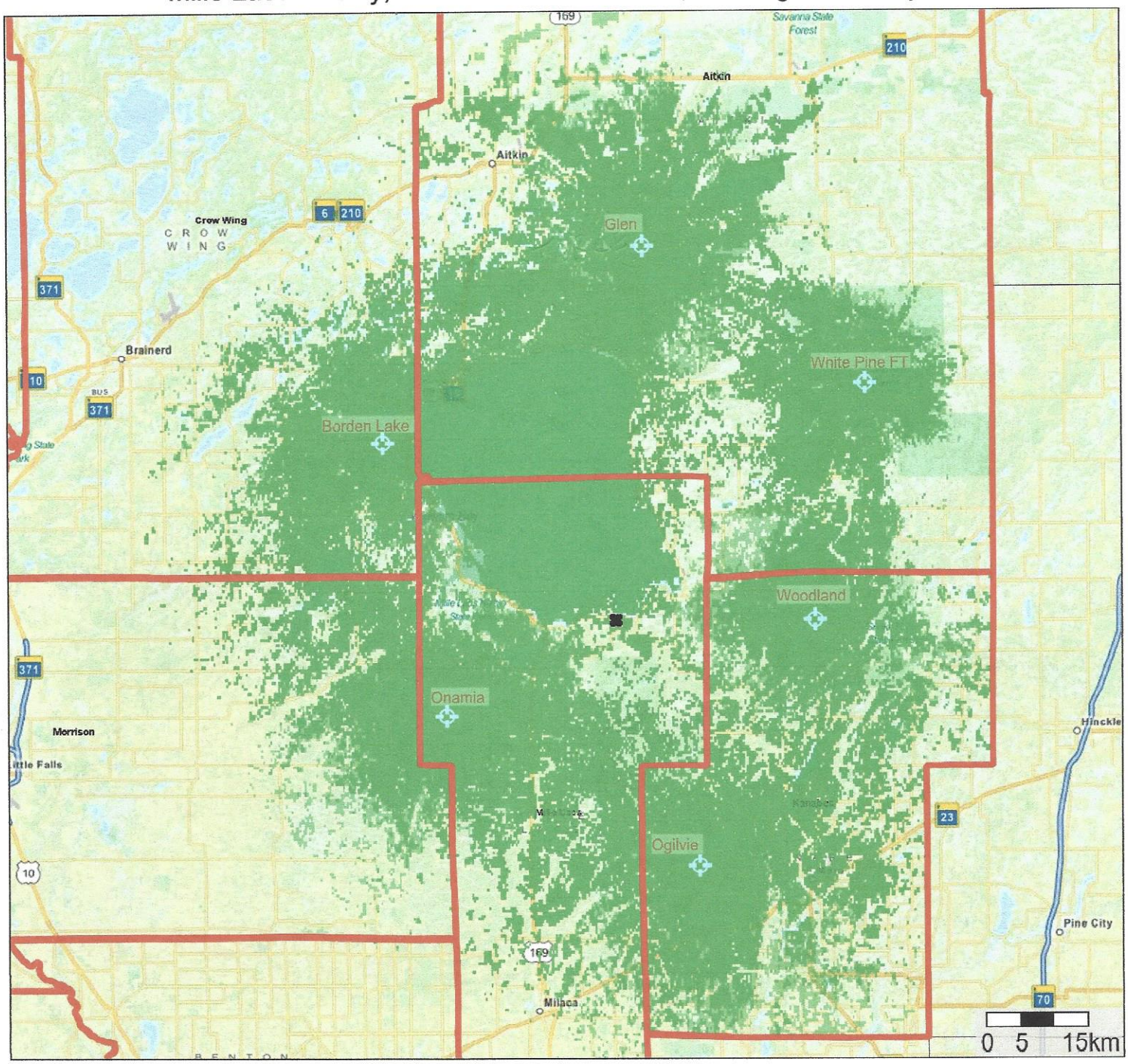
Analysis for an APX7500 mobile with a ¼-wave antenna mounted centerline roof level of vehicle(5ft hi). Outdoor coverage (No building penetration loss) everywhere. 95% or more of the shaded area is covered at DAQ3.4.

Solution: Mille Lacs County ASR | Workspace: Mille Lacs | Design: Design 13 copy design 12

Job ID: 9173648227.1.Design 13 copy design 12 | System version: 20150703, N/A, 1.66.1 | Printed: 7/10/2015

MOTOROLA

# Mille Lacs County, ~~Isle~~ WAHKON MN PORTABLE Portable-Radio, Existing Site Analysis




Tiles Courtesy of MapQuest

Scale 1 : 809379

Legend

- 95% Area inbound Portable APX7000
- 95% Area outbound Portable APX7000

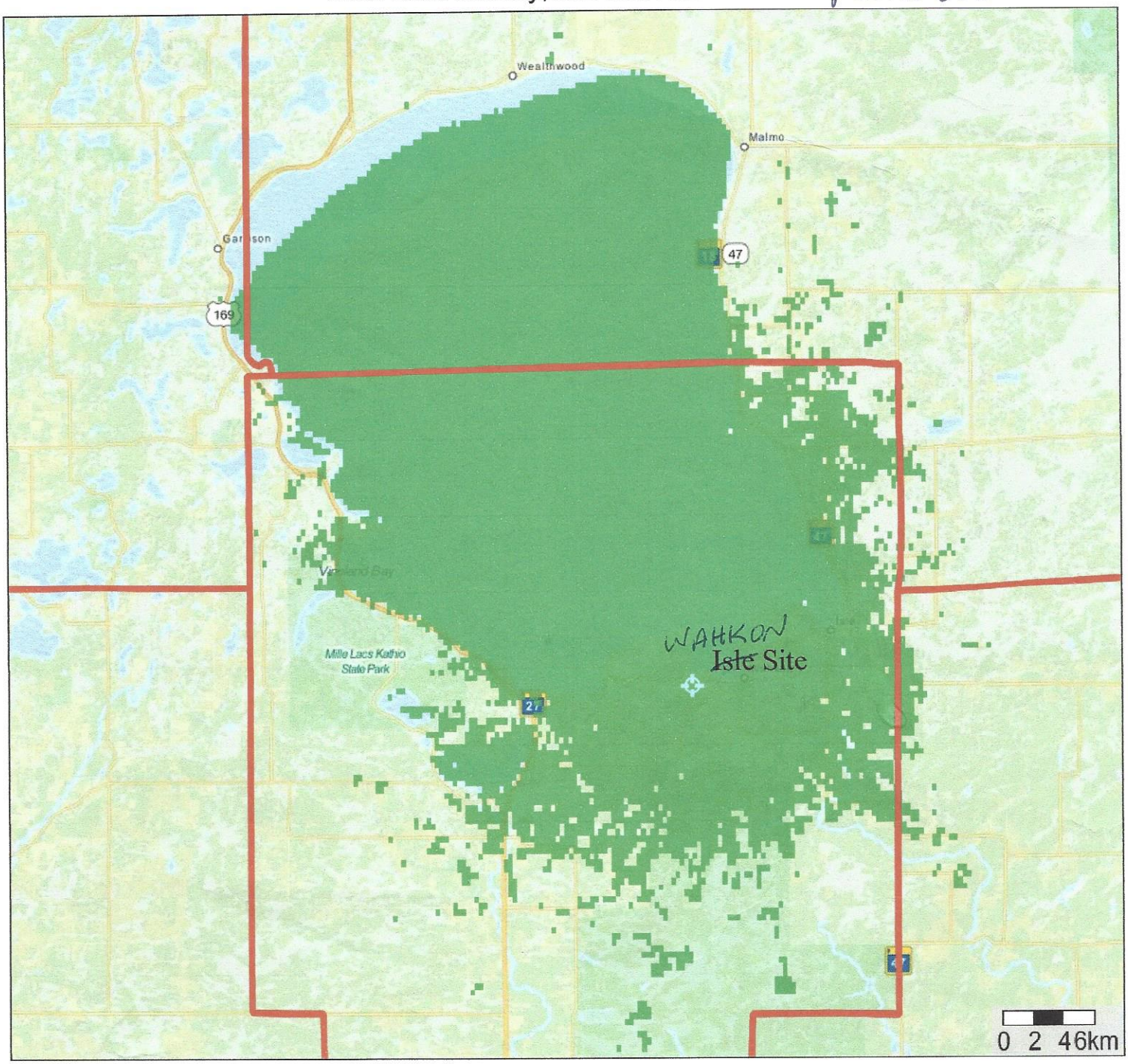
Current coverage. Analysis for an APX7000 portable at hip in a swivel, equipped with 1/2 wave flex whip antenna and Remote Speaker Mic, with 6 dB (Low) building penetration loss everywhere. 95% or more of the shaded area is covered at DAQ3.4.

Solution: Mille Lacs County ASR | Workspace: Mille Lacs | Design: Design 17 Neighbor sites

Job ID: 1281357347.6.Design 17 Neighbor sites | System version: 20150703, N/A, 1.66.1 | Printed: 7/16/2015

MOTOROLA

# Mille Lacs County, ~~Isle~~ WAHKON MN New Tower PORTABLE




Tiles Courtesy of MapQuest

Scale 1 : 358589

Legend

- 95% Area inbound Subscriber
- 95% Area outbound Subscriber

Analysis for an APX7000 portable at hip in a swivel, equipped with 1/2 wave flex whip antenna and Remote Speaker Mic, with 6 dB (Low) building penetration loss everywhere. 95% or more of the shaded area is covered at DAQ3.4.

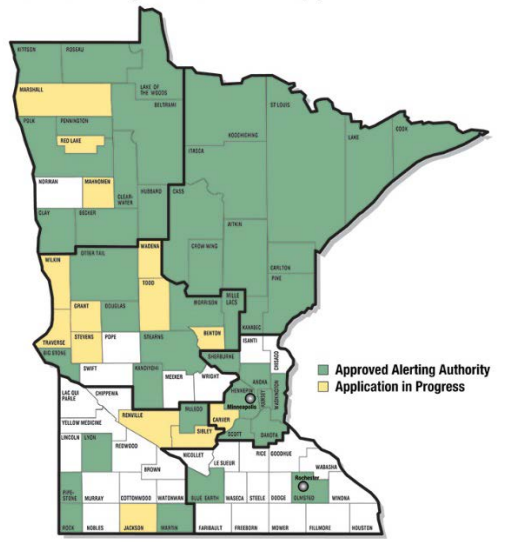
Solution: Mille Lacs County ASR | Workspace: Mille Lacs | Design: Design 10 GTR-BR 70W

Job ID: 6921124171.1.Design 10 GTR-BR 70W | System version: 20150703, N/A, 1.66.1 | Printed: 7/07/2015

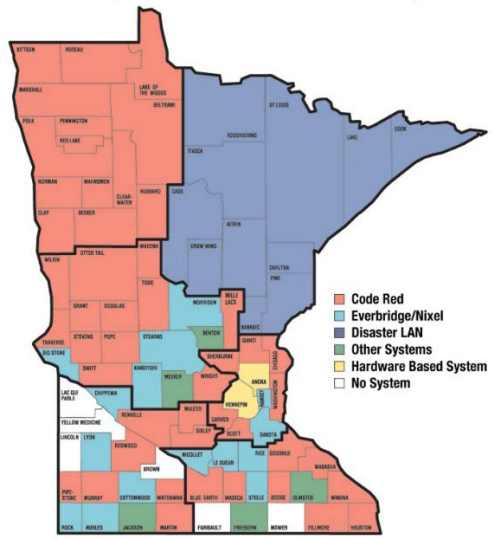
# IPAWS Activity

21 April 2016

**Local Alerting Authorities Approved for IPAWS**




**IPAWS Capable Mass Notification Systems**




List of Counties Approved by FEMA – Jan 2016

Counties in process since last map:

-

**Percentage of Counties signed on or in application phase with IPAWS by SECB Region:**

North East Region – 100% using a Regional COG

North West – 90 %

Metro Region – 80 %

Central – 75 %

South Central – 40 %

South West – 45 %

South East – 9 %

Counties with Class 1 rail traffic

Counties with Class 1 Rail traffic without IPAWS capable warning system: (Goal 2.3.1)

- Todd – Selected Code Red March 2016
- Yellow Medicine

## Training:

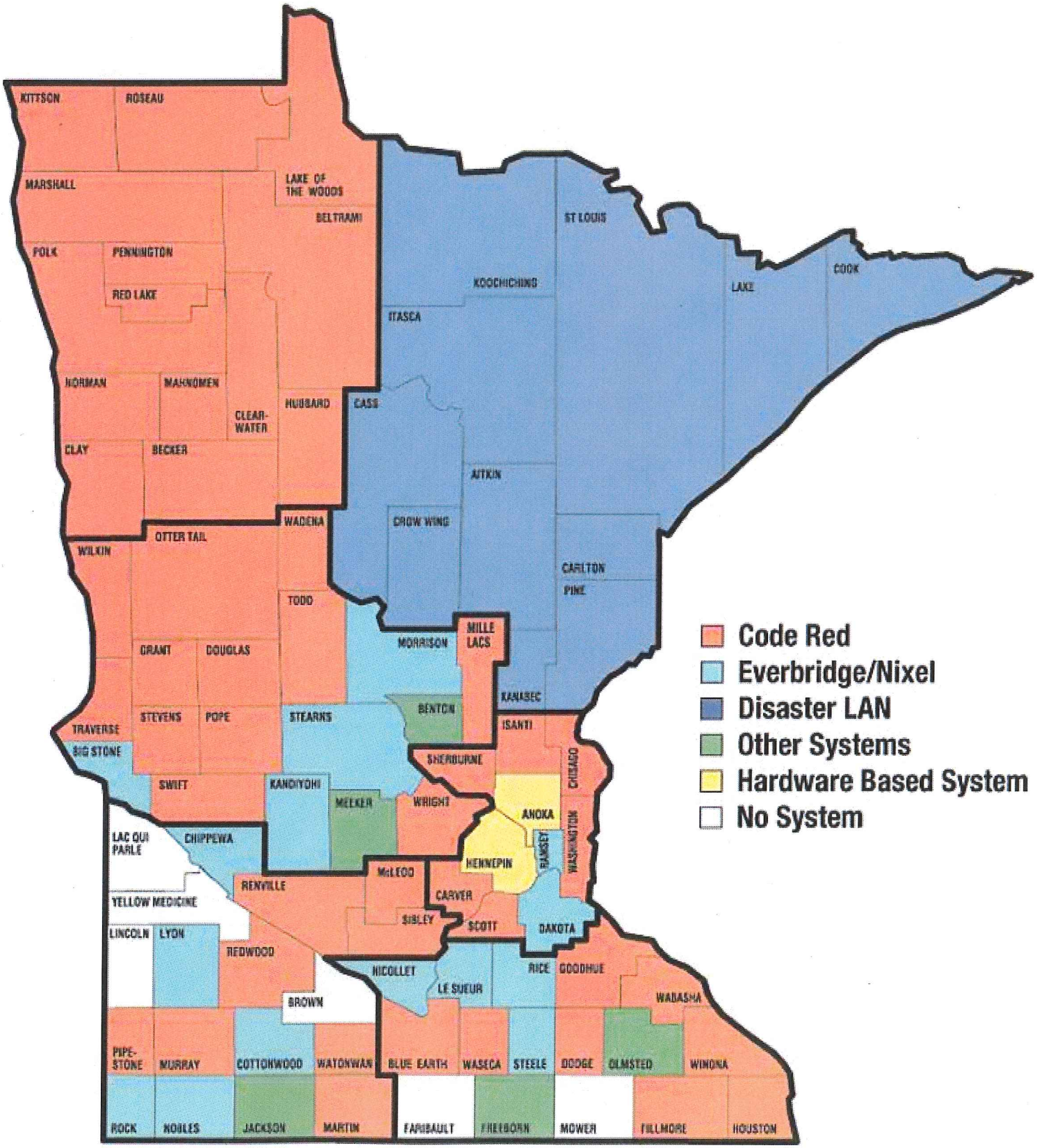
**Up Coming, Public Alerting Authority Best Practices Workshop:**

- 3 May – Region I, SE Albert Lea

**Recent, Public Alerting Authority Best Practices Workshops: 10 Workshops – 207 Participants**

- 5 Nov 2015 – Region II (15)
- 6 Jan 2016 – Region IV SW (23)
- 7 Jan – Region IV and VII, SW (32)
- 20 Jan – Region I & VII SC and ES (30)
- 9 Feb – HSEM Conference (19)
- 24 Feb – Region IV CM (19)
- 25 Feb – Region III NW (24)
- 9 Mar – Region IV, CM (23)
- 15 April – Region I, SE, Rochester (11)
- 20 April – Region III, NW, Polk (11)

# IPAWS Capable Mass Notification Systems



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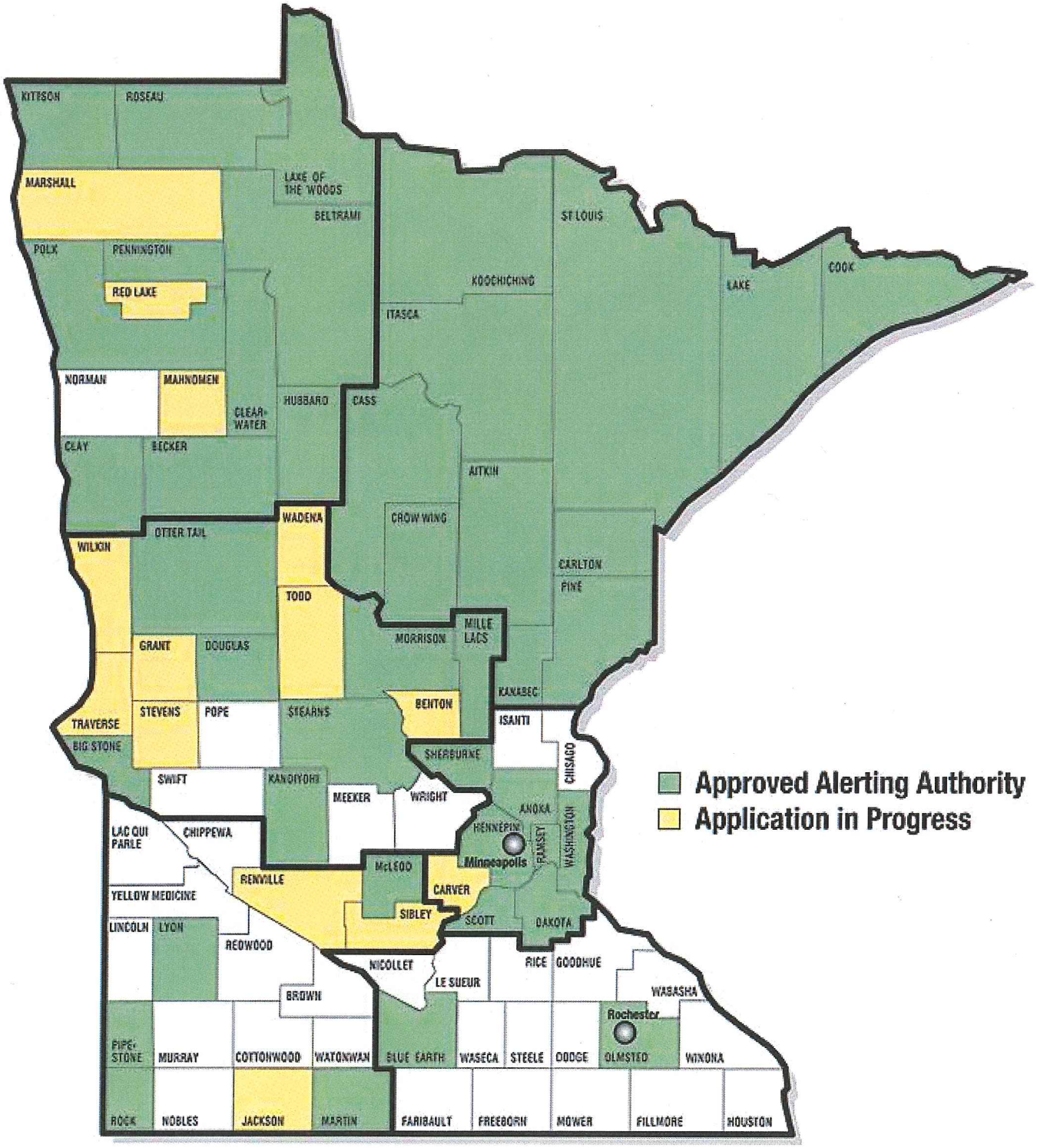


March 2016

MnFCP

Minnesota-FirstNet Consultation Project

MINNESOTA DEPARTMENT OF PUBLIC SAFETY – DIVISION OF EMERGENCY COMMUNICATION NETWORKS

## FirstNet RFP

FirstNet published a Request for Proposal (RFP) on January 13, 2016. This particular contract will provide for a single interoperable Nationwide Public Safety Broadband Network (NPSBN). Thus far, the FirstNet RFP has been through a number of amendments and has been actively publishing updates. Currently, RFP proposals are due on or before May 13, 2016.

The State has published a brief summary of the RFP. We have outlined key components of the RFP in the context of our stakeholder requirements. For this summary and more information please visit our website. https://dps.mn.gov/divisions/ecn/Pages/broadband.aspx

## Consultation Task Teams

This year, FirstNet will be organizing Consultation Task Teams to seek the State's input on a number of technical issues regarding the NPSBN. The first issue FirstNet is seeking input on is entitled Quality of Service (QoS), Priority and Preemption or "QPP" for short. Here is a quick summary of the three separate issues. It is important to note that these issues deal directly with the implementation of the 3GPP LTE standard that the NPSBN shall be built to.

Quality of Service (QoS) is a mechanism used in the LTE standard that helps to ensure that the tolerances of the user's data (referred to as "bearer traffic") is respected as it moves across the network. For example, voice communication has a very low tolerance for delay or latency. QoS helps to ensure that the data packets that carry voice traffic is delivered to its destination within the tolerances set within the network. The issue of Priority is with regard to the user; some users of the NPSBN would have a greater priority than others. FirstNet is seeking input as to how this element would be implemented nationwide. Preemption is very similar. Preemption refers to the ability of a higher priority user to preempt the communications of an active user of lower priority on the network. It is likely that this functionality will be used only during emergency events.

The MnFCP is seeking stakeholders who are willing to provide their guidance and feedback. We will be hosting a series of informational webinars on each of these three issues prior to the completion of a FirstNet survey. If you are interested in participating in this endeavour, please contact Melinda Miller, ECN FirstNet State Program Manager at (651) 201-7554 or Melinda.Miller@state.mn.us

## Minnesota Interop Conference

The Minnesota Public Safety Interoperable Communications Conference will be held from 25 – 27 April 2016, in St Cloud Minnesota. This year, we have an expanded list of FirstNet/LTE related sessions ranging from the very technical to the informative. We highly encourage those who are interested in FirstNet, wireless broadband or the LTE standard to attend as many sessions as you can. Registration information

## A brief summary of… MnFCP and FirstNet

The State of Minnesota FirstNet Consultation Project (MnFCP) was initiated in January of 2014 with the purpose of familiarizing our stakeholder community with the Nationwide Public Safety Broadband Network (NPSBN) and FirstNet.

FirstNet was created on February 22, 2012, by the Middle Class Tax Relief and Job Creation Act with the mission to build, operate and maintain the first high-speed, nationwide wireless broadband network dedicated to public safety. FirstNet has been obligated by Congress to take all actions necessary to ensure the building, deployment and operation of the Nationwide Public Safety Broadband Network (NPSBN).

For more information on FirstNet please visit:

http://firstnet.gov/

For more information on the MnFCP and all activities of this project, please visit ECN's website.

https://dps.mn.gov/divisions/ecn/Pages/broadband.aspx

The MnFCP team has posted all project related news and have provided links to in-depth training modules on this subject.

and descriptions for each of these workshop sessions can be found on the conference website. http://www.togpartners.com/interop/

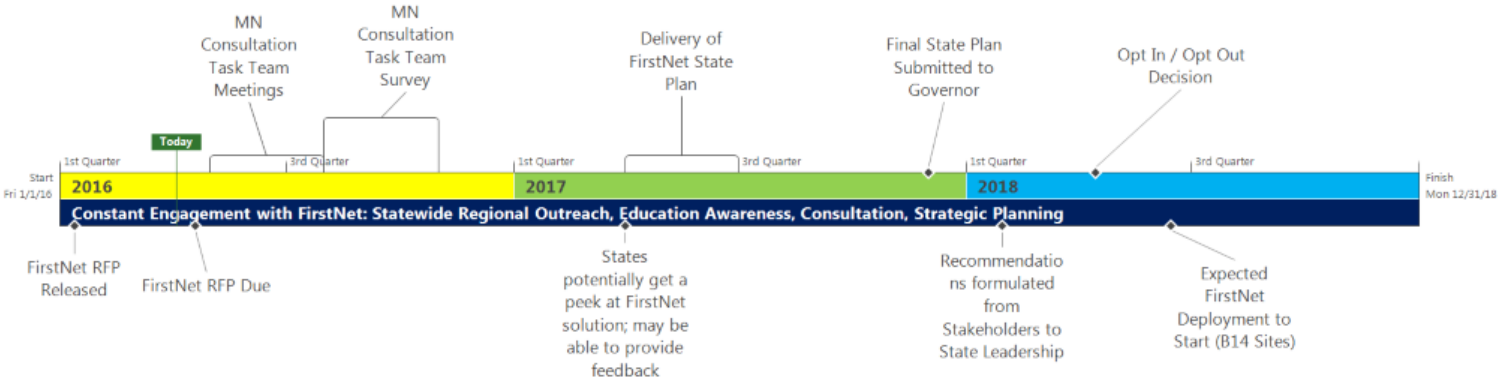
## Other Ongoing Tasks

**Data Usage/Traffic Profiles - CAD Data Manipulation**

Prior to conducting Coverage Review Meetings, the Project Team worked with counties and tribal entities to obtain three-years of CAD data, which we used to support the designation of high-priority coverage areas for the NPSBN. The data is used to justify to FirstNet why we require coverage within each and every county and tribal area. The Project Team has continued to analyze the data to assess data throughput requirements, to establish traffic profiles per public safety discipline and preform a trends analysis to predict usage into the future. This task is in its final phase and we will be shortly publishing our results on a county-by-county basis.

**Tribal Consultation and Outreach**

We continue our active tribal outreach efforts across the state with the goal to capture all tribal requirements for the NPSBN. In the late fall we met with the Prairie Island Indian Community, Lower Sioux Indian Community, Shakopee-Mdewakanton Sioux Community tribal nations. In January we met with the Bois Forte Band of Chippewa, Fond du Lac Band of Lake Superior Chippewa, Grand Portage, Leech Lake Band of Ojibwe, Mille Lacs Band of Ojibwe tribal nations. In March ECN met with the Minnesota Indian Affairs Council to discuss inclusion of tribes on the SECB. They are in agreement and we will pursue this through the SECB committee approval process with the goal to have statute language changed for the 2017 Legislative session.




## Your Project Team:

You are encouraged to contact the project team at any time! We are happy to answer questions or hear your concerns.

Jackie Mines, MN DPS-ECN
Jackie.Mines@state.mn.us
(651) 201-7550

Melinda Miller, MN DPS-ECN
FirstNet State Program Manager, Dep SWIC
Melinda.miller@state.mn.us
(651) 201-7554

Marcus Bruning, Northern RIC
Marcus.Bruning@state.mn.us
(218) 232-3762

Randy Donahue, Southern RIC
Randy.Donahue@state.mn.us
(507) 360-2660

Rick Juth, Central & Metro RIC
Rick.Juth@state.mn.us
(612) 743-0252

Mark Navolio, Televate PM
mnavolio@televate.com
(301) 922-6691

## Allied Radio Matrix for Emergency Response

# ARMER

# Project Status Report

**Reporting Period March 1, 2016 through April 1, 2016**

## *Executive Summary*

**Overall Status:**

| | Green (Controlled) | Yellow (Caution) | Red (Critical) | Reason for Deviation |
|---|---|---|---|---|
| **Budget** | ☒ ☐ ☐ | ☐ ☐ | ☐ | |
| **Schedule** | ☐ ☐ ☐ | ☐ ☒ | ☐ | Land acquisition delays will impact completion of some sites |
| **Scope** | ☒ ☐ ☐ | ☐ ☐ | ☐ | |

ARMER Backbone

**97%**

On-the-air

## *Controls*

**Issue Status:**

**Change Status:**

- No pending plan changes

## *Accomplishments*

**Accomplishments during this Reporting Period:**

- The following sites went on the air:
- The land acquisition has been completed for the following sites:

## *Budget*

**Construction Budget Status as of April 1, 2016**

| Project Funding | Original Budget | Spent to Date | Unspent Balance Remaining | Encumbered | Available Balance |
|---|---|---|---|---|---|
| **Phase 3** | $45,000,000 | $44,952,397.19 | $47,602.82 | $0.00 | ***COMPLETE** |
| **SRB Funds (FY 09)** | $1,902,831.00 | $1,902831.00 | $0 | $0 | **COMPLETE** |
| | | | | | |
| **Phase 456 (FY 09)** | 61,996,957.89 | $61,981,069.99 | $15,887.90 | $15,887.90 | $ 0.00 |
| **Phase 456 (FY 10)** | $62,015,407.77 | $61,912,097.77 | $103,310.00 | $103,310.00 | $ 0.00 |
| **Phase 456 (FY 11, 12, 13)** | $61,987,634.34 | $53,718,690.66 | $8,268,943.68 | $2,792,034.75 | $ 5,476,908.93 |
| **Total Phase 456** | $186,000,000.00 | $177,611,858.42 | $8,388,141.58 | $2,911,232.65 | **$ 5,476,908.93** |
| | | | | | |
| **Projected Contingency as of April 1, 2016** | | | | | $251,908.93 |

**Comments:**

## *Scheduled Milestones / Deliverables*

**Status updated April 1, 2016**

| Milestone | Total Sites | Sites Not Started | Sites in Progress | Sites Complete |
|---|---|---|---|---|
| ARMER Backbone Construction | 335 Sites | | | |
| Tower Site Acquisition | 335 | 0 | 8 | |
| Tower Construction & Site Development Work | 335 | 8 | 5 | |
| Microwave Connectivity & RF Deployment | 335 | 11 | 0 | 326 On the Air |

Some Sites are on the air, but on the old towers or temporary towers. They are counted as on the air, but still require construction and/or installation at the new tower sites before they are complete:

- Finland
- Duluth South
- Eden Valley
- Lake Crystal

Of the 326, 4 are on temporary sites; sites construct and move still in the works.

SE – all sites completed
SR – 2 land acquisitions remaining, 1 new site plus leased site replacement for Lake Crystal.
SW – all sites completed
CM – Leased site replacement for Eden Valley, out for bid.
Metro – all sites completed
NW – 2 land acquisitions remaining.
NE – 3 land acquisitions remaining, 5 site under construction.

<u>Completion Targets</u>

ARMER all Phases:

4 original plan sites will be delayed due to delays in land acquisition.

## *Ongoing ARMER System Work*

**Motorola System Upgrade**

- 7.15 upgrade scheduled to begin May 2016. Lock down for any system changes prior to the 7.15 upgrade will be around the beginning of April 2016.
- Motorola 2016-2020 Support services contract is completed.
- Working on contracts for billing with local agencies involved in 7.19 equipment replacements under the Motorola contract.
- Notice for 2016 Motorola SUAII local agency billing amounts will be sent out will do actual billing invoices in March.

**Site improvements**

- Still working on the addition of card key reader to the equipment shelters. Parts are in. Working on installs, 95% of the sites completed.

- We are continuing our review of our leased sites/land. Plans had always been to build towers in these areas, but to get the project moving we leased sites to get on the air. In review of some of the land and lease cost it would make sense to find land in these areas and build towers. Also looking at long term land lease from private parties, would prefer to have towers we own on state, County or City owned land.

- Replace Lake Crystal leased site with 2 new sites. This adds a new site to the area.

**Microwave improvements**

- At this point we have identified one bad path where an intermediate microwave site is needed. So we are looking to add a microwave site somewhere in the Cromwell area to split the Lawler – Moose Lake link. Working with the County, a site has been identified. Need to work through the acquisition and easements.

- We are also working to get the DC power systems updated at all sites to improve system reliability. Battery system install is nearing completion.

- Still reviewing microwave performance, ongoing.

**VHF interop layer**

- VPN access for access to MotoBridge network has been worked out. Remote access is now working.
- Working on plans in the metro area to simplify the VHF interop layer as we move from Gold Elites to 7500s.

**Old towers that need replacement**

- We have a number of towers that are on the air for ARMER that are old towers constructed in the 50's. These towers did not pass structural when we added the new ARMER equipment. But the level of structural deficiency was not a risk that required immediate replacement. So we have held off on replacement of these towers to see where we were in the ARMER budget to build what we had planned. We are still holding off on these until we are a little further along with ARMER. Towers not replaced under the ARMER project will be scheduled for replacement as the ARMER maintenance budget allows, estimate 1 to 2 per year until completed.

# ARMER Construction Budget (Remaining Work)

| | | | | | |
|---|---|---|---|---|---|
| | | | | Unencumbered Fund Balance ( As of April 1, 2016) | $5,476,908.93 |
| **Site Name** (Green - site on air) | **County** | **Description** | **Land/ Construction** | **Estimate to Complete** | **Balance** |
| Eden Valley | Meeker | New tower | Out for Bid | $500,000.00 | $4,976,908.93 |
| Finland | Lake | Replace Tower | Envir | $440,000.00 | $4,536,908.93 |
| NE Lake County | Lake | New tower | DNR/Envir | $930,000.00 | $3,606,908.93 |
| Lima Mt | Cook | New tower | DNR/Envir | $880,000.00 | $2,726,908.93 |
| Red Lake | Beltrami | New tower | Indent Land | $505,000.00 | $2,221,908.93 |
| Lake Crystal | Blue Earth | New tower | Envir/Lease | $575,000.00 | $1,646,908.93 |
| Madelia | Watonwan | New tower | Envir | $350,000.00 | $1,296,908.93 |
| Molde | St Louis | Replace fire tower | DNR/Envir | $320,000.00 | $976,908.93 |
| Berner | Clearwater | New tower | Indent Land | $505,000.00 | $471,908.93 |
| PENDING WORK | | | | | |
| Card Key | | | | $20,000.00 | $451,908.93 |
| Site clean up, shelter and tower removals | | | | $200,000.00 | $251,908.93 |
| MSO - Backup equipment | | | | $0.00 | $251,908.93 |
| Microwave DC power - Upgrades to meet run time required | | | | $0.00 | $251,908.93 |
| **TOWER REPLACEMENTS (This work being held until above projects compeleted)** | | | | | |
| Hawley | Replace tower | | Out for Bid | $600,000.00 | |
| Freedhem | Replace tower | | | $600,000.00 | |
| Middle River | Replace tower | | | $600,000.00 | |
| Theif River Falls | Replace tower | | | $600,000.00 | |
| Windom | Replace tower | | | $600,000.00 | |
| Virginia | Replace tower | | | $600,000.00 | |
| Cass Lake | Replace tower | | | $600,000.00 | |
| Viola | Replace tower | | | $600,000.00 | |
| Kimball | Replace tower | | | $600,000.00 | |
| Hoffman | Replace tower | | | $600,000.00 | |
| New London | Replace tower | | | $600,000.00 | |
| Woodland | Replace tower | | | $600,000.00 | |
| Littlefork | Replace tower | | | $600,000.00 | |
| Roosevelt | Replace tower | | | $600,000.00 | |
| Hewit: Land Purchase, replace tower. | | | | $500,000.00 | |
| Scandia: Need to look at land purchase. | | | | $100,000.00 | |
| Geneva: Need to look at land purchase, new tower ? | | | | $500,000.00 | |
| Mapleton: Find land and build new tower | | | | $500,000.00 | |
| Red Wing: Land purchase | | | | $100,000.00 | |

# Next Generation 9-1-1 GIS Project

**NG911 Committee and SECB**
**April 2016 Update**

**Presenter:**
**Adam Iten, Project Manager**

# NG9-1-1 GIS Project Update

## 2016 Goals

- **GIS Data Collection, Assessment, and Preparation**
  - Data Readiness Profiles
    - Metro and NE – Q2 CY16
    - All regions – Q4 CY16
  - MSAG/GIS Sync Projects
    - Metro – ongoing with MESB
    - NE – start in Q2 CY16

- **GIS Data Workflow and Repository**
  - Data uploads, portal, normalization, validation – Q2 CY16
  - Aggregation – Q3 CY16
  - Provision ECRF/LVF/Commons – begin Q3/Q4 CY16
- **MN NG9-1-1 GIS Data Standards**
  - Draft review – ongoing
  - Approval – Q3 CY16

# MN NG9-1-1 GIS Standards

- Developing GIS data requirements for NG9-1-1 in Minnesota
- Aligning with NENA standards and validate against similar standards
  - Other states (IA, KS, ND, TN, TX) and MRCC
  - Standards Comparison spreadsheet
- Standards Workgroup working toward Version 1.0

# MN NG9-1-1 GIS Standards

- Stakeholder review – **started February 2016**
  - Metropolitan Emergency Services Board (MESB) – ongoing
  - Metro Regional Centerline Collaborative (MRCC) – started 2/29
  - MN PSAP and GIS Managers – started 3/18
  - ECRF, LVF, and other NG9-1-1 vendors – starting June 2016
  - Other states – starting June 2016

# MN NG9-1-1 GIS Standards

- Stakeholder approval of v1.0 – **Complete Q3 CY16**
  - Metropolitan Emergency Services Board (MESB)
  - GIS Subcommittee
  - NG9-1-1 Committee
  - Statewide Emergency Communications Board (SECB)
  - MN Geospatial Advisory Council (MGAC)
  - MN Information Technology Agency (MNIT)

# Standards Considerations

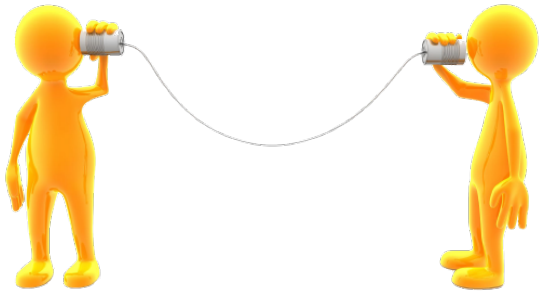
- DRAFT NENA Standards
  - NG9-1-1 GIS Data Model
  - Provisioning GIS to ECRF/LVF
  - i3 Solution
- Specific ECRF/LVF Vendor(s) is unknown
- Review and approval of additional standards
  - Address points
  - PSAP boundaries
  - Emergency Service boundaries
  - NG9-1-1 GIS Data Maintenance boundaries
  - Metadata
  - Best Practices and Exceptions

# Standards Action Items

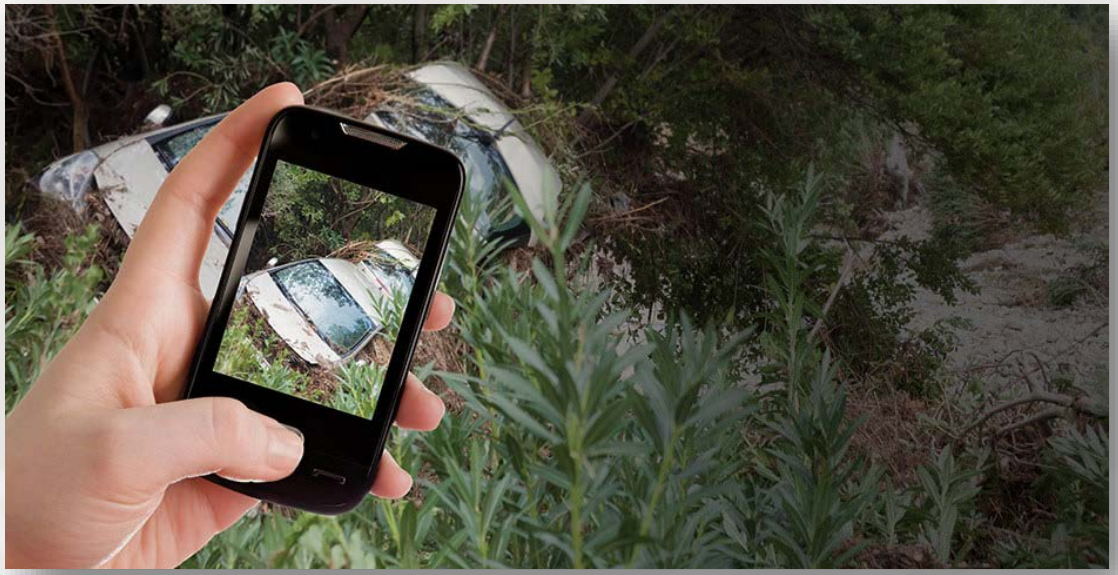
- PSAP and GIS Manager review and comment
  - Work together to complete **ONE** comment form **per PSAP**
  - Return comment form by April 29

# Communication Plan

- ECN website
  - Project newsletter - Issue #3 to be published soon!
- Monthly
  - GIS Subcommittee meeting
    - Next meeting: Thursday, May 12 at 2pm
  - NG9-1-1 Committee meeting
  - SECB meeting
- Quarterly
  - Regional PSAP/GIS meetings
  - MN Geospatial Advisory Council



# Thank You!



Adam Iten, Project Manager
Adam.Iten@state.mn.us
651-201-7559