Minnesota NG9-1-1 GIS News

May, 2016 Issue #3

In This Issue:

Useful Links:

DPS/ECN

Minnesota Department of Public Safety – Emergency Communications Networks GIS Information

MnGeo

Minnesota Geospatial Information Office

SECB

State Emergency Communications Board

NENA

National Emergency Number Association

FirstNet

First Responder Network Authority

Contact Us:

Adam Iten, NG9-1-1 Project Manager

adam.iten@state.mn.us

or 651-201-7559

SECB

The Minnesota Department of Public Safety, Emergency Communication Networks division (ECN) is responsible for oversight of public safety communications including the 9-1-1 system in the state and the migration to a Next Generation 9-1-1 (NG9-1-1) system. Established in 2004 by the Minnesota Legislature, the 20-member Statewide Emergency Communications Board (SECB) provides guidance to ECN by helping it set the vision, priorities and technical roadmap for interoperable voice communications, NG9-1-1, Integrated Public Alert and Warning (IPAWS) and wireless broadband for public safety across the state. The board's priorities include:

1) Ensuring that advances in technology will be implemented across the state to enhance the ability for all residents to call for help
2) Providing confidence that responders statewide have the ability to communicate with each other during an emergency
3) Enabling all counties to effectively alert and warn residents and visitors of impending danger

This unique board consists of both urban and rural members representing multiple public safety disciplines from all corners of the state.

The SECB relies on *committees* and *workgroups* consisting of subject matter experts to advise it on a wide array of issues. The NG9-1-1 Committee makes recommendations to the SECB regarding the design, policy and procedures needed to implement NG9-1-1 statewide. It is supported by the input from the GIS Work Group and GIS Data Standards Work Group whose members include state, county, Public Safety Answering Point (PSAP) and local GIS experts. The SECB must approve and adopt all policy and standards recommended by the committees before implementation. More information about the SECB's strategic plan can be found at https://dps.mn.gov/entity/srb/Pages/default.aspx.

I would also like to introduce with this issue of the newsletter a guest article prepared by Geoff Maas of the Metropolitan Council. Geoff provides us with information about the Metro Regional Centerline Collaborative – a very important program in the Twin Cities metropolitan area that will help guide the structure and content of GIS road data used statewide in NG9-1-1. We invite members of the 9-1-1 community to share information about their efforts to build-out NG9-1-1 in future releases of this newsletter. Thank you Geoff!

Jackie Mines, Director, DPS-ECN

Metropolitan Roads Centerline Consortium

By Geoff Maas, MetroGIS Coordinator

At present, there is no authoritatively-sourced, publicly-available GIS road centerline dataset that meets the core business needs of local, regional and state agencies in Minnesota.

The Metro Regional Centerline Collaborative (MRCC) was established to address this issue for the Twin Cities metropolitan area by facilitating the creation and sustained maintenance of a local/regional road centerline dataset that will meet the needs of partner agencies. It is a ground-breaking, collaborative project involving technical and managerial GIS staff from the seven metropolitan counties (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington), the Metropolitan Emergency Services Board (MESB) and the Metropolitan Council. Senior advisors from the Minnesota Department of Transportation (MnDOT) and the Minnesota Geospatial Information Office (MnGeo) have also participated in the project, providing insight into state agency needs.

Specific needs to be addressed. During the business case documentation phase of the project, begun in May 2014, all partners agreed the desired road centerline dataset should be designed to satisfy the following major core uses:

- Vehicular routing
- Address geocoding (the dataset will contain both assigned *and* theoretical address ranges)
- Next Generation 911 call routing and location validation
- Emergency services dispatching
- Support for linear reference system use
- Cartographic representation of road features

They also agreed that no road dataset can be "all things to all agencies". However, MRCC participants are working to ensure that the defined core needs are met with individual agencies and users having the ability to append their program-specific attributes to the data so they can meet their internal business requirements.

Guiding Principles of the MRCC Project. There are three over-arching principles that guide the MRCC project:

1. The acknowledgement that local jurisdictions—cities and counties—know their roadways best and will therefore produce the most current, accurate and authoritative road network data possible.
2. Developing and maintaining a road dataset that is standardized across many local jurisdictions saves time and money and reduces duplicative efforts by local, regional, state and emergency services interests requiring similar data.
3. An authoritative, standardized and continually updated road centerline dataset serves as a foundational layer of the state's geospatial data infrastructure. Agencies from all levels of government working together to make this data a reality is a sound investment and wise commitment of their time and resources.

Key actions to date. Over the course of 2014, the MRCC documented core business needs identified by participating partners and developed a draft data specification intended to meet those needs. In late 2014-early 2015, a sample dataset - based on the draft specification, was developed and shared with the state's geospatial community. The community was asked to provide comments and suggestions regarding the sample dataset. Over 50 government agencies and other interests provided input to the MRCC team who reviewed their comments and then made modifications to the data specification as needed.

The 'First Build'. In August 2015, participating counties began their 'First Build' of the regional dataset (Figure 1). Each county committed staff resources to: alter their road centerline data to meet the MRCC specification; populate 40-60% of the required attributes; work diligently to edge-match road centerlines data along county borders and document the process. By December 2015, participating counties had successfully delivered their 'First Build' version of the dataset. Hennepin County then performed a validation and audit of the dataset, which revealed a number of opportunities for enhancement and refinement.

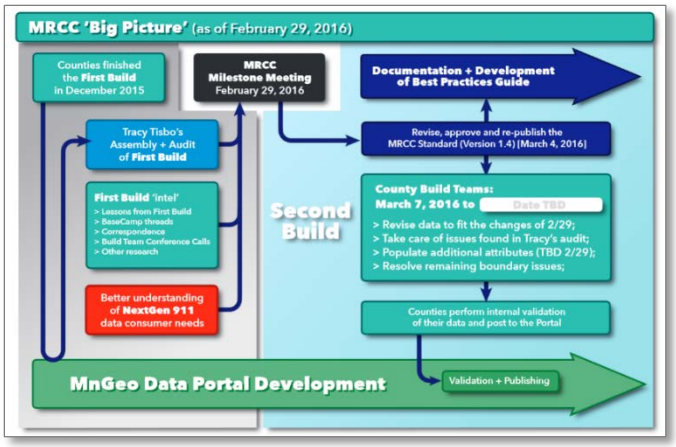

Figure 1: MRCC First Build Migration

The 'Second Build'. On February 29, 2016, members of the MRCC project team and representatives from Greater Minnesota, the state's NextGen 911 effort, the Minnesota Department of Natural Resources and MnDOT gathered for a 'Milestone Meeting' (Figure 2). The purpose of the meeting was to make key decisions on refining the MRCC specification (upgrading to Version 1.4) and agreeing on specific tasks and goal dates for putting together a fully realized, metro road centerline dataset.

During the meeting the seven metropolitan county partners agreed to a goal date of September 30, 2016, for completing a 'Second Build' of the dataset which would incorporate needed improvements and refinements revealed during the 'First Build'. Counties also expressed their desire to populate as many remaining attributes as possible and to make the updated dataset available for download, use and review by the broader geospatial community.

Figure 2: MRCC Second Build Meeting

Current MRCC project planning specifies goals of monthly dataset updates by the counties, and making the data available via the Minnesota Geospatial Commons after September 30. The MRCC team also anticipates that during October-November of this year, a new round of comments regarding the usability and applicability of the 'Second Build' of the MRCC road dataset and data specification will be requested from stakeholders across the state. The project team will compile and review these comments at the end of 2016.

Availability of the MRCC road data. During the course of 2014 and 2015, all seven metropolitan counties adopted free and open public geospatial data policies (see http://www.metrogis.org/projects/free-open-data.aspx). As a result, the MRCC road dataset will be available to the public at no charge and without licensure. While the driving purpose behind the data's creation was to meet clearly expressed county data needs, i.e. a standardized dataset that is uniform across seven counties, edge matched and routable, it is widely acknowledged that this data will be of tremendous value to all consumers of Minnesota geospatial data. As the MRCC dataset is used and tested by the geospatial community, the project team encourages users to submit comments, critiques and suggestions to ensure continual improvement to both its data specification and resulting road data.

The MRCC project team also encourages other non-metro counties, regions, agencies and stakeholders across Minnesota to build upon its work so others do not to have to replicate its data model development process. The

MRCC does not claim to completely understand all of the unique road centerline data needs of stakeholders in Greater Minnesota. However, the MRCC specification can easily be extended to accommodate features such as national and state forest roadways, tribal nation roadways and so on. The MRCC project team hopes that their work will augment and support larger statewide road dataset development efforts in the future.

The MRCC project represents a unique, inter-agency and inter-jurisdictional collaborative to create an authoritatively-sourced, publicly-available GIS road centerline dataset that meets the core business needs of local, regional and state agencies in Minnesota. Potentially the road centerline dataset could be of significant value to the citizens, government and greater geospatial community of Minnesota. Its creation speaks to the MRCC continued leadership, vision and willingness to provide key decision making and technical task support to the collaborative. For this effort Hennepin County provided a project manager, Ann Houghton, from its GIS Office, while the Metropolitan Council provided the services of the MetroGIS Coordinator Geoff Maas to facilitate documentation and communications. Matt Koukol, GIS Manager of Ramsey County, has served as the lead technical advisor for the effort.

MRCC Project Resources and Contacts. All relevant project materials and documentation on the MRCC effort can be found on the Centerlines project page on the MRCC website: http://www.metrogis.org/projects/centerlines-initiative.aspx

Questions about the MRCC project can be directed to the following individuals:

Ann Houghton, Hennepin County GIS Office Project Manager MRCC Project Manager	Matt Koukol, Ramsey County Enterprise GIS Manager MRCC Senior Technical Advisor	Geoff Maas, Metropolitan Council MetroGIS Coordinator MRCC Research and Communications Liaison
ann.houghton@hennepin.us	matt.koukol@co.ramsey.mn.us	geoffrey.maas@metc.state.mn.us

NG9-1-1 GIS Standards - Update

The Minnesota NG9-1-1 GIS Standards Workgroup met a major milestone in late March – completing the draft publication, *Minnesota Next Generation 9-1-1 GIS Data Standards* (Figure 3).

Consistent, accurate and timely geospatial data is required to route 9-1-1 calls to the correct PSAP, to display a caller's location in tactical PSAP mapping systems and provide valuable life-saving information to emergency response personnel. Because the required NG9-1-1 GIS data will be harvested from and maintained by local authoritative sources whenever possible, standards are needed to ensure that the data can be consumed efficiently and with confidence that it will meet Emergency Call Routing Function (ECRF) and Location Validation Function (LVF) requirements.

The primary purpose of this document is to specify a statewide standard for each required GIS dataset. The secondary core goal is to identify additional common data elements necessary to support multiuse, statewide GIS datasets – those datasets that local GIS agencies may only have to submit once.

This standards document was created through a collaborative effort involving many agencies, including DPS-ECN, MnGeo, the Minnesota

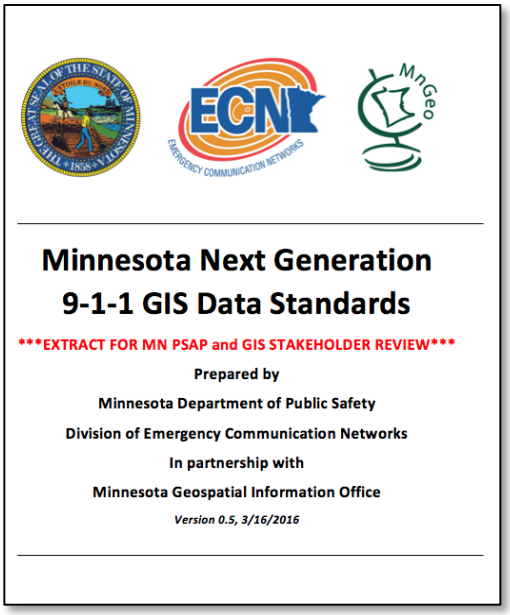

Figure 3: NG9-1-1 Draft Standards

NG9-1-1 GIS Standards Workgroup, the MESB, and the MRCC (see article by Geoff Maas in this issue). It will create a solid foundation for NG9-1-1 GIS dataset development in Minnesota. At its core, this document follows the draft NENA Standard for NG9-1-1 GIS Data Model and as such, may be amended in the future as the NENA standards are finalized and made public.

This draft of Minnesota's standards document is focused on **roads centerlines**. It includes sections describing the NG9-1-1 GIS data model (Figures 4 and 5), Data Requirements, Data Synchronization, Spatial Accuracy and Attribute Accuracy. A comprehensive appendix incorporates detailed descriptions of field names, domains and associated attribute data. Best practices and examples round out the Appendix.

Figure 4: - State Road Centerline Field Names

Descriptive Name	Field Name	M/C/O	Type	Width	Description
Source of Data	SOURCE	M	T	75	Name of the 9-1-1 GIS Authority responsible fo submitting road centerlines to the State for use in the ECRF and LVF. Example: STEARNS COUNTY
Date Updated	EDITED_DT	M	D		Date (and time) that the record was created or whose geometry or attributes was last modified. If no date exists in the original local data, then the current date should be used. Format: *MM/DD/YYYY HH:MM:SS AM/PM*
Effective Date					
Expiration Date					
Road Centerlin ID					
Country Left					
Country Right					

Figure 5: State Road Centerline Field Domains

Element	ID	Descriptive Name	Field Name	Requirements	Type	Width	Responsibility	Domain Name
1 Identification	1.1	Route ID	ROUTE_ID	Optional	Text	16	State/MnDOT	<NA>
	1.2	Road Centerline Unique ID	UNIQUE_ID	Mandatory	Text	100	Local	<NA>
2 Linear Reference	2.1	Route System	ROUTE_SYS	Optional	Text	2	Local/State	MnDOT_Route_System
	2.2	Route Direction	ROUTE_DIR	Optional	Text	1	State/MnDOT	Route_Direction
	2.3	Directional Route ID						
	2.4	Local to State						
	2.5	Primary Status						
3 Geocoding	3.1	Street Name Pre Modifier						
	3.2	Street Name Pre Directional						
	3.3	Street Name Pre Type						
	3.4	Street Name						
	3.5	Street Name Post Type						
	3.6	Street Name Post Directional						
	3.7	Street Name Post Modifier						
	3.8	Full Street Name						
	3.9	Alternate Street Name 1						
	3.10	Alternate Street Name 2						
	3.11	Alternate Street Name 3						
	3.12	Fully Spelled Out Street Name Post Directi						
	3.13	Fully Spelled Out Street Name Post Type						
	3.14	Fully Spelled Out Street Name Pre Directio						
	3.15	Street Name Pre Type Separator						
4 Geocoding Side	4.1	Left FROM Address						
	4.2	Left TO Address						
	4.3	Right FROM Address						

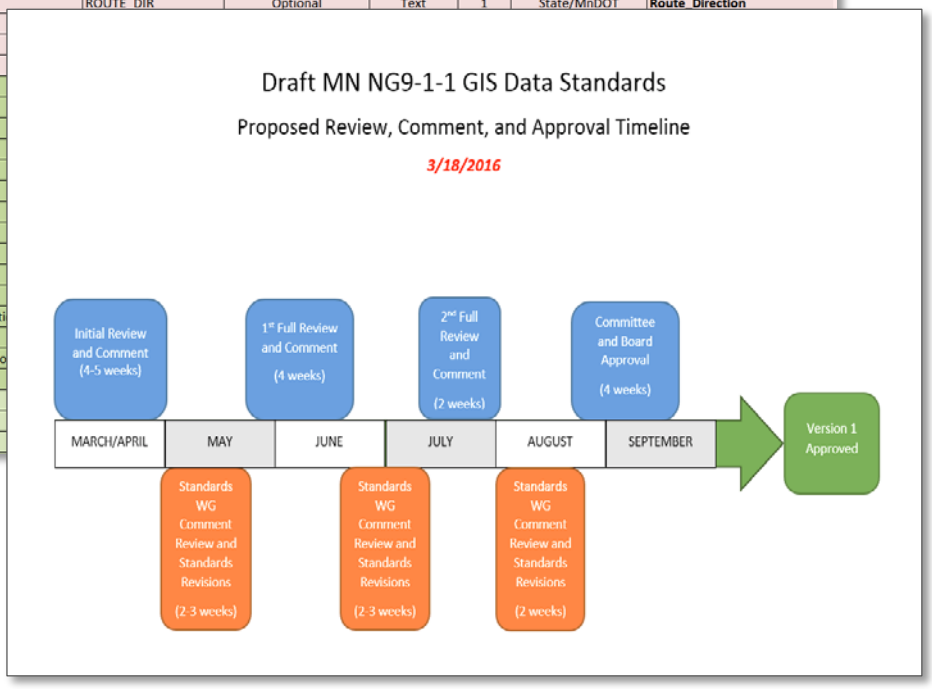

Figure 6: GIS Data Standards Timeline

This document has been delivered to PSAP and GIS managers across the state for their initial review and comment by the end of April. A full review of the draft standards will be expanded to include NG9-1-1 vendors and other states starting this June. In addition to incorporating revisions recommended through the vetting process, future updates to this document will include specifications for address points and polygonal GIS data such as PSAP, law, fire and ambulance service areas. Formal approval of the completed document by the MESB, NG9-1-1 GIS Subcommittee, NG9-1-1 Committee, SECB, and Minnesota Statewide Geospatial Advisory Council will not occur until September 2016 (Figure 6).

Data Readiness Profiles

A major initiative underway at MnGeo is the assessment of key geospatial data needed to support the implementation of NG9-1-1. This effort includes collecting and evaluating updated street centerlines, address points, PSAP boundaries as well as Master Street Address Guide (MSAG), Automatic Location Information (ALI) and English Language Translation (ELT) tabular data for four ECN regions (Figure 7) in the state - beginning with the Northeast and more recently Northwest, Central and Southeast. The nine-county Twin Cities metropolitan area is being evaluated by MESB.

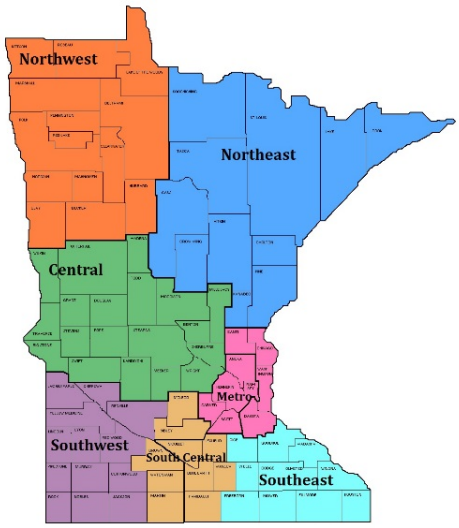

Figure 7: ECN Regions

Building upon criteria identified first by MESB and augmented with information extracted from the ECN/MnGeo PSAP Request for Information survey (see Issue #1) as well as results from tests performed by MnGeo, staff have created a "readiness profile" consisting of nearly 90 characteristics (Figure 8) for each PSAP in a region. Characteristics include the number of MSAG entries existing in a county; the number of MSAGs that use Postal Standard Suffix Abbreviations; the number of unique MSAG street names that exist in a county.

Profile	*Aitkin County*	*Carlton County*	*Cass County*	Cook County
# of MSAG entries as of Q4 2015	0	0	0	0
MSAG uses Postal Standard Suffix Abbreviations?	Postal	Postal	Postal	Other
MSAG uses ordinals?	Ordinals	Ordinals	Ordinals	Other
MSAG uses Jurisdictional Community names				
MSAG uses Jurisdictional Community names: Exceptions				
# of unique MSAG street names	1260	1423	2531	533
# of Centerline segments	4973	3808	8311	2230
# of unique Centerline street names	1249	1491	2710	1035
# of fields streetnames are parsed.(Field Names)	5 (PRE_DIR, PREFIX, STR_NAME, SUFFIX, POST_DIR)	4 (FDPRE, FNAME, FTYPE, FDSUF)	5 (PRE_DIR, PRE_TYPE, STREET_NAM, STREET_TYP, SUF_DIR)	4 (FDPRE, FNAME, FTYPE, FDSUF)
Are postal community names spelled out?	Yes(LCITY & RCITY)	NO (LCITY & RCITY)	YES??? (COMM_L & COMM_N) Contains blank records. Usure is the best avalible data	NO (LCITY & RCITY) Many Blanks. Also the city names are in code version.
Are street names completely spelled out Up to addressing autority	Incomplete	Incomplete	Incomplete	Incomplete
Do Post Types follow standard USPS Standardize Street Post Types	YES	YES	NO	NO
Are the pre modifiers spelled out? Parsed Address Needed	Incomplete	Incomplete	Incomplete	Incomplete
Are the post modifiers spelled out? Parsed Address Needed	Incomplete	Incomplete	Incomplete	Incomplete
Are the pre and post directionals abbreviated correctly?	YES	YES	YES	YES

Figure 8: PSAP Data Readiness Profiles

As each region is completed, abbreviated versions of these profiles will be prepared and shared with project partners. DPS-ECN and MnGeo staff will then meet with PSAP and GIS managers in each region to review and discuss the reports and strategize as to how best to create the needed data. It is anticipated that the readiness profiles will be completed for the entire state by the end of 2016, if not earlier. Future issues of this newsletter will include more information and samples of the profile summaries.

Wireless Emergency Routing Management (WERM)

DPS-ECN has been working with MN.IT and West (formerly Intrado) to develop a secure, web-based application that will streamline the manual, wireless provisioning process that has been in used since the introduction of wireless calls to 9-1-1 back in the mid-1990s.

The existing provisioning process, while state of the art upon its inception, is very labor intensive. It involves multiple repetitions of moving data, in the form of spreadsheets, between wireless carriers operating in Minnesota, West, DPS-ECN or MESB, and PSAPs. This manual process introduces numerous opportunities for error.

Currently, wireless carriers initiate the process to add, move, make a technology change to, or decommission a specific cell tower site/sector by recording the site and sector information on a spreadsheet and making a recommendation as to which PSAP should receive the calls. The carrier then forwards the spreadsheet to West's Wireless Provisioning Team who, after performing their required tasks, sends it to MESB - if the sites/sectors are located within the Twin Cities nine county metropolitan area. For sites/sectors located within Greater Minnesota, the spreadsheets are sent to DPS-ECN.

Upon receipt of the spreadsheet (Figure 9), MESB and/or DPS-ECN work with PSAP staff responsible for wireless routing changes when tower site/sectors under their jurisdiction require updating. Once all the appropriate fields are completed by the PSAP, the information flow reverses itself, eventually ending up with the carrier who submitted the original request.

	PSAP to complete these Columns*											
	Provide and Format the Address as you prefer it to appear on the PSAP display. (Important Note: Format is subject to your Local Exchange Carrier requirements, PSAP equipment and solution.)											
Carrier Recommended Routing (PSAP)	PSAP To Receive Wireless 9-1-1 Calls	MN Routing PSAP	Wireless ESN	Carrier	MN Abbreviated Street	MN Sector Description	MN Abbreviated Community	MN State Patrol Station ID	Location- (Building)	Comments	Request Reason	Beam Width
St Louis County Psap												59.8
St Louis County Psap												59.8
St Louis County Psap												59.8
St Louis County Psap												64.5
St Louis County Psap												65.2
St Louis County Psap												64.5
St Louis County Psap												65.2
St Louis County Psap												64.5
St Louis County Psap												65.2
	*This section to be completed with information that corresponds with your local exchange carrier's information. If you choose to have your Wireless MSAG look like a Wireline MSAG, then please put the pertinent information in the appropriate columns. If you choose to have the entire address in the Street Field/Name (example: 123 E. Main St - NW Sector) please ensure that your CAD system can accept this											

Figure 9: PSAP Change Request Form

The Wireless E9-1-1 Routing Management (WERM) application (Figure 10), which is expected to go-live in mid-May, has been designed to streamline the provisioning process. Wireless carriers and PSAP "End Users" will soon be able to exchange information through a secure web-based application.

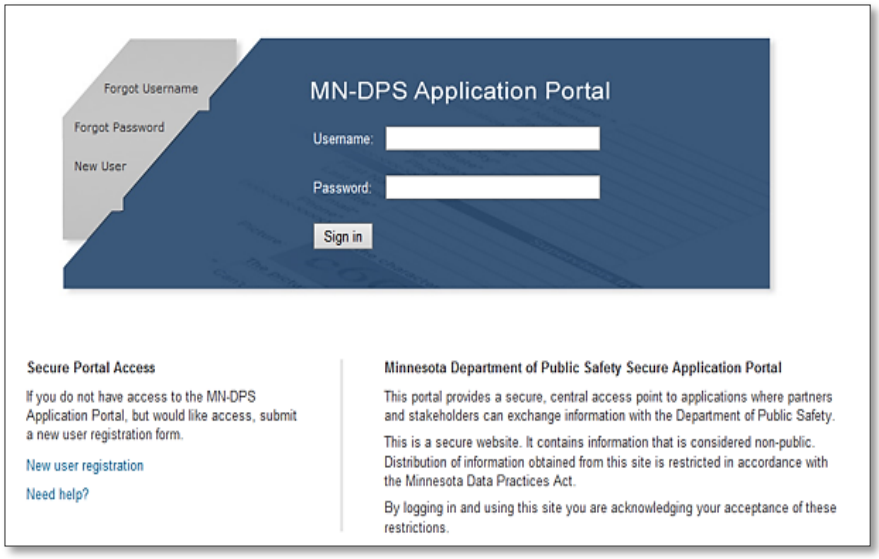

Figure 10: WERM Portal

When one or the other needs to take action on a tower site/sector, an automatic email will be generated in WERM alerting the recipient of the site/sector that requires attention. Files containing revised information will be transferred on a nightly basis, which will result in more timely updates of additions, moves and changes to wireless tower sites/sectors. The spreadsheet is replaced with a window (Figure 11) containing both drop down menus and open fields with set field lengths to minimize entry errors.

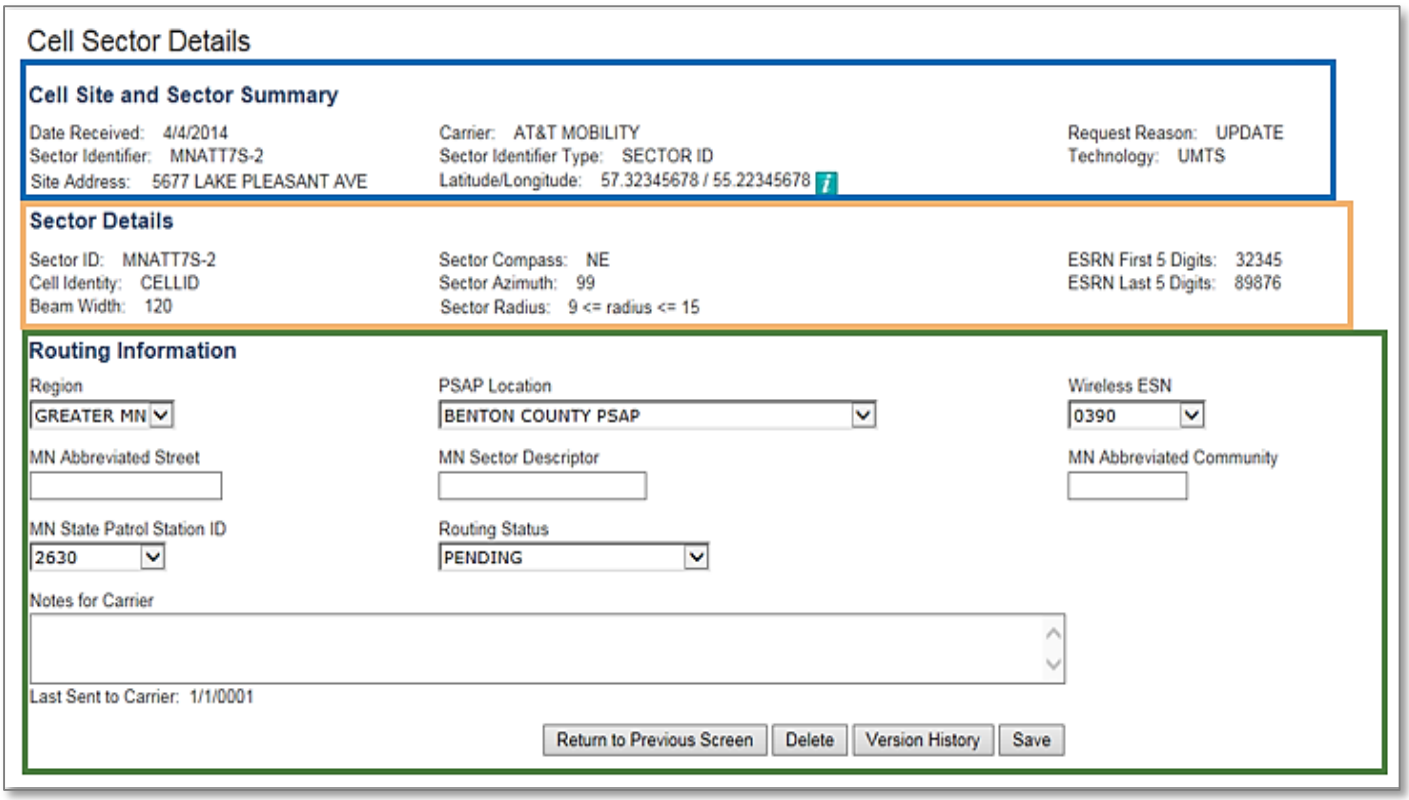

Figure 11: Cell Sector Details

PSAP End Users will also have access to an associated map (Figure 12) that provides cell site details based on the latitude/longitude of the cell tower site to aid the routing decision.

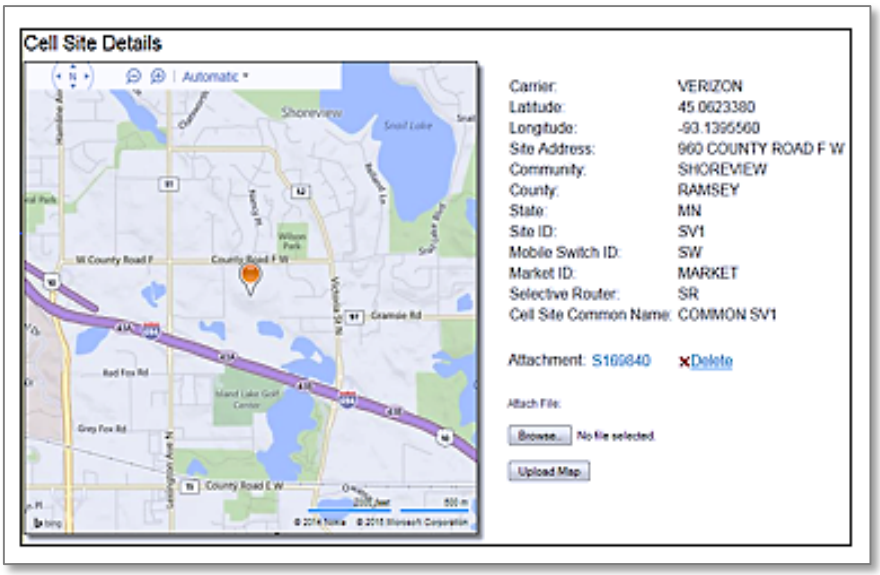

Figure 12: Cell Site Map

Regional "Points of Contact" (POC) and PSAP End Users have already been identified. Regional POCs will serve as subject matter experts and will be the first point of contact for the PSAP End Users when they have questions or identify problems with the application. Regional POCs have already participated in an interactive web based training session. Site visits are underway in all seven DPS-ECN regions to introduce PSAP End Users as well as Regional POCs to the application and to spend one-on-one time answering their provisioning questions. Following each regional visit, PSAP End Users will have an opportunity to explore and become familiar with the application once they register and obtain a username and password. The application will be using mock data between now and the "go-live date" in mid-May.

Once operational, data maintained via WERM will be displayed on the ALI (Automatic Location Identification) screen in the PSAP when a wireless 9-1-1 call is answered. This is critical information for 9-1-1 call takers and is needed to help pinpoint the location of wireless callers. Having accurate information, updated in a timely manner whenever tower adds/moves and other changes occur, is essential.

Data contained in WERM will not only be used in the PSAP for locating wireless 911 callers, it will be shared with GIS staff working on the state's NG9-1-1 effort. Minnesota's FirstNet project will also consume the data as part of its wireless coverage area assessment.

Special thanks to MN.IT project manager Shannon O'Keefe for her diligence in bringing this lengthy project to fruition.

For more information, contact Dana Wahlberg at 651-201-7546 or Dana.Wahlberg@state.mn.us

Upcoming Events

Notable upcoming DPS-ECN NG9-1-1 events:

- May 9, 2016: GIS/LIS Consortium Spring Workshops, U of M – Minneapolis, MN
  - Preparing for NG911 Workshop - Vic Barnett/Ramsey County, MN
- May 12, 2016: NG9-1-1 GIS Subcommittee Meeting
- May 18, 2016: NG9-1-1 Committee Meeting
- May 26, 2016: SECB Meeting
- May 25-26: Upper Midwest Geospatial Conference (UMGEOCON 2016), La Crosse, WI

Neighboring States

For more information about NG9-1-1 efforts in the states surrounding Minnesota, visit:

Iowa Enhanced 9-1-1
North Dakota ND911
South Dakota 9-1-1

If you have a news item pertaining to NG9-1-1 that you would like to share in future publications of this newsletter, please contact:

Adam Iten, NG9-1-1 Project Manager
Telephone: 651-201-7559
E-mail: adam.iten@state.mn.us