STATEWIDE EMERGENCY COMMUNICATIONS BOARD

September 25, 2014
12:30 P.M.
Chair: Mark Dunaski
MnDOT Arden Hills Training Center
1900 West County Road I Shoreview, MN 55126

Call in Number: 1-888-742-5095
Call in code: 2786437892#

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MEETING AGENDA

Call to order

Approval of Today's Agenda

Approval of Previous Meeting's Minutes

Reports of Standing Committees:

Operations and Technical Committee (Glaccum)

- ***Hennepin EMS Participation Plan Change Request*** ***ACTION ITEM***
- ***ARMER Participation Plan for Mahnomen County*** ***ACTION ITEM***

Finance Committee (Gerlicher)

Interoperability Committee (Thomson)

- ***Standard 3.31.0 Status Board*** ***ACTION ITEM***

Legislative & Government Affairs Committee (Kaase)

Steering Committee (Hartog)

IPAWS Committee (Seal)

Interoperable Data Committee (Risvold)

- ***Report on the FirstNet Consultation Meeting***

NG911 (Pankonie)

Reports – Other

- ***ARMER Project Status Report (MnDOT OSRC)***
- ***ECN Update (Mines, DPS ECN)***
    - ***SWIC Report***
    - ***911***

Old Business

- ***Strategic Planning Session Update (Dunaski)***

New Business

- ***ARMER Presentation (Thakur/Lee)***

Other Business/discussion

Announcements

- ***Presentation of COML Certificates to:***
    - ***Jerry Erickson***
    - ***Sgt. David Pike***
    - ***Duane Oothoudt***
    - ***Judy Sivertson***
    - ***Kerry Swenson***

Adjourn

STATEWIDE EMERGENCY COMMUNICATIONS BOARD

MEETING MINUTES

August 28, 2014

Attendance

Members:

PRESENT	MEMBER/ALTERNATE	REPRESENTING
X	Mark Dunaski (Chair)/Jackie Mines	DPS
X	Mukhtar Thakur/Tim Lee/Jim Mohn	MnDOT
X	Tarek Tomes/Dave Van Thiel	MNIT
X	Rodmen Smith/Dan Kuntz	DNR
X	Bob Meyerson/Rick Juth	MSP
X	Vince Pellegrin/Thomas Humphrey	METC
	Bill Droste/ Vacant	League of MN Cities, Metro
	Eric Anderson/Pat Novacek	League of MN Cities, Greater MN
X	Liz Workman/vacant	Assoc. of MN Counties, Metro
X	Jim McMahon/Tom Kaase	Assoc. of MN Counties, Greater MN
X	Jim Bayer/Darlene Pankonie	MSA, Metro
X	Dan Hartog/Scott Turner	MSA, Greater MN
X	George McMahon/Mary Jo McGuire	MESB
X	Mike Risvold/Mark Raquet	MN Chiefs of Police Assoc., Metro
X	Cari Gerlicher/Dave Thomson	MN Chiefs of Police Assoc., Greater MN
X	Ulie Seal/Vacant	MN Fire Chiefs Assoc., Metro
	T. John Cunningham	MN Fire Chiefs Assoc., Greater MN
X	Joe Glaccum/Gordon Vosberg	MN Ambulance Assoc., Metro
X	Brad Hanson/Paul McIntyre	MN Ambulance Assoc., Greater MN
X	Steve Cook/Scott Camps	RRBs

Also in attendance:

Jill Rohret, MESB
John Dooley, HSEM
Cathy Anderson DPS-ECN
Shari Schmitz, Motorola
Bill Burton, Motorola
Mike Fink, Motorola

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Call to Order

Chair calls the meeting to order at 12:33 p.m. noting there is a quorum.

Approval of Agenda

Thomas Humphrey moves to approve the agenda.
Cari Gerlicher seconds the motion.
Motion carries.

Approval of Previous Meeting Minutes

Cari Gerlicher moves to approve the minutes.
Liz Workman seconds the motion.
Motion carries.

Reports of Standing Committees:

Operations and Technical Committee Report (Joe Glaccum)

Wadena County Participation Plan Amendment Request ***ACTION ITEM***

Joe Glaccum reports that Wadena County is requesting to update to three MCC7500 consoles. MnDOT had no objection, and on behalf of OTC, Glaccum recommends approval.

Glaccum moves to approve the Metro Transit MCC 7500 upgrade.
Jim McMahon seconds.
Motion carries.

Morrison County Participation Plan Amendment Request ***ACTION ITEM***

Glaccum reports that Morrison County s is looking to replace their existing Gold Elite consoles with four Motorola MCC7500's. MnDOT had no objection, and on behalf of OTC, Glaccum recommends approval.

Glaccum moves a Washington County variance request be approved.
Mike Risvold seconds.
Motion carries.

Hennepin County Sheriff's Office Request for ARMER System Additions ***ACTION ITEM***

Glaccum reports that Hennepin County is looking for AIS servers and will be doing logging a bit differently. One will remain at the Naper Street location, and one will be at their new comm center. A high-level diagram has been included in the Meeting Materials, and there was no objection by MnDOT or OTC. Glaccum points out that OTC moved it forward contingent upon the TOC and regional board approval. From a timing perspective, OTC looked at it before it went to the TOC, which later met and approved it. The Metro Board is expected to ratify it at their November meeting.

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Glaccum moves to approve Hennepin County's request for ARMER system additions.
Ulie Seal seconds.
Motion carries.

ISSI Final Report ***DISCUSSION***

Glaccum mentions this is an item for discussion only and there is no formal action necessary. The ISSI final report was included in the Meeting Materials, and Glaccum mentions this works a little better with partners on the borders, like connecting into Wisconsin's system. There are a lot of advantages to having this in place, but OTC looked at it from an operational and technical situation. It will be moved forward to the Finance committee and will be discussed in the Strategic Planning Session.

Chair asks Cari Gerlicher if it came before the Finance Committee yet.

Gerlicher replies that it hasn't and asks Glaccum if there is an immediate need to reschedule the Finance Committee meeting (cancelled due to falling on the same day as the Strategic Planning Session) to look at it or if it can wait until October.

Glaccum says it should be fine to wait until October, unless it is deemed a priority at the Strategic Planning Session.

Chair says this was not on the radar six months ago and needs to be discussed more before making a decision about ISSI because it comes with a pretty fair price tag.

Mike Fink says it was prompted out of St. Louis County, because of the immediate need to interface with the Wisconsin system.

Chair asks if this is different than how we currently interface.

Fink says it is.

Jackie Mines says it replaces control stations.

Liz Workman asks if this would be needed statewide or only along the border areas of Minnesota.

Glaccum says at a high level, this widget box connects systems to systems so it's not like it would just connect St. Louis County. If ISSI is in place, it is eligible to hook into whatever system is there.

Chair says it's primarily for bordering states but would allow an interface with other systems, if necessary.

Mines says it would be pertinent to any other state that has an 800 system and not a VHF system like South and North Dakota.

Fink says it could work in a VHF trunked system as well and it could work with a system within the state like the power plant, so it's not just for bordering systems. He says it could be a system within the state itself, though.

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Glaccum says it has to be a P25 system.

Fink says that is correct, but it doesn't have to be 800 MHz.

Mines says we have not gotten the final cost from MnDOT yet, and they need to review it. There is early indication there might be an additional cost from the maintenance budget to support it.

Gerlicher asks if the ISSI is similar to Motobridge.

Fink says ISSI is system-to-system, taking a talkgroup from one system to another. Motobridge is more of a patch situation which allows two systems to talk to each other. It brings more features than Motobridge does, including being able to see ID's.

Rodmen Smith says looking at the cost estimate, it would include ten talkgroups and asks if any additional talkgroups needed would cost $50,000 more or is it just limited to 10 talkgroups.

Fink says it is sold in blocks of ten talkgroups.

Jim McMahon says the assumptions listed in costs would be flushed out before it is brought back.

Chair says during the Executive Committee meeting, Glaccum asked if this should be brought up for the SECB. Chair said yes, we wanted to put this out for people to think about, knowing it will come up in the Strategic Planning group. There are a lot of decisions to be made about this as to how many will be interested or if it's just St. Louis County, and we aren't going to make a decision based on one region. Chair says he didn't think we'd be talking about this until after the Strategic Planning process to talk about our priorities and how we're going to make those future decisions on what we are going to fund and what we're not going to fund.

Glaccum says this is for awareness only so everyone would know it was out there being discussed.

Finance Committee Report (Cari Gerlicher)

The Finance Committee did not meet last month.

Interoperability Committee (Thomson)

The Interop Committee did not meet last month.

Legislative & Government Affairs Committee (Kaase)

The Legislative Committee did not meet last month.

Steering Committee (Hartog)

Standard 1.11.3 – Training Dispatchers ***ACTION ITEM***

Hartog discusses the highlights and changes of the standard as presented. He summarizes that agencies

are responsible for making sure their dispatchers who deal with ARMER equipment are trained on all the items at a minimum. He points out that dispatchers shall receive refresher training every two years at a minimum or any time there's a significant change to a procedure or equipment and that each agency is responsible for keeping track and who attended the training. On behalf of Steering, Hartog recommends approval.

Hartog moves to approve Standard 1.11.3.
Jim McMahon seconds.
Motion carries

Standard 1.11.4 – Training ARMER End Users ***ACTION ITEM***

Hartog discusses the highlights and changes of the standard as presented. There are three tiers of users included in this standard. He reiterates that the agency is responsible to make sure people are trained on the use of radios and equipment on the ARMER system. This standard also includes refresher training every two years and that records shall be kept regarding the training and who attended. On behalf of Steering, Hartog recommends approval.

Hartog moves to approve Standard 1.11.4.
Cari Gerlicher seconds.
Motion carries

Standard 1.10.2 – Requesting Participation by Non-Public Safety/Non-Public Service Organizations ***ACTION ITEM***

Hartog discusses the highlights of this standard as presented. This was a newly created standard. This is for an agency or group that wants to use the ARMER system, and examples of groups are included in the standard. If an agency wants to come onto the ARMER system, they need a sponsoring agency. He says there is a Sample Sponsored Participation Plan included with this standard, so any agency wanting to use the system would fill that out and give it to their sponsoring agency. The sponsoring agency would be responsible for things like training and monitoring usage. A request would go to the OTC, and they would review and approve or deny the application. If necessary, it could also go to the Steering Committee.

Steve Cook asks if there are any requirements for the regional Emergency Communications Board to review it first.

Hartog says it goes to the regional Communications Board, and that is spelled out in the sponsorship requirements. On behalf of Steering, Hartog recommends approval.

Hartog moves to approve Standard 1.10.2.
Joe Glaccum seconds.

Steve Cook asks if there is a lot of need for this since public safety would be in charge of an event.

Hartog says this has come up in the past, but the example he uses is where a tow company wants to use the system. They are not allowed to use the system on a daily basis, only when they are working with a

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sponsoring agency or during an emergency situation. It would come up when a tow company wants to talk with law enforcement or other emergency groups and have access to those radios.

Cook asks if they did not have access, how would they communicate.

Hartog says it would be like what they do now – the dispatch center contacts the tow, advising them where they need them. Dispatch would be the middle person if any information needed to be relayed to the towing company or back to law enforcement. On the ARMER system, the tow driver could talk directly to the officer on scene.

Glaccum says he believes the intent was that after the adoption of this standard, we will send out a letter to all agencies advising them of this standard so they don't have to just discover it. The letter will be coming from ECN.

Motion carries

IPAWS Committee (Seal)

Minnesota Emergency Alert System (EAS) Statewide Plan ***ACTION ITEM***

Seal discusses the Plan as presented and recommends approval on behalf of IPAWS.

Chair asks if the item on page 12 has been fixed and the item is explained about being an FCC person.

Seal explains it is a chief from FCC who has to sign off on the plan and it is a federal person. Two changes have been made on page 12, but the wrong version was sent out. On the final version, those corrections have been made. He says this document has been in place for a long time but has been updated.

Seal moves to approve the Statewide Plan with changes noted.
Bob Meyerson seconds

Seal says this document has been in place for a long time but has been updated.

Motion carries

Interoperable Data Committee: (Risvold)

Tribal Outreach Report for FirstNet (Leech Lake) ***ACTION ITEM***

Risvold reports that the committee met by teleconference and gives the floor to Mines.

Mines reviews the status report, which was included in the meeting materials. Televate has been working with us reviewing our governance structure. There probably won't be any recommendations that will come out of their review, and we need to make sure as a Board that all members of committees are getting information back to their regions the county level.

Mines talks about the Education and Outreach training items that are available and says that some that are still in progress.

She says a second newsletter about Broadband was put out on the list serve, and she received additional comments from commissioners who were starting to look at it. As a result, she will be going to the AMC Public Safety meeting next week to do a presentation about what FirstNet is and how it affects them. There were some concerns about money and what it will cost after we just deployed ARMER. She says she will make sure people understand that this is an opportunity for us to impact the design that FirstNet is working on so we will be able to make informed decisions.

Mines say ECN has been working diligently to do some coverage reviews. ECN is trying to identify around the state and in every county where the coverage deficits are, what the challenges are in communications today, and what is needed to overcome those challenges. That's what we'll be consulting with FirstNet on, and the sites chosen first provided all the data, representing a cross-section of the state. Those early providers of that data will probably also be invited to the FirstNet consultation meeting on September 24. We have expanded our initial invite list to be more in line with what FirstNet is recommending, which includes Emergency Management, MnDOT, State Police, as well as boots on the ground.

We will be asking for representatives from those early responding counties, along with a tribal representative or two, and we will have major commissioner-level players at DPS, MnDOT, MNIT, SP and others. Once we've had the opportunity to solidify that in the next week, we'll present that information to the Interoperable Data Committee and present it to the Board next month.

We have been working with FirstNet to establish an agenda, and we have the second meeting tomorrow morning. We should have a firm agenda soon, and she will copy Board members on the status of that.

Mines says we have released a very brief RFI to vendors to identify potential partners and mentions examples like Great River Energy, Verizon, etc. This would be for partners who would be interested in working with FirstNet and providing backbone resources. This will be followed up in future months with a more formal RFI. We want to get an idea of who might be interested before our first FirstNet meeting. The first meeting will be an overview of who they are, what their objectives are, why FirstNet is important to the responder community, and then there will be an opportunity to ask questions. We want to focus in on places like the Boundary Waters and disasters we encounter in Minnesota.

Risvold says the outreach to the tribes was important. Televate was contracted and met with Leech Lake, who was happy to be engaged and be part of the conversation. FirstNet had not contacted them directly, which was foreign to them since they are their own nation. These are issues we will work through in the future.

Some of the recommendations that came out of the report include to facilitate tribal interest in operating public-private partnership, resolve legal issues related to tribal sovereignty and engagement rules, investigate possible synergies with U.S. FCC Office of Native Affairs, obtain the Leech Lake drive test cell data.

Risvold recommends approval of the Televate report for the commission to FirstNet.
Cari Gerlicher seconds.

Risvold says that the report has already been sent to FirstNet but the committee wanted to formally support the report and recommends board support.

Motion carries.

NG911 (Pankonie)

Pankonie says the committee met this month, and it was a well-attended meeting. She says the committee continues to work on all items and projects we have going on and that standards are starting off very well.

Reports – Other

- ***ARMER Project Status Report (MnDOT OSRC)***

Mukhtar Thakur says MnDot is continuing to make progress on the ARMER system construction. For the period of July 1 to August 1, the budget is well controlled. He says the schedule in yellow includes land acquisition delays that will impact completion of some sites. He says two more sites were obtained this month - Beaver Bay Argo Lake, and that the scope is also good. The ARMER backbone is 96% on the air and milestones include 313 sites on the air. He says that is a pretty significant achievement over the last two or three years, and they are targeting a total of around 324 sites. He says it might be more or less, depending on what kind of land can be acquired. There is still concern about some of the pieces of land – DNR, federal lands – but MnDot is beginning to receive responses and is making good progress.

- ***Update (Mines, DPS ECN)***
    - ***SWIC Report***
    - ***911***

Mines talks about FirstNet and the project under NG911 and says ECN is working diligently with MN.IT to review the GIS initiative and is embarking on a joint GIS initiative to gather data and create a statewide database for NG911. That will also work with the initiative that GIS has for statewide GIS database. We have developed a preliminary scope of work and job description for GIS that would support this initiative.

She says ECN has finished the program narrative for Minnesota Management and Budget. She has completed all interviews with potential SWIC candidates and is in the final stage of paperwork submission to HR and negotiations with candidates, which will be taking place over the next couple of weeks.

Old Business

StatusBoard and MN.IT Proposal (Mines)

Mines says over the last month we have been meeting on a regular basis with Intertech and MN.IT to address the issues we've been experiencing. The first issue was reporting of outages, which is now working very well. The immediate notification is going out, and MnDOT Radio Operations Center (ROC) sends out notifications if there is an outage.

We have identified an action plan with all the software issues that have been found. We are meeting each week, and Cathy Anderson and MN.IT have been testing things that have been reported. MNIT is looking at the code, and we will meet again tomorrow to see if code need to be changed by Intertech.

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We invited MNIT to come to the OTC meeting to report and give clarification on questions that had been misunderstood, which was very helpful. They have agreed to do this on a regular basis.

We have a proposal from MNIT regarding moving to a more secure 24/7 site, but we are more focused right now on getting the application to work consistently, including working on outage notification report information. If it goes beyond a server capacity issue, we will look into moving it to a more secure and larger environment.

Glaccum reiterates that this is a standing agenda item at OTC and the committee will stay on top of it to deal with a response plan for when it goes down.

Strategic Planning Session Update (Mines)

Mines says last week we met with Judy Flange, who is the facilitator. We identified the agenda we want to have, and it got put together and was sent out. RSVP's were returned. We have the food and location set and we are confident we'll have everything ready to go for that session on September 10 and 11. About 50 people have RSVP'd that they will attend.

Mines says that participants have been asked to think about two things in preparation. One was what their experience has been about the history of change in communication over time and how vastly different this has been over the past five years, and the other is to think about the challenges that affect their discipline from a policy perspective and what the challenges are for their stakeholder group.

Chair says what they've done is framed the first two hours for segments giving overviews of the technologies they're talking about for the programs. In the evening, participants will have greater opportunity to talk about technical issues and get more information in a one-one-one process. Instead of just sending out a bunch of material, they're hoping to do it in a more informal method.

New Business
None.

Other Business/discussion
None.

Announcements

Chair announces names for COML certifications, but none are in attendance, and their certificates will be mailed to them.

- *Karla White, Aitkin County*
- *Jason Matthias, St. Louis County*
- *Duane Johnson, St. Louis County*

Resignation

John Tonding was not in attendance, but Chair announced that he is leaving the RIC position and said he did a great job, was fun to work with, and was always smiling.

Meeting adjourns at 1:23 p.m.

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Hennepin EMS Communications Center
701 Park Avenue South, R2
Minneapolis, MN 55415

August 21, 2014

Ms. Jill Rohret
Regional Radio Services Coordinator
Metropolitan Emergency Services Board
2099 University Avenue West
St. Paul, MN 55104

Dear Ms. Rohret,

Hennepin EMS Communications Center is requesting a change in our participation plan on the ARMER radio system in the metropolitan region. Hennepin EMS is in the preparation phase to install five (5) Motorola MCC 7500 radio consoles. The installation of equipment will begin October 7th, 2014 with a tentative cutover date on November 17th, 2014.

Hennepin EMS will return 294 ID's from the Motorola Gold Elite Consoles that are ready to decommissioned. The replacement Motorola MCC 7500 Radio Consoles will have five (5) ID's that are:

- 121141 – Console/OP 1
- 121142 – Console /OP 2
- 121143 – Console/OP 3
- 121144 – Console/OP 4
- 121145 – Console OP/5

Hennepin EMS will have one (1) CCGW installed and will use the four (4) ports for daily operations.

Please forward this information appropriately to both the Radio TOC and the SECB to go through the approval process. I will be prepared to represent the Hennepin EMS Communications Center at the upcoming meetings to assist in the approval process.

Respectfully Submitted,

Wendy L. Lynch
Hennepin EMS Communications Manager
612-873-3839

Mahnomen County, Minnesota

ARMER Participation Plan

June 2014

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Contents

1. Introduction 1

A. ARMER System Application – Mahnomen County, Minnesota 1

B. Project Summary 1

C. Jurisdictional Coverage of System 3

D. Entities and Users Participating in the Planned System 3

E. Existing VHF System Configuration 3

2. ARMER System Technical Review 5

A. System Design 5

i) System Infrastructure and Tower Site Planning 5

ii) Local Equipment Additions and Enhancements 7

iii) Subscriber Radios 7

iv) System Talkgroup Planning and ID Requirements 9

v) 800 MHz Frequency and Capacity Planning 9

vi) PSAP Console Planning and Logging 13

vii) PSAP Connectivity 13

viii) Legacy VHF Equipment 16

B. Coverage Review 16

i) Design Parameters 16

ii) Coverage Propagation Mapping 16

C. Contingency Planning 25

D. Training 26

E. Interoperability 26

F. Standards 27

G. Alarms and Monitoring 27

H. Maintenance 28

I. System Administration 28

J. Other Local Enhancements 28

3. Project Costs and Budget 29

4. Project Implementation 30

A. Schedule 30

B. System Cut Over Plan 30

Attachment 1: Mahnomen County Fleet Map 31

Attachment 2: Mahnomen County Draft Implementation Schedule 33

Attachment 3: References 3

ARMER Participation Plan

1. Introduction

A. ARMER System Application – Mahnomen County

Mahnomen 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)

Mahnomen 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

Mahnomen County, Minnesota, and the public safety entities within Mahnomen County have developed a plan for the replacement of the existing VHF public safety radio systems currently used by those agencies. A comprehensive 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.

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

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

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 will be a "2-Phased" approach, as follows:

- Phase 1: This initial phase could occur later in 2014, and would include the Mahnomen County Sheriff's Office law enforcement operations migrating to the ARMER system on a full-time basis. The Sheriff's Office currently has a full inventory of dual-band (VHF and 800 MHz) Motorola mobile and portable radios, which were purchased with grant funding over the past two years. These radios will require a software upgrade to allow P25 Trunking operation on the 800 MHz ARMER radio system, and the county is in the process of planning for this upgrade.

  The county's dispatch center currently utilizes Motorola MCC5500 radio control consoles, which are connected to two 800 MHz RF control stations, and 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 Mahnomen County operations. Fire and EMS operations would continue to operate on existing VHF systems, which are relatively new.

- Phase 2: This phase could potentially occur in 2015, depending on funding options available to the county. The County would replace the existing Motorola MCC5500 radio dispatch consoles with new MCC7500 IP consoles, and implement microwave radio connectivity to the Mahnomen ARMER tower site.

  EMS operations would migrate to ARMER operations; Fire agencies would obtain a small number of 800 MHz radios for interoperability with other agencies using the ARMER system, but continue to use VHF for primary operations. The level of Fire agency transition will be dependent on the funding available for radio purchases.

The primary points of contact for this project are:

Sheriff Doug Krier
Mahnomen County Sheriff's Office
311 North Main St.
Mahnomen, MN 56557
218-935-2255 Phone
doug.krier@co.mahnomen.mn.us

Rey Freeman
RFCC
13517 Larkin Drive
Minnetonka, MN 55305
952-541-0747 Phone
rfreeman@geo-comm.com

C. Jurisdictional Coverage of System

The radio system is intended to provide radio communications throughout the entire geographic area of Mahnomen County, Minnesota. Mahnomen County is located in the northwest area of Minnesota, covering 558 square miles, with a population of 5,413 people. The terrain of Mahnomen 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 Mahnomen 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	
Mahnomen County Sheriff's Office	Waubun Fire Department
City of Mahnomen Fire Department	Twin Lakes Fire Department
Participating Public Works and School Departments	
Mahnomen County Highway Department	Local School District
Mahnomen County Transit	

E. Existing VHF System Configuration

All existing Mahnomen 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 Mahnomen County Sheriff's Office in the city of Mahnomen, Minnesota.

The existing Mahnomen 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 Mahnomen County system.

- Mahnomen County Sheriff's Office
- Mahnomen County (ARMER site)

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 a control station.

The primary VHF radio system infrastructure equipment used by the county is a variety of newer Motorola base and repeater stations. Most stations are in good operating condition, and are operating on narrowband (12.5 kHz) radio frequencies. A 2-position Motorola MCC5500 PC-based radio control console is used in the Mahnomen 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 Mahnomen County radio system. Since the basic structure of the ARMER system as a multicast digital trunked radio system will meet the needs of Mahnomen 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 talkgroup 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 Mahnomen County area includes two 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 Mahnomen County:

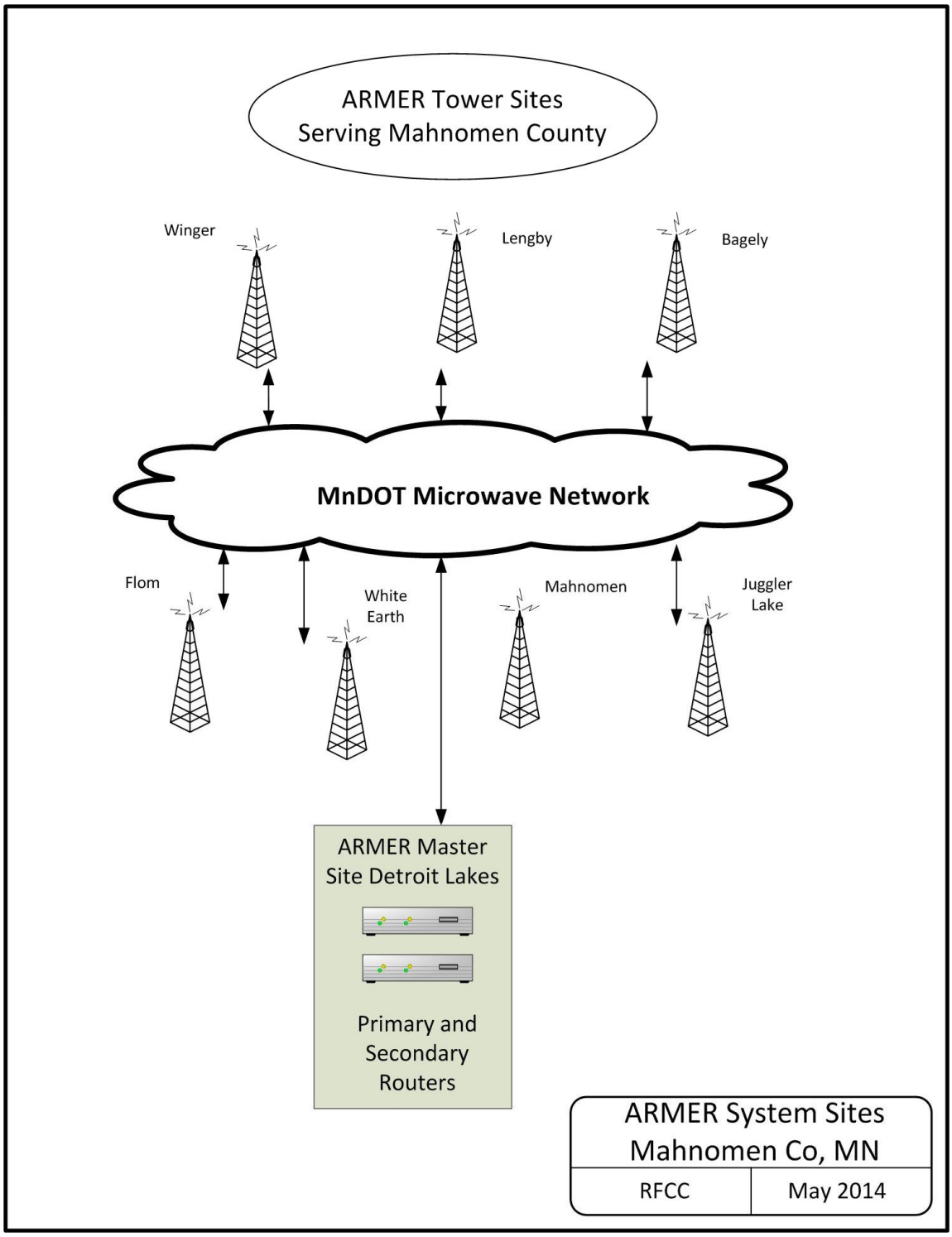
Mahnomen	Lengby

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

Bagely	Flom
White Earth	Juggler Lake
Winger	

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 Mahnomen County.

Mahnomen County ARMER System Architecture



ii) Local Equipment Additions and Enhancements

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

A review of the number of radios planned for use in Mahnomen County, along with the number of talkgroups 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) Subscriber Radios

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

Agency Type	Mobile	Portable	Base
Law Enforcement	15	16	6
Fire/EMS	22	74	4
Public Works	4	4	0
Schools/Other	2	2	0
Totals	**43**	**96**	**10**

A total of approximately 150 mobile and portable radios, and control bases would be implemented in the system, if all existing public safety and some public works VHF radios are replaced with new 800 MHz radios. This includes the total potential for three year growth for the agencies within the county. A detailed breakdown of Mahnomen County's mobile, portable, and VHF radio pager inventory requirements and cost estimates is provided on the next page. 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. As noted previously, the Sheriff's Office has purchased all mobile and portable radios required for law enforcement operations on the ARMER system.

Mahnomen County MN ARMER Mobile/Portable Cost Estimate Worksheet

Total of 800 MHz Mobile and Portable Radio Equipment Required for System Implementation

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 @ $2,150	Low-Tier Portable Radios @ $1,550	800 Mhz RF Control Stations @ $6,000
Mahnomen County Sheriff (needed)	1				0					
Mahnomen Co Sheriff (on hand)	14				16					2
Mahnomen Co 911 Dispatch										4
Law Agency Totals	**15**				**16**		**0**			**6**
Mahnomen Fire			8					26		1
Twin Lakes Fire			4					10		1
Waubun Fire			7					20		1
Mahnomen EMS				3			18			
Mahnomen Hospital										1
Fire/EMS Agency Totals	**0**		**19**	**3**	**0**		**18**	**56**	**0**	**4**
Mahnomen County Highway Dept								2	2	
Mahnomen Public Works								2	2	
Mahnomen School District								2	2	
Public Works Agency Ttls		**0**	**0**	**0**		**0**	**0**	**6**	**6**	**0**
GRAND TOTALS	**15**	**0**	**19**	**3**	**16**	**0**	**18**	**62**	**6**	**10**

Total Qty Radios:	**149**

iv) System Talkgroup Planning and ID Requirements

Mahnomen County agencies have conducted several radio implementation meetings to discuss talkgroup 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 talkgroups for law enforcement
- Primary and secondary dispatch talkgroups for fire service
- Primary and secondary dispatch talkgroups for EMS service
- Individual dispatch talkgroups for non-traditional public safety agencies
- Countywide talkgroups for special events
- Countywide talkgroups for interoperability
- Individual talkgroup(s) for each participating agency
- Non-trunked tactical talkgroups for "Scene of Action" use

Refer to Attachment 1 for a copy of the preliminary Mahnomen County fleet map. It is estimated that 40 talkgroups will be required for Mahnomen County agencies within the system.

A total of 160 ARMER system IDs are expected for the Mahnomen County implementation, which includes three year estimated totals:

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

v) 800 MHz Frequency Planning

The ARMER system sites within Mahnomen 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:

- Mahnomen 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 150 local radio units planned for this system, it is expected that the planned five channels will be sufficient at the Mahnomen 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 Mahnomen 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 (Mahnomen 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 Mahnomen County radio traffic calculations are as follows:

- Quantity 150 Mahnomen County radios (three year maximum)
- Quantity 110 neighboring county radios (interoperability use in Mahnomen 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 talkgroups being planned for use by the local county agencies. The number of talkgroups can have a dramatic effect on system loading, as the larger the number of talkgroups, 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 Mahnomen County, based on the parameters in the previous data table:

Predicted 800 MHz Standard Voice Channel Traffic Loading for Mahnomen County

	Number of Voice Channels Normal Conditions				
Site and GOS	**1**	**2**	**3**	**4**	**5**
Mahnomen	25.1%	2.6%	0.2%	0.0%	0.0%
Lengby	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 Mahnomen 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 Mahnomen County

	Number of Voice Channels Emergency Conditions				
Site and GOS	**1**	**2**	**3**	**4**	**5**
Mahnomen	49.1%	8.8%	1.2%	0.1%	0.0%
Lengby	46.3%	8.1%	1.1%	0.1%	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 average quantity of talkgroups planned by Mahnomen County agencies (44), we do not believe that Mahnomen 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 six tower sites within Mahnomen County. The table on the following page is the current available 800 MHz frequency data for the Mahnomen County ARMER tower sites. The channels listed as "Mahnomen Co." have been assigned to Mahnomen 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 "?" listed may have been assigned a non-NPSPAC 800 MHz channel, but this information is not readily available at this time.

800 MHz Frequency Assignments for ARMER Sites in Mahnomen County

Site	Chan 1	Chan 2	Chan 3	Chan 4	Chan 5
Mahnomen County	3	23	59	199	219
Mahnomen	29	67	PS	PS	PS
Lengby	111	183	PS	PS	PS

(PS = Public Safety/Non-NPSPAC channels)

vi) PSAP Console Planning and Logging

As outlined earlier in this ARMER plan, Mahnomen County envisions an ARMER implementation in two phases, in an effort to move more quickly towards use of the ARMER system.

The Mahnomen County dispatch center currently utilizes a two-position Motorola MCC5500 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 talkgroups.

Phase 1 of the implementation plan, which may occur later in 2014, will retain the existing MCC5500 consoles, and install additional RF control stations for access to the new talk groups established for Mahnomen County.

Phase 2 of the implementation plan, which may occur in 2015 (depending on funding), will replace the existing consoles with a new Motorola MCC7500 3-position console system for use with the ARMER system. The county would notify the State and OTC at the time the Phase 2 transition was being planned.

High-level system connectivity diagrams are provided on the following pages.

A total of eight (8) Conventional Channel Gateway (CCGWs) ports are being planned for the Phase 2 (MCC7500) implementation.

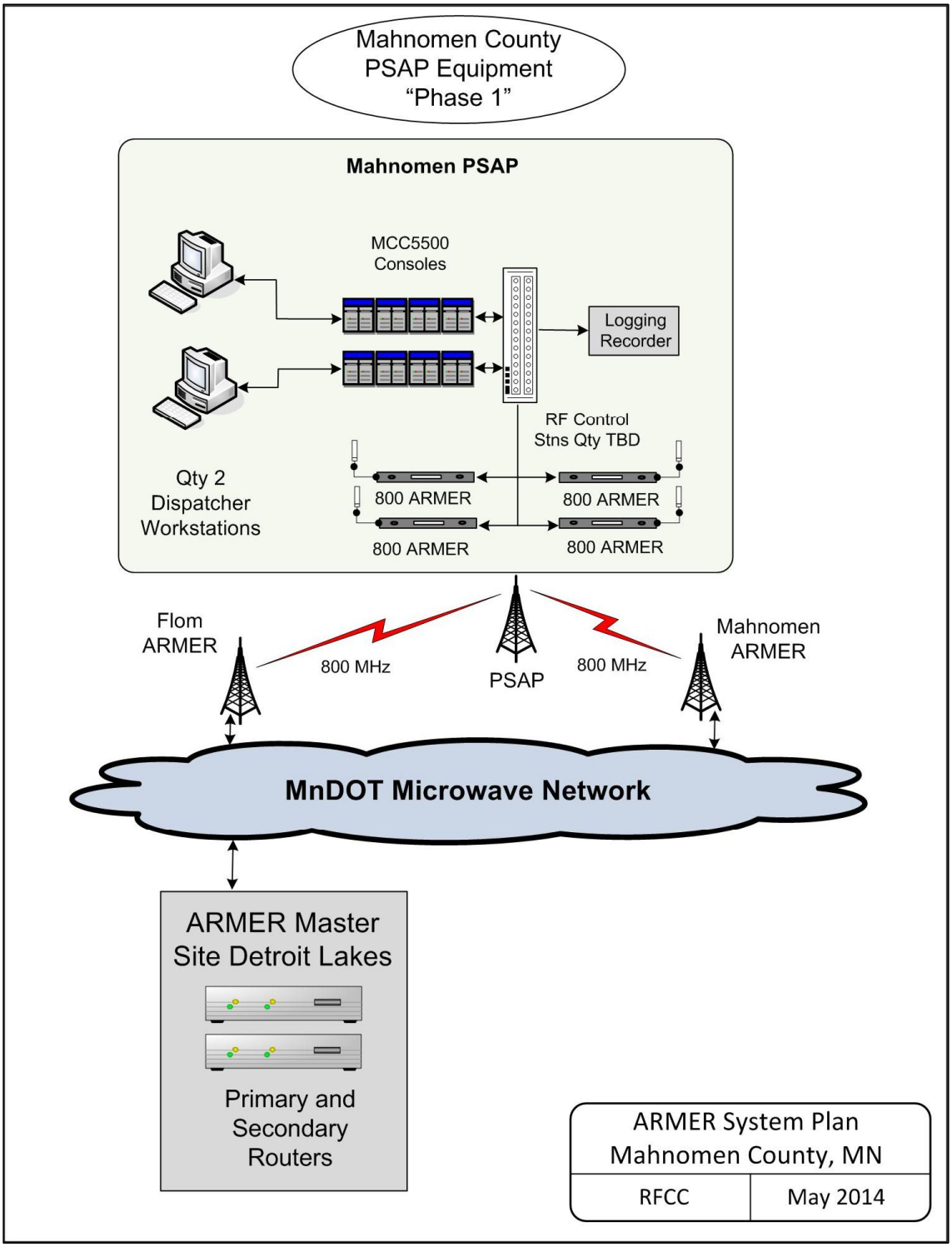
The dispatch center will continue to use its existing local voice logging recorder for the recording of ARMER and conventional channel radio traffic. A limited number of ARMER talkgroups will be recorded at the PSAP, and will be handled via local 800 MHz RF control stations.

vii) PSAP Connectivity

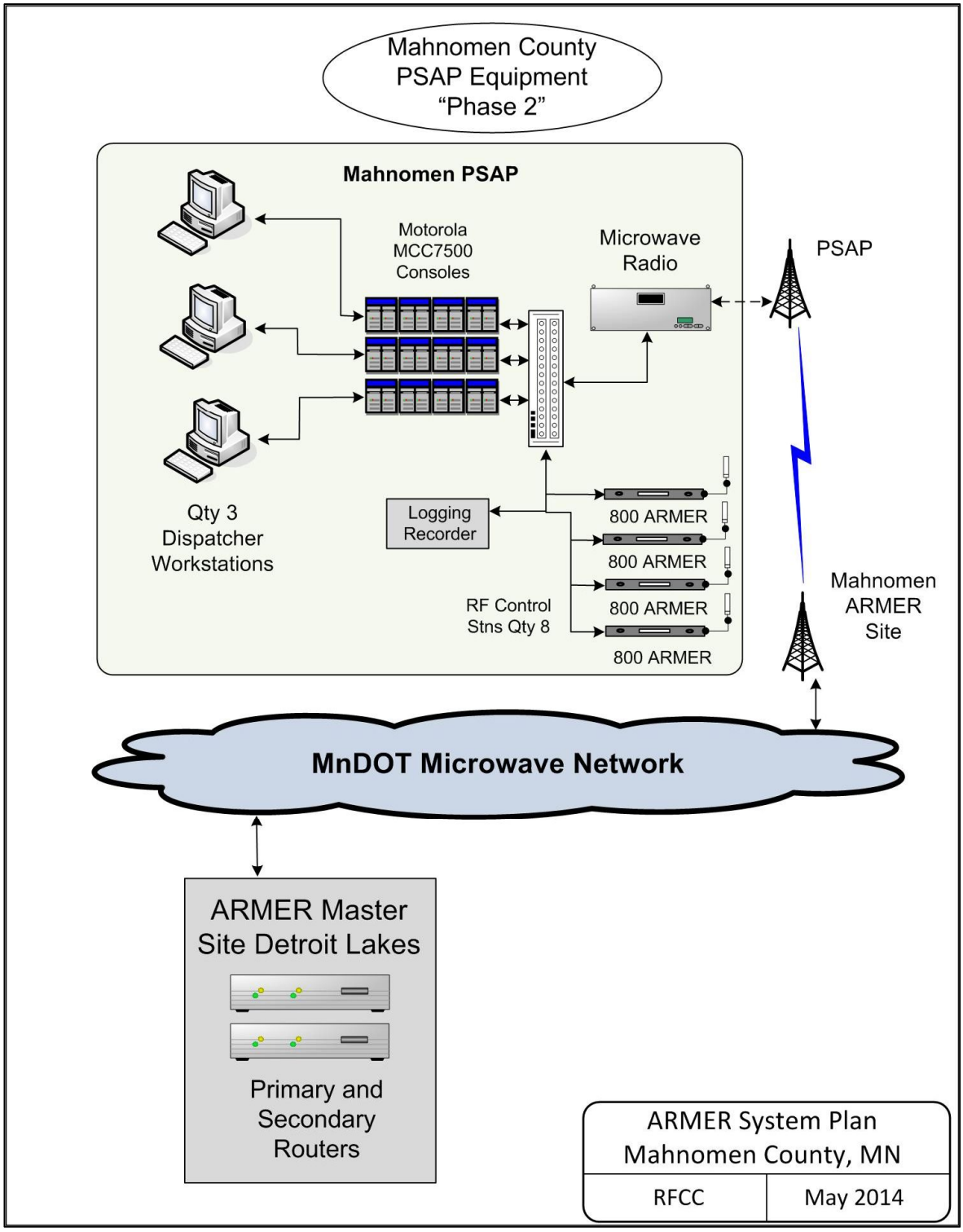
Connectivity between the Mahnomen County dispatch center and the ARMER system is required for operation of the system talkgroups, as well other non-trunked conventional channel resources.

This will be accomplished via microwave radio connectivity from the Mahnomen County PSAP in Mahnomen to the Mahnomen ARMER tower site, which is located approximately ten miles southeast of the PSAP. The county currently has 4.9 GHz microwave connectivity between the PSAP and the ARMER tower site.

Mahnomen County PSAP ARMER Architecture



Mahnomen County PSAP ARMER Architecture (Phase 2)



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 Mahnomen 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 Mahnomen 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

Six 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:

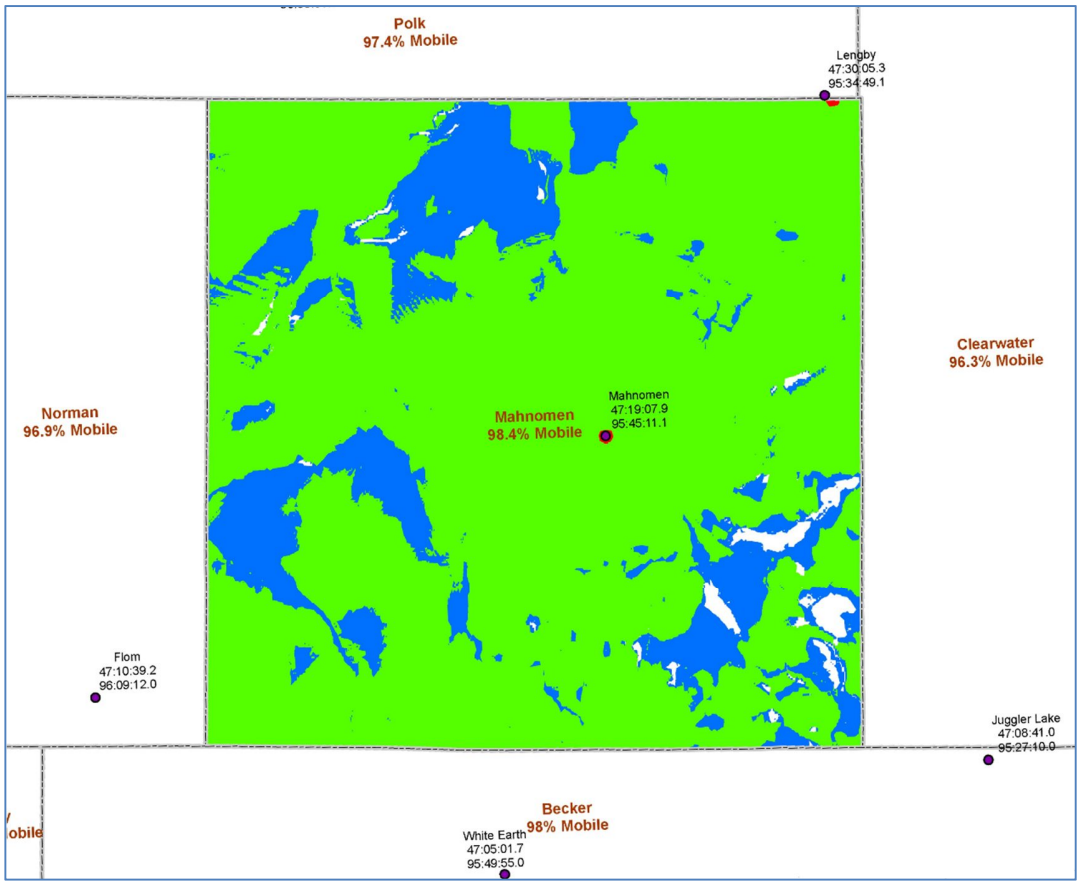
1. State of Minnesota prepared coverage map for Mahnomen County (from 2008).
2. RFCC mobile (vehicle-mounted) radio coverage
3. On-Street portable radio coverage
4. In-building countywide coverage
5. In-building coverage in the City of Mahnomen area
6. In-building coverage in the City of Waubun area

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 Mahnomen County geographical area.

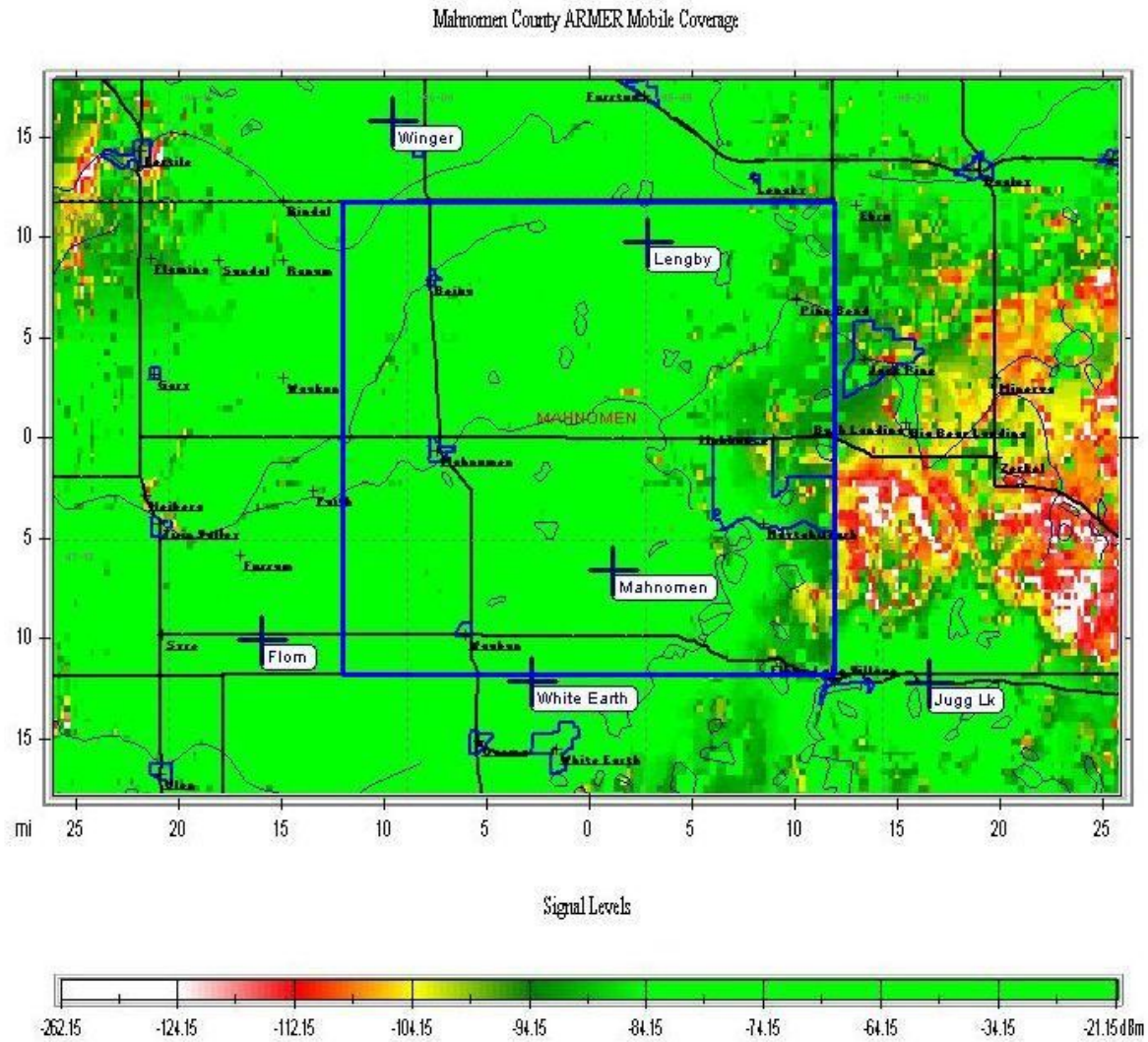
All maps were created using RadioSoft© ComStudy2© software program, and the modeling for the coverage analysis was done with the Longley-Rice and Okumura propagation models. The modeling parameters used by the State and RFCC are similar, however a somewhat different color-coding scheme is used. The State's 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: Mahnomen 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 the significant changes in tower site locations that have been established since the time of original publication).

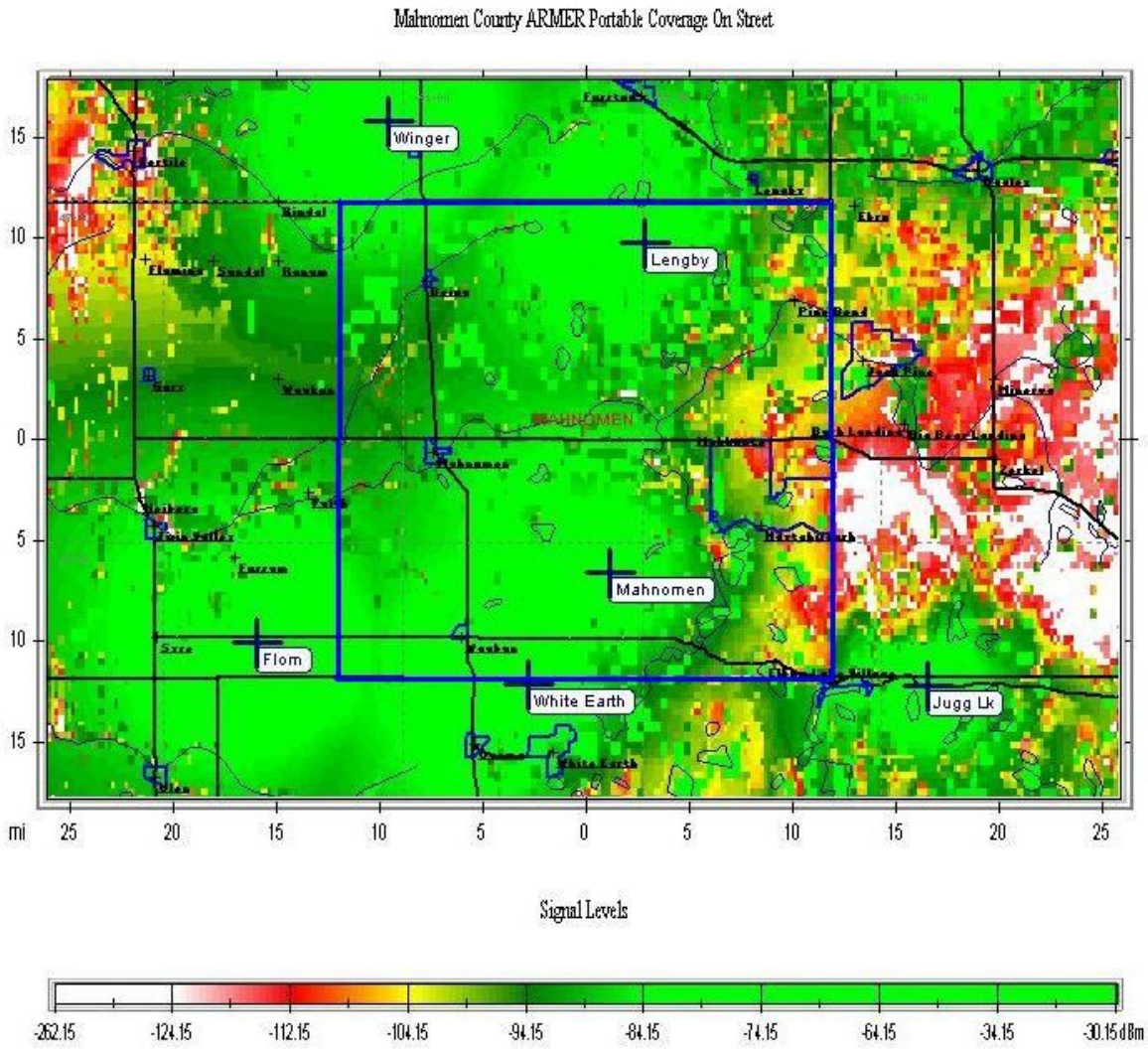


Map 2: The map shown below, prepared by RFCC for the county's ARMER planning process, demonstrates the predicted coverage to be expected for Mobile (vehicle-mounted) radios from the ARMER tower sites to be located within Mahnomen County, including the first-tier sites outside the county borders.



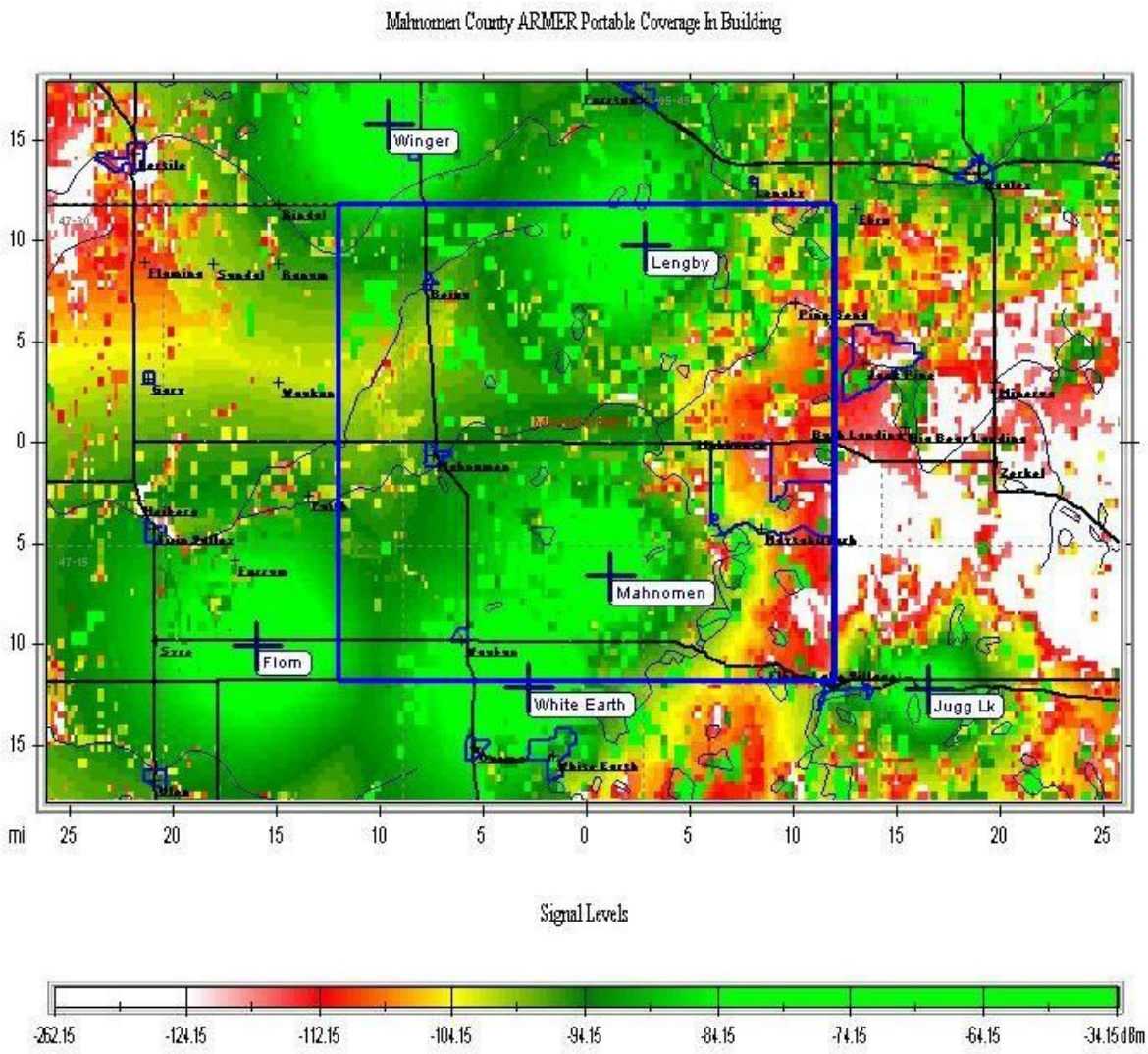
The predicted mobile radio coverage throughout most of the county is excellent with the planned tower sites, and coverage within the county is enhanced by tower sites outside of the county borders.

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 Mahnomen County, including the first-tier sites outside the county borders.



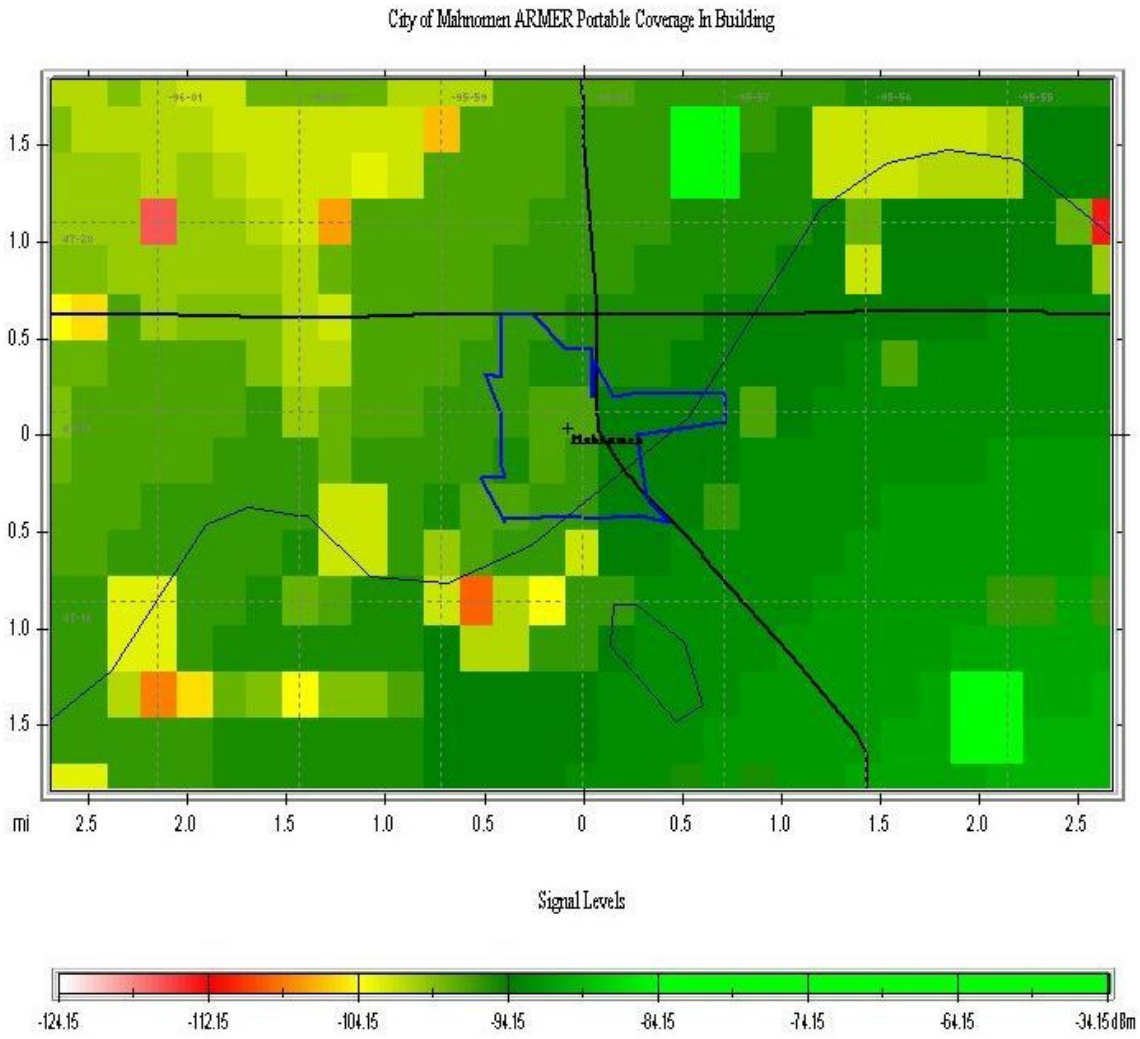
The predicted portable radio coverage throughout most of the county is very good with the planned tower sites, and coverage within the county is enhanced by tower sites outside of the county borders. The only area of concern would be the far east and southeast part of the county, near the Twin Lakes area.

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



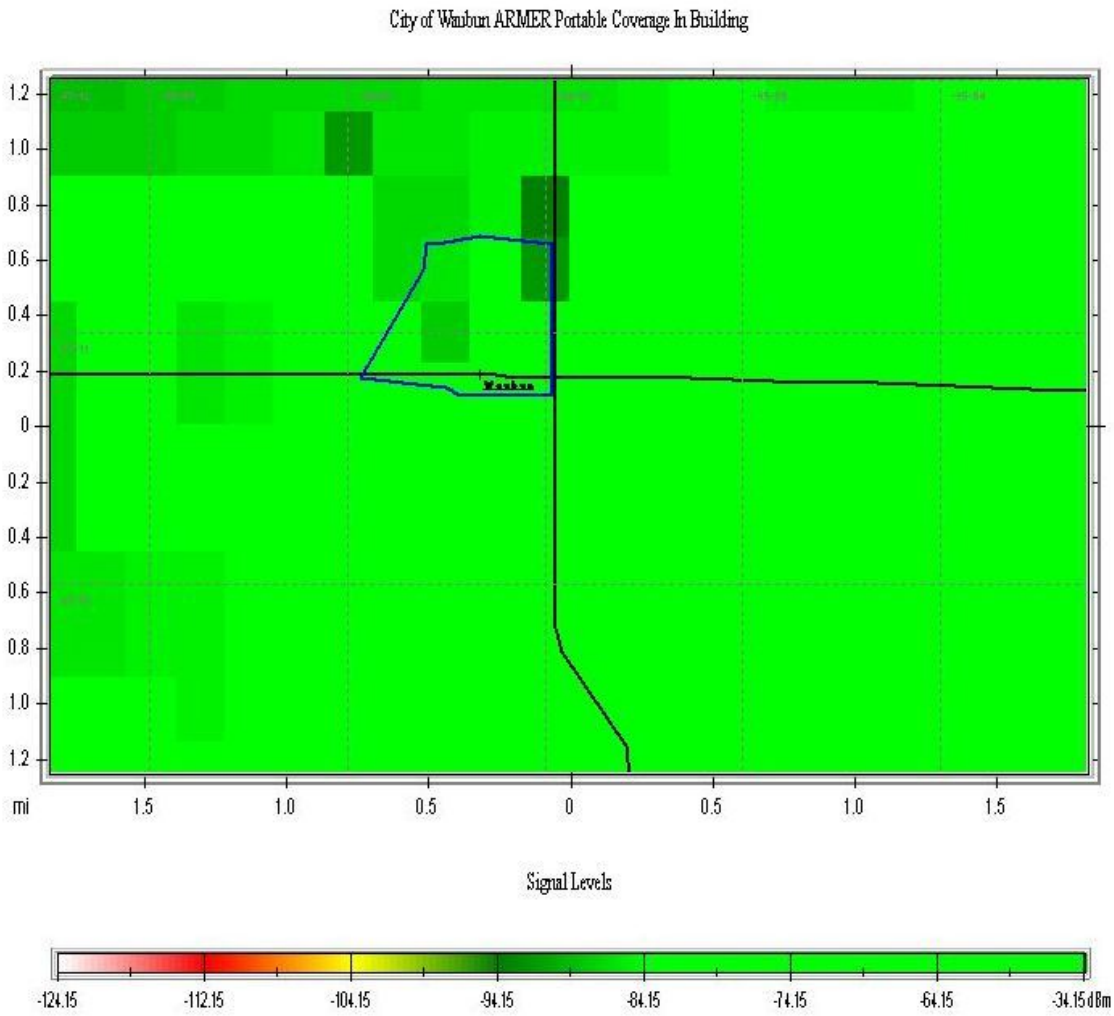
The predicted 6db in-building coverage for Mahnomen County is good in many areas, including the cities of Mahnomen and Waubun. Refer to the maps on the next pages for more detail of the predicted coverage in these two areas. There is some concern with weak in-building coverage in the eastern area of the county.

Map 5: This map demonstrates the predicted in-building (6db loss) portable radio coverage to be expected in the City of Mahnomen 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 Mahnomen, 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 is 10 miles from town, but the terrain is relatively flat, allowing good signal propagation.

Map 6: This map demonstrates the predicted in-building (6db loss) coverage to be expected for portable radios in the City of Waubun 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 Waubun, 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.

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 Mahnomen 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 talkgroup access and control is lost. The control stations will allow the PSAP staff to access the county-specific and system interoperability talkgroups 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, it is possible to implement multiple RF control stations at the dispatch center, with access to all 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 talkgroups incorporated in the backup station plan.

No final determination has been made for Mahnomen 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.

Mahnomen 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 Mahnomen 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 Mahnomen 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 Mahnomen County, to include the following:

- Polk County agencies
- Clearwater County agencies
- Becker County agencies
- Norman County agencies

- Minnesota State Patrol, Mn/DOT, Department of Natural Resources (DNR) enforcement, and fire agencies
- Federal law enforcement and fire agencies

Many 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. Mahnomen 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. Mahnomen County will have neighboring agencies operating on both types of systems for the foreseeable future.

To accommodate communications between agencies that may operate with Mahnomen 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 Mahnomen 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 Mahnomen 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.

Mahnomen 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 Mahnomen 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 Mahnomen County will be handled by the Mn/DOT staff. Mahnomen County will contract with a local Motorola authorized service facility for maintenance of any additional 800 MHz system equipment planned for the Mahnomen County implementation, including the PSAP equipment.

I. System Administration

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

J. Other Local Enhancements

The primary local enhancements to the planned system implementation are:

- ☐ VHF interoperability systems

No other tower site or 800 MHz channel expansion local enhancements are planned for the system.

3. Project Costs and Budget

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

- Local bonding
- Local levy
- Grant opportunities

Grant funding has been received for the purchase of a small number of 800 MHz mobile and portable radios for public safety agencies in the county. Funding for the remaining system infrastructure equipment has not yet been finalized, but is being reviewed by the county and considered for year 2014 or beyond.

Project Cost Estimates – Phase 1:

Item/Category	Estimated Costs
MCC5500 Console Modifications	$ 25,000
800 RF Control Stations	$ 20,000
800 MHz Subscriber Radios (Law Enforcement)	$ NA
800 MHZ Law Radio 800/Trunking Upgrades	$ 21,000
Project Management	$ 10,000
Grand Total Estimated Costs	**$ 76,000**

Project Cost Estimates – Phase 2:

Item/Category	Estimated Costs
MCC7500 ARMER Console Equipment	$325,000
Microwave Radio (upgrades)	$ 10,000
Other Interoperability Equipment	$ 15,000
800 MHz Subscriber Radios (Fire and EMS)	$261,600
800 MHz Subscriber Radios (Public Works and Schools)	$ 22,000
Project Management	$ 20,000
Grand Total Estimated Costs	**$653,200**

4. Project Implementation

A. Schedule

The implementation of the ARMER radio network for an organizational group the size of Mahnomen 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
- ☐ Tower site development
- ☐ Establish contract with vendor for equipment and services
- ☐ FCC licensing
- ☐ Equipment installation and configuration
- ☐ Radio user training
- ☐ System cut over

Attachment 2 of this planning document provides an estimated schedule for the implementation of the ARMER network for Mahnomen County agencies. As shown, the critical-path elements are expected to be the replacement of the Motorola Centracom dispatch consoles with new MCC7500 consoles.

Please note that the schedule in Attachment 2 is only tentative at this time, and is subject to many factors, including Mahnomen County securing the funding to move forward with the project.

B. System Cut Over Plan

Mahnomen 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.

Attachment 1: Mahnomen County Fleet Map

	Law Enforcement Operations	TG Alias
1	Mahnomen County Law 1	MM Law 1
2	Mahnomen County Law 2	MM Law 2
3	Mahnomen County Law 3	MM Law 3
4	Mahnomen County Law 4 Encrypted	MM Law 4E
5	Mahnomen County Law Car-Car	MM L C2C
6	Waubun Police Law 1	MM WLaw 1
7	Mahnomen County Law Admin	MM Law Adm
8	Waubun Police Law Admin	MM WL Adm
9	Mahnomen County Emergency Management	PN EM
	Fire and EMS Operations	**TG Alias**
10	Mahnomen County Fire 1	MM Fire 1
11	Mahnomen County Fire 2	MM Fire 2
12	Mahnomen County Fire TAC	MM Fire Tac
13	Mahnomen County Fire Admin	MM Fire Adm
14	Mahnomen County EMS 1	MM EMS 1
15	Mahnomen County EMS 2	MM EMS 2
16	Mahnomen County EMS Tac	MM EMS Tac
17	Mahnomen County EMS Admin	MM EMS Adm

Attachment 1: Mahnomen County Fleet Map (continued)

	Local Interoperability	TG Alias
18	Mahnomen County Announcement Group	MM ANNC ALL
19	Mahnomen County Emergency Button	MM EMER
20	Mahnomen County Emergency 911	MM 911
21	Mahnomen County Public Safety Statewide Roam	MM PS Roam
22	Mahnomen County All Statewide Roam	MM All Roam
23	Mahnomen County Public Safety Common 1	MM Com 1
24	Mahnomen County Public Safety Common 2	MM Com 2
25	Mahnomen County Public Safety Common 3	MM Com 3
26	Mahnomen County Public Safety Common 4	MM Com 4
27	Mahnomen County Public Safety Common 5	MM Com 5
28	Mahnomen County Event 1	MM Event 1
29	Mahnomen County Event 2	MM Event 2
	Public Works and Schools	**TG Alias**
30	Mahnomen County Highway Operations 1	MM Hwy 1
31	Mahnomen County Highway Operations 2	MM Hwy 2
32	Mahnomen County Human Services	MM HNSV
33	Mahnomen County Transit	MM TRNST
34	Future Public Works 1	MM PW 1
35	Future Public Works 2	MM PW 2
36	Future Public Works 3	MM PW 3
37	Mahnomen County School Transportation 1	MM School 1
38	Mahnomen County School Transportation 2	MM School 2
39	Mahnomen County Future Use 1	MM Future 1
40	Mahnomen County Future Use 2	MM Future 2

All regional and statewide interoperability talkgroups will be incorporated into Mahnomen County radios as defined by ARMER standards.

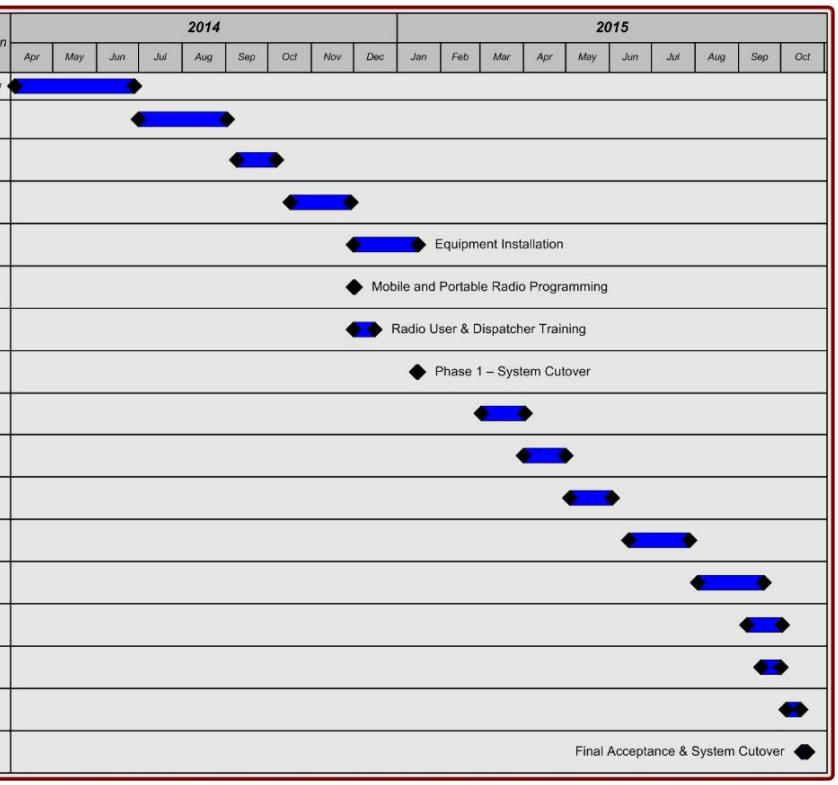
Attachment 2: Mahnomen County Draft Implementation Schedule

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 Mahnomen County ARMER implementation will be a "phased" process, as discussed earlier in this plan. The County is planning the Phase 1 implementation for later in 2014. The Phase 2 implementation (new MCC7500 consoles) will be considered in 2015, 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.

Mahnomen County Proposed ARMER Radio System Project Schedule

ID	Task Name	Start	End	Duration
1	ARMER Participation Plan Development	4/4/2014	6/27/2014	12.2w
2	**ARMER Plan Approvals (RRB, SRB/OTC)**	7/1/2014	9/1/2014	9w
3	**Phase 1 System Design & Planning**	9/9/2014	10/6/2014	4w
4	Order Equipment from Vendor	10/17/2014	11/28/2014	6.2w
5	Equipment Installation	12/1/2014	1/15/2015	6.8w
6	Mobile and Portable Radio Programming	12/1/2014	12/1/2014	.2w
7	Radio User & Dispatcher Training	12/1/2014	12/15/2014	2.2w
8	**Phase 1 – System Cutover**	1/15/2015	1/15/2015	.2w
9	**Phase 2 System Design & Planning**	3/2/2015	4/1/2015	4.6w
10	Order Equipment from Vendors	4/1/2015	4/30/2015	4.4w
11	Equipment Order Processing & Mfgr	5/4/2015	6/2/2015	4.4w
12	Equipment Delivery to Sites	6/15/2015	7/27/2015	6.2w
13	Dispatch Center Equipment Upgrades	8/3/2015	9/18/2015	7w
14	System Optimization	9/7/2015	10/1/2015	3.8w
15	Dispatcher Training	9/17/2015	9/30/2015	2w
16	System Acceptance Testing & Approval	10/5/2015	10/14/2015	1.6w
17	**Final Acceptance & System Cutover**	10/16/2015	10/19/2015	.4w



Revised 5-30-2014

Attachment 3: References

1. State of Minnesota "Local Agency and Regional Planning and Contracting for ARMER Participation" (sic) dated September 8, 2008, as published at www.srb.state.mn.us
2. Federal Engineering "Radio System Needs Assessment and Alternatives Report for Mahnomen 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
6. Table based on inventory data from the Federal Engineering report cited above in (Attachment 2) and ongoing RFCC cost/pricing research

REQUEST FOR SPECIAL
WIDE AREA SITE ACCESS
FOR AN ARMER TALKGROUP

Talkgroup/ Announcement Group Name(s): Mahnomen County PS Roam (MM 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:	Mahnomen County Sheriff's Office
Contact Name:	Sheriff, Mahnomen County (Doug Krier)
Address:	PO Box 440
	Mahnomen, MN 56557
Phone:	218-935-2255
Email:	Doug.krier@co.mahnomen.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 "MM PS Roam" talk group is intended to allow Mahnomen County public safety agency personnel the ability to contact Mahnomen County dispatch when outside of the Mahnomen County geographical service area. It may also be used for two Mahnomen County public safety personnel to communicate with each other when operating outside of the Mahnomen 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 typical uses of this talk group are 1) Prisoner transports, and 2) Communications between two Mahnomen County field units when outside of the Mahnomen 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 twice a week, again 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 Mahnomen County PSAP would be monitoring the various Statewide Shared Incident Response or Roaming talk groups, and the purpose for which Mahnomen County units would need to communicate would not necessarily appear to fit the intended use of those talk groups.

Douglas A Krier 8-25-14

Talkgroup Owner Agency Authorized Official – Signature & Date

Doug Krier, Sheriff – Mahnomen 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): Mahnomen County All Roam (MM 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:	Mahnomen County Sheriff's Office
Contact Name:	Sheriff, Mahnomen County (Doug Krier)
Address:	PO Box 440
	Mahnomen, MN 56557
Phone:	218-935-2255
Email:	Doug.krier@co.mahnomen.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 "MM All Roam" talk group is intended for future use, to provide any/all Mahnomen County agency personnel (public works, public safety, or school transportation) using the ARMER radio network the ability to contact Mahnomen County dispatch when outside of the Mahnomen 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 Mahnomen 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 Mahnomen 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 Mahnomen County PSAP would be monitoring the various Statewide Shared Incident Response or Roaming talk groups, and the purpose for which Mahnomen County units would need to communicate would not necessarily appear to fit the intended use of those talk groups.

Douglas A Krier 8-25-14

Talkgroup Owner Agency Authorized Official – Signature & Date

Doug Krier, Sheriff – Mahnomen County MN

Printed Name and Title

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

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

Document Section 3	**Interoperability Standards**	**Status:** Complete
State Standard Number	**3.31.0**	
Standard Title	**StatusBoard**	
Date Established	**8/6/2008**	**SECB Approval**: 12/19/2013
Replaces Document Dated	**7/25/2013**	
Date Revised	**9/16/2014**	

1. Purpose and Objective

The purpose of this standard is to establish guidelines for the StatusBoard application.

2. Technical Background

- **Capabilities**

The StatusBoard Application, maintained by the Minnesota Department of Public Safety (DPS), Emergency Communication Networks (ECN), is a statewide web-based dispatch tool accessible through the public Internet. It is intended to help coordinate use of interoperable communications resources (e.g., talkgroups or channels) are available for urgent, emergent, or preplanned events.

- **Constraints**

  StatusBoard is accessed via the public Internet. If a user has no Internet access, then he or she cannot access StatusBoard.

3. Operational Context

The StatusBoard Application is to be used for all emergent or pre-planned emergency situations and planned exercises. It is a tool to advise all dispatch centers with Internet access which mutual aid resources may be available at any given time.

There are two kinds of reservations on StatusBoard:

Quick Reservation: A reservation made by pressing the "quick reservation" button in the StatusBoard application. This reservation will last for a set period of time that is determined in the global application settings.

Calendar Reservation: A reservation made in advance by entering an event time into the StatusBoard calendar.

A talkgroup can be assigned to only one reservation at a time. I.E., if a quick reservation is made which overlaps with an existing quick reservation *or* an existing calendar reservation, then the old reservation will be deleted and the new reservation will take precedence. Users of StatusBoard are

able to override other users' reservations according to the SOPs that assign priority for those resources.

There are two kinds of users on StatusBoard:

Users: End-users, such as dispatchers or field users.

Administrators: Technical staff who are able to create resources, profiles, and user accounts.

User accounts may be set with a "read" or a "write" flag, enabling agencies to assign the appropriate level of access to a user account. "Read" accounts cannot reserve resources and can only view current resource status. "Write" accounts may reserve resources and enter notes.

4. Recommended Protocol/Standard

Required resources for all StatusBoard user accounts:

All user accounts are required to have access to the "MN" zone (See State Standard 3.16.6). Local StatusBoard administrators are responsible for determining whether each user account has "read" or "write" access.

All user accounts are strongly encouraged to have access to the appropriate regional zones (e.g., Central Minnesota counties' user accounts are encouraged to have access to the Central Minnesota mutual aid interoperability pool, per applicable regional standards.

User accounts policy:

ECN maintains the "super" administrator account.

Each ARMER participant is required to designate a local administrator and to keep that administrator's contact information up-to-date with ECN. Local administrators may create additional local administrators for StatusBoard, if required.

Non-ARMER participating agencies can access StatusBoard but must designate a local StatusBoard administrator before being provided access, and their access must be approved by ECN.

Each Regional Radio Board (RRB), or equivalent, is strongly encouraged to designate a regional StatusBoard administrator and to keep that administrator's contact information up-to-date with ECN.

No language in this standard shall be construed to prohibit multiple agencies from sharing a single StatusBoard administrator; i.e., a single administrator is allowed to provide administrative support for neighboring counties or for an entire region.

Each user agency will create and maintain its own user accounts and resources. ECN will maintain statewide resources and will maintain a single administrator user account for each ARMER participant or non-ARMER participating agency using StatusBoard. ECN will **not** maintain region wide resources or region wide user accounts.

Upon employee termination, that employee's user account shall be immediately removed from the system.

Upon employee disciplinary or administrative suspension, that employee's user account shall be locked in the system until the employee returns to duty.

At least once a month, StatusBoard Administrators shall review their agency StatusBoard accounts for accuracy.

By December 31 of every year, a StatusBoard Administrator shall provide the ECN Standards & Training Coordinator with a list of all designated StatusBoard administrators for their agency.

Access Levels:

Write access to StatusBoard is available **only** to the following categories of personnel:

- Dispatchers and Public Safety Answering Point (PSAP) personnel
- Incident command staff (e.g., Communications Unit Leaders, or COMLs, and Communications Technicians, or COMTs)
- Agency supervisors
- Technical staff
- Local administrators

Write access is **not** intended to be available to field personnel, unless an individual falls into one of the categories above.

COMLs and COMTs shall have access to all regional tabs on the StatusBoard when creating their profile.

Read access is available to **all** Federal Communications Commission (FCC) Part 90 eligible users and support staff at the discretion of regional and local administrators.

Training:

All users shall be appropriately trained to use StatusBoard before being provided access.

Each user is required to complete the online training module for StatusBoard prior to getting an individual log on and password.

The StatusBoard training module was created on behalf of the Statewide Emergency Communications Board (SECB) and is hosted through the Alexandria Technical & Community College online network. This module and others can be accessed from the Emergency Communication Networks (ECN) website under ARMER Standards.

Information Security Policy for StatusBoard:

Generic accounts are **not allowed**. Each user account in StatusBoard shall be assigned to an **individual** and not to a user role (e.g., "911 Dispatch Seat 4" is **not allowed**).

5. Recommended Procedure

For **EMERGENT INCIDENTS:**

Any time a mutual aid resource is used for an emergent event, a quick reservation shall be made on StatusBoard.

As soon as it is practical to do so, the user shall enter a brief description of the event and an estimated end time should in the description field.

When the mutual aid resource is no longer required and as soon as it is practical to do so, the dispatcher should release the resource on StatusBoard.

For **PRE-PLANNED INCIDENTS and EXERCISES:**

Any time a mutual aid talkgroup or channel is used for a pre-planned incident, a calendar reservation shall be made on StatusBoard at least one week in advance of the event, if it is practical to do so.

The user shall enter a brief description of the event and an estimated end time should in the description field.

When the mutual aid resource is no longer required and as soon as it is practical to do so, the dispatcher should release the resource on StatusBoard.

During **UNPLANNED** outages:

If an agency experiences an unplanned outage, they shall contact two other agencies to verify whether those agencies are having the same problem with StatusBoard.

After verifying the outage, if it is during business hours, affected agencies shall report the outage to the ECN Standards & Training Coordinator, who will verify the report, contact MN.IT, and send out notification to affected agencies.

When StatusBoard has come back online, the ECN Standards & Training Coordinator shall notify affected agencies that the service is back up.

After verifying the outage, if it is during non-business hours, affected agencies shall report the outage on the StatusBoard Hotline number.

If no response is received by the reporting agency within five minutes, they shall then notify the ARMER Radio Operations Center (ROC). The ROC shall notify affected agencies via ARMER-sys-notify mailing list of the outage.

When StatusBoard has come back online, the ROC shall notify affected agencies that the service is back up.

If an agency experiences any other issue with StatusBoard, they shall contact the ECN Standards & Training Coordinator, who will attempt to determine the cause and correct the issue, if possible. If the issue cannot be corrected, all information will be sent to MN.IT for further investigation.

If an agency requires a mutual aid resource during an outage, it shall monitor the resource for existing traffic. An agency shall announce that it is securing control of the resource before commencing tactical communications on the resource.

The ROC is **not** required to monitor StatusBoard or take action to address any interruption in service. It is the responsibility of user agencies to report outages.

For **PLANNED** outages:

ECN shall notify affected agencies prior to a planned outage via ARMER-sys-notify at least 48 hours before the planned outage, or as soon as ECN is aware that there will be a planned outage. The notice shall provide date, time, and expected duration of the outage. When work is completed, ECN shall provide notice that the service is back online.

6. Management

The dispatch center managers for all ARMER and non-ARMER participants shall ensure there is an internal procedure for use of StatusBoard in the dispatch center or on any mobile user's application for which they are responsible.

Local StatusBoard Administrators will be responsible to ensure that:

- Only qualified personnel are granted StatusBoard accounts.
- All users are properly trained on the use of StatusBoard.
- All users remain in compliance with the StatusBoard Standard.
- StatusBoard Administrators shall manage only their agency profile and user accounts unless otherwise designated for another agency.

Dispatch center supervisors may receive initial training from ECN on the use of StatusBoard**.** Ongoing training shall be conducted internally by agencies and by ECN whenever necessary.

Identified issues and concerns will be brought to the Interoperability Committee (IC) for resolution.

Allied Radio Matrix for Emergency Response

ARMER

Project Status Report

Reporting Period August 1, 2014 through September 1, 2014

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

96%

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:
  - Argo Lake
  - Beaver Bay
  - Soudan
  - Palo

Budget

Construction Budget Status as of September 1, 2014

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	$61,757,332.57	$258,075.20	$258,036.24	$ 38.96
Phase 456 (FY 11, 12, 13)	$61,987,634.34	$35,575,522.78	$26,411,111.56	$8,829,076.84	$ 17,582,034.72
Total Phase 456	$186,000,000.00	$159,314,925.34	$26,685,074.66	$9,103,000.98	**$17,582,073.68**
Projected Contingency as of September 1, 2014					$1,062,073.68

Comments:

-

Scheduled Milestones / Deliverables

Status updated August 1, 2014

Milestone	Total Sites	Sites Not Started	Sites in Progress	Sites Complete
ARMER Backbone Construction	324 Sites			
Tower Site Acquisition	324	0	11	313
Tower Construction & Site Development Work	324	8	10	305
Microwave Connectivity & RF Deployment	324	13	0	313 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:

- Border(New site under construction)
- Finland
- Beaver Bay
- Lake One (New site under construction)
- Line Lake
- Erie Hill
- Argo Lake
- Duluth South

Of the 313, 8 are on temporary sites; sites construct and move still in the works.

SE – all sites completed
SR – all sites done, but working on leased site replacement.
SW – all sites completed
CM – all sites completed
Metro – all sites completed
NW – 3 land acquisitions remaining.
NE – 13 site under construction, 8 land acquisitions remaining.

<u>Completion Targets</u>

ARMER all Phases:

15 sites will be delayed due to delays in land acquisition.

Ongoing ARMER System Work

Motorola System Upgrade

- Upgrade to Motorola system version 7.13 punch list is nearing completion.

Site improvements

- We also have 3 sites that need shelter upgrades to get air handlers and generators upgraded.
- Still working on the addition of card key reader to the equipment shelters. We are gathering the parts and working on the install plans. Parts are on order. Working on install plans.
- We are also still working on replacing a number of towers that are on the air, but are not structurally up to standards and need to be replaced. This has limited some of the county requests for other antenna system and microwave additions.
- We are also reviewing some of our leased sites. Plans had always been to build towers in these areas, but to get the project moving we leased site 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 on state, County or City owned land.

Microwave improvements

- We have developed a process for microwave path review and are working on a number of improvements to the microwave system. For high capacity routes we have taken the target of 20 miles for space diversity down to 17 miles. We are reviewing outage records for the paths and working improvements, space diversity, realignment, etc.
- We are reviewing and rerouting some links sometimes requires changing the link capacity.
- 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 it appears a site has been identified. Need to work through the environmental reviews and acquisition.
- Working to reroute the Oakland Woods – Alden path through Albert Lea to improve path performance. Working with County.
- We are also working to get the DC power systems updated at all sites to improve system reliability. Battery system out for bid.
- Still reviewing microwave performance, ongoing through the year.

VHF interop layer

- 109 outstate VHF sites have VLAW31 installed. VLAW31 is connected to CCGW so it is available to any MCC7500 console in the system and any Gold Elite within the zone. With the 7.13 upgrade zone boundaries for 7500 consoles have gone away, you just need to program the resource into the MCC7500.
- 109 sites have the VHF VFS installed and connected to MotoBridge.
- VPN access is being worked on for access to MotoBridge network.

System improvements

- Add redundant router and sink links to all ASR sites. This will help improve the instances of site trunking. Working on install of redundant routers, SW area complete, working in SE/SC.
- Site addition in NE Lake County. Expansion of the Honeymoon simulcasts to sites in Lake County. Equipment in, licenses for some sites in, install of simulcast in completed.
- Site in Tower. Simulcast an area around Virginia and Soudan, due to frequency limitations in the Canadian Border area and power limitations at our site, simulcast will provide for channels and may improve roaming at these power limited sites in this area. Frequencies found, license in, working to replace some antenna system before simulcasting. Most site converted to simulcast.
- Replace Lake Crystal leased site with 2 new sites. This adds a new site to the area.

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. We are looking a moving a few of these up due to County co-location request that we have had to turn down and a couple that need to may have to have space diversity dished added.

ARMER Construction Budget (Remaining Work)

			Unencumbered Fund Balance (As of September 2014)		$17,582,073.68
Site Name (Green - site on air)	**County**	**Description**	**Land/ Construction**	**Estimate to Complete**	**Balance**
Lutsen	Cook	Replace Shelter	Ready	$175,000.00	$17,407,073.68
Tower	St Louis	Add Shelter/site work	Ready	$150,000.00	$17,257,073.68
Beaver Bay	Lake	Replace Tower	Ready	$630,000.00	$16,627,073.68
Argo Lake	St Louis	New tower	Ready	$585,000.00	$16,042,073.68
Palo	St Louis	New tower	Ready	$710,000.00	$15,332,073.68
Soudan	St Louis	New tower	Ready	$710,000.00	$14,622,073.68
Berner	Clearwater	New tower	Envir/Purc	$610,000.00	$14,012,073.68
Island Lake	Beltrami	New tower	Envir/Purc	$610,000.00	$13,402,073.68
Cromwell	Carlton	New tower	Envir/Purc	$735,000.00	$12,667,073.68
Duluth South	St Louis	New tower	Lease	$280,000.00	$12,387,073.68
Finland	Lake	Replace Tower	DNR/Envir	$710,000.00	$11,677,073.68
Cascade River	Cook	New tower	DNR/Envir	$790,000.00	$10,887,073.68
NE Lake County	Lake	New tower	DNR/Envir	$840,000.00	$10,047,073.68
Lima Mt	Cook	New tower	DNR/Envir	$1,340,000.00	$8,707,073.68
Sawbill	Cook	New tower	DNR/Envir	$1,390,000.00	$7,317,073.68
Devil Fish	Cook	New tower	DNR/Envir	$640,000.00	$6,677,073.68
Red Lake	Beltrami	New tower	Indent Land	$630,000.00	$6,047,073.68
Eden Valley	Meeker	New tower	Envir/Lease	$500,000.00	$5,547,073.68
Lake Crystal	Blue Earth	New tower	Indent Land	$625,000.00	$4,922,073.68
Madelia	Watonwan	New tower	DOT/Envir	$610,000.00	$4,312,073.68
Molde	St Louis	Replace fire tower	DNR/Envir	$320,000.00	$3,992,073.68
PENDING WORK					
Card Key				$500,000.00	$3,492,073.68
Site clean up, shelter and tower removals				$400,000.00	$3,092,073.68
Hewit: Land Purchase, replace tower.				$350,000.00	$2,742,073.68
Scandia: Need to look at land purchase.				$120,000.00	$2,622,073.68
Geneva: Need to look at land purchase, new tower ?				$60,000.00	$2,562,073.68
Mapleton: Find land and build new tower				$500,000.00	$2,062,073.68
Red Wing: Land purchase				$100,000.00	$1,962,073.68
MSO - Backup equipment				?	
Microwave DC power - Upgrades to meet run time required				$900,000.00	**$1,062,073.68**
TOWER REPLACEMENTS (This work being held until above projects compeleted)					
Russell	Replace tower			$600,000.00	$462,073.68
Freedhem	Replace tower			$600,000.00	-$137,926.32
Middle River	Replace tower			$600,000.00	
Hawley	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	