State of Montana
Statewide 9-1-1 Plan Project

Valley County, MT
High-Level PSAP NG9-1-1 Needs Assessment

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Prepared by:

Federal Engineering, Inc.
10560 Arrowhead Dr, Suite 100
Fairfax, VA 22030
703-359-8200
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1. Introduction

The State of Montana Public Safety Communications Bureau engaged Federal Engineering, Inc. (FE) to provide consulting services and assist the State in its efforts relating to the transition to Next Generation 9-1-1 (NG9-1-1). FE's current task for the Montana Public Safety Communications Bureau will culminate with the development of a set of recommendations for the technical requirements, design and implementation of a statewide i3 compliant Emergency Services Internet Protocol (IP) Network (ESInet) and Next Generation Core Services System (NGCS).

FE was tasked with conducting a statewide inventory to establish a high-level understanding of the current Montana Public Safety Answering Point (PSAP) environment throughout the State. The FE team worked with stakeholders from each PSAP to accurately capture and document existing inventory and readiness for evolution to NG9-1-1. Visits to 49 of the 50 Certified Primary PSAPs were completed over a two-month period.

The information collected will be used to further define what upgrades and improvements are required for each PSAP, as well as assist in the design and transition planning to a statewide NG9-1-1 system.
2. Methodology

FE employed a data collection approach that combined a variety of methods to collect the necessary data to formulate the PSAP assessment. Initially, a data collection survey was distributed to collect statistical data and information regarding the systems used by the public safety agency. FE developed survey workbooks to gather data from each of the 50 PSAPs to identify the technology, hardware and software, in place and to gather other data points and statistical information that will impact or influence the PSAPs compliance with NG9-1-1 i3 standards and their subsequent involvement in the planned statewide ESINet.

Additionally, FE conducted on-site visits and interviews with PSAP personnel. End-user outreach activities are essential to obtain necessary information about the current systems and provide the stakeholders with the ability to voice issues and barriers to meeting business goals associated with the current systems and assist in identifying requirements for a future system(s). This information is key to developing the transition plan of each PSAP by allowing FE to determine the needs and use of the PSAP in the future ESINet network.
3. Current Condition

An FE representative conducted an on-site visit and interview with PSAP personnel on January 8, 2019.

The PSAP is located within Valley County Detention Center / Courthouse at 501 Court Square in Glasgow, Montana. There is employee parking on both sides of the building.

As of the 2010 census, the County’s population was 7,369 and encompasses an area of 5,062 square miles.

3.1 Technology

<table>
<thead>
<tr>
<th>Valley County Technology</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9-1-1 Answering Equipment</td>
<td>Motorola Vesta 6.1</td>
</tr>
<tr>
<td>CAD</td>
<td>Zuercher 13.3</td>
</tr>
<tr>
<td>Administrative Phone System</td>
<td>Avaya IP Office 500</td>
</tr>
<tr>
<td>Mapping/GIS</td>
<td>Zuercher Insight</td>
</tr>
<tr>
<td>Logging Recorder</td>
<td>Nice Call Focus</td>
</tr>
<tr>
<td>Phone IRR</td>
<td>Vesta</td>
</tr>
<tr>
<td>Radio IRR</td>
<td>Nice Call Focus</td>
</tr>
<tr>
<td>Master Clock</td>
<td>Spectracom</td>
</tr>
<tr>
<td>Dispatch Protocols EMS</td>
<td>Yes</td>
</tr>
<tr>
<td>Dispatch Protocols Fire</td>
<td>No</td>
</tr>
<tr>
<td>Dispatch Protocols Police</td>
<td>No</td>
</tr>
<tr>
<td>MSAG</td>
<td>VisionNet (Century Link)</td>
</tr>
<tr>
<td>ALI Circuits</td>
<td>(2) VisionNet (Century Link)</td>
</tr>
<tr>
<td>9-1-1 Trunks</td>
<td>(T1) VisionNet (Century Link)</td>
</tr>
<tr>
<td>Text-to-911</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.1.1 Telephony

The Valley County PSAP uses Motorola Vesta IP based call taking equipment, version 6.1. The system was installed in January 2016. The operating system is Windows 7 and the workstations are the same hardware installed at implementation. The equipment is Phase II compliant, capable of rebids and can display Wireless Phase II caller’s location. The system is interfaced to PSAP’s Nice logging recorder and is maintained by the County. There is no management information system (MIS) for telephone statistics.
The network provider is VisionNet (CenturyLink) and there is a T1 connection installed that delivers the incoming 9-1-1 calls. The ALI database is provided by VisionNet (Century Link) via two redundant ALI circuits.

The PSAP is using the County’s Avaya IP Office 500 IP based administrative phone system that is not interfaced to the 9-1-1 answering equipment. There are administrative phone sets installed at the positions in the dispatch center. The system was installed in 2012.

The 9-1-1 answering equipment is IP capable.

The Master Street Address Guide (MSAG) is hosted and maintained via CenturyLink’s Web DBMS.

### 3.1.2 Computer Aided Dispatch

The CAD system used by the PSAP is a Zuercher system, software version 13.3, that was originally installed in February 2016. The server and workstations are the original hardware installed during implementation. The workstation operating system is Windows 7 and the server operating system is Linux. There is no redundant server installed. The system is multi-jurisdictional and multi-discipline, meaning it supports police, fire and EMS call-taking/dispatching. The system is not capable of unit recommendations.

Significant interfaces include paging. The following is a list of the most common interfaces found in PSAPs and their status in the Valley County PSAP:

**Table 2—Current CAD Interfaces**

<table>
<thead>
<tr>
<th>Interface</th>
<th>Valley County</th>
<th>Interface</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-1-1 ANI/ALI</td>
<td>No</td>
<td>Phase II Wireless Mapping</td>
<td>No</td>
</tr>
<tr>
<td>Alarm Monitoring</td>
<td>No</td>
<td>Police Field Reporting</td>
<td>No</td>
</tr>
<tr>
<td>Alphanumeric/Text Paging</td>
<td>Yes</td>
<td>Police Mobile</td>
<td>No</td>
</tr>
<tr>
<td>Automatic Vehicle Location (AVL)</td>
<td>No</td>
<td>Police RMS</td>
<td>No</td>
</tr>
<tr>
<td>Call Taker/Dispatcher Mapping</td>
<td>No</td>
<td>Radio Console-PTT / Emergency</td>
<td>No</td>
</tr>
<tr>
<td>Corrections Management</td>
<td>Yes</td>
<td>Rip/Run Printers</td>
<td>No</td>
</tr>
<tr>
<td>Logging Recorder</td>
<td>No</td>
<td>Routing/Directions Apps for Responders</td>
<td>No</td>
</tr>
<tr>
<td>Emergency Medical Dispatch (EMD)</td>
<td>No</td>
<td>Staffing Module</td>
<td>No</td>
</tr>
<tr>
<td>EMS Mobile</td>
<td>No</td>
<td>State/NCIC</td>
<td>No</td>
</tr>
<tr>
<td>EMS ePCR</td>
<td>No</td>
<td>TDD/TTY</td>
<td>No</td>
</tr>
<tr>
<td>Fire Mobile</td>
<td>No</td>
<td>Text to 9-1-1</td>
<td>Yes</td>
</tr>
<tr>
<td>Fire RMS</td>
<td>No</td>
<td>Tone Alerting (radio paging)</td>
<td>No</td>
</tr>
<tr>
<td>Fire Station Alerting</td>
<td>No</td>
<td>Pictometry</td>
<td>No</td>
</tr>
</tbody>
</table>
### 3.1.3 Logging Recorder

The PSAP uses a Nice Call Focus recording system that was installed in 2008. The operating system is Windows XP. The recorder is not under a support and maintenance contract. The system has a 24-channel capacity, of which 13 channels are being used; 6 for radio channels, 5 for telephone lines, and 2 for 9-1-1 trunks. The 9-1-1 calls are recorded by trunk and the recordings cannot be remotely accessed.

The PSAP is using Motorola Vesta answering equipment to provide instant recall recorder (IRR) functionality at each position for telephone conversations and the Nice recording application to provide IRR for radio communications.

### 3.1.4 Master Clock

The PSAP has a Spectracom NetClock solution installed and all critical technology such as CAD, 9-1-1 answering equipment, radio dispatch consoles and logging recorder are connected.

### 3.2 Operations

The PSAP typically staffs one position, however during busier times they do have overlapping shifts with two people on duty. The Manager fills in for sick and vacation time taken by the full-time employees.

#### 3.2.1 Call Taking Protocols (e.g. EMD)

The PSAP does use standardized scripted call taking protocols such as Emergency Medical Dispatch (EMD), Emergency Fire Dispatch (EFD) and Emergency Police Dispatch (EPD). They are using the State of Montana EMD protocols via flip card charts and no protocols for police or fire dispatch. The level of employee certification was not collected during the on-site visit.

### 3.3 Facility

The PSAP is approximately 500 SF and has two system furniture positions installed. They back-up Roosevelt and Phillips Counties and those PSAPs provide the same for Valley County.
Primary power is provided by Northwestern Energy and there is a Generac gas powered generator installed to provide emergency back-up power to the PSAP and the Detention Center. The generator is tested weekly. The PSAP has an uninterruptible power supply (UPS) for the technology installed in the PSAP and the server/equipment room. The equipment room is climate controlled, has room for expansion, and all the equipment racks that have dedicated UPS electrical circuits. The facility has the required electrical grounding and utilizes cable trays for cable management and there is raised flooring in both the PSAP and the equipment/server rooms. Doors are secured, and both rooms are sprinklered for fire protection. Security cameras have been installed throughout the building.

3.4 Geographic Information System

The State of Montana recently completed an analysis of Geographic Information System (GIS) readiness for NG9-1-1 for each county within the State. This GIS analysis\(^1\) was performed by Digital Data Technologies, Inc. (DDTI) through the Montana State Library following guidelines recommended by the National Emergency Number Association (NENA) guideline NENA 71-501\(^2\).

The purpose of this analysis was to perform a quality review and report layer consistency and synchronization between the Master Street Address guide (MSAG) and the Automatic Location Information (ALI) databases to GIS road centerline and site / structure address points. The performance of this synchronization analysis highlighted areas of improvement necessary within the GIS data, MSAG and ALI databases, which can be used by the County to focus on improving the preparation and accuracy of their GIS data for NG9-1-1.

The table below represents the results of the data synchronization quality control tests performed by DDTI using the County’s MSAG, ALI and GIS data.

<table>
<thead>
<tr>
<th>Valley County</th>
<th>Synchronization Test</th>
<th>Match %</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALI to MSAG</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>MSAG to Roads (Name)</td>
<td>86.28</td>
<td></td>
</tr>
<tr>
<td>MSAG to Roads (Range)</td>
<td>45.08</td>
<td></td>
</tr>
<tr>
<td>Addresses to MSAG</td>
<td>83.27</td>
<td></td>
</tr>
<tr>
<td>ALI to Road Centerlines</td>
<td>82.01</td>
<td></td>
</tr>
<tr>
<td>ALI to Addresses</td>
<td>82.01</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Valley County, MT NG9-1-1 Analysis December 2018

\(^2\) www.nena.org/page/synch_gis_msag_ali
4. **Next Generation 9-1-1 Readiness Recommendations**

4.1 **Technology**

The PSAP will need to take NG9-1-1 into consideration when planning to procure any new public safety technology, hardware, software and future interfaces. Where applicable, all new technology must be able to accept and process additional information that will be provided by NG9-1-1, such as text messages, streaming video, fixed or still images and other data possibly related to a caller’s location or type of emergency.

**NG9-1-1 Readiness Summary**

<table>
<thead>
<tr>
<th>System</th>
<th>Equipment Description</th>
<th>NG9-1-1 Ready/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephony</td>
<td>Motorola Vesta 6.1</td>
<td>No, i3 compliancy requires VESTA R7.2 or higher</td>
</tr>
<tr>
<td>Logging Recorder</td>
<td>Nice Call Focus</td>
<td>No</td>
</tr>
</tbody>
</table>

**Readiness Recommendations**

1. The existing Motorola Vesta, version 6.1, IP based call taking equipment is not NG9-1-1 ready according to the vendor.

2. The existing Nice Call Focus, version 2.6.1, recording system is i3 compliant by adding SIPREC recording and Event Logging to the units according to the vendor.

3. There would be a significant benefit to interface future NG9-1-1 applications to the PSAP’s CAD system allowing this additional information to be captured and shared by PSAP staff, local emergency responders and agency support staff. The majority of the major CAD vendors are already providing NG9-1-1 interfaces while others are still assessing their need and strategy to provide this interface. The PSAP will have to check with their CAD vendor on their status of this interface. Several organizations are working on NG9-1-1 standards development, CAD system interoperability and the exchange of information between those applications. As these standards continue to evolve, they should be monitored, considered and incorporated in new interfaces between NG9-1-1 applications and CAD systems.
4.2 Operational Impact of NG9-1-1 on Workflow and Training

Once NG9-1-1 is completely deployed throughout North America and becomes the normal method of processing requests for emergency services, the landscape of how a PSAP operates, intakes and processes emergency service requests, and how the PSAP training programs and protocols are impacted, will differ widely from the current operational models and methodologies. PSAPs across the country are now experiencing the beginning of the evolution in the initiation of text-to-9-1-1. Note that the current text-to-911 solutions are interim and may involve integrated CPE or web-based solutions. There are many other methods of communication and data sharing that will further impact operations, workflows, hiring standards, as well as training program content and methods. These future communications capabilities are present now in the public, but PSAPs, in general, are not quite capable technically nor operationally ready to field these broader communications and data sharing mediums. Examples of the types of communication and data available to, and used by, the public include multimedia (i.e., pictures, pre-recorded/streaming videos, automatic crash notification, smart clothing) and other applications. These communications and data sharing capabilities are publicly available today and are fueling the public expectation of access to emergency services. These formats are the driving forces for transitioning from the antiquated telephony networks to future emergency services IP-networks (ESInets).

These present and future communications and data sharing capabilities expose the PSAP to a broad spectrum of information that our industry expects will enhance the response to requests for emergency services. However, the PSAP will have to alter the operational model, workflow, hiring and training program content to be able to process these new information intake methods. In the case of NG9-1-1, technology is driving operational change in the PSAP environments. The operations component of the PSAP must adapt to these changes.

To adapt to the changes in communications and data sharing capabilities, consideration must be given to the following:

- What type of data will be received, to include the applications utilizing the ESInet for access to emergency services?
- How will data be received, as example will the intake of data come integrated to a call processing software or will it come via a third-party web access?
- How it will be processed and packaged for entry into a CAD system for processing?
- How will information be relayed to the appropriate responders or emergency rooms without exposing the call-taker to graphic material or protected data relayed in a manner that does not violate HIPPA?
- How will data be stored and/or relayed?
- How will data be archived for future access with redacted or protected information parsed out?
• How will this information be conveyed to responders, investigators, medical personnel and others with authority to access/use/view? and
• How it will be retrieved/accessed by responders and by future investigations?

The answer: Governance and access policy will be key.

In preparation for NG9-1-1 and the influx of data anticipated as the waypoint of information in an ESInet, PSAPs must plan to address each technical change with thought and consideration of the impact on the overall PSAP operation.

Workflow adjustments will be required to align the technical choices of network access, security, systems integration and interfaces, data gathering and processing for call taking and dispatching, and must include post-data processing storage and access.

Training program content will require adaptation and expansion to include processing emergency service requests via these new methods. Training must include, but not be restricted to, the following:

• Use and access of new technology and applications, and how these co-exist with the traditional voice processing component of call-taking;
• Tools for communicating via non-traditional (no-voice) methods;
• Social media’s role, use, and access in the NG PSAP environment;
• Compilation, access and authority for data in the call taking and dispatching methodologies as well as the post-dispatch access needs and methods;
• Adapting Critical Incident Stress Management (CISM) for the PSAP staff exposure to graphic material; and
• The inherent increase in stress/trauma to the PSAP staff from traumatic exposure

The hiring program eligibility requirements will be impacted by the increased level of technical skills and abilities, as well as through the increased multi-tasking, judgement and decision-making tied to the broader methods of communication and data sharing at the base of operating in a NG9-1-1 PSAP environment.

4.3 Geographic Information System

Today’s NG9-1-1 applications and solutions are becoming more reliant on complete and highly accurate Geospatial data housed and maintained in Geographic Information Systems (GIS). Synchronization and remediation are critical processes when provisioning the GIS data for use in NG9-1-1. The GIS / mapping data should be maintained at the local level and provided by the local jurisdiction.

NG9-1-1 call routing solutions, in today’s world, rely solely on the provisioning of localized geographical data and polygon areas, built and maintained through GIS systems, to
accurately route emergency calls to the appropriate, responsible PSAP at a state, region, or local level.

**Readiness Recommendations**

1. NENA recommends that a minimum match rate of 98% be achieved prior to utilizing the GIS data for NG9-1-1 call routing purposes\(^3\). Focus should be placed on improving the individual synchronization match rate components identified in Table 3 – Synchronization Results shown above in Section 3.4.

2. A thorough review of the County’s GIS discrepancy/remediation process should occur. The primary focus should be to streamline the current process that may be impacting the efficiency and flow to the identification, resolution and remediation of the GIS dataset, and ultimately its use within NG9-1-1. The County is encouraged to reference the DDTI NG9-1-1 Analysis document previously cited in Section 3.4 for a good foundational reference when initiating a review of their GIS data remediation process.

3. With NG9-1-1 GIS will become the authoritative source for the routing of emergency calls to the correct PSAP. This necessitates that the GIS datasets are accurately maintained at the local level in preparation of being shared and aggregated at the regional or statewide level during the transition to NG9-1-1. The need to share this data during the aggregation process makes it necessary to having GIS data that is standardized. A valuable source in preparing the GIS datasets for sharing and aggregation is NENA’s NG9-1-1 GIS Data Model Standard\(^4\). A review of this standard will provide jurisdictions with valuable information that may identify necessary components missing from their GIS data and the opportunity to mitigate prior to transition and use for NG9-1-1.

4. Develop a PSAP boundary layer encompassing the jurisdiction’s entire PSAP coverage area. Special attention should also be placed on working with neighboring PSAP jurisdictions to ensure that coincidental PSAP boundaries are established to eliminate any potential coverage gaps or overlaps between PSAP jurisdictions.

5. In order to facilitate the sharing and aggregation of the GIS datasets at the local, regional and state levels, jurisdictions should build and maintain GIS data in coordination with the authoritative jurisdictional boundary datasets (e.g., incorporated municipality boundaries) maintained by the State.

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\(^3\) [www.nena.org/page/synch_gis_msag_ali](http://www.nena.org/page/synch_gis_msag_ali)

\(^4\) [www.nena.org/page/NG911GISDataModel](http://www.nena.org/page/NG911GISDataModel)