

Nebraska Public Service Commission

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November 30, 2017

Members of the Transportation and Telecommunications Committee
Nebraska Legislature
The Honorable Senator Curt Friesen, Chairperson
State Capitol, Room 1110
Lincoln, NE 68508

Members of the Appropriations Committee
Nebraska Legislature
The Honorable Senator John Stinner, Chairperson
State Capitol, Room 1004
Lincoln, NE 68508

RE: LR 174 and LB 938 (2016)

Dear Senators Friesen, Stinner and Members of the Committees:

It is with great pleasure that I submit the attached 911 Service System Plan ("Plan") for your consideration. In 2016, the Nebraska Legislature adopted LB 938, which created the 911 Service System Act. The 911 Service System Act established the Public Service Commission ("Commission") as the statewide implementation and coordinating authority to plan, implement, coordinate, manage, maintain, and provide funding assistance for the 911 Service System in Nebraska,¹ including the transition to Next Generation 911 services.

Pursuant to LB938, the Commission hired a State 911 Director and created the State 911 Department to provide 911 services and develop an implementation plan for the 911 Service System. The Commission entered into a contract with Mission Critical Partners ("MCP"), a nationally recognized consulting firm, to assist with the development of the Plan.

Following the requirements set forth in LB 938, the State 911 Director and MCP worked with a key group of stakeholders to draft the Plan. The stakeholder group consisted of representatives from public safety agencies, Public Safety Answering Points ("PSAPs"), the telecommunications

¹ Nebraska Legislative Bill 938 (2016), Section 2.

industry, and government officials at the state and local level.² The stakeholder group met twice a month for almost a full year to develop the plan. The Commission also held two public hearings, in Lincoln and North Platte, to obtain public input and feedback. On November 7, 2017, the Commission voted to formally adopt the 911 Service System Plan.

The plan is divided into eight separate sections: 911 System Design, Governance, Geographic Information System (“GIS”), Continuity of Operations and Disaster Recovery, PSAP Policies and Procedures, Training and Education, FirstNet Process and Procedures, and Funding. Our consultant provided several options for consideration in each of the above categories. Based on those options, the Commission and the State 911 Director recommend the following:

- 911 System Design
 - Nebraska presently has over 70 separate 911 Communication Centers, known as Public Safety Answering Points (“PSAPs”). Each PSAP operates independently of one another under local authority. With the encouragement of the Commission, Nebraska PSAPs are currently undergoing a locally-driven process of combining into eight to ten regions. Under this regionalization process, PSAPs within similar geographic regions of the State are joining forces to reduce costs, conserve resources and provide mutual failover support. Regionalization can be characterized as “virtual consolidation,” because it allows PSAPs to consolidate equipment and share costs by leveraging technology, without surrendering local control to a central agency.
 - As regionalization progresses, all the PSAPs within a region will be connected to one another by a dedicated IP network that allows them to share operations in real time. Two PSAPs in each region will act as host centers (“Hosts”), separately maintaining two sets of primary equipment. This allows each Host to provide backup and overflow support in the event of equipment failure, natural disaster or other disruption of service. All of the other PSAPs in a region operate as fully functional remote centers connected to the two Hosts. This design allows the PSAPs within a region to save money by sharing costly resources.
 - The 911 System Design recommended by the Commission calls for each of the regions to be connected to one another via a statewide, vendor-provided high speed IP network, known as an Emergency Services Internet Protocol Network (“ESInet”).³ The ESInet would extend the benefits of real-time PSAP communication and failover support from region to region and across the State of Nebraska. This design would minimize connectivity costs by limiting the number of connections to the statewide ESInet to two per region, providing for a streamlined, secure, cost effective approach. The Commission would identify

² A list of the members of stakeholder working group can be found on page 8 of the plan.

³ This recommendation can be found in section 3.2.2 of the Plan, beginning on page 15.

the ESInet vendor by issuing a Request for Proposal (“RFP”) and entering into a contract with the lowest cost reputable bidder that meets all design and functionality requirements.

- Governance - The Commission proposes to establish an advisory committee, to be known as the 911 Service System Advisory Committee (“Advisory Committee”), to provide input on technical training, quality assurance, funding, and operation and maintenance standards for the 911 Service System. The Advisory Committee membership will include representatives of public safety agencies, PSAPs, municipal and county officials, the telecommunications industry, and the OCIO and the Commission.⁴ The Advisory Committee will make recommendations to the Commission on the various components of the 911 Service System and provide a mechanism for the State 911 Department to receive user feedback regarding the system’s operation.
- Geographic Information System (“GIS”) - Accurate GIS mapping is a critical component of an effective Next Generation 911 system. In the Next Generation environment, 911 calls will be routed, 911 callers will be located and first responders will be dispatched using GIS technology. Therefore, the GIS data supporting the 911 Service System in Nebraska must be as accurate as possible. To meet this need, the Commission has hired a GIS Specialist and begun the process of preparing Nebraska GIS data for geo-spatial identification of 911 caller locations and routing of emergency services. In order to assure that critical GIS data attains the required standards, the Commission will issue RFPs to identify GIS vendors to provide Quality Assurance/Quality Control services and for caller location and routing services.
- Continuity of Operations and Disaster Recovery Planning – The 911 Service System must be protected in the event of disaster, equipment failure or other mishap so that emergency services will continue to be provided when needed. To mitigate the potential impact of disaster and provide resiliency to the 911 Service System, the Plan calls for the State 911 Department to work with PSAPs statewide to develop model Continuity of Operations and Disaster Recovery Plans that can be tailored to meet their specific needs.⁵
- PSAP Policies and Procedures – Although PSAPs in Nebraska will continue to be under the operation and control of local authorities, the development of uniform policies and procedures statewide will help ensure the effective and efficient operations and a consistent level of service across the state. The State 911 Department and the Commission will work to help the PSAPs adopt Policies and Procedures that meet their needs and provide for consistent operations across the state.

⁴ This recommendation can be found in section 4.5.1 of the Plan, beginning on page 37.

⁵ Continuity of Operations and Disaster Recovery planning is covered in section 6 of the Plan, beginning on page 47.

- Training and Education – PSAP call takers are 911 professionals with critical responsibilities when Nebraskans call for help in an emergency. However, the State of Nebraska currently has no training requirements or certification program for PSAP Call Takers. The Plan provides for the Commission to seek recommendations from the Advisory Committee to develop minimum training requirements and establish a state certification process for PSAP call takers, to be administered by the State 911 Department.⁶

- FirstNet Process and Procedures - FirstNet is the national public safety communications system for first responders that is currently under development across the country. At the Governor’s direction, Nebraska has already opted into the FirstNet project, which will provide for interoperable communications among first responders and PSAPs. It is imperative that the 911 Service System work in harmony with FirstNet to ensure a seamless transfer of information from 911 callers to first responders in order to provide emergency services most efficiently. The Plan calls for the State 911 Director and the OCIO to work collaboratively to assure that these two critical systems work together.⁷

- Funding Considerations – The Commission has determined that implementation of the 911 Service System can proceed without increasing the wireless surcharge above the current level of 45 cents per month or using State General Funds. The Commission has practiced careful stewardship of the Enhanced Wireless 911 Fund in anticipation of the transition to Next Generation 911, resulting in a reserve balance that is presently almost \$12 million. The Plan estimates that the rough order of magnitude cost to implement and operate the 911 Service System will be between \$6 million and \$8 million per year.⁸

- Legislative Recommendations – LB 938 calls for the Commission to provide recommendations for additional legislation that may be required to implement the 911 Service System. While recognizing that future legislative changes may be necessary as technology matures and new circumstances arise, the Plan recommends the following legislative action at this time:
 - Establishing a range for the wireless surcharge rate for the Commission to consider between \$0.45 and \$1.25.
 - Combining the Enhanced Wireless 911 Fund into the 911 Service System Fund.
 - Granting the Commission authority to spend the available funds in the 911 Service System Fund for the efficient operation of the system.
 - Providing for the Commission to appoint the members of the 911 Service System Advisory Committee.
 - Designating the Commission as the State’s point of contact to apply for and receive Federal grants to benefit the 911 Service System.

⁶ Training and Education is covered in Section 8 of Plan, beginning on page 55.

⁷ FirstNet is covered in section 9 of the Plan, beginning on page 67

⁸ Funding Considerations are covered in section 10 of the plan, beginning on page 74.

We live in an increasingly mobile society. Cellular phones are already responsible for almost eighty percent of the calls received by Nebraska PSAPs, and that percentage is only expected to increase. Today's smartphones already have the ability to record and transmit vital information, such as location data, video and even medical information that can assist first responders in an emergency situation. The current 911 system cannot process this information, but the 911 Service System with Next Generation 911 technology will be able to do so.

The 911 system is critical public safety infrastructure and it is time for Nebraska to begin modernizing our 911 system by implementing the 911 Service System Plan. The Plan is the result of months of collaboration among the Commission, national experts and stakeholders from across the State of Nebraska. We believe this Plan is the essential road map to begin this journey. We hereby present the 911 Service System Plan for your consideration.

Respectfully,



David A. Sankey
State 911 Director
Nebraska Public Service Commission

DAS/ME/bz
Enc.



**Nebraska Public
Service Commission**



MissionCriticalPartners
Because the Mission Matters

**Nebraska Public Service Commission
9-1-1 Service System Plan**

Final Report

PREPARED NOVEMBER 2017
FOR NEBRASKA PUBLIC SERVICE COMMISSION

MissionCriticalPartners.com

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Table of Contents

- Executive Summary..... 1
- 1 Background..... 6
- 2 911 Service System Plan Development 6
- 3 911 System Design 9
 - 3.1 Network Facilities and Services 10
 - 3.1.1 Meetings with 911 Service Providers 11
 - 3.1.2 Data Centers 11
 - 3.1.3 Common Network and Application Design Criteria 12
 - 3.1.4 Rough Order of Magnitude Pricing for Next Generation Core Services 13
 - 3.2 Options for Consideration 13
 - 3.2.1 Option 1 – Statewide Fiber Optic Ring Network 13
 - 3.2.1.1 *Benefits and Drawbacks* 14
 - 3.2.1.2 *Rough Order of Magnitude Costs – Option 1*..... 15
 - 3.2.2 Option 2 – Interconnected Regional Fiber Optic Networks..... 15
 - 3.2.2.1 *Benefits and Drawbacks* 16
 - 3.2.2.2 *Rough Order of Magnitude Costs – Option 2*..... 17
 - 3.2.3 Option 3 – Hybrid Network 17
 - 3.2.3.1 *Benefits and Drawbacks* 18
 - 3.2.4 Estimated Network Connectivity Costs 18
 - 3.2.5 Strengths and Weaknesses Summary 19
 - 3.3 Other Considerations 20
 - 3.3.1 Network Infrastructure and Services Monitoring 20
 - 3.3.2 Complete Managed Service, Call Handling Equipment, and Network..... 21
 - 3.4 Recommendations 21
 - 3.5 Actionable steps 22
- 4 Governance..... 22
 - 4.1 Key Findings 22
 - 4.2 State-level Interworking 23
 - 4.2.1 Establishment of a Governing Body 23
 - 4.2.1.1 *Option #1* 24
 - 4.2.1.2 *Option #2* 25
 - 4.2.1.3 *Option #3*..... 26
 - 4.2.2 Establishment of a Governance Plan 29
 - 4.2.3 Creation of a Change Management Plan 29
 - 4.2.4 Creation of a Transition Communications Plan 30
 - 4.2.5 Cost Allocation Plan and Cost Recovery 31
 - 4.3 Regional Implementations..... 32
 - 4.3.1 Establishment of Regional Governance 34
 - 4.4 PSAP-centric Options 37

4.5	Recommendations	37
4.5.1	State-level Interworking.....	37
4.5.2	Regional	38
4.5.3	PSAP	39
4.6	Actionable Steps	39
4.6.1	State-level Interworking.....	39
4.6.2	Regional	40
4.6.3	PSAP	40
5	Geographic Information System	40
5.1	Key Findings	41
5.2	Options for Consideration	42
5.2.1	GIS Data Analysis	42
5.2.2	GIS Implementation	43
5.2.3	Nebraska Standard Operating Procedures	44
5.3	Recommendations	44
5.3.1	GIS Data Analysis	44
5.3.2	GIS Implementation	45
5.3.3	Nebraska Standard Operating Procedures	45
5.4	Actionable Steps	47
5.4.1	GIS Data Analysis	47
5.4.2	GIS Implementation	47
6	Continuity of Operations and Disaster Recovery	47
6.1	Key Findings	48
6.2	Threat and Hazards	49
6.3	State Information Technology Guidelines.....	49
6.4	Professional Standards.....	50
6.5	Continuity of Operations and Disaster Recovery Planning	50
6.6	Recommendations	51
6.7	Actionable Steps	51
7	PSAP Policies and Procedures	52
7.1	Key Findings	52
7.2	Considerations.....	52
7.3	Recommendations	53
7.4	Actionable Steps.....	54
8	Training and Education	55
8.1	Key Findings	55
8.2	Considerations.....	56
8.2.1	Standard Training Requirements and Mandatory Statewide Telecommunicator Certification Program	56
8.2.1.1	<i>Establish Standard Minimum Training Requirements and Mandatory Certification for Telecommunicators</i>	<i>57</i>

8.2.1.2	<i>Establish Standard Minimum Training Requirements as the Foundation of a Mandatory Statewide Telecommunicator Certification Program</i>	58
8.2.2	Training Sources and Content	59
8.2.3	Training Requirement for Executives and Support Staff	59
8.2.3.1	<i>Executive and Staff Support</i>	59
8.3	Recommendations	60
8.3.1	Standard Training Requirements and Mandatory Statewide Telecommunicator Certification Program	60
8.3.2	Training Sources and Content	64
8.3.3	Training Requirement for Executives and Support Staff.....	66
8.4	Actionable Steps.....	66
9	FirstNet Process and Procedures	67
9.1	Options for Consideration	68
9.1.1	Governance.....	68
9.1.2	FirstNet Deployment	69
9.1.3	Training and Education	72
9.1.4	SCIP	73
9.2	Recommendations	73
9.2.1	Governance.....	73
9.2.2	FirstNet Deployment	73
9.2.3	Training and Education	73
9.2.4	SCIP	74
9.3	Actionable Steps.....	74
10	Funding Considerations	74
10.1	National Trends	75
10.2	Current Nebraska Funding	76
10.2.1	Wireline Funding	76
10.2.2	Wireless Funding.....	78
10.2.3	911-SAM Funding	79
10.3	PSAP Funding Survey.....	79
10.4	Collection of 911 Surcharges.....	80
10.5	Rough Order of Magnitude Costs for NG911	81
10.5.1	Network Connectivity Costs	81
10.5.2	Next Generation Core Services	81
10.5.3	Text-to-911	82
10.5.4	Call Handling	82
10.5.4.1	<i>Model 1 – Stand-alone PSAP</i>	83
10.5.4.2	<i>Model 2 – Regional Host-Remote</i>	83
10.5.4.3	<i>Model 3 – Fully Hosted</i>	85
10.5.5	ROM Cost Compared with Remittance	85
10.6	Recommendations	91
10.7	Actionable Steps	92
11	Implementation Phases	93

11.1	Phase One – 10/12/2017 through 4/30/2018	94
11.2	Phase Two – 7/2/2018 through 4/19/2019	94
11.3	Phase Three – 4/20/2019 through 3/27/2020	95
11.4	Phase Four – 3/16/2020 through 2/26/2021	96
	Appendix A – Nebraska NPSBN Phased Deployment Submission	98
	Appendix B – PSAP Funding Survey	101
	Appendix C – Nebraska Service System Plan Initial Implementation Plan	106
	Glossary	110
	Bibliography	112

Executive Summary

Mission Critical Partners, Inc. (MCP) respectfully submits this 911 Service System Plan to the Nebraska Public Service Commission (PSC) for consideration. The plan's objective is to provide Nebraska stakeholders and the PSC a comprehensive strategy and holistic approach for Next Generation 911 (NG911) deployment in the state of Nebraska. This plan is the culmination of several months of work in a collaborative forum, with MCP providing subject matter expertise to support the views and needs of Nebraska stakeholders. The result is a tailored approach for Nebraska.

Public expectations of technology are evolving; moving Nebraska towards a statewide NG911 implementation will enable Nebraska to meet the demands and expectations of today's public and the evolving technology landscape. **This transformational change requires recognition that 911 service is no longer strictly a local issue; it requires a coordinated and collaborative effort at all levels. Interconnectivity is the key element of NG911, which differs from platforms in use today. This 911 Service System Plan represents the first step in an extensive and important process towards the realization of NG911 service in Nebraska.**

Representatives and direction for the 911 Service System Plan were provided from multiple organizations and stakeholder groups throughout Nebraska. In alphabetical order:

- League of Nebraska Municipalities
- Nebraska Association of County Officials
- Nebraska Emergency Service Communications Association
- Nebraska Firefighters, Sworn
- Nebraska Firefighters, Volunteer
- Nebraska Office of the Chief Information Officer (OCIO)
- Nebraska Public Service Commission
- Nebraska Sheriffs' Association
- Police Chiefs Association of Nebraska
- PSAPs
- Voice over Internet Protocol (VoIP) Providers
- Wireless Telecommunications Providers
- Wireline Service Providers

This plan provides Nebraska stakeholders with an actionable course for the implementation of NG911 from technical, operational, economic, and policy perspectives.

Through the plan development effort, MCP learned that many areas within Nebraska are proceeding with foundational steps to prepare for NG911 at a local level. This is demonstrated through establishing regions in a collaborative approach; neighbors working with neighbors to provide improved service to citizens through regionalized deployments. Additionally some counties within the state provide services through consolidated call taking and dispatch. Numerous complex operational, technical, regulatory, and funding

issues must be addressed to successfully implement an NG911 system throughout Nebraska and this grass roots movement will benefit Nebraska in deployment efforts.

Regionalization and consolidation represent two different deployment configurations. The two terms are not synonymous when assessing call handling and dispatch operations; there are significant differences to consider pertaining to aspects of this plan. Regionalized systems share equipment allowing participating PSAPs to continue autonomous operations. Consolidation represents a condition where all technology and operations are managed by a single governing authority providing services for multiple jurisdictions. Further details on these two configurations can be found in section 4.3 – Regional Implementations.

Deployment will be a complicated and evolving process, requiring the willing cooperation of many stakeholders from all levels of government and the private sector. MCP provides recommendations in each functional area of this plan to assist in the establishment of a statewide Emergency Services Internet Protocol (IP) network (ESInet) and ultimate implementation of NG911.

The plan covers eight functional areas and each area includes background, recommendations, and actionable steps for execution. A summary of each functional area is outlined below; additional details and related recommendations may be found in each detailed section of the plan. Following the detailed review of each section, an implementation section provides a path forward for phased implementation of the recommendations to move Nebraska towards a statewide NG911 platform.

911 System Design

The 911 System Design section of this plan provides possible ESInet designs for consideration. MCP recommends the State pursue the acquisition of the hybrid model ESInet, as described in section 3.2.3 – Option 3 – Hybrid Network, and Next Generation Core Services (NGCS) through a managed services business model. This approach supports the current landscape developing in Nebraska. Many local Nebraska agencies and regions have demonstrated and acted to regionalize, the PSC is supporting these efforts through outreach and coordination.

Governance

In alignment with Nebraska Legislative Bill 938 (LB938) (2016), Section 26, plans for establishing an advisory committee are presented.

MCP provides three options and ultimately recommends the third option presented for the creation of a 911 Service System Advisory Committee, details of this recommendation are found in section 4.5.1. The recommended composition builds on the already established Wireless Enhanced 911 Advisory Board.

There is a wealth of knowledge and capability on the current board, it will prove beneficial to build upon the already established board and allow the members to help coordinate the transition to NG911 within the state. Board members are educated on State legislation, have an expansive knowledge base, and are vested in the programs and initiatives.

In addition to recommendations on the constitution of the advisory committee, the Governance section also discusses establishment of a governance plan, change management plan, and a communications plan. The Governance section also provides governance considerations at a regional and local level.

MCP also recommends where regions are established there is a regional governance body, priorities and considerations for regional committees are in section 4.5.2. MCP has engaged existing regions within Nebraska and learned regional governance boards are already in place supporting this approach.

Geographic Information Systems

The spatial data and query capabilities of geographic information systems (GIS) are critical components of NG911. PSAPs, GIS departments, and emergency response leaders must work together internally and regionally to refine this data across the entire state. The spatial data managed by GIS is also extremely complex and creates a necessity of cross-jurisdictional and regional coordination of address points and ranges, street centerlines, and PSAP polygons.

MCP recommends a process driven approach to execute GIS data analysis for the data validation process converting from legacy tabular call routing to spatial call routing. This recommendation can be reviewed in section 5.3.1

For GIS implementation, in section 5.3.2, MCP recommends a collaborative working group environment, similar to the Street Centerline working group under the Nebraska Information Technology Commission (NITC) to resolve Issues with PSAP and emergency service zone (ESZ) boundaries, as well as other recommended NG911 datasets.

Finally in section 5.3.3, MCP recommends the creation and maintenance of several NG911-focused standard operating procedures (SOPs).

Continuity of Operations and Disaster Recovery

The 911 system exists to provide a lifeline to individuals in need of emergency assistance and the public has a high level of confidence in the 911 system and public safety communication services. Continuity of Operations (COOP) and Information Technology (IT) Disaster Recovery plans are intended to enhance the resilience of system components and mitigate the potential impact of a disaster. MCP discovered through stakeholder engagement that many PSAP are already performing COOP planning.

MCP provided several recommendations for PSAPs to consider for preparedness, all recommendations are identified in section 6.6. Key recommendations are for PSAPs to conduct COOP and Disaster Recovery planning in conformance with NITC COOP and Disaster Recovery planning standards. PSAPs should consider adopting PSAP building design standards to enhance resilience to environmental and intentional threats. Annual testing to assess the validity of COOP and Disaster Recovery plans is recommended.

MCP provided additional recommendations for the PSC. The first is for the PSC to adopt continuity planning guidelines and a standardized plan template to aid local PSAP managers in the development of plans and emergency procedures. The PSC 911 staff should sponsor COOP and Disaster Recovery training for PSAP managers, personnel, and IT staff. The PSC 911 staff and the 911 Service System Advisory Committee, with use of a focused subcommittee, should review and consider adoption of construction guidelines for new PSAPs to promote physical resilience to environmental hazards and intentional threats (i.e., blast standoff distances and vehicle barriers).

PSAP Policies and Procedures

In today's environment, many public safety answering points (PSAPs) operate independently of one another with limited state-level coordination. Therefore, PSAP operational and technical policies and procedures must be reviewed and changes may be necessary to ensure they will withstand a transition to an NG911 environment.

Each element of the 911 Service System Plan will have some impact on the operational policies and procedures of the PSAPs.

Each PSAP has a variety of technological, human resource, and funding capabilities and challenges. These capabilities and challenges will drive the development and modification of operational policies and procedures.

Whether new policies or procedures need to be developed or existing ones modified, a collaborative approach will be required. To achieve a realistic yet visionary outcome, MCP recommends this approach include collaboration with a working group, detailed in section 7.2. This ad-hoc group also aligns with Governance recommendations and would be formed to evaluate specific efforts and then disbanded once work is completed.

Training and Education

Through direct engagement with the Nebraska PSAP community and stakeholders representing PSAPs, MCP identified important points related to current training requirements, capabilities, and programs that could be leveraged for NG911 purposes.

As defined in Nebraska LB938 (2016), the Nebraska legislative leadership desires to formulate a strategy and assess the training requirements for NG911. MCP recommends establishing minimum training requirements for "basic" or initial telecommunicator certification and initiating discussion on a statewide certification exam, this recommendation can be reviewed in section 8.3.1.

To assist in that endeavor, MCP conducted research to identify ways to enhance the training capabilities and programs for NG911. MCP identified options, each with strengths and challenges, that would provide the level of training and capabilities to serve the current 911 service system, as well as set the path for the future. Recommendations related to sources and content may be reviewed in section 8.3.2.

FirstNet Process and Procedures

The Middle Class Tax Relief and Job Creation Act of 2012 (Act) created the First Responder Network Authority (FirstNet) as an independent authority within the National Telecommunications and Information Administration (NTIA). While this is a different deployment from NG911, the two are complementary; as such, MCP provided a section within this plan that provides related information and considerations as Nebraska moves forward with NG911 deployment. MCP has recommended the 911 Service System Advisory Committee include as an ex-officio member representation from the OCIO to ensure close communications between teams advancing FirstNet and NG911 within Nebraska.

The Nebraska governance structure places responsibility for the Nationwide Public Safety Broadband Network (NPSBN) and land mobile radio (LMR) under the Nebraska OCIO, and the responsibility for 911 under the PSC.

Funding Considerations

Funding of public safety technology and 911 services is a complex issue. Funding considerations for any technology transition requires planning and forethought to ensure adequate resources are available to support existing systems until the transition to new technology is complete.

MCP provided several recommendations related to funding, located in section 10.6. The first recommendation is a review of allowable PSAP expenditures. In addition to this recommendation, MCP recommends the development of a revised 911 support allocation model that is simplified. MCP also recommends standardizing the surcharge for all devices capable of connecting to 911; this means a single rate for any device that can place a request for service to a PSAP. MCP developed rough order of magnitude (ROM) costs for NG911 deployment. Based upon these ROM costs and current funds available to the PSC MCP recommends the wireless surcharge rate remain at the present level. Finally, MCP recommends a range for the surcharge be established, controlled by the PSC; the recommended range is between \$0.45 and \$1.25.

MCP provided three potential models for NG911 and projected costs associated with each. Taking the projected costs, MCP compared that to the forecasted amount of surcharge income to demonstrate the projected difference that must be accounted for in the transition. The projection models were based on funds from wireless surcharges assuming the recommended initial rate defined above. Wireline and VoIP surcharge funds were not used in the estimates and in this plan those revenues will remain with local governing authorities, MCP encourages local authorities to align wireline and VoIP surcharge rates with the rate established by the PSC for wireless surcharges.

In Nebraska, with LB938 (2016), there is a clear desire to understand and take proactive steps for migration to NG911. With this migration, consideration must be given to the transition period in which two systems will have to function in parallel until the full transition is complete.

1 Background

Mission Critical Partners, Inc. (MCP) is supporting the Nebraska Public Service Commission (PSC) in the development of a master plan for the 911 system; this is known as the Nebraska 911 Service System Plan (Plan). The Plan shall, at a minimum:

- Document costs associated with the implementation and estimated ongoing operations of the state’s 911 service system
- Provide recommendations to the Legislature for cost recovery of the implementation, operation, and maintenance of the 911 service system
- Provide a proposal outlining the PSC’s role as a coordinator of the 911 service system
- Provide recommendations for any additional legislation required to implement the 911 service system¹

The proposed Plan must be developed per specific timeline milestones, shown below in Table 1, to comply with Nebraska Legislative Bill 938 (LB938)² (2016).

Table 1: LB938 Milestones

Milestone	Date/Timing
Progress of plan development	February 1, 2017
Presentation of adopted plan to Transportation and Telecommunications Committee and Appropriations Committee	December 1, 2017
First of two public hearings on the plan	At least 90 days prior to plan adoption by the Commission
Second of two public hearings on the plan	At least 30 days prior to plan adoption by the Commission

The Plan must clearly define how Nebraska will migrate from the current 911 systems to an NG911 environment, while meeting the defined requirements established in Nebraska LB938 (2016).

2 911 Service System Plan Development

MCP initiated Plan development with broad stakeholder engagement to gather requirements relevant to Nebraska.

¹ <http://nebraskalegislature.gov/FloorDocs/104/PDF/Final/LB938.pdf>
² Ibid.

Stakeholder engagement began with a meeting with PSC on August 25, 2016, in Lincoln, Nebraska. MCP and the PSC reviewed legislatively required stakeholders and identified additional stakeholders that needed to be aware of NG911 planning efforts in Nebraska.

Stakeholder meetings began in September 2016 and have continued throughout the Plan development process. Initially, stakeholders were interviewed individually to discuss the focal points of Nebraska LB938 (2016), which allowed individuals the opportunity to define success from their perspective. MCP then facilitated a recurring series of stakeholder meetings in the form of a working group, as shown in Figure 1.

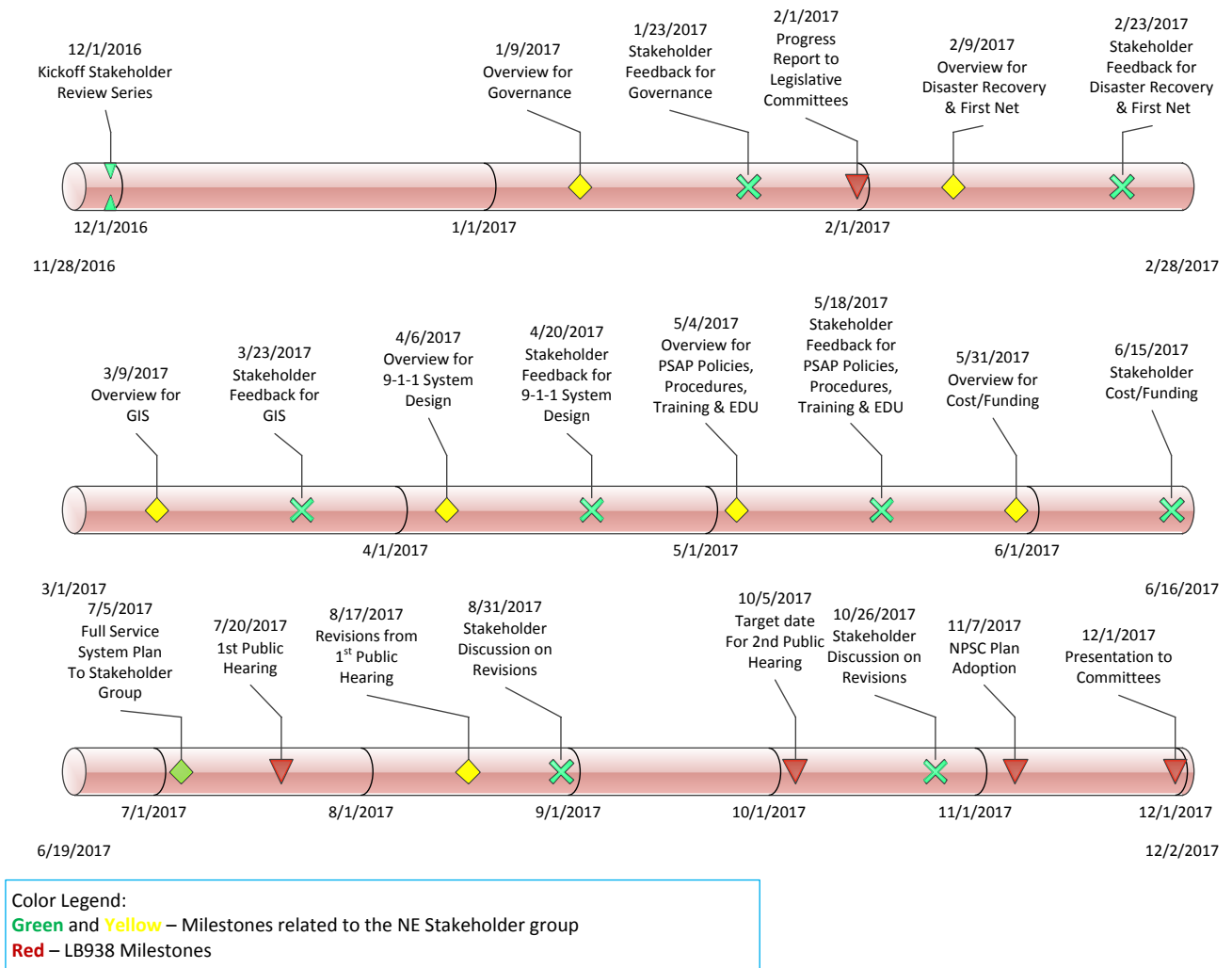


Figure 1: Stakeholder Meeting Schedule

The stakeholder meetings were specifically established to foster a collaborative environment for the PSC to consult with and seek advice and assistance from stakeholders defined within statute. The working group was comprised of the Nebraska stakeholders shown in Table 2.

Table 2: Nebraska Stakeholder Working Group

Name	Organization/Department	Stakeholder Group Represented
Dave Sankey	PSC	PSC
David Sleeter	Douglas County 911 Emergency Communications	PSAPs
Lynn Rex	League of Nebraska Municipalities	Municipalities
Lash Chaffin	League of Nebraska Municipalities	Municipalities
Larry Dix	Nebraska Association of County Officials	Counties
Bob Wilhelm	Nebraska Office of the Chief Information Officer (OCIO)	CIO
Neil Miller	Sheriff – Buffalo County	Nebraska Sheriffs' Association, PSAPs
Shelly Holzerland	Nebraska Emergency Service Communications Association	PSAPs
Tom Casady	Public Safety Director – Lincoln	Chiefs of Police, PSAPs
Jerry Stilmock	Nebraska State Volunteer Firefighters Association	Volunteer Firefighters
Stanley Shearer	Omaha Fire Department, Information Technology (IT) Division	Sworn Firefighters
Bill Mizner	Norfolk Police Department	Police Chiefs Association of Nebraska
Caleb Johnson	Commissioner – Keith County	County Officials
Mary Ann Borgeson	Commissioner – Douglas County	County Officials
Joyslyn Leudke	Verizon Wireless	Wireless Telecommunications
Jim Ediger	Hamilton Telecommunications	Wireline Service Providers
Brad Moline	Allo Telecom	Voice over Internet Protocol (VoIP) Service Providers

3 911 System Design

In late 2013, 49 service providers operating in the state were contacted to determine if they offered facilities and support suitable for local, regional, and statewide Emergency Services Internet Protocol (IP) networks (ESInets). Twenty-seven responded to the survey and/or phone calls. In addition to the traditional local exchange carrier (LEC) service providers, several non-traditional service providers were contacted. These included public power districts, cable television providers, 4G long-term evolution (LTE) wireless service providers, a broadband satellite provider, and the Nebraska Regional Interoperability Network (NRIN) statewide initiative. Several of the smaller LECs believed they were not staffed to support a public safety-grade network or it was not a fit for their business model.

Several service providers did not operate any facilities, but simply offered VoIP or Digital Subscriber Line (DSL) services using leased loops from the incumbent LEC (ILEC). These providers were not considered for primary ESInet services as they have no control over the outside plant their services traverse.

A wealth of fiber optic transport exists in Nebraska, owned and operated by all sizes of LECs around the state. There is one consortium of seven ILECs that not only coordinates the extensive network of its member LECs, but also has interconnect agreements with every LEC in the state. There are also fiber-to-the-premise (FTTP) deployments that would allow for a complete fiber optic, Ethernet-based connection to certain PSAPs. Many of these providers already deliver some level of services to the PSAP(s) in their serving areas, ranging from internet service to delivering the centralized automatic message accounting (CAMA) trunks and automatic location identification (ALI) links to their existing call handling equipment.

The most important properties of an ESInet are redundancy and resiliency. Redundancy is having two or more devices and connection paths between the PSAP and the core data centers. Resiliency is how quickly the backup device or path can take over when the primary fails. These can be achieved in several ways, which will be covered in more detail later. For now, it is sufficient to say that backup networks, redundancy, and resiliency are critical in an ESInet deployment.

For backup networks, several options were examined: secondary fiber connectivity, NRIN, Hybrid Fiber Coax (HFC), cable television (TV), 4G LTE wireless, point-to-point wireless broadband, and satellite broadband. LTE and satellite services offer some measure of portability and flexibility, characteristics that are especially important in the event of a disaster. Either would be suitable for use with a mobile command post or communications unit. Cable TV providers typically have extensive HFC networks, with a fiber backbone feeding cabinets from which the coax runs to the premises. At present, the NRIN is a 100 megabit (Mb) microwave network, with an effective bandwidth of 85 Mb. For a primary transport network, this is not sufficient to support a statewide ESInet due to both its susceptibility to weather interference and its limited bandwidth. When complete, the NRIN can be used as a limited backup network for those PSAPs that may not have a better alternative or that, due to their call volume, may require a third connection. Use of the NRIN will require diligent monitoring of traffic levels to avoid congestion.

Discussions were held with the OCIO regarding ESInet support. There are several statewide networks in place, but each serves a specific function: education, healthcare, homeland security, land mobile radio (LMR) communications, etc. Presently there are roadblocks to using any of these networks, except the NRIN (homeland security) for connecting the PSAPs to a statewide ESInet. For instance, the education network can only be used for education purposes per the rules of the federal grant used to build it. There is no statewide strategy for implementing networks. The OCIO sets network standards and guidelines, but has no rule-making authority. The OCIO operates the network operations center (NOC) for state networks, and provides performance statistics and outage reports.

3.1 Network Facilities and Services

Nebraska has a wealth of fiber optic transport and access facilities available. Any references to specific companies or providers are intended for illustration purposes only, and does not constitute an endorsement of any products or services.

NebraskaLink³ handles large-scale sales and service for their members' networks, and has interconnection agreements with all other LECs operating in the state, including AT&T and CenturyLink. Depending on how one traces the fiber routes, there are eight network rings overlaying the state. This number is likely to increase by the time the ESInet implementation begins. NebraskaLink has several construction projects underway, constructing their own fiber to close gaps in the network. There is currently access to long-haul interstate transport west to Denver, east to Chicago, north to Sioux City, and south to Kansas City. NebraskaLink can provide service to 1102 Grand, Kansas City, a carrier hotel. Over 30 major carriers, including Kansas Fiber Networks⁴ (KsFiberNet), a consortium similar to NebraskaLink, have backbone facilities into 1102 Grand as well. Additionally, some service providers have direct interconnections with LECs in northern Kansas.

Given the extent of and interconnections between fiber optic networks in the state, the statewide ESInet design should include as much fiber as possible, not only on the transport side, but on the access side as well. Many providers have FTTP deployments using either Passive Optical Networking (PON) or Active Ethernet technology. Some offer both, using the Active Ethernet for business-class service and PON for residential. The only limitation with a fiber network is the equipment used to terminate the fiber. Depending on the equipment initially selected, upgrading the backbone from 1 gigabyte (GB) to 10 GB may be a change of optic modules, an additional card and optics, or simply a few mouse clicks and keystrokes.

Possible ESInet designs will be described in detail below. Regardless of the design ultimately selected, each facility should have physically diverse entries. Given that this is a statewide effort, it is important to note that physically diverse entries into a given facility may not be possible in some cases. In these cases, it may be necessary to use other types of networks as a backup link: NRIN, HFC, 4G LTE, satellite broadband, or point-to-point wireless broadband. Some providers without FTTP deployments may provide the last-mile connection over copper plant, using Ethernet-over-Copper or T1 technology. Many providers

³ <http://nebraskalink.com/>

⁴ <http://www.ksfiber.net/>

have expressed a willingness to construct dual entrances where feasible. It is important to note that there may be construction costs for the second entrance. The amount will vary by provider and location, and is more properly part of a request for proposal (RFP), should one be eventually issued. It is presented here as advance notice so it may be included in any RFP issued.

3.1.1 Meetings with 911 Service Providers

A series of meetings were held with 911 service providers the week of January 20, 2017, in Lincoln, to discuss their current service offerings, their support of NG911, and their roadmap to full i3 support. CenturyLink partners exclusively with West/Intrado⁵ in some areas, but Nebraska is non-exclusive. CenturyLink operates selective routers in the state. Windstream also operates selective routers in the state, and is working with two regions in Nebraska, providing wide area network (WAN) connectivity and data center space. NebraskaLink operates an extensive fiber optic network and one of its member companies, Hamilton Telephone, has some experience in the 911 environment through Hamilton Relay, an accessibility service. AT&T also partners with West/Intrado and has some exclusive areas in which they offer services; Nebraska is a non-exclusive area for AT&T.

3.1.2 Data Centers

Regardless of the ultimate network design, geographically diverse data centers must be designated as points of interconnection (POIs) to provide secure, redundant, resilient interconnection points to carriers, service providers, and other networks. The data centers should meet Tier 4 standards as detailed in American National Standards Institute/Telecommunications Industry Association/Electronic Industries Alliance (ANSI/TIA/EIA) 942 Data Center Standards, but must meet Tier 3 standards. These data centers will house core routers and switches, servers, gateways, firewalls, session border controllers (SBCs), and other similar equipment.

The i3 services are referred to as Next Generation Core Services (NGCS), and include Emergency Services Routing Proxy (ESRP), Policy Routing Function (PRF), Emergency Call Routing Function (ECRF), and Location Validation Function (LVF). Network access elements include Border Control Function (BCF), legacy network gateways (LNGs), and legacy selective router gateways (LSRGs). The BCF usually includes SBC, virtual private network (VPN), and firewall functions. Also, it is common to find that one physical device will handle several of the above functions, such as a gateway device handling SBC, LNG, and LSRG functions. The legacy PSAP gateway (LPG) typically resides at a legacy time division multiplexing (TDM) PSAP, and is removed when that PSAP upgrades to an i3-capable call handling system.

⁵ <http://west.com/safety-services>

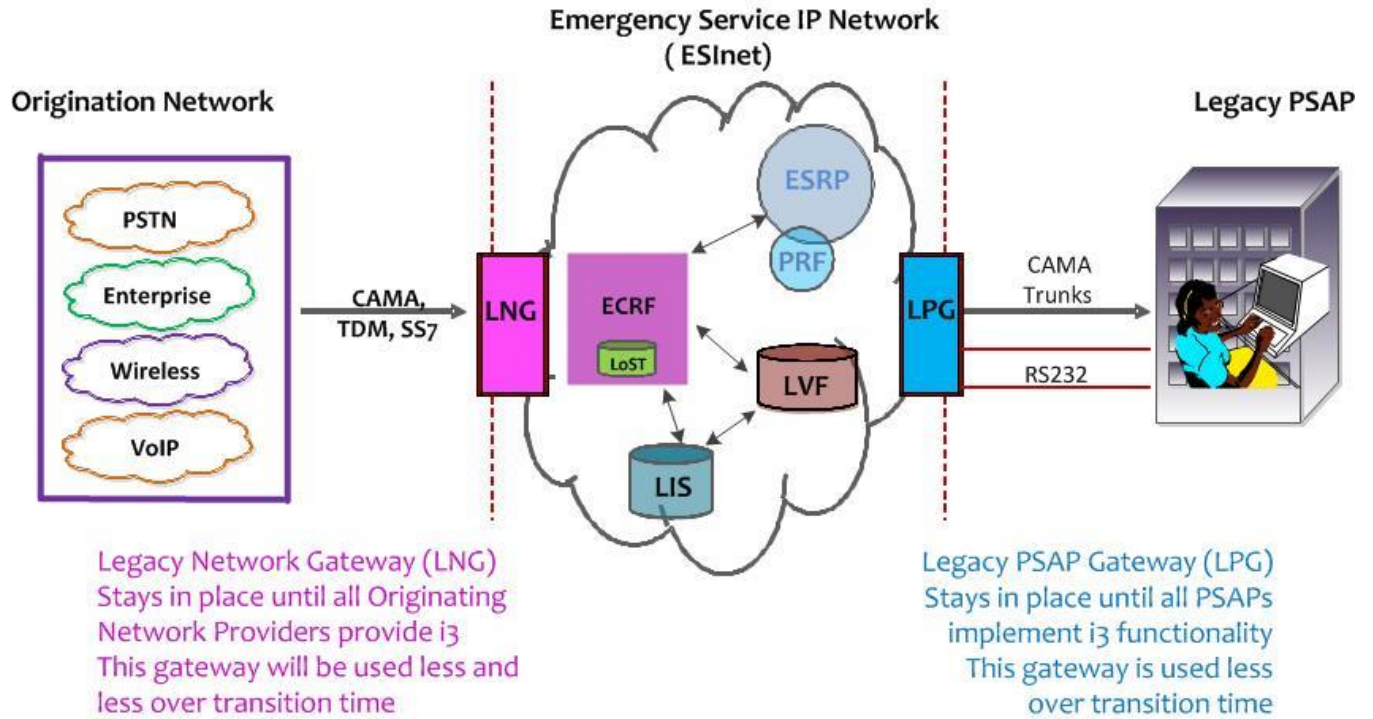


Figure 2: Basic ESInet

3.1.3 Common Network and Application Design Criteria

It is important to note that the State would, through the governance structure, adopt standards for the networks, call handling systems, and i3 next generation core systems. The State should not prescribe how service providers implement the network at Open Systems Interconnection (OSI) Layer 1 or Layer 2, beyond the requirement that they use the most robust facilities available in a given service area. However, the providers must disclose, in detail, how they propose to implement the selected network design. The design must have no single point of failure, and must operate at 99.999 percent uptime. The data center routers and switches must have redundant processors, power supplies, and network interfaces, and must perform fast packet reroute (<50 milliseconds [ms]) in the event of a failure. PSAPs and similar facilities must be equipped with dual routers and dual switches configured to meet the fast packet reroute time.

The State's view of the network should be at OSI Layer 3; that is, at the delivery of IP packets between network nodes. The network must deliver any IP packet from any address to any other address among the interconnected sites. This assumes the packet has met any applicable firewall rules to allow it to enter the network.

The network routers and switches must support both IP version 4 (IPv4) and version 6 (IPv6) addressing and protocols, and must use standard routing protocols such as Open Shortest Path First (OSPF) and Border Gateway Protocol (BGP). The routers and switches must also support Quality of Service (QoS)

marking and traffic prioritization, as well as multicast routing and switching. Multicast traffic is frequently used for video, network services, data and software updates, and to a lesser extent, system failover heartbeats.

For servers, there should be both hardware and software redundancy. One approach is to use virtual servers running on multiple physical servers, with a virtualization management software that automatically switches virtual servers between physical servers in the event of a failure. Two such packages are VMware and Citrix' XenServer. The NGCS would then run on the virtual servers.

3.1.4 Rough Order of Magnitude Pricing for Next Generation Core Services

MCP estimates that the NGCS will cost \$0.15 to \$0.18 per month per person served. With an estimated 2016 population of 1,907,116, this is roughly \$286,100 to \$343,300 per month (rounded). On an annual basis, the range would be \$3.43 million to \$4.12 million.

3.2 Options for Consideration

3.2.1 Option 1 – Statewide Fiber Optic Ring Network

The first option is to implement a fiber optic ring around the state and establish physically diverse connections to each PSAP. The ring will have a series of POIs where the PSAPs will connect to it. Each POI will house network equipment to which the PSAP connections will terminate. Each PSAP should have physically diverse connections to two POIs. Two geographically diverse POIs should be chosen to house gateways, servers, core routers and switches, and systems serving call handling equipment (if applicable) and i3 elements as they are implemented.

To the extent feasible, connections from the data centers and POIs to the PSAPs should be delivered over fiber optic facilities. Where the last mile cannot be delivered over fiber optic facilities, the next best alternative is Metro Ethernet over copper. If that is not available, multiple T1s or possibly a DS3 may need to be considered. In cases where the existing copper or fiber plant does not lend itself to physically diverse entries to a given PSAP, alternatives (NRIN, HFC, wireless, etc.) will need to be investigated. Redundancy solutions will vary based on location. These alternate network facilities must have physical entries diverse from the primary connection to the PSAP.

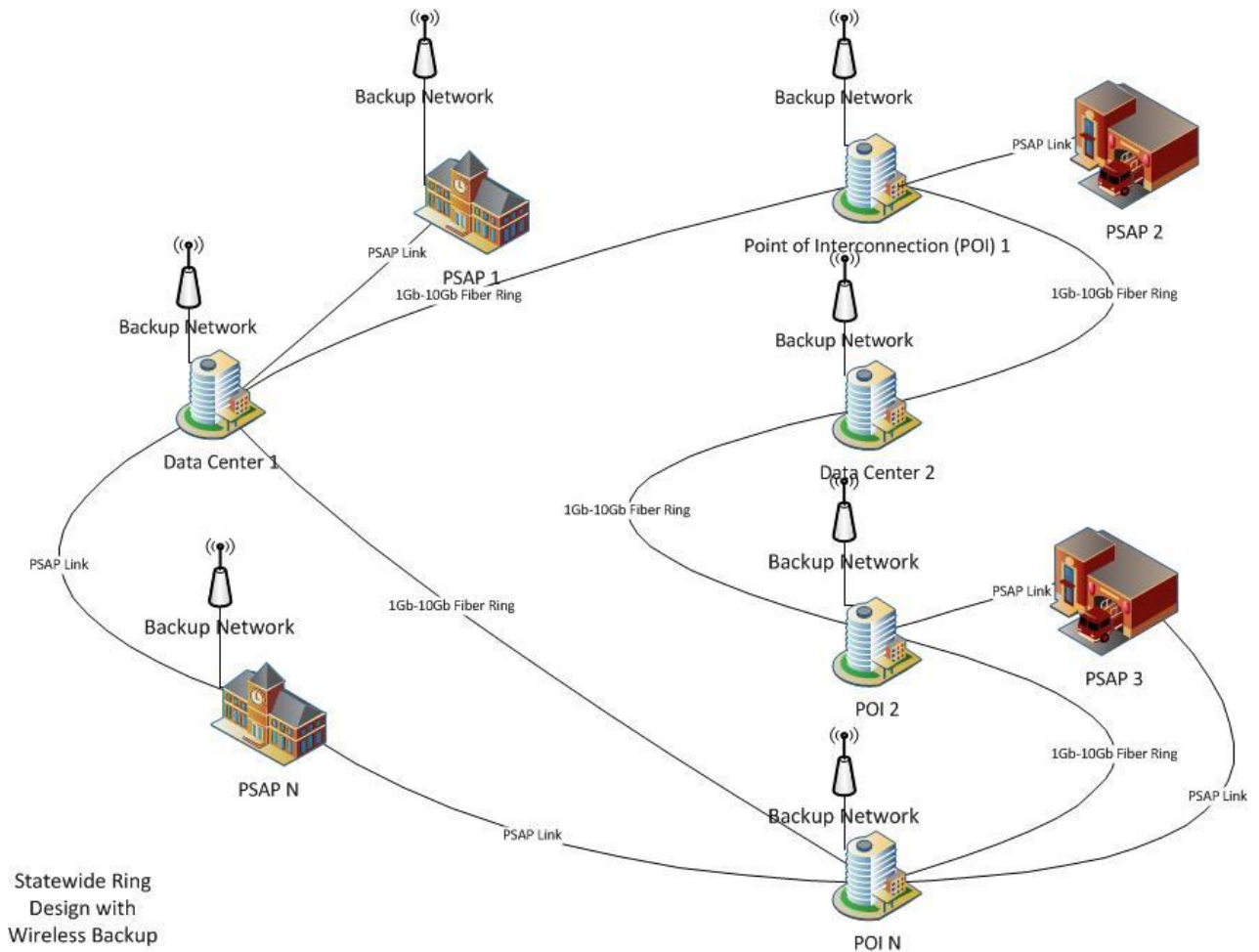


Figure 3: Statewide Fiber Ring

3.2.1.1 Benefits and Drawbacks

This option has the benefit of centralized i3 systems and services, a resilient backbone network, and state-level management and control all the way to the PSAP routers. Drawbacks include loss of local control, high PSAP circuit costs due to distance from points of presence (POPs) to PSAPs, increased equipment costs, and possibly forcing the State to provide call handling equipment for some PSAPs.

Local control is important in Nebraska; this solution provides a changing delivery mechanism for local jurisdictions. Cities and counties need to participate in this decision, allowing an understanding of the model. Local control is still in place at the PSAP with regard to policies and procedures on call processing and dispatching.

Depending on the carrier, long-haul circuits would be necessary for the backbone connections and for the PSAP access connections, and may include a mileage charge. Pricing for local connections, on the other hand, is not usually distance-sensitive. This could be used as a negotiating point in the RFP process.

This also presents some interesting governance issues for the State and those PSAPs that are in the process of regionalizing their technology or have already done so. It could potentially put the State in the call handling equipment business as well, or at least the rack-space rental business to host call handling equipment solutions for PSAPs and/or regions. This option may also cause the State to back into the hybrid model discussed below if it connects to pre-established regional networks.

3.2.1.2 Rough Order of Magnitude Costs – Option 1

Network connectivity costs are presented after Option 3 below. The main cost differences between the three designs is in data center space, call handling system, and NGCS system costs, which will be higher in the first two options.

3.2.2 Option 2 – Interconnected Regional Fiber Optic Networks

The second option is to implement a series of interconnected fiber optic networks, each network serving a geographic area. Each network should have dual connections to its neighbor(s). Each PSAP would have physically diverse connections to the network. Each network would also require two data centers to house the call handling equipment backroom equipment and common i3 systems, and to provide interconnection facilities for the carriers and service providers.

The simplest implementation would be a series of Layer 3 switches in the POPs and PSAPs connected one to the next to the next until the connection got back to the first facility. A slightly more complex design would resemble a scaled-down version of the statewide ring, wherein the PSAPs are connected to a series of POPs on the network. Some allowances will be required in the governance model to allow stand-alone PSAPs to connect to the regional networks even if they are not participating in regional call handling equipment. These PSAPs may be either geographically remote or simply choose not to participate in a region beyond the level of network connectivity. Their connections should be made into the POPs, and not a PSAP, unless there are some technical limitations that would prevent them from doing so.

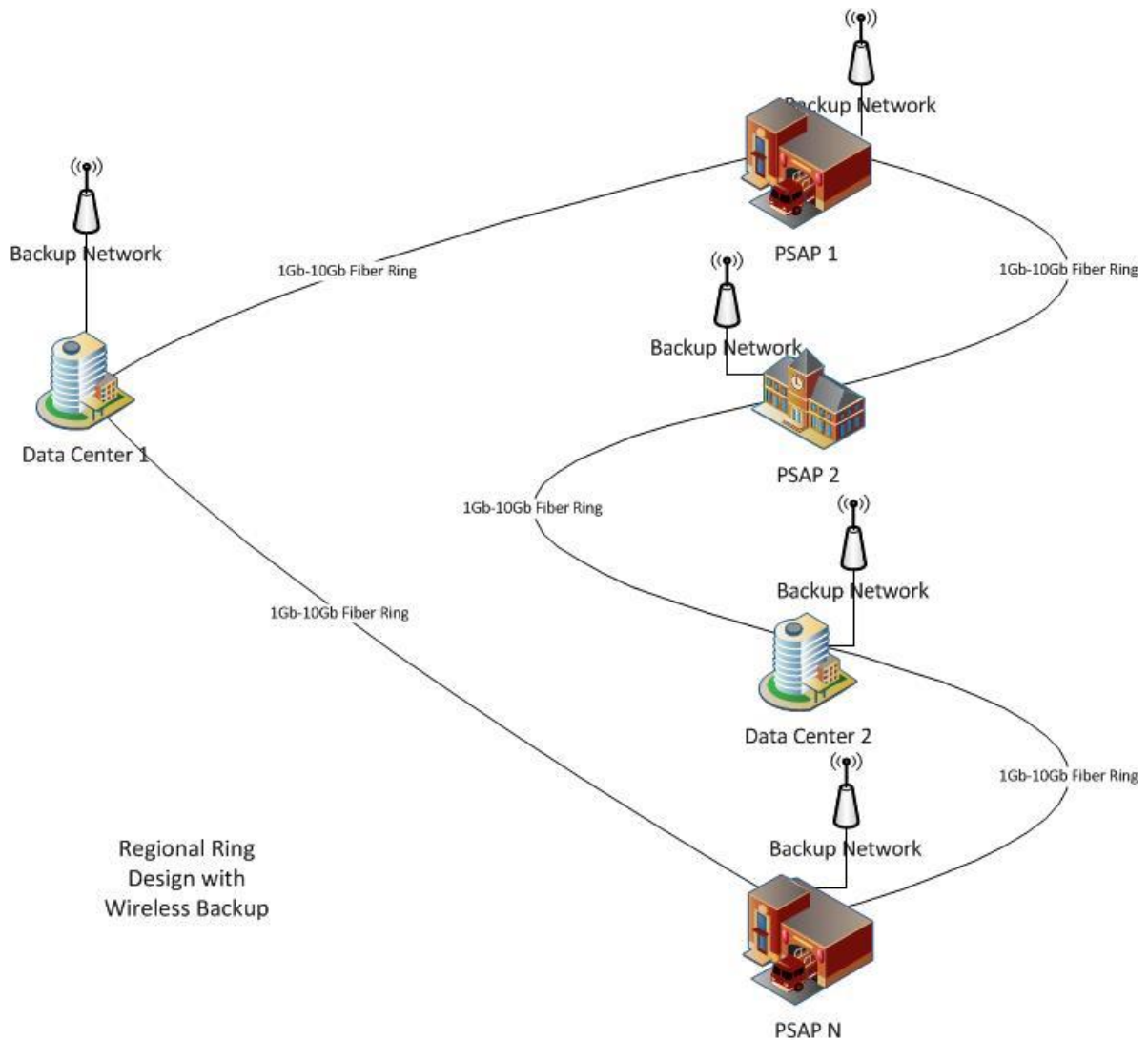


Figure 4: Regional Ring

3.2.2.1 Benefits and Drawbacks

One benefit would be that the operator of each network could choose to implement call handling equipment that best fits its needs and budget. One immediate drawback would be the cost of the i3 (not call handling equipment) systems necessary to equip 12 to 20 data centers (6 to 10 networks times two data centers per network) versus the two data centers of the statewide ring. This solution would force regionalization, and some PSAPs may not want to participate in regionalization. Also, using the scaled-down statewide model at the regional level would add equipment costs in the form of Layer 3 switches in the POPs as well as the PSAPs, compared to the simple regional network that would only have them in the PSAPs and the two data centers. Also, as previously mentioned, maintenance costs may vary with the physical configuration of the network equipment.

It is important to note that long-haul circuits, as would be necessary for the backbone connections, may include a mileage charge. Pricing for local connections, on the other hand, is not usually distance-sensitive. This varies by carrier and circuit type.

3.2.2.2 Rough Order of Magnitude Costs – Option 2

Network connectivity costs are presented after Option 3 below. The main cost differences between the three designs is in data center space, call handling system, and NGCS system costs. Costs in one or more of these areas will be higher in the first two options.

3.2.3 Option 3 – Hybrid Network

The third option is a combination of the first two, with a statewide ring connecting regional networks and individual PSAPs not otherwise connected to a regional network. The regional networks would support the call handling equipment systems and the connectivity to each PSAP through two data centers on each network, while the statewide ring and its data centers would support the i3 systems and services, and provide interconnection points for communications service providers (CSPs). This design would not preclude those PSAPs that choose not to regionalize or are geographically remote from a regional network from joining the statewide ring directly.

The preferred design would have each PSAP or regional network connected to the state-level data centers, rather than to a data center and a neighboring regional network. However, it would be technically possible to connect regional networks directly. It simply adds some complexity to the network.

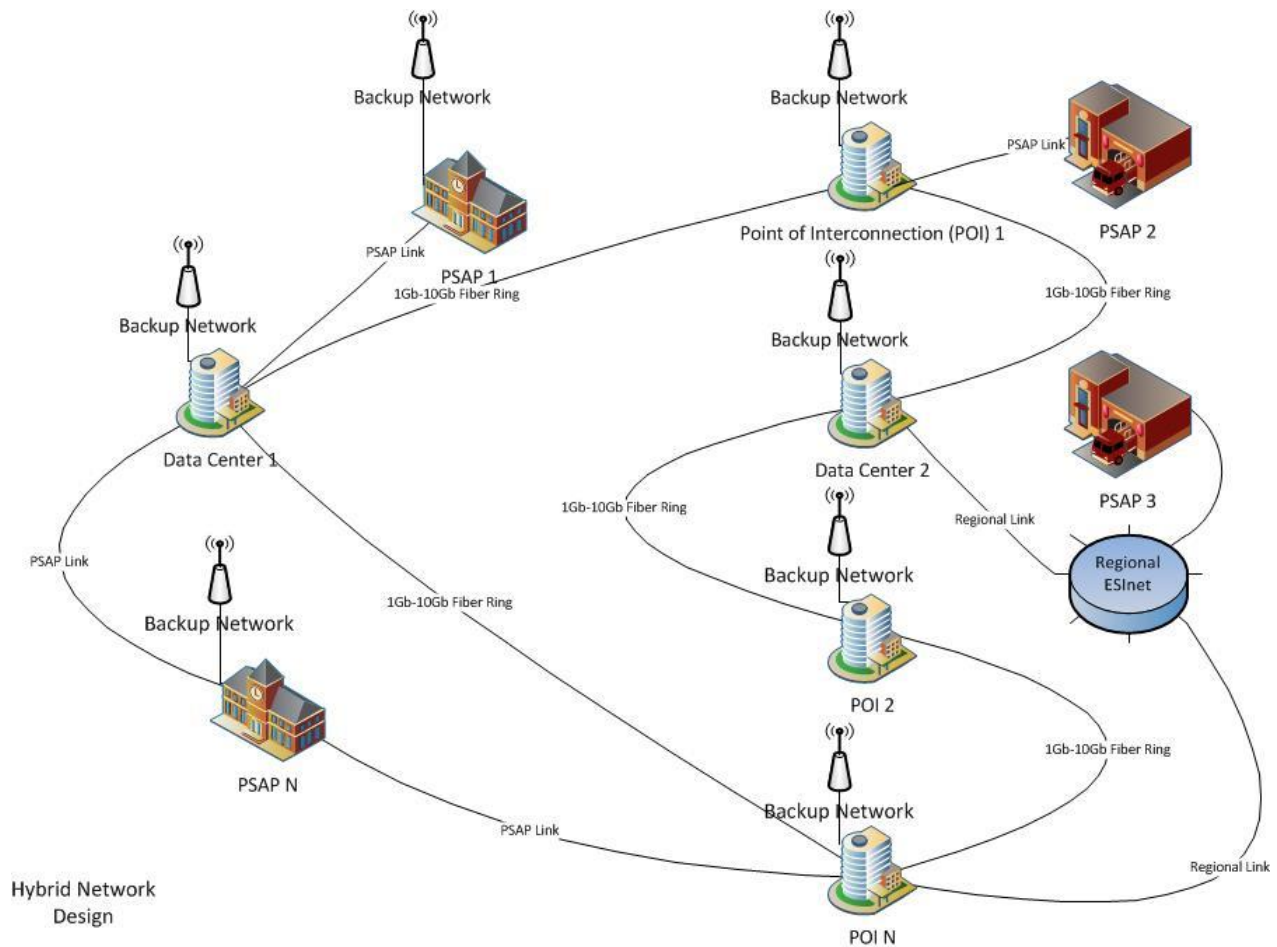


Figure 5: Hybrid Network

3.2.3.1 Benefits and Drawbacks

Costs for i3 systems and services would be the same as for the statewide ring only. Additionally, the routers and switches for the statewide ring would require fewer network ports, lowering initial costs and, in some cases, maintenance, which can be viewed as a benefit. Management is simplified because there are fewer system and network components in this design.

3.2.4 Estimated Network Connectivity Costs

The network connectivity pricing below was developed for the 2014 report, and has not significantly changed. This pricing is not RFP response pricing, which should be lower. LEC pricing will vary, but MCP often sees managed circuit prices between \$1,000 per month and \$1,300 per month from LECs. Distance charges can impact pricing to as high as \$3,500 per month for a circuit. A good approximation is \$2,100 per managed circuit per month, average, across the state of Nebraska.

In some parts of the state, there may be large mileage costs for copper circuits. Ethernet service, particularly when delivered over fiber, is not usually distance sensitive. The National Emergency Number Association (NENA), the Association of Public-Safety Communications Officials-International (APCO), and national organizations all recommend as much redundancy and resiliency as can be afforded.

Table 3 shows estimated costs for one, three, and five years based on the circuit cost for a single connection to each stand-alone PSAP or host facility in host remote deployments; MCP has estimated the number of PSAP links to be 46, and the state ring with circuits for three data centers. The option of redundant connections may be left up to the individual PSAPs or be mandated by the State. The table does not account for connections to a regional ESInet where only two connections are required rather than two connections to each PSAP on the regional ESInet.

Table 3: Estimated Network Connectivity Costs

	Quantity	Monthly Cost	Total	1-year Costs	3-year Costs	5-year Costs
PSAP Links	46	\$2,100	\$96,600	\$1,159,200	\$3,477,600	\$5,796,000
State Ring	1	\$6,500	\$6,500	\$78,000	\$234,000	\$390,000
Totals	47	\$8,600	\$103,100	\$1,237,200	\$3,711,600	\$6,186,000

Many states have considered multiple backup network options, including LTE, microwave and other options, where there is not sufficient connectivity to have a redundant and resilient ESInet. Pricing on those will vary widely.

3.2.5 Strengths and Weaknesses Summary

Table 4 below summarizes the strengths and weaknesses of each option.

Table 4: Option Strengths and Weaknesses

Option	Strengths	Weaknesses
Statewide Fiber Optic Ring	<ul style="list-style-type: none"> Centralized NGCS deployment Redundant, resilient backbone network State-level management and control 	<ul style="list-style-type: none"> Loss of local control Forces the State into the hosted call handling system business Increased equipment and maintenance costs Increased circuit costs

Option	Strengths	Weaknesses
		<ul style="list-style-type: none"> • Redundant circuits may not be available at some PSAPs • Governance issues with existing regional networks
Interconnected Regional Rings	<ul style="list-style-type: none"> • Allows regional networks to implement systems best suited to their needs • Balances state and local control 	<ul style="list-style-type: none"> • Increased data center and equipment costs • Increased maintenance costs • Potentially higher circuit costs • Redundant circuits may not be available at some PSAPs
Hybrid	<ul style="list-style-type: none"> • Lower network equipment costs • Potentially lower maintenance costs • Simplified management • Simpler interconnection with existing regional ESInets • Allows the State to provide a hosted call handling system 	<ul style="list-style-type: none"> • Redundant circuits may not be available at some PSAPs

3.3 Other Considerations

3.3.1 Network Infrastructure and Services Monitoring

Regardless of how the network is ultimately implemented, there should be one entity with overall management responsibility. Given the broad geographic extent of the network, multiple providers will likely be involved with their own management access to the relevant segments. However, there must be one place to call when trouble arises and one NOC monitoring all the way out to the last device in a PSAP (usually a switch) in order to see up/down status on all ports throughout the network.

The highest level NOC will coordinate the handling of any outages, maintain the master trouble ticket, and have primary responsibility for creating the Reason for Outage (RFO) report. Other subordinate NOCs should have their own trouble ticket systems and may have their own local reporting responsibilities, but they should also report up through the top-level NOC.

Routers and switches are capable of talking to multiple management systems, and allowing differing levels of access to each. The local or regional management system should have read/write access (the ability to make changes), while the next levels up in the hierarchy should have read access only.

Monitoring software and services are a bit more interesting. Some management software has the ability to monitor network services such as Dynamic Host Control Protocol (DHCP), Domain Name Server (DNS), Hypertext Transfer Protocol (HTTP), File Transfer Protocol (FTP), Session Initiation Protocol (SIP), etc., using either standard Simple Network Management Protocol (SNMP) traps or a small client running on the servers being monitored. Usually each software vendor has its own ways and means of monitoring its software, and most are willing to work through the security issues related to access into the network. In addition, some systems do not require the vendor to have access into the network, but rather the systems establish a secure tunnel to their support center that allows support staff to access only that system.

3.3.2 Complete Managed Service, Call Handling Equipment, and Network

This is presented for discussion in the event some vendors come forward with a complete managed service proposal, presenting call handling equipment and/or i3 services as a Software as a Service (SaaS) model with the network, monitoring, and management included. Such a solution must still meet the State's standards and best practices as would be set forth in governance documents.

This option would simplify operation and management from the State's perspective; one number to call in the event of any trouble, and no finger pointing between vendors. The most likely network implementation in this model would look much like Option 3.

A managed services model is one in which the service provider retains ownership of the systems, software, and data, and charges a fee for use of the system. The service provider is responsible for all maintenance, upgrades, provisioning, monitoring, etc. of the system. The service provider furnishes a series of operational reports to the authority having jurisdiction detailing the amount of calls processed, problem tickets, change management tickets, and more. The service provider also bears the liability when outages occur.

3.4 Recommendations

MCP recommends the State pursue the acquisition of the hybrid model ESInet, as described in section 3.2.3 – Option 3 – Hybrid Network, and NGCS through a managed services business model. This approach supports the current landscape developing in Nebraska, without legislation or policy that mandates consolidation. Many local Nebraska agencies and regions have taken proactive steps and demonstrated a willingness to regionalize, and the PSC is supporting these efforts through outreach and coordination.

In the system design, the PSC should consider offering a hosted call handling system for those PSAPs that may not join a regional effort. In the funding section of this plan, there is a recommendation for simplification of the 911 Support Allocation Methodology (911-SAM). With revisions, the PSC should

encourage regionalization by providing incentives for local agencies to move to regional or consolidated implementations.

Implementation of NG911 is not what is termed a “flash cut,” meaning an instant change from legacy E911 technology to NG911; there will be a transition period once NG911 implementation begins. MCP has provided an initial implementation plan in section 11 – Implementation Phases of this document. To minimize the overlap, the PSC, 911 staff, and the 911 Service System Advisory Committee should refine implementation objectives and timing, striving for a prudent timeframe for transition. With that said, it should be expected that the transition will take several years to complete.

3.5 Actionable steps

The following actionable items should be taken:

1. The PSC 911 staff should develop a detailed requirements document for the ESInet and NGCS, and an option for a hosted call handling system. This will become the basis for RFPs to be issued for acquiring these elements.
2. The PSC 911 staff should develop a phased implementation plan for the ESInet and NGCS, and optionally for hosted call handling.
3. The PSC 911 staff should advertise the RFPs, evaluate responses, and select providers.
4. The PSC 911 staff should add detail to the aforementioned plan as needed to align with the implementation process.
5. The PSC 911 staff should execute the implementation plan.

4 Governance

4.1 Key Findings

During the initial phase of this project, representatives from MCP met with stakeholders to determine what they saw as necessities for a successful NG911 implementation. Their comments were broken down into nine themes: communication, planning and policy, stakeholder engagement, governance, consolidation, collaboration with others, data and information gathering, outreach and education, and telecommunicator training. Conversation and feedback during those conversations were captured and published in the *Nebraska Public Service Commission Master Plan Findings Document*, October 2016.

The findings in that document drove development of governance options for the effective deployment of NG911. The governance options and corresponding oversight considerations for state-level interworking, regional implementation, and PSAP-centric operational elements are discussed below.

4.2 State-level Interworking

Creating a state-level interworking for the advancement of NG911 in Nebraska is critical. An effective governance structure creates a comprehensive and manageable means to transition the 911 systems in Nebraska. Change is always challenging; however, by creating a transition plan with metrics and a timeline, it becomes transparent; ensuring stakeholder understanding. A level of trust must be established in all layers of this process.

An opportunity exists with this transformational project to assess the current governance structure and determine which is more beneficial: remaining on the current course or forging a new course. The Wireless Communications and Public Safety Act of 1999 encouraged states to “implement seamless, end-to-end emergency telecommunications services and found that efficiency in deploying such services requires statewide coordination of the efforts of local public safety, fire service and law enforcement officials, emergency dispatch providers, and transportation officials; the establishment of sources of adequate funding for carrier and public safety, fire service and law enforcement agency technology development and deployment; the coordination and integration of emergency communications with traffic control and management systems...”⁶

4.2.1 Establishment of a Governing Body

Nebraska LB938 (2016), Section 25, states:

“The Commission shall serve as the coordinating authority for the implementation of statewide 911 service system, including but not limited to, basic 911, enhanced-911 service, enhanced wireless 911 service, next-generation 911 service, and any other emerging technologies, networks, and systems that allow the public to access 911 service”.

LB938 (2016), Section 26, states:

“The state 911 director shall establish an advisory committee to provide input on technical training, quality assurance, funding, and operation and maintenance of the statewide 911 service system”⁷

Currently the State of Nebraska 911 Program is managed by the PSC with the support of the Wireless Enhanced 911 Advisory Board. The new advisory committee will be known as the 911 Service System Advisory Committee.

⁶ Next Generation 9-1-1 Transition Policy Implementation Handbook. NENA. June 2011.

https://c.ymcdn.com/sites/www.nena.org/resource/resmgr/ngpp/ng911_transition_policy_hand.pdf (last accessed November 10, 2016)

⁷ Nebraska Legislative Bill 938 <http://nebraskalegislature.gov/FloorDocs/104/PDF/Intro/LB938.pdf> (last accessed December 20, 2016)

4.2.1.1 Option #1

The first option for the composition of the new committee could be to model it after the Wireless Enhanced 911 Advisory Board as it exists today, which includes:

- One sheriff
- Two county officials or employees
- Two municipal officials or employees
- Two representatives from the state’s telecommunication industry
- Two PSAP managers
 - One employed by a sheriff
 - One not employed by a sheriff
- Two ex officio members
 - State 911 Director
 - State Chief Information Officer or his/her designee

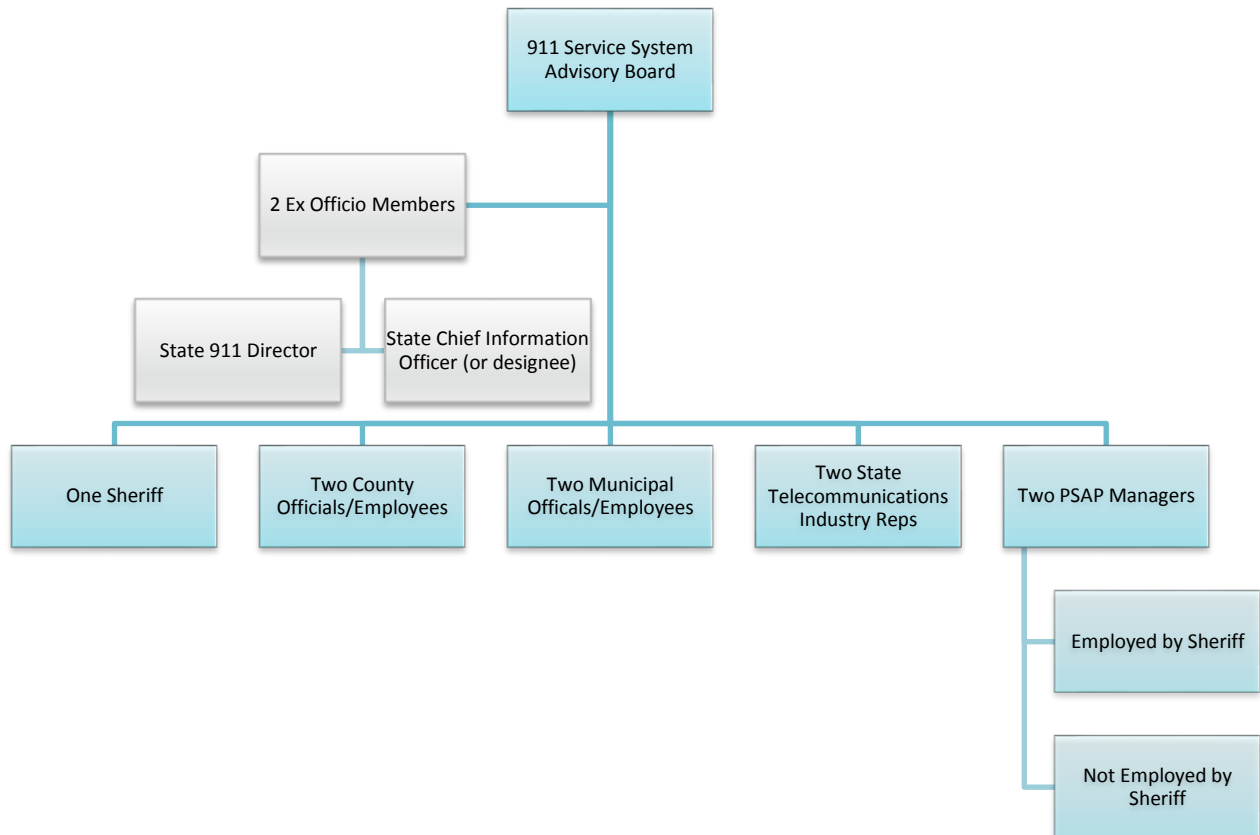


Figure 6: 911 Service System Advisory Committee – Option #1

4.2.1.2 Option #2

A second option is to build upon the already created organizational structure used for the Wireless Enhanced 911 Advisory Board and add subject-specific elements. This would bring together subject matter experts (SMEs) familiar with the governance as it currently stands with the experience in specific areas of the 911 system that are appropriate to an NG911 transition. The appointed committee members would be tasked with collaboratively focusing on issues pertaining to the statewide transition to NG911. This approach would have a total of ten voting members, and two ex officio members without voting authority:

- Two technical SMEs (persons with expertise and background as it pertains to 911 technology; specifically, persons with a vast knowledge of GIS)
 - One representing the interest of counties
 - One representing the interest of municipalities
- Two Quality Assurance (QA) SMEs (persons with experience in standards and QA Programs or those having responsibilities pertaining to QA and quality improvement [QI] in a public safety field)
 - One representing the interest of Counties
 - One representing the interest of Municipalities
- Two Funding SMEs (persons familiar with the state budgeting processes and processes for reallocation of funding)
 - One representing the interest of counties
 - One representing the interest of municipalities
- Two Operations and Maintenance SMEs (persons with experience in a statewide 911 system and the operations and maintenance of such a system)
 - One representing the interest of Counties
 - One representing the interest of Municipalities
- PSAP Operational Representatives
 - One employed by a sheriff
 - One not employed by a sheriff
- Two ex officio members
 - State 911 Director
 - State Chief Information Officer or his/her designee

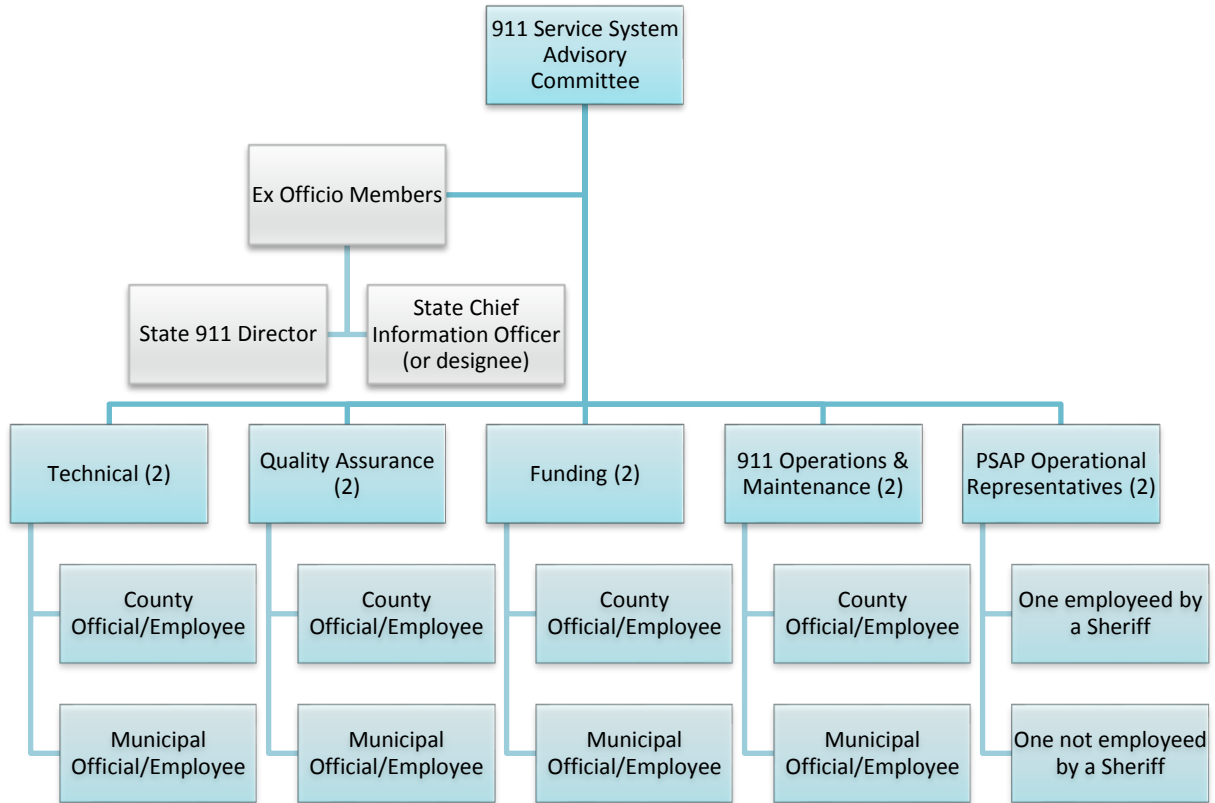


Figure 7: 911 Service System Advisory Committee – Option #2

4.2.1.3 Option #3

The third option builds upon the already established Wireless Enhanced 911 Advisory Board. One representative from the League of Nebraska Municipalities and one from the Nebraska Association of County Officials is added. This is the recommended approach from MCP. The composition of this group would include:

- Operational representatives
 - Law Enforcement
 - Fire Department
 - Emergency Medical Services (EMS)
 - Emergency Management
- Two county officials or employees
- Two municipal officials or employees
- Two representatives from the state’s telecommunications industry
- Two PSAP managers
 - One employed by a sheriff

- One not employed by a sheriff
- One Nebraska Association of Counties representative
- One League of Nebraska Municipalities representative
- Two ex officio members
 - State 911 Director
 - State Chief Information Officer or his/her designee

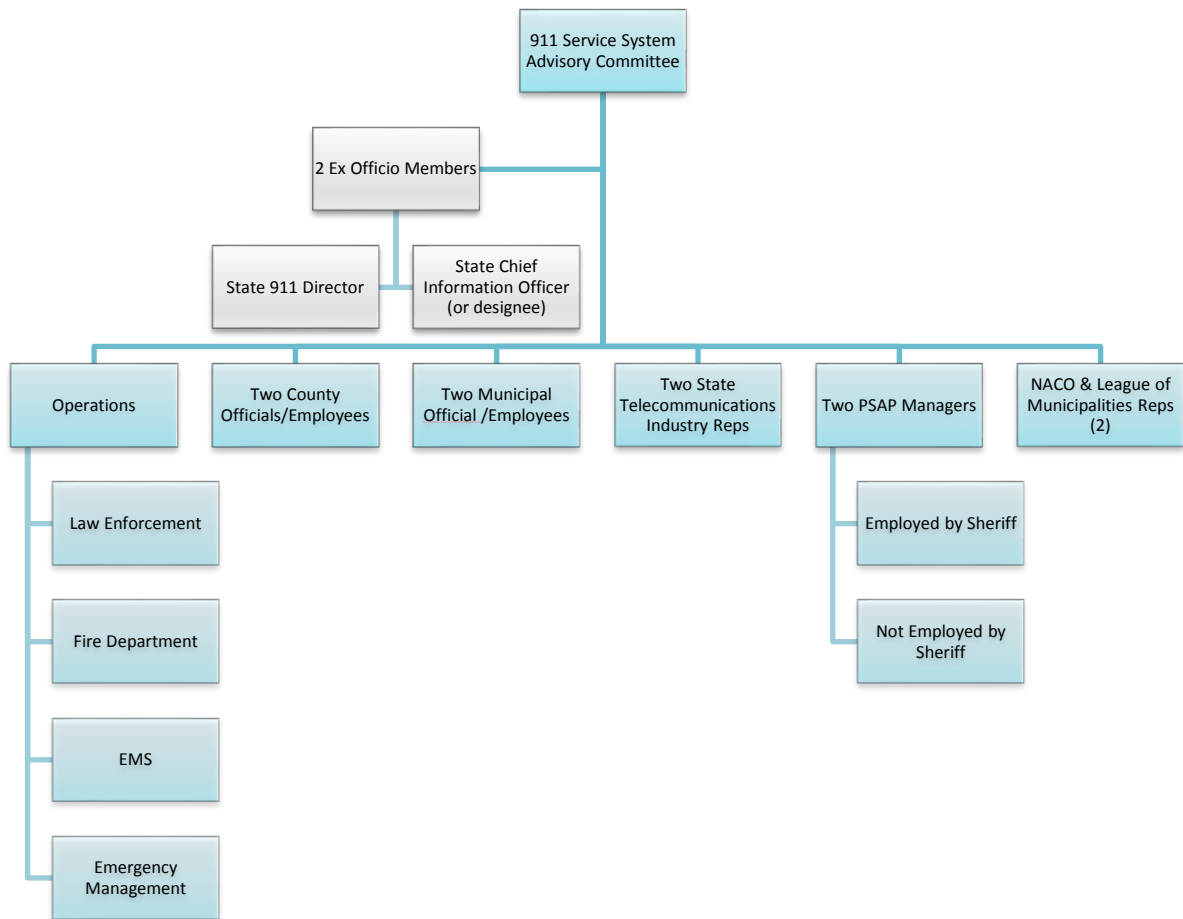


Figure 8: 911 Service System Advisory Committee – Option #3

With the third option, the opportunity exists to merge the new 911 Service System Advisory Committee with the already established Wireless Enhanced 911 Advisory Board. Merging the committee with the already established board offers the ability for those representatives on the Wireless Enhanced 911 Advisory Board to inject their vast knowledge and expertise of the Nebraska 911 system, operations, and funding to further develop and encourage the transition to NG911. The ability to mirror processes in place

by other state boards that have similar structure would make the transition from acting on behalf of the Advisory Board to acting on behalf of the Advisory Committee manageable.

Establishment of the voting membership of the 911 Service System Advisory Committee will be through appointment by the PSC. The State 911 Director will seek recommendations on behalf of the PSC from respective professional organizations. Individuals will also be afforded an opportunity to apply to the PSC for appointment; the individual application process shall be defined by the PSC. Pursuant to guidelines in Nebraska LB938 (2016), once all nominations and applications are received, the PSC will confirm the appointments and form the 911 Service System Advisory Committee. Once the 911 Service System Advisory Committee is formed, the committee will absorb all responsibilities of the current Wireless E911 Advisory Board.

Once formed, members would elect, among themselves, a chairperson during the initial meeting of the committee. The first order of the committee would be to establish guidelines that align with the direction established in LB938 (2016) and to make decisions regarding the organization and meeting rhythms of the committee.

To ensure proficient resources are available to the 911 Service System Advisory Committee, there should be allowance for the committee to establish working groups as they see fit. The working groups can either be standing working groups or ad hoc working groups. Standing working groups would be established for the duration of the committee's existence or a defined period at the direction of the committee; ad hoc working groups would be created when necessary and then relinquished when their particular tasks are complete. The working groups would be charged with researching issues and reporting on their findings and recommendations to the Advisory Committee. Some suggested working groups may include:

- Technical Working Group
- Operational Working Group
- Training Working Group
- Public Education Working Group
- Disaster Recovery and COOP Working Group
- FirstNet Integration Working Group

The 911 Service System Advisory Committee, with input from any subcommittees or working groups, will provide recommendations to the PSC. Upon receiving recommendation(s) from the 911 Service System Advisory Committee, the Director will present recommendations to the PSC who will then determine whether to adopt the recommendation(s). If recommendations are adopted, the PSC 911 staff is charged with the responsibility to execute the recommendations by direction of the 911 Director. This is shown in the graphic below.

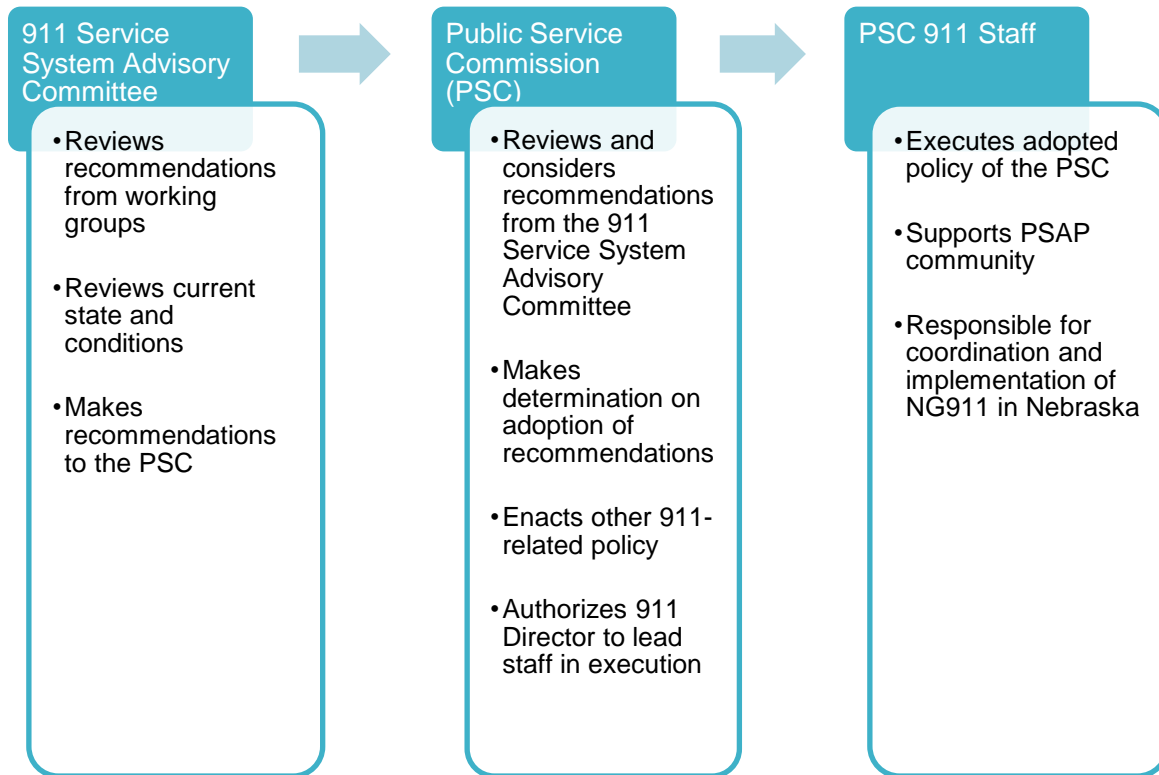


Figure 9: Recommendation Progression

4.2.2 Establishment of a Governance Plan

A well-crafted and functional governance and policy structure is imperative for ensured success in any facet of public safety. Evaluating, improving, and creating governance-focused documents simultaneously with the implementation and transition to new technology proves ideal, ensuring there are policies, guidelines, and rules in place from the initial implementation point. Governance plans include bylaws, committee structures, and policies that direct the advisory groups activities. The 911 Service System Advisory Committee in their interaction with other members, their responsibilities as defined in statute, and their relationship with PSC, refer to these plans in their role of advising the Nebraska Public Service Commission. The plans also ensure staff and administrators are familiar with policies, procedures, and processes and eliminates recanting or revising after the implementation or transition period to create a more robust and effective governance framework. In MCP’s experience, governance structures with a solid foundation are those that prove to be the most effective and are the most resilient.

4.2.3 Creation of a Change Management Plan

Change management plans and processes guide organizations and allow the PSAPs to stay current on updates. The goal of the PSC and the 911 Service System Advisory Committee is to ensure that a similar standard of care is being provided for all citizens of Nebraska when they need 911 services. Having a

method in place, like a change management plan, ensures there are established practices to provide for that.

As Nebraska lays out the road map for NG911 implementation, it is imperative that all current policies and procedures be reviewed and, if necessary, amended to reflect a NG911 platform and ensure the policies and procedures are feasible in the new environment.

The PSC 911 staff with support from the 911 Service System Advisory Committee must manage change and should institute, from the beginning, a change management plan with a results-driven process to vet changes that are suggested.

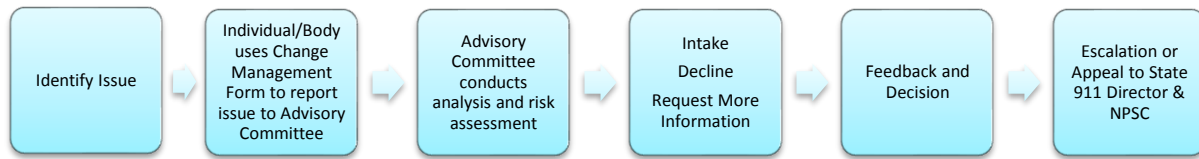


Figure 10: Change Management Process

Change management is a continual process and the 911 Service System Advisory Committee must be committed to continuously meet with stakeholders; complete assessments of operational, technical, and security components; and review all current local and state policies, plans, and procedures to ensure alignment with the statewide standard level of care.

4.2.4 Creation of a Transition Communications Plan

The benefits of a transitional communications plan allow for stakeholders to be kept informed as the project advances, ensures proper information and knowledge of the processes that are occurring in the transition period are being communicated, and offers the opportunity for transparency. It is imperative information is made available in a timely and efficient manner and that it is accurate and comprehensive.

Identifying the audiences to which information needs to be disseminated is the first task for a successful communications plan. For this project, the audiences that have been identified for engagement include internal audiences, public safety external audiences, and the traditional external audiences. Table 5 lists some examples.

Table 5: Target Audiences

Audience	Examples
Internal	<ul style="list-style-type: none"> • Governor • Nebraska Legislature • Nebraska PSC Commissioners • Nebraska Association of County Officials • League of Nebraska Municipalities
Public Safety External	<ul style="list-style-type: none"> • PSAP Coordinators • First Responders • State NENA/APCO
Traditional External	<ul style="list-style-type: none"> • Public • Business Owners • Special Needs Communities

Once the audiences have been identified, the best means of distribution needs to be determined to ensure the message is received and addresses the needs of the individual audiences. The PSC may want to consider distributing communication by multiple means and determining which ones are best received by using methods that are used today, provided they work for all parties. This can include: e-mail blasts, online forums, publishing information on websites, alerts, social media, and TV and radio announcements.

Once the audience and the method are determined, the content is then developed and a schedule is put in place so there is an established rhythm. Like other aspects of a transition, the communications plan must be evaluated and improvements must be made, if necessary, to ensure the right message is reaching the right people at the right time.

The overarching goal of the communications plans is to ensure everyone affected knows what the plan is, how they may be affected, and allowing time to prepare for the change.

4.2.5 Cost Allocation Plan and Cost Recovery

A cost allocation plan is important to ensure that costs that are incurred during the transition and implementation of NG911 are funded properly and cost recovery methods are explored and implemented in accordance with PSC and State Administrative Services guidelines. General funds were not a consideration for cost recovery in the development of this plan.

Several initiatives can be researched and discussed to help maximize cost recovery of the project. The National 911 Program Grant, which was reauthorized in the Next Generation 911 Advancement Act of 2012, allocated more than \$100 million dollars in 911 grant funds. Historically, grantees have used the funds to upgrade 911 systems to comply with Phase II Wireless E911 and the implementation of NG911.

During the 2009 disbursements, Nebraska was awarded \$484,000, which was used for intertandem trunking between the selective routers in Scottsbluff and Grand Island, which reduced call wait time; ensured Federal Communications Commission (FCC) compliance for Phase II signaling; allowed 911 calls to be transferred throughout all of Nebraska; and upgraded call handling software in 45 call taking stations to meet NG911 standards.

In the newest phase of the National 911 Program grants, the National Highway Transportation Safety Administration (NHTSA) and National Telecommunications and Information Administration (NTIA) are currently drafting joint grant regulations. Grants are anticipated to be awarded in early 2018. Planning to apply for grant monies should be a priority. Grants are slated to help states ameliorate their efforts to ensure NG911 compliance and readiness. This, as proven from past success, is a viable choice for Nebraska to help fund and recover some of the costs associated with statewide deployment.

The cost and funding portion of this document provides a more in-depth look at what the transition to NG911 will cost and it is important to ensure that methods for cost recovery are in place before costs are incurred. Recommendations and actionable steps from this section on the cost allocation plan are directly tied to the funding recommendation for revising and simplifying the 911-SAM, which provides Nebraska with a cost allocation plan.

4.3 Regional Implementations

Defining regions is often the first step in any regional process. Regions are usually divided by some characteristic that is important to the process or project.

One objective, defined in Section 27(d)(2) of LB938, was for the plan to detail “A recommendation of the number of public safety answering points that should be maintained in the state that are capable of next generation 911 service”. Though defining a number of PSAPs may seem like a simple task, there are a multitude of variables that impact this type of recommendation. In deciding this number, there must be consideration for balancing technical capabilities with real-world operational realities. With the adoption and execution of this plan all call handling equipment procured moving forward must be next generation 911 capable. If a reduction in the number of PSAPs throughout the State is desired, this requirement will facilitate that in a gradual yet progressive manner.

Currently, there are no State statutes or policies that mandate regionalization or consolidation. The PSC 911 staff has been performing outreach to local agencies explaining the benefits of regionalization during the development of this plan. Demonstrable results from this outreach and coordination are occurring. This approach, “organic” regionalization and consolidation, allows local 911 authorities to collaborate with neighboring agencies in defining regions that work for their specific local public safety needs. Regionalization represents a virtual consolidation environment where agencies share call handling equipment which reduces cost and provides flexibility for operations.

Regionalization and consolidation represent two different deployment configurations. The two terms are not synonymous when assessing call handling deployments. There are significant differences to consider pertaining to aspects of this plan. Regionalized systems share equipment while allowing existing PSAPs to

continue autonomous operations. Consolidation represents a condition where all technology and operations are managed by a single governing authority providing services for multiple jurisdictions.

Regionalization represents a group of counties that have entered into some form of intergovernmental agreement to share technical systems; for purposes of this plan, this pertains to call handling equipment. In a regional call handling system, all participants have the same type of equipment from the same manufacturer. In this configuration, two physical sites are selected to house the controlling equipment; these are commonly referred to as host sites. The host sites process and route all calls to the correct destination PSAP that is connected to the host; the destination PSAPs are commonly referred to as remote sites. The hosts serve as a backup to one another and, in the event of a failure at one host, the other host assumes all call routing and processing functions until the other host is returned to service. In this configuration, existing PSAPs retain their autonomy, but overall cost is reduced as each individual site does not require its own controlling equipment for call handling. There is typically some type of cost sharing for equipment and circuit charges. In Nebraska, examples of this type of deployment include the South-Central region, the East-Central region, and the Southeast region.

Consolidated PSAPs also require some type of formal intergovernmental agreement, but not with the intent of sharing equipment. In this deployment, a single PSAP will assume all call taking and dispatch responsibilities for another jurisdiction. There is typically a fee assessed from the providing agency to the jurisdiction being served. In Nebraska, examples of this type of deployment include Keith County and Region 26.

The current regional breakdown options include:

- Using existing PSC district lines to create five regions
- Using the already-defined Nebraska PET regions
- Using Nebraska Association of Counties regions
- Creating new regions by call volume, ensuring each region handles a similar number of calls collectively
- Creating new regions by population, creating lines that separate the population of Nebraska into quasi-equal proportions
- Creating new regions by geographic boundaries that divide the state into regions that make sense geographically

Consolidated and combined PSAPs that already exist today (Figure 11) could remain the same or expand, as necessary, to encompass neighboring jurisdictions where there are demonstrated cost savings and efficiencies for Nebraska.

MCP recognizes the collaborative efforts of the PSC and local governing authorities in initiating progress towards consolidation and regionalization throughout the state. This proactive approach, allows local authorities to make decisions in the best interest of their citizens. While this does not establish an explicit number, progress is occurring resulting in cost reduction through the sharing of equipment.

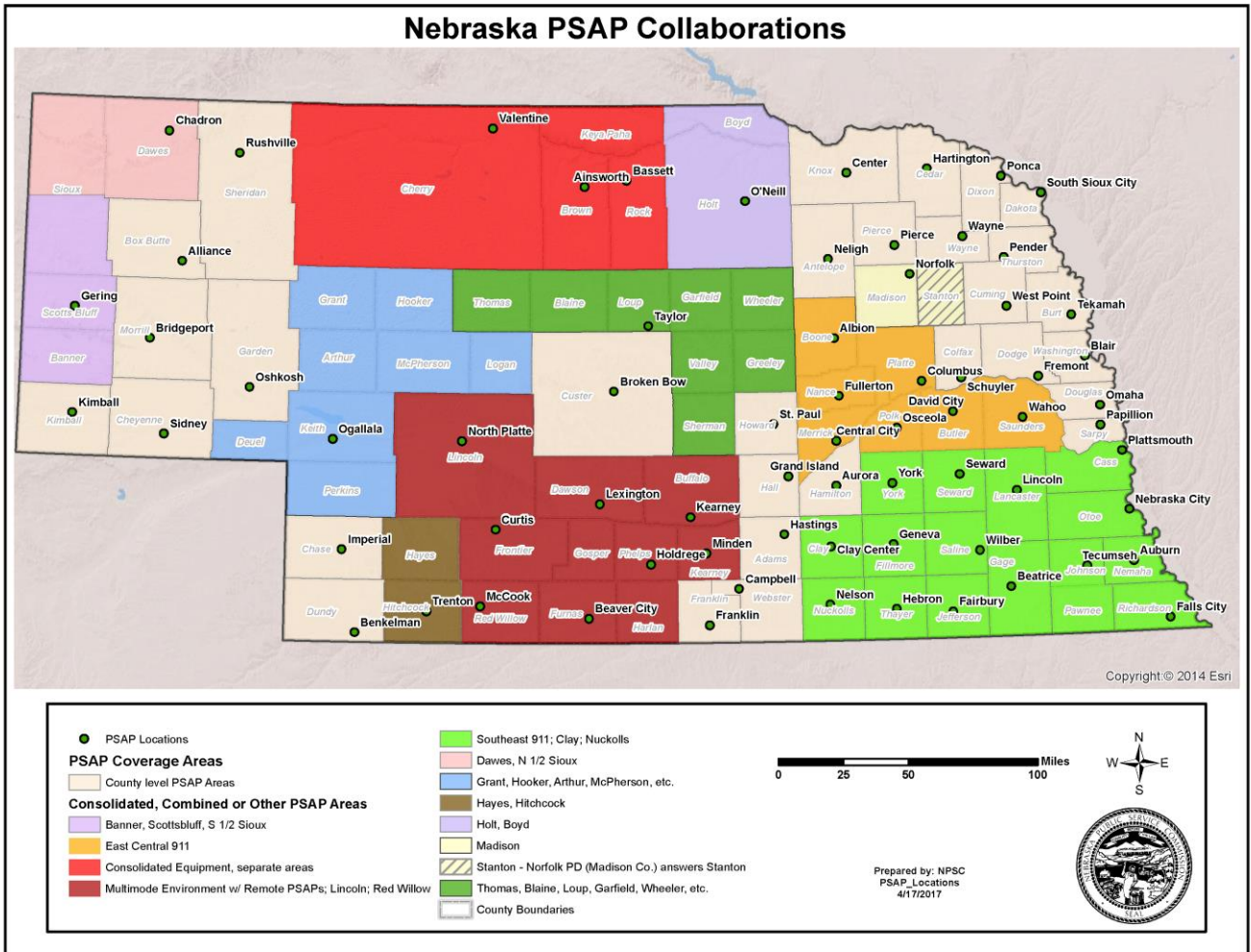


Figure 11: Current Regional PSAPs in Nebraska

4.3.1 Establishment of Regional Governance

The PSC 911 staff should continue working with counties that are not currently part of a regional solution and determine with local officials what is best as the state transitions to an NG911 solution. Parameters would need to be set so the number of NG911 PSAPs in Nebraska can be determined. These parameters could be based on variables such as call volume or population. As the regions are identified, the 911 Service System Advisory Committee can work to establish a naming convention that is recognized statewide; regions could be named by geographic location, be numbered, or by some other agreed upon solution. This will make it easy to identify the regions moving forward.

MCP has engaged existing regions within Nebraska and learned that most already have some type of governing board or committee performing activities outlined in this section. These established regional

governing bodies are equipped and already demonstrating this approach is sound. MCP has some suggested organizational approaches for regions below.

Once new regions are established, work can begin to form regional governing bodies. It is recommended that a committee, such as a Regional Coordinating Committee, be formalized to address technical, operational, cost allocation, and policy concerns of the transition and maintenance of an NG911 system within the region.

Once regions are defined and a governing body is developed (Figure 12), the creation of a governance plan is necessary. The governing plan should establish policies for decision-making, interaction within the region, and responsibilities as defined by the PSC. The plan would also ensure the policies and procedures agreed upon within the region are being followed. As part of the governance process, regional meetings with key stakeholders should begin to identify regional concerns that need to be addressed.

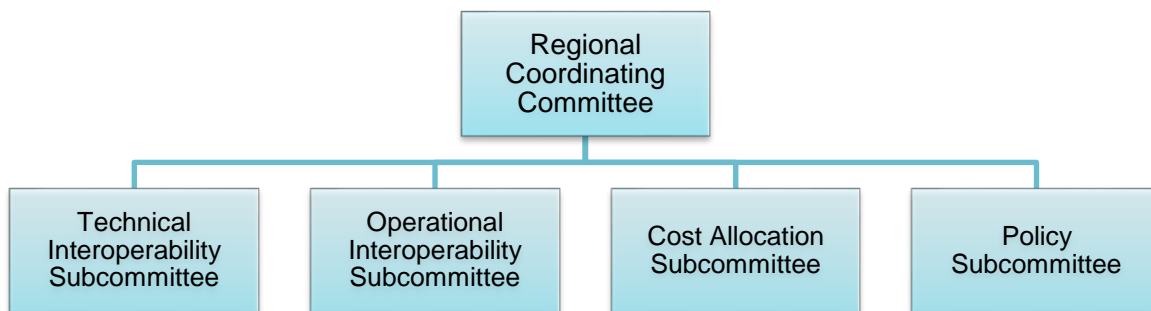


Figure 12: Regional Oversight

Technical Interoperability Subcommittee: This subcommittee would focus on the technical issues of interoperating several local systems and on making recommendations to the Regional Coordinating Committee for action. This subcommittee would:

- Address how the technical solutions will be integrated across the region
- Address interoperability issues and propose solutions for the Regional Coordinating Committee's approval
- Make recommendations on new technology or system migration
- Address how to prepare for the appropriate integration of additional system participants
- Identify the requirements for security, GIS, and technical operations

Members of this subcommittee may include representatives for the following stakeholders:

- IT Security
- GIS
- PSAP Technical Support

Operational Interoperability Subcommittee: This subcommittee would focus on the operational issues related to interoperating several local systems, and will make recommendations to the Regional Coordinating Committee for action. This subcommittee would address:

- How individual PSAPs will interoperate with the NG911 solution
- How partner systems' operational processes impact other systems in the region
- Integration of NG911 system processes and protocols that impact all participants
- Recommendations to the Regional Coordinating Council regarding changes to, coordination of existing, or new operational procedures related to interoperability that might become necessary for the effective operation of the system
- Process for accommodating jurisdictional membership evolution as new PSAPs decide to join the regional solution

It is recommended that members of this subcommittee be 911 directors or their designees, such as a 911 operations manager, of each participating agency. If counties decide to join the regional ESInet, the respective 911 directors, or their designees, would be voting members of the committee. Each jurisdiction in the designated region will be able to participate; however, only full participants, those that are part of the regional ESInet, will have a vote. Non-participating counties within the region (those not currently on the ESInet) will be considered non-voting members of the subcommittee. Those counties that do not participate in a regional ESInet at all would be omitted from having a voice or vote in the respective Regional Coordinating Committee.

Cost Allocation Subcommittee: This subcommittee would focus on issues related to cost allocation to the participating agencies and would make recommendations to the Regional Coordinating Committee for action. This subcommittee would address:

- How grant funds should be used to advance the region's interoperability
- Development of recommendations regarding new funding streams or other grant applications
- Development of recommendations to the Regional Coordinating Council for ongoing funding models post-grant
- Integrating new partners into the regional system as it relates to cost allocation
- Development of an equitable cost-allocation formula for adoption by the Regional Coordinating Committee

Policy Subcommittee: This subcommittee would focus on overarching policy issues related to system management, the methods and procedures for integrating new member agencies to the system, and recommendations to the Regional Coordinating Committee for action. This subcommittee would address:

- Development of policies for adoption by the Regional Coordinating Committee based upon recommendations of the Technical Interoperability, Operational Interoperability, and/or Cost Allocation subcommittees
- Development and maintenance of bylaws for the Regional Coordinating Committee and subcommittees

- Development of the methodology for integrating new members

As PSAPs will no longer be stand-alone entities, but will be part of a regional network, it is important that there is a regional governing body to handle the deployment and maintenance of the NG911 solution. The regional subcommittees can serve as the liaison between the local PSAPs and the 911 Service System Advisory Committee as there will be an established communications path.

4.4 PSAP-centric Options

The PSAP community throughout Nebraska has expressed the need for education on topics that directly affect them as they begin to transition to NG911. This education and support should come from the State level. Additionally, there should be minimum standards that need to be met by the PSAPs, and could be confirmed at the State level. For example, in the stakeholder engagement phase, the lack of PSAPs mandated to have a COOP plan was troublesome to stakeholders. The State could require each PSAP to have one and could offer guidance in its creation without actually taking the onus to create the plan.

Interconnectivity is the key element of NG911, which differs from platforms in use today. In today's environment, many PSAPs operate independently of one another with limited state-level coordination. Therefore, PSAP operational and technical policies and procedures must be reviewed and changes may be necessary to ensure they will withstand a transition to an NG911 environment.

Options for how this happens varies. The PSC and State 911 Director could develop best practices or provide PSAPs with nationally recognized best practices as guidelines for PSAPs to conform their policies and procedures.

Technical policies and procedures could become the State's or region's responsibility, and operational policies and procedures could remain the responsibility of the local PSAP.

The State could also allow PSAPs to operate as they do today and encourage them to create their own technical and operational policies and procedures for the transition, while providing guidance and oversight to ensure the direction aligns with the State's direction and NG911 requirements.

Whichever direction the PSAPs choose regarding policies and procedures development, it is important that those with that responsibility are educated on the topics and have access to resources that will make the policies sustainable in an NG911 environment.

4.5 Recommendations

4.5.1 State-level Interworking

Currently there is a wealth of knowledge and capability on the Wireless Enhanced 911 Advisory Board; therefore, it will prove beneficial to build upon that already established board and allow the members to

help coordinate the transition to NG911 within the state. Board members are educated on state legislation, have an expansive knowledge base, and are vested in the programs and initiatives.

The new 911 Service System Advisory Committee shall advise the State 911 Director and the PSC. The State 911 Director will participate as an ex-officio member of the board and serve as the 911 Service System Advisory Committee's escalation point if needed.

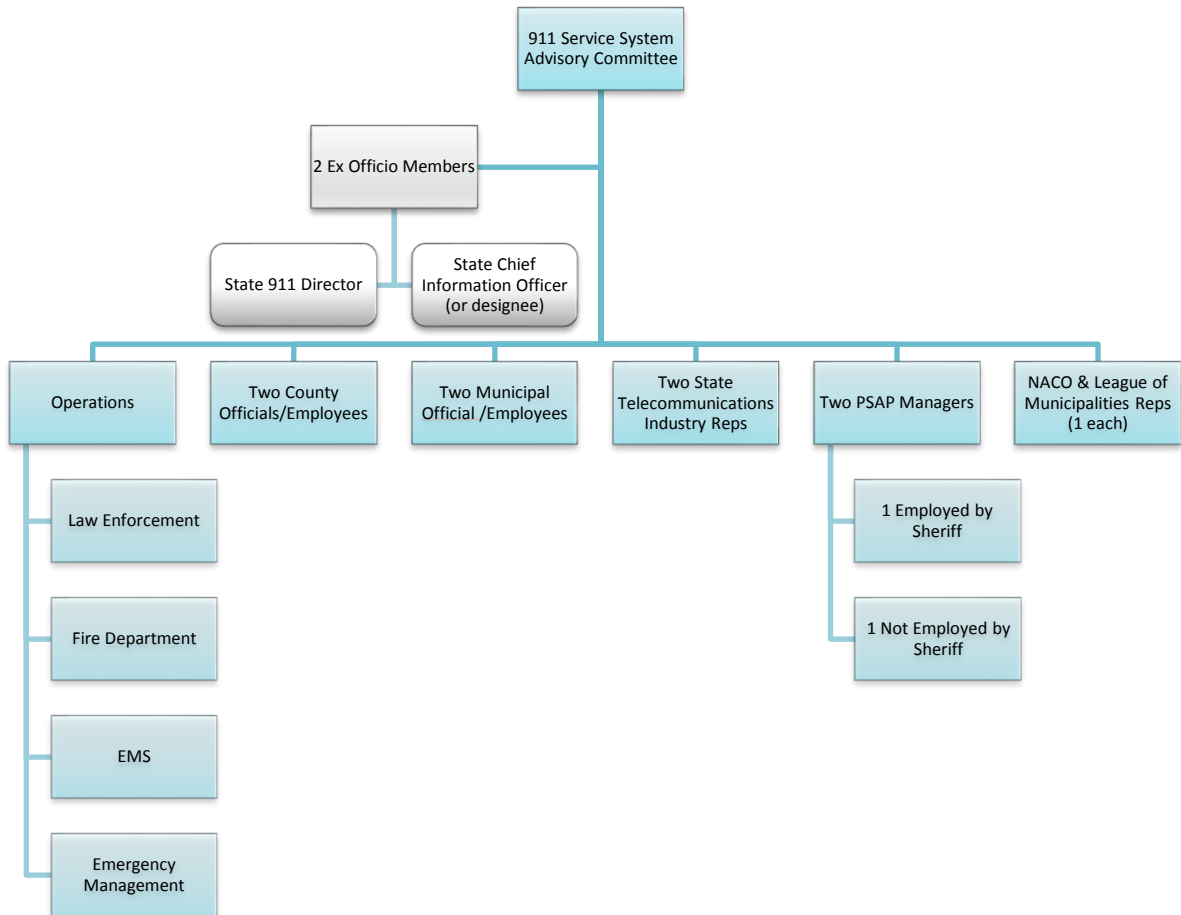


Figure 13: Recommended 911 Service System Advisory Committee

Using the established board and supplementing it with necessary SMEs and working groups will bode well for the 911 program.

4.5.2 Regional

Most important on the regional level is the review and consideration of any service level agreements (SLAs) that are associated with future regional deployments and any services that would be shared among

PSAPs and memoranda of understanding (MOUs) between jurisdictions when writing governance and policy for the NG911 platform in the regions. As NG911 allows for never-before used features, such as dynamic call overflow and rerouting, local jurisdictions and the State need to ensure there is a governance plan in place for each region to assure there is a plan that addresses the various aspects that require oversight regionally. With those features and others available, it is important that jurisdictions have MOUs in place to ensure call handling and processes are standardized, aligned, and do not conflict with those of neighboring jurisdictions. SLAs need to be identified to determine those that need to continue to exist and what new agreements would be necessary.

Policy routing rules would need to be established. It would also be beneficial to identify and examine any current MOUs that exist between jurisdictions to support the establishment of broad region-wide policy routing rules for NG911 call flow management.

4.5.3 PSAP

The PSC 911 staff should continue to act in an advisory role to local jurisdictions. The PSC 911 staff should offer advice and guidance when requested by the localities to do so. To ensure localities have met the requirements set forth by the 911 Service System Advisory Committee, PSAPs must be willing to periodically provide documentation, such as policies, procedures, and COOP plans, to prove statewide minimum standards are met and are in alignment with the State's NG911 plan. All operational responsibilities remain with the local jurisdiction.

4.6 Actionable Steps

4.6.1 State-level Interworking

The following actionable items should be taken to assure proper governance is in place at a state level:

1. The PSC should create the 911 Service System Advisory Committee to oversee the transition of the State to an NG911 platform.
2. The PSC 911 staff should create an initial Governance Plan.
3. The PSC 911 staff should create an initial Change Management Plan.
4. The PSC 911 staff should create an initial Transitional Communications Plan.
5. The PSC 911 staff should create a Cost Allocation Plan. This recommendation is in conjunction with the funding recommendation to revise the 911-SAM.
6. The PSC 911 staff should apply, or seek guidance in applying, for 911 grant funding through the National 911 Program.

7. The PSC should plan and begin the process for legislative changes that are necessary to assure a smooth transition.

4.6.2 Regional

The following actionable items should be taken to assure proper governance is in place at the regional level:

1. The PSC 911 staff should formalize the regions with a naming convention.
2. A Regional Coordinating Committee, or other governing body, should be created among jurisdictions within the region, once defined.
3. The Regional Coordinating Committees should review SLAs and MOUs to ensure they are reflective of the region and align with national best practices.

4.6.3 PSAP

The following actionable items should be taken to assure PSAPs are prepared for NG911 implementation:

1. PSAPs should write and/or review policies and standard operating procedures (SOPs) to ensure alignment with nationally recognized best practices.
2. PSAPs should determine if current policies and procedures align with Nebraska's NG911 mission.
3. PSAPs should review all SLAs and MOUs.
4. Policy routing rules should be developed.

5 Geographic Information System

The spatial data and query capabilities of GIS are a critical component of NG911. In fact, core functionalities such as call routing and location validation, which are handled via tabular referencing in legacy systems, are completely spatial in NG911. The spatial data managed by the GIS is also extremely complex because NG911 eliminates the traditional blinders placed at PSAP boundaries by the legacy Master Street Address Guide (MSAG) (call routing) and ALI (location validation) and creates the necessity of cross-jurisdictional and regional coordination of address points and ranges, street centerlines, and PSAP polygons. The powerful capability of NG911 to seamlessly failover for 911 centers to neighboring PSAPs or to a PSAP across the state further complicates the creation, maintenance, and distribution of spatial data. Statewide datasets must be aggregated from local and regional datasets, creating a regional (Nebraska) dataset supporting NG911 implementation. There is no one-size-fits-all solution to

regionalization. PSAPs, GIS departments, and emergency response leaders must work together internally and regionally to refine this data across the entire state.

5.1 Key Findings

GIS capabilities within jurisdictions across Nebraska vary widely. Other than the State and PSC GIS programs, Lancaster County, Sarpy County, Washington County, and Douglas County PSAPs also have internal GIS capabilities. The remainder of the state either contracts GIS services to a vendor or relies on the State to provide GIS data. This fragmentation of spatial competencies has led to a vast disconnect in data quality across the state. For example, Figure 14 shows edge matching errors between emergency service zones (ESZs). These slivers of unassigned geography would result in the ESInet default routing 911 calls and causing potentially life-threatening delays. Such errors can be found in all PSAPs in Nebraska.



Figure 14: ESZ Errors

This is problematic to the creation of statewide aggregated spatial data for NG911. Fortunately coordinating bodies and statewide efforts exist which can be leveraged by the PSC to accomplish this daunting task. The OCIO Geographic Information Office (GIO) provides enterprise level data and technology services to state agencies and partnering political subdivisions. These services work in collaboration with the Nebraska Information Technology Commission (NITC) GIS Council to support the Nebraska Spatial Data Infrastructure (NESDI) strategic initiative and other statutory requirements.⁸

The NITC GIS Council is tasked, by statute, to develop statewide policies and standards to help guide the acquisition and sustainability of the core NESDI framework layers.⁹ Within these core layers are the street centerline, address, and metadata standards that relate directly to the NG911 efforts of the PSC.

⁸ <http://www.cio.ne.gov/gio/index.html>

⁹ <https://www.nebraskamap.gov/news/nebraska-gis-council-emphasizes-latest-published-data-standards>

In 2012, the NITC commissioned the development of a statewide geospatial strategic plan. This plan identified several key areas for improvement within the Nebraska GIS program including the development and subsequent maintenance of a seamless street centerline and address referencing system. As a result of the recommendations therein, NITC formed the Street Centerline Address Database working group to focus on providing an authoritative dataset for all programs requiring spatial street centerlines. While this effort has both greatly improved the quality of the data and reduced duplicative expenditures for the street centerline dataset, there is not representation for any other NG911 required or recommended datasets within this or any other NITC working group.

Under the supervision of the 911 GIS Specialist, the PSC has migrated NG911 data collection, storage, and dissemination from a third-party hosted solution to the OCIO GIS enterprise data warehouse for the near-term. This migration allowed the PSC greater control over the data processes and improved the quality of service experience for the PSC stakeholder community. This is not a permanent solution, however, as neither the OCIO nor the GIO are prepared to provide the level of service required for provisioning data into ECRF or LVF databases to support real-time 911 call servicing. The PSC will begin the RFP process to provision a long-term solution to aggregation, quality control, and dissemination of NG911 data.

While the responsibility for individual datasets will remain with the jurisdictional data steward, it is necessary to establish a point of aggregation with the authority to enforce SOPs for data development, maintenance, submission, and usage. This point of aggregation must, in addition to storing and disseminating the data, serve as the quality control for the datasets as they are aggregated. To better enable the PSC to manage the submissions and validate the changes, the solution will also include quality control and validation tools. Errors in the data, identified using these tools, prohibiting the aggregation will be returned to the data steward for resolution. Nebraska state-level agencies are currently not equipped to provide this service to the demanding standards of NG911; hence the need for the development of an RFP for these services.

In an effort to align Nebraska public safety entities with the PSC's data development plan, the PSC has held two GIS education sessions on NG911 data development and is developing a guidance session on the broader role of GIS in NG911.

5.2 Options for Consideration

There is a growing collection of lessons learned and best practices for NG911 GIS data development. These, coupled with the stakeholder community's existing efforts and organization, will assist the PSC in moving forward with a successful NG911 implementation.

5.2.1 GIS Data Analysis

NG911 utilizes street centerlines attributed with address ranges for emergency call routing to the correct PSAP as well as within a CAD system for call dispatching and responder routing. Every PSAP in Nebraska will require a highly accurate, fully attributed street centerline file for their respective area of responsibility (AOR). One of the most significant benefits of NG911 is the capability for PSAPs to employ alternate

routing support for an offline or disabled PSAP. To realize this benefit, every PSAP must be provided with a seamless statewide street centerline dataset. Further, a statewide street centerline dataset supports many other operational needs within and beyond NG911. The development and maintenance of such a dataset requires coordination with every jurisdiction across the state. The PSC must also correct and complete the individual data and then aggregate the data into a single dataset. Currently, these services are being provided by the State. In the near-term, the PSC can rely on the assistance of the State GIO. These services are being included in the forthcoming RFP as part of a long-term solution.

On March 27, 2015, the NITC adopted the Street Centerline Standards (NITC 3-205). This document sets the standards for both geographic accuracy and the required attribution of the street centerline data in Nebraska. The authors displayed great consideration to the requirements of the NG911 civic layer data exchange format¹⁰ (CLDXF) while constructing these standards; only neglecting a country field in the data table. The GIO currently maintains an aggregated street centerline file with address ranges that was built and is maintained in compliance with the NITC 3-205. Source data is provided through a combination of local, regional, and state data stewards and is checked for compliance and accuracy by the GIO and then aggregated into a single spatial dataset. A careful review of NITC 3-205 shows that the standard sufficiently addresses the needs of NG911 and will yield a dataset of public safety-grade quality. The PSC should continue to actively participate in the centerline working group with the GIO and the Department of Roads to ensure this dataset is maintained in compliance with 911 requirements for attribution, accuracy, and currency.

GIS for call routing also requires statewide, seamless, and topologically-correct PSAP boundaries. ESZ boundaries are strongly recommended for dispatching and have the same accuracy requirements as PSAP boundaries. When analyzed in 2014, both boundary files were found to contain topological errors. Additionally, street centerlines must break at every intersection with either boundary file in addition to every intersection with another centerline. The State has an established boundary working group. Once the PSAP and ESZ boundaries have been corrected to remove gaps and overlaps, the PSC should request that maintenance of the aggregated PSAP and ESZ data be adopted by the working group. This group is best situated to monitor the need for updates due to changes in municipal boundaries, updated mutual aid agreements, or other political events.

5.2.2 GIS Implementation

The core datasets for NG911 are the street centerlines and PSAP and ESZ boundaries. Additionally, address points are highly recommended for use in Nebraska. While the current aggregated street centerline data is sufficient for NG911, PSAP and ESZ boundary datasets do not meet public safety-grade requirements. The PSC must work with the GIO and the jurisdictions to develop these datasets to public safety-grade.

PSAP and ESZ datasets do not need to follow other jurisdictional boundary geography. It is important to understand that while logical alignment of the boundary files with parcels, natural breaks such as bodies of

¹⁰ http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/Standards/NENA-STA-004.1.1-2014_CLDXF.pdf

water or drastic changes in elevation or with jurisdictional boundaries may be desired, operational factors and political and financial implications must also be considered. In some cases, these boundaries can be resolved between neighboring fire or police chiefs using existing mutual aid and other long-standing operational agreements. Where resolution cannot be achieved through such means, interim solutions must be implemented until political or official mitigation can resolve boundary disputes. There is no single solution to NG911 boundary resolution. Because the PSAP dataset will be utilized in place of the MSAG for call routing in NG911, the aggregated PSAP boundary file must be spatially and topologically flawless.

Address points further focus responders' search from a point somewhere along the road centerline to a single location for each address. For the majority of the state, these points can be placed at the discretion of the addressing authority in each jurisdiction. Address points are generally placed at the center of the parcel, on a building, at the entrance of a building, or at the point of intersection of the road centerline and the driveway. Suburban and urban residential and most commercial addresses can be placed on the building or parcel centroid. In more rural areas of the state, however, the driveway may be so long that the building cannot be seen from the roadway or the building may be closer in proximity to a right of way (ROW) other than the road to which the driveway is connected. In these cases, the address point must be located at the point of ingress to the address. Some jurisdictions have developed a secondary location point, a 911 address, for such parcels. Not all CAD systems can process secondary addresses. These second sets of location points also increase maintenance efforts and subsequent costs with little to no tertiary benefit.

Campuses and military bases also present potential issues for addressing and 911 authorities. For the latter, if response is to the security gate, there is no benefit to assigning dispatchable addresses to the buildings thereon. For either campuses or military bases where fire and/or law services are provided by the jurisdiction, all internal roads must be assigned address ranges and individual buildings should be assigned address points. Without internal road centerlines with address ranges, address points for these locations risk causing service delays.

5.2.3 Nebraska Standard Operating Procedures

As the PSC moves to seamless data for NG911, local, regional, state, and PSC GIS staff must work together to maintain the spatial data supporting NG911 call routing and CAD systems, as well as provide data corrections as required to maintain the ECRF. These standards will serve to protect the spatial components of the NG911 system.

5.3 Recommendations

5.3.1 GIS Data Analysis

The data validation process for converting from legacy tabular call routing to spatial call routing in NG911 must be completed in the listed order at each PSAP. Once a validation reaches 98 percent, the jurisdiction may begin the next testing phase. All jurisdictions should strive for 99 percent or better match rates.

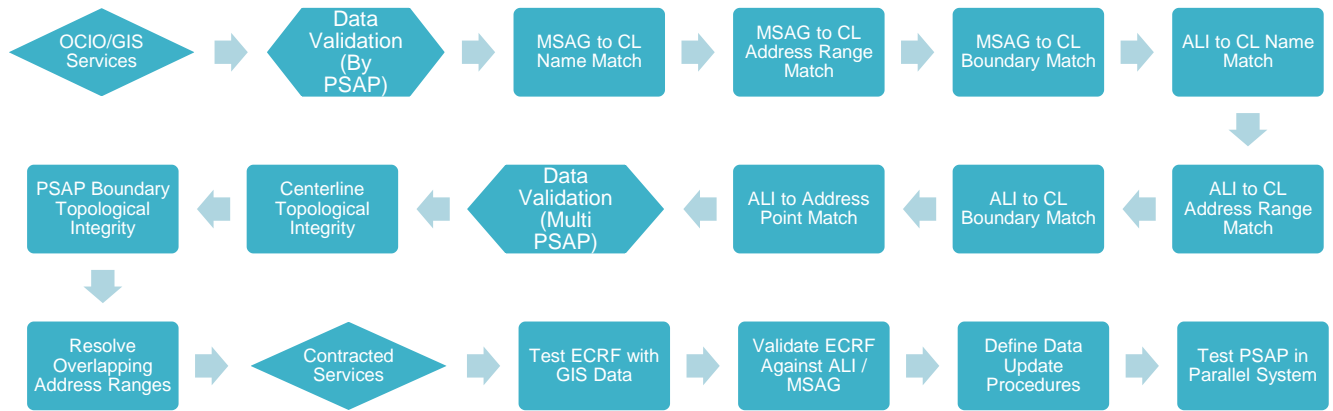


Figure 15: Data Validation Process

The migration to NG911 is not a simple flip-of-the-switch for each jurisdiction. The necessary phased approach to the migration will require the parallel maintenance of the spatial interface components and the legacy MSAG and ALI tabular data. The 98 percent match rate between the legacy tables and the road centerlines requires the editing of both datasets. The same is true for the ALI to road centerlines comparison and all other core datasets. Errors identified in the comparison process will require the researching of both legacy and spatial datasets for a resolution. In many cases, a single change will result in the resolution of a large number of discrepancies and a dramatic jump in the match rate. Some identified errors may require much greater individual attention and minimally improve the match rate. The tedious process of resolving 98 percent or better of all errors is necessary to provide the best life safety service to the population.

5.3.2 GIS Implementation

Issues with PSAP and ESZ boundaries as well as other recommended NG911 datasets would best be resolved through collaborative cooperation via a working group environment, similar to the Street Centerline working group under the NITC.

Address points and, more importantly, road centerlines with address ranges, must be implemented for school, university, and commercial campuses, and state parks with facilities such as picnic shelters, multiple park buildings, camp sites or cabins, or other publicly accessible buildings. Each building in these campus environments should be assigned an address that is associated with the road centerline and address range serving the building.

5.3.3 Nebraska Standard Operating Procedures

To ensure all parties understand time constraints, accuracy requirements and applicable standards as well as identifying the authoritative data stewards and proper data flow while minimizing the negative impact of new staff at any point along the data aggregation process, the PSC should create and maintain SOPs for:

- Roles and responsibilities of the GIS staff at the PSC
- Process for working with the OCIO and GIO to update, aggregate and disseminate data
- All workflows between local, regional, state, and PSC GIS staff
- Creation and maintenance of road centerlines with address ranges, to public safety standards
- Creation and maintenance of PSAP boundaries to public safety standards
- Creation and maintenance of address points to public safety standards
- Creation and maintenance of ESZ boundaries to public safety standards
- Aggregation of local and regional GIS data into a seamless, statewide coverage

Further, these SOPs must be updated as new best practices are identified and distributed widely to all stakeholders across Nebraska.

Table 6 shows the existing NITC standard and the related modifications necessary to cover all NG911 datasets.

Table 6: NITC Standard Changes

NITC ID	Standard	Change
3-201	Geospatial Metadata	Expand required compliance to include all data identified in the PSC 911 Service Plan as necessary for NG911
3-202	Land Record Information (Boundary)	Standard does not address NG911 requirements. Contradicts many PSC requirements. PSC should work with the Nebraska Administrative and Political Boundaries Program on the creation of an additional standard to resolve NG911 requirements based on FGDC and NENA guidance documents.
3-205	Street Centerline	Standard adequately reflects PSC requirements
3-206	Address	Standard adequately reflects PSC requirements
x-xxx	Workflow	Standard does not exist. PSC should document the workflow of data submission, validation and aggregation through dissemination and back to update. These standard operating procedures will be identified as the program matures and must be recorded, distributed and enforced to ensure data interoperability.

5.4 Actionable Steps

5.4.1 GIS Data Analysis

The following actionable items should be taken:

1. The PSC 911 staff should request MSAG copies from every PSAP.
2. The PSC 911 staff should request ALI copies from every PSAP.
3. The appropriate State agency should break OCIO aggregate data at the PSAP boundary.
4. The PSC 911 staff should perform validation tests on each dataset.
5. The PSC 911 staff should provide error feedback to OCIO and jurisdiction.
6. The appropriate State agency should recompile updated datasets.

5.4.2 GIS Implementation

The following actionable items should be taken:

1. The PSC 911 staff should identify data service providers.
2. The PSC 911 staff should establish performance metrics.
3. The appropriate State agency should develop data steward user interfaces.
4. The State should convene a 911 data working group.
5. The State should develop SOPs.

6 Continuity of Operations and Disaster Recovery

Nebraska's emergency 911 system was implemented to provide a lifeline to individuals in need of emergency assistance. The public has a high level of confidence in the 911 system and public safety communication services. Failure of the 911 system could result in a loss of life. 911 system managers and PSAP managers must develop and implement emergency response plans that protect the integrity of the system and assure public trust and confidence.

COOP and IT Disaster Recovery plans are intended to enhance the resilience of system components and mitigate the potential impact of a disaster. The adoption of a COOP/Disaster Recovery plan is intended to enhance the protection of personnel, facilities, systems, and data to assure the continued delivery of mission critical communication services.

Operations within a PSAP are heavily dependent upon IT systems. 911 system components, LMR systems, CAD, management information systems (MIS), logging recorders, records management systems (RMS), and administrative phones are IP-based systems. The addition of IP-based NG911 services will introduce an additional level of complexity to an already complex infrastructure. Emerging issues including Internet of Things (IoT) and Bring Your Own Devices (BYOD) internet-connected devices present unique threats to the security of critical IT systems.

Governmental entities are not exempt from threats posed by cyber-attacks. Administrators of 911 systems and PSAPs at the state, regional, and local levels must implement measures to enhance the resilience of the 911 system. A robust Disaster Recovery plan includes procedures to prevent, respond to, and recover from cyber-related incidents that can impact public safety communications systems.

The United States (U.S.) Department of Homeland Security (DHS) has designated the nation's 911 systems as Critical Infrastructure (CI). *Presidential Policy Directive on Critical Infrastructure Security and Resiliency (PPD-21)* defines Critical Infrastructure as "systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters." To further strengthen the resilience of IT infrastructure, Executive Order 13636, *Improving Critical Infrastructure Cybersecurity Framework*, was signed by President Obama on October 12, 2013.¹¹ The DHS Office of Cybersecurity and Communications (CS&C) works to prevent or minimize disruptions to critical information infrastructure to protect government services.¹² The Task Force on Optimal PSAP Architecture (TFOPA)'s final report¹³ has additional information on COOP and Disaster Recovery planning and can serve as another resource for Nebraska PSAPs and stakeholders.

The State of Nebraska has adopted a proactive approach to protect IT that serves state agencies and higher education. The NITC, in concert with the OCIO, has developed standards and guidelines that are intended to protect the State's IT systems. These standards could be applied to 911 systems and PSAPs to enhance resilience to cyber threats that could adversely impact the emergency communications systems.

6.1 Key Findings

MCP invited PSAP managers to participate in a survey concerning the status of COOP and Disaster Recovery planning. Thirty-two surveys were completed using the online system. The survey included the following key questions:

- Has the jurisdiction developed and adopted a continuity of operation/continuity of government (COOP/COG) plan?
- Has the jurisdiction develop an information technology Disaster Recovery (DR) plan to address data protection, system redundancy, data recovery, and system recovery?
- Has the jurisdiction completed a hazard and risk assessment?
- Has the jurisdiction's PSAP experienced impacts from a disaster?
- Do agreements exist with another jurisdiction to serve as a backup?

¹¹ Executive Order 13636, Improving Critical Infrastructure Cybersecurity, DCPD-201300091, February 12, 2013. <http://www.gpo.gov/fdsys/pkg/FR-2013-02-19/pdf/2013-03915.pdf>

¹² "Office of Cybersecurity and Communications." *Office of Cybersecurity and Communications | Homeland Security*. N.p., n.d. Web. 16 Dec. 2016.

¹³ https://apps.fcc.gov/edocs_public/attachmatch/DA-16-179A2.pdf

Only 60 percent of survey respondents indicated that their jurisdiction has adopted a COOP plan. Less than 40 percent of those responding reported the development of an IT Disaster Recovery plan. Slightly over 50 percent of the respondents indicated that their PSAP had suffered a direct impact from a continuity event. PSAP managers reported disruptions due to lightning strikes, flooding from a broken water main, roof leaks, power outages, staff illness, ice storm, and a tornado. This indicates a very high probability that a PSAP will suffer a continuity event at some point.

6.2 Threat and Hazards

Nebraska is susceptible to a variety of threats and hazards that can impact the welfare of individuals and cause property damage. The State of Nebraska Emergency Operations Plan (EOP) categorizes hazards into three categories: Natural, Technological, and Security.

A disaster or large-scale emergency incident has the potential to disrupt operations or components of the 911 system and PSAPs. COOP/Disaster Recovery plans must include mitigation measures, or controls, that are implemented to prevent or lessen the potential impact of known hazards. Table 7 contains a description of the key hazards that exist statewide.

Table 7: Nebraska Threats and Hazards

Statewide Hazards	Threats
Natural	Drought, earthquake, flood/flash flood, severe thunderstorm, high winds, hail, tornado, wildfire, winter storm, and pandemic disease
Technological	Dam/levee failure, utility failure, chemical hazardous materials (fixed site and in-transit), radiological (fixed site and in-transit), transportation incidents (air and rail), agricultural and animal disease, and urban fire
Human-induced/Security	Chemical, biological, radiological, nuclear, explosive (CBRNE) attack, civil disorder, conventional attack, internal sabotage, and cyber risks (cyber intrusions, denial of service attack, and ransomware)

6.3 State Information Technology Guidelines

The NITC was established by Executive Order 97-7 in November 1997. The Commission was codified in 1998 with the passage of the Information Technology Infrastructure Act. The NITC has developed technical standards and guidelines intended to coordinate the implementation of IT projects funded by the State.

The NITC adopted a Security Architecture standard that includes an *Information Security Policy, Data Security Standard, and Information Technology Disaster Recovery Plan Standard*. The 2015–2016 Nebraska Statewide Technology Plan presented ten objectives for protecting the State’s information technology resources.

6.4 Professional Standards

Several public safety-oriented professional organizations have developed standards intended to assist officials in protecting the physical, human, and IT resources within a PSAP.

NENA has promulgated a series of standards that address contingency planning and IT security. These standards have been widely adopted within the industry and have become the benchmark for assessing PSAP preparedness. NENA standards include:

- [NENA-INF-017.2-2015](#): *NENA Communications Centers/PSAP Disaster and Contingency Plans Model Recommendation*
- [NENA 75-001](#): *NENA Security for Next-Generation 9-1-1 Standard (NG-SEC)*
- [NENA 04-503](#): *NENA Technical Information Document Network/System Access Security*

The National Fire Protection Association (NFPA) is recognized as the leader in fire service standards. [NFPA 1600](#), *Standard on Disaster/Emergency Management and Business Continuity/Continuity of Operations Programs*, is recognized as a national preparedness standard.

IT and cybersecurity enhancements are of little value without PSAP personnel and facilities. The protection of facilities and personnel is a paramount concern, given the recent attacks on law enforcement officers. The Federal Emergency Management Agency (FEMA), in coordination with DHS, provides training on conducting risk assessments of critical infrastructure. [FEMA 452](#), *Risk Assessment: A How-To Guide to Mitigate Potential Terrorist Attacks Against Buildings*, provides guidance to government officials in methods to protect individuals and facilities. This guide addresses methods to mitigate threats involving explosive devices, chemical agents, disease agents, and physical intrusion of assailants.

These standards and guidelines, as well as others, may be adopted or referenced by the PSC to assist in the design of more resilient facilities, protection of PSAP staff, and the security of IT systems.

6.5 Continuity of Operations and Disaster Recovery Planning

An effective continuity of operations and disaster recovery plan should be a concise task-oriented document that details the procedures necessary to prevent or lessen the impact of an incident, prepare for a range of incidents, respond to an incident, and implement procedures to recover from an incident. A continuity plan will enable a PSAP to continue or reinstitute critical and essential functions. Essential functions are those functions that must be performed to assure the continuation of critical and essential services. The planning process will include an assessment of all staff positions and the functions performed by each position to determine those that are critical and essential within each PSAP. Specific procedures will be developed and resources identified to ensure the continuity of each function.

The planning process will involve the following key steps:

- Conduct a hazard and vulnerability risk assessment
- Conduct an Operations Impact Analysis (OIA)
- Identify controls, countermeasures, and mitigation measures
- Identify and define essential functions
- Define roles and responsibilities by task for all personnel
- Determine the delegation of authority and orders of succession
- Develop departmental-level response plans and procedures
- Define an incident management system
- Develop disaster recovery system and data recovery processes
- Identify logistics, resources, and mutual aid requirements
- Protect vital records and databases
- Identify alternate work sites and backup facilities
- Develop personnel communications, warning, and alerting procedures
- Develop continuity strategies
- Conduct training, testing, and exercising of the plan
- Determine plan maintenance and revision cycles

6.6 Recommendations

MCP formulated the following recommendations to improve PSAP preparedness:

- Conduct COOP and Disaster Recovery planning for PSAPs in conformance with state NITC COOP and Disaster Recovery planning standards
- Adopt PSAP building design standards to enhance resilience to environmental and intentional threats
- Develop pandemic response procedures to address decreased workforce availability
- Recommend public safety agencies strengthen IT security measures for all operational aspects
- Implement redundant paths to deliver calls to each PSAP
- Institute failover planning to re-route calls to designated alternate PSAPs
- Conduct annual testing and exercising to assess the validity of COOP and Disaster Recovery plans
- Develop an incentive that links funding to the adoption and testing of COOP and Disaster Recovery plans

6.7 Actionable Steps

The following actionable items should be taken to assure statewide PSAP COOP and Disaster Recovery planning:

1. The PSC 911 staff should adopt continuity planning guidelines and a standardized plan template to aid local PSAP managers in the development of plans and emergency procedures.

2. The PSC 911 staff should sponsor COOP and Disaster Recovery training for PSAP managers, personnel, and IT staff.
3. The PSC 911 staff and the 911 Service System Advisory Committee, with use of a focused subcommittee, should review and consider adoption of construction guidelines for new PSAPs to promote physical resilience to environmental hazards and intentional threats (i.e., blast standoff distances and vehicle barriers).
4. PSAPs and regional committees should engage in planning efforts on a regional basis to better coordinate response actions across neighboring facilities.

7 PSAP Policies and Procedures

7.1 Key Findings

Each element of the 911 Service System Plan will have some level of impact on the operational policies and procedures of the PSAPs. This is true for both legacy and NG911 PSAPs. National standards and guidelines that speak to operational policies and procedures offer some general information, but do not speak to specific policies and procedures. Each state, regional, and local PSAP, including those in Nebraska, have a variety of technological, human resource, and funding capabilities and challenges. These capabilities and challenges will drive the development and modification of operational policies and procedures needed to assist agencies, which will find themselves coming together for the first time, reduce risks associated with elements such as data accuracy and security, and meet the goals and objectives of Nebraska LB938 (2016). As noted in the *Next Generation 9-1-1 Transition Policy Implementation Handbook*¹⁴, a key is the “appropriate adoption of industry-based standards, rules, policies and procedures by stakeholders necessary to support such deployment.”

7.2 Considerations

Policies and procedures relative to the 911 system and specific to PSAP operations will need to exist. As such, the only area that may include options for consideration is in the approach to accomplishing this essential task. Even then, the approach is limited to either a bottom-up user-driven or top-down executive-driven options.

A solely user-driven approach may provide outcomes based on mission critical, functional, and realistic needs. However, when considering the potential future and yet unrealized possibilities in a public safety 911 system without the boundaries that currently exist, working groups consisting solely of users can result in unnecessary constraints. Conversely, and fraught with more risk, is a solely executive-driven approach.

¹⁴ http://c.ymcdn.com/sites/www.nena.org/resource/resmgr/ngpp/ng911_transition_policy_impl.pdf, page 7, viewed January 2, 2014.

Where the executives may provide a visionary view, the policies and procedures that would result may introduce risk to the PSAPs as the staff would be responsible for executing on policies and procedures that were unrealistic. Similarly, leaving the development of operational policies and procedures to IT specialists will introduce unnecessary risk as the outcomes will likely have technology-driving policies and procedures without true understanding of the mission critical and operational needs of the PSAP.

State, regional, and local stakeholders will need to establish operational policies and procedures that address:

- Processing of calls from new data sources
- Who has access to 911 call information and under what circumstances
- Data storage and retention, and dissemination of data
- Who has data rights and access to applications
- Coordination of services such as mutual aid, call transfers, evacuation, and fall back
- Effective communication and sharing of information
- Troubleshooting and reporting processes that may involve neighboring PSAPs and regions
- Maintenance procedures
- Processes for new or combined services
- Notification procedures that extend beyond the jurisdiction to outside agencies/companies

7.3 Recommendations

Whether new policies and procedures need to be developed or existing ones modified, it will require a collaborative approach. Agencies need to determine how to operate in a new infrastructure where traditional boundaries no longer exist. The PSC 911 staff will need to provide standards and processes for enforcing adherence to those standards. The PSC 911 staff will also need to provide an environment that is conducive to constructive discussion and action. This environment is essential to the ability of establishing how agencies will work more collaboratively to operate not only day-to-day but provide emergency assistance such as backup or coverage. To that end, MCP recommends a collaborative bi-directional facilitative approach to develop operational policies and procedures.

To achieve a realistic yet visionary outcome, MCP recommends this approach include oversight of a working group of users, technology specialists, and executives by the 911 Service System Advisory Committee, referred to in Nebraska LB938 (2016). This working group creation aligns with recommendations from the governance section of the plan and is considered an ad-hoc group that will be formed to evaluate specific efforts and then be disbanded once work is completed. The working group would come together for the sole purpose of reviewing and providing a comparison of current practices, policies, procedures, and methodologies to standards and best practices. This effort must be coupled with the local and regional governance recommendations on review of SOPs. This process will provide the PSC with a comprehensive view of how existing practices, policies, and procedures align with the industry. While it will be important to address disaster recovery policies and procedures as well, the working group should focus on the operational protocols with PSAPs that they would most likely interact with on a routine basis and provide comparison of practices with those agencies in their regions. It is important not only to identify capabilities, but also to uncover constraints that threaten effective call processing. The analysis

should highlight changes required to accommodate the capabilities of the new infrastructure and applications in the agile NG911 environment.

To assist with data and information gathering, MCP recommends the working group employ a survey tool to target individual PSAPs. To reduce inconvenience to PSAP staff, the survey could be combined with other elements in the plan that recommend use of a survey tool, such as governance and disaster recovery. Once the survey results have been compiled and reviewed by the working group, MCP recommends the next step be a series of webinar and regional meetings to garner even more insight into the operational policy and procedure needs and expectations.

MCP recommends the working group use the information gathered to produce an analysis report. This report should identify those policies and procedures that need to be updated and an outline of operational policies and procedures that are needed to address changes in protocols on how agencies operate and interact with each other agencies in the region and/or state as a result of increased functionality and capabilities of NG911.

7.4 Actionable Steps

The following actionable items should be taken:

1. At the state level, authorize formation of an operational policy and procedure working group, with 911 Service System Advisory Committee oversight, tasked with reviewing and providing a comparison of current practices, policies, procedures, and methodologies to standards and best practices. This action is inter-related with the regional and PSAP governance recommendations.
2. At the 911 Service System Advisory Committee level, bring together appropriately skilled users, technology specialists, and executives to form the operational policy and procedure working group and review the policy and procedure analysis report and provide recommendations to the PSC.
3. At the operational policy and procedure working group level, there are several actions:
 - a. Create and disseminate PSAP policy and procedure survey tool
 - b. Conduct regional webinars and meetings
 - c. Create policy and procedure analysis report and submit to the 911 Service System Advisory Committee
 - d. Write and/or review policies and SOPs to assure alignment with nationally recognized best practices
 - e. Determine if the proposed policies and procedures align with Nebraska's NG911 mission
4. At the PSAP and/or 911 jurisdictional level, respond to the survey, attend and participate in scheduled regional webinars and meetings, and adopt and implement model Nebraska 911 System operational policies and procedures.

8 Training and Education

8.1 Key Findings

The findings document published several previously identified important points related to current training requirements, capabilities, and programs that could be leveraged for NG911 purposes. The key findings are summarized below.

- There was agreement between all stakeholders interviewed that there should be minimum standard training requirements for emergency communications personnel and that these minimum training requirements should be based on national standards. National standards include those published by APCO15, NENA16, NFPA17, International Academies of Emergency Dispatch (IAED)18, and the Commission on Accreditation for Law Enforcement Agencies (CALEA)19, as well as the nationally recognized industry-recommended minimum training guidelines20 recently published by the National 911 Program.
- Stakeholders generally agreed that there is value in pursuing mandatory telecommunicator certification process as an end-state. However, there was a distinct difference in opinion among stakeholders regarding the implementation of mandatory certification as a short-term initiative.
- Consistent with industry opinions, a majority of the stakeholders believe that requiring certification will help elevate the professional status of emergency communications personnel to a level that in turn has the potential to improve recruitment and retention.
- The expectation is to promote consistent instruction in telecommunicator core competencies, which would be supplemented by the necessary practice of agency-specific classroom and on-the-job training.
- Attending minimum standards training will be a challenge for most PSAPs in the state. This is driven by the fact that most are single-position PSAPs where staff perform ancillary duties such as jail and public window services; the PSAPs do not have a CAD system and do not have the backup resources needed to receive regular breaks, or attend a comprehensive standard training program.

¹⁵ APCO's *Minimum Training Standards for Public Safety Telecommunicators*, APCO ANS 3.103.2.2015, identifies minimum training requirements for new and veteran telecommunicators.

¹⁶ NENA model recommendations/standards give 9-1-1 centers the tools they need to maintain a consistent level of service and work in relation to their peers in neighboring counties and states.

¹⁷ NFPA "develops, publishes, and disseminates more than 300 consensus codes and standards intended to minimize the possibility and effects of fire and other risks.

¹⁸ IAED is a non-profit standard-setting organization promoting safe and effective emergency dispatch services world-wide.

¹⁹ CALEA, a "credentialing authority through the joint efforts of law enforcement's major executive associations" accredits law enforcement agencies and 9-1-1 communications centers. *Standards for Public Safety Communications Agencies*. CALEA. Section 5.2 Training, page 5-3, July 2007.

²⁰ <http://wc911.squarespace.com/minimum-training-guidelines-do>

- The State has two primary industry professional organizations that work collaboratively, but identify as having different focuses. The first organization is a combined APCO/NENA chapter that focuses on management needs of the State’s urban agencies. The second, NESCA, identifies as the voice of the PSAPs with a focus on providing training, communicating what is going on across the state related to PSAP operations, and assisting the many small rural PSAPs. Both organizations use national standards as the basis for their guidelines.
- Beyond traditional agency-specific, in-house, on-the-job training, PSAP personnel have access to an 80-hour telecommunicator course. Since the 1980s, NESCA has coordinated, maintained, and provided instructors for this voluntary course. Agencies are encouraged, but not required, to send staff to the full 80-hour basic training.
 - Two exceptions to the mandatory attendance involve the National Crime Information Center (NCIC) and EMD certification modules, which are included in the 80-hour curriculum. Since the original meeting, NESCA has updated the protocols, making the EMD certification process more accessible. NESCA used national guidelines as a basis for the updates.
 - NESCA has a training committee that provides instructors for the 80-hour course. These instructors typically do not have, nor are they required to have, any form of standardized instructor certification.

8.2 Considerations

Comparing the findings to various training-related content of Nebraska LB938 (2016), it is clear that the Nebraska legislative leadership desires to formulate a strategy and assess the training requirements for NG911. To assist in that endeavor, MCP conducted research to identify ways to enhance the training capabilities and programs for NG911. MCP identified options, each with strengths and challenges, that would provide the level of training and capabilities to serve the current 911 service system, as well as set the path for the future. Provided below is a description of each consideration highlighting the strengths, opportunities, challenges, and risks of each option.

8.2.1 Standard Training Requirements and Mandatory Statewide Telecommunicator Certification Program

Regardless of the option, the end-state of this decision results in the same outcome—implementation of a mandatory statewide telecommunicator certification program. The risk in failing to achieve this outcome is directly related to the ability to maintain the enthusiasm and momentum that exists today. The decision to be made is to immediately establish standard training requirements with mandatory certification for emergency communications personnel or establish training standards as the foundation of a mandatory statewide telecommunicator certification program that would be implemented at a future time.

8.2.1.1 Establish Standard Minimum Training Requirements and Mandatory Certification for Telecommunicators

Implementing industry-accepted training standards along with mandatory certification for telecommunicators is crucial. This is consistent with industry opinions that requiring not only standard training but also certification helps elevate the professional status of emergency communications personnel to a level that in turn has the potential to improve recruitment, retention, and ultimately performance. These outcomes directly translate into risk mitigation and improved public trust.

Most public safety entities in the state possess some type of certification, including those for law enforcement, fire services, and EMS. Implementing a mandatory statewide telecommunicator certification program is a step towards mitigating exposure to risk and aligning with requirements for other public safety professions.

Requiring all telecommunicators to take a certification exam and not allowing a grandfather clause further reduces agency risk and liability concerns and ultimately enhances 911 service in Nebraska. Another option for Nebraska is to align with other states' approaches to establish a historical recognition benchmark for experienced communications staff.

By moving directly to a certification requirement, Nebraska would benefit from improved management of 911 services in a more timely manner. This approach reduces the risk that changes in leadership, political agendas, and lost momentum will occur. Also, by working on training standards and a certification program sequentially, duplication of effort is reduced, which results in a reduction in the overall schedule; allowing the PSC to achieve its goals of improving the delivery of 911 services sooner than later. This approach provides several opportunities that leverage these strengths:

- Provide a platform for the PSC to engage key operational stakeholders in a statewide training and education committee comprised of PSAP, APCO/NENA chapter, and NESCA representatives to provide input into the training and testing requirements
- Efficiently implement this approach by leveraging existing training standards already developed by national standards bodies and the National 911 Program, and lessons learned from several other states that have already implemented certification programs
- Enhance the consistency of 911 services throughout the state
- Make basic telecommunicator training opportunities available for smaller agencies with limited personnel resources and budgets

A challenge of this approach is the perception the program is an unfunded mandate that would place unnecessary burden upon the PSAPs, especially the smaller rural ones. Another common perception is staff may not be able to meet the requirements and will lose their jobs.

Risks associated with these challenges include:

- The current political environment may be conducive to moving straight into a full mandatory statewide telecommunicator certification program; however, changes in leadership and political agendas over time can impact program oversight and maintenance.
- Penalties for non-compliance such as withholding funds may be difficult and enforcement by the PSC may not have the support of the state's combined APCO/NENA chapter or NESCA.

This approach is clearly more burdensome than just establishing training requirements. To mitigate this risk for all parties, legislative language will need to be drafted along with a detailed governance document and related policies.

8.2.1.2 Establish Standard Minimum Training Requirements as the Foundation of a Mandatory Statewide Telecommunicator Certification Program

The primary difference between this approach and the previous one is it requires a lighter lift than establishing training requirements in conjunction with a mandatory certification program. As such, it will take longer to achieve the apparent results the legislative leadership is trying to achieve in Nebraska LB938 (2016). There is also the risk that the current momentum and enthusiasm for change would be lost over time, resulting in a failure to achieve the desired outcome.

Implementing statewide training standards without mandatory certification will reduce liability, but not as rapidly or to the same degree as a telecommunicator certification program. It is also a step towards aligning with requirements for other public safety professions, but again will not have the rate or level of impact on improving public trust, recruitment, retention, and ultimately performance as requiring certification. Implementing training standards will also contribute to the organic consolidation of PSAPs and the reduction in NG911 costs, but will not be realized as rapidly as the previous approach.

The opportunities that exist are similar to the previous option. The State can still build relationships with operational users through an education and training committee, offer basic telecommunicator training for smaller agencies, and ultimately enhance the consistency of 911 services throughout the state.

Perceptions and concerns regarding unfunded mandates will still exist, as will concerns that staff may not be able to meet the training requirements and will lose their jobs. Additionally, the enforcement of penalties for non-compliance such as withholding funds may still be difficult and enforcement by the PSC may not have the support of the state's combined APCO/NENA chapter or NESCA.

Stopping short of a mandatory statewide telecommunicator certification program and simply implementing training standards increases the risk that changes in leadership and political agendas will be realized and the momentum lost. Additionally, with this approach, tasks to achieve the training standards and then ultimately a certification program would be worked on sequentially, introducing duplication of effort and increasing the time it takes for the PSC to achieve its goals of improving the delivery of 911 services.

Legislative language will need to be drafted along with a detailed governance document and related policies.

8.2.2 Training Sources and Content

The outcome of this decision will determine to what extent to leverage professional organizations and existing training sources to support the development of training standards and/or certification. This decision can impact availability, accessibility, cost, and the timeline for accomplishing the goals and objectives of the PSC.

Leveraging existing training that is based on national standards and best practices will accelerate the timeline for delivering training to telecommunicators. Training can be customized to the specific needs of the State; however, this approach can take longer and challenges exist for reciprocity and mutual aid with border agencies. To mitigate the challenges of custom/one-off training programs, numerous training sources exist that can be leveraged to develop standardized training for telecommunicators, supervisors, training officers and managers.

New hire training should meet legislated requirements, at a minimum, and are available from multiple sources, such as APCO, IAED, National Emergency Communications Institute (NECI), or in-house if the program is approved by the PSC or is APCO-certified. Training that can only be delivered by staff in the State of Nebraska limits availability and access, and negatively impacts the timeline for training personnel. That said, using professional organizations may increase training costs.

The existing 80-hour course offered by NESCA is not certified by APCO through its Agency Training Program Certification. However, the course has the potential to serve as the framework for standardized training requirements and a mandatory certification program. NESCA members began a major curriculum revision last year with the stated goal of achieving APCO certification.

The NESCA training committee has the potential to serve as the foundation for a cadre of instructors for minimum training and a certification program. It would add significant QA and credibility to the minimum training standards and certification program if the instructors meet industry standard qualifications or possess certification, as described in the APCO and NENA training standards.

Alternate training sources such as computer-based and online (E-learning or distance) education can increase accessibility to available training, reduce costs for smaller agencies, and advance the timeline.

8.2.3 Training Requirement for Executives and Support Staff

The outcome of this decision will determine the PSC's intent as to the breadth of training beyond PSAP operational and supervisory staff. This decision can impact stakeholder engagement, cost, and the timeline for accomplishing the goals and objectives of the PSC.

8.2.3.1 Executive and Staff Support

New staff within the PSC tasked with fulfilling the statewide NG911 system initiatives based on Nebraska LB938 (2016) may require 911 system (specifically NG911) related training. Unlike PSAP staff for whom

training standards exist, there are currently no such standards for administrative, technical, and executive level office personnel involved in NG911 efforts.

Dynamic training program requirements will provide direction and guidance for PSC and municipal executives and support staff as they put forth effort and resources toward supporting its NG911 system goals and objectives. Such training enables PSC staff to use NG911-focused training and professional development to enhance decision-making. A plan for providing training to executive and support staff will help justify the time, money, and effort required to create and maintain the training program.

A commitment to provide ongoing professional development opportunities to not only telecommunicators, but also to administrative, technical, and executive-level office staff can help the PSC address the fast growing and rapidly changing 911 environment.

Strategically, the executive and support staff training initiative provides many opportunities including:

- Aligning program requirements with other agency program goals and objective
- Planning and preparing staff for the demands of NG911
- Developing and implementing a comprehensive training plan
- Establishing a basis for future hiring actions and/or job performance measures

8.3 Recommendations

The strengths and challenges presented for varying options considers opportunities to leverage existing programs, but also does not shy away from presenting larger initiatives that risk opposition, yet through an evolutionary process of education and outreach may achieve the optimal state of delivering 911 services throughout the state.

8.3.1 Standard Training Requirements and Mandatory Statewide Telecommunicator Certification Program

Approximately 75 percent of states have state-mandated minimum training requirements for telecommunicators; some of which may just encompass EMD. Currently about 18 percent of states have mandated state-level certification or licensure; however, the number is increasing in part because of the increased public expectation and liability exposure brought about by tragic incidents. Unfortunately, these incidents are often the catalyst for dispatcher training and certification legislation, such as the Denise Amber Lee Act in Florida. In Nebraska, the State should mandate that anyone answering a 911 call must meet minimum requirements to ensure the public has the confidence their calls will be answered with the same level of service no matter where they are within Nebraska.

MCP recommends training to a set of standards, as developed by industry organizations²¹ such as APCO, NENA, NFPA, and others, and clearly defined performance goals at all levels. These go hand-in-hand

²¹ <https://www.nena.org/page/trainingguidelines>

toward properly training and holding personnel accountable in order to provide the public with the level of service that the State expects to deliver.

Standard training requirements for supervisors and managers should be outlined. While certification for supervisors should not be out of the question, it should not necessarily be mandated as the position is different across the state with varying responsibilities and skill levels. It is important to start at the telecommunicator level, build a successful program, and then expand where appropriate, to perhaps different levels of telecommunicator certification. It is also important for PSAP managers and directors to have training requirements if not certification.

The PSC is in the position now to add Nebraska to the list of states that legislate certification or licensure of their telecommunicators—a proactive step towards advancing 911 as a profession within the public safety community. MCP recommends that the PSC pursue legislated statewide certification of telecommunicators.

Practitioner-based stakeholders clearly expressed that now is the opportunity to really push for certification of telecommunicators. They questioned, if not now, when will this opportunity exist again? There are great things happening in the 911 industry nationwide as well as in Nebraska and stakeholders think now is the time for setting training standards and implementing a certification program.

Regarding the concern of an unfunded mandate, stakeholders noted that no other public safety field uses the fact that they are small agencies to avoid certification. Organizations do not allow a county to say their jail is too small to meet jail standards or their city is too small to certify their police officers. It should not be any different for telecommunicators. The job is too important and the responsibilities too great. With the standardization of training and operations, the benefit of certifying telecommunicators will outweigh the expense. Certification will develop telecommunicators who are better prepared and more knowledgeable than in the past.

The justification for this recommendation is also supported as a best practice from the National 9-1-1 Assessment Guidelines. Statutory and Regulatory (SR) guideline 19 is provided below.²²

²² 911 Resource Center. Draft Report for National 9-1-1 Assessment Guidelines. June 2012, page 17.

Guideline SR19: The statutory environment provides for professional certification and accreditation.		
Guidance: This type of certification or accreditation may be issued by a State agency or a national organization. Personnel may include call takers, dispatchers, and technical staff. The statute should include continuing education and recertification.		
Minimum Criteria	Advanced Criteria	Superior Criteria
Statute(s) requires a certification or accreditation process for personnel/PSAPs that are part of the 9-1-1 system.	Statute(s) requires and enforces an evaluation of personnel/PSAPs that are part of the 9-1-1 system.	Statute(s) requires an assessment/certification process for personnel/PSAPs that are part of the 9-1-1 system. This process is fully implemented and demonstrated.
Rationale: Certifications and accreditation illustrate a measure of competence and can decrease liability. Having certifications and/or accreditation standards fosters a consistent service level across the state.		

Figure 16: National 9-1-1 Assessment Guideline SR19

Human Resources (HR) guideline 6 also supports this recommendation.²³

Guideline HR6: The state has a telecommunicator certification program.		
Guidance: This guideline is intended to recommend professional certification, which carries more weight than just attending training and receiving a certificate. The certification program should define the minimum job skills required for acceptable performance. There should be a process for those who are not able to meet certification requirements. Varying levels of certification should be commensurate with experience.		
Minimum Criteria	Advanced Criteria	Superior Criteria
The state has taken measurable steps towards a telecommunicator certification program.	The state has implemented a telecommunicator certification program.	The certification program is consistent with emerging national standards. The certification program is funded and enforced.
Rationale: Certification helps to ensure professional job performance.		

Figure 17: National 9-1-1 Assessment Guideline HR6

MCP recommends this approach include oversight of a committee or working group of users, technology specialists, and executives by the 911 Service System Advisory Committee. This training and certification committee (working group) would come together for the sole purpose of offering the PSC a set of minimum training standards for telecommunications personnel and recommendations for a telecommunicator certification program based on standards and best practices. This process will provide the PSC with a comprehensive view of how existing training practices and requirements align with the industry.

²³ Ibid., page 40.

To assist information gathering, MCP recommends the training and certification committee (working group) employ a survey tool to target individual PSAPs. To reduce inconvenience to PSAP staff, the survey could be combined with other elements that recommend use of a survey tool, such as governance, disaster recovery, and PSAP policies and procedures. Once the survey results have been compiled and reviewed by the training and certification committee (working group), MCP recommends the next step be a series of webinars and regional meetings to garner additional insight into training and certification needs and expectations.

MCP recommends the training and certification committee (working group) use the information gathered to produce an analysis report. This report should recommend the minimum training requirements along with recommendations for a statewide telecommunicator certification program.

MCP recommends that the training and certification committee (working group) begin by establishing the minimum training requirements for “basic” or initial telecommunicator certification, realizing that varying levels of certification could exist in the future. Other states’ requirements range from 40 hours to 232 hours. MCP believes that to elevate the telecommunicator position in the eyes of the responders and the public, additional training hours are necessary. However, MCP is aware that this could be problematic, particularly for smaller agencies.

MCP also recommends the training and certification committee (working group) discuss a statewide certification exam. The content could be developed independently by the committee itself, or with input from other states already conducting exams and professional testing organizations. There are other areas that must be given consideration, particularly whether current telecommunicators are grandfathered in and how an exam would be administered.

During the interviews, there was not a consensus on grandfathering staff. Arguments could be made for either side, and other states have grandfathered in current telecommunicators. Later feedback received from practitioner-focused stakeholders clearly indicates that although it is unnecessary to have current staff complete beginning level training, it is crucial to ensure all working telecommunicators can meet the standards. From their perspective, the option to establish a benchmark for experienced communications staff is really the only option. The alternative, which is to allow operators who are unable to do the job to continue in the position, is fraught with risk and should not be considered acceptable. It is highly probable that with additional coaching, most telecommunicators currently employed can be helped to meet the standard.

While it is ultimately the PSC’s decision, MCP recommends that practitioners’ subject matter expertise in this area be heeded and current telecommunicators’ past training suffice for any new established training requirements, but telecommunicators must successfully pass a certification exam within a defined time period to receive certification. This lends credibility to the certification process. For current telecommunicators who are unable to pass the certification exam after a defined number of attempts, there could be a remedial training requirement before sitting for the exam again.

Ideally a certification exam would be electronic; however, this may not be feasible at the onset. Paper exams, as well as electronic exams, should be proctored to ensure credibility of the process. Certification

exams could be offered at various locations across the state, such as PSAPs or the NLETC, space permitting.

Stakeholders also expressed a need for training opportunities offered by the PSC, including basic training, leadership training, and management training. Many supervisors have increased responsibilities that may require specific skill sets and/or knowledge. MCP recommends that supervisors receive specialized training within a defined time after promotion; this is especially important for first-time supervisors. MCP recommends that a training program be developed specifically for supervisors. The program could be a multi-year program, with required steps for each year. For example, perhaps the first year requires a first-time supervisor's course, a communications course, and a coaching or team-building course. The second year builds on the previous year and introduces new skill sets, such as effective writing. The third year introduces supervisors to other administrative areas such as budgeting, hiring, project management, etc. This could be a first step towards voluntary, or mandated, supervisor certification, depending on the State's direction.

To this end, MCP recommends that the training and certification committee (working group) develop training curricula for leadership, and then explore available options. This begins the development of career path training for telecommunicators, even if there are no advancement opportunities within a respective PSAP. Many leadership courses already exist and there is no need to reinvent the wheel.

Depending on the success of the training and certification committee (working group) and the realization of telecommunicator certification, there will be oversight and logistical considerations. MCP recommends the PSC give serious consideration to a statewide Training and Certification Coordinator(s) with primary responsibility for the certification process and requisite training as records will need to be kept and any re-certification requirements met. It is also likely that some enforcement activity for certification will be necessary, which could be coordinated through this position(s).

8.3.2 Training Sources and Content

It was apparent from stakeholder engagement that PSAP staff training requirements established based on national standards could be met from a variety of sources; that is, not mandating a training product. For example, if the committee decides that current national training standards for telecommunicators are satisfactory for initial certification, those training programs currently in use throughout the state that meet the minimum requirements should be sufficient to meet the requirements prior to any exam. This would include APCO's Public Safety Telecommunicator (PST) 1, IAED's Emergency Telecommunicator (ETC), and NECI's Basic 9-1-1 Certification. However, NESCA does offer an established 80-hour Public Safety Telecommunicator course that is hosted at the NLETC.

MCP recommends any in-house developed training programs, including NESCA's, which do not utilize APCO, IAED, or NECI courses, are certified by APCO through its Agency Training Program Certification before they are permitted to meet the training criteria for initial certification. NESCA members are revising the curriculum with the stated goal of achieving APCO certification. MCP recommends the PSC engage NESCA in discussions to explore the potential for NESCA's program to serve as the framework for the training program, certification program, or both. An advantage of using NESCA's curriculum is that it is

tailored to meet the needs of small and rural agencies. National training programs will be useful, but in addition, Nebraska-specific training offered by NESCA will enhance the choices.

NESCA also has a training committee that provides instructors for the 80-hour course. These instructors typically do not have, nor are they required to have, any form of standardized instructor certification such as outlined in APCO's *Core Competencies and Minimum Training Standards for Public Safety Communications Training Officer* or *Core Competencies and Minimum Training Standards for Public Safety Communications Training Coordinator*.²⁴ The instructors are considered SMEs and volunteer or receive compensation for their time from their agencies as other duties. MCP recommends the PSC engage with NESCA to explore the potential of the committee to serve as the instructional foundation for the training and/or certification program. MCP further recommends that instructors meet industry standard qualifications or possess certification.

Although NESCA's program is tailored to meet the needs of small and rural agencies, maintaining training may be a struggle for rural PSAPs if there is not support from the State. Several options are available for ongoing training, such as:

- Web-based training classes that can be attended from the PSAP workstation
- On-demand training programs where telecommunicators log into a website and complete the training at their pace
- Regional-based training classes within minimal driving distance of rural PSAPs so personnel can attend without costly overnight stays

While alternate online training could increase accessibility, the value of instructor-led face-to-face group training should not be dismissed. Stakeholders report that the opportunity to test skills in live scenario settings has proven invaluable in the training curriculum at NLETC. Adult education research demonstrates that most adults learn by doing and the opportunity to network with peers and practice new skills in a live scenario environment is very important. The skills needed to communicate effectively in crisis situations with not only professionals in the field but the public is greatly enhanced with live practice.

Most PSAPs surveyed rely on the State to provide telecommunicator training, if their staffing allows. Telecommunicator training should be mandatory, and the requirements clearly defined to allow the PSAPs to follow a training plan within a set time. For example, the State of Texas provides its telecommunicators with training plans, training aids, and schedules on their website. Texas recently adopted the licensing of telecommunicators.

Local community colleges with public safety coordinators could also serve as hosts for basic telecommunicator training offered by NESCA, APCO, IAED, or NECI. In North Carolina, for example, a local community college is one conduit; coordinating and scheduling needed classes that are paid for by the State.

²⁴ <https://www.apcointl.org/standards/apco-standards-for-download.html>

To meet the challenges of providing basic certification training efficiently throughout the state, alternative training delivery methods will be required. MCP recommends the PSC explore the feasibility of leveraging on-line or distance learning platforms that may exist at the NLETC or community colleges to economically deliver training throughout the state. Florida is an example of a state that has successfully engaged this methodology.

The increased quantity of available multimedia data will enhance and expand existing call taking functions. It may also extend the time it takes to process 911 calls, increase the workload of the call taker, and significantly change the call taker's experience (e.g., seeing the incident unfold in pictures and video versus hearing the incident). MCP recommends revamped introductory training, as well as continuing education and retraining for experienced staff. Properly designed training programs can enable PSAP managers and supervisors to prepare dispatchers and call takers to effectively utilize the data presented by an IP-enabled system, while maintaining the level of service expected by the public.

With the expectation of new data being presented to PSAP staff, the State will need to provide all staff with proper training to handle the influx of new data sources. Localities will maintain control and set policies and procedures on data storage and retention, and dissemination of data. However, the State will need to provide standards, and processes for enforcing adherence to those standards, for the training of PSAP staff.

Nebraska should facilitate a focus group that helps with the development, coordination, and communication of the NG911 strategy for the deaf, hard of hearing, and speech-impaired. The Nebraska Commission for the Deaf and Hard of Hearing and the Nebraska Commission for the Blind and Visually Impaired are potentially great resources to leverage for training assistance, especially in the areas of communication.

Clearly defined and attainable performance goals should be set for the PSAPs based upon nationally recognized best practices. Once the performance goals are set, then the appropriate training plans should be developed to support the goals. Funding should be appropriated for the training materials, equipment and, if possible, the courses themselves. The courses should be conducted in regional areas to ensure the rural PSAPs have the ability and means to attend.

8.3.3 Training Requirement for Executives and Support Staff

As the PSC moves toward implementation of NG911, it will be necessary to expand training curricula across the spectrum, including frontline telecommunicators and PSAP management, as well as municipal and PSC executive and support staff. MCP recommends providing introductory training, as well as continuing education and retraining for executive and support staff. To fully realize the capabilities that can be achieved in a true NG911 system, local and State IT staff would benefit from training in NGCS, wireless location technologies and integrity testing, public safety GIS, and related IP-based systems and interfaces.

8.4 Actionable Steps

The following actionable items should be taken:

The PSC 911 staff and 911 Service System Advisory Committee should form a training and certification working group, with 911 Service System Advisory Committee oversight, tasked with developing a set of standards and clearly defined performance goals for 911 staff.

At the state level, adopt legislation that mandates that anyone answering a 911 call must meet minimum requirements to ensure the same level of service is available anywhere within Nebraska.

The 911 Service System Advisory Committee should bring together appropriately skilled personnel to form the training and certification working group to establish minimum training requirements and present a training and certification analysis report with recommendations to the PSC.

The training and certification working group should:

- Establish the minimum training requirements for “basic” or initial telecommunicator certification
- Write and/or review training standards to ensure alignment with national standards
- Create and disseminate PSAP training and certification survey tool
- Conduct regional webinars and meetings
- Create training and certification analysis report and submit to the advisory board

PSAPs and local authorities should support this effort by responding to the survey, attending and participating in scheduled regional webinars and meetings, and adopting and implementing Nebraska 911 System training and certification requirements.

9 FirstNet Process and Procedures

The Middle Class Tax Relief and Job Creation Act of 2012²⁵ (Act) created FirstNet²⁶ as an independent authority within the NTIA; FirstNet is charged with designing, deploying, and operating a nationwide broadband network dedicated to public safety for their mission critical data needs. The nationwide public safety broadband network (NPSBN) will provide public safety users with access to 20 megahertz (MHz) of dedicated bandwidth in the 700 MHz frequency band, which will be utilized to transmit data that public safety responders require to perform their duties in a more effective and efficient manner. To facilitate the planning effort, the Act allocated grant funding to the 56 states and territories where the network is to be deployed for those states and territories to carry out various activities in preparation for network deployment. These activities consisted of:

- Outreach and education to inform stakeholders about the network and its capabilities for public safety
- Data collection to assist the states in establishing their requirements for network deployment in terms of coverage, capacity, users, and proposed phased deployment

²⁵ To view the Act follow this link: <https://www.gpo.gov/fdsys/pkg/PLAW-112publ96/pdf/PLAW-112publ96.pdf>

²⁶ FirstNet is directed by a board of 15 individuals with a cross-section of expertise from the public and private sectors. <http://www.firstnet.gov/>

- Establishing or refining public safety communications governance structures to include broadband communications
- Updating the statewide communications interoperability plan (SCIP) to include broadband communications and the NPSBN
- Other miscellaneous tasks

The grants have been administered by NTIA under the State and Local Implementation Grant Program (SLIGP). Nebraska applied for and received their allocated grant funding in 2013 and has been conducting planning activities in accordance with grant guidelines since that time. The State CIO, Ed Toner, has been designated as the single point of contact (SPOC) for coordinating the planning efforts. Bob Wilhelm, Nebraska OCIO, is the SLIGP program manager.

In assessing the current processes and procedures for FirstNet within Nebraska, MCP spoke with Mr. Wilhelm concerning the activities conducted to date and reviewed the materials the State submitted to FirstNet as part of the data collection activities. MCP reviewed the current governance structure and inter-agency communication mechanisms, as well as the State's SCIP.

MCP provides an anticipated timeline of NPSBN deployment and considerations for potential synergies between the NPSBN and NG911, as well as impacts to training and education requirements for all PSAP personnel.

9.1 Options for Consideration

9.1.1 Governance²⁷

The key consideration from a governance perspective for FirstNet deployment is ensuring the inclusion of the three primary public safety communications components (LMR, broadband, and 911) within the governance structure in some form or fashion. SAFECOM²⁸ and the National Council of Statewide Interoperability Coordinators²⁹ (NCSWIC) published the *Emergency Communications Governance Guide for State, Local, Tribal, and Territorial Officials*³⁰ in September 2015. The guide was designed to assist officials in establishing effective public safety communications governance structures by examining best practices from across the country to identify effective consistencies. The guide acknowledges that there is no optimal model that will work within every state due to the unique environments within each. However, it

²⁷ Governance considerations are addressed in Section 4, Governance.

²⁸ SAFECOM was created in the wake of the events of September 11, 2001; its mission is to improve designated emergency response providers' inter-jurisdictional and inter-disciplinary emergency communications interoperability through collaboration with emergency responders across federal, state, local, tribal, and territorial governments, and international borders. <https://www.dhs.gov/safecom>

²⁹ NCSWIC members are composed of the Statewide Interoperability Coordinators (SWICs) from the 56 states and territories. NCSWIC assists state and territory SWICs with promoting the critical importance of interoperable communications and the sharing of best practices to ensure the highest level of interoperable communications across the nation. <https://www.dhs.gov/safecom/NCSWIC>

³⁰ https://www.dhs.gov/sites/default/files/publications/2015%20Governance%20Guide_Master_508c%20Final.pdf

acknowledges the necessity for open and consistent communications between the LMR, broadband, and 911 components.

The Nebraska Public Safety Communications Council³¹ (NPSCC), created by Executive Order 12-01³², housed within the OCIO, is charged with overseeing LMR and broadband within the state. Broadband would include the planning effort for deployment of the NPSBN. The Public Service Commission³³ was created under the Nebraska Constitution, Article IV, Section 20³⁴, and is charged with coordination of 911 within the state.

Given the origins of both bodies, MCP would not recommend re-structuring of the governance model to include all three components under one structure. There is a need to ensure robust communications between the two groups, however, so both networks are not deployed in a vacuum without considerations as to potential synergies and common resource opportunities between them. The deployment of both the NPSBN and NG911 technology will together form an entirely new platform for public safety communications; citizens will be connected to first responders, first responders will be connected to other first responders, and PSAPs will serve, as they do now, as the hub for those communications. It is necessary for everyone involved in public safety communications planning to bear in mind what this new integrated environment will look like once completed to ensure all efficiencies are realized.

9.1.2 FirstNet Deployment

The Act that created FirstNet expires in 2022; as such, the initial deployment of the NPSBN must be completed by that date. FirstNet released an RFP³⁵ in January 2016, under solicitation number D15PS00295E, soliciting a partner to build and operate the NPSBN. Deadline for proposal submissions was May 31, 2016. There were three known respondents to the RFP: Rivada Mercury, pdv Wireless, and AT&T. FirstNet had intended to award the contract by November 1, 2016. On October 17, 2016, pdv Wireless and Rivada Mercury were informed that their proposals were no longer under consideration. Rivada Mercury filed a bid protest over their elimination from consideration.³⁶ All parties agreed that no award would be made until the bid protest was resolved.

On March 17, 2017, Judge Elaine Kaplan of the U.S. Court of Federal Claims, ruled in favor of the Department of the Interior, which had issued the RFP on behalf of FirstNet.³⁷ On March 30, 2017, FirstNet officially announced that they had awarded the contract to AT&T.³⁸

³¹ <http://www.cio.nebraska.gov/ps-broadband/npscc.html>

³² <http://govdocs.nebraska.gov/docs/pilot/pubs/eofiles/12-01.pdf>

³³ http://www.psc.nebraska.gov/ntips/ntips_e911.html

³⁴ <http://www.psc.nebraska.gov/admin/history.html>

³⁵ https://www.fbo.gov/index?s=opportunity&mode=form&tab=core&id=7806696f4340f16474647ccc57805040&_cview=0

³⁶ (Jackson, AT&T Is Apparent Selection to Build FirstNet, As Rivada Mercury Files Protest Over Elimination From Bid, 2016)

³⁷ (Hill, 2017)

³⁸ (Jackson, It's Official: AT&T Awarded Historic FirstNet Contract, 2017)

On June 19, 2017, FirstNet/AT&T released deployment plans to all states and territories. State and territory reviewers have 45 days to review these versions of the plans and provide feedback to FirstNet/AT&T concerning areas where they would like to see improvement. Upon receipt of all feedback, FirstNet/AT&T will take approximately 45 days to incorporate the feedback to the extent possible, and then deliver the finalized versions to the governors, which is anticipated to occur in mid to late September 2017. Once the finalized version is received, governors will have 90 days to decide whether their state or territory will “opt-in” and accept the FirstNet/AT&T plan to deploy and operate the network or will “opt-out” and assume responsibility for the construction and operation of the radio access network within the state. At the time of creating this plan Figure 18 showed the anticipated timeline for FirstNet/AT&T efforts through the end of 2017.

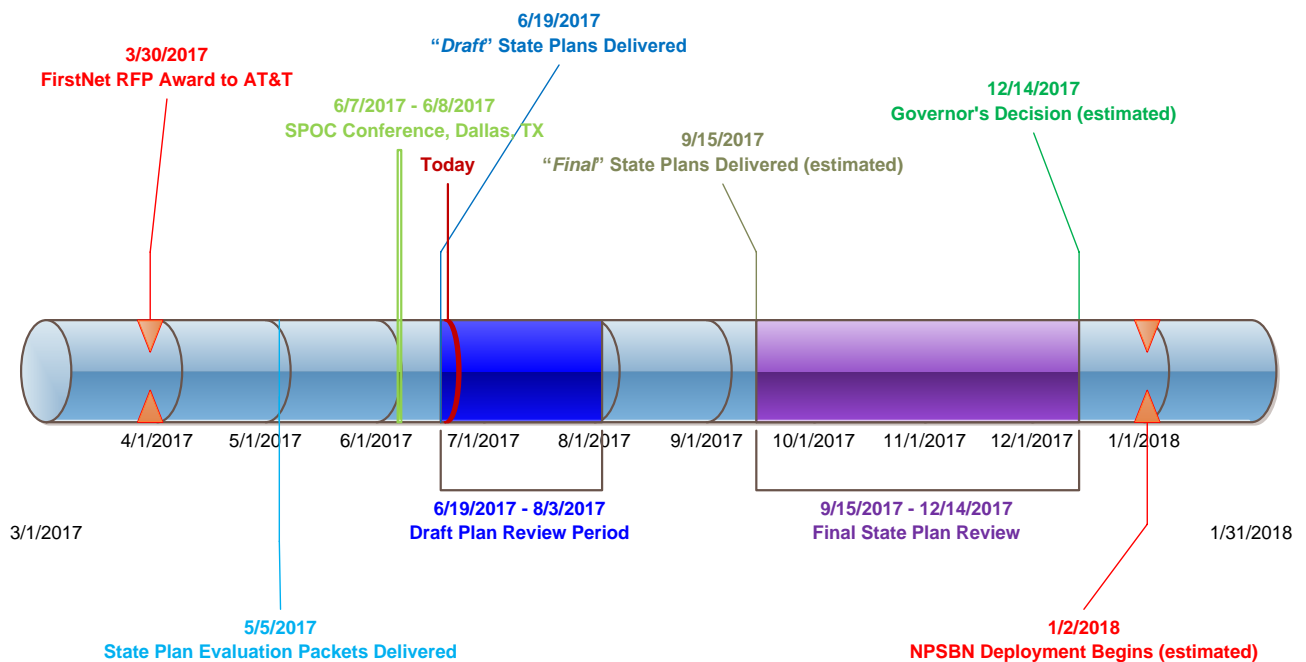


Figure 18: Estimated FirstNet Timeline

FirstNet envisions a phased deployment consisting of five phases over a five-year period. Appendix A contains the five phases submitted by Nebraska for consideration by FirstNet for the Nebraska state plan. The NPSBN and NG911 are separate networks that will complement each other in the realm of public safety communications. Even though these will be built as separate networks, MCP believes there should be opportunities for resource sharing between the networks as they enter and exit the PSAPs. The two complementary networks, once converged, will be able to provide first responders access to information that they have not had the opportunity to utilize in performing their duties. This information will enable first responders to perform their jobs more efficiently and effectively, potentially resulting in less loss of life, injuries, and property damage. In June 2015, the National Public Safety Telecommunications Council³⁹

(NPSTC) published *FirstNet and Next Generation 9-1-1 High-Level Overview of Systems and Functionality*⁴⁰. The report identifies three demarcation points for the two networks:

- Carrier network to the NG9-1-1 network
- NG9-1-1 network to the local public safety agency network/PSAP
- Local public safety agency network to the FirstNet network

Because FirstNet has not yet been deployed, and there are no current fully matured NG911 networks in place enabling the transmission of data from callers to PSAPs more than text messaging, the exact configurations of the demarcation points and technical specifications are not yet known. What also is unknown are the interface specifications between the networks and applications such as CAD. For this reason, it is important for the persons responsible for the deployment of each network to maintain regular communications with each other so these interfaces and interconnections can be developed to work in both directions. Figure 19, extracted from the NPSTC report, presents an image of how the networks will interoperate when fully deployed.

³⁹ NPSTC is a federation of organizations whose mission is to improve public safety communications and interoperability through collaborative leadership. <http://www.npstc.org/>

⁴⁰ (National Public Safety Telecommunications Council, 2015)

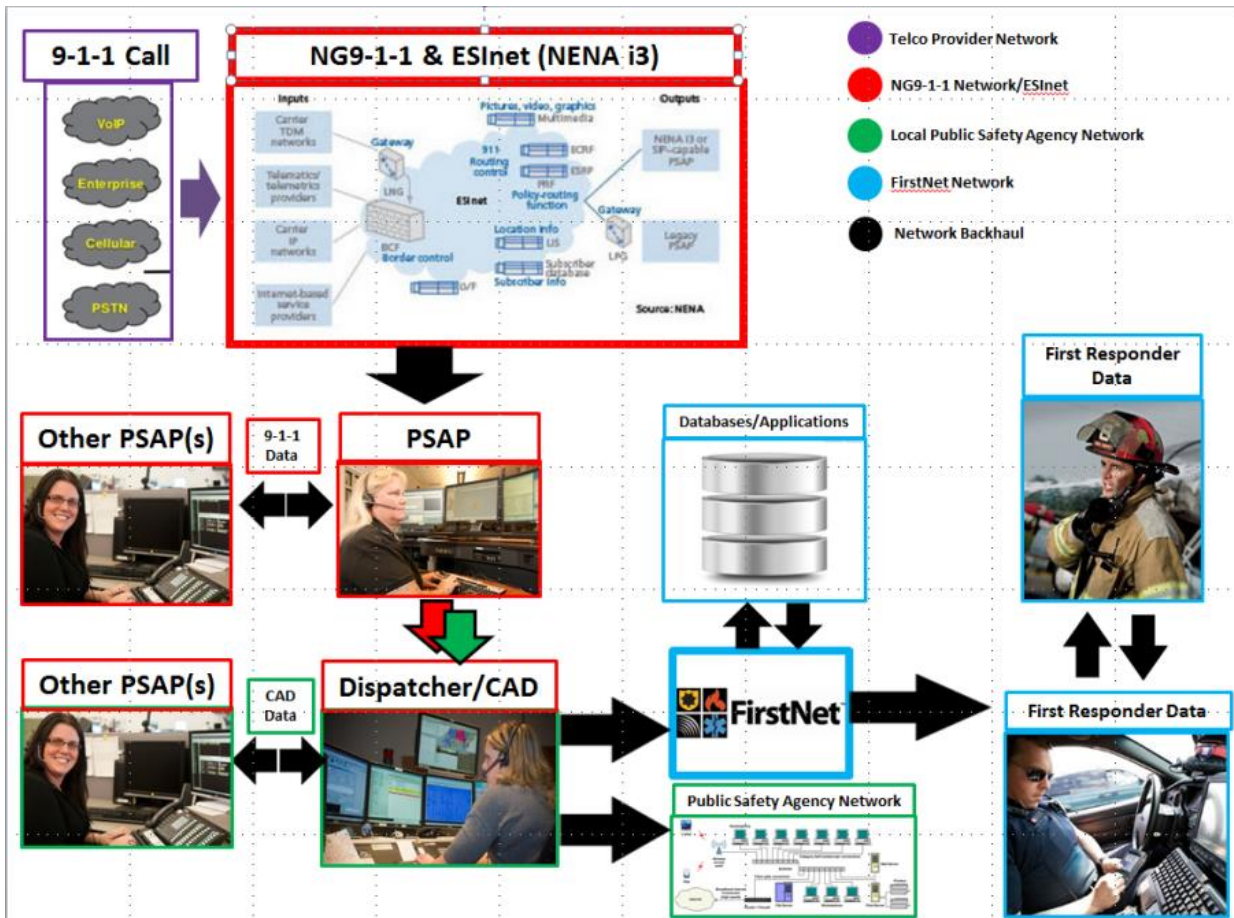


Figure 19: NG9-1-1/FirstNet Call Flow Diagram (NPSTC)

9.1.3 Training and Education

The NG911 framework will allow a much larger volume of information from different source devices to enter the PSAPs than what is now possible. The NPSBN will then enable dispatchers to send that information over the network to public safety personnel in the field. There will be distinct decision processes involved for dispatchers to discern what information, and how much of that information, will be sent to responders. It will be critical that only the most relevant information be forwarded so as not to “overload” responders with a great deal of information which they will have to sort through and which may not be necessary. The mechanics of ingress and egress of the information has yet to be determined, but will certainly need to be monitored as the mechanics are developed to ensure appropriate training can be developed.

9.1.4 SCIP

The National Emergency Communications Plan⁴¹ published by the Office of Emergency Communications within DHS calls for each state to establish and maintain a SCIP. The SCIP is a living document that must evolve as public safety communications technology evolves. The Nebraska SCIP was last updated in November 2015 and contains forward-looking elements for the deployment of the NRIN to connect PSAPs and enable the deployment of NG911 technology. The SCIP also addresses the deployment of the NPSBN, while also noting that the NPSBN will not replace LMR for the foreseeable future. PSAPs will still utilize LMR as their primary dispatching medium for first responders, but the introduction of broadband capabilities with NG911 and the NPSBN will greatly increase the complexities involved in call taking and dispatching. The SCIP will require further updating in the future as the networks deploy and the use of broadband increases.

9.2 Recommendations

9.2.1 Governance

The Nebraska governance structure places the responsibility for the NPSBN and LMR under the Nebraska OCIO, and the responsibility for 911 under the PSC. MCP recommends ensuring ubiquitous communications between the two bodies. The two networks are complementary and close coordination between the two efforts presents opportunity to identify synergy between the two implementations. Currently, there is cross-representation between the PSC and NPSCC.

The Nebraska Public Safety Broadband Working Group (NPSBWG) was created under the NPSCC to oversee the NPSBN planning effort. The working group membership is borne from the NPSBWG charter to ensure information sharing between the PSC and NPSCC. The State 911 Director and a representative from the Nebraska APCO/NENA chapter hold seats on the NPSBWG. The OCIO holds a seat on the Wireless Enhanced 911 Advisory Board. This cross-structure participation and integration is designed to facilitate the communication process between the governance entities.

9.2.2 FirstNet Deployment

Close coordination between the NG911 deployment and the NPSBN deployment is important to ensure common resources and infrastructure can be identified to avoid unnecessary redundancy and waste. Identifying and tracking CAD applications in use across PSAPs should be a consideration as to future interfacing capabilities with both FirstNet and NG911.

9.2.3 Training and Education

Once the NPSBN and NG911 are deployed, both the technological and operational elements will need to be incorporated in PSAP personnel training curricula. Broadband technology will provide access to vast

⁴¹ (Office of Emergency Communications, 2014)

amounts of information not previously possible, but will greatly increase the complexities involved with call taking and dispatching.

9.2.4 SCIP

The SCIP was updated in November 2015 and contains the most recent planning elements for current and future technologies. There will need to be regular updates to the plan as network deployments progress. There will need to be components of the NG911 deployment included in the plan to make it complete. Thus, the need for continued regular communications between the public safety communications governance bodies within the state.

9.3 Actionable Steps

The following actionable items should be taken:

1. If not already in place, the PSC 911 staff should establish regular lines of communication with the NPSCC to ensure appropriate information is exchanged between the areas of responsibility for each.
2. The PSC 911 staff should initiate dialogue with the OCIO concerning participation in the review of the FirstNet draft state plan so the 911 community is aware of the proposed deployment timeline, phases, and coverage areas. This will assure affected PSAPs are aware for planning purposes.

10 Funding Considerations

Funding of public safety technology, and 911 services is a complex issue. Funding considerations for any technology transition requires planning and forethought to ensure adequate resources are available to support existing systems until the transition to new technology is completed. Significant benefits can be realized through a statewide ESInet, interconnecting individual PSAPs and regional ESInets. This includes sharing network capacity, security, resources, system monitoring, call reporting, disaster recovery and enhanced call routing capabilities.

The National Association of 911 Administrators (NASNA) published a paper in 2015 titled *Four Potential Sustainable Funding Models for NG911*.⁴² This document provides some national perspective on potential sustainable funding, acknowledging that this is a very complex and diverse issue. In 2016 NASNA produced a companion paper, *911 Funding: Optimizing Revenue from the Current Surcharge Model*, drawing the conclusion that “The State 911 Administrators agree that the current 911 funding model needs to be optimized and sustained for the time being, but understand that it will eventually become necessary to change to a different mechanism.”⁴³

⁴² <https://drive.google.com/file/d/0B6UENGshedL6Mml5dWFFMVIneU9PZ2hVakNoUVpCeDdOLVZj/view>

⁴³ <https://drive.google.com/file/d/0B5HEHifGSF-eX3ZvUVZfVENYTmM/view>

To realize these and other benefits noted elsewhere in this document, Nebraska must assess the current 911 systems supported today, including existing funding policies, if effective planning for migration is to occur. A willingness among all Nebraska stakeholders to openly review and evaluate existing funding policy and advance changes where it makes sense will be paramount to moving Nebraska towards a realized NG911 end state.

10.1 National Trends

Technology advancement in 911 is playing catch-up to private sectors. Citizens currently have expectations of the technology used in their day-to-day lives, which includes:

- Services based on accurate location information (e.g., Uber or Lyft)
- Ability to communicate in non-voice methods while mobile (e.g., text messages, email and file sharing applications like Google™ and Dropbox™)
- Ability to share real-time multi-media such as photos and videos taken with their mobile device (e.g., Snap Chat and Facebook Live)

Migration to NG911 has been slow for a multitude of reasons, but while 911 authorities consider the transition, the telephone industry continues “transition of the underlying e911 [*sic*] infrastructure, from legacy circuit-switched networks to Internet-based communications”⁴⁴.

Based upon the transition of other legacy technology to IP, industry experts project that costs for support of legacy technology will rise as this transition continues. Analysis of past technology migrations demonstrates that as legacy networks become further removed from the provider’s mainstream service offering, the legacy service rapidly becomes obsolete and parts scarcer. This results in legacy networks being exceedingly costly to maintain. So, while historically there may have been sufficient funds to support the existing legacy 911 infrastructure, it should not be assumed that maintenance costs will remain static.

The move away from legacy technology can be seen in examples like the introduction of California bill AB2395⁴⁵ in 2016, which proposed an end to landline service by 2020. While this bill failed, it demonstrates a push away from legacy analog technology that currently supports 911.

In Nebraska, with LB938 (2016), there is a clear desire to understand and take proactive steps for migration to NG911. With this migration, consideration must be given to the transition period in which two systems will have to function in parallel until the full transition is completed.

This parallel operation will burden current funding levels, which, based on data collected for review from the PSC, are trending downward. In their 2015 report, the Industry Council for Emergency Response

⁴⁴ <https://www.theindustryCouncil.org/publications/iCERTReportontheStatusofNG911DeploymentintheUnitedStates.pdf>

⁴⁵ <https://legiscan.com/CA/bill/AB2395/2015>

Technologies (iCERT) stated that “Unless 911 fee collections are increased significantly, one-time funding support will be required from either states or the federal government.”⁴⁶

10.2 Current Nebraska Funding

Presently, the responsibility for management and oversight of 911 is shared between the PSC and local governing bodies. Local governing bodies are defined in the Nebraska Emergency Telephone Communications Systems Act as the county board, the city council of a city, the board of trustees of a village, or the board of directors of any rural or suburban fire protection district.

Historically, with assistance of the Wireless Enhanced 911 Advisory Board, the primary role of the PSC has been the administration of wireless funds, which are remitted directly to the PSC by the wireless providers. On an annual basis, the PSC reviews PSAP funding requests for approved expenditures and, based upon the 911-SAM, distributes a portion of wireless funds to supplement 911 costs. The PSC along with the Wireless Enhanced 911 Advisory Board also review funding requests for other approved 911 requests from PSAPs, for example Text-to-911.

Local governing bodies define local policies for 911 and execute service delivery. Local governing bodies are also responsible for management of landline and VoIP surcharges that the providers remit directly to the appropriate local authority.

With the introduction of LB938 (2016), the Nebraska legislature establishes intent that the commission (PSC) serve as the statewide coordinating authority for the implementation of the 911 service system. The PSC is to be responsible for statewide planning, implementation, coordination, funding assistance, deployment, and management and maintenance of the 911 service system to ensure that coordinated 911 service is provided to all residents of the state at a consistent level of service in a cost-effective manner.

10.2.1 Wireline Funding

The Emergency Telephone Communications Systems Act⁴⁷ permits local governing bodies to impose a surcharge of up to \$1.00 per telephone line or functional equivalent (limited to \$0.50 in Douglas County) for paying costs associated with the provision of E911 service. Funds generated by the surcharge are to be expended only for the purchase, installation, maintenance, and operation of telecommunications equipment and telecommunications-related services required for the provision of 911 service.

Landline surcharge revenue is remitted directly to local governing bodies by the LECs no later than 60 days after the close of a quarter.

MCP reviewed the PSC Annual Report on Telecommunications for the past five years to assess impact to Nebraska’s revenue stream at a local level. This report documents the surcharge assessed within each

⁴⁶ <https://www.theindustryCouncil.org/publications/iCERTReportontheStatusofNG911DeploymentintheUnitedStates.pdf>

⁴⁷ Nebraska Revised Statute 86-420 thru -441.01 (2016)

county and shows the surcharge by carrier for wireline and VoIP service. Table 8 below illustrates this data and the declining revenue over the past five years. From report year 2011 to report year 2016, there has been a total aggregate decline throughout the State of 14.19 percent. Based on national trends, a continuing decline in this revenue stream should be anticipated.

Table 8: Reported Wireline and VoIP Surcharge from Local Government

	Report Year 2012	Report Year 2013	Report Year 2014	Report Year 2015	Report Year 2016
Reported Wireline and VoIP Total Surcharge	\$6,841,492.01	\$7,417,466.86	\$6,905,190.46	\$6,000,550.39	\$5,870,367.10
Percent Change from Previous Year	N/A	8.42%	-6.91%	-13.10%	-2.17%

During the review of data, MCP evaluated the surcharges reported in 2016 and found inconsistent fee collection throughout the state. Of the 93 counties in Nebraska, 67 reported the monthly surcharge amount collected per line within the 2016 PSC Annual Report on Telecommunications. The 26 that did not report the monthly surcharge are part of regional solutions and reference other counties for this information.

The range of monthly surcharge is between \$0.50 and \$1.00. In 55 counties, the fee per line is reported at \$1.00 uniformly for all providers within that county, while some counties reported a different single rate countywide. In some counties, there are differing rates being charged within a single county depending on the provider; for example, in Hitchcock County all surcharges are reported at \$1.00 except for one provider which has a surcharge of \$0.50. In one county, the fee on wireline is capped at \$0.50. This disparity of fee collection among service types and providers means that payments by citizens in different parts of the state are not uniform and equitable.

The resounding message on funding from national organizations is that fee collection should be uniform and equitable for all communications devices capable of accessing 911. In January 2016, the Task Force on Optimal PSAP Architecture (TFOPA), in an advisory role to the FCC, published their final report. The report states, “The TFOPA shares the view of many in the public safety community that any technology or services capable of accessing the 9-1-1 system should contribute its fair share to operate the legacy 9-1-1 systems and also to assist in the build-out of the NG9-1-1 networks.”⁴⁸

⁴⁸ <https://www.fcc.gov/about-fcc/advisory-committees/general/task-force-optimal-public-safety-answering-point>

10.2.2 Wireless Funding

Wireless 911 services are managed and overseen by the PSC. An advisory board was created to assist the PSC in execution of its’ responsibilities and provides advice concerning the implementation, development, administration, coordination, evaluation, and maintenance of enhanced wireless 911 services.

The Nebraska Enhanced Wireless 911 Fund was created in 2001 to implement wireless E911 services across the state. The Enhanced Wireless 911 Services Act⁴⁹ grants the PSC broad authority to carry out the Act’s intent, stating: "The commission shall have any powers necessary to carry out the intent and purposes of the act." To this end, the PSC defines eligible costs to be reimbursed as requested by PSAPs and wireless carriers.

Wireless carriers are required to collect and remit a surcharge set by the PSC. The surcharge may be up to \$0.70 per month on all active telephone numbers or functional equivalents. An exception is made for users of wireless service whose primary place of use is in a county containing a city of the metropolitan class where the maximum surcharge is \$0.50 per month. The current surcharge on wireless devices is set by the PSC at \$0.45 statewide. While the charge on wireless devices is uniform throughout the state, there is still disparity between service types, wireline versus wireless.

Part of this assessment for current revenue streams included collecting input from the PSC on the remittance of funds from wireless carriers. Table 9 below shows this data for the past five years; there has been a very slight increase over that period of 0.64 percent. The funds shown below include both pre-paid and post-paid devices.

Table 9: Wireless Carrier Remittance Five Year Span

	Calendar Year 2012	Calendar Year 2013	Calendar Year 2014	Calendar Year 2015	Calendar Year 2016
Remittance	\$8,115,815.60	\$7,913,648.60	\$7,939,876.41	\$8,108,340.58	\$8,167,645.76
Percent Change	N/A	-2.49%	0.33%	2.12%	0.73%

With a slight increase in wireless remittances and continuing decline in wireline remittances, it becomes critical for Nebraska to take action to create a surcharge mechanism that is uniform and equitable for all devices.

⁴⁹ N.R.S. 86-442 thru -471

During review of available information, it was noted that presently there does not exist a method for effective auditing of funds remitted by wireless carriers. NASNA identifies this as a potential issue in a 2015 white paper on funding models⁵⁰, stating that a problem with funding may be “Under collection of funds. Adequate oversight and enforcement mechanisms rarely exist to audit remittances to ensure that all entities that are required to collect and remit do so and do so accurately.”

The Prepaid Wireless Surcharge Act became effective on July 19, 2012. Under this Act, beginning January 1, 2013, each retail seller of prepaid wireless telecommunication services collects wireless 911 surcharges directly from the consumer at the point-of-sale. The amount of the surcharge collected per retail transaction is based on an annual determination by the Nebraska Department of Revenue. Currently the amount is 1 percent of the transaction.

10.2.3 911-SAM Funding

The PSC has adopted a permanent funding mechanism, 911-SAM, for wireless 911 service. The 911-SAM forecasts the future status of the fund and assists in the allocation of annual support amounts to eligible PSAPs and wireless carriers. Individual funding amounts for PSAPs are approved taking into account their allocation from the 911-SAM, deductions, and any advances for special circumstances. Wireless carriers may also request funding.

With the present 911-SAM model for Nebraska, PSAPs that consider consolidation, bringing multiple PSAPs into a single PSAP, have to accept a loss of funds from the PSC. Due to the model, consolidating agencies lose out on some factors related to facilities at the PSAP.

The 911-SAM was adopted in 2010 as required by LB1222, N.R.S. §86-465. The initial model was created based upon historical data collected from 2003 through 2009 from actual PSAP costs. The complex economic forecasting model contains multiple variables that create many cross references throughout the model. In addition, there are several areas where data is manually pulled from other calculations and is challenging to understand. With a need to review and modify existing surcharge structures for wireline and wireless to prepare for transition to NG911 it is a logical time to assess the viability of the current model and consider changes to a more transparent, mainstream approach.

10.3 PSAP Funding Survey

Part of understanding the impact of migration to NG911 is gaining perspective from a local level. At the request of the PSC, MCP engaged the Nebraska PSAPs in this discussion by requesting input to a series of questions related to funding.

Five key points were identified from the collected data.

- Funding challenges are reported primarily in two areas: Staffing and NG911.

⁵⁰ <https://drive.google.com/file/d/0B6UENGshedL6MmI5dWFFMVIneU9PZ2hVakNoUVpCeDdOLVZj/view>

- At a local level, more than 50 percent of funding comes from sources other than 911 surcharges.
- GIS, Networks and NGCS are the three priorities identified by PSAPs for State funding of the migration to NG911.
- Radio equipment, IT support, and GIS were identified as the top three items for local funding of the migration to NG911.
- Of respondents, 72 percent were either neutral or in agreement with the PSC being the single aggregation point for all 911 surcharges, if consideration were given to expanding eligible funding items.

Of note from the key points identified above is number two, which identifies more than 50 percent of funding for 911 coming from sources other than surcharges. Through discussions with Nebraska stakeholders, part of the team reviewing this plan, the consensus is these are coming from local property tax revenues. Planning for the migration to NG911 should consider this and ensure a clear fiscal plan supports implementation without causing additional fiscal burden to local authorities.

A complete review of the survey questions posed to the PSAP community and the results can be found within Appendix B.

10.4 Collection of 911 Surcharges

U.S. Public Law 112-96, known as the Next Generation 911 Advancement Act (the Act), allocated \$115 million to support grants for eligible states and U.S. territories for the implementation and operation of 911, E911, and NG911 services and applications. Section 6503 of the Act requires applicants seeking to receive grants under this program to certify that no portion of any designated 911 charges imposed by the state or other taxing jurisdiction within which the applicant is located are being obligated or expended “for any purpose other than the purposes for which such charges are designated or presented.”⁵¹

The Act does not specify explicit allowable expenditures, but does state as the condition of eligibility that 911 charges may not be obligated or expended for any purpose other than the implementation or operation of 911 services, E911 services, or NG911 services. E911 services, by definition, include both Phase I and Phase II.

It is incumbent on the PSC and local governing bodies to ensure funds collected through surcharge remittance are not diverted to ensure Nebraska remains eligible for any funds released through grant programs.

⁵¹ https://apps.fcc.gov/edocs_public/attachmatch/DA-17-61A2.pdf

10.5 Rough Order of Magnitude Costs for NG911

Costs for the transition to NG911 are variable depending on several factors, including vendor solution, population served, technology deployed, and deployment model, among others. MCP developed rough order of magnitude (ROM) costs for NG911 to assist in budgetary planning across four component areas – Network Connectivity, NGCS, Interim Text-to-911, and Call Handling. The first two component areas are covered in the 911 system design section of this document; a summary is provided here for ease of reference.

10.5.1 Network Connectivity Costs

MCP often sees managed circuit prices between \$1,000 per month and \$1,300 per month from LECs. Distance charges can impact pricing to as high as \$3,500 per month for a circuit. A good approximation is \$2,100 per managed circuit per month, average, across the state of Nebraska.

MCP has used the count of PSAPs within Nebraska and adjusted the number where there is knowledge of a deployed regional host-remote system. There are 70 funded PSAPs, but this count is reduced for network connections where regional host-remote deployments are established.

When this plan was created the southeast region has two host sites with 15 supported PSAPs, so the count for this region reduces the PSAP link count from fifteen to two. The south-central region supports eight PSAPs, so the count is reduced from eight links to two. The east-central region supports seven PSAPs, so the count is reduced from seven links to two. With all adjustments, network costs currently must account for 46 connections.

Table 10: Estimated Statewide Network Connectivity Costs

	Quantity	Monthly Cost	Total	1 Year Cost	3 Year Cost	5 Year Cost
PSAP Links	46	\$2,100.00	\$96,600.00	\$1,159,200.00	\$3,477,600.00	\$5,796,000.00
State Ring	1	\$6,500.00	\$6,500.00	\$78,000.00	\$234,000.00	\$390,000.00
Totals	47	\$8,600.00	\$103,100.00	\$1,237,200.00	\$3,711,600.00	\$6,186,000.00

10.5.2 Next Generation Core Services

From the System Design section, MCP estimates that NGCS will cost \$0.15 to \$0.18 per month per person served. With an estimated 2016 population of 1,907,116, that is approximately \$286,100 to \$343,300 per month (rounded). On an annual basis, the range would be \$3.43 million to \$4.12 million.

10.5.3 Text-to-911

Currently the Wireless Enhanced 911 Advisory Board reviews funding requests from PSAPs on a case-by-case basis for deployment of text-to-911. Upon review, the Wireless Enhanced 911 Advisory Board makes a recommendation on funding to the PSC. The trend has been to provide direct IP connectivity for the delivery mechanism from the text control centers (TCCs). This type of connectivity has some significant deployment and recurring costs for consideration.

This trend was discovered by reviewing provided data that shows there are a total of 36 instances that are in some form of deployment from planning to completed implementation. Of that total, 33 of the 36 deployments—92 percent—to date in Nebraska have either already deployed with direct IP connection or have made their intent known they will request this type of deployment.

MCP reviewed available information on Nebraska deployments approved and determined the average non-recurring costs with deployments have been \$14,488 per deployment, with recurring fees averaging \$16,475 per year.

Based on these average costs of recurring fees, if deployments continue to utilize direct IP as the preferred solution, with Nebraska at the current rate of 92 percent, that means 63 PSAPs would deploy in this model and the recurring fees would be over \$1 million annually.

For forecasting, MCP uses this figure for ROM estimating. If the Wireless Enhanced 911 Advisory Board and the PSC select other deployment options, that is, web-based or teletypewriter (TTY) interim solutions, then these costs could be reduced significantly.

10.5.4 Call Handling

With transition planning, any call handling deployments must support NG911 technologies. A recommendation on the number of next generation-capable PSAPs to be maintained in Nebraska is required by Nebraska LB938 (2016). While presently the state does not mandate regionalization, several collaborative regions have taken shape already. Without a framework for requiring regionalization, MCP supports continued support for organic regionalization.

Call handling solutions vary widely based upon many factors including: size of PSAP, included features, teaming agreements between vendors, vendor-offered discounts, maintenance costs, and other factors. There are three models to consider for deploying next generation-capable call handling solutions in the transition to NG911. The first two are already deployed in Nebraska and fall into the “own and operate” category. The own and operate model cost can be prohibitive for smaller PSAPs due to the redundancy and resiliency that is built into current technology. Based on future planning, the third model, hosted, may be considered as an end state for transition of call handling as a more cost-effective method of service delivery.

10.5.4.1 Model 1 – Stand-alone PSAP

This model represents a typical historical deployment where a PSAP procures call handling equipment and keeps the entire system on premises. Current call handling systems should all be NG911-capable; to ensure this, any procurement moving forward should require this compatibility.

This model can be used by a single county and can also be used in a model where several counties are supported from a single PSAP; an example of this is Nebraska Region 26.

Costs for this model represent the most expense and are based on the existing PSAPs within Nebraska and the number of positions being deployed; fewer positions at a PSAP leads to greater cost as each stand-alone PSAP will require its own controller equipment. Each stand-alone deployment will also require connectivity to an established ESInet.

Based on data collected and reviewed by MCP, 46 of the 70 funded PSAPs in Nebraska are two-position PSAPs, roughly 66 percent. Costs for these type deployments may range between \$45,000 and \$60,000 per seat. MCP has estimated a per seat cost for call handling equipment at \$52,000 and has planned for a rotation of 20 percent of the total positions throughout the state on an annual basis. Based on these assumptions, Table 11 shows annual ROM costs for model 1.

Table 11: Estimated Statewide ROM Cost – Model 1

Rough Order of Magnitude Costs Annually – Model 1	
Network	\$1,237,200.00
Next Generation Core Services	\$3,776,089.68
Text-to-911 Recurring Fees – Assumption of Widespread Direct IP Connections	\$1,000,000.00
Estimated Annual Call Handling – Own and Operate	\$2,152,800.00
Estimated Annual Cost for Transitioned System	\$8,166,089.68

10.5.4.2 Model 2 – Regional Host–Remote

This model uses the same NG911-capable call handling controller and supports connectivity to that controller from multiple PSAPs. This model allows sharing of resources by numerous PSAPs that share backroom equipment. This model is deployed in Nebraska in three regions: southeast, south-central, and east-central.

Costs for model 2 align with model 1, with two key differences. First, the call handling cost per seat is lower due to sharing of controller equipment. Second, network connectivity costs to a state-level ESInet will be

lower because connectivity will be with the regional host sites, not each individual PSAP. While the connectivity costs to the state-level ESInet will be lower, there will be local connectivity costs to consider for connections between host and remote sites.

Both models 1 and 2 allow for improved resiliency by geographically diversifying the two redundant elements of the call handling controllers. The separation will then require redundant network connections to both core elements.

In model 2, MCP assumes the seat count for a region will be between 30 and 40 seats. Based on that seat count and evaluating similar sized deployments in other parts of the country, a per seat cost of \$27,000 is used for this model. MCP has assumed the same planned rotation of 20 percent of the total positions throughout the state on an annual basis. Based on these assumptions, Table 12 shows annual ROM costs for model 2.

MCP has developed two tables for model 2 reflecting the difference in network connectivity costs. In model 2a, the model assumes local governing authorities will continue to work towards regionalization and reflects settling on ten regional deployments. Model 2b shows the ROM costs if regionalization reduces that number to six regions.

Table 12: Estimated Statewide Annual ROM Costs for Model 2a

Rough Order of Magnitude Costs Annually – Model 2a	
Network	\$582,000.00
Next Generation Core Services	\$3,776,089.68
Text-to-911 Recurring Fees – Assumption of Widespread Direct IP Connections	\$1,000,000.00
Estimated Annual Call Handling – Regional Host-Remote Deployments – 10 Regions	\$1,117,800.00
Estimated Annual Cost for Transitioned System	\$6,475,889.68

Table 13: Estimated Statewide Annual ROM Costs for Model 2b

Rough Order of Magnitude Costs Annually – Model 2b	
Network	\$380,400.00
Next Generation Core Services	\$3,776,089.68
Text-to-911 Recurring Fees – Assumption of Widespread Direct IP Connections	\$1,000,000.00

Rough Order of Magnitude Costs Annually – Model 2b	
Estimated Annual Call Handling – Regional Host-Remote Deployments – 6 Regions	\$1,117,800.00
Estimated Annual Cost for Transitioned System	\$6,274,289.68

10.5.4.3 Model 3 – Fully Hosted

In this model, the state of Nebraska would identify a vendor through procurement that would host all call handling functions. The awarded vendor would provide a complete end-to-end solution for call handling. This solution deploys call taking positions at PSAPs that participate; all “back end” equipment is maintained by the awarded vendor in its data centers or appropriate location.

In this model, MCP estimates an average cost per seat to be \$21,000 based on information from similar deployments.

Table 14: Estimated Statewide Annual ROM Costs for Model 3

Rough Order of Magnitude Costs Annually – Model 3	
Network – Now local sites to hosted network	\$1,237,200.00
Next Generation Core Services	\$3,776,089.68
Text-to-911 Recurring Fees – Assumption of Widespread Direct IP Connections	\$1,000,000.00
Estimated Annual Call Handling – Fully Hosted	\$869,400.00
Estimated Annual Cost for Transitioned System	\$6,882,689.68

10.5.5 ROM Cost Compared with Remittance

With the current surcharge collection of wireless funds at the state level, the PSC projects an available amount of support for the next three years of planning as part of the 911-SAM. MCP used this data, along with the remittance projections shown earlier, to provide a view for costs over the next three years.

The following four tables show the projected cost differences between the 911-SAM forecasted amounts available for support and the ROM projections for NG911 deployment.

For each comparison below, the row for “Projected PSAP and GIS Costs from 911-SAM” will fluctuate as Nebraska transitions to NG911. Some costs that were planned as PSAP support costs will move to NG911 costs; at this point in the process it is unknown the rate of this transition.

Table 15: Cost Projections for NG911 Compared with 911-SAM Projected Available Support Dollars, Model 1

Model 1	Calendar Year 2017	Calendar Year 2018	Calendar Year 2019
911-SAM Forecast of Available Support	\$6,844,456.00	\$7,108,716.00	\$7,367,740.00
Projected PSAP and GIS Costs from 911-SAM	\$4,835,231.00	\$4,928,160.00	\$5,019,521.00
Remaining Funds After PSAP and GIS Costs	\$2,009,225.00	\$2,180,556.00	\$2,348,219.00
Projected Annual NG911 Costs – Model 1	\$8,166,089.68	\$8,166,089.68	\$8,166,089.68
Funding Needs for NG911 Deployment	(\$6,156,864.68)	(\$5,985,533.68)	(\$5,817,870.68)

Table 16: Cost Projections for NG911 Compared with 911-SAM Projected Available Support Dollars, Model 2a

Model 2a	Calendar Year 2017	Calendar Year 2018	Calendar Year 2019
911-SAM Forecast of Available Support	\$6,844,456.00	\$7,108,716.00	\$7,367,740.00
Projected PSAP and GIS Costs from 911-SAM	\$4,835,231.00	\$4,928,160.00	\$5,019,521.00
Remaining Funds After PSAP and GIS Costs	\$2,009,225.00	\$2,180,556.00	\$2,348,219.00
Projected Annual NG911 Costs – Model 2a	\$6,475,889.68	\$6,475,889.68	\$6,475,889.68
Funding Needs for NG911 Deployment	(\$4,466,664.68)	(\$4,295,333.68)	(\$4,127,670.68)

Table 17: Cost Projections for NG911 Compared with 911-SAM Projected Available Support Dollars, Model 2b

Model 2b	Calendar Year 2017	Calendar Year 2018	Calendar Year 2019
911-SAM Forecast of Available Support	\$6,844,456.00	\$7,108,716.00	\$7,367,740.00
Projected PSAP and GIS Costs from 911-SAM	\$4,835,231.00	\$4,928,160.00	\$5,019,521.00
Remaining Funds After PSAP and GIS Costs	\$2,009,225.00	\$2,180,556.00	\$2,348,219.00
Projected Annual NG911 Costs – Model 2b	\$6,274,289.68	\$6,274,289.68	\$6,274,289.68
Funding Needs for NG911 Deployment	(\$4,265,064.68)	(\$4,093,733.68)	(\$3,926,070.68)

Table 18: Cost Projections for NG911 Compared with 911-SAM Projected Available Support Dollars, Model 3

Model 3	Calendar Year 2017	Calendar Year 2018	Calendar Year 2019
911-SAM Forecast of Available Support	\$6,844,456.00	\$7,108,716.00	\$7,367,740.00
Projected PSAP and GIS Costs from 911-SAM	\$4,835,231.00	\$4,928,160.00	\$5,019,521.00
Remaining Funds After PSAP and GIS Costs	\$2,009,225.00	\$2,180,556.00	\$2,348,219.00
Projected Annual NG911 Costs – Model 3	\$6,882,689.68	\$6,882,689.68	\$6,882,689.68
Funding Needs for NG911 Deployment	(\$4,873,464.68)	(\$4,702,133.68)	(\$4,534,470.68)

Funding considerations were initially developed based on the current 911 SAM without factoring the use of any reserve funds available to offset funding needs for NG911 deployments, this led to evaluating changes in the wireless surcharge to account for the necessary funds. MCP calculated the number of subscribers in Nebraska based upon the current rate on devices set at \$0.45 per device. To derive the number of devices, MCP reduced the total wireless remittance figure by the amount of remittance attributed to pre-paid wireless surcharges, \$1,058,351. This left a balance of \$7,109,294. This balance then is divided by 12

months to reduce the annual figure to a monthly amount; this equals \$592,441.17. Dividing this monthly figure by \$0.45, MCP arrived at an estimated 1,316,536 wireless devices in Nebraska providing monthly surcharge remittance.

MCP supports a single fee for all interconnected devices capable of two-way communications with a PSAP and recommends the establishment of a range for a single surcharge be established. The range should ensure the surcharge will provide a sustainable revenue stream for Nebraska to deploy NG911 without additional burden on local property tax revenues. The PSC should be permitted to set the surcharge within the range established by the legislature. The range should be set between \$0.45 and \$1.25. This range allows the PSC to establish a rate to fund NG911 transition and the flexibility to scale the rate down in the future if deployment costs are less than anticipated.

Moving to a one fee model also means standardizing the surcharges on VoIP and wireline as well. The cost models were based on funds from wireless surcharges assuming an initial surcharge rate of \$0.90 per device, shown below. MCP modeled this change based on the reported figures in the PSC Annual Report on Telecommunications (2016). For demonstration, if the rate were set at \$0.90, Table 19 below shows projections based on the current data points from the PSC report and the estimated number of wireless devices calculated above. The table shows how this rate compares to Model 1, which was the highest cost model. Wireline and VoIP surcharge funds were not used in the cost models and those revenues will remain with local governing authorities, MCP encourages local authorities to align wireline and VoIP surcharge rates with the rate established by the PSC for wireless surcharges.

Table 19: Rate Change Demonstration

	Calendar Year 2017	Calendar Year 2018	Calendar Year 2019
911-SAM Forecast of Available Support	\$6,844,456.00	\$7,108,716.00	\$7,367,740.00
Projected PSAP and GIS Costs from 911-SAM	\$4,835,231.00	\$4,928,160.00	\$5,019,521.00
Remaining Funds After PSAP and GIS Costs	\$2,009,225.00	\$2,180,556.00	\$2,348,219.00
Projected Annual NG911 Costs – Model 1	\$8,166,089.68	\$8,166,089.68	\$8,166,089.68
Funding Needs for NG911 Deployment	(\$6,156,864.68)	(\$5,985,533.68)	(\$5,817,870.68)
Additional Projected Funds from Wireless Remittance if Surcharge Increased to \$0.90	\$7,057,132.84	\$7,102,201.91	\$7,049,660.21
Available Funds After Projected NG911 Costs	\$900,268.16	\$1,116,668.23	\$1,231,789.53

Additional projected funds from wireless remittance were calculated by the following formula:

Modeled wireless surcharge rate [(\$0.90) * Estimated number of wireless subscribers in Nebraska (1,316,536)] = estimated per month wireless remittance \$1,184,882.33

Estimated monthly remittance * 12 months = estimated annual wireless remittance \$14,218,588

Estimated annual remittance (\$14,218,588 + pre-paid remittance from 2016 \$1,058,351) = Projected remittance with increase for 2017 - \$15,276,939.76

Projected remittance with increase for 2017 – previous projection for 2017 from 911-SAM (\$8,219,806.92) = Additional projected funds from wireless remittance \$7,057,132.84

However, the PSC could use current available reserve funds to build out the NG911 system. Using the NG911 ROM projections PSC staff analyzed the use of reserve funds with a phased deployment. The analysis concluded Nebraska could initiate the transition to NG911 without needing an immediate increase in the wireless surcharge. This approach supports deployment for established regions initially and would

require consistent monitoring of the fund balance. At a future time, it may be necessary to increase the wireless surcharge to support the addition of PSAPs to the ESInet.

10.6 Recommendations

MCP recommends that the PSC, along with the 911 Service System Advisory Committee formed under the guidelines of Nebraska LB938 (2016), review eligible PSAP expenses and potentially expand those to encompass elements of the NG911 migration and recurring future expenses. These might include connection costs to a state-level ESInet or regional ESInets. The PSC should consider a state-level management information system (MIS). This has the potential to reduce the burden of data collection at the local level. While considering these changes, Nebraska should ensure alignment with all applicable national guidelines and rules that must be met to retain eligibility for federal grants.

MCP also recommends a review of the current 911-SAM funding structure. This model is a complex economic projection model and agencies considering consolidation will have some funds limited by its calculations. This model could be streamlined for a broader understanding by Nebraska stakeholders. The model should be reviewed for transparency, relevance, accuracy, and simplification.

MCP recommends the continued percentage-based charge for pre-paid devices and services. Nationally, such charges range anywhere from 0.5 percent to 4 percent, and before supporting an increase to the current rate of 1 percent, additional information will be needed.⁵² Currently, the pre-paid surcharges are combined with per device surcharges. MCP recommends a clear auditing method be established to monitor the trends in these two different types of fees. In the event trends show a shift lowering per device collection amounts in favor of pre-paid devices, it may be necessary to increase the point of sale surcharge associated with pre-paid to ensure the viability of funding for the NG911 transition.

MCP recommends Nebraska immediately begin work on modifications to the current funding model. Potential changes should focus on equitable surcharge rates for access to 911 for all devices and standardize charges throughout the state for all service and device types. The recommendation is for a single rate to be charged for any device capable of connecting to the E911 system and ultimately the NG911 system. These changes would require legislative action.

MCP recommends that the basis for any funding model be built upon population as the primary factor. Other variables that should be considered are 911 call volume, personnel (field, dispatch or both), subscriber units, number of 911 trunks, number of incidents dispatched or workstations. Some regions within Nebraska are faced with conditions where the population base is low but call volume may rise dramatically during certain periods due to high volume roadways, recreation areas or other temporary population increases. Reporting and tracking of call volumes could be enhanced with state-level MIS allowing call volume to be a more reliable and consistent metric in the evaluation of call volume levels.

⁵² <https://www.nena.org/?page=911RateByState>

To manage the number of ESInet connections and control costs, MCP recommends the PSC and 911 Service System Advisory Committee develop an incentive based program to encourage PSAP regionalization. The program may consider additional funds and/or one-time stipends to aid in regionalization. Based upon the ROM costs identified, the PSC and 911 Service System Advisory Committee may consider additional funding for PSAPs that work with regional partners to deploy model 2.

MCP identified national trends in sections 10.1 and 10.2 noting recommendations from TFOPA and others on uniform and equitable surcharge, this is challenging with the current split surcharge collection of 911 fees in Nebraska. While it would be easier to achieve these recommendations if the PSC were the single collection point for all 911 surcharges, there is strong sentiment from local governing authorities to retain wireline and VoIP surcharge collection at a local government level. Projections have been developed for managing NG911 costs based upon wireless surcharge revenues and the use of reserve funds. Maintaining the current split surcharge collection will not impact the proposed plans for managing NG911 costs. In keeping with national trends and recommendations from national level organizations, MCP encourages the 911 Service System Advisory Committee and PSC evaluate the potential of the PSC becoming the single collection point for all 911 surcharges at a future point. This will consolidate and simplify fee collection and provide Nebraska with a clear method to comply with reporting. All 911 surcharge fees, regardless of where collection occurs, should also be protected from general fund diversions by the Legislature to ensure funds collected from consumers are used for the intended purpose of providing 911 service and ensure eligibility for federal grants.

10.7 Actionable Steps

The following actionable items should be taken:

1. The PSC and 911 Service System Advisory Committee should review existing approved funded items and identify additional items for approved funding.
2. The PSC should review and simplify the existing 911-SAM funding model while continuing to use population as the primary variable for funding.
3. The PSC and 911 Service System Advisory Committee should ensure appropriate records are maintained on expenditures allowing Nebraska eligibility for federal grants associated with Public Law 112-96.
4. The PSC in coordination with the 911 Service System Advisory Committee needs a detailed funding review to baseline the transition to NG911 that includes:
 - a. Audit of surcharge remittance in accordance with Nebraska statute 86-113⁵³.

⁵³ <http://nebraskalegislature.gov/laws/statutes.php?statute=86-313>

- b. Collection and documentation of actual costs from PSAPs for assessing cost of providing 911 today.
5. Based upon the decision to use available reserve funds to manage NG911 costs the establishment of a single rate, or increase to wireless surcharge, can be deferred. MCP projects a surcharge increase will be needed to complete full transition. Assuming continued regionalization occurs during transition the PSC should plan on introducing legislation which allows the Commission to set the wireless surcharge rate within a range between \$0.45 and \$1.25. Deferment will provide the SSAC and PSC with a greater level of detail on actual costs following release and award of associated RFP(s). This refined cost information will permit cash flow analysis and development of an appropriate recommendation on surcharge rates in the future.
6. The PSC, in coordination with the 911 Service System Advisory Committee created with Nebraska LB938 (2016), should consider developing incentives for regionalization while transitioning to NG911.

11 Implementation Phases

MCP has provided recommendations and actionable steps through the course of this plan in eight functional areas to advance NG911 with a statewide vision for Nebraska. The next step is committing to a path forward. Executing the recommendations provided in this plan introduces several changes for Nebraska stakeholders.

Managing this change is best done through a phased implementation. MCP has drafted a high-level initial project plan to provide Nebraska the starting point to a phased approach for execution. The projected timeline provides an initial roadmap for Nebraska stakeholders to implement the recommendations from this plan. Figure 20 provides an over-arching view of the projected timeline and phases. On the overview timeline, only a few key milestones are depicted; to review all aspects of the draft plan, refer to Appendix C, Nebraska Service System Plan Initial Implementation Plan.

As progress occurs, it will be incumbent upon the PSC 911 staff to update this plan. There may be overlap between phases as the realities of implementing recommended changes are realized.

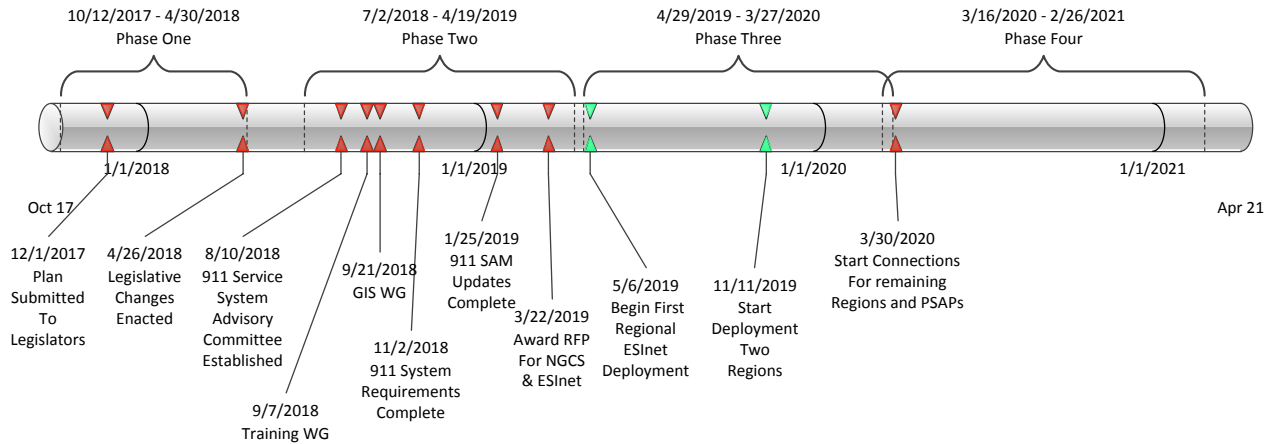


Figure 20: Initial Project Timeline

11.1 Phase One – 10/12/2017 through 4/30/2018

Phase One focuses on recommending legislative changes to execute the implementation of NG911 for Nebraska. These changes will be required to realize the entirety of recommendations within the Service System Plan.

- Legislative Changes
 - Plan for recommended changes in next session
 - Modify the Enhanced Wireless 911 Services Act to grant authority to the PSC to establish a uniform wireless surcharge rate to be within a range of \$0.45 and \$1.25
- Governance
 - Track and apply for NHTSA grant funding

11.2 Phase Two – 7/2/2018 through 4/19/2019

Phase Two focuses on initiation tasks that address recommendations from multiple functional areas. The execution of the recommendations identified in Phase Two will lay the foundation for, and are necessary before proceeding with, Phases Three and Four. Phase Two includes the following steps for execution:

- Governance
 - Create the 911 Service System Advisory Committee
 - Create initial Governance Plan
 - Create initial Change Management Plan
 - Create initial Communications Plan
 - Create initial Cost Allocation Plan
- 911 System Design
 - Develop detailed requirements for ESInet and NGCS
 - Create detailed phased implementation plan
 - Issue and award RFP for core services and ESInet

- GIS
 - Data Analysis
 - PSC request MSAG from each PSAP
 - PSC requests ALI from all PSAPs
 - PSC breaks OCIO aggregate data at PSAP boundary
 - Perform validation tests on each dataset
 - Provide error feedback to OCIO and jurisdiction
 - Implementation
 - Convene a 911 data working group
- COOP and Disaster Recovery
 - Review recommendation for construction guidelines
- Training and Education
 - Form a training working group to recommend State standards and objectives to the PSC 911 staff and 911 Service System Advisory Committee
 - Establish minimum training requirements
- FirstNet
 - Establish regular lines of communication between PSC and NPSCC
 - Continual communication on FirstNet plan and implementation
- Funding
 - Revise the 911-SAM to include incentives for regionalization/consolidation
 - Define policy for approved funding
 - Develop method for tracking 911 spending for grant applications
 - Replace forecasted cost with actual costs from the RFP process
 - Monitor the difference between forecasted and actual costs closely

11.3 Phase Three – 4/20/2019 through 3/27/2020

Phase Three builds upon groundwork established in Phase One. Phase Two will begin the implementation of the ESInet and NGCS. Phase Three continued efforts will formalize regions within the state that developed throughout Phase Two. Training standards will also be developed.

- Legislative Changes
 - Propose legislation mandating minimum requirements for any 911 telecommunicator
- Governance
 - Formalize regions
 - Update Communications Plan for communications between PSC/911 Service System Advisory Committee and Regional Coordinating Committees
 - Regional Activities
 - Regional Coordinating Committees establish/update regional governance and establish/review SLAs/MOUs
 - Local Activities
 - PSAPs review SOPs to align with region and NG911 deployment

- Work with Regional Coordinating Committees to define policy routing rules
- 911 System Design
 - Update/Revise plan implementation
 - Initiate implementation of first regional deployment and state ESInet
 - Document lessons learned from first deployment
 - Deploy two additional regions
- GIS
 - Data Analysis
 - Recompile updated datasets
 - Implementation
 - Identify data service providers
 - Establish performance metrics
 - Develop data steward user interfaces
 - Develop SOPs
- COOP and Disaster Recovery
 - Develop standardized plan template
 - Develop training material for COOP/Disaster Recovery
- Training and Education
 - Update Communications Plan with training requirements
 - Begin implementation of required training
- Funding
 - Funding review to gather actual costs on deployment and ensure manageable method of surcharge auditing is in place

11.4 Phase Four – 3/16/2020 through 2/26/2021

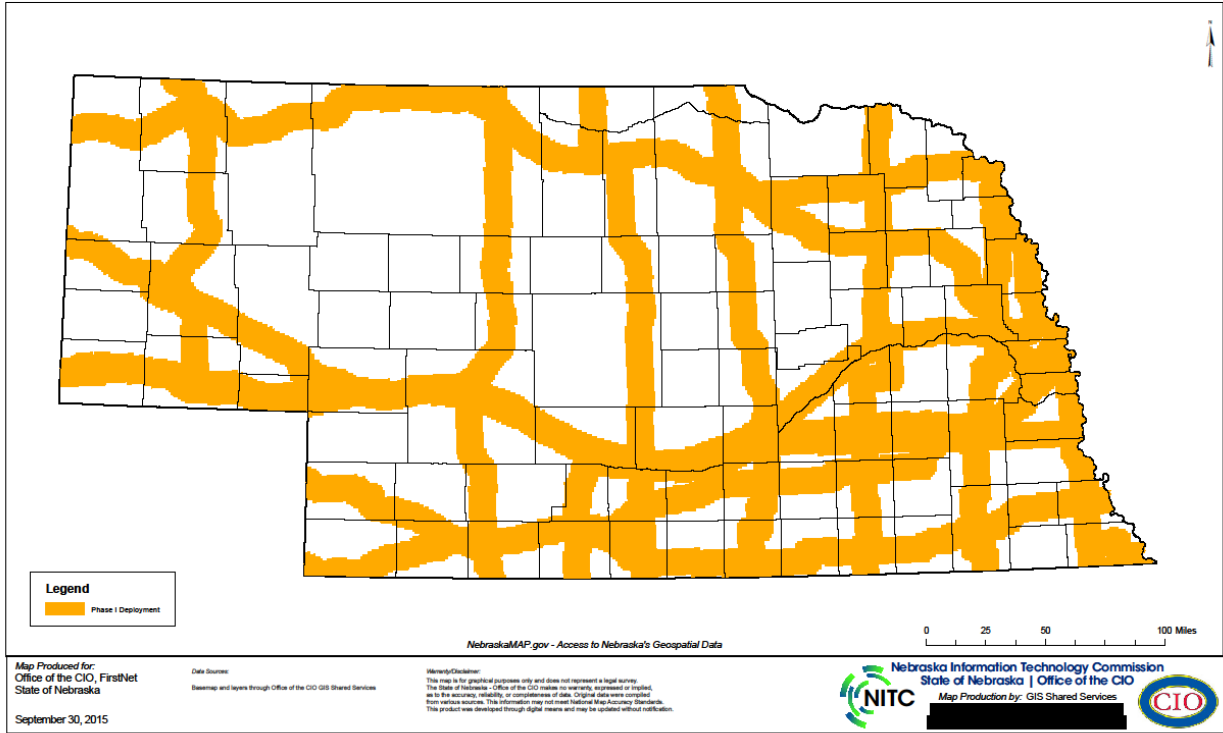
Phase Four will continue activities in all phases with iterative modifications. Primary execution in Phase Four will be completion of the deployment and connectivity to the state ESInet. Phase Four will also include policy alignment with local regions and agencies.

- Governance
 - Update and support developed governance plans
- 911 System Design
 - Implement remaining regions/PSAPs
- GIS
 - Ongoing GIS updates
- COOP and Disaster Recovery
 - Refinement and support of COOP and Disaster Recovery planning
- PSAP Policies and Procedures
 - Form policies and procedures working group; effort will be to review and report to the 911 Service System Advisory Committee recommendations from regional and local governance efforts completed in Phase Two

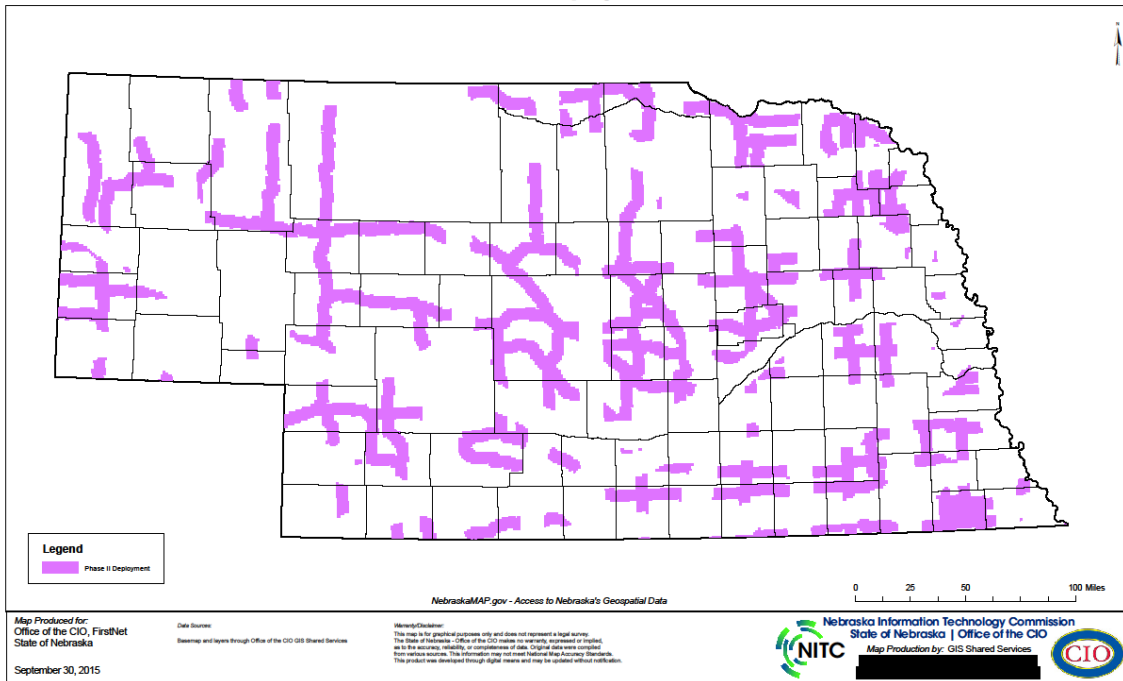
- Training and Education
 - Continued training and education
- Funding
 - Continued monitoring of funding and revenue streams
 - Surcharge changes will be revisited in the future as needed based on cash flow forecasts by PSC staff

Appendix A – Nebraska NPSBN Phased Deployment Submission

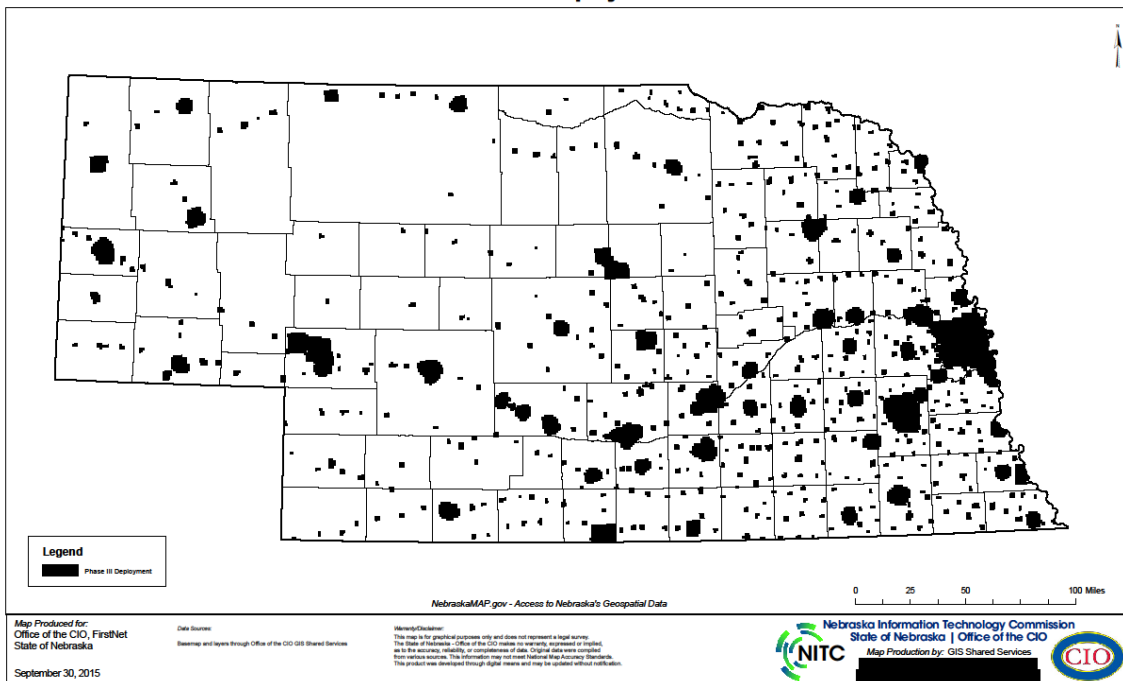
Nebraska Phase I Deployment for FirstNet



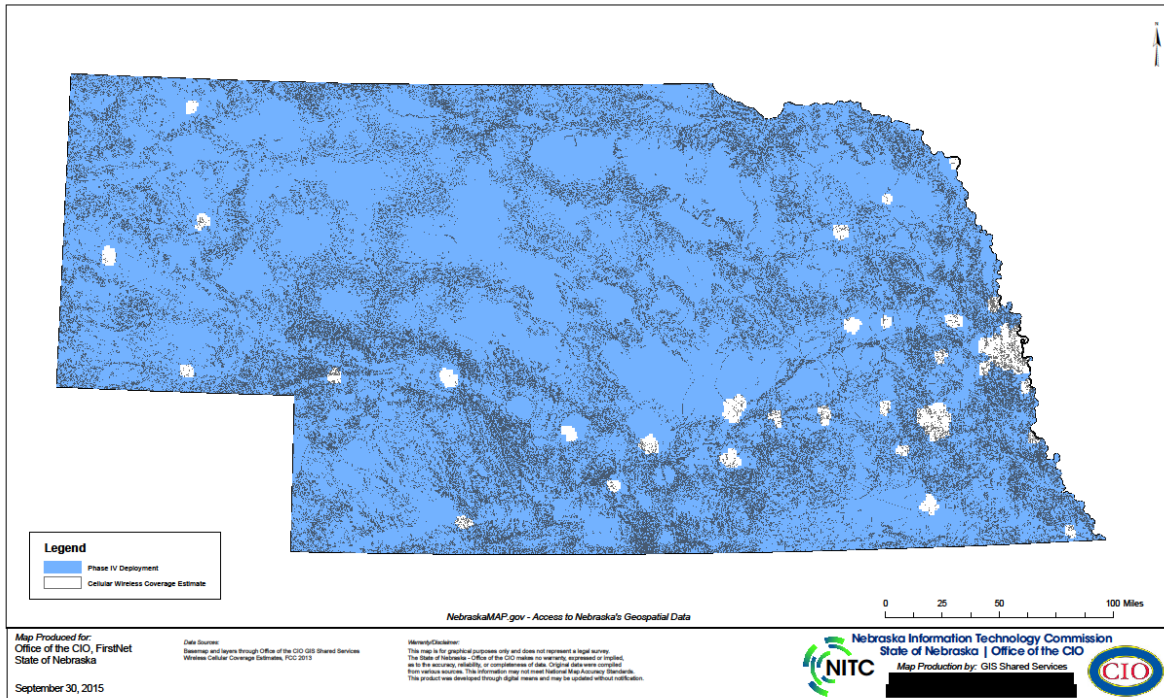
Nebraska Phase II Deployment for FirstNet



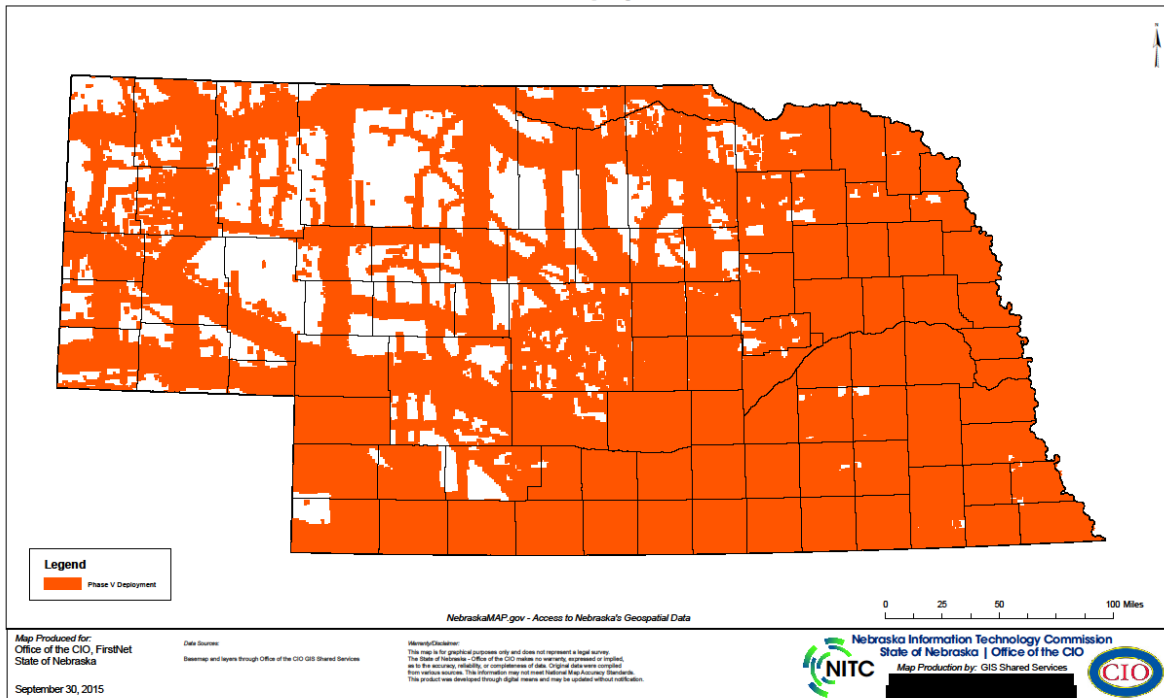
Nebraska Phase III Deployment for FirstNet



Relationship of Estimated Cellular Coverage to Nebraska Phase IV Deployment for FirstNet



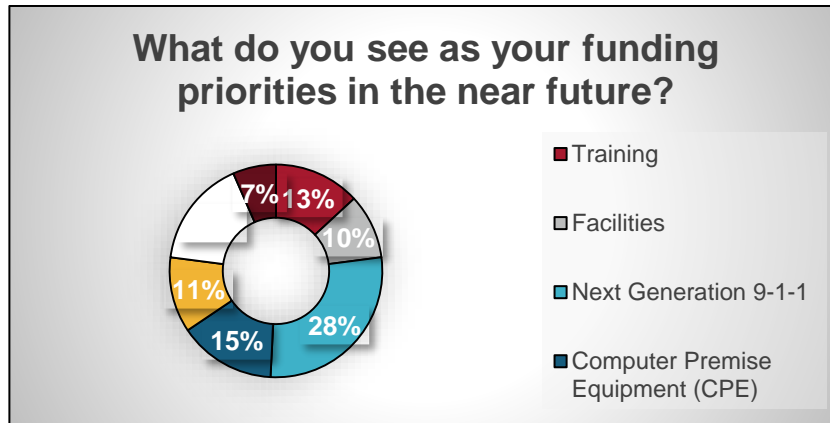
Nebraska Phase V Deployment for FirstNet



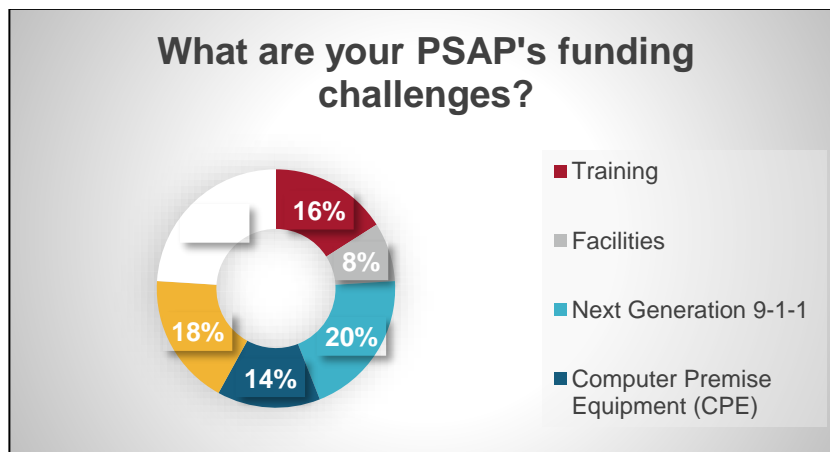
Appendix B – PSAP Funding Survey

MCP received feedback from 33 percent of Nebraska PSAPs. The questions below were asked and the resulting responses are shown below

1. What do you see as your funding priorities in the near future?



2. What are your PSAPs funding challenges?



3. What percentage of your budget is paid for using wireline funds?

What percentage of your budget is paid for using wireline funds?	
Statewide Average	13.45%

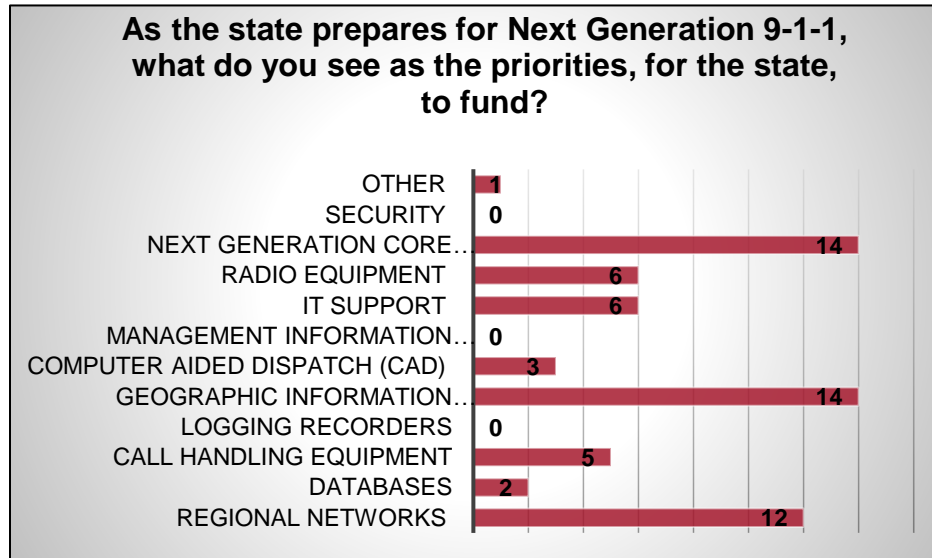
4. What percentage of your budget is paid for using wireless funds?

What percentage of your budget is paid for using wireless funds?	
Statewide Average	21.75%

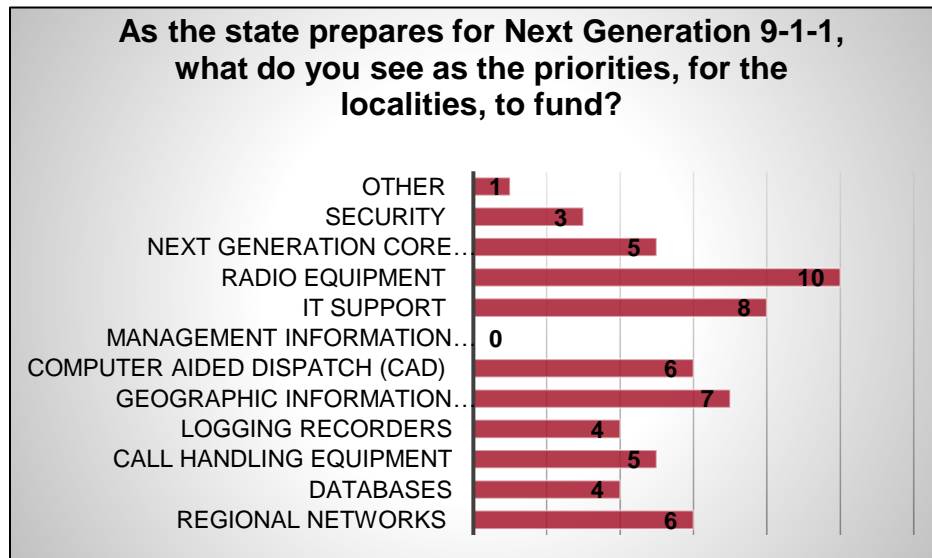
5. What percentage of your budget comes from other sources (i.e. general funds)?

What percentage of your budget comes from other sources (i.e. general funds)?	
Statewide Average	55.59%

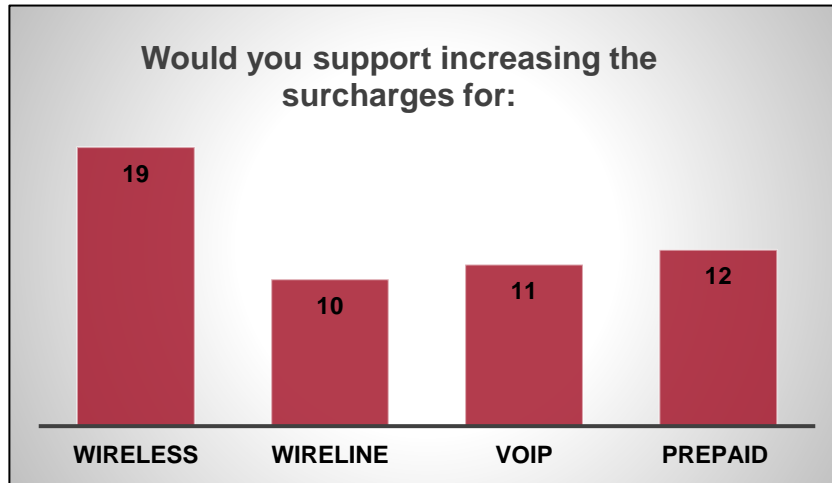
6. As the State prepares for Next Generation 9-1-1, what do you see as the priorities, for the state, to fund?



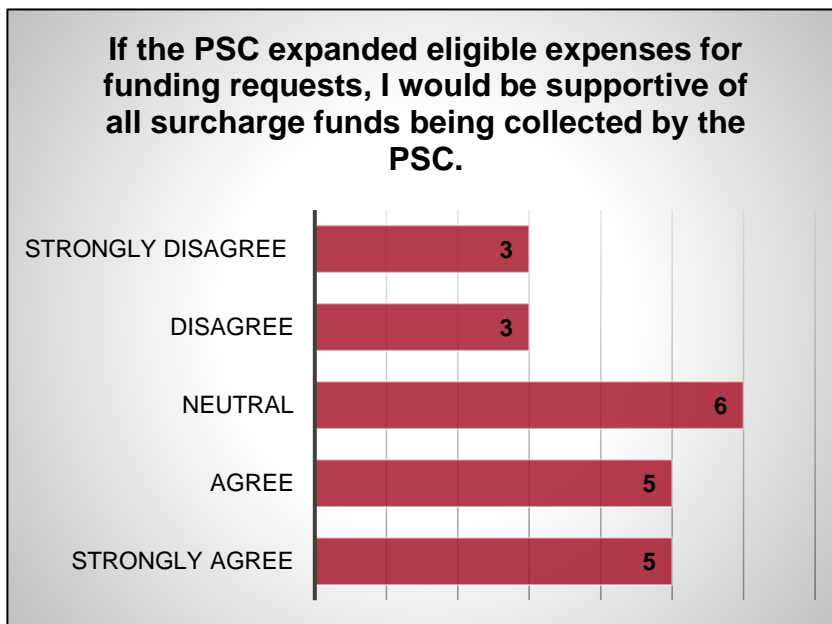
7. As the State prepares for Next Generation 9-1-1, what do you see as the priorities, for localities, to fund?



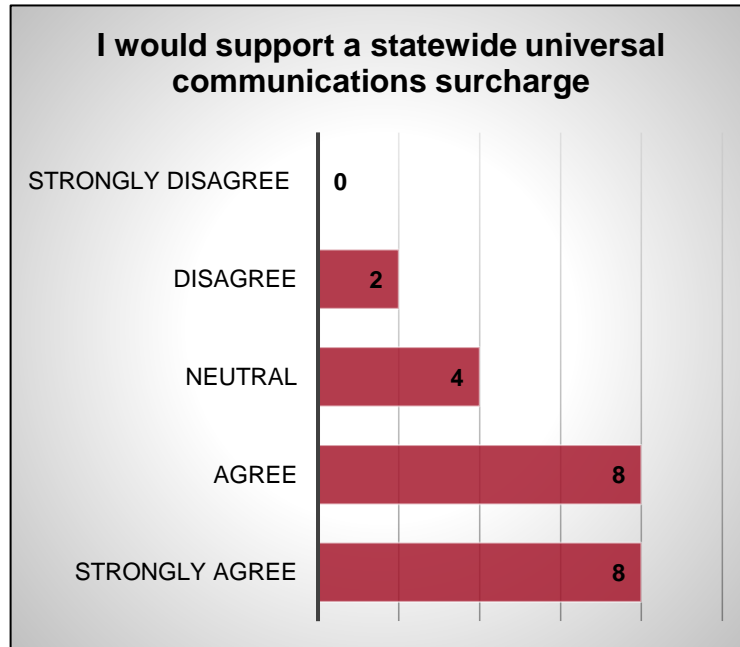
8. Would you support increasing the surcharges for:



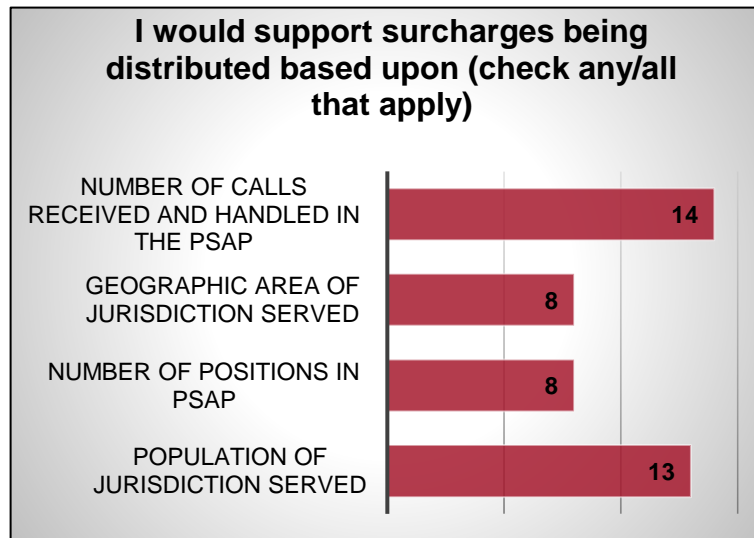
9. If the PSC expanded eligible expenses for funding requests, I would be supportive of all surcharge funds being collected by the PSC.



10. I would support a statewide universal communications surcharge (a single rate surcharge across the board to include all line types).



11. I would support surcharges being distributed based upon:

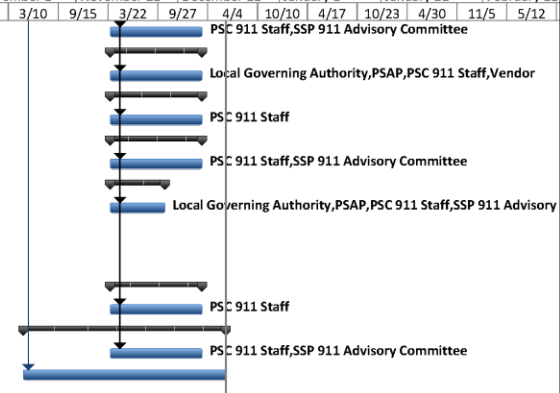


Appendix C – Nebraska Service System Plan Initial Implementation Plan

ID	Task Name	Duration	Start	Finish	SSP Actionable Step	September 21		October 11		November 1		November 21		December 11		January 1		January 21		February 11	
						8/7	2/12	8/20	2/25	9/2	3/10	9/15	3/22	9/27	4/4	10/10	4/17	10/23	4/30	11/5	5/12
1	NE SSP IPP for Implementation Phases	958 days?	Thu 10/12/17	Fri 6/11/21																	
2	External Triggers	67 days?	Wed 11/1/17	Thu 2/1/18																	
3	Plan Adoption by PSC	1 day?	Wed 11/1/17	Wed 11/1/17																	
4	Plan presentation to Legislation	1 day	Fri 12/1/17	Fri 12/1/17																	
5	Next Legislative session	1 day?	Thu 2/1/18	Thu 2/1/18																	
6	Phase 1	111 days	Thu 10/12/17	Thu 3/15/18																	
7	Legislative changes	96 days	Thu 11/2/17	Thu 3/15/18																	
8	Plan for recommended legislative changes	60 days	Thu 11/2/17	Wed 1/24/18	Gov - 7																
9	Modify Enhanced Wireless 911 Services Act to set a range between \$0.50 and \$1.25, initial setting at \$0.90	30 days	Fri 2/2/18	Thu 3/15/18	Fund - 6																
10	Track and Apply for NHTSA Grant Funding	30 days	Thu 10/12/17	Wed 11/22/17	Gov - 6																
11	Phase 2	221 days?	Sun 7/1/18	Fri 5/3/19																	
12	LB938 Start of Implementation	1 day?	Sun 7/1/18	Sun 7/1/18																	
13	Governance	75 days	Mon 7/2/18	Fri 10/12/18																	
14	State/PSC Level	75 days	Mon 7/2/18	Fri 10/12/18																	
20	911 System Design	160 days	Mon 8/13/18	Fri 3/22/19																	
21	Develop detailed requirements for ESInet and NGCS	60 days	Mon 8/13/18	Fri 11/2/18	911SysDes - 1																
22	Create detailed phased implementation plan	90 days	Mon 8/13/18	Fri 12/14/18	911SysDes - 2																
23	Issue and award RFP for Core Services and ESInet	100 days	Mon 11/5/18	Fri 3/22/19	911SysDes - 3																
24	GIS	200 days	Mon 7/2/18	Fri 4/5/19																	
25	Data Analysis	200 days	Mon 7/2/18	Fri 4/5/19																	
26	PSC request MSAG from each PSAP	60 days	Mon 7/2/18	Fri 9/21/18	GIS - 1																
27	PSC requests ALI from all PSAPs	60 days	Mon 7/23/18	Fri 10/12/18	GIS - 2																
28	PSC breaks OCIO aggregate data at PSAP boundary	60 days	Mon 8/13/18	Fri 11/2/18	GIS - 3																
29	Perform validation tests on each dataset	200 days	Mon 7/2/18	Fri 4/5/19	GIS - 4																
30	Provide error feedback to OCIO and jurisdiction	200 days	Mon 7/2/18	Fri 4/5/19	GIS - 5																
31	Implementation	60 days	Mon 7/2/18	Fri 9/21/18																	
32	Convene a 911 data working group	60 days	Mon 7/2/18	Fri 9/21/18	GIS - 10																
33	COOP-Disaster Recovery	45 days	Mon 8/13/18	Fri 10/12/18																	
34	Review recommendation for construction guidelines	45 days	Mon 8/13/18	Fri 10/12/18	C/DR - 3																
35	Training and Education	115 days	Mon 8/13/18	Fri 1/18/19																	
36	Form a Training working group to recommend State standards and objectives to the PSC 911 Staff and 911 Advisory Committee	45 days	Mon 8/13/18	Fri 10/12/18	TrnEdu - 1																
37	Establish minimum training requirements	70 days	Mon 10/15/18	Fri 1/18/19	TrnEdu - 3, 4, 5																
38	FirstNet	200 days	Mon 7/2/18	Fri 4/5/19																	
39	Establish regular lines of communication between PSC and NPSCC	30 days	Mon 7/2/18	Fri 8/10/18	Fnet - 1																
40	Continual communication on FirstNet Plan and Implementation	200 days	Mon 7/2/18	Fri 4/5/19	Fnet - 2																
41	Funding	220 days	Mon 7/2/18	Fri 5/3/19																	
42	Revise the 911 SAM - include incentives for regionalization/consolidation	150 days	Mon 7/2/18	Fri 1/25/19	Fund - 2, 7																
43	Define policy for approved funding	65 days	Mon 10/15/18	Fri 1/11/19	Fund - 3																

ID	Task Name	Duration	Start	Finish	SSP Actionable Step	September 21		October 11		November 1		November 21		December 11		January 1		January 21		February 11	
						8/7	2/12	8/20	2/25	9/2	3/10	9/15	3/22	9/27	4/4	10/10	4/17	10/23	4/30	11/5	5/12
44	Develop method for tracking 911 spending for grant application	30 days	Mon 7/2/18	Fri 8/10/18	Fund - 4																
45	Replace forecasted cost with actual cost from RFP process	15 days	Mon 3/25/19	Fri 4/12/19	Fund - 5																
46	Monitor cash flow based upon differences in forecasted and actual costs	15 days	Mon 4/15/19	Fri 5/3/19	Fund - 5																
47	Phase 3	532 days	Fri 3/16/18	Fri 3/27/20																	
48	Legislative changes	90 days	Mon 1/21/19	Fri 5/24/19																	
49	Propose legislation mandating minimum requirements for any 911 telecommunicator	90 days	Mon 1/21/19	Fri 5/24/19	TrnEdu - 2																
50	Governance	240 days	Fri 3/16/18	Wed 2/13/19																	
51	Formalize regions	90 days	Fri 3/16/18	Wed 7/18/18	Gov - 8																
52	Update communication plan for communications between PSC/911 Adv Cmte and RCC	90 days	Fri 3/16/18	Wed 7/18/18	Gov - 9																
53	Regional Activities	150 days	Thu 7/19/18	Wed 2/13/19																	
54	RCCs establish/update regional governance, establish/review SLAs/MOUs	150 days	Thu 7/19/18	Wed 2/13/19	Gov - 10																
55	Local Activities	120 days	Thu 8/30/18	Wed 2/13/19																	
56	PSAPs review SOPs to align with region and NG deployment	120 days	Thu 8/30/18	Wed 2/13/19	Gov - 11, 12, 13																
57	Work with RCC to define policy routing rules	120 days	Thu 8/30/18	Wed 2/13/19	Gov - 14, C/DR - 4																
58	911 System Design	265 days	Mon 3/25/19	Fri 3/27/20																	
59	Update/Revise Implementation Plan	30 days	Mon 3/25/19	Fri 5/3/19	911SysDes - 4																
60	Initiate execution of Implementation - 1st regional deployment and State ESinet	105 days	Mon 5/6/19	Fri 9/27/19	911SysDes - 5																
61	Document lessons learned from 1st regional deployment	30 days	Mon 9/30/19	Fri 11/8/19																	
62	Deploy 2 additional regions	100 days	Mon 11/11/19	Fri 3/27/20																	
63	GIS	250 days	Fri 3/16/18	Wed 2/27/19																	
64	Data Analysis	250 days	Fri 3/16/18	Wed 2/27/19																	
65	Recompile updated datasets	250 days	Fri 3/16/18	Wed 2/27/19	GIS - 6																
66	Implementation	240 days	Fri 3/16/18	Wed 2/13/19																	
67	Identify data service providers	45 days	Fri 4/27/18	Thu 6/28/18	GIS - 7																
68	Establish performance metrics	45 days	Fri 4/27/18	Thu 6/28/18	GIS - 8																
69	Develop data steward user interfaces	120 days	Fri 3/16/18	Wed 8/29/18	GIS - 9																
70	Develop SOPs	120 days	Thu 8/30/18	Wed 2/13/19	GIS - 11																
71	COOP-Disaster Recovery	120 days	Fri 3/16/18	Wed 8/29/18																	
72	Develop standardized plan template	90 days	Fri 3/16/18	Wed 7/18/18	C/DR - 1																
73	Develop training material for COOP/DR	120 days	Fri 3/16/18	Wed 8/29/18	C/DR - 2																
74	Training and Education	150 days	Mon 5/27/19	Fri 12/20/19																	
75	Update communication plan with training requirements	45 days	Mon 5/27/19	Fri 7/26/19																	
76	Begin implementation of required training	150 days	Mon 5/27/19	Fri 12/20/19																	
77	Funding	200 days	Fri 3/16/18	Wed 12/19/18																	
78	Funding review to gather actual costs on deployment and ensure manageable method of surcharge auditing in place	200 days	Fri 3/16/18	Wed 12/19/18	Fund - 5																
79	Phase 4	550 days	Mon 5/6/19	Fri 6/11/21																	
80	Governance	250 days	Mon 3/30/20	Fri 3/12/21																	

ID	Task Name	Duration	Start	Finish	SSP Actionable Step	September 21		October 11		November 1		November 21		December 11		January 1		January 21		February 11	
						8/7	2/12	8/20	2/25	9/2	3/10	9/15	3/22	9/27	4/4	10/10	4/17	10/23	4/30	11/5	5/12
81	Updates and support to developed governance plans	250 days	Mon 3/30/20	Fri 3/12/21																	
82	911 System Design	250 days	Mon 3/30/20	Fri 3/12/21																	
83	Implement remaining regions/PSAPs	250 days	Mon 3/30/20	Fri 3/12/21																	
84	GIS	250 days	Mon 3/30/20	Fri 3/12/21																	
85	Ongoing GIS updates	250 days	Mon 3/30/20	Fri 3/12/21																	
86	COOP-Disaster Recovery	250 days	Mon 3/30/20	Fri 3/12/21																	
87	Refinement and support of COOP and DR planning	250 days	Mon 3/30/20	Fri 3/12/21																	
88	PSAP Policies and Procedures	150 days	Mon 3/30/20	Fri 10/23/20																	
89	Form Policy and Procedure Working Group - effort will be to review and reporting to the advisory committee recommendations from regional and local governance efforts in phase 2	150 days	Mon 3/30/20	Fri 10/23/20	PolProc - 1, 2, 3,4																
90	Training and Education	250 days	Mon 3/30/20	Fri 3/12/21																	
91	Continued training and EDU	250 days	Mon 3/30/20	Fri 3/12/21																	
92	Funding	550 days	Mon 5/6/19	Fri 6/11/21																	
93	Continued monitoring of funding and revenue streams	250 days	Mon 3/30/20	Fri 3/12/21	Fund - 5																
94	Review cash flow projections and make any necessary recommendations related to wireless surcharge to PSC - ongoing once actuals from RFP are known	550 days	Mon 5/6/19	Fri 6/11/21	Fund - 5																



Glossary

Some frequently used definitions used within this plan are in the table below as defined by NENA.

Term or Acronym	Explanation
ANI (Automatic Number Identification)	Telephone number associated with the access line from which a call originates.
ALI (Automatic Location Identification)	The automatic display at the PSAP of the caller's telephone number, the address/location of the telephone and supplementary emergency services information of the location from which a call originates.
ESInet (Emergency Services IP Network)	An ESInet is a managed IP network that is used for emergency services communications, and which can be shared by all public safety agencies. It provides the IP transport infrastructure upon which independent application platforms and core services can be deployed, including, but not restricted to, those necessary for providing NG9-1-1 services. ESInets may be constructed from a mix of dedicated and shared facilities. ESInets may be interconnected at local, regional, state, federal, national and international levels to form an IP-based inter-network (network of networks). The term ESInet designates the network, not the services that ride on the network. See NG9-1-1 Core Services.
ESZ (Emergency Service Zone)	A geographical area that represents a unique combination of emergency service agencies (e.g., Law Enforcement, Fire and Emergency Medical Service) that is within a specified 9-1-1 governing authority's jurisdiction. An ESZ can be represented by an Emergency Service Number (ESN) to identify the ESZ.

Term or Acronym	Explanation
i3	NENA i3 introduces the concept of an Emergency Services IP network (ESInet), which is designed as an IP-based inter-network (network of networks) shared by all agencies which may be involved in any emergency.
MIS (Management Information System)	A program that collects, stores and collates data into reports enabling interpretation and evaluation of performance, trends, traffic capacities, etc.
NGCS (Next Generation 9-1-1 (NG9-1-1) Core Services)	The base set of services needed to process a 9-1-1 call on an ESInet. Includes the ESRP, ECRF, LVF, BCF, Bridge, Policy Store, Logging Services and typical IP services such as DNS and DHCP. The term NG9-1-1 Core Services includes the services and not the network on which they operate.
PSAP Boundary	This layer depicts the polygon(s) and related attribute information that defines the geographic area of all PSAP boundaries within a given 9-1-1 authority's geographic coverage area.

For a complete listing of related terms please refer to the NENA's *Master Glossary of 9-1-1 Terminology* "defines the terms, acronyms and definitions associated with the 9-1-1 industry."⁵⁴ A link to the most current version of the document may be found at: <https://www.nena.org/?page=Glossary>

⁵⁴ <https://www.nena.org/?page=Glossary>

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