

Report for

Dispatch Service Improvement Plan

Prepared for

City, Township and County of Kalamazoo and City of Portage, Michigan

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EXECUTIVE SUMMARY

In an effort to provide the community with the highest level of 9-1-1 services possible while utilizing a cost efficient funding structure, the City, Township and County of Kalamazoo, the City of Portage and Western Michigan University (WMU) contracted L.R. Kimball (Kimball) to develop a comprehensive business plan for the consolidation of area Public Safety answering points (PSAPs). The PSAPs include three PSAPs co-located within the Kalamazoo Department of Public Safety (KDPS) facility as well as the PSAPs for Portage Department of Public Safety (Portage DPS) and WMU Public Safety. This business plan examines five consolidation alternatives, each with different participants. The capital and operating costs were estimated for each alternative and revenue applied from two potential county surcharge levels including the minimum \$0.42 and maximum \$3.00.

Current Emergency Communications Environment

In general, although each of the existing PSAPs are staffed with dedicated employees that perform excellent work every day, the emergency communications system within which they work is deficient in key areas including:

- County fire services are not receiving the same level of dispatch service received by Portage and KDPS Departments of Public Safety. This disparity is a key issue that, in Kimball's opinion, not only endangers the county firefighters, but fails to meet National Fire Protection Agency (NFPA) safety recommendations. Resolution of this key and critical issue is recommended in the strongest possible way. Additional staff, training and upgrades to the county fire radio system will be required to resolve this issue.
- Shift supervision. Supervision for the PSAP staff is often a combination of oversight by sworn personnel either in the field or located within the PSAP but who are also responsible for a multitude of other law enforcement related tasks and a senior telecommunicator who is also responsible for call taking and/or dispatch responsibilities. In both scenarios, the PSAP employees do not have the undivided supervisory support needed during busy periods and at critical decision making points because the supervisors are pulled in other directions simultaneously. Public Safety answering point supervision that is not assigned to a call taking or dispatch position is an industry best practice and is part of NFPA standards.
- Interoperability among the participant agencies. All of the participating agencies need to be able to communicate with each other and have a regional awareness to effectively manage cross jurisdictional incidents. To achieve the highest degree of interoperability possible, all agencies would need to be on the same radio system so interagency communications can occur easily and quickly. However, an agency utilizing a separate radio system is not a roadblock to consolidation. Having dispatchers for all agencies located within a single organization and location can speed the sharing of information between agencies.

Emergency communications oversight is no longer a task that can be readily handled by law enforcement or fire service management staff as part of a wealth of other duties. In addition, the technology evolution has created an environment that requires higher levels of training than in the past; which make it increasingly difficult for telecommunicator responsibilities to be covered by sworn personnel.

With Next Generation 9-1-1 (NG9-1-1), the ability for the PSAP to receive text, photos, video and other data types, rapidly becoming a reality, it is imperative that smaller PSAPs explore the benefits offered by consolidation.

Consolidation Alternatives

The consolidation alternatives examined include:

1. Alternative 1 – The City, County and Township of Kalamazoo, City of Portage and WMU
2. Alternative 2 – The City, County and Township of Kalamazoo (these PSAPs are already co-located together)
3. Alternative 3 – The City, County and Township of Kalamazoo and the City of Portage
4. Alternative 4 - The City, County and Township of Kalamazoo and WMU
5. Alternative 5 - Shared Technology – All Participants

All of the consolidation alternatives provide benefits in terms of operational efficiencies and service level improvements. Alternative 1 provides the most potential for service level improvements as all participants would be together in a single PSAP and would function as a single entity.

If Alternative 1 is not achievable, serious consideration should be given to Alternative 2 which would combine the PSAPs already co-located in the KDPS facility into a single PSAP and organization. Simply combining these PSAPs would provide a continuity of service from municipality to municipality, as well as increasing the level of service provided to the county fire services.

If no other alternatives are achievable, Alternative 5 should be considered. In this alternative all PSAPs remain separate as they are today, but share key PSAP systems such as CAD, radio and 9-1-1 call answering equipment. Sharing the systems will potentially provide an increased regional awareness and interoperability and may result in lower technology costs long-term through joint purchasing.

Key Roadblocks to Consolidation

Two main issues must be resolved before any consolidation effort can be implemented. These issues are establishment of a governance agreement and a cost distribution formula for funding consolidated PSAP costs.

Consolidated PSAP governance structures can take a variety of forms such as whether the PSAP will be part of a participating agency or an individual, stand-alone organization. The positives and negatives of various structures can be found in the body of this document. Kimball recommends that a consolidated PSAP should be a stand-alone organization with a civilian director and an oversight board.

Development of a cost distribution formula is probably one of the most contentious parts of the consolidation process. There is no template or standard formula. The correct formula is the one that is considered fair and equitable by all participants and is almost always determined at the local level. Kimball recommends that the formula be kept as simplistic as possible and that it be based on criteria that are not subjective in nature.

The cost distribution formula used throughout this document was chosen by Kimball because it is based on two criteria that can be quantified; service area population and the number of 9-1-1 calls. Whether this is the “best” formula for the municipalities that may choose to consolidate will need to be determined during the planning phase. Each municipality will not have cost estimates that are accurate enough to determine the final fiscal impact of a consolidation until after this formula is finalized.

Consolidation Costs

The costs of personnel, technology, capital and operating expenses were estimated for each alternative. As is typical, the organizational chart calls for more staff than the individual PSAPs combined. Reasons for the additional staff include:

- Civilian management
- Additional telecommunicator positions to provide staffing for a fire dispatch position.
- Creation of shift supervisor positions that are not assigned to call taker or dispatch positions, in keeping with industry best practices and NFPA 1221 guidelines.
- Inclusion of personnel to support the PSAP technology which may have been provided by another municipal department previously.

Technology costs were based on each key PSAP system. Each system was assessed to determine if it could be expanded and meet the needs of a consolidated environment. In terms of technology costs the participants are fortunate in that key systems have been recently replaced and offer sufficient functionality for not only a consolidation of all participants, but in preparation for NG9-1-1 as well.

From a total cost perspective, the participants in this project are in an unusually advantageous position. In terms of initial capital costs, facility and key systems are typically the most expensive. In this case; however, a facility exists where all participants could be located and key systems are relatively new and able to provide the necessary functionality which eliminates the high cost of system replacement. The cost advantage of this situation cannot be understated. *In short, it will probably never be as “inexpensive” for the participants to consolidate as it is today.*

When considering whether to move forward with consolidating, especially when taking into consideration the increased personnel costs and initial capital costs, it is critical to remember that comparing the costs of the current PSAPs with the estimated costs of a fully consolidated PSAP is not an apples-to-apples comparison. A fully consolidated PSAP will:

- Provide continuity of service levels across the participating agencies which will ensure all citizens receive the same high level services from law enforcement and fire agencies.
- Increase the efficiency of 9-1-1 call handling and dispatch
- Prepare emergency communications in the region for the next phase of the technology evolution (NG9-1-1)
- Improve interoperability which will improve incident response and field personnel safety.

County Surcharge Analysis

Kimball was tasked with estimating the costs of each consolidation alternative and then applying two potential county surcharges, \$0.42 and \$3.00, to the cost estimates. In each alternative a \$0.42 county surcharge was not sufficient to cover all PSAP costs. Under a \$0.42 surcharge the remaining unfunded costs would need to be distributed among the participating agencies under the agreed upon cost distribution formula. In each alternative and using the cost distribution formula in this document, KCSO's financial responsibility would significantly increase as compared to its current PSAP budget and substantially more than the increases projected for the other participants. It is important to recognize that under a different cost distribution formula, the results may change.

The following table estimates the technology costs associated with consolidating all five agencies and adds that to the estimated operating budget for the consolidated PSAP. Also included are the estimated annual costs associated with establishing a replacement fund for key PSAP systems and equipment. Revenue and reimbursements are then

applied against that total to arrive at the amount that would need to be distributed among the PSAP participating agencies.

Alternative 1 PSAP Budget with a \$0.42 County Surcharge – Year 1		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
Consolidation Technology/Transition Costs (Year 1 Only)*	\$750,000	
		\$750,000
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$5,413,190	
Annual Operating Costs	\$865,514	
		\$6,278,704
Annual Systems Replacement Reserve		
Annual Contributions - Systems Replacement		\$261,424
Total Expenses		\$7,290,128
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$458,135	
State Training Reimbursement	\$18,000	
Estimated \$0.42 County Surcharge	\$1,173,351	
Total Revenue/Reimbursements		\$1,649,486
Remaining Unfunded Costs		\$5,640,642

Table 1—Alternative 1 - Budget with a \$0.42 County Surcharge – Year 1

In the first consolidation scenario, a \$0.42 county surcharge in Year 1 would offset the capital and recurring costs and leave just over \$5.5 million to be paid by all participants. All agencies would see an increase in overall costs. KCSO would see a substantial increase under this cost distribution model.

In the second alternative for the first consolidation scenario a maximum \$3.00 county surcharge would cover the capital and recurring costs of the new PSAP and result in a budget balance of approximately 1.8 million dollars. This alternative would allow the participating agencies to set aside funds for future system replacements and upgrades, which are critical, as well as funds for a separate facility for the PSAP, if desired.

Alternative 1 PSAP Budget with a \$3.00 County Surcharge – Year 1		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
Consolidation Technology/Transition Costs (Year 1 Only)*	\$750,000	
		\$750,000
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$5,413,190	
Annual Operating Costs	\$865,514	
		\$6,278,704
Annual Systems Replacement Reserve		
Annual Contributions - Systems Replacement		\$261,424
Total Expenses		\$7,290,128
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$458,135	
State Training Reimbursement	\$18,000	
Estimated \$3.00 County Surcharge	\$8,381,082	
Total Revenue/Reimbursements		\$8,857,217
Budget Balance		\$1,567,089

Table 2—Alternative 1 - PSAP Budget with a \$3.00 County Surcharge – Year 1

In Kimball's opinion, a full consolidation of all plan participants would provide substantial service level improvements. This alternative is more costly than the existing PSAP budgets combined, but the resulting service levels will be raised to meet best practices, equalize service levels among all responder agencies, and will create a PSAP that is operationally and technologically efficient and ready to move forward with the on-going technology evolution.

Key Recommendations

- Given the unusually advantageous position that exists for facility and initial capital costs, serious consideration should be given to moving forward with Alternative 1, consolidation of all of the study participants. Consolidating with an available and suitable facility and new technology that can be expanded is highly unusual. In short, it will likely never be as cost effective to consolidate as it is today.
- Regardless of whether any consolidation takes place, serious consideration should be given to increasing the level of service provided to the county fire services to alleviate firefighter safety concerns and to provide the county fire agencies with services levels on par with the other agencies in this report.
- The KDPS facility should be utilized for any initial consolidation.

- The key PSAP systems currently in use by the co-located PSAPs at KDPS should be expanded for use in a consolidated PSAP.
- Municipalities should commit to advancing to the next phase of the consolidation process which is development of a governance agreement and a cost distribution model. Until participants can reach consensus on these issues it is difficult for the municipalities to reach an informed decision on whether to commit to the consolidation process.
- If politically feasible, a county surcharge sufficient to cover the costs of a consolidated PSAP should be implemented.
- Implementing a \$3.00 surcharge should be given serious consideration. A surcharge at this level will:
 - Enable dispatch services for the county fire agencies to be brought up to NFPA safety standards and be raised to be on par with the police and fire dispatch service provided to other departments within the region.
 - Enable the county fire very high frequency (VHF) radio system to be upgraded to meet the needs of the county fire agencies.
 - Prevent the emergency communications technology from becoming outdated by setting aside an annual contribution earmarked for systems replacement as each system reaches the end of its lifecycle.

While the KDPS facility is large enough to accommodate an initial consolidation effort, space will become an issue very quickly. A \$3.00 surcharge will enable funds to be set aside for new construction or renovation of an existing facility in the future.

1. INTRODUCTION

1.1 Key Definitions

Public Safety Answering Point (PSAP) – Also called a 9-1-1 center or dispatch center and is an emergency communications facility that receives 9-1-1 calls. Dispatching of police, fire, and emergency medical services (EMS) field personnel each may or may not be part of this facility. Emergency medical services calls are transferred to the appropriate third party providers.

9-1-1 Call Answering Equipment – This term may be used interchangeably with customer premise equipment (CPE). Refers to the hardware and software that is used to receive and answer a 9-1-1 call.

Full PSAP Consolidation – Full consolidation is defined as the consolidation of police, fire and EMS call handling and police and fire dispatch functions for a defined region into a single facility.

Co-Located PSAPs – PSAPs from separate entities sharing the same facility and critical PSAP systems such as CAD, radio consoles, 9-1-1 answering equipment and logging recorders. The PSAPs for the City of Kalamazoo, Kalamazoo Township and Kalamazoo County are currently co-located.

Shared Technology – May also be called virtual consolidation. Two or more PSAPs share key PSAP systems such as CAD, radio, 9-1-1 call answering equipment or logging recorders. Although technology is shared, each PSAP retains its existing organizational structure and remain in its own facility. This form of consolidation increases interoperability and allows for cost efficiencies through group purchases.

Telecommunicator – Refers to a PSAP employee who performs call taking and dispatch job functions. For purposes of this document, all PSAP staff are assumed to be telecommunicators, exclusive of supervision.

Call taker – Refers to a PSAP job function which includes the processing of incoming 9-1-1 and administrative calls. Call taker may also be a job title in PSAPs where an employee performs only call taking functions. However, this document assumes all PSAP staff will perform both call taking and dispatch functions and will hold a telecommunicator job title.

Dispatcher – Refers to a PSAP job function which includes the dispatching of field personnel via radio to calls for service. Dispatcher may also be a job title in PSAPs where an employee performs only dispatch functions. However, this document assumes all PSAP staff will perform both call taking and dispatch functions and will hold a telecommunicator job title.

1.2 Background

In an effort to provide the community with the highest level of 9-1-1 services possible while utilizing a cost efficient funding structure, the City, Township and County of Kalamazoo, the City of Portage and Western Michigan University contracted Kimball to develop a comprehensive business plan for the consolidation of area PSAPs including three co-located PSAPs within the Kalamazoo Department of Public Safety (KDPS) facility, as well as the PSAPs for

Portage Department of Public Safety and WMU Public Safety. This business plan examines multiple consolidation scenarios and potential \$0.42 and \$3.00 county level 9-1-1 fees.

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2. CONSOLIDATION OVERVIEW

2.1 Historical Background

Historically, 9-1-1 call answering and dispatch services have been provided by small Public Safety answering points (PSAPs), except in larger urban areas. The PSAPs were commonly part of a larger law enforcement, fire or emergency medical services (EMS) agency. These PSAPs typically had a small staff that answered 9-1-1 calls and dispatched field units for a single primary agency in addition to a host of other non-9-1-1 or dispatch related job tasks. Little specialized training was necessary for the staff to perform these functions and advanced technology was not yet present. In fact, sworn personnel with no 9-1-1 training routinely filled temporary vacancies in the PSAP. However, over the last 25 years several key factors have caused Public Safety communications to evolve into a profession that requires highly skilled people with extensive on-going training and advanced technology. The key factors are:

- The explosion of cellular phone usage which created two major issues:
 1. A dramatic increase in 9-1-1 call volume.
 2. The need for Wireless 9-1-1 Phase I and II technology to locate cell phone callers and improved mapping abilities.
- Increased public awareness about available 9-1-1 technology and services such as the ability to locate 9-1-1 callers through technology and emergency medical dispatch (EMD) raised public expectations and drove the need for higher service levels.
- The terrorist attacks of September 11, 2001 raised awareness for the need for interoperability among responder agencies and the PSAPs that serve them.
- New technology such as wireless devices with video, photos and text capabilities, as well as automatic crash notification (ACN) through such companies as OnStar.

As this evolution progressed, those agencies managing PSAPs found that as training and technology needs increased so did the costs associated with operating a PSAP. In fact, the evolution is continuing as 9-1-1 service levels in the near future will include the ability to handle text messages, video and photos over IP based networks also known as Next Generation 9-1-1 (NG9-1-1). As time progresses those agencies that maintain individual PSAPs will be faced with supplying even higher levels of training and procuring expensive new technology without which they will no longer be able to meet the 9-1-1 service level expectations of the community.

Key Public Safety industry organizations recognize that the on-going evolution of 9-1-1 requires establishing minimum standards for PSAP employee training, operations, technology and facilities. These organizations include:

- International City/County Management Association (ICMA)
- National Emergency Number Association (NENA)
- Association of Public-Safety Communications Officials – International (APCO)
- International Association of Fire Chiefs (IAFC)
- Commission on Accreditation for Law Enforcement Agencies (CALEA)
- National Fire Protection Association (NFPA)

The evolution of 9-1-1 and the associated technology coupled with difficult economic times have encouraged state and local governments and Public Safety agencies to investigate the concept of shared services or consolidation.

The simplest definition of consolidation is the combining of two or more PSAPs into a single facility and/or organization with a single set of critical PSAP technology and protocols. Different consolidation models exist and are customized to meet unique regional and stakeholder needs. The consolidation process is a complex and difficult process that can yield substantial improvements in service levels, responder safety, employee retention, and potential cost savings if implemented correctly.

2.2 Reasons to Consider Consolidation

Municipalities and agencies consider consolidation for a number of reasons. Commonly cited reasons are:

1. Service level improvements – An important benefit of consolidation is service level improvements. The degree and nature of the improvements will vary depending on the efficiency of each individual PSAP considering consolidation.

9-1-1 call takers and dispatchers are truly the “first responder on the scene” and can substantially affect the outcome of an incident. The types of service improvements typically achieved include:

- An improvement that will be realized for even the most efficient existing PSAP is regional awareness of workload and the deployment of field personnel. This awareness leads to improved usage of resources regionally and better management of large scale or multi-jurisdictional events from a single point of control.
- Reduction or elimination of the transfer of 9-1-1 calls between PSAPs improves response times and lowers the potential for human or technology errors.
- Quicker call processing and dispatch times, resulting in potentially faster on-scene times for field personnel. To Kimball's knowledge, case studies demonstrating this point are not available. However, an examination the typical call process where one dispatcher performs both call taking and dispatch functions does support it. Typically, when one person (the telecommunicator) is performing both functions, he or she answers the 9-1-1 call, interviews the caller long enough to confirm basic information and identify the call has a high priority. The telecommunicator then turns to the radio and dispatches field personnel and handles the initial brief flurry of radio traffic. During this time, however short it may be, the caller is essentially on-hold, perhaps not mechanically, but certainly has been asked to hold on while units are dispatched. During this time, no further information is being obtained by the telecommunicator. Once the field units are enroute and the initial radio traffic is handled, then the telecommunicator can turn his or her full attention back to the caller and obtain additional information. However, from this point forward the telecommunicator must split his or her attention between the caller and the radio.
- When call taking and dispatch functions are split, the call taker answers the 9-1-1 call and does the same basic interview in the first example. When a call is identified as a high priority, the call is entered into CAD while the call taker continues to gather information. The CAD incident is instantaneously received by the dispatcher(s) and field personnel is sent. There is no lag in gathering information, potentially critical information, from the caller while the telecommunicator balances two tasks. As the call taker gathers new information, it is added to the CAD incident and sent to the dispatcher(s) to be communicated to the responding units. In Kimball's experience, this call processing methodology is highly efficient and more accurate. In reality, a telecommunicator, no matter how talented, is still limited in the number of tasks he or she can do efficiently by virtue of being human.

- In further support of this model, the 2013 version of NFPA 1221 Standard for Installation, Maintenance and Use of Emergency Communications Systems Section A.7.3.1 (Annex to Chapter 7 Staffing) states “...Consider the following two concepts of communications center operations:
 - i. Vertical Center. A telecommunicator performs both the call taking and dispatching functions
 - ii. Horizontal Center. Different telecommunicators perform the call taking and dispatch functions.

Telecommunicators working in a vertical center are known to engage in multitasking that can inhibit their ability to perform assigned job functions. Routine evaluation of telecommunicator staffing....”

- Sharing of physical space enables communications between call takers, law enforcement and fire dispatchers to be virtually instantaneous. This improved communications enables field personnel to receive information more quickly and accurately which is particularly important in multi-jurisdictional incidents. This communication is the least tangible or quantifiable benefit of consolidation, but is one of the most key.
 - If large enough, a consolidated PSAP can utilize a call taker/dispatcher organizational structure. This structure enables the call takers to focus solely on the incoming call and obtain the best information possible. The dispatcher’s ability to focus solely on field personnel improves field personnel safety.
 - Standardized training of all PSAP employees increases regional consistency.
 - A consolidated environment will offer the opportunity for smaller participants to benefit from state-of-the-art technology, improved training, and expanded career opportunities that would not be otherwise financially or organizationally feasible.
2. Individual agencies no longer wish to or are able to support the training and technology needed or handle the personnel issues for PSAP staff. Reassigning sworn personnel functioning as PSAP management and support staff to other positions is possible by eliminating the PSAP.
 3. Another primary reason cited for consolidation is cost savings. While cost savings are possible, it is critical that potential participants understand two points. First, not all consolidations result in cost savings. A common misconception is that consolidating will result in significant personnel reductions thus significant cost savings. Consolidations do not normally involve large staff reductions. The real cost savings come from the elimination of redundant and expensive technology such as CAD, 9-1-1 answering equipment, radio consoles and logging recorders. The single set of technology and systems found in a consolidated environment reduces costs associated with procurement, connectivity and maintenance costs.

Second, in those scenarios where cost savings are achievable the actual realization of the savings may not occur for several years. The consolidation process can be expensive and can generate substantial one-time start-up and capital costs for facility and technology needs. These costs delay the actual cost savings.

2.3 Roadblocks to Consolidation

Public Safety answering point consolidation is a complex process and one has potentially negative, as well as positive aspects. The negative aspects most commonly raised are:

1. Loss of control. Depending on the consolidation model and organizational structure chosen, law enforcement and fire agencies that have had 9-1-1 call taking and dispatch staff as part of their organizations must often relinquish control of the PSAP employees as they become part of the new

organization. Complaint and other personnel investigations and any resulting training or disciplinary actions become the responsibility of the new PSAP management which can be seen as a negative by participating agencies.

Often, the level of control the new PSAP would have over the responses of the participating agencies is misunderstood. The role of any PSAP is to implement dispatch plans developed by each individual agency not to dictate response levels to each agency. For example, a law enforcement agency will still have complete control over the type or nature of the incidents they respond to and the level of that response. While standardization among participating agencies is recommended to the degree possible, each agency is still able to customize its responses to the unique needs of the community it serves. Finally, the PSAP dispatches calls for service according to each agency's dispatch plan, but any dispatch can be overridden by an agency command officer if he or she feels it necessary.

2. Start-up costs or increased operational costs. It is important to understand that comparing the cost of current, non-consolidated PSAP operations with that of a consolidated environment is not an apples-to-apples comparison. The typical emergency communications system that has been in place for the last 25 years cannot provide the level of service expected by today's technologically savvy citizens.
3. Ancillary or non PSAP related duties. In many small PSAPs where the call volume is low, staff members are often responsible for a host of other non-9-1-1 or dispatch related responsibilities. These include tasks such as handling walk-in complaints, holding cell monitoring, dispatchers performing jail duties, releasing impounded animals and vehicles, management of business key holder/contact files, entering records, tickets, and permits, tracking municipal fees such as dog licenses, and functioning as a receptionist and switchboard for the parent agency and/or the entire municipality.

Not only does PSAP staff perform necessary functions outside what would be considered 9-1-1 and dispatch duties, but also often provide a 24x7 presence within the Public Safety agency. Many agencies consider this 24x7 presence to be a vital part of the service level provided to the community and do not wish to lose it. Not having a 24x7 presence can be managed in a number of ways such as a direct phone in the lobby of the agency that dials the consolidated PSAP or installing "safe room" capabilities in the facility entrance. However, each community will need to assess if compromises such as these are acceptable when considering consolidation.

Each entity considering consolidation must determine how these types of tasks will be managed if consolidation becomes a reality. This may mean adding tasks to current non-PSAP employees within the entity, hiring new employees or altering the service levels provided. The hiring of new staff will affect the potential cost savings for the municipality and should be considered when assessing whether to consolidate.

4. Loss of geographical knowledge of the community and/or personal knowledge of callers. There is no question that PSAP staff in small communities often knows the local citizens and geography well. When moving to a larger, consolidated environment, it is also true that some of this knowledge will be lost. However, it is important to recognize that the employees from the small PSAP will likely move over to the consolidated center, taking their knowledge with them to share with other employees. In addition, mapping software is commonly available which reduces the need for a high level of local geographical knowledge.

3. CURRENT ENVIRONMENT

3.1 Funding

The PSAPs participating in this business plan currently fund their emergency communications services through a combination of 9-1-1 fees collected at the state level and local funds.

The State 9-1-1 fee is assessed on all 9-1-1 accessible devices within Michigan and collected at the state level. The State distributes the money to counties on a quarterly basis based on population. Kalamazoo County currently receives approximately \$463,000 each year from the State 9-1-1 fee. The county then distributes the money to the five PSAPs providing service within the county. The county determines the amount to distribute to each PSAP based on their percentage of the total county population. Although the 2000 census numbers are currently used, the numbers will be adjusted based on the 2010 census in the near future. The table below summarizes the 2012 county distributions to each of the business plan participants.

State 9-1-1 Fee Distribution				
PSAP	2000 Population	Percent of Population	Quarterly Distribution	Estimated Annual Distribution
KDPS	66,762	26.67%	\$37,153	\$148,125
KCSO	106,055	42.37%	\$45,697	\$182,188
TKPD	23,722	9.48%	\$10,439	\$41,617
Portage DPS	46,292	18.49%	\$21,622	\$86,205
WMU	7,500	3.00%	N/A ¹	N/A
Totals	250,331	100.00%	\$115,862	\$458,135

Table 3—State 9-1-1 Fee Distribution

The remainder of the emergency communications operating expenses must be paid at the local level. Based on information provided by each of the five PSAPs within Kalamazoo County, 9-1-1 operations total just over \$4.2 million. More detailed overviews of the individual PSAP budgets are located in Section 2.3.

Local funding can come from a variety of sources including millage and allocations from general funds. Although it has the ability to do so, Kalamazoo County does not currently assess a county level 9-1-1 surcharge. This business plan will discuss the potential revenue streams that could be generated by assessing a county level surcharge at two separate rates; .42 and \$3.00 per 9-1-1 accessible device.

¹ WMU revenue (~\$14,401) is turned over to KDPS for handling of wireless 9-1-1 calls.

3.2 Public Safety Answering Points

3.2.1 Kalamazoo Department of Public Safety

Encompassing 25.2 square miles, the City of Kalamazoo is home to 74,262² people. It is the county seat of Kalamazoo County and is part of the Kalamazoo-Portage metropolitan area. The City is part of and hosts the integrated Public Safety communications center that is located in the Crosstown Center at 150 East Crosstown Parkway in the City of Kalamazoo. The primary campus for Western Michigan University is located within the borders of the city.

3.2.1.1 Public Safety Answering Point Structure/Governance

The Kalamazoo Public Safety Communications Center is the primary PSAP for the City and is operated under the administration and oversight of KDPS. KDPS is a unified law enforcement and fire services organization with Public Safety officers (PSO) trained in law enforcement, firefighting and as EMS first responders. Oversight of the KDPS PSAP is provided by a KDPS sergeant who also oversees fleet maintenance, RMS, evidence and the quartermaster. A dispatch center group leader is assigned to each shift platoon and supervises the operations floor while on duty and assigned to a dispatch position.

The service area population is 66,762. This adjusted number reflects the population for which the KDPS PSAP provides services. It has been reduced by the estimated number of residential WMU students within the city borders.

3.2.1.2 Operations

The PSAP is staffed by nineteen (19) full time telecommunicators. Although part time positions exist, there were no part time employees on staff at the time of this report. The telecommunicators belong to Kalamazoo Public Safety Officer's Association. Public Safety answering point staff work twelve hour schedules. The minimum level of staffing required for the PSAP is three telecommunicators from 02:00 to 12:00 and from 12:00 to 02:00. PSAP staffing is augmented by PSOs trained in dispatch for any open shifts that can't be covered or filled through overtime by the civilian telecommunicators.

The PSAP received and processed 73,433 9-1-1 calls in 2011. In addition, the PSAP received 134,883 phone calls on 7 or 10 digit numbers. These calls represent a compilation of administrative, non-emergency and out-of-state alarm companies. Calls received on these lines may or may not generate a field response. In total, the KDPS staff handled 208,316 phone calls. The PSAP dispatches KDPS police and fire services (6 stations).

The KDPS PSAP serves KDPS police and fire. In addition to their primary dispatch responsibilities, other telecommunicator responsibilities include the following:

- Informational non-emergency calls
- Impound, repossession and no trespass logs are maintained
- Law Enforcement Information Network (LEIN) queries, entries, modifications, deletions

² 2010 US Census (<http://www.census.gov/>)

- Public works notifications and call outs
- Animal control notifications
- Notification of utilities (power, phone, MDOT, railroad)
- Tornado siren system
- Child Protective Services (CPS) faxes
- Security garage access
- Tow truck notification and call out
- Facility access control
- Matron duties
- Monitor e-mail for Kalamazoo Valley Enforcement Team (KVET)/CID alarms
- Monitor e-mail for Silent Observer Program
- Training tracking
- Public education and PSAP tours
- Test TDD/TTY equipment
- Monitor weather computer

Emergency medical services for the City is provided by LIFE EMS. Calls received via 9-1-1 requesting an emergency medical response are answered at the KDPS and then transferred to the LIFE dispatch center that then provides the required EMD protocols and ultimately dispatches the EMS units.

3.3 Technology

KDPS houses its own PSAP, as well as the co-located PSAPs for the Township of Kalamazoo Police Department (TKPD) and KCSO. Although each PSAP remains under the operational control of its parent agency, technology is shared by the three agencies. The shared technology includes:

- CAD
- Police RMS
- Mobile Data
- 9-1-1 Answering Equipment
- Radio Consoles
- Logging Recorder

With the use of shared technology at each position in the center, the systems has been configured and programmed to include the functionality needed for each agency's operations. This allows the critical technology to be identical at each position and provides the ability to have access each agency's resources at each position. For example, a KDPS 9-1-1 answering position has the ability to view and answer the 9-1-1 calls for the other two agencies. The Township's radio consoles have the tabs and resources for the KDPS and KCSO talk groups and channels.

Although there is a signification need for coordination, in the long run there are a number of technological and operational benefits to this type of installation.

The following sections include dedicated sections for each agency and a summary of the technology used by each, including the shared systems.

The PSAP has access to a total of six positions within the integrated communications center in which five have been equipped with CAD, 9-1-1 answering equipment and radio dispatch consoles; one of these positions (Position 5) is shared with Kalamazoo Township and the sixth position (Position 10) has 9-1-1 answering equipment only and is used by all three agencies for training. The following table depicts the various technologies that are currently installed and available at each of the six positions, as well as the associated number of monitors:

KDPS Technology			
Description	9-1-1 CPE	CAD	Radio Dispatch Console
Position 1	Yes	Yes	Yes
Position 2	Yes	Yes	Yes
Position 3	Yes	Yes	Yes
Position 4	Yes	Yes	Yes
Position 5	Yes	Yes	Yes
Position 10	Yes	No	No

Table 4—KDPS Technology

KDPS Monitors Per Workstation	
Monitor	Number
Sentinel Answering Position	1
MCC7500 Radio Console	1
CAD Entry	1
CAD Working	1
Admin/LEIN	1
CAD Mapping (future)	1
Total	6

Table 5—Workstation Technology Monitors

The PSAP is currently using an Intergraph CAD software system, version 8.1.2. The system was originally installed in 2007 and operating on the original software. The servers and workstation PCs are the original hardware that was installed in 2007. Both the production and back-up servers are installed in the equipment room and failover to the back-up server is automatic. The CAD has integrated mapping, however the map data is significantly out of date and has not been updated in the past six years. There is an interface between the Cassidian Sentinel 9-1-1 answering positions and the CAD system.

The following table depicts typical interfaces found within Public Safety CAD systems and the status of those interfaces at the KDPS PSAP.

Kalamazoo Department of Public Safety PSAP CAD Interfaces			
CAD Interfaces	Yes/No	CAD Interfaces	Yes/No
E9-1-1	Yes	Police RMS	Yes
Alarm Monitoring	No	Logging Recorder	No
AVL	Yes	Master Clock	Yes
Call Taker/Dispatcher Mapping	Yes	Mobile Mapping	Yes
EMD	No	Phase 2 Wireless Mapping	Yes
Fire RMS	No	Pictometry	No
Fire Mobile Data	Yes	Radio Console/PTT/Emergency	No
Radio Tone Encoding	No	TDD/TTY	No
Fire Station Alerting	No	Text/Alphanumeric Paging	No
Police Field Reporting	Yes	LEIN/NCIC	Yes
Police Mobile Data	Yes	Web Access/Web CAD	Yes

Table 6—KDPS CAD Interfaces

KDPS is currently using a NetMotion software application to help manage mobile data connectivity and provide a mobile virtual private network (VPN) solution. The software version being used is 8.1.2 and was last updated in 2003. The application provides secure connectivity between the mobile server and mobile data communications (MDCs). The interface provides silent dispatch, message switching, status changes, field reporting, mobile mapping and for the police operations LEIN/NCIC queries. Connectivity to the message switch is accomplished using a commercial radio vendor's wireless network (Sprint). KDPS is using Intergraph police RMS software version 8.2.0 that was last updated in 2007 and is using Fire Tools fire RMS software, version 10.2M that was updated in June, 2012.

The 9-1-1 answering equipment is a Cassidian Sentinel Patriot IP based solution that was installed in September, 2011 and is shared by KCSO and Kalamazoo TWP. All of the 9-1-1 answering equipment is maintained by AT&T. The answering positions are used to answer all incoming calls, both 9-1-1 and ten-digit, place outgoing calls, ring down lines and one-button transfers. The equipment is capable of receiving enhanced 9-1-1 (E9-1-1) call data. An interface to the CAD system allows the location of wireline calls, Phase I wireless tower locations, and Phase II wireless caller locations to display on the map. For wireless calls, the CAD mapping displays a geographical radius around the location based on the confidence factor provided with the automatic location identification (ALI) data. The PSAP is using Cassidian Aurora management information system (MIS) version 1.3.

There are sixteen 9-1-1 trunks installed on the answering positions, with six of those trunks dedicated to incoming 9-1-1 calls for the City of Kalamazoo. Fourteen of the 9-1-1 trunks are provided by AT&T from their 5ESS tandem switch in Grand Rapids and two trunks are provided by Frontier from their 5ESS tandem switch in Muskegon. AT&T provides ALI service to the PSAP through redundant centralized ALI databases located in Southfield and Northbrook, Illinois. They are served by two ALI circuits, one connected to each database. This network provides redundancy

and flexibility for future enhancements. Six ten-digit incoming phone lines are installed on the answering positions and DPS shares a pool of outgoing ten-digit lines with the other agencies in the co-located center. Back-up phones with two lines have been installed at all of the console positions for back-up purposes.

The PSAP is using a NICE Call Focus III logging recorder, version 8.90.04.03. All radio traffic is being recorded by talk group and then by select speaker at the radio console positions. The 9-1-1 answering positions are being recorded by position with no individual phone lines or trunks being recorded. The Sentinel positions are providing instant recall recording (IRR) for the telephone and the MCC7500 radio consoles are providing IRR for radio.

KDPS participates in the Michigan Public Safety Communications System (MPSCS) radio system. The system is a Project 25 (P25) compliant trunked system that was originally engineered to allow for 97 percent all-weather mobile coverage. The City of Kalamazoo installed an additional MPSCS site at Fire Station 6, 1414 Howard Street to increase and enhance the local mobile and portable radio coverage footprint. The communications center is using Motorola MCC7500 consoles that are directly connected via a T1 line to the state radio system. The center is using a combination of Plantronics wireless and wired headsets. The KDPS field units operate on trunked radio talk groups that have been assigned for use for them. There are a number of backup and portable radios installed and/or available in the communications center.

KDPS is using Zetron Model 26 fire station alerting (FSA) software and hardware. This equipment is used to provide an audible alert within the fire stations and then open up the public address systems to hear the dispatch announcement.

The center uses a Spectracom master clock solution. The 9-1-1 answering positions, logging recorder and radio consoles have been interfaced with this central time system; CAD is not connected to the master clock. The critical systems in communications and server rooms are protected by two dedicated UPS systems; one for City IT equipment and one for dispatch equipment. The entire building is provided emergency power through the facility's emergency generator. A second back-up generator dedicated to the PSAP is available should the primary generator malfunction. The communications center does not directly monitor any outside residential or business alarm systems.

The communications center is using Watson sit-to-stand system furniture that was originally installed when they moved in. A total of ten positions have been installed in the center; however only nine have been equipped with all the technology needed for dispatch/call taking operations. The tenth position only has 9-1-1 answering equipment installed at it and is typically used as a training position by all the agencies or to access telephone call statistics.

3.3.1.1 Budget

As is common, there were differences in how each agency listed and/or categorized their costs. In order to provide an apples-to-apples comparison, Kimball created the six line item names in the sections that follow and re-categorized expenses as needed to fit this criteria. This allows the expenditures to be more easily viewed within the document and allows for consistency when evaluating the budgets of all five PSAPs. The categories are defined in the table below:

Expense Category Definitions	
Expense Category	Definition
Network Costs	Includes charges for 9-1-1 trunks, connectivity costs, and administrative phones
Equipment Costs	Includes CPE, software, maintenance and call interpretation charges
CAD Costs	Includes maintenance, CAD software and all other CAD charges
Radio Costs	Includes radio console maintenance, radio service calls and all radio connectivity charges
Office Expenses	Includes non-CPE computer equipment, base building charges, electricity, gas, water, sewer, snow removal, paper, UPS generator maintenance, uniforms and any other office related charges
Personnel Expenses	A total of all the personnel expenses provided in the survey. Includes telecommunicator pay and benefits as well as personnel costs associated with support from other departments and/or sworn personnel.

Table 7—Expense Category Definitions

KDPS comprises the largest portion of the 9-1-1 operations expenses within the county with costs currently totaling approximately \$1.9 million per year. The bulk of the expenses for KDPS are personnel costs which account for 77 percent of the total costs. Of the non-personnel related expenses, CAD accounts for 48 percent, equipment accounts for 19 percent and radio comprises 14 percent of the total expenses.

The following chart shows a breakdown of the costs within each category of the overall agency expenses.

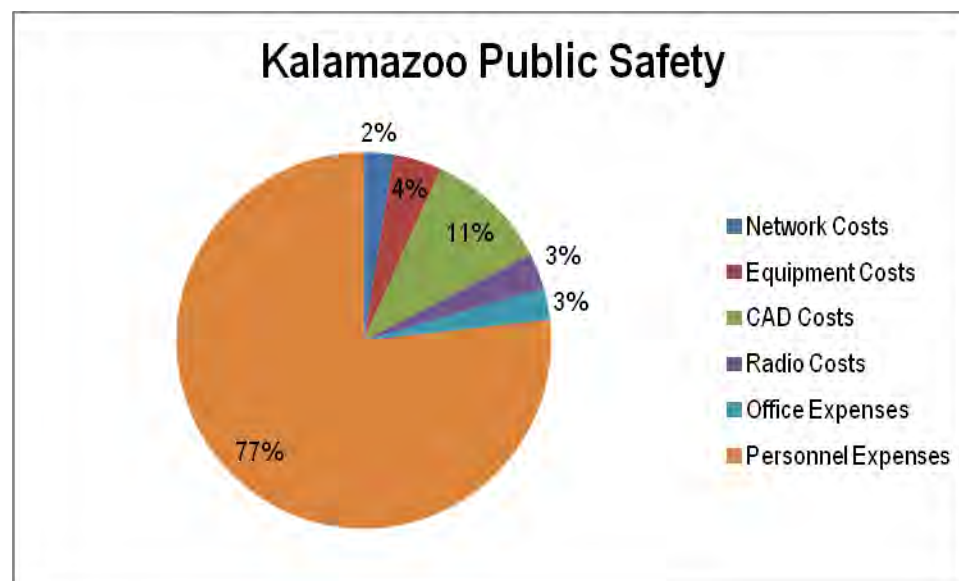


Chart 1—KDPS Budget Summary

The following table depicts the breakout of costs excluding personnel expenses.

KDPS Budget Exclusive of Personnel		
Expense Category	Amount	Percentage of Total
Network Costs	\$50,174.00	11.01%
Equipment Costs	\$81,379.64	17.86%
CAD Costs	\$209,647.00	46.00%
Radio Costs	\$60,697.44	13.32%
Office Expenses	\$53,813.79	11.81%
Total	\$455,711.87	100%

Table 8—KDPS Budget Summary Exclusive of Personnel

As the host agency for the co-located PSAPs, KDPS receives just over \$619,000 in revenue each year from agreements with the County, municipalities and Kalamazoo Township. As the host agency, KDPS receives annual invoices for expenses such as the CAD maintenance and mobile data which are inclusive of other county agencies. KDPS invoices each agency for their respective portion. The revenue also includes the annual contract payments from Kalamazoo TWP and KCSO, training funds from the State for the training of dispatch personnel and the 9-1-1 fee. The revenue is shown in the table below.

Kalamazoo Department of Public Safety Net Annual PSAP Costs		
Expense Category	Amount	
Network Costs	\$50,174	
Equipment Costs	\$81,380	
CAD Costs	\$209,647	
Radio Costs	\$60,697	
Office Expenses	\$53,814	
Personnel (Salary, Benefits, Other Dept. Support)	\$1,505,485	
Total Expenses		\$1,961,197
Revenue / Reimbursements	Amount	
State 9-1-1 Fee - Estimated	\$148,124 ³	
CMRS Agreement	\$141,000	
TKPD Contract	\$66,082	
KCSO Contract	\$197,631	
iLEADS/NetMotion Agency Reimbursement	\$48,612	
State Training Reimbursement	\$18,000	
Total Revenue/Reimbursements		\$619,441
Total Net Annual Cost		\$1,341,747

Table 9—KDPS Net Annual PSAP Costs

³ Includes WMU surcharge of \$14,500.

3.3.2 Kalamazoo County Sheriff's Office

As of the most recent 2010 census, the County's population was 250,331 and encompasses a geographical area of approximately 580.30 square miles. The County seat is the City of Kalamazoo and is part of the Kalamazoo-Portage metropolitan area. The County is part of the integrated Public Safety communications center that is located in the Crosstown Center at 150 East Crosstown Parkway in the City of Kalamazoo. The County is bordered by the following:

- Barry County - Northeast
- Allegan County – Northwest
- Calhoun County – East
- Van Buren County – West
- Branch County – Southeast
- St. Joseph County – South
- Cass County – Southwest

The service area population is 106,055. This number reflects the 2010 county population reduced by the population served by other PSAPs within the County.

3.3.2.1 Structure/Governance

The KCSO public safety communications center is the primary PSAP for the County with the exception of City of Kalamazoo, Kalamazoo Township, City of Parchment and the City of Portage. The communications center is operated under the administration and oversight of the County Sheriff. The PSAP dispatches the County Sheriff's Office, a number of local police departments and paid on-call fire departments. Emergency medical services within the County is provided by four various EMS agencies all who have respective first dues areas; LIFE, LifeCare, PrideCare and South County EMS. Emergency medical responses initiated by 9-1-1 calls are answered by the KCSO and then transferred to the appropriate EMS dispatch center, based on location, which then provides the required EMD protocols and dispatches the local medical units.

3.3.2.2 Operations

KCSO Public Safety communications center is the primary PSAP for the County with the exception of City of Kalamazoo, Kalamazoo Township, City of Parchment and the City of Portage. The communications center is operated under the administration and oversight of the County Sheriff. The PSAP dispatches the County Sheriff's Office, a number of local police departments and paid on-call fire departments. Emergency medical services service within the County is provided by four various EMS agencies all who have respective first dues areas; LIFE, LifeCare, PrideCare and South County EMS. Emergency medical responses initiated by 9-1-1 calls are answered by the County Sheriff's Department and then transferred to the appropriate EMS dispatch center, based on location, which then provides the required EMD protocols and dispatches the local medical units.

Kalamazoo County Sheriff's Office PSAP Agencies Served		
Police Agencies	Fire Agencies	
Kalamazoo County Sheriff's Department	Alamo Township Fire Department	Richland Township Fire Department
Augusta Police Department	Charleston Township Fire Department	Ross Township Fire Department
Galesburg Police Department	Climax Township Fire Department	South County Fire Authority
Kalamazoo Valley Community College (Texas TWP Campus)	Comstock Township Fire Department	Texas Township Fire Department
Richland Police Department	Cooper Township Fire Department	
Schoolcraft Police Department	Oshtemo Township Fire Department	
Vicksburg Police Department	Pavillion Township Fire Department	

Table 10—KCSO PSAP Agencies Served

The PSAP has access to four positions in the integrated communications center and three have been equipped with CAD, 9-1-1 answering equipment and radio dispatch equipment; the fourth position (Position 10) only has 9-1-1 answering equipment and is used by all three agencies for training and access to telephone statistics. The following table depicts the various technologies that are currently installed and available at each of the four positions.

KCSO PSAP Position Technology			
Description	9-1-1 CPE	CAD	Radio Dispatch Console
Position 7	Yes	Yes	Yes
Position 8	Yes	Yes	Yes
Position 9	Yes	Yes	Yes
Position 10	Yes	No	No

Table 11—KCSO Position Technology

KCSO Workstation Monitors	
Equipment	Number
Sentinel Answering Position	1
MCC7500 Radio Console	1
CAD Entry	1
CAD Working	1
Admin/LEIN	1
CAD Mapping (future)	1
Total	6

Table 12—KCSO Technology Workstation Monitors

There are currently nine (9) full time telecommunicators and no part time employees. The employees are all union and work twelve hour schedules, with the exception of an overlap shift that is ten hours. Minimum staffing for the PSAP is two dispatchers from 07:00 to 19:00 and from 19:00 to 07:00; one sworn and one civilian employee. Public Safety answering point staffing is augmented by dispatch trained Sheriff's Deputies and their current labor contract states a sworn dispatcher must be on duty for all shifts.

The KCSO PSAP received 52,189 9-1-1 calls in 2011. In addition, the PSAP staff handled 76,987 calls received on 7 and 10 digit phone lines. These calls represent a compilation of administrative, non-emergency and out-of-state alarm companies. Calls received on these lines may or may not generate a field response. In total the KCSO PSAP received 129,176 calls in 2011.

In addition to their primary dispatch responsibilities, other telecommunicator responsibilities include the following:

- Informational non-emergency calls
- LEIN queries, entries, modifications, deletions
- Michigan State Police dispatch
- Michigan Department of Natural Resources
- Public works notifications/call outs
- Animal control notifications
- Animal control dispatch (after hours)
- Notification of utilities (power, phone, MDOT, railroad)
- Child Protective Services (CPS) faxes
- Tow truck notification/call out
- Monitor weather computer
- Emergency Management Call-outs

3.3.2.3 Technology

The KCSO PSAP is currently sharing the Intergraph CAD system, version 8.1.2 with KDPS and TKPD. The system was originally installed in 2007 and the software has not been updated since. The servers and workstation PCs are the originals that were installed back in 2007. Both the production and back-up servers are installed in the equipment room and failover to the back-up is an automatic process. The CAD has integrated mapping, however the map data is significantly outdated and has not been updated in over six years. There is an interface between the Cassidian Sentinel 9-1-1 answering positions, which are also shared, and the CAD system.

The following table depicts typical interfaces found within public safety CAD systems and the status of those interfaces at the KCSO PSAP:

KCSO CAD Interfaces			
CAD Interfaces	Yes/No	CAD Interfaces	Yes/No
E9-1-1	Yes	Police RMS	Yes
Alarm Monitoring	No	Logging Recorder	No
AVL	Yes	Master Clock	Yes
Call Taker/Dispatcher Mapping	Yes	Mobile Mapping	Yes
EMD	No	Phase 2 Wireless Mapping	Yes
Fire RMS	No	Pictometry	No
Fire Mobile Data	Yes	Radio Console/PTT/Emergency	No
Radio Tone Encoding	No	TDD/TTY	No
Fire Station Alerting	No	Text/Alphanumeric Paging	No
Police Field Reporting	Yes	LEIN/NCIC	Yes
Police Mobile Data	Yes	Web Access/Web CAD	Yes

Table 13—KCSO CAD Interfaces

The County is using an Intergraph mobile data solution with Motorola ML910 mounted rugged notebook computers and is using the NetMotion software application to help manage mobile data connectivity and provide a mobile VPN solution. The software version being used is 8.1.2 and was last updated in 2003. The application provides a secure connectivity between the mobile server and the MDCs. The interface provides silent dispatch, message switching, status changes and for the police operations LEIN/NCIC queries. Connectivity to the message switch is accomplished through USB dongles on a commercial radio vendor's wireless network (Verizon Wireless). The County is using Intergraph police RMS software version 8.2.0 and was last updated in 2007.

The 9-1-1 answering equipment is a Cassidian Sentinel Patriot IP based solution that was installed in September, 2011 and shared with KDPS and the TWP. All of the 9-1-1 answering equipment is maintained by AT&T. The answering positions are used to answer all incoming calls, both 9-1-1 and ten-digit, place outgoing calls, ring down lines and one-button transfers. The equipment is capable of receiving E9-1-1 call data. An interface to the CAD system allows the location of wireline calls, Phase I wireless tower locations, and Phase II wireless caller locations to

display on the map. For wireless calls, the CAD mapping displays a geographical radius around the location based on the confidence factor provided with the automatic location identification (ALI) data. The PSAP is using Cassidian Aurora management information system (MIS) version 1.3 for call statistics.

There are sixteen 9-1-1 trunks installed on the answering positions, with eight of those trunks dedicated to incoming 9-1-1 calls for the County; six trunks are provided by AT&T and two are provided by Frontier. The AT&T provided 9-1-1 trunks are from their 5ESS tandem switch in Grand Rapids and the two Frontier trunks are from their tandem switch in Muskegon. AT&T provides ALI service to the PSAPs through redundant centralized ALI databases; one located in Southfield, Illinois and the other in Northbrook, Illinois. They are served by two ALI circuits, one connected to each database. This network provides redundancy and flexibility for future enhancements. Six ten-digit incoming phone lines and two four-digit extensions off the County phone system are installed on the answering positions and the County shares a pool of outgoing ten-digit lines with the other agencies in the co-located center. Back-up phones with two lines on each phone have been installed at all of the console positions for back-up purposes.

The PSAP is using a NICE Call Focus III logging recorder, version 8.90.04.03. All radio traffic is being recorded by talk group and by select speaker at the radio console position. The 9-1-1 answering positions are being recorded by position and no individual phone lines or 9-1-1 trunks are being recorded. The Sentinel positions are providing IRR for the telephone and the MCC7500 radio consoles is providing IRR for radio.

KCSO and other local police agencies participate in the MPSCS radio system. The system is a P25 compliant trunked system originally engineered to allow for 97 percent all-weather mobile coverage. The communications center is using Motorola MCC7500 consoles that are directly connected via a T1 line to the radio system. The center is using a combination of Plantronics wireless and wired headsets. The law enforcement field units operate on trunked radio talk groups that have been assigned to them. There are a number of backup and portable radios installed and/or available in the communications center.

The County dispatches all of the fire departments in the County with the exception of Kalamazoo DPS, Kalamazoo Township, Portage DPS and the City of Parchment. All of the County fire departments are paid on-call departments and are dispatched via the Kalamazoo County Fire Radio System. The dispatcher manually selects the tower that provides the best radio coverage for that specific agency and then sends the appropriate pager tones via that tower followed by the dispatch announcement. The county fire system is a VHF repeated system with the 'main' fire repeater located at the West Michigan tower site. There are five other receivers that are voted located at other sites in the County. All fire departments utilize local VHF 'fire tactical' channels for on scene command and operations. The communications center does not monitor these channels and all communications back the center is via the repeated channels.

The center uses a Spectracom master clock solution. The 9-1-1 answering positions, logging recorder and radio consoles have been interfaced with this central time system; CAD is not connected to the master clock. The critical systems in communications and the server rooms are protected by a two dedicated uninterruptible power supply (UPS) systems; one for the IT network and the other for the PSAP equipment. The entire building is provided emergency power through the building's emergency generator. A second back-up generator dedicated to the PSAP is available should the primary generator malfunction. The communications center does not directly monitor any outside residential or business alarm systems.

The communications center is using Watson sit-to-stand system furniture that was originally installed when they moved in. A total of ten positions have been installed in the center; however, only nine have been equipped with the critical technology that is needed for dispatch/call taking operations. The tenth position only has 9-1-1 answering equipment installed at it and is typically used as a training position by all the agencies in the center or to access telephone call statistics.

3.3.2.4 Budget

KCSO is co-located within KDPS. Costs for the Sheriff's Office currently total \$1.141 million each year including money paid to KDPS for CMRS and facilities. The bulk of the expenses for the Sheriff's Office are personnel costs which account for 79 percent of the total costs. Of the non-personnel related expenses, the annual contract, which is the fee paid to KDPS, accounts for 83 percent.

The following chart shows a breakdown of the costs within each category of the overall agency expenses.

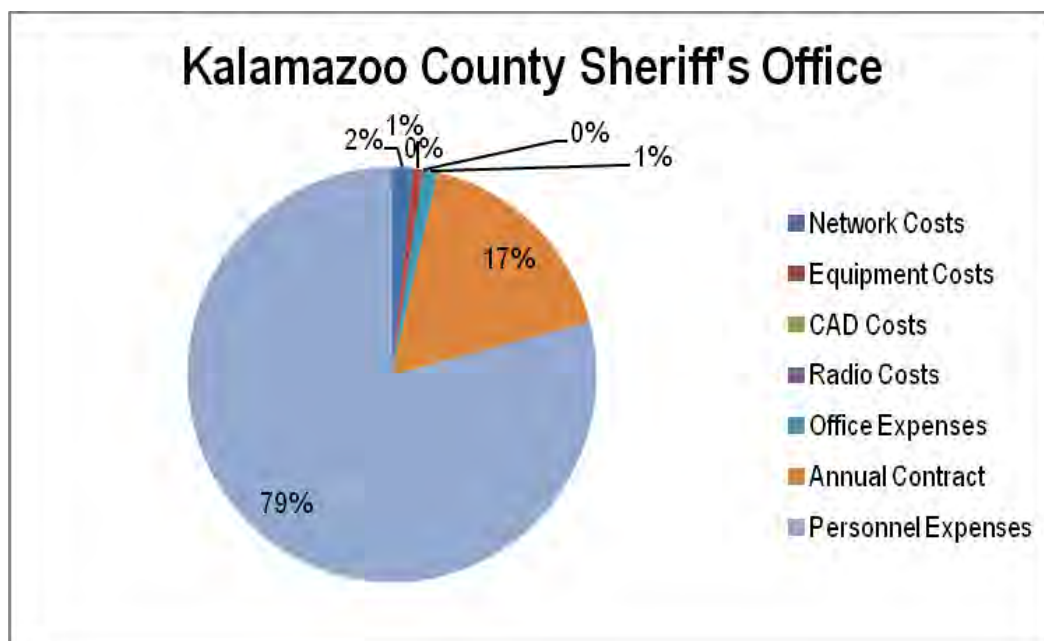


Chart 2—KCSO Budget Breakdown

KCSO Budget Exclusive of Personnel		
Costs	Amount	Percentage of Total
Network Costs	\$19,000	7.96%
Equipment Costs	\$8,805	3.69%
CAD Costs	\$0	0.00%
Radio Costs	\$0	0.00%
Annual KDPS Contract	\$197,631	82.76%
Office Expenses	\$13,369	5.60%
Total	\$238,436	100%

Table 14—KCSO PSAP Budget Exclusive of Personnel

The following table represents KCSO's annual net costs for its PSAP. Its total annual costs are offset by approximately \$182,188 in disbursements from the State 9-1-1 Fee.

Kalamazoo County Sheriff's Office Net Annual PSAP Costs	
Costs	Amount
Network Costs	\$19,000
Equipment Costs	\$8,805
CAD Costs	\$0
Radio Costs	\$0
Office Expenses	\$13,000
Annual KDPS Contract	\$197,631
Personnel	\$902,094.00
Sub-Total	\$1,140,530
Revenue (State 9-1-1 Fee) - Estimated	\$182,188
Total Net Annual Cost	\$958,342

Table 15—KCSO Annual Net PSAP Costs

3.3.3 Township of Kalamazoo Police Department

As of the most recent 2010 census, the Township's population was 21,918 and encompasses a geographical area of approximately 11.79 square miles. The Township is part of the Kalamazoo-Portage metropolitan area. The

integrated Public Safety communications center is located in the Crosstown Center at 150 East Crosstown Parkway in the City of Kalamazoo.

The service area population is 23,722. This number represents the adjustment of the 2010 census figure to include the City of Parchment for which the TWP provides police services.

3.3.3.1 Structure/Governance

The primary PSAP for the Township and the City of Parchment is co-located with KDPS and KCSO in Crosstown Center. The TWP's PSAP is operated under the administration and oversight of the Kalamazoo Township Police Department. The PSAP dispatches the Township Police Department who is also contracted to provide police services to the City of Parchment, Kalamazoo Township Fire Department and the City of Parchment Fire Department. Emergency medical services for the Township are provided by Pride Care Ambulance. EMS service for the City of Parchment is provided by LIFE EMS. 9-1-1 calls requesting an emergency medical response are answered at the communications center and then transferred to appropriate dispatch center that will then provide the required EMD protocols and dispatches the units.

Kalamazoo Township PSAP Agencies Served	
Police Agencies	Fire Agencies
Kalamazoo Township Police	Kalamazoo Township Fire
	Parchment City Fire

Table 16—Kalamazoo Township Agencies Served

3.3.3.2 Operations

The PSAP has access to a total of three positions within the integrated communications center and two of these positions have been equipped with CAD, 9-1-1 answering equipment and radio dispatch consoles; one of these positions (Position 5) is shared with Kalamazoo DPS and the sixth position (Position 10) only has 9-1-1 answering equipment and is used by all three agencies for training and for call statistics. The following table depicts the various technologies that are currently installed and available at each of the three positions:

TKPD PSAP Position Technology			
Description	9-1-1 CPE	CAD	Radio Console
Position 6	Yes	Yes	Yes
Position 5	Yes	Yes	Yes
Position 10	Yes	No	No

Table 17—TKPD PSAP Position Technology

TKPD PSAP Workstation Monitors	
Equipment	Number
Sentinel Answering Position	1
MCC7500 Radio Console	1
CAD Entry	1
CAD Working	1
Admin/LEIN	1
CAD Mapping (future)	1
Total	6

Table 18—Kalamazoo Township Technology – Workstation Monitors

The Township currently employs five full time telecommunicators although a retirement at the end of 2012 is expected. There are no part time employees. Minimum staffing for the PSAP is one dispatcher and sworn personnel trained in dispatching are used to augment the civilian staff as needed. The employees are unionized (Township of Kalamazoo Police Officers' Association) and work eight hour schedules. Telecommunicators work the following shifts:

1. Shift A: Sunday – Thursday 0700 hours to 1500 hours (7 AM – 3 PM)
2. Shift B: Tuesday – Saturday 2300 hours to 0700 hours (11 PM – 7 AM)
3. Shift C: Friday – Saturday 0700 hours to 1500 hours (7 AM – 3 PM)
Sunday – Tuesday 1500 hours to 2300 hours (3 PM – 11 PM)
4. Shift D: Thursday – Saturday 1500 hours to 2300 hours (3 PM – 11 PM)
Sunday and Monday 2300 hours to 0700 hours (11 PM – 7 AM)
5. Shift E: Monday and Tuesday 1100 hours – 1900 hours (11 AM – 7 PM)
Wednesday 1500 hours – 2300 hours (3 PM – 11 PM)
Thursday and Friday 1100 hours to 1900 hours (11 AM – 7 PM)

The TWP PSAP received 12,507 9-1-1 calls in 2011. In addition, the PSAP staff handled 39,895 calls received on 7 and 10 digit phone lines. These calls represent a compilation of administrative, non-emergency and out-of-state alarm companies. Calls received on these lines may or may not generate a field response. In total the Township PSAP received 52,402 calls in 2011.

In addition to their primary dispatch responsibilities, other telecommunicator responsibilities include the following:

- Informational non-emergency calls
- LEIN queries, entries, modifications, deletions
- Public works notifications/call outs
- Animal control notifications
- Notification of utilities (power, phone, MDOT, railroad)
- Tow truck notification/call out
- Monitor weather computer

Emergency medical services and EMD service for the Township is provided by Pride Care Ambulance. Emergency medical services and EMD service for the City of Parchment is provided by LIFE EMS.

3.3.3.3 Technology

The PSAP is currently sharing an Intergraph CAD system, version 8.1.2 with KDPS and KCSO. The system was originally installed in 2007 and the software has not been updated since. The servers and workstation PCs are the same as originally installed in 2007. Both the production and back-up servers are installed in the equipment room and failover to the back-up server is automatic process. The CAD has integrated mapping, however the map data is significantly outdated and has not been updated in over six years. There is an interface between the Cassidian Sentinel 9-1-1 answering positions and the CAD system.

The following table depicts typical interfaces that are found within public safety CAD systems and the status of those interfaces at the Township of Kalamazoo Police Department PSAP:

TKPD PSAP CAD Interfaces			
CAD Interfaces	Yes/No	CAD Interfaces	Yes/No
E9-1-1	Yes	Police RMS	Yes
Alarm Monitoring	No	Logging Recorder	No
AVL	Yes	Master Clock	Yes
Call Taker/Dispatcher Mapping	Yes	Mobile Mapping	Yes
EMD	No	Phase 2 Wireless Mapping	Yes
Fire RMS	No	Pictometry	No
Fire Mobile Data	Yes	Radio Console/PTT/Emergency	No
Radio Tone Encoding	No	TDD/TTY	No
Fire Station Alerting	No	Text/Alphanumeric Paging	No
Police Field Reporting	Yes	LEIN/NCIC	Yes
Police Mobile Data	Yes	Web Access/Web CAD	Yes

Table 19—TKPD PSAP CAD Interfaces

The Township is using an Intergraph mobile data solution with Dell mounted semi-rugged notebook computers and is using the NetMotion software application to help manage mobile data connectivity and provide a mobile VPN solution. The software version being used is 8.1.2 and was last updated in 2003. The application provides a secure connectivity between the mobile server and the MDCs. The interface provides silent dispatch, message switching, status changes, field reporting, mobile mapping and for the police operations LEIN/NCIC queries. Connectivity to the message switch is accomplished through air cards on a commercial radio vendor's wireless network (Sprint). The Township is using Intergraph police RMS software version 8.2.0 that was last updated in 2007.

The 9-1-1 answering equipment is a Cassidian Sentinel Patriot IP based solution that was installed in September, 2011 and is shared with KDPS and KCSO. All of the 9-1-1 answering equipment is maintained by AT&T. The answering positions are used to answer all incoming calls, both 9-1-1 and ten-digit, place outgoing calls, ring down lines and one-button transfers. The equipment is capable of receiving E9-1-1 call data. An interface to the CAD system allows the location of wireline calls, Phase I wireless tower locations, and Phase II wireless caller locations to display on the map. For wireless calls, the CAD mapping displays a geographical radius around the location based on the confidence factor provided with the ALI data. The PSAP is using Cassidian Aurora MIS version 1.3.

There are sixteen 9-1-1 trunks installed on the answering positions and two of those trunks are dedicated to incoming 9-1-1 calls for Kalamazoo Township/City of Parchment. Fourteen of the 9-1-1 trunks are provided by AT&T from their 5ESS tandem switch in Grand Rapids and two of the trunks are provided by Frontier from their 5ESS tandem switch in Muskegon. AT&T provides ALI service to the PSAP through redundant centralized ALI databases located in Southfield and Northbrook, Illinois. They are served by two ALI circuits, one connected to each database. This network provides redundancy and flexibility for future enhancements. Four ten-digit incoming phone lines are installed on the answering positions and the TWP shares a pool of outgoing ten-digit lines with the other agencies within the co-located center. Back-up phones with two lines have been installed at all of the console positions.

The PSAP is using a NICE Call Focus III logging recorder version 8.90.04.03. All radio traffic is being recorded by talk group and by select speaker at the radio console position. The 9-1-1 answering positions are being recorded by position and no individual phone lines or 9-1-1 trunks are being recorded. The Sentinel positions are providing IRR for the telephone and the MCC7500 radio consoles are providing IRR for the radio traffic.

The TWP participates in the MPSCS radio system. The system is a P25 compliant trunked system originally engineered to allow for 97 percent all-weather mobile coverage. Kalamazoo Township installed an additional MPSCS site at the County Jail, 1500 Lamont Street to enhance their local mobile and portable radio coverage footprint. The communications center is using Motorola MCC7500 consoles that are directly connected via a T1 line to the state radio system. The center is using a combination of Plantronics wireless and wired headsets. The Kalamazoo Township Police field units operate on trunked radio talk groups that have been assigned to them by the state. There are a number of backup and portable radios installed and/or available in the communications center.

The TWP dispatches the Kalamazoo Township and City of Parchment Fire Departments. All of the fire agencies are paid on-call departments and are dispatched via the VHF base station at the Westwood Fire Station located at 1310 Nichols Road. The radio consoles are programmed to automatically send the appropriate pager tones from the Westwood transmitter site automatically which is then followed by the dispatch announcement. The fire departments utilize local VHF 'fire tactical' channels for on scene command and operations.

The center uses a Spectracom master clock solution. The 9-1-1 answering positions, logging recorder and radio consoles have been interfaced with this central time system; CAD is not connected to the master clock. The critical systems in communications and server rooms are protected by a dedicated UPS system and the entire building is provided emergency power through the facility's emergency generator. A second back-up generator dedicated to the PSAP is available should the primary generator malfunction. The communications center does not directly monitor any outside residential or business alarm systems.

The communications center is using Watson sit to stand system furniture that was originally installed when they moved in. A total of ten positions have been installed in the center; however, only nine have been equipped with the technology needed for dispatch/call taking operations. The tenth position only has 9-1-1 answering equipment and is typically used as a training position by all the agencies or to access telephone call statistics.

3.3.3.4 Budget

The TKPD PSAP is co-located within the KDPS facility. Costs for the TWP currently total just over \$430,000 per year and include money paid to KDPS for facilities. Personnel expenses account for 78 percent of the total expenses for the township. The annual contract paid to KDPS accounts for the largest portion of the non-personnel related expenses.

The following chart shows a breakdown of the costs within each category of the overall agency expenses.

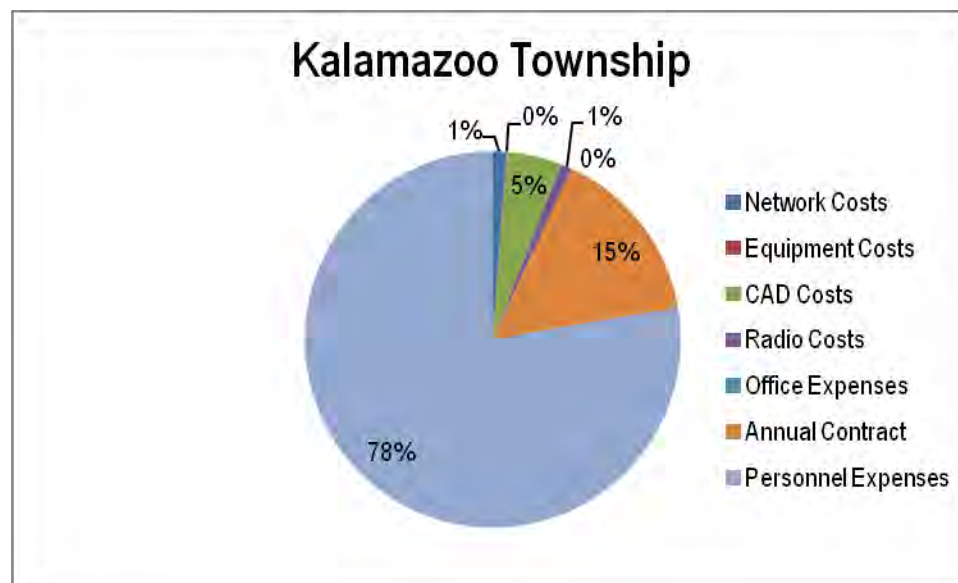


Chart 3—Kalamazoo Township Budget Breakdown

Kalamazoo Township PSAP Budget Exclusive of Personnel Costs		
Cost	Amount	Percentage of Total
Network Costs	\$5,000	5.23%
Equipment Costs	\$350	0.37%
CAD Costs	\$20,250	21.16%
Radio Costs	\$4,000	4.18%
Annual KDPS Contract	\$66,082	69.06%
Office Expenses	\$0	0.00%
Total	\$95,682	100%

Table 20—Kalamazoo Township Budget Exclusive of Personnel Costs

TKPD PSAP Net Costs	
Cost	Amount
Network Costs	\$5,000
Equipment Costs	\$350
CAD Costs	\$20,250
Radio Costs	\$4,000
Office Expenses	\$0
KDPS Annual Contract	\$66,082
Personnel	\$334,670
Sub-Total	\$430,352
Revenue (State 9-1-1 Fee) - Estimated	\$41,617
Total Net Annual Cost	\$388,735

Table 21—Kalamazoo Township Annual Net PSAP Costs

3.3.4 City of Portage Department of Public Safety (Portage DPS)

As of the most recent 2010 census, the City's population was 46,292 and encompasses a geographical area of approximately 35.17 square miles. The City is part of the Kalamazoo-Portage metropolitan area. The Public Safety communications center is located at 7810 Shaver Road, in the City of Portage. The City has consolidated administration for the police and fire departments into a single public safety department. However, field personnel are organized in the traditional model of separate departments with each focused on its own area of expertise. The police department is accredited by the Commission on Accreditation for Law Enforcement Agencies (CALEA).

3.3.4.1 Structure/Governance

The Portage Public Safety Communications Center is the primary PSAP for the City of Portage and is operated under the administration and oversight of the Portage Department of Public Safety. The PSAP dispatches DPS's police and fire divisions. Emergency medical services for the City are provided by LIFE and Pride Care EMS, and they operate on a monthly rotation. Emergency medical responses initiated by 9-1-1 calls are answered at the PSAP and then transferred to the appropriate EMS dispatch center that provides the required EMD protocols and then dispatches the units.

The Portage PSAP serves Portage DPS police and fire.

3.3.4.2 Operations

The PSAP has a total of three positions within the communications center in which all have been equipped with CAD, 9-1-1 answering equipment and radio dispatch consoles. The following table depicts the various technologies that are currently installed and available at each of the three positions:

Portage DPS Position Technology			
Description	9-1-1 CPE	CAD	Radio Console
Position 1	Yes	Yes	Yes
Position 2	Yes	Yes	Yes
Position 3	Yes	Yes	Yes

Table 22—Portage DPS Position Technology

Portage DPS PSAP Workstation Monitors	
Equipment	Number
Positron Answering Position	1
Positron Radio Console	1
CAD Entry/LEIN/Admin	1
CAD Working/LEIN/Admin	1
CAD Mapping/LEIN/Admin	1
Total	5

Table 23—Portage DPS Workstation Monitors

There are currently nine full time telecommunicators and two part time employees. The employees are all union and work eight hour schedules. Minimum staffing for the PSAP at all times is two dispatchers.

The Portage DPS PSAP received 28,565 9-1-1 calls in 2011. In addition, the PSAP staff handled 82,262 calls received on 7 and 10 digit phone lines. These calls represent a compilation of administrative, non-emergency and out-of-state alarm companies. Calls received on these lines may or may not generate a field response. In total the Portage PSAP received 110,827 calls in 2011.

In addition to their primary dispatch responsibilities, other telecommunicator responsibilities include the following:

- Informational non-emergency calls
- LEIN queries, entries, modifications, deletions
- Monitor security cameras
- Monitor traffic cameras
- Monitor facility access controls/Key fob system
- Civil defense siren system
- Emergency notification for all City Departments (streets, water/sewer, etc.)
- Animal control notifications
- Notification of utilities (power, phone, MDOT, railroad)
- Tow truck notification/call out
- Monitor weather computer

3.3.4.3 Technology

The PSAP is currently using a New World AS400 CAD software system, version 9.0. The system was originally installed in 1990 and the software is updated on a routine basis. The servers are the original equipment installed in 2007. The workstation PCs were upgraded in November, 2012. The production server is installed at City Hall and connectivity to the PSAP is a fiber connection. There is no back-up CAD/RMS server. The CAD has integrated mapping and there is an interface between the Positron 9-1-1 answering positions and the CAD system.

The following table depicts typical interfaces found within Public Safety CAD systems and the status of those interfaces at the Portage PSAP:

Portage DPS CAD Interfaces					
CAD Interfaces		Yes/No		CAD Interfaces	Yes/No
E9-1-1		Yes		Police RMS	Yes
Alarm Monitoring		No		Logging Recorder	No
AVL		Yes		Master Clock	Yes
Call Taker/Dispatcher Mapping		Yes		Mobile Mapping	Yes
EMD		No		Phase 2 Wireless Mapping	Yes
Fire RMS		Yes		Pictometry	Yes
Fire Mobile Data		Yes		Radio Console/PTT/Emergency	No
Radio Tone Encoding		Yes		TDD/TTY	No
Fire Station Alerting		Yes		Text/Alphanumeric Paging	No
Police Field Reporting		No		LEIN/NCIC	Yes
Police Mobile Data		Yes		Web Access/Web CAD	No

Table 24—Portage DPS CAD Interfaces

The City is using a New World mobile data solution, version 7.0, with mounted notebook computers and is using the NetMotion software application to help manage mobile data connectivity and provide a mobile VPN solution. The software version being used is 8.1.2 and was last updated in 2003. The application provides a secure connectivity between the mobile server and the MDCs. The interface provides silent dispatch, message switching, status changes, mobile mapping and for the police operations LEIN/NCIC queries. Connectivity to the message switch is accomplished through broadband air cards on a commercial radio vendor's wireless network (Verizon Wireless) and an 800 MHz data channel. Communications from CAD to the mobiles is via the radio data channel and communications from mobile back to the mobile switch if Verizon broadband. The City is using New World's police RMS software version 9.0 and they have a CAD interface to FireHouse fire RMS.

The 9-1-1 answering equipment is a Positron Lifeline 100 solution that was installed in 2005. All of the 9-1-1 answering equipment is maintained by AT&T. The answering positions are used to answer all incoming calls, both 9-1-1 and ten-digit, place outgoing calls, ring down lines and one-button transfers. The equipment is capable of receiving E9-1-1 call data. An interface to the CAD system allows the location of wireline calls, Phase I wireless tower locations, and Phase II wireless caller locations to display on the map. For wireless calls, the CAD mapping displays a geographical radius around the location based on the confidence factor provided with the ALI data.

There are three 9-1-1 trunks installed on the answering positions that are provided by AT&T from their 5ESS tandem switch in Grand Rapids. AT&T provides ALI service to the Portage PSAP through redundant centralized ALI databases located in Southfield and Northbrook, Illinois. They are served by two ALI circuits, one connected to each database. This network provides redundancy and flexibility for future enhancements. Seven ten-digit incoming phone lines are installed on the answering positions. Back-up phones for the 9-1-1 answering positions have been installed in the center at the console positions.

The PSAP is using a DSS Equature logging recorder that was installed in 2012. All radio traffic is being recorded by radio channel. The 9-1-1 trunks are being recorded individually, as well as six individual phone lines. Each 9-1-1 answering position is also recorded. The Positron answering positions are providing IRR for the telephone and the Positron radio consoles are providing IRR for the radio consoles.

The City operates its police and fire communications on its own VHF repeated radio system. The primary police repeater is located at the Romence Road site and the primary fire repeater is located at the Haverhill Road site. There are a number of remote receivers with voting capabilities for both the police and fire primary repeaters installed at sites throughout the City. There is back-up police repeater on stand-by at the Romence Road site and a back-up fire repeater on stand-by at the Haverhill Road site. The communications center is using Positron Power consoles that were originally installed in December 2004 and last updated in 2008. The center is using a combination of Plantronics wireless and wired headsets. There is a desktop base station installed and available in the communications center and at all fire stations. All of these base stations have the ability to provide some limited communications as a back-up to the consoles positions.

The center IT network and the systems using this network are all on a master clock. The critical systems in communications and server rooms are protected by a dedicated MGE Galaxy 3000 UPS system and the entire building is provided emergency power through the facility's Cummins natural gas emergency generator. The communications center does not directly monitor any outside residential or business alarm systems; however they do monitor some several alarms for Courts office that is co-located in the same building.

The communications center is using Xybix sit to stand system furniture that was installed when the facility was renovated in 2005. A total of four system furniture positions have been installed in the center; however only three have been equipped with the critical technology needed for dispatch/call taking operations.

3.3.4.4 Budget

Costs for the Portage DPS PSAP total just over \$720,000 per year. Personnel expenses account for 83 percent of the yearly total expenses. The remaining expenses are distributed fairly evenly throughout the other five categories.

The following chart shows a breakdown of the costs within each category of the overall agency expenses.

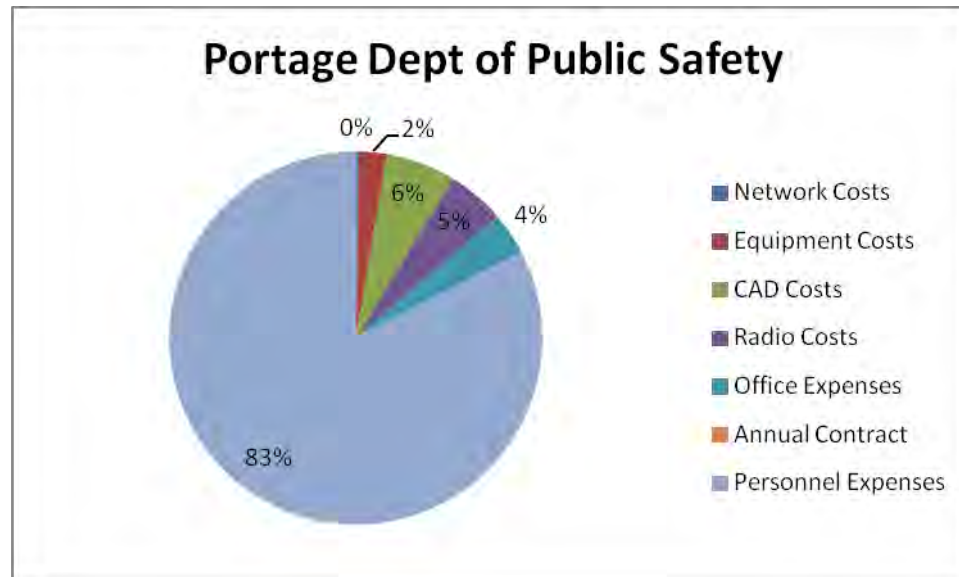


Chart 4—Portage DPS Budget Breakdown

The following table depicts the breakout of costs excluding personnel expenses.

Portage DPS PSAP Budget Exclusive of Personnel		
	Amount	Percentage of Total
Network Costs	\$2,000	1.60%
Equipment Costs	\$17,400	13.90%
CAD Costs	\$43,500	34.74%
Radio Costs	\$36,000	28.75%
Office Expenses	\$26,300	21.01%
Total	\$125,200	100%

Table 25—Portage DPS Budget Exclusive of Personnel Costs

The table on the following page depicts the annual net PSAP costs for Portage DPS.

Portage DPS PSAP Annual Net Costs	
Cost	Amount
Network Costs	\$2,000
Equipment Costs	\$17,400
CAD Costs	\$43,500
Radio Costs	\$36,000
Office Expenses	\$26,300
Personnel	\$595,000
Sub-Total	\$720,200
Revenue (State 9-1-1 Fee)	\$86,205
Total Annual Net Cost	\$633,995

Table 26—Portage DPS PSAP Annual Net Costs

3.3.5 Western Michigan University Department of Public Safety

Western Michigan University is a public university with the main campus located in the City of Kalamazoo. As of the fall 2010 semester the class enrollment was 25,045 with approximately 7,500 residential students. Western Michigan University campuses encompass more than 1,200 acres and have approximately 150 buildings. Western Michigan University is divided into five campuses in and around Kalamazoo; West Campus (Main Campus), East Campus, Oakland Drive Campus, Parkview Campus and the College of Aviation. The university Public Safety communications center is located on the main campus at 511 Monroe Street, in the City of Kalamazoo.

3.3.5.1 Operations

The Western Michigan University communications center is a public safety dispatch point (PSDP) and does not have 9-1-1 answering equipment and no enhanced 9-1-1 capability. Western Michigan University receives and handles emergency calls from within the campus, but does not receive the enhanced 9-1-1 information. The primary PSAP for on-campus 9-1-1 calls (wireless) or any wireline phone that reaches the public switch telephone network (PSTN) is KDPS. A 9-1-1 call that originates on campus and requires a police response is manually transferred to the WMU dispatch center by KDPS. The university's internal telephone system switch has been programmed so that when 9-1-1 is dialed from a telephone on the system the call rings into the university's dispatch center. Caller ID is provided with the call. The office of Information Technology maintains an E9-1-1 directory which is a database of telephone number locations on campus. The WMU dispatcher can do a database look-up for the phone's location, if needed. All 9-1-1 calls generated at 'off campus' locations are routed to the appropriate public safety PSAP that provides coverage for that location.

The dispatch center is operated under the administration and oversight of the WMU Department of Public Safety. DPS has four divisions; police department, parking services, environmental/emergency management and security

administration. The center dispatches the University Police Department while fire services are provided by KDPS and emergency medical service is provided by LIFE EMS.

The WMU PSAP serves WMU police.

3.3.5.2 Technology

The communications center has two positions that have both been equipped CAD, administrative phone sets and radio dispatch consoles. The following table depicts the various technologies that are currently installed and available at each of the positions:

Western Michigan University PSAP Technology			
Description	9-1-1 CPE	CAD	Radio Console
Position 1	No	Yes	Yes
Position 2	No	Yes	Yes

Table 27—WMU PSAP Technology

WMU PSAP Workstation Monitors	
Monitor	Number
Gold Elite Radio Console	1
CAD Entry/LEIN/Admin	1
CAD Working	1
Admin/LEIN	1
Mapping	1
Alarms	1
Total	6

Table 28—WMU PSAP Workstation Monitors

There are currently four full time telecommunicators and no part time employees. The employees work twelve hour schedules. Minimum staffing for the PSAP is one dispatcher. Center staffing is augmented by police officers trained for dispatch and they cover any open shifts that can't be filled with the civilian dispatchers.

The WMU PSDP does not receive 9-1-1 calls directly via 9-1-1 trunks. However, the PSAP received approximately 66,000 calls in 2011. These calls represent a compilation of on-campus emergencies, administrative, non-emergency and out-of-state callers. Calls received on these lines may or may not generate a field response.

In addition to their primary dispatch responsibilities, other telecommunicator responsibilities include the following:

- Primary answering point for University after hours

- Phone number look-ups in E9-1-1 directory
- Monitor university fire alarms (2500)
- Monitor university security/intrusion alarms (1600)
- University call boxes (150)
- Informational non-emergency calls
- LEIN queries, entries, modifications, deletions
- Walk up window
- Issue parking permits
- Process monies for impound vehicles
- Process monies for parking tickets
- Monitor security cameras (600)
- Monitor building access controls/after-hours building access
- Remote access to lock and unlock doors (emergencies only)
- Safe ride calls
- Monitor Student Watch patrols
- Radio communications with Maintenance
- Emergency notification for all WMU Departments (maintenance, engineering, etc.)
- Animal control notifications
- Notification of utilities (power, phone, MDOT, railroad)
- Tow truck notification/call out
- Monitor weather computer

3.3.5.3 Technology

The communications center is currently using an ID Networks CAD software system, version 1.4.155.0. The system was originally installed in December, 2011. The servers and workstation PCs are all less than a year old. The production server is installed in the equipment room and a redundant back-up server is installed in the Lieutenant's office. The CAD has integrated mapping and AVL.

The following table depicts typical interfaces found within Public Safety CAD systems and the status of those interfaces at the WMU dispatch center:

WMU PSAP CAD Interfaces			
CAD Interfaces	Yes/No	CAD Interfaces	Yes/No
E9-1-1	No	Police RMS	Yes
Alarm Monitoring	No	Logging Recorder	No
AVL	Yes	Master Clock	Yes
Call Taker/Dispatcher Mapping	Yes	Mobile Mapping	Yes
EMD	No	Phase 2 Wireless Mapping	N/A
Fire RMS	N/A	Pictometry	No
Fire Mobile Data	N/A	Radio Console/PTT/Emergency	No
Radio Tone Encoding	N/A	TDD/TTY	No
Fire Station Alerting	N/A	Text/Alphanumeric Paging	No
Police Field Reporting	Yes	LEIN/NCIC	Yes
Police Mobile Data	Yes	Web Access/Web CAD	No

Table 29—WMU PSAP CAD Interfaces

The University is using an ID Networks mobile data solution, version 4.01.1.178, with mounted notebook computers in the vehicles. The interface provides silent dispatch, message switching, status changes, and field reporting, mapping and LEIN/NCIC queries. Connectivity to the message switch is accomplished through broadband air cards on a commercial radio vendor's wireless network (Verizon 4G LTE). The University is using ID Networks police RMS software.

The University communications center does not have any 9-1-1 answering positions. All telephone calls are processed using the University's administrative phone system. There are two dedicated circuits on these phones, one to KDPS and the other to the KCSO.

The dispatch center is using an Equature logging recorder that was originally installed in March, 2009. All radio traffic is being recorded by talk group and there are currently eleven talk groups being recorded. There are three telephone sets being recorded individually. The logging recorder is providing IRR for the telephone sets and for the radio traffic.

The University operates its own eight channel 800 MHz digitally trunked single site radio system. The radio system provides service to the WMU Police Department along with approximately six hundred other campus radio subscribers. The University's primary radio system is not affiliated with MPSCS, but the Police Department does portable radios that are on MPSCS. The Police Department currently has six talk groups on the university radio system and other DPS divisions have an additional four talk groups. They also have access to some tactical and special event talk groups. If needed, there is the ability to patch any of the talk groups into the MPSCS and KDPS has access to four WMU talk groups for the same patch purposes. The WMU Police Department utilizes the MPSCS as its back-up radio system.

The communications center is using Motorola Gold Elite radio consoles that were originally installed in May, 2000 and last updated in March, 2008.

The critical systems in communications and server rooms are protected by a dedicated UPS system and the entire building is provided emergency power through the building's diesel emergency generator. As would be expected with a University environment the WMU dispatch center monitors an extensive number of fire alarms, security and intrusion alarms installed throughout the various campus locations via several different alarm monitoring systems.

3.3.5.4 Budget

The WMU PSAP handles landline emergency calls that originate on the campus. They utilize radio and CAD equipment; however, they do not have 9-1-1 CPE equipment. This causes the total expenses to be lower than traditional PSAPs. The yearly total expenses for WMU are just over \$272,000 with personnel expenses accounting for 84 percent of the total. Computer aided dispatch expenses account for the largest portion of the non-personnel expenditures.

The following chart shows a breakdown of the costs within each category of the overall agency expenses.

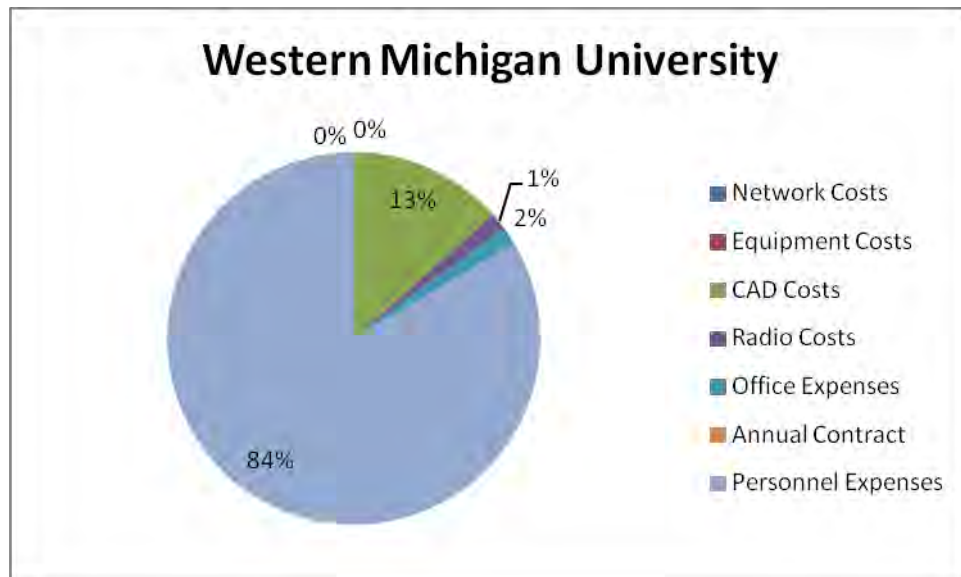


Chart 5—WMU Budget Breakdown

The following table depicts the breakout of costs excluding personnel expenses.

WMU PSAP Budget Exclusive of Personnel Costs		
Costs	Amount	Percentage of Total
Network Costs	\$0	0%
Equipment Costs	\$0	0%
CAD Costs	\$36,649	81.51%
Radio Costs	\$4,000	8.90%
Office Expenses	\$4,311	9.59%
Total	\$44,960	100%

Table 30—WMU PSAP Budget Exclusive of Personnel Costs

The following table depicts WMU's annual net costs for its PSAP.

WMU Annual PSAP Net Costs	
Costs	Amount
Network Costs	\$0
Equipment Costs	\$0
CAD Costs	\$36,649
Radio Costs	\$4,000
Office Expenses	\$4,311
Personnel	\$227,860
Sub-Total	\$272,820
Revenue (State 9-1-1 Fee)	\$0 ⁴
Total Net Annual Cost	\$272,820

Table 31—WMU Annual Net PSAP Costs

3.4 Current Environment Summary

3.4.1 Population / Service Coverage Area Summary

The following table summarizes the population actually covered by each PSAP in this report.

⁴ The State 9-1-1 Fee is turned over to KDPS for handling of wireless 9-1-1 calls.

Population Summary By PSAP Service Area		
Municipality	2010 Population ⁵	Agency % of Total Population
KDPS	66,762 ⁶	26.67
KCSO	106,055 ⁷	42.37
TKPD	23,722 ⁸	9.48
Portage DPS	46,292	18.49
WMU	7,500 ⁹	3.00
Total	250,331	100.00

Table 32—Population Distribution by PSAP Service Area

3.4.2 Staffing Summary

The following table summarizes the number of dispatch staff in all PSAPs combined as well as any labor union affiliation and CALEA accreditation.

Group leaders for KDPS are included in the full time position count as they are assigned to a work station during their shifts. In addition to the dispatch staff positions listed, KDPS has sworn oversight. Portage DPS has a PSAP supervisor in addition to the full time dispatch staff listed. The supervisor is not assigned to a work station.

PSAP Staff Summary							
PSAP	Full-Time	Part-Time	Civilian	Sworn	Union	Union Name	CALEA
KDPS	19	3 (Not Filled)	Yes	No	Yes	KPSOA	No
KCSO	9	0	Yes (4)	Yes (5)	Yes	KCSDA	No
TKPD	5	0	Yes	No	Yes	KTPOA	No
Portage DPS	9	2	Yes	No	Yes	PPOA	Yes
WMU	4	0	Yes	No	No	No	No
Total Combined Staff	46	2					

Table 33—PSAP Staff Summary

⁵ 2010 US Census (<http://www.census.gov/>)

⁶ Population reduced by the residential student population of WMU within the city borders (~7,500).

⁷ Total 2010 county population is 250,331. This number reflects the total population minus the population of Kalamazoo City, TWP, Portage and WMU.

⁸ Includes City of Parchment population of 1,804 for which the TWP provides police services.

⁹ Includes students living on the main campus only. Remaining students are counted in the population where they reside of campus.

3.4.3 Workload Summaries

The workload of a PSAP is generally comprised of three components; call volume, radio traffic and ancillary duties.

Call volume is broken down into 9-1-1 calls and those received on 7 and/or 10 digit lines. Calls received on 7 or 10 digit lines may be of an administrative nature and may or may not require a field response.

The recorded telephone volume for the previous three years is as follows:

9-1-1 Call Summary by PSAP				
PSAP	2011	2010	2009	Average
KDPS	73,433	68,498	67,719	69,883
KCSO	52,189	47,320	46,500	48,670
TKPD	12,507	10,827	10,476	11,270
Portage DPS	28,565	26,220	25,814	26,866
Western Michigan University ¹⁰	0	0	0	0
Total	166,694	152,865	150,509	156,689

Table 34—9-1-1 Call Summary

7 & 10 Digit Call Summary by PSAP				
PSAP	2011	2010	2009	Average
KDPS	134,883	190,228	206,497	177,203
KCSO	76,987	87,000	101,000 ¹¹	88,329
TKPD	39,895	44,216	60,124	48,078
Portage DPS	82,262	84,235	88,841	85,113
WMU	66,000	66,000	66,000	66,000
Total	400,027	471,679	522,462	464,723

Table 35—10 and 7 Digit Phone Calls Summary

¹⁰ WMU does not receive calls on 9-1-1 trunks. Wireless calls are routed to KDPS and on-campus emergencies are received via WMU's VoIP system.

¹¹ Accurate statistics were not available for the County in 2010 and 2009 so Kimball estimated these years based on 2011 statistics and difference percentages for the other two agencies during those years

9-1-1 and 7 / 10 Digit Call Summary by PSAP				
PSAP	2011	2010	2009	Average
KDPS	208,316	258,726	274,216	247,086
KCSO	129,176	134,320	147,500	136,999
TKPD	52,402	55,043	70,600	59,348
Portage DPS	110,827	110,455	114,655	111,979
WMU	66,000	66,000	66,000	66,000
Total	566,721	624,544	672,971	621,412

Table 36—Total 9-1-1 and 7 and 10 Digit Call Summary

3.4.3.1 Computer Aided Dispatch Statistics

The second component to benchmarking a PSAP's workload is radio traffic. Radio traffic is generated by the dispatcher assigning calls for service, as well as from the field as personnel supply status updates and make requests for support services from the dispatcher. To determine the actual amount of channel traffic or dispatcher workload generated by channel traffic, a radio study would be required. However, absent such a study, a review of the number of CAD incidents entered can provide some insight. The following tables provide an overview of the CAD events entered for each agency. The recorded event volume (from CAD system statistics) for the previous three years is as follows:

Law Enforcement CAD Event Summary				
PSAP	2011	2010	2009	Average
KDPS	80,979	83,361	87,017	83,786
KCSO	44,713	46,262	43,581	44,852
TKPD	14,387	15,211	15,795	15,131
Portage DPS	40,541	38,821	<u>38,687¹²</u>	39,350
WMU	<u>9,500¹³</u>	12,298	10,256	10,685
Total	190,120	195,953	195,336	193,803

Table 37—CAD Law Enforcement Event Summary

¹² Portage law events include CAD quick calls.

¹³ Includes all incident types

Fire CAD Event Summary				
PSAP	2011	2010	2009	Average
KDPS	1,670	1,649	1,680	1,666
KCSO	6,843	6,728	6,388	6,653
TKPD	1,705	1,547	1,718	1,657
Portage DPS	3,656	3,111	3,074	3,280
Total	13,874	13,035	12,860	13,256

Table 38—Fire CAD Event Summary

EMS CAD Event Summary				
PSAP	2011	2010	2009	Average
KDPS	5,746	5,688	5,618	5,684
KCSO	5,676	5,618	5,354	5,549
TKPD	1,144	1,169	1,107	1,140
Portage DPS	0	0	0 ¹⁴	0
Total	12,566	12,475	12,079	12,373

Table 39—EMS CAD Event Summary

Total CAD Events				
PSAP	2011	2010	2009	Average
KDPS	88,395	90,698	94,315	91,136
KCSO	57,232	58,608	55,323	57,054
TKPD	17,236	17,927	18,620	17,928
Portage DPS	44,197	41,932	41,761	42,630
WMU	9,500	12,298	10,256	10,685
Total	216,560	221,463	220,275	219,433

Table 40—Total CAD Event Summary

¹⁴ Portage EMS events are included in the fire CAD incident count.

When reviewing CAD data as an indicator of workload it is important to recognize that agencies differ on what may be recorded within CAD as an event. Given these operational differences, the comparisons are not necessarily apples-to-apples, but can serve as a general indicator of radio traffic.

3.4.3.2 Ancillary Duties

Ancillary duties are defined as job tasks performed by PSAP staff that fall outside what would be considered “true” emergency communications. Assigning a wide variety of tasks as described in each PSAP section is a common practice in small, stand-alone PSAPs. This practice often make perfect sense from an efficiency/cost perspective when the workload generated by 9-1-1 and radio traffic is not sufficient to keep staff busy. However, when considering consolidation these tasks must be examined to determine which will move to a consolidated center and which will stay with each municipality. The disposition of these tasks during the consolidation process can impact the service levels provided by the new PSAP as well as costs for each municipality.

A list of these tasks can be found within Section 2 under each individual PSAP.

3.4.3.3 Budget Summary

For convenience, the Expense Category Definitions table found earlier in the document is replicated here.

Expense Category Definitions	
Expense Category	Definition
Network Costs	Includes charges for 9-1-1 trunks, connectivity costs, and administrative phones
Equipment Costs	Includes CPE, software, maintenance and call interpretation charges
CAD Costs	Includes maintenance, CAD software and all other CAD charges
Radio Costs	Includes radio console maintenance, radio service calls and all radio connectivity charges
Office Expenses	Includes non-CPE computer equipment, base building charges, electricity, gas, water, sewer, snow removal, paper, UPS generator maintenance, uniforms and any other office related charges
Personnel Expenses	A total of all the personnel expenses provided in the survey. Includes telecommunicator pay and benefits as well as personnel costs associated with support from other departments and/or sworn personnel.

Table 41—Expense Category Definitions

The following table depicts a summary of the net annual costs for all PSAPs participating in this business plan.

Current Combined PSAP Budget Summary					
	KDPS	KCSO	Kalamazoo Township	Portage DPS	WMU
Network Costs	\$50,174	\$19,000	\$5,000	\$2,000	\$0
Equipment Costs	\$81,380	\$8,805	\$350	\$17,400	\$0
CAD Costs	\$209,647	\$0	\$20,250	\$43,500	\$36,649
Radio Costs	\$60,697	\$0	\$4,000	\$36,000	\$4,000
Office Expenses	\$53,813	\$13,000	\$0	\$26,300	\$4,311
KDPS Annual Contract	\$0	\$197,631	\$66,082	\$0	\$0
Personnel Expenses	\$1,505,485	\$902,094	\$334,670	\$595,000	\$227,860
Sub-Totals	\$1,961,197	\$1,140,530	\$430,352	\$720,200	\$272,820
Revenue	\$619,450	\$182,188	\$41,617	\$86,205	\$0
Annual Net PSAP Costs	\$1,341,747	\$958,342	\$388,735	\$633,995	\$272,820
Combined Net PSAP Costs	\$3,584,547				

Table 42—Budget Summary

3.4.3.4 Initial Observations

Without exception, all PSAP staff with whom Kimball spoke are committed to providing the best possible service to the community and field personnel. Any time focus is placed on a single work unit or job function, areas of potential improvement can be found. Although this section identifies some of those areas, the PSAP staff should be recognized for the difficult job they do well every day.

During the data collection process Kimball made basic observations and made some initial observations in relation to the current emergency communications environment and consolidation. Where appropriate, these topics will be explored more fully in later sections of the report. It should be noted that these observations are not atypical and could be addressed through consolidation of the PSAPs. Some of these concerns are based on the perceptions of stakeholders Kimball spoke to throughout the data collection process. The validity of any specific concern was not verified by Kimball.

3.4.3.4.1 Observations

- Dispatch service provided to the fire agencies serviced by the KCSO PSAP appear to be at a lower level than the services provided to law enforcement. Although *Kimball did not investigate the validity of each concern raised, it is clear that the perception, at minimum exists.* However, Kimball's observation on the dispatch floor and conversation with dispatch staff indicate that these concerns should be looked into and, if needed, addressed. Fire service levels as they relate to consolidation will be explored in more detail in

other sections of the report. Issues raised include (Again, these are the perceptions of those Kimball spoke to and have not been researched further by Kimball):

- Fire training not provided to dispatch staff so all relevant information is not always gathered.
- Dispatchers not answering when fire personnel call on the radio (there appears to be a number of potential causes)
- Lack of consistency in service levels provided from dispatcher to dispatcher
- Dispatchers give law enforcement priority when both police and fire call at the same time. This has reportedly resulted in safety issues on the fire ground.
- Training levels and programs differ from PSAP to PSAP
- Policies and procedures differ from PSAP to PSAP. This is true in three ways. First, the degree to which policies and procedures are written and distributed to staff vary. Second, the written procedures often focus on field personnel actions, rather than PSAP staff actions. Third, within the co-located PSAP, while the telecommunicators from each PSAP were often willing to assist each other as needed, at times they were prevented from doing more than answering an incoming phone line and putting the caller on hold in non-emergency situations because they did not know the procedures for the other agencies.
- The large size of the space that contains the three co-located PSAPs seems to prevent easy communications between the telecommunicators for each of the agencies. The space appears to be configured as would be expected for co-located agencies; sharing the same space, but clearly separate from one another. The rectangular shape of the room seems to prevent easy communications from one end to the other due to size. Typically, in a consolidated PSAP the floor configuration is more focused on having dispatch positions that are in closer proximity to each other to facilitate communications between agencies and field personnel. This instantaneous communications can be invaluable when sharing field resources, managing a pursuit or broadcasting suspect or vehicle information.
- Some of the telecommunicators Kimball spoke with expressed serious worry and concern about potential layoffs and/or pay cuts should a consolidation become a reality. Although this sort of concern is understandably almost always present in the initial stages of a consolidation effort, the level of concern expressed was unusually high.
- Transfer of 9-1-1 callers. Medical calls are transferred to an EMS agency so pre-arrival instructions (EMD) can be given to the caller. Wireless calls for WMU are received by KDPS and transferred to the university. Any time a 9-1-1 call is transferred a minimum of 30 seconds is added to the time needed to process the call and get field personnel on the way. While 30 seconds doesn't seem like much, in a medical emergency, violent situation or fire 30 seconds can be critical.
- Interoperability with Portage DPS. Several concerns were expressed to Kimball that suggests the need to re-visit the current methodology for interoperability between Portage and other area agencies to see where improvements may be achieved.
- Emergency medical dispatch is reportedly not being provided consistently. Anecdotal information suggests dispatch staff will at times interview a 9-1-1 caller, obtain basic information and end the call. The dispatch staff will then call the EMS agency and give them the location and nature of the call rather than transfer the caller. If this is occurring, this methodology prevents consistent application of EMD and could impact the patient outcome and expose the agency/municipality to liability as the expected national standard of care is now that EMD (pre-arrival instructions) will be given on all EMS calls.

4. FACILITIES

4.1 Current Facilities

Kimball conducted a high-level assessment of the current dispatch facilities for all three of the PSAPs that currently operate in the Kalamazoo County and house all of the potential consolidation participants including Kalamazoo DPS, City of Portage and WMU. All of the respective dispatch centers are located in secure areas within well-constructed, hardened buildings. At a high level, all three of the dispatch centers appear to be average to above average installations in terms of equipment installation, cable management and heating, ventilation and air conditioning (HVAC).

The physical layouts and adjacencies in the current facilities are dictated by the confines of the spaces provided to them. While the size and configuration of each dispatch center is appropriate for their current use and budget, only one the three existing dispatch centers, as they are configured today, has the required space for the number of positions required for Alternatives 1 through 4. Alternative 5 Shared Technology assumes that each PSAP will remain in its current location so no facility discussion is necessary.

Currently there are ten console positions installed in KDPS, four positions in the Portage DPS PSAP and two positions at WMU Public Safety. Each of the existing facilities has adjacent equipment rooms near their dispatch centers; KDPS in an adjacent room off the dispatch center floor, Portage in an adjacent room off the dispatch center floor and WMU in a room located directly below the dispatch center floor.

Existing PSAPs Available Square Footage		
Facility	Communications Center Square Feet	Equipment Room Square Feet
KDPS	2,000	350
Portage DPS	738	181
Western Michigan University	350	140

Table 43—Existing PSAPs Available Square Footage

The required number of console positions for the operation of the consolidated center is dependent on the consolidation option selected; two of the alternatives recommend twelve positions and the other two recommend ten positions. The rule of thumb on the amount of square footage needed for a system furniture position is typically in the area of 150 square feet. The recommended positions include only those positions that will need to be staffed to manage the estimated workload.

Space Requirements for Consolidation Alternatives			
Consolidation Alternative	Positions Required	Square Feet per Position	Total Square Footage Required
Alternative 1: Full Participation	12	150	1,800
Alternative 2: KDPS, KCSO & TKPD	10	150	1,500
Alternative 3: KDPS, KCSO, TKPD and Portage DPS	12	150	1,800
Alternative 4: KDPS, KCSO, TKPD and WMU	10	150	1,500

Table 44—Space Requirements for Consolidation Alternatives

As is evident from the tables displaying existing and required square footage, only the KDPS facility is large enough to be used to house any of the PSAPs that would result from Alternatives 1 through 4. With the current ten-position configuration in the KDPS facility there should be adequate room to add the other two positions required for Alternatives 1 and 3.

The existing KDPS equipment room is sufficient in size and would be adequate to meet the needs of a consolidated center. There is an existing kitchenette/break room and three administrative offices located off to the side of the dispatch center with access to those rooms from within the dispatch center. A separate office, currently designated for a communications center coordinator, is located just outside the dispatch center but adjacent to it. It is unknown if this room would be made available to the consolidated center, but there will be a need to identify sufficient office or work space for the consolidated center's support staff such as management and quality assurance and training support staff.

The dispatch area in the KDPS facility was renovated in 2005 and was part of an overall building renovation. The dispatch area and equipment room are already installed on raised flooring which allows all the required cable management and power runs to be installed and accessed under the floor. The critical systems in dispatch areas and equipment rooms are currently protected by two dedicated UPS systems; one for City IT equipment and one for dispatch equipment. The entire building is provided emergency power through the facility's emergency generator. A second back-up generator dedicated to the PSAP is available should the primary generator malfunction.

One other concern regarding the current facility is that the KDPS facility is located in the 100-year flood plain and has a history of being prone to flood events. The 2013 version of NFPA 1221, Chapter 4, Section 4.2.3 states that the "The lowest floor elevation of the communications center shall be above the 100-year flood plain established by the Federal Emergency Management Agency."

4.2 Facility Recommendations

1. Based on the total floor space that is available in the dispatch room, there is the possibility of exploring other furniture configurations and/or other system furniture vendors to see if even more than twelve positions could be installed in the room. Kimball strongly recommends exploring the addition of more positions to achieve the following operational benefits:

- Improved communications within the operations floor. The addition of more positions would allow for a reconfiguration of the existing floor layout to improve communications within the PSAP. One of the key benefits of consolidating is that call takers and dispatchers are in close proximity to each other and can communicate quickly when needed.
- Allow for overflow positions to handle operations during periods of significant activity or incidents.
- Employee training positions.
- Redundancy for equipment issues at other positions and/or as back-up for other PSAPs.

Of course, adding these extra positions would come with a cost as various technology systems would need to be installed. This additional overflow or back-up option does not have to be included in the initial configuration but could be considered as a future enhancement that can be added later on.

2. Typically, Kimball does not recommend locating a consolidated communications center within either an existing or a future facility of a participating user agency. We have seen in the past that when this occurs, the project has difficulty in gaining a distinct or independent image separate from the agency where the center is co-located. This is generally dependent on the local political environment. It is Kimball's experience that in a situation such as this, politics alone is enough to derail a potential consolidation project. For this reason, a consolidated communications center's governing body most often chooses to promote a more independent presence and does not co-locate with any existing or future user agencies or counties.

However, if this co-location issue could be overcome, the use of the KDPS facility would provide significant fiscal benefits to the start of the project by using an existing facility and avoiding the need to find a new home, especially if new construction or significant building renovations would be needed. Kimball recommends that consideration should be given to the option of opening the consolidated center in the existing Kalamazoo facility for the short term with the long term goal of building or relocating to another independent location in the future.

The City of Kalamazoo, of course, would have to agree to provide this space in the building for the consolidated center. Typically in scenarios such as this, the project does provide some type of financial benefits or reimbursement to the host agency for the use of the space. The consolidated center could also take advantage of some other City services like using their existing network connectivity, IT services, mapping/GIS and other facility infrastructure such as conference rooms, admin phones, fire protection, utilities, UPS and emergency power. There will be a need for a detailed and pre-agreed upon agreement with the City to take advantage of some or all of the above services.

4.3 Back-Up Facility

Whether the consolidation project decides to use an existing facility or someday decides to find a new facility to accommodate a consolidated communications center, redundancy needs must be identified to ensure continuity of operations in the event the consolidated PSAP had to be evacuated or was rendered uninhabitable.

A back-up PSAP is essential to maintaining an acceptable level of 9-1-1 call processing and emergency services dispatching. Without a back-up center, call processing and dispatching would be severely compromised if operations at the consolidated PSAP ceased for whatever reason. Evacuation and relocation of staff from the consolidated

communications center may be caused by environmental and/or technical infrastructure failure. Failures of the 9-1-1 internal or external telecommunications, radio dispatch equipment, or electrical service equipment are situations when evacuation to a back-up PSAP could be warranted.

A back-up facility should be reviewed for specific requirements by management of the consolidated center and by the user agencies. It will require robust and diverse systems that share operational and functional redundancy and physical capabilities with the primary facility. Dependent on location and proximity, the selected back-up facility can also serve as a cost-effective location for off-site installation of back-up servers or database maintenance for any or all critical systems in use at the primary facility. The primary and back-up facility can provide systems redundancy for each other. It is best if the facility has sufficient hardening and redundant power/telecommunications connectivity to function in this capacity.

Kimball recommends a back-up center sized to accommodate at about 75 percent capacity of the consolidated communications center (9 positions). Full capacity is the "perfect world" configuration but often cannot be achieved due to fiscal limitations, technology capabilities or space requirements.

The facility should have the ability to support a temporary short and long-term loss of the primary facility. Short-term is defined as two to five days and long-term would be considered a longer period (e.g., days, weeks, months).

If use of the KDPS facility is selected, agencies may want to consider using an adjacent PSAP(s) as an option to act as the back-up center(s). This could be an existing agency within the County that is not participating in the consolidation project, an adjacent county, such as Barry County, or a combination of both. Any selected back-up PSAP must have the necessary resources and capability to handle the capacity of a consolidated communications center. In Kimball's experience, a single adjacent center may not have the resources or the equipment to be a back-up for a larger operation such as a consolidated center.

The other option is for the participants, although an expensive one would be to locate and equip their own fully functional back-up center. As indicated earlier, this option can be cost prohibitive as it can be very expensive to equipment, maintain and operate a secondary location simply as a 'back-up' site for the primary communications center. However, there are advantages to this option such as with the proper connectivity to the primary facility; the back-up facility can augment operations at the primary facility during times of disaster or high call volume when additional call taking and/or dispatching resources are needed.

Kimball does not recommend a mobile command post solution as the only means for back-up communications. Mobile command posts typically work as a temporary solution until a more robust, reliable and well-equipped back-up center can be staffed and begin operations.

The back-up facility should be geographically diverse for weather-related or other localized disasters and emergencies. The back-up facility should be served by alternate utilities (telephone home office, power grid, etc.).

Costs related to supporting a back-up facility range can range from minimal to expensive depending on the size, furnishings and the amount and type of technology desired. Commonly, a back-up facility does not mirror the primary PSAP in terms of space, technology and furnishings due to the cost involved as compared to the actual usage of a back-up facility. While it is critical that a back-up facility exist, it can function with less technology (use of manual or

paper tracking systems) and often uses furniture and chairs that are “second-hand” from the primary PSAP. In other words, when the primary PSAP installs new dispatch furniture, the old furniture is moved to the back-up facility. Under these circumstances, costs to support the back-up facility are minimized. If a mirror of the primary PSAP is desired, then technology-related costs can be substantially higher and, at times, cost prohibitive.

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5. GOVERNANCE

Any of the consolidation alternatives discussed in this document will require the establishment of a new form of governance for the PSAP. A governance structure that works well in one scenario may not in another. A well-crafted governance agreement is critical to the success of any consolidation. The agreement also allows a director to manage operations effectively. Regardless of the governance model chosen, incorporating the following key points are essential

- Reporting structure for director and composition of the any oversight board
- Span of authority and control for any oversight board
- Capital and operating budget development process as well as establishment of a reserve account to pay for critical systems replacements.
- Budget approval process
- Funding mechanism, board authority, and a method for updating it or changing it as needed
- Length of the agreement
- De-consolidation process - What happens if a participating agency leaves before the end of the agreement? For example, does the departing agency lose any capital contribution?
- Ownership of technology purchased jointly
- Process for participating agency complaint resolution and input
- Span of authority for the director
- Standard operating procedures approval process

A well-crafted agreement will prevent common errors in establishing governance and ensure that the PSAP is able to function as designed.

5.1 Recommended Governance Structure

Although a variety of governance structures exist, the model recommended for Alternatives 1 through 4 is a joint powers authority. In this governance model, the consolidated PSAP is an independent entity rather than part of any larger government structure. The director, typically civilian, traditionally reports to a board comprised of representatives of the participating members.

The primary positives of this structure include:

- Independent organizational structure allows the director to best manage PSAP resources and provide equitable service to all participating agencies.
- Offers a developed career path for PSAP staff as civilian personnel generally fill supervisory and management positions.
- A degree of neutrality in that it is independent of law enforcement and fire. This neutrality allows the PSAP to provide equal service to all participating agencies and avoid the perception of bias or favoritism.
- Total organizational and single mission focus on PSAP services without resource competition.

The primary negatives of this structure include:

- Since the PSAP is not part of a larger municipal entity, real and intangible costs for support services such as computer/network services, human resources, and facilities are perceived to be higher and in fact may be more transparent.
- A poorly crafted governance structure can result in a director that has to answer to multiple bosses and is rendered unable to manage the PSAP effectively. Although the heads of the agencies served by the PSAP should have input into its operation, they should not be a voting member of the oversight board. Rather, the municipal or county decision makers should be the voting members with the agency heads functioning in an advisory role. Agencies served by the PSAP will, at times, have conflicting needs. The director must be able to manage the needs of all participating agencies and the available PSAP resources as a whole. This can best be accomplished by establishing the director as “on-par” with the agency heads rather than in a subordinate role to multiple voting board members/agency heads.
- Law enforcement and fire agencies will require equal representation on the oversight and/or advisory board. Some limitations on participation may be required to prevent the size of the board from becoming unmanageable.
- Political infighting among the participating agencies can impact the PSAP and/or entities represented on the oversight board. Although initially all agencies and entities may agree on the direction for the PSAP, over time, as the people and political agendas change, the PSAP can become the focus of political disputes. This structure requires a carefully crafted governance agreement to protect the PSAP from the impact of political disputes. Such an agreement will ensure that the PSAP can focus on its primary mission.

This governance model is recommendation only. Should the needs of the agency participants require it; the model can be modified to best fit the needs of the new PSAP and the participating agencies.

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6. TECHNOLOGY PLAN

This section contains technology plans for each of the five consolidation alternatives. The plans for these alternatives are very similar. Therefore, they have been combined into a single section to reduce replication. Any recommendation specific to a single alternative is noted. Cost estimates for each alternative are contained within the individual alternative sections.

6.1 Computer Aided Dispatch

In any consolidation alternative when multiple CAD systems are in use, stakeholders must decide on a single CAD system to be used in the new PSAP. The selected CAD system must be able to support multiple jurisdictions, disciplines and departments within a jurisdiction as well as be able to apply unique algorithms to generate specific unit recommendations for incident responses according to the standard operating procedures of each agency. The CAD system should utilize intelligent workstations with multiple monitors capable of displaying location, type of incident, assigned units and current unit status, time in status, mapping, and pending incidents, “at-a-glance” without the need to switch monitors or views to access key information.

To ensure end user acceptance of a consolidated communications center, Kimball recommends that first responders do not lose any existing functionality once the consolidated center is brought on-line. It is important to note that maintaining existing functionality does not necessarily mean an exact duplication of existing systems. The same or higher service levels can be provided by different vendors or systems albeit in a different “package.”

There are no substantial, technical roadblocks to this consolidation alternative in regards to CAD, mapping, mobile data and other sub-systems/interfaces. Four options exist for choosing a CAD system including:

1. Expand the Intergraph CAD for use in the consolidated PSAP. Three of the five participants are already using this system. Intergraph is considered one of the top tier CAD vendors available and could be reasonably expected to be capable of handling the needs of a consolidated PSAP that included all five study participants. The pending system refresh is expected to resolve all or most of the current functionality issues as well as update the hardware and software. This option is likely the most cost effective given that the majority of participants already uses this system and is already located in the KDPS facility.
2. Migrate to the New World Microsoft® Platform system from the Portage DPS PSAP (Not an option in Alternative 4) to the KDPS facility and expand it to accommodate all agencies. New World is considered one of the top tier CAD vendors and could be reasonably expected to be capable of handling the needs of a consolidated PSAP that included all five study participants. Utilizing New World would require a significant number of additional software licenses, a new back-room hardware configuration and migration to the most recent version of New World’s software; all factors that would require additional cost above what would be needed for the Intergraph solution.
3. Migrate WMU’s CAD system, ID Networks (Not applicable to Alternatives 2 and 3). Based on the number of additional licenses, hardware that would be needed, as well as the high level of functionality needed for multiple agencies, disciplines and jurisdictions, ID Networks would not be a viable option. Although it appears to provide an adequate solution for a smaller sized PSAP, the vendor does not have the required experience in a similar type installation that would be needed for a larger sized multi-discipline consolidated center.

4. Conduct an in-depth needs assessment and procure a new CAD system. While this is a common first step for a newly consolidated PSAP, it is likely to be the most expensive option. One of the key reasons to choose this option is to ensure that the chosen CAD system has the necessary functionality to meet the new PSAP's more complex needs. However, Intergraph is considered one of the top vendors for consolidated PSAPs that provide service for multiple jurisdictions and disciplines and it is already in place in the KDPS facility. New World, used by Portage DPS, also has a proven reputation for being a suitable CAD for consolidated PSAPs. Therefore, there is little benefit to be gained by choosing this option with two existing options already in place.

6.1.1 Computer Aided Dispatch Recommendations

1. Three of the five agencies currently use Intergraph CAD and mapping. This system is currently going through a software upgrade and hardware refresh that includes adding additional servers. Plans are to include three CAD environments that include production, back-up and test/training and geographical diversity. Based on software versions, hardware needed, network, installation requirements, training requirements and budgetary considerations Kimball recommends utilizing the Intergraph CAD solution for the consolidated center.

The following list defines interfaces that are already supported by the Intergraph CAD system and would be available in a consolidated environment.

- E9-1-1
 - Alarm monitoring
 - Automatic vehicle location (AVL)
 - Call taker/Dispatcher mapping
 - Fire mobile computers
 - Fire records management system
 - Fire mobile data
 - Fire station alerting
 - Law field reporting
 - Law records management system
 - Law mobile data
 - Master clock
 - Mobile Mapping
 - Radio system—push-to-talk/emergency
 - Rip and run
 - TDD
 - LEIN/NCIC
 - Tone Encoding
 - WebCAD
 - Wireless E9-1-1 Phase II mapping
2. The new consolidated center should take advantage of the software's unit recommendation features and functionality. This most likely would be viewed as a signification enhancement to the paid on-call fire departments and would provide them with an improved service level. Using this functionality would allow

those agencies to pre-plan for various event types and allow the dispatcher to automatically send initial aid agencies on the initial event dispatch, should those agencies desire this option.

3. The emergency medical dispatch interface would provide alternative options to transferring callers requesting medical assistance. The consolidated center could take all the pertinent information as it does for other disciplines, provide the necessary medical protocols and questions and then dispatch the EMS agencies either by radio or computer.
4. A CAD system should provide fault-tolerant or high level of availability, security, and reliability. The system should be capable of taking advantage of current fail-over and other backup technologies that enable continued operation, notwithstanding single or multiple component failure. Sufficient redundancy should exist within the system to ensure that no single point of failure exists whereby the entire CAD system would go down. Kimball recommends that production server(s) is located on the communications center premises with additional back-up servers off premise to ensure data security.
5. With the addition of new agencies, verify that the current hardware configuration has the required system capacity to ensure that all systems run reliably. A system assessment should be completed to ensure that it is sized appropriately to meet performance criteria for the new consolidated center, including significant periods of high call volume, accommodate anticipated future workload increases and store sufficient event/unit history.
6. The consolidated center should procure and maintain vendor 24x7 system support and maintenance. This 24x7 support will provide coverage should there be any problems with the system and also provides for the future timely software updates.
7. Identify what interfaces already exist and identify those interfaces that need to be added along with the ability for the current vendor to provide these interfaces. These may include either standard or customized interfaces that may be needed for the consolidated center. Examples could be law enforcement records management, fire records management or medical electronic patient care reports. The need for these interfaces would be dependent on decisions by the local agencies of the applications that they choose, decide to retain or want to add.
8. The PSAP should implement a backup plan and ensure all staff are trained on this plan should there be a failure in the CAD system. This could simply mean moving to a paper-based tracking system, such as a radio log or a manual card system with a time stamp. Kimball recommends a PSAP have a "CAD crash kit" that includes all necessary paperwork, backup instructions, resource lists, standard operating procedures/guidelines, incident/unit status cards and time stamps.

6.1.2 Computer Aided Dispatch Consolidation Steps

- Select a single CAD vendor for use in the consolidated center. Kimball recommends using Intergraph, the existing vendor used by the co-located PSAPs in the KDPS facility for all alternatives.
- Complete a through CAD assessment to ensure the functionality currently in place in each individual agency is present in the chosen CAD system. Ensure that no functionality is lost for the user agencies.
- Through the CAD assessment identify any additional or modifications needed to interfaces (e.g. RMS)
- Consider additional interfaces to supplement the current system. These interfaces are commonly used and would enhance PSAP and field operations.
 - Emergency Medical Dispatch
 - Fire station alerting
 - Radio tone encoding
 - Mobile routing

- Text/Alphanumeric paging
- TDD/TTY
- Pictometry
- Alarm monitoring
- Verify a high availability hardware solution with automatic failover is in place.
- Verify a geo-diverse hardware solution with back-up servers is in place.
- Configure and utilize the systems unit recommendation features especially for fire services.
- Verify system capacity is sufficient for adding the additional agencies and for future growth.
- The consolidated center needs to procure and maintain 24/7 system support and maintenance from the vendor.
- The consolidated center should develop and test manual back-up process routinely for system outages, both planned and unplanned. Prepare and keep current a CAD crash kit.
- Investigate the ability and feasibility to integrate WMU alarm systems into the CAD system.
- Have sufficient support staff on board to administer and maintain the CAD system.

6.2 Mapping/Geographic Information System

A process needs to be implemented so that the mapping/GIS data used in the CAD system and associated modules is accurate, remains current and is always up to date. The center will need to identify any missing GIS data sets or issues with any of the existing data that will need to be corrected. The maintenance of the GIS mapping data must include steps to ensure that updated mapping information is provided by the member municipalities and/or agencies and provided to the GIS support staff so they can process the changes and then upload them to the CAD system in a timely manner.

The consolidated communications center will need to provision some type of GIS expertise, either by hiring a GIS specialist or getting that expertise from a member municipality or agency. Determining the needed GIS data source(s), identifying the process for receiving this data and the maintenance of the GIS data set should be considered a high priority task. The GIS expertise could be available within a member municipality's current staff such as the County, WMU or a member city. WMU has a robust GIS program and a number of valuable resources that could be used.

It is imperative that the consolidated communications center has sufficient support staff or resources trained in the maintenance and uploading of GIS mapping data. These staff will need to have a good understanding of the complete map production process, how the map data is used in the CAD system and associated modules and be familiar with other vendor required specific mapping software tools such as GeoMedia Pro and MapEditor. The Intergraph CAD upgrade includes three training classes related to GIS mapping and current identified shortcomings:

- Map Basics for I/CAD
- Map Maintenance for I/CAD Systems
- GeoMedia Pro and I/MapEditor for I/CAD

All of the agencies are using integrated mapping with their CAD applications. No issues were identified with the mapping for the City of Portage and WMU. Two significant issues for the three co-located Kalamazoo agencies will be resolved with the pending CAD upgrade and refresh. These issues include mapping data that has not been

updated since 2007 and additional training that was needed for support staff to process mapping/GIS updates into the CAD system. Current mapping data has been obtained and will be loaded into the system with the planned CAD upgrade. The training issue will be resolved with the planned CAD upgrade and steps are being taken to solicit the updated mapping/GIS data.

6.2.1 Mapping/Geographic Information System Consolidation Steps

- Identify all current GIS mapping shortcomings and make the necessary changes to correct the problem areas. This includes any missing street centerlines and/or address points. There are a significant number of streets, especially in the County, that can't be verified in CAD because they are not included in the current maps.
- Implement a standard procedure for receiving GIS mapping updates directly from the member municipalities, county and/or user agencies.
- Ensure there is a standard procedure in place to ensure that when any GIS mapping updates, additions or deletions are received they are processed in a timely manner and then uploaded to the CAD system as quickly as possible.
- Identify access to GIS expertise to maintain the data, either in-house, through a member agency or through a third party agreement.
- Have sufficient numbers of CAD support staff sufficiently trained to upload GIS data to the CAD system.

6.3 Mobile Data

In a consolidated PSAP environment with a single CAD system, Kimball recommends that all agencies dispatched by the center use the same vendor's integrated mobile data application. An integrated mobile data solution would allow inter-agency message switching, and if the agencies would like, the ability to share active events and display unit locations.

Past experience with consolidated dispatch environments indicate that the communications center is usually responsible for providing all of the back room equipment needed for the mobile data application. This includes the mobile data server and any required interfaces to other applications, such as CAD. Field equipment including the laptops, GPS units and connectivity costs are most commonly the responsibility of the user agencies.

Dependent on the consolidated projects situation and available funding, either the agencies or the communications center would be responsible for the mobile data software licenses needed. Typically these are provided and priced by the vendor as separate modules:

- Mobile application
- Mobile mapping
- AVL
- Routing

Dependent on the solution selected by each agency, the consolidated center will need to ensure that each agency has access to their RMS application and records from their mobile data computers.

The consolidated center should assist in any way they can to get more of the fire agencies to install and use mobile data computers along with the associated mapping and AVL technology.

6.3.1 Mobile Data Consolidation Steps

- Select a single mobile data vendor for use by the agencies participating in the consolidated center. Kimball recommends using an integrated solution with the recommended CAD vendor, Intergraph.
- Complete an assessment on the number of additional software licenses and mobile hardware that will be needed for the additional agencies.
- Verify that the current hardware configuration has the capacity to handle the additional mobile data units.
- Determine the procurement and funding process for the additional mobile data units (e.g. determine what costs will be the responsibility of the consolidated center and what costs, if any to the user agencies).
- Verify if any of the existing mobile hardware currently used by the agencies can be used with the new mobile data software.
- Research and consider the need for turn-by-turn routing.
- Identify if there are any additional interfaces needed from the mobile data computers for the new agencies to access other applications or databases (e.g. RMS).
- Research the feasibility and develop a plan to implement additional fire service mobile data computers.
- Ensure that the same mapping that is available in the dispatch center is available on the mobile data computers.

6.4 Records Management Systems

Typically, records management is not considered a function of the communications center but more of an agency required or specific application. The only dispatch center functionality typically required is an interface between the CAD system and the RMS application(s). This interface provides the ability to automatically transfer data fields captured in CAD system to the RMS application and this transfer is most commonly triggered when the event is closed. This data includes, but is not limited to, event and incident numbering, locations, phone numbers, complainant names, event types, units/personnel assigned, unit times, narrative, disposition, etc.

The 'perfect-world' scenario would be if all of the agencies utilized an integrated RMS application provided by the same CAD and mobile data vendor. This totally integrated solution would allow for the least amount of interfaces and the maximum amount of data sharing. However, because records management is more of an agency specific application agencies that are satisfied with their current RMS will most likely be reluctant to change.

It is not uncommon to see agencies refuse or be reluctant to change their current RMS applications simply to achieve an integrated solution that benefits the consolidated dispatch center and/or other agencies. Typically change is only possible when there is some type of financial or operational benefit seen by that agency. For that reason, in some past projects the consolidated center actually purchased and implemented an integrated RMS solution just to get the agencies to participate. However this generally only occurs when sufficient funding is available and/or RMS is an allowable expense by 9-1-1 fees that are collected.

If and when an agency agrees to change RMS systems they will usually insist on data conversion from the old system to the new system. Our experience is that data conversion can be costly, time consuming for both the vendor

and the agencies and many times provides results that are short of being acceptable. Conversion requires a considerable amount of analysis to determine the scope of the conversion effort and to weigh the benefits realized from a data conversion. The results of such analysis require an understanding of the source data, that is, its data elements, database design, and whether the data is considered “clean”. It also requires the understanding of how well the data fits with the new application. The conversion must also meet the intended goals of administration.

Should the consolidated communications center’s law enforcement and fire agencies elect to retain their current RMS, it is vital that substantial advance planning and coordination occur to assure that appropriate interfaces exist and are available in order for CAD to transfer the required incident data to those systems. Failure to do so will adversely affect the agencies’ administrative operations. While RMS is not a PSAP function per se, such complications will detract from the overall acceptance of any consolidation project. During the planning process the consolidated center will need to consider that with RMS interfaces there is typically a cost by both vendors.

6.4.1 RMS Consolidation Steps

Option 1: All Agencies Migrate to a Single RMS System

- Investigate the feasibility of all participating agencies installing and utilizing the same RMS system. Kimball recommends using an integrated RMS solution with the recommended CAD vendor, Intergraph.
- Complete an RMS assessment to ensure that at a minimum the same functionality exists with the selected RMS application as the agencies had with their old application.
- Complete an assessment on the number of additional software licenses and hardware that will be needed for the added agencies.
- Verify that the current hardware configuration can handle the number of additional RMS users.
- Determine the procurement and funding process for the additional RMS users including both software licenses and hardware (e.g. what costs belong to the dispatch center and what will be the cost, if any, to the user agencies).
- Identify the need for any data conversion from current RMS systems to the new system.
- Add the cost associated with CAD interfaces for any law enforcement agency that chooses to keep its existing RMS systems.
- Verify what RMS applications are in use by the fire services and provide a CAD interface for the application or a data warehouse if multiple applications are used.

Option 2 – One More Agencies Retain Existing RMS Systems

- Identify which RMS applications will need to be interfaced with the consolidated center’s CAD system.
- Identify the CAD data fields that will need to be transferred to the RMS systems for each interfaced system.
- Work with the various vendors to develop a statement of work for the required interfaces and to provide cost estimates.

6.5 9-1-1 Answering Equipment

In any consolidation alternative when multiple call answering systems are in use, stakeholders must decide on a single 9-1-1 call answering system to be used in the new PSAP. There are three options to consider when deciding upon which call answering system to use in the consolidated PSAP.

1. Expand the system already being used by the Kalamazoo PSAPs in the KDPS facility.

2. Move the system being using by Portage DPS to the KDPS facility and expand it.
3. Procure an entirely new system.

Installed in 1994, Portage DPS' controller has reached the end of its life cycle and will need to be replaced soon. The Positron Lifeline 100 9-1-1 answering equipment, installed in 2005, is still supported by the vendor. However, the answering equipment is still six years older than the answering equipment in use in the co-located facility. For these reasons, Kimball recommends expanding the Cassidian Sentinel Patriot IP answering position equipment already installed in the KDPS facility. This solution will be the most cost effective and operationally feasible solution for the consolidated center.

Other observations include:

- If the consolidation project moves forward, project decision-makers will need to coordinate with the incumbent telephone companies and the state to ensure that the appropriate 9-1-1 network trunking is made available and installed within the consolidated communications center. The network will have to be engineered to route all 9-1-1 calls to the consolidated center within a network that provides as much diversity and redundancy as possible.
- WMU's participation in the consolidated center would enable WMU to benefit from receiving enhanced 9-1-1 data such as automatic number identification (ANI), ALI and wireless Phase II. This data is not currently available to them.
- The consolidated center must be cognizant of upcoming NG9-1-1 standards and stay current with regional and state agencies in finalizing the future IP network and supporting PSAP infrastructure/equipment that will adhere to associated standards. Although next generation standards are still being developed, there is enough information being provided that new networks are being designed and installed. The Sentinel Patriot answering positions installed in the Kalamazoo center are being advertised as being NG9-1-1 capable.

6.5.1 9-1-1 Answering Equipment Consolidation Steps

- Select a single 9-1-1 answering equipment solution for use in the consolidated center. Kimball recommends using the existing Sentinel Patriot equipment already installed in the KDPS facility.
- Coordinate with the incumbent telephone companies and the State to ensure that the appropriate 9-1-1 network is installed to handle the geographical area of the consolidated center.
- Ensure that the 9-1-1 network is engineered to provide as much diversity and redundancy as possible.
- Verify that the system capacity is sufficient for adding the additional answering positions that will be needed.
- The consolidated center needs to procure and maintain 24x7 system support and maintenance from the vendor.
- The consolidated center will need to identify a back-up center.

6.6 Radio

Technologically, consolidated dispatching can take place without a consolidated radio system and a consolidated radio system can exist without consolidated dispatching. However, when considering consolidation the use of disparate radio systems by the participating agencies is often the most difficult operational hurdle to overcome in terms of interoperability and cost efficiencies. The number of independent talk groups or radio channels that will

require control is a significant factor when determining the number of dispatchers that will be required to monitor and manage those talk groups and channels. In other words, the more radio platforms used within the consolidated PSAP, the more dispatch positions, equipment and employees will likely be needed which extends to higher costs.

During Kimball's on-site visits, the project team noted that it is common place for law enforcement dispatchers to monitor one talk group or channel via their select speaker and another through their unselect speaker thereby splitting their attention between two different sets of field personnel. While listening to multiple talk groups can help keep the dispatcher informed, it becomes problematic when a dispatcher is responsible for tracking field personnel and answering radio transmissions on more than one primary talk group. Emergency communications best practices recommend that a police dispatcher should only be responsible for one primary law enforcement dispatch talk group or channel to prevent missed transmissions and potential safety issues for field personnel. When consolidating, the number of actual dispatch positions that are necessary must be determined. Often agencies that have low call volume and/or a low number of on-duty field units can be combined with other agencies to reduce the number of dispatch positions necessary. Maintaining individual dispatch positions for agencies with low call volumes and/or a low number of units assigned to that dispatch channel is not cost effective and not recommended. Obviously, a common radio platform among all agencies would allow for the most efficient configuration from both an operational and fiscal perspectives.

Some of the existing radio systems were built to provide operational coverage for specific agencies (police, fire, and EMS) and for specific geographical areas. This makes the assignment of primary dispatch channels for specific agencies a much more difficult task, especially when there is an operational need to reduce dispatch channels and move agencies from one primary dispatch channel to another. A consolidated radio system usually provides coverage over an entire operational area and makes the assignment or changing an agency's primary dispatch channels a much simpler task. The advantage with less dispatch primary dispatch positions most often results in lower operational costs for the communications center through less personnel and lower technology costs because less equipment is needed.

The ideal scenario is all of the participating agencies use the same type of radio technology and share a common platform providing seamless operational coverage. In addition, all connectivity is accomplished by a common backbone providing connectivity from dispatch locations into the radio system or to the radio transmitter sites. The police agencies participating in this study are primarily using two radio platforms; 700/800 MHz and VHF. KDPS, TKPD and KCSO participate in the MPSCS. Portage DPS operates its police and fire communications on its own VHF multiple site repeated radio system and WMU operates its own eight channel 700/800 MHz digitally trunked single site radio system.

Past experience with consolidated dispatch environments indicate that the communications center is usually responsible for providing the radio system backbone and all associated connectivity. This would include all radio console and backroom equipment, tower sites, base stations and connectivity to those sites. The agencies are typically responsible for all radio subscriber units that include mobile radios, portable radios, agency control stations and personnel alerting devices.

6.6.1 Radio Recommendations and Observations

- The Motorola MCC7500 console system is already in place in the KDPS facility, has the necessary features, is still well within its product life cycle and can be expanded as necessary. For these reasons, Kimball's recommends that the center continue to use the MCC7500 system. This equipment offers the most cost effective and operationally feasible solution for the consolidated center.
- The project could initially consider consolidating the agencies using their current radio systems with the long range goal to migrate all the agencies to the same common, standards-based radio platform, MPSCS.
- Emergency communications best practices recommend that a police dispatcher should only be responsible for one primary law enforcement dispatch talk group or channel; assigning multiple primary talk groups or channels to one dispatcher is not recommended. Maintaining individual dispatch positions for agencies that have their own dispatch channel and low call volumes is not cost effective and is never recommended. If the PSAP consolidation moves forward, in-depth radio channel traffic studies should be conducted to determine if any of the various law agencies can be consolidated onto either new or existing dispatch talk groups. It may be decided that a geographical dispatch talk group might be a better operational solution for both the consolidated communications center and the local field units.
- There most likely will be a need for some enhancements to the County's fire radio network due to current issues being experienced on the system. A thorough radio assessment may be needed to identify the problems and to determine the corrections needed to rectify them. Based on past experience, when a newly consolidated center takes over management of a problematic radio system there is an immediate expectation by the user agencies for improvement. System upgrades to achieve better coverage could have significant costs associated with them. All these issues should be identified early on and discussed with the user agencies so that their expectations can be managed.
- Some type of VHF radio infrastructure will need to be maintained into the future since a trunked radio system technology does not support paging and alerting of fire agencies. The consolidated center should investigate the feasibility and cost to upgrade the current VHF radio system to a County-wide simulcast system that could be used to page and dispatch all the fire services within the County.
- WMU should continue their efforts to move their public safety dispatch to the MPSCS.
- The consolidated center would need to take over management, support and maintenance of all radio system networks used to dispatch public safety agencies in use within the county. This includes all coordination and connectivity to MPSCS, the Portage DPS police and fire systems, County fire radio system and the VHF base stations at the Westwood Fire Station. If WMU continues to operate their dispatch operations on the University radio system then the consolidated center would need connectivity to that system.

6.6.2 Working Toward a Common Radio Platform

Although the County does not have its own consolidated radio system, the MPSCS is an option available to them. Agencies within the county are permitted to join and utilize the system with a number of agencies who have already chosen to do so. The system is a P25 compliant trunked system that was originally engineered to allow for 97 percent all-weather mobile coverage. Agencies utilizing the state system are required to pay annual fees based on the number of subscriber units they have on the system.

The state system was engineered for mobile coverage therefore it may be necessary for some agencies to add sites to ensure a sufficient level of portable and in-building radio coverage is available to them. The City of Kalamazoo

installed an additional MPSCS site at Fire Station 6, 1414 Howard Street to increase and enhance the local mobile and portable radio coverage footprint and Kalamazoo Township did the same by adding a site at the County Jail, 1500 Lamont Street. The cost of subscriber units on the system for the two agencies have been offset by agreement with the state based on capital costs associated with building out those two sites. If additional agencies choose to join the state system additional sites may be needed.

There are a number of fiscal implications to moving an agency to a new radio platform. These include the cost to replace all of the agency's mobile and portable radio equipment. Further, if additional tower site is required for coverage enhancement there are significant costs associated to this network build out such as towers, repeater stations and associated hardware and connectivity to the system may be incurred.

Prior to any additional agencies joining the state system a detailed radio system assessment should be conducted to determine the best plan and identify budgetary costs. The radio assessment would be used to determine:

- If the system can accommodate the additional agencies
- If the current radio coverage footprint provides the same or better coverage than the existing system
- Number of additional sites needed, if any
- Location of additional sites, if needed
- Cost of additional sites, if needed
- Operational benefits

6.6.3 Radio Consolidation Steps

- Select a single radio console vendor for use in the consolidated center. Kimball recommends using an existing solution, the Motorola MCC7500 radio consoles. Only Motorola consoles can provide full functionality and direct connection to the MPSCS.
- Identify the need for interface additions or modifications for the added agencies (e.g. fire station alerting) through a radio assessment.
- Verify if the current back room equipment is sufficient for adding the number of console positions needed.
- Coordinate with the state on the number of radio consoles that will be added to the system.
- Migration to MPSCS should continue for WMU.
- Determine the feasibility for all law enforcement agencies participating in the consolidated center to utilize the same radio system, MPSCS. If the interest exists, a thorough radio needs assessment can be completed to identify:
 - If the MPSCS can accept the additional agencies
 - Need and location for additional radio sites
 - Desired radio coverage footprints
 - Number of subscriber units needed and estimated costs
 - Determine fiscal responsibility for system enhancement (new sites) including costs for subscriber units (mobiles and portables)
- If existing law enforcement agencies decide to continue to use their current radio systems then the consolidated center will need to make the necessary connections to access and control those radio systems.

- Conduct a thorough assessment of the radio system prior to taking over control to identify any problems or shortcomings. If any are found, these should be discussed with the agencies so that expectations can be managed.
- Investigate the feasibility and cost to upgrade the existing VHF fire radio system to a County-wide simulcast system.
- Procure and maintain 24x7 system support and maintenance for the radio consoles and all radio systems.
- Develop and test manual back-up processes routinely for system outages, both planned (maintenance) and unplanned.
- Identify resources and the need for support staff to administer and maintain the radio equipment.
- Identify any enhancements needed for radio system interoperability such as hardware, operational changes, training, and education and testing.

6.7 Logging Recorder

- Taking into consideration that the KDPS facility would be the location of the new PSAP and the age of the recorder already in place, Kimball recommends expanding the NICE Call Focus III recorder and expanding it as necessary. This solution will provide the most cost effective and operationally feasible solution for the new PSAP.
- If the consolidation project moves forward, a digital recorder needs assessment should be conducted to determine if the existing recorder has sufficient functionality as it relates to the type of resources needed (analog, digital and/or IP) and anticipated channel capacity. All primary dispatch and operational radio channels and talk groups, 9-1-1 trunks, console position audio and other administrative phone audio will need to be recorded in the consolidated PSAP.
- The consolidated PSAP should individually record all 9-1-1 trunks, incoming and outgoing phone lines, answering positions, radio positions and all radio channels or talk groups.
- Remote playback/monitoring software for management, supervisory, training, investigation and quality assurance administrative positions will be necessary. Instant recall for telephone and radio is another digital recorder function that could be considered to enhance the IRR capabilities of the answering positions and the radio positions.
- A 24x7 maintenance and support contract should be in place for the logging recorder system.

6.7.1 Logging Recorder Recommendations

- Select a logging recorder solution for use in the consolidated center. Kimball recommends using an existing solution, the NICE Call Focus III that is currently being used by the co-located PSAPs within the KDPS facility.
- Conduct a recorder needs assessment to determine if the existing recorder has sufficient capacity and capability to record the necessary resources. If not, determine if additional capacity or functionality can be added.
- Ensure that sufficient licensing is added to provide access to remote client applications (management, supervisory, training and quality assurance).
- Procure and maintain 24x7 system support and maintenance for the logging recorder.

6.8 Master Clock

In the consolidated center a fully redundant master clock solution should be installed and integrated with each and every critical system that will be used. This includes, but is not limited to, CAD, 9-1-1 answering equipment, radio consoles and logging recorder.

6.8.1 Master Clock Recommendations

Ensure that all critical systems are interfaced to the master clock (CAD, 9-1-1 answering equipment, radio consoles and logging recorder).

6.8.2 Alternative 5 Shared Technology Network Connectivity

There will be a need to identify, install and maintain a sufficient IP path between the back-room equipment used by the shared technology and the remote positions installed at the participating agencies. All of the critical technology recommended for use by Kimball is already IP based so that should not be an issue.

Due to the critical nature of this equipment this IP 'pipeline' must have sufficient bandwidth and should be engineered with redundancy, automatic back-up and diversity. There are several options for connectivity, but all come with associated costs:

- Utilize the existing fiber network that is in place today. Some extension of this network may be necessary but can only be determined after a detailed assessment is conducted. High level conversations indicate that a path may already exist but no detailed drawings were available.
- Lease point-to-point IP connectivity through an existing commercial telecom vendor (e.g. telephone company).
- Install a microwave link between the PSAPs.

If an existing fiber network exists today the current path may be routed through facilities managed by multiple jurisdictions and/or IT departments. For example, the fiber path may utilize equipment owned and managed by KDPS IT, Kalamazoo City IT, County IT and possibly even Portage IT. This could be a concern because it could add additional opportunities for disruptions or failures based on access and/or equipment management and maintenance tasks. A secure primary and secondary VPN environment would be needed for the project and any changes along the path could impact service levels or connectivity.

6.9 Technology Replacement Costs

The critical PSAP systems have, on average, a five-to-ten year life before needing replacement. As part of any consolidation, establishing a reserve funded with annual contributions is highly recommended. The following table provides an overview the system replacement cycle and estimated replacement costs for a consolidated PSAP with 12 positions.

Critical PSAP Systems Life Cycle and Replacement Costs

Systems and Specialized Furniture	Installed/Last Update	Replacement Year	Positions or Channels	Cost Per Unit	Total Cost
CAD, Mobile, RMS*	2013	2023	12	\$22,000	\$264,000
9-1-1 Answering Positions	2011	2021	12	\$75,000	\$900,000
Radio Consoles	2012	2022	12	\$50,000	\$600,000
Ergonomic Dispatch Furniture**	2005	2020	12	\$18,000	\$216,000
Digital Logging Recorder	2011	2021	120	\$1,500	\$180,000
Redundant Master Clock Solution	2011	2021	1	\$20,000	\$20,000
				Total	\$2,180,000

*CAD cost includes hardware replacement at the PSAP only. Software updates would be included in annual support which needs to be maintained on an annual basis.
**Dispatch furniture replacement

Table 45—Critical PSAP Systems Life Cycle and Replacement Costs

Technology Replacement Budget Reserve Estimates					
Systems and Specialized Furniture	Total Replacement Cost	Installed/Last Update	Replacement Year	Years Remaining	Annual Reserve Amount*
CAD, Mobile, RMS	\$264,000	2013	2023	10	\$26,400
9-1-1 Answering Positions	\$900,000	2011	2021	8	\$112,500
Radio Consoles	\$600,000	2012	2022	9	\$66,667
Ergonomic Dispatch Furniture	\$216,000	2005	2020	7	\$30,857
Digital Logging Recorder	\$180,000	2011	2021	8	\$22,500
Redundant Master Clock Solution	\$20,000	2011	2021	8	\$2,500
	\$2,180,000		Annual Reserve Needed		\$261,424

*Based on annual contributions beginning in 2014. The annual contribution amount will increase if contributions begin later than 2014.

Table 46—Technology Replacement Budget Reserve Estimates

The annual reserve needed to prepare for systems and equipment replacement is included in the cost distribution tables for each alternative and reflected in the per-agency costs illustrated in those tables.

7. ALTERNATIVE 1: FULL CONSOLIDATION

Alternative 1 examines the physical consolidation and organizational integration of all of the business plan participants including the KDPS, KCSO, TKPD, Portage DPS and WMU. Based on discussions in other sections of the report, the consolidated PSAP is assumed to be housed in the KDPS facility where KDPS, KCSO and TKPD are currently co-located.

This alternative is assumed to be governed by a joint powers authority as discussed in the Governance section.

The following sections will discuss the needed technology, organizational structure, staffing needs and budget estimates.

7.1 Alternative 1 Technology Cost Estimates

The following table provides budgetary costs for new technology that will be needed to support the consolidated emergency communications center and these costs are currently based on a 12 position PSAP. The actual number of needed console positions cannot be determined until the staffing portion of the report is completed. Any change in the number of recommended positions would change the anticipated technology costs.

There are no hard and fast rules that apply to a consolidation project when it comes to who is the responsible party, either the agency(s) or the communications center, for a technology cost or a portion of the cost. This funding decision must be made locally and depends on a number of factors, such as, but not limited to; the technology, project participants, local politics, available funding, is the cost eligible using collected local fees or is there an effort to entice an agency, agencies or a discipline to participate in the consolidation project.

Alternative 1 - Required Technology Cost Estimates				
System	Description	Quantity	Individual Cost	Total Estimated Cost
CAD	Workstation Licenses	3	\$32,000	\$96,000
CAD	RMS Interface	2	\$20,000	\$40,000
Mobile	Mobile Licenses	33	\$4,000	\$132,000
LERMS	CAD Interface	2	\$20,000	\$40,000
9-1-1	Answering Positions	2	\$75,000	\$150,000
9-1-1	Network Costs	5	\$3,600	\$18,000
Radio	Radio Consoles	3	\$50,000	\$150,000
Radio	Radio Console Backroom	1	\$15,000	\$15,000
Radio	Radio Connectivity	5	\$4,000	\$20,000
Recorder	Additional Capacity	36	\$1,500	\$54,000
System Furniture/Chairs	Additional Positions	2	\$17,500	\$35,000
TOTAL				\$750,000

Table 47—Alternative 1 Cost Estimates for Required Technology

The following assumptions were used in calculating the above budgetary estimates:

- The technology systems used in the consolidated center would be:
 - CAD (Intergraph)
 - Mobile (Intergraph)
 - Law enforcement records management system (LERMS)
 - 9-1-1 (Cassidian Sentinel Patriot)
 - Radio Consoles (Motorola MCC7500)
 - Recorder (NICE Call Focus III)
- Kimball recommends that critical technology such as 9-1-1 answering equipment, radio consoles and CAD be installed at all the console positions. This provides the best operational model for the communications center, however that additional functionality or redundancy does add cost.
- There is no need to upgrade any of the CAD server hardware.
- CAD interfaces to the New World LERMS and ID Networks LERMS will be needed.
- Thirty-three new mobile data licenses will be needed; 24 for Portage and 9 for WMU
- Mobile costs do not include any subscriber hardware or connectivity costs to the mobile server.
- The three 9-1-1 trunks that currently are in place in Portage would be moved to the consolidated center. The number of actual 9-1-1 trunks that will be needed in the consolidated center would not be determined until traffic studies are provided by the phone company. Additional trunks may not be needed.
- Radio connectivity to five additional radio systems for the Portage DPS and WMU.
- All radio channels, talk groups, 9-1-1 trunks and phone lines would be individually recorded at the consolidated communications center.
- An in-depth phone assessment would need to be conducted to determine which 10-digit lines and extensions will need to be installed in the consolidated center.
- There are no estimated costs associated with data conversion. The cost for converting data varies significantly from vendor to vendor. Typically an in-depth analysis must be conducted before a price for data conversion can be estimated. Commonly, data conversion is expensive.

The following table provides additional or optional costs for new technology that may or may not be needed to support the consolidated emergency communications center. These costs are dependent on either of the two following factors:

1. The project decision makers determine the need to implement an optional or recommended enhancement to a system.
2. The costs shown in the following table should be considered budgetary estimates only. Actual costs may increase or decrease during the consolidation process as options are chosen at various decision points throughout the process.

Alternative 1 - Recommended Technology Cost Estimates				
System	Description	Quantity	Individual Cost	Total Estimated Cost
CAD	EMD Interface	1	\$25,000	\$25,000
CAD	Fire Station Alerting Interface	1	\$20,000	\$20,000
CAD	Radio Tone Encoding Interface	1	\$20,000	\$20,000
CAD	Text/Alphanumeric Paging Interface	1	\$23,000	\$23,000
Mobile	Mobile Routing	172	\$1,000	\$172,000
LERMS	Workstation Licenses	15	\$1,500	\$22,500
Radio	MPSCS Site	1	\$750,000	\$750,000
Radio	Simulcast VHF	1	\$475,000	\$475,000
Master Clock	Redundant Master Clock Solution	1	\$20,000	\$20,000
TOTAL				\$1,527,500

Table 48—Alternative 1 - Recommended Technology Cost Estimates

- EMD interface would only be needed if there was an operational change in the handling of medical calls and the consolidated center was going to provide EMD.
- CAD interfaces to station alerting, radio tone encoding, text/alphanumeric paging are recommended operational enhancements.
- Mobile routing is an operational recommendation.
- LERMS licenses would only be needed if WMU or Portage changed RMS vendors. This would also impact the CAD interface pricing listed under Required Technology.
- The MPSCS site would only be needed if Portage decided to move to that radio system. This would also impact radio connectivity costs listed under needed technology.
- No radio costs are included for agency subscriber units (mobiles, portables).
- The simulcast VHF for fire paging is a technology recommendation to correct current system problems that were reported. This cost includes all new equipment for a five site system; transmitters, antenna systems, GPS timing and simulcast controller. It is possible that some existing equipment could be re-used lowering the cost of the project.
- Redundant master clock solution is an operational best practice recommendation.
- The radio costs do not include any costs for agency subscriber units (mobiles, portables).

7.2 Operational Plan

The operational plan that follows in this section represents as close to a “perfect world” organizational structure and staffing projections as can be developed at this early juncture in the consolidation process. While the estimated telecommunicator staffing numbers are close to what will be needed, support and management staff numbers will be difficult to accurately estimate until actual planning takes place and key decisions are made.

As is often the case, the new organizational structure recommended for Alternative 1 includes:

- Additional telecommunicator staffing to provide a higher level of service to the county fire service as well as a change to a call taker/dispatcher call processing methodology.
- Supervisors that are not assigned to work a call taking or dispatch position
- Civilian management and support positions created to take over PSAP responsibilities covered by sworn personnel or other municipal employees.

The organizational changes often equate to unaffordable personnel costs, at least initially. An organizational structure that could be considered an intermediate step to the structure in this section is provided in Section 7.4.

7.2.1 Organizational Structure

Based on the size of the consolidated PSAP in this alternative, Kimball recommends the following as an initial organizational structure. Key changes in this structure are:

- A civilian director or manager
- 100 percent civilian staff
- The inclusion of 24x7 shift supervision that are not assigned to work a call taking or dispatch position
- Assignment of quality assurance/training to a shift supervisor(s).

This recommended structure should be viewed as a starting point that will be altered as necessary to fit the needs of the new PSAP as decisions regarding how IT and technology needs will be supported and the actual workload better defined.

7.2.1.1 Position Definitions

The structure is based on the following position definitions:

1. **Director or Manager**

This position has overall responsibility for providing leadership and has ultimate responsibility for all PSAP operational, technology, budget and administrative tasks. The director is charged with setting the direction for the PSAP, planning for future operational and technological changes, and ensuring that the PSAP is meeting mission set by the PSAP's oversight body. The reporting relationship for this position is determined by the type of governance chosen.

2. **Deputy Director – Operations**

This position reports to the director. This position oversees the shift supervisors, may function as the shift supervisor during the day shift or as needed. This position is also responsible for assisting the director in budget preparation, making staffing decisions, performing complaint investigations, working with agencies served by the PSAP and other operational support.

3. **IT Manager**

This position reports to the director or manager. This position oversees all technical and equipment issues concerning the PSAP's technology. This position oversees IT and GIS support staff, works with vendors on maintenance and repair issues, plans for upgrades and supports the technology needs of the PSAP.

4. **GIS and IT Support**

This position reports to the IT manager and is responsible for providing GIS and/or IT support for the PSAP.

5. **Telecommunicators**

This position reports to the shift supervisors and is responsible for call taking and dispatch functions.

6. **Shift Supervision**

To properly manage a consolidated PSAP, a strong supervisory structure is recommended for two primary reasons; public safety best practices and operational efficiency. Although in smaller PSAPs shift supervisors are not always present for financial reasons or because sworn personnel function in this role, the PSAP in this alternative will be too large to operate efficiently without the presence of 24x7 supervision. In Kimball's view, it is essential that shift supervision not be assigned to a call taker or dispatch position and are present on a 24x7x365 basis. Additional discussion related to best practices is located in the Best Practices and Standards section.

7. **Administrative Support**

This position reports to the director or manager and is responsible for providing administrative support and managing office responsibilities.

Such functions as human resources, payroll and facility maintenance are not covered within this structure. These functions can be provided in several different ways such as adding in-house staff or contracting with one of the participating municipalities to provide support. Therefore, the final organizational structure may change during the implementation planning process.

7.2.2 Call Processing and Dispatch Methodology

Traditionally, telecommunicators in smaller PSAPs often function as a combined call taker and dispatcher simultaneously. In other words, the incoming call is received and processed and field units sent by the same telecommunicator. Most often, this methodology works well in this environment. However, medium to large PSAPs are better served by a split call taker/dispatcher role or task-based dispatching. This splitting of functions represents significant changes from the traditional one-person-does-it-all approach, but does provide benefits that cannot be achieved when a single telecommunicator performs both functions.

A true call taker and dispatcher system allows call takers to be on line with the caller, obtaining vital information for responders, while the dispatcher sends units simultaneously. 9-1-1 callers are queried to determine the incident type (nature), the incident location, vital information, and the calling party name and call back phone number. The call information is then sent via CAD to the appropriate dispatcher(s) for radio dispatch of field units. For example, CAD will generate two incidents, one police and one fire for a call that requires both police and fire response ensuring that both response agencies are notified at the same time. When the call taker remains on line with the caller (when necessary), further information important to response and mitigation of the incident can be gathered, entered into CAD, viewed by the dispatcher(s) and relayed to the field units. This model will provide the best possible service to callers by potentially reducing the overall response time through a faster dispatch time. This methodology also allows the call taker and dispatcher to both focus on obtaining necessary information and dispatching units without having to manage an upset caller, field personnel and potentially additional incoming calls. The key to achieving maximum efficiency in call taking and dispatch is standardized call taking protocols and effective use of the CAD system so that communications between call taker and dispatcher are seamless.

In scenarios where a caller is in danger, best practices dictate that the call taker stay on the line with the caller until help arrives. The call taker provides updates for the dispatcher(s) and responders throughout the call via the CAD

system. Situations where a caller may remain on the line may include in-progress/just occurred events and suicidal or homicidal persons. In these instances, the responders are already dispatched and are kept apprised of the updated information by the dispatcher(s). The unit's/apparatus' initial dispatch response, overall, will be potentially reduced by having the call available for dispatch simultaneously for all appropriate responders.

Taking this concept one step further, the dispatcher role is generally split between fire, EMS if appropriate, and law enforcement. This structure ensures that police, fire and 9-1-1 callers all receive the same high quality service from the PSAP.

In addition to allowing telecommunicators to better focus on only call taking or dispatching, splitting the functions helps the PSAP achieve the following industry standards for call taking:

- NENA 56-005, *9-1-1 Call Answering Standard*, states, "Ninety percent (90%) of all 9-1-1 calls arriving at the Public Safety Answering Point (PSAP) shall be answered within ten seconds during the busy hour (the hour each day with the greatest call volume, as defined in the NENA Master Glossary 00-001). Ninety-five (95) percent of all 9-1-1 calls should be answered within twenty (20) seconds."
- The 2013 version of NFPA 1221, Section 7 states, "Ninety-five percent of alarms¹⁵ received on emergency lines shall be answered within 15 seconds, and 99 percent of alarms shall be answered within 40 seconds" and, "Ninety percent of emergency alarm processing shall be completed within 60 seconds, and 99 percent of alarm processing shall be completed within 90 seconds."
- The 2013 version of NFPA 1221, Chapter 7 Annex A.7.3.1 states "...Consider the following two concepts of communications center operations:
 1. Vertical Center. A telecommunicator performs both the call taking and dispatching functions
 2. Horizontal Center. Different telecommunicators perform the call taking and dispatch functions.

Telecommunicators working in a vertical center are known to engage in multitasking that can inhibit their ability to perform assigned job functions. Routine evaluation of telecommunicator staffing...."

These standards can be difficult to meet when a single employee must juggle multiple job functions simultaneously.

7.2.3 Staffing

The first step in estimating staffing levels for this alternative is to estimate the total call volume the PSAP will handle, including both 9-1-1 and 7 and 10 digit.

The combined 9-1-1 call volume for all agencies is 184,316. Using the 2:1 ratio discussed in the previous section for administrative and non-emergency calls the total call volume for the consolidated PSAP is 368,632. The sum of the 9-1-1 and 7 and 10 digit call volumes is the estimated total call volume for this alternative, as indicated in the following table .

¹⁵ NFPA 1221 defines an alarm as "a signal or message from a person or device indicating the existence of an emergency or other situation that requires action by an emergency response agency."

¹⁶ 2011 9-1-1 call statistics plus the number of estimated emergency calls received by WMU via the campus VoIP system.

Alternative 1 - Total Call Volume Summary				
Agency	Total 9-1-1 or Emergency Calls	7/10 Digit Calls	Total Call Volume	% of Total Call Volume
KDPS	73,433	146,866	220,299	38.92%
KCSO	52,189	104,378	156,567	27.66%
TKPD	12,507	25,014	37,521	6.63%
Portage DPS	28,565	57,130	85,695	15.14%
WMU	17,622	48,378	66,000	11.66%
Total	184,316	381,766	566,082	100.00%

Table 49—Alternative 1 Estimated Call Volume

The next step is to calculate the number of call taker positions needed to manage the call volume. The following table reflects the monthly and per-hour estimated call volume determined from the statistics supplied to Kimball. The slowest and busiest month and hour within each respective table are highlighted. The number of call taker positions listed in the hourly table was arrived at using an Erlang C calculator and the call performance standards listed in this report.

Alternative 1 Estimated Monthly Call Volume Distribution		
Month	Calls	% per Month
January	44,658	7.88%
February	41,654	7.35%
March	46,811	8.26%
April	45,451	8.02%
May	49,191	8.68%
June	48,795	8.61%
July	52,705	9.30%
August	51,685	9.12%
September	46,244	8.16%
October	47,945	8.46%
November	43,694	7.71%
December	47,831	8.44%
Total	566,721¹⁷	100.0%

Table 50—Alternative 1 - Monthly Call Volume Distribution

¹⁷ Total call volume estimates in this chart are 639 calls higher than the previous table due to rounding from multiple spreadsheet calculations. This difference does not have an impact on the overall staffing estimates for this alternative.

Alternative 1 Hourly Call Volume Distribution and Workstation Count					
Hour	Calls Per Hour	% per Day	Call Taker Workstations Needed	Dispatch Workstations Needed	Total Workstations Needed
0:00	39	3.55%	4	6	10
1:00	36	3.21%	4	6	10
2:00	33	2.99%	3	6	9
3:00	29	2.65%	3	6	9
4:00	23	2.11%	3	6	9
5:00	22	1.96%	3	6	9
6:00	21	1.94%	3	6	9
7:00	28	2.57%	3	6	9
8:00	37	3.38%	4	6	10
9:00	45	4.05%	4	6	10
10:00	53	4.77%	5	6	11
11:00	50	4.48%	4	6	10
12:00	50	4.51%	4	6	10
13:00	58	5.27%	5	6	11
14:00	61	5.56%	5	6	11
15:00	60	5.44%	5	6	11
16:00	62	5.58%	5	6	11
17:00	65	5.90%	5	6	11
18:00	57	5.20%	5	6	11
19:00	59	5.31%	5	6	11
20:00	52	4.72%	4	6	10
21:00	57	5.12%	5	6	11
22:00	59	5.31%	5	6	11
23:00	49	4.40%	4	6	10
TOTAL	1,105	100.0%			

Table 51—Alternative 1 - Hourly Call Volume Distribution and Workstation Count

The tables indicate that the month of February is the slowest month while July is the busiest month. The slowest hour of the day is estimated to be 06:00 hours (6:00 A.M.) and 17:00 hours (5:00 P.M.) is the busiest hour of the day. These tables provide upper and lower call volume from which staffing projections can be estimated. When looking at

scheduling at a more granular level, determining the busiest and slowest days of the week and hour of those days allows the PSAP manager to staff shifts more efficiently based on actual workload. However, for the purposes of this preliminary staffing estimate, the average number of workstations that need to be covered is used. In this case, the average number of call taker positions needed to manage the incoming call volume is 4.10 or rounded downward, 4 positions. Since call volume is not evenly distributed around the 24-hour clock, some hours of the will require more than 4 positions and others will require less than four positions. In addition to assisting in staffing estimations, determining the maximum number of call takers and dispatchers required is necessary to properly estimate equipment needs.

The next step in estimating staffing is based on the number of dispatch workstations that will be needed. To maximize the efficiencies gained by consolidating each existing dispatch position should be reviewed to see if combining agencies on to the same talk group makes sense by taking into consideration the following:

- Radio platforms currently in use by each agency. Clearly, agencies that use different radio platforms cannot share talkgroups or channels without one agency moving to a new platform and incurring the cost of doing so.
- Geography. When considering combining agencies thought must be given to whether the combination makes sense from a geographical perspective. Agencies that share geographical borders often already assist each other on a routine basis. Therefore, combining talkgroups would be beneficial and potentially more efficient.
- Number of field personnel tracked by each dispatcher. If a law enforcement dispatcher is responsible for only a small number of field units, then combining talkgroups may offer the opportunity to reduce the number of personnel, create a more efficient call flow process in the PSAP and improve field communications by having those agencies that commonly work together on the same talkgroup. A general rule of thumb for the ideal number of units a dispatcher can manage is 20 – 25 active police units at a time. However, if the talkgroup is used only for primary communications and administrative functions are moved to another talkgroup, then the number of manageable units can be much higher. Given the very different nature of fire emergency communications, the rule of thumb cited for the number of active units does not apply. The configuration of fire communications is discussed in the next bullet.
- Number and type of dispatch positions. Participants must evaluate whether existing positions provide the same level of service for all agencies served. For example, the Kimball project team determined during the data collection phase that county fire agencies do not received the same level of service from its PSAP as does law enforcement. Specifically, the county fire agencies do not have a telecommunicator assigned to monitor and support field personnel during active incidents. To rectify this, an additional dispatch workstation will be needed.

The following table illustrates the number and type of physical workstations and operational model needed for this alternative.

Alternative 1 Workstation Distribution	
Position #	Position Type
1	Police 1 (Dispatch)
2	Police 2 (Dispatch)
3	Police 3 (Dispatch)
4	LEIN/Overflow (Dispatch)
5	Fire 1 (Dispatch)
6	Fire Operations (Dispatch)
7	Call Taker 1
8	Call Taker 2
9	Call Taker 3
10	Call Taker 4
11	Call Taker 5
12	Call Taker 6/Supervisor

Table 52—Alternative 1 - Workstation Distribution

It is important to understand that the above workstation distribution table is conceptual. Multiple options exist for the actual configuration or operational and work distribution for the PSAP. Those options are examined during the implementation planning process and a final workflow and operational model are put in place. However, in order to estimate staffing needs and personnel costs, the Kimball team developed the above model based on our knowledge and experience with PSAP operations.

The rationale behind the above workstation configuration is as follows:

- Four police dispatch positions staffed 24x7. KDPS, KCSO and Portage would have their own talkgroup. TKPD and WMU would combine with either KDPS or KCSO. This creates three primary law enforcement talkgroups.
- The fourth police dispatch position would be designated for LEIN and administrative functions, as well as an overflow position for incoming calls, tactical dispatching or even to cover breaks and lunches.
- Two fire positions are created; a primary dispatch channel and an operations channel. These positions will allow an increase in service levels to county fire agencies. Overflow calls can also be routed to one of the fire dispatchers to provide added call taking support. Kimball considers the establishment of these dedicated fire positions to be essential for increasing the level of service currently provided to the county fire agencies to an acceptable level. The 2013 version of NFPA 1221 Chapter 7 Staffing Annex A.7.3.3 states:

“The issues of communications capabilities and/or failures is cited by the National Institute of Occupational Safety and Health (NIOSH) as one of the top five reasons for fire fighter fatalities. The importance of an assigned telecommunicator for specific incidents is a critical factor in incident scene safety. The assignment process should be outlined in specific SOPs within each agency represented in the communications center...”

- The above table shows six call taker workstations. Call volume distribution indicates that the most call takers needed to handle high call volume periods is five and the least needed is three. Based on Kimball's experience, call volume from approximately one call taker position can be distributed between the overflow police and fire operations positions and, when absolutely necessary, the supervisor's position. The remaining unstaffed, physical call taker workstations are then used for special weather events or other high volume incidents that require additional staff, tactical dispatch assignments, back up workstations should repairs be needed and so forth.
- All staff would be cross-trained for all job functions. While daily job function assignments would change, any employee could be utilized at any position. This methodology ensures a higher level of efficiency and, hopefully, lower overtime costs. The ability to cross train all staff is a benefit of a PSAP of this size. As PSAPs grow and become more complex there is a need to split job functions by specialty; police or fire dispatcher and call taker. While this structure works well, it does add a layer of complexity to scheduling and training.

7.2.4 Personnel Cost Estimates

Based on the assumptions in the prior sections, the estimated personnel count and costs for the new PSAP are as follows:

Alternative 1 Consolidated Center Staffing & Personnel Cost Summary					
Position Title	Number of Employees	Estimated Base Pay Per Position	Estimated Total Base Pay	Benefits @ 50%	Total
PSAP Director/Manager	1	\$85,000	\$85,000	\$42,500	\$127,500
Deputy Director - Operations	1	\$70,000	\$70,000	\$35,000	\$105,000
Technology Manager	1	\$70,000	\$70,000	\$35,000	\$105,000
Shift Supervisors	5	\$64,480	\$322,400	\$161,200	\$483,600
Telecommunicators	60	\$45,801	\$2,748,060	\$1,374,030	\$4,122,090
GIS / IT Support	1	\$65,000	\$65,000	\$32,500	\$97,500
IT Support	2	\$65,000	\$130,000	\$65,000	\$195,000
Administrative Support	1	\$35,000	\$35,000	\$17,500	\$52,500
Total PSAP Staff Needed	72		\$3,525,460	\$1,762,730	\$5,288,190

Table 53—Alternative 1 - Consolidated PSAP Staffing and Cost Estimates

Payroll costs are based on the following:

- PSAP Director or Manager – This position is seen as the equivalent of a municipal department head. The rate of pay selected is in keeping with national trends and the type of experience this person would need to bring to the position.
- Deputy Director or Technology Manager – Estimated based in input from the study participants.

- Supervision – The PSAP will need a shift supervisor on duty at all times. To cover this, five to six supervisors will be needed. This group can be supplemented by senior telecommunicators functioning in an acting supervisory capacity. Kimball also assumes that training and quality assurance and control functions, which are essential, will be spread across this group initially. The creation of a separate position(s) may be necessary once the PSAP is operational and the true work load assessed. The salary estimate is based on the midpoint for the highest paid shift supervisors among the participants which is Portage DPS at \$31.00 per hour¹⁸.
- All PSAP staff are assumed to be civilian and full time employees.
- The hourly rate for the telecommunicators is based on the midpoint of the highest paid telecommunicators among the participants which is KDPS at \$22.02 an hour. The annual cost is based on a standard 2,080 hour year.
- Administrative Support – Based in input from the study participants.
- Benefits are calculated at a rate of 50 percent of the base pay.

7.3 Cost Analysis

The purpose of this section is to provide two cost analyses for each consolidation alternative. One of the analyses will include a county 9-1-1 surcharge of \$0.42 and the other a surcharge of \$3.00.

7.3.1 Cost Distribution Methodology

The distribution of costs associated with a newly consolidated PSAP requires that all participants agree on the distribution formula. Achieving consensus is often a difficult task. The criteria used to determine the distribution of costs frequently yield different results for participants so agreeing on what is fair and equitable can be difficult, and largely a matter of perspective. For example, using strictly population as the basis for cost distribution may provide Agency A significant cost savings while Agency B's costs increase. Using 9-1-1 call volume only may well reverse those results with Agency A incurring cost increases while Agency B saves. Commonly, more than one criterion is used to reach a formula that is considered fair and equitable by all participants.

Clearly, establishing an acceptable formula can be a “show stopper” in the consolidation process. Most often, this issue is addressed early in the pre-implementation process, along with governance, to determine if the consolidation will be able to move forward. If agencies are unable to agree on a distribution formula, then the rest of the implementation process cannot take place.

For the purposes of this report, Kimball used a formula based on two key components each weighted at 50 percent; service area population and 9-1-1 or emergency call volume.¹⁹ Kimball chose these measures because they are measureable and not open to multiple interpretations. For example, another commonly chosen measure is calls for

¹⁸ Portage DPS supervisors are salaried employees. The salary range was converted to hourly rates for comparison purposes.

¹⁹ WMU does not receive 9-1-1 calls directly. However, they do receive emergency calls through the on-campus phone system. WMU's contribution was estimated, in part, by the number of these calls.

service. However, agencies track their calls for service in different ways which creates a measure that can be manipulated to control costs or simply may not be an apples-to-apples comparison.

When first consolidating, Kimball recommends that the cost distribution model be based on data that is measurable and consistent across all participants. Once the consolidation has taken place and other measurable data is developed, the cost formula should be re-visited.

It is important to note that the following cost analysis is based on a single distribution formula. The results could change should a different formula be used.

7.3.2 Cost Estimates

The cost estimates contained in this section are based on the criteria listed below. The estimates are intended to be budgetary in nature and are “high end” for planning purposes. Rationale for personnel costs is fully explained in the staffing section.

- The county surcharge revenue projections are based on the formula utilized by the state for distribution of the state surcharge monies. At the time of this report the number of 9-1-1 accessible devices used by the state was 250,331. The state formula multiplies the population by .93 to determine the distribution amount.
- It was assumed that the county surcharge revenue would be applied towards the consolidated PSAP costs first.
- 2010 Census numbers were utilized for the population numbers in all cost and revenue estimates.
- The revenue is assumed to remain the same as there is no data currently available to determine whether revenue will increase or decrease each year.
- The state surcharge distribution was calculated from the actual 2011 distributions.
- It was assumed that state surcharge would go towards the consolidated PSAP costs only.
- Capital costs estimates were carried forward from the technology section to estimate costs for the first year of the five year projections.
- A three percent increase is used to calculate the personnel costs for each of the subsequent years.
- A three percent increase is used to calculate ongoing operational expenses for each of the subsequent years.
- Benefits are calculated at a rate of 50 percent of salaries and wages.
- Maintenance on equipment is calculated based on 17 percent of the total cost of the new equipment.
- The current expenses provided to Kimball are accurate.
- Except Alternative 5 Shared Technology, the following cost estimates assume any consolidation effort will utilize the space already occupied by the three co-located PSAPs including KDPS, KCSO and TKPD.

It is important to note in all scenarios that a surcharge of \$0.42 would require only county board approval while any surcharge from \$0.43 to the maximum of \$3.00 county surcharge would require voter approval.

The following methodology was used to arrive at the cost estimates for each alternative:

1. Determine the estimated personnel costs for each consolidation alternative
2. Estimate a total operating budget for the consolidated PSAP
3. Estimate the capital (primarily technology related) and one-time transition costs related to the initial consolidation

4. Apply the projected revenue for both the \$0.42 and \$3.00 surcharge scenarios
5. Calculate the cost distribution of any expenses not covered by the revenue generated by the surcharge scenarios.
6. Compare the final estimated cost per agency under each surcharge option to existing PSAP budgets.

7.3.3 Current PSAP Budgets

For ease of reference, the following table is a duplicate table depicting the budgets for each of the PSAPs.

Current Combined PSAP Budget Summary					
	KDPS	KCSO	Kalamazoo Township	Portage DPS	WMU
Network Costs	\$50,174	\$19,000	\$5,000	\$2,000	\$0
Equipment Costs	\$81,380	\$8,805	\$350	\$17,400	\$0
CAD Costs	\$209,647	\$0	\$20,250	\$43,500	\$36,649
Radio Costs	\$60,697	\$0	\$4,000	\$36,000	\$4,000
Office Expenses	\$53,814	\$13,000	\$0	\$26,300	\$4,311
KDPS Annual Contract	\$0	\$197,631	\$66,082	\$0	\$0
Personnel Expenses	\$1,505,485	\$902,094	\$334,670	\$595,000	\$227,860
Sub-Totals	\$1,961,197	\$1,140,530	\$430,352	\$720,200	\$272,820
Revenue	\$619,450	\$182,188	\$41,617	\$86,205	\$0
Annual Net PSAP Costs	\$1,341,747	\$958,342	\$388,735	\$633,995	\$272,820
Combined Net PSAP Costs	\$3,595,639				

Table 54—Current Combined PSAP Budget Summary

7.3.4 Alternative 1 Cost Distribution Criteria

The following table indicates the criteria used to determine the distribution of costs among the participating agencies.

Alternative 1 Cost Distribution Criteria Summary				
PSAP	2011 9-1-1 or Emergency Calls	Percentage of Total 9-1-1 or Emergency Calls	2010 Population	Agency % of Total Population
KDPS	73,433	39.84%	66,762	26.67%
KCSO	52,189	28.31%	106,055	42.37%
TKPD	12,507	6.79%	23,722	9.48%
Portage DPS	28,565	15.50%	46,292	18.49%
WMU	17,622	9.56%	7,500	3.00%
Totals	184,316	100.00%	250,331	100.00%

Table 55—Alternative 1 - Cost Distribution Criteria Summary

7.3.5 Alternative 1 - \$0.42 County Surcharge Scenario

This alternative reflects a full consolidation of KDPS, KCSO, TKPD, Portage DPS and WMU. This section applies the combined estimated revenue against the estimated consolidated PSAP operating budget and initial technology and transition costs. The remaining unfunded costs will need to be distributed between the participants to fully fund the PSAP. The estimates are based on a total staff of 72. The capital cost estimates cover the additional CAD, radio, 9-1-1 workstations and other technology needs to reach twelve positions as detailed in the technology plan. The estimated PSAP budget includes 24x7 maintenance on all CAD, radio and 9-1-1 equipment.

The following sections reflect the first two years of estimated costs and cost distribution at \$0.42 and \$3.00 surcharge levels.

Year 1 – Inclusive of Technology Costs

Alternative 1 PSAP Budget with a \$0.42 County Surcharge – Year 1		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
Consolidation Technology/Transition Costs (Year 1 Only)*	\$750,000	
		\$750,000
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$5,413,190	
Annual Operating Costs	\$865,514	
		\$6,278,704
Annual Systems Replacement Reserve		
Annual Contributions - Systems Replacement		\$261,424
Total Expenses		\$7,290,128
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$458,135	
State Training Reimbursement	\$18,000	
Estimated \$0.42 County Surcharge	\$1,173,351	
Total Revenue/Reimbursements		\$1,649,486
Remaining Unfunded Costs		\$5,640,642

Table 56—Alternative 1 - Budget with a \$0.42 County Surcharge – Year 1

The above table estimates the technology costs associated with consolidating and adds that to the estimated operating budget for the consolidated PSAP. Also included are the estimated annual costs associated with establishing a replacement fund for key PSAP systems and equipment. Revenue and reimbursements are then applied against that total to arrive at the amount that would need to be distributed among the PSAP participating agencies.

The following table takes the amount arrived at above and applies the cost distribution formula described in Section 7.3.1 to arrive at the estimated contribution for each agency. Should a different cost distribution formula be used, the results are likely to be different.

Cost Distribution - Full Participation \$0.42 Surcharge - Year 1						
		KDPS	KCSO	TKPD	Portage DPS	WMU
Unfunded PSAP Costs	\$5,640,642					
Component 1 - 9-1-1 / Emergency Call Volume (50%)						
% of Total 9-1-1/Emergency Call Volume		39.84%	28.31%	6.79%	15.50%	9.56%
Call Volume Based Contribution		\$1,123,616	\$798,433	\$191,500	\$437,150	\$269,623
Component 2- Service Area Population (50%)						
% of Total Service Area Population		26.67%	42.37%	9.48%	18.49%	3.00%
Population Based Contribution		\$752,180	\$1,194,970	\$267,366	\$521,477	\$84,610
Total Agency Contribution		\$1,875,795	\$1,993,403	\$458,866	\$958,627	\$354,232

Table 57—\$0.42 Surcharge Cost Distribution – Year 1

The following table compares the estimated Year 1 contribution to the existing PSAP budget for each agency. As indicated in the table above, all agencies will see an increase in costs. This is especially true for KCSO which would see an increase of ~\$1 million. The Year 1 estimate includes the one-time costs associated with consolidation so increases are common.

Alternative 1 - \$0.42 Surcharge Cost Comparison – Year 1			
Agency	Current PSAP Budget*	Consolidated PSAP Contribution	Increase or Decrease (+/-)
KDPS	\$1,341,747	\$1,875,795	+\$534,048
KCSO	\$958,342	\$1,993,403	+\$1,035,061
TKPD	\$388,735	\$458,866	+\$70,131
Portage DPS	\$633,995	\$958,627	+\$324,632
WMU	\$272,820	\$354,232	+\$81,412
Total	\$3,595,639	\$5,640,923	+\$2,045,284
*Reflects net costs after revenue/reimbursements have been applied.			

Table 58—\$0.42 Surcharge Agency Cost Comparison – Year 1

Year 2 – PSAP Operating and Equipment Replacement Reserve Costs Only

In Year 2, the estimated costs drop to include only the operating budget for the consolidated PSAP as seen in the following table.

Alternative 1 PSAP Budget with a \$0.42 County Surcharge – Year 2		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)*	\$5,575,585	
Annual Operating Costs	\$891,479	
		\$6,467,064
Systems Replacement Reserve		
Annual Contribution - Systems Replacement		\$261,424
Total Expenses		\$6,728,488
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$458,135	
State Training Reimbursement	\$18,000	
Estimated \$0.42 County Surcharge	\$1,173,351	
Total Revenue/Reimbursements		\$1,649,486
Remaining Unfunded Costs		\$5,079,002
*Personnel costs increased by 3%		

Table 59—Alternative 1 - Budget with a \$0.42 Surcharge – Year 2

Cost Distribution - Full Participation \$0.42 Surcharge Scenario - Year 2						
		KDPS	KCSO	TKPD	Portage DPS	WMU
Unfunded PSAP Costs	\$5,079,502					
Component 1 - 9-1-1/Emergency Call Volume (50%)						
% of Total 9-1-1/ Emergency Call Volume		39.84%	28.31%	6.79%	15.50%	9.56%
Call Volume Based Contribution		\$1,011,837	\$719,004	\$172,449	\$393,661	\$242,800
Component 2- Service Area Population (50%)						
% of Total Service Area Population		26.67%	42.37%	9.48%	18.49%	3.00%
Population Based Contribution		\$677,352	\$1,076,092	\$240,768	\$469,600	\$76,193
Total Agency Contribution		\$1,689,188	\$1,795,096	\$413,217	\$863,261	\$318,993

Table 60—Alternative 1 - Full Participation \$0.42 Surcharge Scenario - Year 2

Alternative 1 - \$0.42 Surcharge Cost Comparison – Year 2			
Agency	Current PSAP Budget*	Consolidated PSAP Contribution	Increase or Decrease (+/-)
KDPS	\$1,341,747	\$1,689,188	+\$347,441
KCSO	\$958,342	\$1,795,096	+\$836,754
TKPD	\$388,735	\$413,217	+\$24,482
Portage DPS	\$633,995	\$863,261	+\$229,266
WMU	\$272,820	\$318,993	+\$46,173
Total	\$3,595,639	\$5,079,756	+\$1,484,117
*Reflects net costs after revenue/reimbursements have been applied.			

Table 61—Alternative 1 - \$0.42 Surcharge Cost Comparison – Year 2

In the first consolidation scenario, a \$0.42 county surcharge in Year 1 would offset the capital and recurring costs and leave just over \$5.5 million to be paid by all participants. All agencies would see an increase in overall costs. KCSO would see a substantial increase under this cost distribution model. In Year 2, the net cost to be distributed would drop to just over \$5 million. In the second year the costs for all except for TKPD would see an increase when compared to current costs. TKPD would see a slight decrease in costs for Year 2. Again, under this formula, KCSO would see an increase of ~\$836,754 from its current PSAP budget.

7.3.6 \$3.00 County Surcharge Scenario

In the second alternative for the first consolidation scenario a maximum \$3.00 county surcharge would cover the capital and recurring costs of the new PSAP and result in a budget balance of approximately 1.8 million dollars. This alternative would allow the participating agencies to set aside funds for future system replacements and upgrades, which are critical, as well as funds for a separate facility for the PSAP, if desired.

Alternative 1 PSAP Budget with a \$3.00 County Surcharge – Year 1		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
Consolidation Technology / Transition Costs (Year 1 Only)*	\$750,000	
		\$750,000
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$5,413,190	
Annual Operating Costs	\$865,514	
		\$6,278,704
Annual Systems Replacement Reserve		
Annual Contributions - Systems Replacement		\$261,424
Total Expenses		\$7,290,128
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$458,135	
State Training Reimbursement	\$18,000	
Estimated \$3.00 County Surcharge	\$8,381,082	
Total Revenue/Reimbursements		\$8,857,217
Budget Balance		\$1,567,089

Table 62—Alternative 1 PSAP Budget with a \$3.00 County Surcharge – Year 1

In the second year, the balance would increase to just over \$3.6 million.

Alternative 1 PSAP Budget with a \$3.00 County Surcharge – Year 2		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)*	\$5,575,585	
Annual Operating Costs	\$891,479	
		\$6,467,064
Systems Replacement Reserve		
Annual Contributions - Systems Replacement		\$261,424
Total Expenses		\$6,728,488
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$458,135	
State Training Reimbursement	\$18,000	
Estimated \$3.00 County Surcharge	\$8,381,082	
Total Revenue/Reimbursements		\$8,857,217
Budget Balance		\$2,128,729
*Personnel costs increased by 3%		

Table 63—Alternative 1 - \$3.00 County Surcharge – Year 2

7.4 Alternative 1 Personnel Plan - Option 2

As previously discussed, when multiple smaller PSAPs combine an expanded organizational structure is often necessary. Although the expanded structure is designed to ensure the PSAP is able to meet industry best practices, it can be cost prohibitive initially. This section overviews a second option for the initial operational plan for the newly consolidated PSAP. Kimball does not recommend this second option as it does not meet key industry standards, such as supervision that is not assigned to a console position. However, if used as an intermediate step towards the structure presented in Section xx, it can make it possible to move forward with consolidation.

To create a consolidated PSAP that is initially more financially feasible, modifications to the number of staff must be made. The new PSAP has two key areas where staff may be reduced. First, the number of telecommunicators needed to increase coverage for county fire services could be reduced and the level of service currently provided would be continued at current levels. Second, establishing shift supervisors who are not assigned to work a call taker or dispatch position postponed until some point in the future. Supervisory responsibilities would fall to a senior telecommunicator who also would be assigned to a call taker or dispatch position.

Neither of these changes is *recommended* or is in keeping with 9-1-1 best practices. However, if a change must be made to allow consolidation to move forward, then Kimball recommends having shift supervision assigned to also work a call taker or dispatch position. This change would lower the number of telecommunicator staff and personnel costs. In Kimball's opinion, increasing the level of service to the county fire services is of a higher importance of the two options.

7.4.1 Staffing Summary – Option 2

The following table reflects estimated personnel costs after separate shift supervisor positions have been removed.

Alternative 1 - Staffing & Personnel Cost Summary - Option 2					
Position Title	Number of Employees	Estimated Base Pay Per Position	Estimated Total Base Pay	Benefits @ 50%	Total
PSAP Director/Manager	1	\$85,000	\$85,000	\$42,500	\$127,500
Deputy Director - Operations	1	\$70,000	\$70,000	\$35,000	\$105,000
Technology Manager	1	\$70,000	\$70,000	\$35,000	\$105,000
Telecommunicators	60	\$45,801	\$2,748,060	\$1,374,030	\$4,122,090
GIS / IT Support	1	\$65,000	\$65,000	\$32,500	\$97,500
IT Support	2	\$65,000	\$130,000	\$65,000	\$195,000
Administrative Support	1	\$35,000	\$35,000	\$17,500	\$52,500
Total Staff Needed	67		\$3,203,060	\$1,762,730	\$4,804,590

Table 64—Alternative 1 - Staffing and Personnel Cost Summary – Option 2

The elimination of the shift supervisor positions reduces the personnel costs by an estimated \$608,600. The following table shows the per-agency savings based on this staff reduction.

Alternative 1 Option 2 Personnel Reduction Cost Savings						
		KDPS	KCSO	TKPD	Portage DPS	WMU
Reduction in Personnel Costs	\$608,600					
Component 1 - 9-1-1/Emergency Call Volume (50%)						
% of Total 9-1-1/Emergency Call Volume		39.84%	28.31%	6.79%	15.50%	9.56%
Call Volume Based Contribution		\$121,233	\$86,147	\$20,662	\$47,167	\$29,09
Component 2- Service Area Population (50%)						
% of Total Service Area Population		26.67%	42.37%	9.48%	18.49%	3.00%
Population Based Contribution		\$81,157	\$128,932	\$28,848	\$56,265	\$9,129
Reduction in Total Agency Contribution		\$202,390	\$215,079	\$49,510	\$103,432	\$38,220

Table 65—Alternative 1 - Option 2 Personnel Reduction Cost Savings

7.5 Alternative 1 Summary

In Kimball's opinion, a full consolidation of all plan participants would provide substantial service level improvements. While consolidation provides many advantages as outlined in the body of this document, key improvements include:

- Raising the level of service provided to the county fire departments to the same level currently received by other law enforcement and fire agencies included in this plan.
- More efficient emergency communications system led by a manager that is able to focus solely on the delivery of 9-1-1 and dispatch services to the agencies served and the community.
- Would provide a single point of control during major, regional incidents or incidents that cross jurisdictional boundaries, which allows for improved coordination and response among multiple agencies.
- Shift supervisors that are able to oversee PSAP operations 24x7 and help ensure that the necessary quality assurance and training is being provided to the telecommunicators rather than taking 9-1-1 calls and dispatching field personnel.
- Allows sworn personnel to focus on their key job functions rather than supervising the PSAP which can result in in-direct cost savings.

The cost analysis associated with this consolidation alternative indicates that in the first year all participants will see cost increases when compared to existing PSAP budgets, in part due to one-time capital costs. However, it is critical to understand that a comparison of pre and post consolidation service levels is not an apples-to-apples comparison.

The consolidated PSAP includes a new organizational structure which includes:

- Establishment of separate shift supervisors which is in line with NFPA 1221 best practices as cited elsewhere in this document.
- In-house technology, IT and GIS support all of which are essential to PSAP operations.
- Increased staffing for the fire service, particularly county fire departments.

In short, this alternative is more costly than the existing PSAP budgets combined, but the resulting service levels will be raised to meet best practices, equalize service levels among all responder agencies, and will create a PSAP that is operationally and technologically efficient and ready to move forward with the on-going technology evolution.

Implementation of a \$3.00 county surcharge would enable the PSAP to set aside funds for future system replacements, which is critical and expensive and potentially subsidize necessary equipment upgrades for county fire agencies.

The Option 2 staffing plan achieves cost savings by eliminating the recommended shift supervisor positions. Kimball recognizes that the costs of consolidation related expanded organizational structure can make moving forward not financially feasible. Rather than not move forward at all, this second option can be considered, but should be considered as a stepping stone to the recommended organizational structure.

8. ALTERNATIVE 2: KDPS, KCSO AND TKPD

Alternative 2 examines the organizational integration of the KDPS, KCSO and TKPD PSAPs. The consolidated PSAP is assumed to remain in the KDPS facility where the three PSAPs are currently co-located and sharing technology.

This alternative is assumed to be governed by a joint powers authority as discussed in the Governance section.

The following sections will discuss the needed technology, organizational structure, staffing needs and budget estimates. To keep duplication of information to a minimum, the methodologies used in this section are assumed to be the same as stated in Alternative 1 unless otherwise noted.

8.1 Technology Plan

8.1.1 Mobile Data

All of the current law enforcement agencies are currently utilizing mobile data computers to some degree. The use of mobile data in the fire services is not as prominent, other than Kalamazoo DPS. There are approximately 113 mobile data computers in use within all of the agencies through a single Intergraph mobile data server.

The three co-located Kalamazoo agencies are using Intergraph's integrated mobile data application, I/Mobile. They are using NetMotion software to help manage mobile data connectivity and provide a mobile virtual private network (VPN) solution. The software version currently being used is 8.1.2 but will be upgraded to the latest software release during the upcoming upgrade. The interface provides silent dispatch, message switching, status changes, field reporting, mobile mapping and for the police operations, LEIN/NCIC queries. Connectivity to the message switch is accomplished using a commercial radio vendor's wireless network; Sprint for DPS and the Township and Verizon Wireless for the County.

The following table provides an overview of the mobile data currently in use by each PSAP with number of MDCs and vendor names.

Mobile Data Unit Summary		
Agency	# of MDCs	Vendor
Kalamazoo DPS	54	Intergraph
Kalamazoo Co. Sheriff's Office	45	Intergraph
Township of Kalamazoo Police Department	14	Intergraph ²⁰
Total	113	

Table 66—Mobile Data Unit Summary

²⁰ Currently as shared technology in the Kalamazoo co-located facility.

The agencies are currently using the majority of the most common functions listed in the mobile data section with the exception of routing. Currently, there is variation in the in-vehicle hardware solutions currently in use from agency to agency. Each solution is meeting the needs of the agencies.

8.1.2 Technology Cost Estimates – Consolidation Alternative 2

The following table provides budgetary costs for new technology that will be needed to support the consolidated emergency communications center and these costs are currently based on a 10 position PSAP. The actual number of needed console positions cannot be determined until the staffing portion of the report is completed. Any change in the number of recommended positions would change the anticipated technology costs.

There are no hard or fast rules that apply to a consolidation project when it comes to who is the responsible party, either the agency(s) or the communications center, for a technology cost or a portion of the cost. This funding decision must be made locally and depends on a number of factors, such as, but not limited to; the technology, project participants, local politics, available funding, is the cost eligible using collected local fees or is there an effort to entice an agency, agencies or a discipline to participate in the consolidation project.

Alternative 2 - Required Technology Cost Estimates				
System	Description	Quantity	Individual Cost	Total Estimated Cost
CAD	Workstation Licenses	1	\$32,000	\$32,000
Radio	Radio Consoles	1	\$50,000	\$50,000
TOTAL				\$82,000

Table 67—Alternative 2 - Required Technology Cost Estimates

The following assumptions were used in calculating the above budgetary estimates:

- The technology systems used in the consolidated center would be:
 - CAD (Intergraph)
 - Mobile (Intergraph)
 - LERMS (Intergraph)
 - 9-1-1 (Cassidian Sentinel Patriot)
 - Radio Consoles (Motorola MCC7500)
 - Recorder (NICE Call Focus III)
- Kimball recommends that critical technology such as 9-1-1 answering equipment, radio consoles and CAD be installed at all the console positions. This provides the best operational model for the communications center, however that additional functionality or redundancy does add cost.
- All radio channels, talk groups, 9-1-1 trunks and phone lines would be individually recorded at the consolidated communications center.

The following table provides additional or optional costs for new technology that may or may not be needed to support the consolidated emergency communications center. These costs are dependent on if the project decision makers determine the need to implement an optional or recommended enhancement to a system.

Alternative 2 - Optional Technology Cost Estimates				
System	Description	Quantity	Individual Cost	Total Estimated Cost
CAD	EMD Interface	1	\$25,000	\$25,000
CAD	Fire Station Alerting Interface	1	\$20,000	\$20,000
CAD	Radio Tone Encoding Interface	1	\$20,000	\$20,000
CAD	Text/Alphanumeric Paging Interface	1	\$23,000	\$23,000
Mobile	Mobile Routing	139	\$1,000	\$139,000
Radio	Simulcast VHF	1	\$475,000	\$475,000
Master Clock	Redundant Master Clock Solution	1	\$20,000	\$20,000
TOTAL				\$722,000

Table 68—Alternative 2 - Optional Technology Cost Estimates

- EMD interface would only be needed if there was an operational change in the handling of medical calls and the consolidated center was going to provide EMD.
- CAD interfaces to station alerting, radio tone encoding, text/alphanumeric paging are recommended operational enhancements.
- Mobile routing is an operational recommendation.
- The simulcast VHF for fire paging is a technology recommendation to correct current system problems that were reported. This cost includes all new equipment for a five site system; transmitters, antenna systems, GPS timing and simulcast controller. It is possible that some existing equipment could be re-used lowering the cost of the project.
- Redundant master clock solution is an operational best practice recommendation.

8.2 Operational Plan

8.2.1 Organizational Structure

The recommended organizational structure and governance for this alternative is identical to Alternative 1 except where noted in the following sections.

8.2.2 Staffing

Using the methodology outlined in Alternative 1, the combined 9-1-1 call volume for KDPS, KCSO, and TKPD is 138,129. Using the 2:1 ratio discussed in the previous section for administrative and non-emergency calls the total call volume for the consolidated PSAP is 276,258. The sum of the 9-1-1 and 7 and 10 digit call volumes, 414,387, is the estimated total call volume for this alternative, as indicated in the following table.

Alternative 2 - Estimated Call Volume Summary				
PSAP	Total 9-1-1 or Emergency Calls	7/10 Digit Calls	Total Call Volume	Percentage of Total Call Volume
KDPS	73,433	146,866	220,299	53.16%
KCSO	52,189	104,378	156,567	37.78%
TKPD	12,507	25,014	37,521	9.05%
Total	138,129	276,258	414,387	100.00%

Table 69—Alternative 2 - Estimated Call Volume Summary

Total Alternative 2 staffing estimates are as follows:

Alternative 2 PSAP Staffing Estimates	
Position Title	Number of Employees
PSAP Director/Manager	1
Technology Manager	1
Shift Supervisors	5
Telecommunicators	55
GIS/IT Support	1
IT Support	2
Administrative Support	1
Total PSAP Staff Needed	66

Table 70—Alternative 2 - PSAP Staffing Estimates

8.2.3 Personnel Cost Estimates

Based on the assumptions in the prior sections, the estimated personnel count and costs for the new PSAP are listed in the following table.

Alternative 2 - Consolidated Center Staffing & Personnel Cost Summary					
Position Title	Number of Employees	Estimated Base Pay Per Position	Estimated Total Base Pay	Benefits @ 50%	Total
PSAP Director/Manager	1	\$85,000	\$85,000	\$42,500	\$127,500
Technology Manager	1	\$70,000	\$70,000	\$35,000	\$105,000
Shift Supervisors	5	\$64,480	\$322,400	\$161,200	\$483,600
Telecommunicators	55	\$45,801	\$2,519,055	\$1,259,528	\$3,778,583
GIS/IT Support	1	\$65,000	\$65,000	\$32,500	\$97,500
IT Support	2	\$65,000	\$130,000	\$65,000	\$195,000
Administrative Support	1	\$35,000	\$35,000	\$17,500	\$52,500
Total PSAP Staff Needed	66		\$3,226,455	\$1,613,228	\$4,839,683

Table 71—Alternative 2 - Consolidated PSAP Staffing and Cost Estimates

Payroll costs are based on the assumptions in Alternative 1 except those that pertain to Portage DPS and WMU as they are not included in this alternative.

8.3 Cost Analysis

This alternative reflects consolidation of the three agencies that are already co-located in the KDPS facility; KDPS, KCSO and TKPD. This section applies the combined estimated revenue against the estimated consolidated PSAP operating budget and initial technology and transition costs. The remaining unfunded costs will need to be distributed between the participants to fully fund the PSAP. The estimates are based on a total staff of 66. The capital cost estimates cover the additional CAD, radio, 9-1-1 workstations and other technology needs to reach ten positions as detailed in the technology plan. The estimated PSAP budget includes 24 x 7 maintenance on all CAD, radio and 9-1-1 equipment.

Kimball assumed that the State 9-1-1 Revenue for Portage DPS would be distributed directly to them and, therefore, is not included in the estimated revenue for this alternative. Kimball also assumed that the WMU surcharge revenue would continue to be distributed to KDPS for handling of wireless calls.

The following sections reflect the first two years of estimated costs and cost distribution at \$0.42 and \$3.00 surcharge levels.

8.3.1 Current PSAP Budget Summary

For ease of reference, the following table depicts a summary of the budgets for each of the PSAPs included in this alternative.

Current Combined PSAP Budget Summary			
	KDPS	KCSO	TKPD
Network Costs	\$50,174	\$19,000	\$5,000
Equipment Costs	\$81,380	\$8,805	\$350
CAD Costs	\$209,647	\$0	\$20,250
Radio Costs	\$60,697	\$0	\$4,000
Office Expenses	\$53,814	\$13,000	\$0
KDPS Annual Contract	\$0	\$197,631	\$66,082
Personnel Expenses	\$1,505,485	\$902,094	\$334,670
Sub-Totals	\$1,961,197	\$1,140,530	\$430,352
Revenue	\$619,450	\$182,188	\$41,617
Annual Net PSAP Costs	\$1,341,747	\$958,342	\$388,735
Combined Net PSAP Costs	\$2,688,824		

Table 72—Current Combined PSAP Budget Summary

8.3.2 Alternative 2 Cost Distribution Criteria Summary

The following table indicates the criteria used to determine the distribution of costs among the participating agencies.

Alternative 2 Cost Distribution Criteria Summary				
PSAP	2011 9-1-1 and Emergency Calls	Percentage of Total 9-1-1 and Emergency Calls	2010 Population	Agency % of Total Population
KDPS	73,433	53.16%	66,762	33.97%
KCSO	52,189	37.78%	106,055	53.96%
TKPD	12,507	9.05%	23,722	12.07%
Totals	138,129	100.00%	196,539	100.00%

Table 73—Alternative 2 - Cost Distribution Criteria Summary

8.3.3 Alternative 2 - .42 Surcharge Scenario

Year 1 – Inclusive of Technology Costs

Alternative 2 PSAP Budget and a \$0.42 County Surcharge – Year 1		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
Consolidation Technology/Transition Costs (Year 1 Only)	\$82,000	
		\$82,000
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$4,914,683	
Annual Operating Costs	\$653,570	
		\$5,568,253
Systems Replacement Reserve		
Annual Contributions - Systems Replacement		\$261,424
Total Expenses		\$5,911,677
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$371,930	
State Training Reimbursement	\$18,000	
<u>Estimated \$0.42 County Surcharge</u> – KDPS, TKPD and KCSO	\$921,218	
Total Revenue/Reimbursements		\$1,311,148
Remaining Unfunded PSAP/Technology Costs		\$4,600,529

Table 74—Alternative 2 - PSAP Budget and a \$0.42 County Surcharge – Year 1

The above table estimates the technology costs associated with consolidating the three co-located agencies and adds that to the estimated operating budget for the consolidated PSAP. Revenue and reimbursements for those three entities are then applied against that total to arrive at the amount that would need to be distributed among the PSAP participating agencies.

The following table takes the amount arrived at above and applies the cost distribution formula described in this report to arrive at the estimated contribution for each agency. Should a different cost distribution formula be used, the results are likely to be different.

Alternative 2 - \$0.42 Surcharge Cost Distribution – Year 1				
		KDPS	KCSO	TKPD
Unfunded PSAP Costs	\$4,600,529			
Component 1 - 9-1-1/Emergency Call Volume (50%)				
% of Total 9-1-1/Emergency Call Volume		53.16%	37.78%	9.05%
Call Volume Based Contribution		\$1,222,821	\$869,040	\$208,174
Component 2 - Service Area Population (50%)				
% of Total Service Area Population		29.67%	60.86%	9.48%
Population Based Contribution		\$682,488	\$1,399,941	\$218,065
Total Agency Contribution		\$1,905,309	\$2,268,981	\$426,239

Table 75—Alternative 2 - \$0.42 Surcharge Cost Distribution - Year 1

The following table compares the estimated Year 1 contribution to the existing PSAP budget for each agency. As indicated, all agencies will see an increase in costs. This is especially true for KCSO which would see an increase of ~\$1.3 million. The Year 1 estimate includes the one-time costs associated with consolidation.

Alternative 2 - \$0.42 Surcharge Cost Comparison – Year 1			
Agency	Current PSAP Budget*	Consolidated PSAP Contribution	Increase or Decrease
KDPS	\$1,341,747	\$1,905,309	+\$563,562
KCSO	\$958,342	\$2,268,981	+\$1,310,639
TKPD	\$388,735	\$426,239	+\$37,504
Total	\$2,688,824	\$4,600,529	+\$1,911,705
*Reflects net costs after revenue/reimbursements have been applied.			

Table 76—Alternative 2 - \$0.42 Surcharge Cost Comparison - Year 1

Year 2 – PSAP Operating and System Reserve Costs Only

In Year 2, the estimated costs drop to include only the operating budget and the annual contribution for systems and equipment replacement for the consolidated PSAP as seen in the table on the following page.

Alternative 2 PSAP Budget and a \$0.42 County Surcharge – Year 2		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$4,914,683	
Annual Operating Costs	\$653,570	
		\$5,568,253
Systems Replacement Reserve		
Annual Contributions - Systems Replacement		\$261,424
Total Expenses		\$5,829,677
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$371,930	
State Training Reimbursement	\$18,000	
Estimated County Surcharge [1]	\$921,218	
Total Revenue/Reimbursements		\$1,311,148
Remaining Unfunded PSAP/Technology Costs		\$4,518,529

Table 77—Alternative 2 - \$0.42 County Surcharge – Year 2

Alternative 2 - \$0.42 Surcharge Cost Distribution – Year 2				
		KDPS	KCSO	TKPD
Unfunded PSAP Costs	\$4,518,529			
Component 1 - 9-1-1/Emergency Call Volume (50%)				
% of Total 9-1-1/Emergency Call Volume		53.16%	37.78%	9.05%
Call Volume Based Contribution		\$1,201,025	\$853,550	\$204,463
Component 2 - Service Area Population (50%)				
% of Total Service Area Population		29.67%	60.86%	9.48%
Population Based Contribution		\$670,324	\$1,374,988	\$214,178
Total Agency Contribution		\$1,871,349	\$2,228,539	\$418,642

Table 78—Alternative 2 - \$0.42 Surcharge Cost Distribution – Year 2

The following table compares the estimated Year 2 contribution to the existing PSAP budget for each agency. As indicated, all agencies will see an increase in costs. This is especially true for KCSO which would see an increase of over \$1.2 million.

Alternative 2 - \$0.42 Surcharge Cost Comparison – Year 2			
Agency	Current PSAP Budget*	Consolidated PSAP Contribution	Increase or Decrease
KDPS	\$1,341,747	\$1,871,349	+\$529,602
KCSO	\$958,342	\$2,228,539	+\$1,270,197
TKPD	\$388,735	\$418,642	+\$29,907
Total	\$2,688,824	\$4,518,529	+\$1,829,705
*Reflects net costs after revenue/reimbursements have been applied.			

Table 79—Alternative 2 - \$0.42 Surcharge Cost Distribution – Year 2

8.3.4 Alternative 2 - 3.00 Surcharge Scenario

Year 1 – Inclusive of Technology Costs

In the second alternative for the second consolidation scenario a maximum \$3.00 county surcharge would cover the capital and recurring costs of the new PSAP and result in a budget balance of approximately one million dollars. This alternative would allow the participating agencies to set aside funds for future system replacements and upgrades, which are critical, as well as funds for a separate facility or renovation of new space for the PSAP, if desired.

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Alternative 2 PSAP Budget and a \$3.00 County Surcharge – Year 1		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
Consolidation Technology/Transition Costs (Year 1 Only)	\$82,000	
		\$82,000
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$4,914,683	
Annual Operating Costs	\$653,570	
		\$5,568,253
Systems Replacement Reserve		
Annual Contributions - Systems Replacement		\$261,424
Total Expenses		\$5,911,677
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$371,930	
State Training Reimbursement	\$18,000	
Estimated \$3.00 County Surcharge	\$6,580,126	
Total Revenue/Reimbursements		\$6,970,056
Budget Balance		\$1,058,379

Table 80—Alternative 2 - Estimated Budget Based on a \$3.00 County Surcharge -Year 1

In Year 2, the estimated costs drop to include only the operating budget and the annual contribution for systems and equipment replacement for the consolidated PSAP as seen in the following table.

Alternative 2 – Estimated PSAP Budget with a \$3.00 County Surcharge – Year 2		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$5,062,123	
Annual Operating Costs	\$673,177	
		\$5,735,300
Total Expenses		\$5,735,300
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$371,930	
State Training Reimbursement	\$18,000	
Estimated \$3.00 County Surcharge	\$6,580,126	
Total Revenue/Reimbursements		\$6,970,055
Budget Balance		\$1,234,755

Table 81—Alternative 2 - Estimated PSAP Budget with a \$3.00 County Surcharge - Year 2

8.4 Summary

In Kimball's opinion, a consolidation of the KDPS, KCSO and TKPD PSAPs is a logical step forward given that the PSAPs are already co-located in the KDPS facility. While consolidation provides many advantages as outlined in the body of this document, key improvements include:

- Raising the level of service provided to the county fire departments to the same level currently received by other law enforcement and fire agencies included in this plan.
- More efficient emergency communications system led by a manager that is able to focus solely on the delivery of 9-1-1 and dispatch services to the agencies served and the community.
- A common set of in-house PSAP procedures and cross training of employees would improve the efficiency of the single PSAP.
- Shift supervisors that are able to oversee PSAP operations 24/7 and help ensure that the necessary quality assurance and training is being provided to the telecommunicators rather than taking 9-1-1 calls and dispatching field personnel.
- Allows sworn personnel to focus on their key job functions rather than supervising or working within the PSAP which can result in in-direct cost savings.

The cost analysis associated with this consolidation alternative indicates that in the first year all participants will see cost increases when compared to existing PSAP budgets, in part due to one-time capital costs. However, it is critical to understand that a comparison of pre and post consolidation service levels is not an apples-to-apples comparison.

The consolidated PSAP includes a new organizational structure which includes:

- *Increased staffing for the fire service which will enable the PSAP to elevate service to the county fire agencies up to an acceptable level and improve fire fighter safety.*
- Establishment of separate shift supervisors which is in line with NFPA 1221 best practices.
- Establishment of a QA/QC program which is also in keeping with NENA and NFPA 1221 best practices. Although QA/QC for EMD is not necessary since EMS calls are transferred to 3rd party providers, a QA/QC program should be in place to ensure adherence to set call taking and dispatch standards.
- In-house technology, IT and GIS support all of which are essential to PSAP operations.

In short, this alternative is more costly than the existing PSAP budgets combined, but the resulting service levels will be raised to meet best practices, equalize service levels among all responder agencies, and will create a PSAP that is operationally and technologically efficient and ready to move forward with the on-going technology evolution.

Implementation of a \$3.00 county surcharge would enable the PSAP to set aside funds for future system replacements, which is critical and expensive and potentially subsidize necessary equipment upgrades for county fire agencies.

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9. ALTERNATIVE 3: KDPS, KCSO, TKPD AND PORTAGE DPS

9.1 Overview

Alternative 3 examines the physical consolidation and organizational integration of all of the business plan participants including the KDPS, KCSO, TKPD and Portage DPS. Based on discussions in other sections of the report, the consolidated PSAP is assumed to be housed in the KDPS facility where KDPS, KCSO and TKPD are currently co-located.

9.2 Technology Cost Estimates – Consolidation Alternative 3

The following table provides budgetary costs for new technology that will be needed to support the consolidated emergency communications center and these costs are currently based on a 12 position PSAP. The actual number of needed console positions cannot be determined until the staffing portion of the report is completed. Any change in the number of recommended positions would change the anticipated technology costs.

There are no hard or fast rules that apply to a consolidation project when it comes to who is the responsible party, either the agency(s) or the communications center, for a technology cost or a portion of the cost. This funding decision must be made locally and depends on a number of factors, such as, but not limited to; the technology, project participants, local politics, available funding, is the cost eligible using collected local fees or is there an effort to entice an agency, agencies or a discipline to participate in the consolidation project.

Alternative 3 - Required Technology Cost Estimates				
System	Description	Quantity	Individual Cost	Total Estimated Cost
CAD	Workstation Licenses	3	\$32,000	\$96,000
CAD	RMS Interface	1	\$20,000	\$20,000
Mobile	Mobile Licenses	24	\$4,000	\$96,000
LERMS	CAD Interface	1	\$20,000	\$20,000
9-1-1	Answering Positions	2	\$75,000	\$150,000
9-1-1	Network Costs	3	\$6,000	\$18,000
Radio	Radio Consoles	3	\$50,000	\$150,000
Radio	Radio Console Backroom	1	\$15,000	\$15,000
Radio	Radio Site Connectivity	4	\$4,000	\$16,000
Recorder	Additional Capacity	24	\$1,500	\$36,000
System Furniture/Chairs	Additional Positions	2	\$17,500	\$35,000
TOTAL				\$652,000

Table 82—Alternative 3 – Required Technology Cost Estimates

The following assumptions were used in calculating the above budgetary estimates:

- The technology systems used in the consolidated center would be:
 - CAD (Intergraph)
 - Mobile (Intergraph)
 - LERMS (agency current vendors)
 - 9-1-1 (Cassidian Sentinel Patriot)
 - Radio Consoles (Motorola MCC7500)
 - Recorder (NICE Call Focus III)
- Kimball recommends that critical technology such as 9-1-1 answering equipment, radio consoles and CAD be installed at all the console positions. This provides the best operational model for the communications center, however that additional functionality or redundancy does add cost.
- There is no need to upgrade any of the CAD server hardware.
- CAD interfaces to the New World LERMS will be needed.
- 24 new mobile data licenses will be needed for the City of Portage
- Mobile costs do not include any subscriber hardware or connectivity costs to the mobile server.
- The three 9-1-1 trunks that currently are in place in Portage would be moved to the consolidated center. The number of actual 9-1-1 trunks that will be needed in the consolidated center would not be determined until traffic studies are provided by the phone company. The possibility exists that additional trunks may not be needed.
- Radio connectivity to four additional radio systems for Portage DPS.
- All radio channels, talk groups, 9-1-1 trunks and phone lines would be individually recorded at the consolidated communications center.
- There are no estimated costs associated with data conversion. The cost for converting data varies significantly from vendor to vendor. Typically an in-depth analysis must be conducted before a price for data conversion can be estimated. Commonly, data conversion is expensive and the results are often unpredictable.

The following table provides additional or optional costs for new technology that may or may not be needed to support the consolidated emergency communications center. These costs are dependent on either of the two following factors:

1. The project decision makers determine the need to implement an optional or recommended enhancement to a system.
2. There are some costs listed in this table that could apply to the project, but they would only apply depending on a solution that is selected by an agency or the PSAP. In addition, there may be costs that would be applied to the project from this table that would result in costs from the required technology table being removed, and vice-versa. There could also be costs that may need to be adjusted based on decisions made by the City of Portage for various technology such as radio system and LERMS.

Alternative 3 - Recommended Technology Cost Estimates				
System	Description	Quantity	Individual Cost	Total Estimated Cost
CAD	EMD Interface	1	\$25,000	\$25,000
CAD	Fire Station Alerting Interface	1	\$20,000	\$20,000
CAD	Radio Tone Encoding Interface	1	\$20,000	\$20,000
CAD	Text/Alphanumeric Paging Interface	1	\$23,000	\$23,000
Mobile	Mobile Routing	163	\$1,000	\$163,000
LERMS	Workstation Licenses	10	\$1,500	\$15,000
Radio	MPSCS Site	1	\$750,000	\$750,000
Radio	Simulcast VHF	1	\$475,000	\$475,000
Master Clock	Redundant Master Clock Solution	1	\$20,000	\$20,000
TOTAL				\$1,511,000

Table 83—Alternative 3 – Recommended Technology Cost Estimates

- EMD interface would only be needed if there was an operational change in the handling of medical calls and the consolidated center was going to provide EMD.
- CAD interfaces to station alerting, radio tone encoding, text/alphanumeric paging are recommended operational enhancements.
- Mobile routing is an operational recommendation.
- LERMS licenses would only be needed if Portage changed RMS vendors. This would also impact the CAD interface pricing listed under Required Technology.
- The MPSCS site would only be needed if Portage decided to move to that radio system and it was determined that an additional radio site was needed. This would also impact radio connectivity costs listed under needed technology.
- No radio costs are included for agency subscriber units (mobiles, portables).
- The simulcast VHF for fire paging is a technology recommendation to correct current system problems that were reported. This cost includes all new equipment for a five site system; transmitters, antenna systems, GPS timing and simulcast controller. It is possible that some existing equipment could be re-used lowering the cost of the project.
- Redundant master clock solution is an operational best practice recommendation.

9.3 Operational Plan

9.3.1 Organizational Structure

The recommended organizational structure and governance models are identical to those in Alternative 1.

9.3.2 Staffing

Operationally, the staffing levels for this alternative are the same as Alternative 1. Even though WMU is included in Alternative 1 and not Alternative 3, the WMU call volume is not sufficient in volume to change staffing levels for either alternative. The following table provides a summary of the estimated staffing needs.

Alternative 3 - Consolidated Center Staffing & Personnel Cost Summary					
Position Title	Number of Employees	Estimated Base Pay Per Position	Estimated Total Base Pay	Benefits @ 50%	Total
PSAP Director/Manager	1	\$85,000	\$85,000	\$42,500	\$127,500
Deputy Director - Operations	1	\$70,000	\$70,000	\$35,000	\$105,000
Technology Manager	1	\$70,000	\$70,000	\$35,000	\$105,000
Shift Supervisors	5	\$64,480	\$322,400	\$161,200	\$483,600
Telecommunicators	60	\$45,801	\$2,748,060	\$1,374,030	\$4,122,090
GIS / IT Support	1	\$65,000	\$65,000	\$32,500	\$97,500
IT Support	2	\$65,000	\$130,000	\$65,000	\$195,000
Administrative Support	1	\$35,000	\$35,000	\$17,500	\$52,500
Total PSAP Staff Needed	72		\$3,525,460	\$1,762,730	\$5,288,190

Table 84—Alternative 3 – Consolidated Center Staffing and Personnel Cost Summary

9.4 Cost Analysis

This alternative reflects consolidation of the three PSAPs that are already co-located in the KDPS facility; KDPS, KCSO and TKPD and the Portage DPS PSAP. This section applies the combined estimated revenue against the estimated consolidated PSAP operating budget and initial technology and transition costs. The remaining unfunded costs will need to be distributed between the participants to fully fund the PSAP. The estimates are based on a total staff of 72. The capital cost estimates cover the additional CAD, radio, 9-1-1 workstations and other technology needs to reach ten positions as detailed in the technology plan. The estimated PSAP budget includes 24 x 7 maintenance on all CAD, radio and 9-1-1 equipment.

The following sections reflect the first two years of estimated costs and cost distribution at \$0.42 and \$3.00 surcharge levels.

For ease of reference, the following table summarizes the current budgets for the PSAPs included in this alternative.

Current Combined PSAP Budget Summary				
	KDPS	KCSO	TKPD	Portage DPS
Network Costs	\$50,174	\$19,000	\$5,000	\$2,000
Equipment Costs	\$81,380	\$8,805	\$350	\$17,400
CAD Costs	\$209,647	\$0	\$20,250	\$43,500
Radio Costs	\$60,697	\$0	\$4,000	\$36,000
Office Expenses	\$53,814	\$13,000	\$0	\$26,300
KDPS Annual Contract	\$0	\$197,631	\$66,082	\$0
Personnel Expenses	\$1,505,485	\$902,094	\$334,670	\$595,000
Sub-Totals	\$1,961,197	\$1,140,530	\$430,352	\$720,200
Revenue	\$619,450	\$182,188	\$41,617	\$86,205
Annual Net PSAP Costs	\$1,341,747	\$958,342	\$388,735	\$633,995
Combined Net PSAP Costs	\$3,322,819			

Table 85—Current Combined PSAP Budget Summary

9.4.1 Alternative 3 Cost Distribution Criteria Summary

The following table indicates the criteria used to determine the distribution of costs among the participating agencies.

Alternative 3 Cost Distribution Criteria Summary				
PSAP	2011 9-1-1/ Emergency Calls	Percentage of Total 9-1-1/ Emergency Calls	2010 Population	Agency % of Total Population
KDPS	73,433	44.05%	66,762	27.49%
KCSO	52,189	31.31%	106,055	43.67%
TKPD	12,507	7.50%	23,722	9.77%
Portage DPS	28,565	17.14%	46,292	19.06%
Totals	166,694	100.00%	242,831	100.00%

Table 86—Alternative 3 - Cost Distribution Criteria Summary

9.4.2 Alternative 3 - .42 Surcharge Scenario

Year 1 – Inclusive of Technology Costs

Alternative 3 PSAP Budget and a \$.42 Surcharge - Year 1		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
Consolidation Technology/Transition Costs (Year 1 Only)	\$652,000	
		\$652,000
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$5,288,190	
Annual Operating Costs	\$850,714	
		\$6,138,904
Systems Replacement Reserve		
Annual Contribution - Systems Replacement		\$261,424
Total Expenses		\$7,052,328
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$458,135	
State Training Reimbursement	\$18,000	
Estimated \$.42 County Surcharge	\$1,138,197	
Total Revenue/Reimbursements		\$1,614,332
Remaining Unfunded PSAP/Technology Costs		\$5,437,996

Table 87—Alternative 3 - \$.42 County Surcharge – Year 1

The above table estimates the technology costs associated with consolidating the four agencies and adds that to the estimated operating budget for the consolidated PSAP. Revenue and reimbursements for those four entities are then applied against that total to arrive at the amount that would need to be distributed among the PSAP participating agencies.

The following table takes the amount arrived at above and applies the cost distribution formula described in this report to arrive at the estimated contribution for each agency. Should a different cost distribution formula be used, the results are likely to be different.

Alternative 3 - \$0.42 Surcharge Cost Distribution – Year 1					
		KDPS	KCSO	TKPD	Portage DPS
Unfunded PSAP Costs	\$5,437,996				
Component 1 - 9-1-1 / Emergency Call Volume (50%)					
% of Total 9-1-1/Emergency Call Volume		44.05%	31.31%	7.50%	17.14%
Call Volume Based Contribution		\$1,197,719	\$851,318	\$203,925	\$466,036
Component 2 - Service Area Population (50%)					
% of Total Service Area Population		27.49%	43.67%	9.77%	19.06%
Population Based Contribution		\$747,453	\$1,187,386	\$265,646	\$518,241
Total Agency Contribution		\$1,945,171	\$2,038,705	\$469,571	\$984,277

Table 88—Alternative 3 - \$0.42 Surcharge Cost Distribution - Year 1

The following table compares the estimated Year 1 contribution to the existing PSAP budget for each agency. As indicated, all agencies will see an increase in costs. This is especially true for KCSO which would see an increase of ~\$1,000,000. The Year 1 estimate includes the one-time costs associated with consolidation.

Alternative 3 - \$0.42 Surcharge Cost Comparison – Year 1			
Agency	Current PSAP Budget*	Consolidated PSAP Contribution	Increase or Decrease (+/-)
KDPS	\$1,341,747	\$1,945,171	+\$603,424
KCSO	\$958,342	\$2,038,705	+\$1,080,363
TKPD	\$388,735	\$469,571	+\$80,836
Portage DPS	\$633,995	\$984,277	+\$350,282
Total	\$3,322,819	\$5,437,724	+\$1,853,753
*Reflects net costs after revenue/reimbursements have been applied.			

Table 89—Alternative 3 - \$0.42 Surcharge Cost Comparison - Year 1

Year 2 – PSAP Operating and Systems Replacement Reserve Costs Only

In Year 2, based on the assumption that start-up capital costs occur in Year 1 only, the estimated costs drop to include only the operating budget for the consolidated PSAP as seen in the following table:

Alternative 3 PSAP Budget and a \$.42 Surcharge - Year 2		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$5,288,190	
Annual Operating Costs	\$850,714	
		\$6,138,904
Systems Replacement Reserve		
Annual Contribution - Systems Replacement		\$261,424
Total Expenses		\$6,400,328
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$458,135	
State Training Reimbursement	\$18,000	
Estimated \$.42 County Surcharge	\$1,138,197	
Total Revenue/Reimbursements		\$1,614,332
Remaining Unfunded PSAP/Technology Costs		\$4,785,996

Table 90—Alternative 3 - PSAP Budget and a \$.42 Surcharge – Year 2

Alternative 3 - \$.42 Surcharge Cost Distribution – Year 2					
		KDPS	KCSO	TKPD	Portage DPS
Unfunded PSAP Costs	\$4,785,996				
Component 1 - 9-1-1/Emergency Call Volume (50%)					
% of Total 9-1-1/Emergency Call Volume		44.05%	31.31%	7.50%	17.14%
Call Volume Based Contribution		\$1,054,116	\$749,248	\$179,475	\$410,160
Component 2 - Service Area Population (50%)					
% of Total Service Area Population		27.49%	43.67%	9.77%	19.06%
Population Based Contribution		\$657,835	\$1,045,022	\$233,796	\$456,105
Total Agency Contribution		\$1,711,951	\$1,794,270	\$413,271	\$866,265

Table 91—Alternative 3 - \$.42 Surcharge Cost Distribution – Year 2

The following table compares the estimated Year 2 contribution to the existing PSAP budget for each agency. As indicated, all agencies except for Kalamazoo Township will see an increase in costs. This is especially true for KCSO which would see an increase of \$866,265.

Alternative 3 - \$0.42 Surcharge Cost Comparison - Year 2			
Agency	Current PSAP Budget**	Consolidated PSAP Contribution	Increase or Decrease (+/-)
KDPS	\$1,382,000	\$1,711,951	+\$329,951
KCSO	\$987,092	\$1,794,270	+\$807,178
TKPD	\$400,397	\$413,271	+\$12,874
Portage DPS	\$653,014	\$866,265	+\$213,251
Total	\$3,703,508	\$4,785,757	\$1,082,249
*Reflects net costs after revenue/reimbursements have been applied.			
**Current PSAP budgets are increased 3% to reflect personnel and operating cost increases.			

Table 92—Alternative 3 - \$0.42 Surcharge Cost Comparison – Year 2

9.4.3 Alternative 3 - 3.00 Surcharge Scenario

Year 1 – Inclusive of Technology Costs

In the second alternative for the third consolidation scenario a maximum \$3.00 county surcharge would cover the capital and recurring costs of the new PSAP and result in a budget balance of approximately \$1.5 million dollars in Year 1. This alternative would allow the participating agencies to set aside funds for future system replacements and upgrades, which are critical, as well as funds for a separate facility for the PSAP, if desired.

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Alternative 3 PSAP Budget and a \$3.00 Surcharge - Year 1		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
Consolidation Technology/Transition Costs (Year 1 Only)	\$652,000	
		\$652,000
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$5,288,190	
Annual Operating Costs	\$850,714	
		\$6,138,904
Systems Replacement Reserve		
Annual Contribution - Systems Replacement		\$261,424
Total Expenses		\$7,052,328
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$458,135	
State Training Reimbursement	\$18,000	
Estimated \$03.00 County Surcharge	\$8,129,982	
Total Revenue/Reimbursements		\$8,606,117
Budget Balance		\$1,553,789

Table 93—Alternative 3 - Estimated Budget with a \$3.00 Surcharge – Year 1

In Year 2, the estimated costs drop to include only the operating budget and systems replacement costs resulting in a budget balance of ~\$2.2 million for the consolidated PSAP as seen in the following table.

Alternative 3 PSAP Budget and a \$3.00 Surcharge - Year 2		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$5,288,190	
Annual Operating Costs	\$850,714	
		\$6,138,904
Systems Replacement Reserve		
Annual Contribution - Systems Replacement		\$261,424
Total Expenses		\$6,400,328
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$458,135	
State Training Reimbursement	\$18,000	
Estimated \$3.00 County Surcharge	\$8,129,982	
Total Revenue/Reimbursements		\$8,606,117
Budget Balance		\$2,205,789

Table 94—Alternative 3 - \$3.00 County Surcharge – Year 2

9.5 Summary

It is Kimball's opinion, a consolidation of KDPS, KCSO, TKPD and Portage DPS would provide substantial service level improvements. While consolidation provides many advantages as outlined in the body of this document, key improvements include:

- Raising the level of service provided to the county fire departments to the same level currently received by other law enforcement and fire agencies included in this plan.
- More efficient emergency communications system led by a manager that is able to focus solely on the delivery of 9-1-1 and dispatch services to the agencies served and the community.
- Would provide a single point of control during major, regional incidents or incidents that cross jurisdictional boundaries, which allows for improved coordination and response among multiple agencies.
- Shift supervisors that are able to oversee PSAP operations 24x7 and help ensure that the necessary quality assurance and training is being provided to the telecommunicators rather than taking 9-1-1 calls and dispatching field personnel.
- Allows sworn personnel to focus on their key job functions rather than supervising the PSAP which can result in in-direct cost savings.

The cost analysis associated with this consolidation alternative indicates that in the first year all participants will see cost increases when compared to existing PSAP budgets, in part due to one-time capital costs. However, it is critical to understand that a comparison of pre and post consolidation service levels is not an apples-to-apples comparison. The consolidated PSAP includes a new organizational structure which includes:

- Establishment of separate shift supervisors which is in line with NFPA 1221 best practices as cited elsewhere in this document.
- In-house technology, IT and GIS support all of which are essential to PSAP operations.
- Increased staffing for the fire service, particularly county fire departments.

In short, this alternative is more costly than the four existing PSAP budgets combined, but the resulting service levels will be raised to meet best practices, equalize service levels among all responder agencies, and will create a PSAP that is operationally and technologically efficient and ready to move forward with the on-going technology evolution.

Implementation of a \$3.00 county surcharge would enable the PSAP to set aside funds for future system replacements, which is critical and expensive and potentially subsidize necessary equipment upgrades for county fire agencies.

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10. ALTERNATIVE 4: KDPS KCSO, TKPD AND WMU

10.1 Overview

This consolidation alternative includes the organizational integration of the KDPS, KCSO and TKPD PSAPs which are already co-located in the KDPS facility. as well as WMU.

10.2 Technology Plan Cost Estimates

The following table provides budgetary costs for new technology that will be needed to support the consolidated emergency communications center and these costs are currently based on a 10 position PSAP. The actual number of needed console positions cannot be determined until the staffing portion of the report is completed. Any change in the number of recommended positions would change the anticipated technology costs.

There are no hard or fast rules that apply to a consolidation project when it comes to who is the responsible party, either the agency(s) or the communications center, for a technology cost or a portion of the cost. This funding decision must be made locally and depends on a number of factors, such as, but not limited to; the technology, project participants, local politics, available funding, is the cost eligible using collected local fees or is there an effort to entice an agency, agencies or a discipline to participate in the consolidation project.

Alternative 4 - Required Technology Cost Estimates				
System	Description	Quantity	Individual Cost	Total Estimated Cost
CAD	Workstation Licenses	1	\$32,000	\$32,000
CAD	RMS Interface	1	\$20,000	\$20,000
Mobile	Mobile Licenses	9	\$4,000	\$36,000
LERMS	CAD Interface	1	\$20,000	\$20,000
9-1-1	Network Costs	2	\$3,600	\$7,200
9-1-1	Answering Positions	1	\$75,000	\$75,000
Radio	Radio Consoles	1	\$50,000	\$50,000
Radio	Radio Console Backroom	1	\$15,000	\$15,000
Recorder	Additional Capacity	24	\$1,500	\$36,000
System Furniture	Workstation	1	\$17,500	\$17,500
TOTAL				\$308,700

Table 95—Alternative 4 – Required Technology Cost Estimates

The following assumptions were used in calculating the above budgetary estimates:

- The technology systems used in the consolidated center would be:
 - CAD (Intergraph)

- Mobile (Intergraph)
- LERMS (agency current vendors)
- 9-1-1 (Cassidian Sentinel Patriot)
- Radio Consoles (Motorola MCC7500)
- Recorder (NICE Call Focus III)
- Kimball recommends that critical technology such as 9-1-1 answering equipment, radio consoles and CAD be installed at all the console positions. This provides the best operational model for the communications center, however that additional functionality or redundancy does add cost.
- There is no need to upgrade any of the CAD server hardware.
- CAD interfaces the ID Networks LERMS will be needed.
- 9 new mobile data licenses will be needed for WMU
- Mobile costs do not include any subscriber hardware or connectivity costs to the mobile server.
- Radio connectivity to the WMU radio systems.
- All radio channels, talk groups, 9-1-1 trunks and phone lines would be individually recorded at the consolidated communications center.
- There are no estimated costs associated with data conversion. The cost for converting data varies significantly from vendor to vendor. Typically an in-depth analysis must be conducted before a price for data conversion can be estimated. Commonly, data conversion is expensive.

The following table provides additional or optional costs for new technology that may or may not be needed to support the consolidated emergency communications center. These costs are dependent on either of the two following factors:

1. Optional and/or recommended enhancements are decided up.
2. There are some costs listed in this table that could apply to the project, but they would only apply depending on a solution that is selected by an agency or the PSAP. In addition, there may be costs that would be applied to the project from this table that would result in costs from the required technology table being removed, and vice-versa. There could also be costs that may need to be adjusted based on decisions made by WMU on various different solutions such as radios systems and LERMS.

Alternative 4 - Recommended Technology Cost Estimates				
System	Description	Quantity	Individual Cost	Total Estimated Cost
CAD	EMD Interface	1	\$25,000	\$25,000
CAD	Fire Station Alerting Interface	1	\$20,000	\$20,000
CAD	Radio Tone Encoding Interface	1	\$20,000	\$20,000
CAD	Text/Alphanumeric Paging Interface	1	\$23,000	\$23,000
Mobile	Mobile Routing	139	\$1,000	\$139,000
LERMS	Workstation Licenses	5	\$1,500	\$7,500
Radio	Simulcast VHF	1	\$475,000	\$475,000
Master Clock	Redundant Master Clock Solution	1	\$20,000	\$20,000
TOTAL				\$729,500

Table 96—Alternative 4 – Recommended Technology Cost Estimates

- EMD interface would only be needed if there was an operational change in the handling of medical calls and the consolidated center was going to provide EMD.
- CAD interfaces to station alerting, radio tone encoding, text/alphanumeric paging are recommended operational enhancements.
- Mobile routing is an operational recommendation.
- LERMS licenses would only be needed if WMU changed RMS vendors. This would also impact the CAD interface pricing listed under Required Technology.
- No radio costs are included for agency subscriber units (mobiles, portables).
- The simulcast VHF for fire paging is a technology recommendation to correct current system problems that were reported. This cost includes all new equipment for a five site system; transmitters, antenna systems, GPS timing and simulcast controller. It is possible that some existing equipment could be re-used lowering the cost of the project.
- Redundant master clock solution is an operational best practice recommendation.
- The radio costs do not include any costs for agency subscriber units (mobiles, portables).

10.3 Operational Plan

10.3.1 Organizational Structure

The organizational structure for this alternative is identical to Alternative 2 except where noted.

10.3.2 Staffing

The staffing estimates for this alternative are identical to Alternative 2 as the workload associated with WMU would not be sufficient enough to need additional staffing.

10.4 Cost Analysis

10.4.1 Current PSAP Budget Summary

For ease of reference, the following table is a summary of the existing PSAP budgets included in this alternative.

Current Combined PSAP Budget Summary				
	KDPS	KCSO	TKPD	WMU
Network Costs	\$50,174	\$19,000	\$5,000	\$0
Equipment Costs	\$81,380	\$8,805	\$350	\$0
CAD Costs	\$209,647	\$0	\$20,250	\$36,649
Radio Costs	\$60,697	\$0	\$4,000	\$4,000
Office Expenses	\$53,814	\$13,000	\$0	\$4,311
KDPS Annual Contract	\$0	\$197,631	\$66,082	\$0
Personnel Expenses	\$1,505,485	\$902,094	\$334,670	\$227,860
Sub-Totals	\$1,961,197	\$1,140,530	\$430,352	\$272,820
Revenue	\$619,450	\$182,188	\$41,617	\$0
Annual Net PSAP Costs	\$1,341,747	\$958,342	\$388,735	\$272,820
Combined Net PSAP Costs	\$2,961,644			

Table 97—Current Combined PSAP Budget Summary

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10.4.2 Alternative 4 - \$0.42 Surcharge Cost Analysis

Year 1 – Inclusive of Technology Costs

Alternative 4 Estimated Budget with a \$0.42 Surcharge – Year 1		
Consolidation Costs / PSAP Budget	Costs	Extended Costs
Consolidation Technology/Transition Costs (Year 1 Only)	\$308,700	
		\$308,700
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$4,839,683	
Annual Operating Costs	\$701,770	
		\$5,541,453
Systems Replacement Reserve		
Annual Contribution - Systems Replacement		\$261,424
Total Expenses		\$6,111,577
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$371,930	
State Training Reimbursement	\$18,000	
Estimated \$0.42 County Surcharge	\$956,372	
Total Revenue/Reimbursements		\$1,346,302
Remaining Unfunded PSAP/Technology Costs		\$4,765,275

Table 98— Alternative 4 - Estimated Budget with a \$0.42 Surcharge – Year 1

The above table estimates the technology costs associated with consolidating the four agencies and adds that to the estimated operating budget for the consolidated PSAP. Revenue and reimbursements for those four entities are then applied against that total to arrive at the amount that would need to be distributed among the PSAP participating agencies.

The following table takes the amount arrived at above and applies the cost distribution formula described in this report to arrive at the estimated contribution for each agency. Should a different cost distribution formula be used, the results are likely to be different.

Alternative 4 - Cost Distribution – Year One \$0.42					
		KDPS	KCSO	TKPD	WMU
Unfunded PSAP Costs	\$4,765,275				
Component 1 - 9-1-1/Emergency Call Volume (50%)					
% of Total 9-1-1/Emergency Call Volume		47.15%	33.51%	8.03%	11.31%
Call Volume Based Contribution		\$1,123,359	\$798,374	\$191,329	\$269,577
Component 2 - Service Area Population (50%)					
% of Total Service Area Population		32.72%	51.98%	11.63%	3.67%
Population Based Contribution		\$779,604	\$1,238,443	\$277,010	\$87,580
Total Agency Contribution		\$1,902,963	\$2,036,816	\$468,339	\$357,157

Table 99—Alternative 4 - \$0.42 Surcharge Cost Distribution - Year 1

The following table compares the estimated Year 1 contribution to the existing PSAP budget for each agency. As indicated, all agencies will see an increase in costs. This is especially true for KCSO which would see an increase of over \$1 million. The Year 1 estimate includes the one-time costs associated with consolidation.

Alternative 4 - \$0.42 Surcharge Cost Comparison – Year 1			
Agency	Current PSAP Budget*	Consolidated PSAP Contribution	Increase or Decrease + or -
KDPS	\$1,341,747	\$1,903,013	+\$561,266
KCSO	\$958,342	\$2,036,917	+\$1,078,575
TKPD	\$388,735	\$468,427	+\$79,692
WMU	\$272,820	\$356,919	+\$84,099
Total	\$2,961,644	\$4,765,275	+\$1,803,631
*Reflects net costs after revenue/reimbursements have been applied.			

Table 100—Alternative 4 - Cost Comparison \$0.42 Surcharge - Year 1

Year 2 – PSAP Operating and Systems Replacement Contribution Costs Only

In Year 2, the estimated costs drop to include only the operating budget for the consolidated PSAP as seen in the following table.

Alternative 4 Estimated Budget with a \$0.42 County Surcharge – Year 2		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$4,984,873	
Annual Operating Costs	\$722,823	
		\$5,707,696
Systems Replacement Reserve		
Annual Contribution - Systems Replacement		\$261,424
Total Expenses		\$5,969,120
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$371,930	
State Training Reimbursement	\$18,000	
Estimated \$0.42 County Surcharge	\$956,372	
Total Revenue/Reimbursements		\$1,346,301
Remaining Unfunded PSAP/Technology Costs		\$4,622,819

Table 101—Alternative 4 - Estimated Budget with a \$0.42 County Surcharge – Year 2

Alternative 4 - Cost Distribution \$0.42 Surcharge – Year 2					
		KDPS	KCSO	TKPD	WMU
Unfunded PSAP Costs	\$4,622,819				
Component 1 - 9-1-1/Emergency Call Volume (50%)					
% of Total 9-1-1/Emergency Call Volume		47.15%	33.51%	8.03%	11.31%
Call Volume Based Contribution		\$1,123,359	\$774,506	\$185,609	\$261,518
Component 2 - Service Area Population (50%)					
% of Total Service Area Population		32.72%	51.98%	11.63%	3.67%
Population Based Contribution		\$756,298	\$1,201,420	\$268,729	\$84,962
Total Agency Contribution		\$1,846,074	\$1,975,926	\$454,338	\$346,480

Table 102—Alternative 4 - \$0.42 Surcharge Cost Distribution – Year 2

The following table compares the estimated Year 2 contribution to the existing PSAP budget for each agency. As indicated, all agencies will see an increase in costs with the exception of Kalamazoo Township. This is especially true for KCSO which would see an increase of over \$917,000.

Alternative 4 - \$0.42 Surcharge Cost Comparison - Year 2			
Agency	Current PSAP Budget**	Consolidated PSAP Contribution	Increase or Decrease + or -
KDPS	\$1,341,747	\$1,846,074	+\$504,327
KCSO	\$958,342	\$1,975,926	+\$1,017,584
TKPD	\$388,735	\$454,338	+\$65,603
WMU	\$272,820	\$346,480	+\$73,660
Total	\$2,961,644	\$4,622,819	\$1,661,175
*Reflects net costs after revenue/reimbursements have been applied.			
**Current PSAP budgets are increased 3% to reflect personnel and operating cost increases			

Table 103—Alternative 4 - \$0.42 Surcharge Cost Distribution – Year 2

10.4.3 Alternative 4 - \$3.00 Surcharge Cost Analysis

Year 1 – Inclusive of Technology Costs

In the second alternative for the fourth consolidation scenario a maximum \$3.00 county surcharge would cover the capital and recurring costs of the new PSAP and result in a budget balance of approximately 1.8 million dollars. This alternative would allow the participating agencies to set aside funds for future system replacements and upgrades, which are critical, as well as funds for a separate facility for the PSAP, if desired.

Alternative 4 Estimated Budget with a \$3.00 Surcharge – Year 1		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
Consolidation Technology/Transition Costs -Year 1 Only	\$308,700	
		\$308,700
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$4,839,683	
Annual Operating Costs	\$701,770	
		\$5,850,153
Systems Replacement Reserve		
Annual Contribution - Systems Replacement		\$261,424
Total Expenses		\$6,111,577
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$371,930	
State Training Reimbursement	\$18,000	
Estimated \$3.00 County Surcharge	\$6,831,226	
Total Revenue/Reimbursements		\$7,221,155
Budget Balance		\$1,109,579

Table 104—Alternative 4 - Estimated Budget with a \$3.00 Surcharge – Year 2

In Year 2, the estimated costs drop to include only the operating budget and annual contribution for systems replacements for the consolidated PSAP as seen in the following table.

Alternative 4 Estimated Budget with a \$3.00 Surcharge – Year 2		
Consolidation Costs/PSAP Budget	Costs	Extended Costs
PSAP Operating Budget		
Personnel Costs (Salaries, wages, benefits)	\$4,984,873	
Annual Operating Costs	\$722,823	
		\$5,707,696
Systems Replacement Reserve		
Annual Contribution - Systems Replacement		\$261,424
Total Expenses		\$5,969,120
Revenue/Reimbursements	Amount	
State 9-1-1 Fee	\$371,930	
State Training Reimbursement	\$18,000	
Estimated \$3.00 County Surcharge	\$6,831,226	
Total Revenue/Reimbursements		\$7,221,155
Budget Balance		\$1,252,035

Table 105—Alternative 4 - Estimated Budget with a \$3.00 Surcharge – Year 2

10.5 Summary

In Kimball's opinion, a consolidation of the KDPS, KCSO, TKPD and WMU PSAPs is a logical step forward given that the PSAPs are already co-located in the KDPS facility. While consolidation provides many advantages as outlined in the body of this document, key improvements include:

- Raising the level of service provided to the county fire departments to the same level currently received by other law enforcement and fire agencies included in this plan.
- More efficient emergency communications system led by a manager that is able to focus solely on the delivery of 9-1-1 and dispatch services to the agencies served and the community.
- A common set of in-house PSAP procedures and cross training of employees would improve the efficiency of the single PSAP.
- Shift supervisors that are able to oversee PSAP operations 24x7 and help ensure that the necessary quality assurance and training is being provided to the telecommunicators rather than taking 9-1-1 calls and dispatching field personnel.
- Allows sworn personnel to focus on their key job functions rather than supervising or working within the PSAP which can result in in-direct cost savings.

The cost analysis associated with this consolidation alternative indicates that in the first year all participants will see cost increases when compared to existing PSAP budgets, in part due to one-time capital costs. However, it is critical to understand that a comparison of pre and post consolidation service levels is not an apples-to-apples comparison.

The consolidated PSAP includes a new organizational structure which includes:

- Increased staffing for the fire service which will enable the PSAP to elevate service to the county fire agencies up to an acceptable level and improve fire fighter safety.
- Establishment of separate shift supervisors which is in line with NFPA 1221 best practices.
- Establishment of a QA/QC program which is also in keeping with NENA and NFPA 1221 best practices. Although QA/QC for EMD is not necessary since EMS calls are transferred to third party providers, a QA/QC program should be in place to ensure adherence to set call taking and dispatch standards.
- In-house technology, IT and GIS support all of which are essential to PSAP operations.

In short, this alternative is more costly than the existing PSAP budgets combined, but the resulting service levels will be raised to meet best practices, equalize service levels among all responder agencies, and will create a PSAP that is operationally and technologically efficient and ready to move forward with the on-going technology evolution.

Implementation of a \$3.00 county surcharge would enable the PSAP to set aside funds for future system replacements, which is critical and expensive and potentially subsidize necessary equipment upgrades for county fire agencies

Throughout the data collection process the question of WMU's ability to consolidate was raised given the unique nature of some of the tasks handled by WMU Public Safety. Although WMU Public Safety does handle, in addition to on-campus emergencies, a wide variety of tasks unique to the university environment, it is Kimball's opinion that the majority of these tasks could be managed from a consolidated PSAP. Only tasks that require face-to-face with staff other than a Public Safety officer could not be accommodated. The installation of a direct connect phone in the entrance or foyer to the campus public safety office could be used to request the services of an officer for the vast majority of tasks. For example, when a student has locked him or herself out of a building, the student would pick up the phone in the foyer and be connected directly with the consolidated PSAP. The PSAP then takes the information and dispatches a campus officer to meet the student. All police departments handle non emergencies and WMU is no different although the non-emergencies may be of a more unique nature than the other police departments in this study.

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11. ALTERNATIVE 5: SHARED TECHNOLOGY

11.1 Overview

Shared technology refers to the joint purchase by participating agencies usage of key PSAP systems such as 9-1-1 answering equipment, CAD, and radio consoles. Although not actually a PSAP consolidation in the same manner as the other alternatives, sharing of space and creation of a single organization, this alternative does offer participants some consolidation benefits including:

- Potential cost efficiencies by purchasing single systems for use by all participants rather than separate systems for each PSAP.
- Improved situational awareness through a shared CAD system.
- Improved interoperability if a single radio system was used. Cost efficiencies associated with a collective purchase of radio consoles would be achievable even if separate radio systems are used.

11.1.1 Alternative 5 – Shared Technology Cost Estimates

The following table provides budgetary costs for new technology that will be needed to support the shared technology option and these costs are currently based on the number of existing positions installed at the participating agencies. Any change in the number of positions at an agency could change the anticipated technology costs.

The funding of shared technology costs should be discussed and agreed upon by the participating agencies early in the project. A decision will have to be made as to which costs will be paid by the shared technology consortium and which cost will be the responsibility of the specific agencies. This funding decision must be made locally and depends on a number of factors, such as, but not limited to; the technology, project participants, local politics, available funding and if a cost is eligible using collected local fees.

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Alternative 5 - Required Technology Cost Estimates				
System	Description	Quantity	Individual Cost	Total Estimated Cost
CAD	Workstation Licenses	5	\$32,000	\$160,000
CAD	RMS Interface	2	\$20,000	\$40,000
Mobile	Mobile Licenses	33	\$4,000	\$132,000
LERMS	CAD Interface	2	\$20,000	\$40,000
9-1-1	Answering Positions	5	\$75,000	\$375,000
9-1-1	Network Costs	3	\$6,000	\$18,000
9-1-1	Remote MIS Client Licenses	5	\$2,500	\$12,500
Radio	Radio Consoles	5	\$50,000	\$250,000
Radio	Radio Console Backroom	3	\$15,000	\$45,000
Radio	Radio Connectivity	5	\$4,000	\$20,000
Recorder	Remote Client Licenses	5	\$2,500	\$12,500
Recorder	Additional Capacity	36	\$1,500	\$54,000
Network	IP Connectivity - Primary	2	\$30,000	\$60,000
Network	IP Connectivity - Secondary	2	\$24,000	\$48,000
TOTAL				\$1,267,000

Table 106—Alternative 5 - Cost Estimates for Required Technology

The following assumptions were used in calculating the above budgetary estimates:

- The technology systems used in the shared technology option would be:
 - CAD (Intergraph)
 - Mobile (Intergraph)
 - LERMS (agency current vendors)
 - 9-1-1 (Cassidian Sentinel Patriot)
 - Radio Consoles (Motorola MCC7500)
 - Recorder (NICE Call Focus III)
- Kimball recommends that critical technology be installed at all the console positions in all the PSAPs. This provides the best public safety communications operational model; however this additional functionality or redundancy does add cost.
- There is no need to upgrade any of the CAD server hardware.
- CAD interfaces to the New World LERMS and ID Networks LERMS will be needed.
- Thirty-three new mobile data licenses will be needed including 24 for Portage and 9 for WMU
- Mobile costs do not include any subscriber hardware or connectivity costs to the mobile server.

- The three 9-1-1 trunks that currently are in place in Portage would be moved to the location of the shared technology back-room equipment. The number of actual 9-1-1 trunks that will be needed would not be determined until traffic studies are provided by the phone company. Additional trunks may not be needed.
- All existing ten-digit phone lines and extensions will be installed, migrated or forwarded to the shared technology back-room equipment.
- The need for radio connectivity to five radio systems/base stations for the Portage DPS and WMU.
- A fiber network currently exists between the participating agencies and anticipated costs would only include costs for routing equipment on each end to maintain a secure VPN. No extensive construction costs to extend the fiber would be needed on either end of the fiber.
- All radio channels, talk groups, 9-1-1 trunks and phone lines would be individually recorded at the shared technology back-room equipment location.
- There are no estimated costs associated with data conversion. The cost for converting data varies significantly from vendor to vendor. Typically an in-depth analysis must be conducted before a price for data conversion can be estimated. Commonly, data conversion is expensive.

The following table provides additional or optional costs for new technology that may or may not be needed to support the shared technology project. These costs are dependent on either of the two following factors:

1. The project decision makers determine the need to implement an optional or recommended enhancement to a system.
2. There are some costs listed in this table that could apply to the project, but they would only apply depending on a solution that is selected by an agency or the PSAP. In addition, there may be costs that would be applied to the project from this table that would result in costs from the required technology table being removed, and vice-versa. There could also be costs that may need to be adjusted based on the number of agencies that select an option; for example if one agency decides to make a change but another does not.

Alternative 5 - Recommended Technology Cost Estimates				
System	Description	Quantity	Individual Cost	Total Estimated Cost
CAD	EMD Interface	1	\$25,000	\$25,000
CAD	Fire Station Alerting Interface	1	\$20,000	\$20,000
CAD	Radio Tone Encoding Interface	1	\$20,000	\$20,000
CAD	Text/Alphanumeric Paging Interface	1	\$23,000	\$23,000
Mobile	Mobile Routing	172	\$1,000	\$172,000
LERMS	Workstation Licenses	15	\$1,500	\$22,500
Radio	MPSCS Site	1	\$750,000	\$750,000
Radio	Simulcast VHF	1	\$475,000	\$475,000
Master Clock	Redundant Master Clock Solution	1	\$20,000	\$20,000
TOTAL				\$1,527,500

Table 107—Alternative 5 - Recommended Technology Cost Estimates

- EMD interface would only be needed if there was an operational change in the handling of medical calls and the PSAPs were going to provide EMD.
- CAD interfaces to station alerting, radio tone encoding, text/alphanumeric paging are recommended operational enhancements.
- Mobile routing is an operational recommendation.
- LERMS licenses would only be needed if WMU or Portage changed RMS vendors. This would also impact the CAD interface pricing listed under Required Technology.
- The MPSCS site would only be needed if Portage decided to move to that radio system. This would also impact radio connectivity costs listed under needed technology.
- No radio costs are included for agency subscriber units (mobiles, portables).
- The simulcast VHF for fire paging is a technology recommendation to correct current system problems that were reported. This cost includes all new equipment for a five site system; transmitters, antenna systems, GPS timing and simulcast controller. It is possible that some existing equipment could be re-used lowering the cost of the project.

11.2 Cost Analysis

In this alternative, all five PSAPs remain separate as they exist today but share technology. This scenario could be considered a precursor to true consolidation. The assumptions made in the following cost analysis include:

- All agencies participate
- All systems are shared
- 100 percent of the revenue from the State 9-1-1 surcharge is applied to system costs

Changes in the actual participants and the technology shared will change the following cost estimates.

11.2.1 Current Public Safety Answering Point Budget Summary

For ease of reference, the following table is a duplicate table depicting the budgets for each of the PSAPs.

Current Combined PSAP Budget Summary					
	KDPS	KCSO	Kalamazoo Township	Portage DPS	WMU
Network Costs	\$50,174	\$19,000	\$5,000	\$2,000	\$0
Equipment Costs	\$81,380	\$8,805	\$350	\$17,400	\$0
CAD Costs	\$209,647	\$0	\$20,250	\$43,500	\$36,649
Radio Costs	\$60,697	\$0	\$4,000	\$36,000	\$4,000
Office Expenses	\$53,814	\$13,000	\$0	\$26,300	\$4,311
KDPS Annual Contract	\$0	\$197,631	\$66,082	\$0	\$0
Personnel Expenses	\$1,505,485	\$902,094	\$334,670	\$595,000	\$227,860
Sub-Totals	\$1,961,197	\$1,140,530	\$430,352	\$720,200	\$272,820
Revenue	\$619,450	\$182,188	\$41,617	\$86,205	\$0
Annual Net PSAP Costs	\$1,341,747	\$958,342	\$388,735	\$633,995	\$272,820
Combined Net PSAP Costs	\$3,595,639				

Table 108—Current Combined PSAP Budget Summary

11.2.2 Alternative 5 - \$0.42 Surcharge Cost Analysis

Alternative 5 - \$0.42 County Surcharge – Year 1		
Shared Technology Costs	Costs	Extended Costs
Consolidation Technology/Transition Costs (Year 1 Only)	\$1,267,000	
		\$1,267,000
Shared Costs		
Annual Shared Technology Related Costs	\$471,348	
Annual Systems Replacement Contribution	\$261,424	
		\$732,772
Total Expenses		\$1,999,772
Revenue / Reimbursements	Amount	
State 9-1-1 Fee - Estimated	\$458,135	
Estimated \$0.42 County Surcharge	\$1,173,351	
Total Revenue / Reimbursements		\$1,631,486
Remaining Unfunded Shared Costs		\$368,286

Table 109— Alternative 5 - Estimated Budget Based on a \$0.42 County Surcharge – Year 1

Alternative 5 - \$0.42 Surcharge Cost Distribution – Year 1						
		KDPS	KCSO	TKPD	Portage DPS	WMU
Unfunded Shared Costs	\$368,286					
Component 1 - 9-1-1/Emergency Call Volume (50%)						
% of Total 9-1-1/Emergency Call Volume		39.84%	28.31%	6.79%	15.50%	9.56%
Call Volume Based Contribution		\$73,363	\$52,131	\$12,503	\$28,542	\$17,604
Component 2- Service Area Population (50%)						
% of Total Service Area Population		26.67%	42.36%	9.48%	18.49%	3.00%
Population Based Contribution		\$49,111	\$78,003	\$17,457	\$34,048	\$5,524
Agency Contribution		\$122,474	\$130,134	\$29,960	\$62,590	\$23,128

Table 110—Alternative 5 - Estimated \$0.42 County Surcharge Cost Distribution – Year 1

Alternative 5 - \$0.42 County Surcharge Scenario – Year 2		
Shared Technology Costs	Costs	Extended Costs
Annual Shared Technology Related Costs	\$471,348	
		\$471,348
Total Expenses		\$471,348
Revenue/Reimbursements	Amount	
State 9-1-1 Fee - Estimated	\$458,135	
Estimated \$0.42 County Surcharge	\$1,173,351	
Total Revenue/Reimbursements		\$1,631,486
Budget Balance		\$1,160,138

Table 111—Alternative 5 - Estimated Revenue \$0.42 Surcharge – Year 2

11.2.3 Alternative 5 - \$3.00 Surcharge Cost Analysis

Alternative 5 - \$3.00 County Surcharge Scenario – Year 1		
Shared Costs	Costs	Extended Costs
Shared/Transition Costs (Year 1 Only)	\$1,267,000	
		\$1,267,000
Shared Costs		
Annual Shared Technology Related Costs	\$471,348	
		\$471,348
Total Expenses		\$1,738,348
Revenue/Reimbursements	Amount	
State 9-1-1 Fee - Estimated	\$458,135	
Estimated \$3.00 County Surcharge	\$8,381,082	
Total Revenue/Reimbursements		\$8,839,217
Surcharge Balance		\$7,100,869

Table 112—Alternative 5 - Estimated Budget with a \$3.00 County Surcharge – Year 1

Alternative 5 - \$3.00 County Surcharge – Year 2		
Shared Technology Costs	Costs	Extended Costs
Annual Shared Technology Related Costs	\$471,348	\$471,348
Total Expenses		\$471,348
Revenue/Reimbursements	Amount	
State 9-1-1 Fee - Estimated	\$458,135	
Estimated \$3.00 County Surcharge	\$8,381,082	
Total Revenue / Reimbursements		\$8,839,217
Surcharge Balance		\$8,367,869

Table 113—Alternative 5 - \$3.00 County Surcharge – Year 2

11.3 Summary

The following table summarizes the estimated costs for technology that would be necessary in order to consolidate under each of the five scenarios. The table's main function is to pull this information together in one place for convenience. The table should not be used to compare one alternative to another as each alternative has different

participants and, therefore, different technology needs. Comparing one alternative to another based on cost alone would not be an apples-to-apples comparison.

Required Technology Cost Estimate Summary						
System	Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
CAD	Workstation Licenses	\$96,000	\$32,000	\$96,000	\$32,000	\$160,000
CAD	RMS Interface	\$40,000	N/A	\$20,000	\$20,000	\$40,000
Mobile	Mobile Licenses	\$132,000	N/A	\$96,000	\$36,000	\$132,000
LERMS	CAD Interface	\$40,000	N/A	\$20,000	\$20,000	\$40,000
9-1-1	Answering Positions	\$150,000	N/A	\$150,000	\$75,000	\$375,000
9-1-1	Network Costs	\$18,000	N/A	\$18,000	\$7,200	\$18,000
9-1-1	Remote MIS Client Licenses	N/A	N/A	N/A	N/A	\$12,500
Radio	Radio Consoles	\$150,000	\$50,000	\$150,000	\$50,000	\$250,000
Radio	Radio Console Backroom	\$15,000	N/A	\$15,000	\$15,000	\$45,000
Radio	Radio Connectivity	\$20,000	N/A	\$16,000	N/A	\$20,000
Recorder	Remote Client Licenses	N/A	N/A	N/A	N/A	\$12,500
Recorder	Additional Capacity	\$54,000	N/A	\$36,000	\$36,000	\$54,000
Network	IP Connectivity - Primary	N/A	N/A	N/A	N/A	\$60,000
Network	IP Connectivity - Secondary	N/A	N/A	N/A	N/A	\$48,000
System Furniture	Workstations / Chairs	\$35,000	N/A	\$35,000	N/A	N/A
Totals		\$750,000	\$82,000	\$652,000	\$291,200	\$1,267,000

Table 114—Required Technology Cost Estimate Summary

The following table summarizes the estimated costs for each consolidation alternative for optional technology. Optional technology is defined as technology that is available in the marketplace, but is not necessary to achieve each consolidation alternative. Each of these pieces of technology would provide benefits to the emergency communications system and field personnel in various way. Each technology piece can be chosen separately or collectively with other pieces.

As with the previous chart, the table's main function is to pull this information together in one place for convenience of the reader. The table should not be used to compare one alternative to another as each alternative has different participants and, therefore, different technology needs. Comparing one alternative to another based on cost alone would not be an apples-to-apples comparison.

Optional Technology Cost Estimate Summary						
System	Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
CAD	EMD Interface	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
CAD	Fire Station Alerting Interface	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
CAD	Radio Tone Encoding Interface	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
CAD	Text/Alphanumeric Paging Interface	\$23,000	\$23,000	\$23,000	\$23,000	\$23,000
Mobile	Mobile Routing	\$172,000	\$139,000	\$163,000	\$139,000	\$172,000
LERMS	Workstation Licenses	\$22,500	N/A	\$15,000	\$7,500	\$22,500
Radio	MPSCS Site	\$750,000	N/A	\$750,000	N/A	\$750,000
Radio	Simulcast VHF	\$475,000	\$475,000	\$475,000	\$475,000	\$475,000
Master Clock	Redundant Master Clock Solution	\$20,000	\$20,000	\$20,000	\$20,000	\$20,000
Totals		\$1,527,500	\$722,000	\$1,511,000	\$729,500	\$1,527,500

Table 115—Optional Technology Cost Estimate Summary

Kimball recommends Kalamazoo implement a surcharge that will cover the costs of consolidation and allow for funds to be set aside for future system replacements and upgrades. It is vital to the ongoing operations of 9-1-1 to plan for equipment replacement and to have a fund for unexpected equipment and technology needs. Setting the surcharge at \$2.10 would result in just under 6 million in annual revenue. This would allow the county to set aside roughly \$570,000 each year in reserve. This fund could be used to replace equipment and technology as needed and to assist in transitioning to NG9-1-1.

In addition, Kalamazoo may want to consider setting aside funds for construction of a new facility or renovations of an existing facility given the long-term space limitations in the KDPS facility.

12. ALTERNATIVE FUNDING SOURCES

Funding is a critical part of any consolidation project. Being able to identify the right sources of funding is essential. The following section provides potential funding options for the participants of this study.

12.1 Federal Grants

Grant opportunities are scarce in the current economic environment, but Congress and Federal Programs are planned for emergency communications and preparedness grants. Whether those grants will be funded remains to be seen.

12.1.1 Federal Emergency Management Agency Preparedness Grants

Federal Emergency Management Agency (FEMA) Preparedness grants are being revamped and potentially consolidated for Fiscal Year (FY) 2013 and FY 2014. As part of the FY 2013 President's Budget, the Administration proposed a new homeland security grants program to help create a robust national preparedness capacity that focuses on **cross-jurisdictional** and readily deployable state and local assets. The proposed National Preparedness Grant Program (NPGP) would consolidate 16 FEMA grant programs into a single program. However, Members of Congress raised concerns about the NPGP and have not approved the proposal. As a result, FEMA officials reported that the agency was drafting new guidance for the execution of the NPGP based on pending Congressional direction on fiscal year 2013 appropriations. If the NPGP is not authorized in fiscal year 2013, FEMA officials stated that the agency plans to resubmit the request for the fiscal year 2014 budgetary cycle.

12.1.1.1 *Proposed 2013 National Preparedness Grant Program*

As of March 2013, FEMA officials reported that the agency was drafting guidance for the execution of the NPGP based on stakeholder feedback and direction from Congress pending the fiscal year 2013 appropriations bill. It is not yet known to what extent the new guidance may differ from the NPGP vision that was developed in 2012, but an analysis of that vision can give clues to the priorities and direction of the program. The following section outlines the details that were released in the 2012 vision for the program²¹.

The FY 2012 grants guidance began to prepare grantees for the transition to the new grants vision by consolidating multiple, separate preparedness grant programs into a more streamlined mode. The vision for the 2013 National Preparedness grants was released in February 2012 and planned to cover the same scope of funding needs that were covered in previous years, but with a streamlined grant program, rather than individual grant programs. The 2013 National Preparedness Grant Program (NPGP) has not been officially announced and specifics related to eligible costs are not yet available. The vision for the 2013 program indicates that the participants of this study would likely be an eligible project under this new grant program. The NPGP Vision focuses on cross-jurisdictional projects and mentions interoperable communications systems as a priority for the program. The Vision planned for all grant

²¹ https://www.fema.gov/pdf/government/grant/fy2013_npgp_grant_program_overview.pdf

funding to be funneled through States so that States are aware of the Grant projects within their borders and can leverage opportunities to consolidate and share grant project initiatives. It will be important for the study participants communicate with the State to identify and apply for Federal Grant Funding in case States are the only eligible applicants. The key objectives of the program as stated in the FY2013 NPGP Vision include:

Focus on the development and sustainment of core capabilities identified in the National Preparedness Goal.

- Utilize gap analyses to determine asset and resource deficiencies and inform the development of new capabilities through a competitive process.
- Build a robust national response capacity based on cross-jurisdictional and readily deployable State and local assets.

12.1.1.2 Changes from Previous Years

The 2012 Vision for NPGP differs from previous preparedness grant programs in the following ways:

- **Consolidation:** Consolidates current grant programs into one overarching program (excluding Emergency Management Performance and fire grants). This will enable grantees to build and sustain core capabilities outlined in the National Preparedness Goal instead of requiring grantees to meet the mandates from multiple individual, often disconnected, grant programs.
- **Core Capabilities:** Focuses on building and sustaining the core capabilities outlined in the National Preparedness Goal that can be utilized across mission areas – Prevention, Protection, Mitigation, Response and Recovery – and can be utilized nationally and regionally.
- **Addressing Gaps:** Utilizes analysis to determine desired level of capability versus current level of capability to inform the competitive process.
- **Accountability:** Requires grantees to match their proposed investments to one or more specific core capabilities and incorporates effectiveness measures that facilitate accountability. This clear linkage will enable all levels of government to collectively demonstrate how the proposed investment will build and sustain core capabilities necessary to strengthen the Nation's preparedness.
- **Mutual Aid:** Requires grant funded resources to be complementary and requires grantees to maintain membership in the Emergency Management Assistance Compact (EMAC) to facilitate the mutual aid of capabilities in order to be eligible for funding.
- **Competition:** Establishes a competitive funding pool to build new assets and capabilities for which a need is identified in the Threat Hazard Identification and Risk Assessment (THIRA).
- **Multiyear Guidelines:** Includes multiyear guidelines to support efforts to measure progress towards building and sustaining the core capabilities identified in the National Preparedness Goal.
- **Project-Based Development and Monitoring:** Grant awards will be based on validated assessments of the needs and gaps for the jurisdiction and region where the project will be implemented. FEMA will use project-based monitoring as the principal means of measuring project progress, following projects from creation to completion. This will provide basic data to measure impact over time, improve accountability, and enable FEMA to identify progress made in preparedness and determine current and future gaps.
- **Peer Review: Validates grant proposals via** peer review to ensure that projects support the building and sustainment of regional and national core capabilities.

12.1.1.3 Allocation of Grant Funding

The 2012 Vision for NPGP funding planned for each State and territory to receive a base level of funding allocated in accordance with a population driven formula. The remainder of the grant allocation was to be determined competitively, based on the criticality of the specific capability and the applicant's ability to complete the project within the two year period of performance.

The funding would support deployable assets that could be utilized anywhere in the country via Emergency Management Assistance Compacts or other mutual aid/assistance agreements. In addition, funding could be used by the states for the sustainment of core capabilities that may or may not be deployable, ***such as interoperable communications systems***, mitigation-related capabilities, and fusion centers.

12.1.2 9-1-1 Implementation Grants

Grants focused on the implementation of 9-1-1 could be a potential funding source for a consolidation effort if the program is fully funded by a Federal Communications Commission (FCC) TV spectrum auction. The passage of the Next Generation 9-1-1 Advancement Act of 2012 provided a onetime appropriation of \$115 million for 9-1-1 implementation grants, but the funds will come from a TV spectrum auction that could take a few years to complete and several other initiatives must be fully funded before the 9-1-1 Implementation Grants are funded.

The 9-1-1 implementation coordination grants will fund training, IP networks and NG9-1-1 services and will continue to fund basic and enhanced 9-1-1 implementation. Both state and local entities are eligible grant recipients under the Act and grants will require a 40% local match. Any entity that diverted 9-1-1 funds for other purposes will be ineligible for 9-1-1 Implementation Grant funding. Details on eligible costs and the grant application process will come from the National Highway Traffic Safety Administration and the National Telecommunications and Information Administration once the Grant has been funded and established. Eligible costs will include:

- The implementation and operation of 9-1-1 services, E9-1-1 services, the migration to the IP-enabled emergency network, and the adoption of Next Generation 9-1-1 services and applications;
- The implementation of IP-enabled emergency services and applications, enabled by Next Generation 9-1-1 services, including IP backbone networks and the application layer software infrastructure needed to interconnect emergency response organizations; and
- Training public safety personnel and other individuals and organizations that are part of the emergency response chain in 9-1-1 service.

The FCC has to design and implement that auction before any proceeds will become available. Once auction proceeds start to flow, a waterfall funding model will be used to distribute the auction funds to six different funding initiatives in addition to the 9-1-1 implementation grants. The waterfall model distributes money to initiatives in order of priority, funneling money to the first initiative until it is satisfied, and then funding the second initiative, and so on. The 9-1-1 implementation grants are ranked sixth on that list. This means five other initiatives totaling over \$29 billion need to be satisfied before the 9-1-1 implementation grants are funded and assumes that the auction will generate more than \$29 billion.

12.1.3 Byrne Justice Assistance Grant Programs

The participating agencies should coordinate with the Grants and Community Services Division of the Michigan State Police to explore whether parts of the consolidation project would be eligible as a Technology Enhancement Project under the Byrne Justice Assistance Grant Program. The intent of this program is to assist local communities to improve or maintain local criminal justice efforts to effectively address crime. Projects must demonstrate increased efficiency, safety and cost effectiveness. The goal of the program is to help criminal justice agency's better serve their communities by automating time-consuming tasks, dispatching personnel more efficiently, and improving an agency's ability to collect and analyze data as well as disseminate it to both internal and external audiences. The 2013 Application period occurred in January. If this program is funded next year it could be a potential funding source if a part of the consolidation project could be considered an eligible technology project.

12.2 Bonds

Issuing bond measures is another source of funding that could potentially assist local municipalities in consolidating emergency dispatch centers. A bond measure is an initiative to sell bonds for the purpose of acquiring funds for various public works projects. These measures are put up for a vote in general elections. Such measures are used when other revenue sources are limited or non-existent.

12.3 Earmarks

Earmarks are another funding option. They are provisions in legislation that allocate an amount of money to a specific project. Earmarks are difficult to come by and require legislative action, so they are not considered a primary revenue source but could be an option if funding is scarce.

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13. OTHER CONSIDERATIONS

13.1 Emergency Medical Dispatch and 9-1-1 Call Transfers

Although not directly related to the immediate focus of this report, this section discusses at a high level two topics that should be considered post-consolidation; emergency medical dispatch (EMD) and the transfer of 9-1-1 callers.

Emergency medical dispatch, the provision of medical instructions to 9-1-1 callers, has become the expected standard of care nationally. EMD has three main focuses; providing medical instructions, determining the appropriate level of field response and quality assurance. The first focus is the provision of medical instructions to the caller, based on strict guidelines and protocols, which are designed to improve patient outcome and responder safety. The instructions range from applying direct pressure to a minor wound to stop bleeding to full CPR or child birth instructions.

The second focus of EMD is to gather enough information from the caller to determine what the appropriate level of response to the scene by ambulance crews. Depending on the nature of the problem, the appropriate response ranges from the ambulance driving to the scene along with the normal flow of traffic to a full lights and sirens response for true life-threatening emergencies. An appropriate response level increases the safety of the community and responders and decreases liability for the EMS agency. The third focus is an on-going quality assurance program.

Under the existing call processing methodology any time an ambulance is needed each of the PSAPs transfers the citizen to the PSAP's designated third-party EMS provider. The EMS provider then performs EMD. When 9-1-1 call takers receive an EMS related call, the call taker must conduct a preliminary interview to determine the nature and location of the emergency. The call must then be transferred to the appropriate EMS agency. The dispatcher then must re-interview the caller, provide EMD and dispatch EMS field personnel. The average length of time added to a call for the second interview process is ~30 seconds. Best practices for 9-1-1 states that every effort should be made to reduce or eliminate the transfer of 9-1-1 callers.

In emergencies, seconds count. This means that information critical to responding agencies' safety and ability to effectively manage the emergency is delayed, as the call must be processed by the receiving PSAP first. These lost seconds can literally mean the difference between survival or not and/or impact the patient's quality of life. For example, 30 seconds to a minute of lost time can mean the difference between not surviving and being able to resuscitate a heart attack or drowning victim and whether that person will have a meaningful quality of life. In another example, a delay in receiving information regarding suspects with weapons or the presence of hazardous materials on-scene can have potentially fatal consequences for responders. While these examples are dramatic, they accurately illustrate the types of emergencies handled every day in PSAPs across the state.

Transfers increase the likelihood that human and/or technological errors will occur. High levels of training can minimize the amount of human errors, but even the best trained employees will still make errors from time to time. When a caller must speak with multiple two call takers, the potential for human error rises.

The quality of technology available today has reduced issues such as calls lost during the transfer process, but the possibility still exists and increases with each transfer.

Once consolidation has been completed, Kimball recommends providing EMD from the PSAP rather than relying on a third-party provider. However, the implementation of an EMD program is a major undertaking that requires:

- Conduct cost analysis to determine the impact on the PSAP budget. This analysis should include a staffing review, the cost of the initial EMD program and the on-going costs for training, QA, and re-certification.
- Procurement of an EMD program. The quality and cost of various programs varies so care should be taken when considering which one to implement.
- Training for all employees who will be answering 9-1-1 calls not only in EMD, but CPR as well.
- Development of an in-service training program so that employees are able to meet their continuing education requirements for recertification.

The benefits of bringing EMD into the PSAP include:

- Elimination of 9-1-1 call transfers which will improve service levels to the community.
- Control of the application of EMD to ensure it is being consistently applied. Failure to consistently apply EMD can be a liability issue for the PSAP.
- Quality assurance would be in-house and the PSAP staff involved.

13.2 Next Generation 9-1-1 Considerations

One focus of NG9-1-1 will be to enable callers to transmit a variety of data types to PSAPs, including text, photos, streaming video and telematic information. While the technology to accomplish this is yet to be determined, it is certain that a mechanism will be needed to get these new data forms to the PSAP. This mechanism may take the form of configuring existing NG9-1-1 capable answering equipment or if the equipment is not currently capable it will require PSAPs to upgrade or replace existing equipment with new NG9-1-1 capabilities. The Cassidian Sentinel Patriot equipment has been advertised as NG9-1-1 ready.

Next Generation 9-1-1 solutions will be forthcoming, and will have additional requirements and/or legislation requiring PSAPs to be able to receive and process these calls. The operational impact of NG9-1-1 will require changes to internal protocols and skill sets, and will require more intense oversight and coordination among applications and interconnected systems. As side effects of NG9-1-1 upgrades, funding, technology and HR requirements may push local, small or individual PSAPs beyond their ability to support 9-1-1, both financially and operationally.

Consolidating PSAPs where sharing resources makes political sense will better prepare everyone for NG9-1-1 and aid in meeting legislative and local funding requirements. Locally, consolidation will allow public safety agencies to continue to provide localized response and recovery, while realizing cost and service efficiencies. Consolidation will also improve voice and data interoperability across all levels of government (local, county, regional, state and national) during response and recovery events.

13.2.1 Next Generation 9-1-1 Computer Aided Dispatch Considerations

All future CAD upgrades and enhancements must take into consideration future interfaces with upcoming NG9-1-1 applications. This new 9-1-1 technology will require the ability to accept and process additional information, such as

text messages, streaming video, fixed or still images, and other data possibly related to a caller's location or type of emergency. There will be a need for an interface to the CAD system so that this additional NG9-1-1 information being provided through the telephony system can be captured and utilized in CAD and associated modules. This information will be critical in creation of the CAD event and as the call is dispatched and responded to by local emergency responders.

Computer aided dispatch system administrators need to begin considering how this new data will impact the systems. There will be a need to interface the NG9-1-1 applications to any CAD systems in use. Future system specifications to allow for an interface to NG9-1-1 should include the following:

- Ability to receive IP-based 9-1-1 embedded and reference location data
- Ability to attach all data to a CAD event, including streaming and fixed video, and audio, telemetric and other data
- Capability to utilize 9-1-1 call data included in the presence information data format location object (PIDF-LO)
- Ability to transfer all incident record attachments to a mobile data device
- Capability to establish a CAD-to-CAD interface
- Capability to parse extensible markup language (XML) data provided as a component of the 9-1-1 request for service
- Ability to perform two-way XML data exchange via a CAD-to-CAD interface when required to transfer to another PSAP or system
- Capability to use links to additional information to retrieve information from other systems
- Establishment of security measures to all input data streams

A number of organizations are working on NG9-1-1 standards development, CAD interoperability, and the exchange of information between those applications. As these standards continue to evolve, they should be monitored, considered, and incorporated in any new interfaces between NG9-1-1 applications and CAD systems. Some of the same standards can be used for any future CAD-to-CAD interfaces.

The majority of the CAD vendors are still assessing future needs to interface and accept the additional information that NG9-1-1 data will provide. At the same time, vendors are trying to determine the true cost that will be encountered as the needed functionality is developed and deployed. Intergraph has indicated that they are reviewing evolving standards for NG9-1-1 and their applications are being prepared to handle these future data attachments.

The consolidated center will need to monitor progress with NG9-1-1 and the associated impacts this new data will have on the CAD system. They will need to work with the current CAD vendor to ensure that they stay on the leading edge of this technology to ensure that when this new data is available to the PSAP it can be accepted, processed, and utilized by the CAD system. In fairness to the CAD vendors, specific planning can't be engineered until such a time when the answering position vendors can provide how this new and additional data will be made available to them.

14. BEST PRACTICES AND STANDARDS

A number of best practices and standards exist for emergency communications. These best practices and standards have been created by organizations such as:

- NENA
- APCO
- NFPA
- DHS
- ICMA
- CALEA

A consolidation effort that includes the creation of a new organization provides an ideal opportunity to establish a sound organizational foundation for the new PSAP. This foundation should be based on key best practices and standards. This section provides an overview of these practices and standards.

14.1 Commission on Accreditation for Law Enforcement Agencies Standards

When consolidating multiple PSAPs into a single organization, standards and policies must be put in place to provide the basic structure and organization needed for operational efficiency. Through its various certification programs, CALEA provides guidelines for establishing standards and policies required for a new PSAP. The standards within each program must be in place to achieve and maintain certified status including programs specifically designed for law enforcement agencies and public safety communications centers. The standards set by CALEA do not dictate what the standard should be; only that such a standard should be in place. The content of the standards is determined at the local level. Of the five participating agencies, only Portage Police Department is currently CALEA certified. This certification includes the existing Portage DPS PSAP as part of the law enforcement certification.

Should Portage decide to participate in a consolidated PSAP, the standards and policies of the new organization must meet, at minimum, the standards set for communications set forth in the CALEA law enforcement certification process.

In addition to the certification of communications as part of a larger law enforcement certification, CALEA also offers a program that is designed solely for Public Safety communications agencies. The CALEA Standards for Public Safety Communications Agencies include 212 separate standards that must be in place. These standards include seven key subject areas, each of which is broken down into multiple sub-topics. The seven key areas and some of the sub-topics, taken from the CALEA website²² follow:

1. Organization
 - Organizational Structure
 - General Management and Administration
 - Allocation and Distribution of Personnel

²² <http://www.calea.org/content/standards-titles>

- Organizational Integrity
- 2. Direction and Supervision
 - Direction
 - Roles, Values and Authority
 - Fiscal Management and Agency Property
 - Agency Performance Measurement
 - Community Involvement and Public Education
- 3. Human Resources
 - Classification and Delineation of Duties and Responsibilities
 - Compensation, Benefits and Condition of Work
 - Collective Bargaining and Contract Management
 - Performance Evaluations
 - Grievance Procedures
 - Disciplinary Procedures
- 4. Recruitment, Selection and Training
 - Recruitment
 - Selection
 - Pre-employment
 - Promotion
- 5. Training
 - Administration
 - Training
- 6. Operations
 - Administration
 - Call Taking
 - Communications with Field Units
 - Telephones
 - Radios
 - Records
 - Computer Systems
- 7. Critical Incidents, Special Operations and Homeland Security
 - Emergency Operations
 - Special Events and Tactical Operations
 - Homeland Security

Whether or not Portage participates, Kimball recommends that the new organization be structured using the standards found in the public safety communications program. The 212 standards set forth in the program provide a sound foundation and structure for any organization that requires structure, organization and clear definition of roles and responsibilities.

A consolidated PSAP, inclusive of Portage, does not necessarily require actual CALEA certification as a communications center, but must meet the requirements of the communications standards included in the law enforcement program to meet Portage's certification requirements. However, setting a long-term goal of achieving

CALEA Public Safety communications agencies certification for the consolidated PSAP would ensure that standards are regularly reviewed and updated.

14.2 Shift Supervisors

Public safety best practices require 24x7 supervision. Should a full consolidation take place, Kimball recommends a strong supervisory presence of one supervisor per shift dedicated to shift operations in the communications center initially with a long term goal of two supervisors (or a supervisor and an acting supervisor) on-duty per shift.

NFPA has developed codes, standards, and recommended practices through a process approved by the American National Standards Institute (ANSI). The 2013 edition of NFPA 1221, Chapter 7, Section 1 addresses management.

NFPA 1221, 7.1.3 states, "At least one supervisor shall be on duty and available when more than two telecommunicators are on duty."

NFPA 1221, 7.1.3.1 states, "The supervision shall be provided by personnel within the communications center who are familiar with the operations and procedures of the communications center."

Annex A of NFPA 1221 provides further explanation. A.7.1.3 states, "The supervisor position(s) in the communications center should be provided in addition to the telecommunicator(s) position(s). Although these supervisory personnel are intended to be available for problem solving, the supervisor position is permitted to be a working position."

The *Standards for Public Safety Communications Agencies* (SPSCA), established jointly by CALEA and APCO, does not specifically address staffing or supervision in a PSAP. However, both sets of standards reference utilizing Incident Command System (ICS) protocols. (CALEA Standard 46.1.2 and SPSCA Standard 7.1.2 are mandatory for accreditation.)

The Department of Homeland Security, coordinating with federal, state and local governments established the National Incident Management System (NIMS). ICS falls under the 'Command and Management' element of NIMS. ICS represents best practices and is the standard for emergency management across the country. ICS requires a supervisor when there are between three and seven persons performing similar functions. (The optimal span of control is five.) A manageable span of control allows supervisors to supervise and control their subordinates, while allowing for efficient communications between all parties.

14.2.1 Operational Efficiency

To be effective, a supervisor must be available to the entire shift as needed. Supervisors should not be counted as part of minimum operational staffing and should not be assigned to work a console position. When functioning as part of the minimum staffing the supervisor cannot devote the time needed to ensure the effective overall operation of the center. Also, when functioning as part of minimum staffing, supervision will be unavailable assisting with handling call taker or dispatcher responsibilities when supervision is most needed, during busy periods or major incidents. While NFPA standards and ICS require dedicated supervisory personnel, there are in-house considerations as well. A consolidated PSAP will have greater geographic boundaries and agency responsibilities. A dedicated supervisor assigned to each shift:

- Provides coordination and direction during major emergency incidents, such as severe weather, high profile incidents and natural disasters
- Is available for problem solving
- Is a single point of contact for the user agencies
- Allows for formalized development of career paths
- Has the ability to document employees' performance for annual/periodic reviews
- Provides more supervision for diversified, complex tasks
- Provides guidance to new employees who have less training and experience
- Provides greater knowledge of laws, procedures, and administrative processes
- Is able to focus on the operations of the PSAP as a whole and not have split responsibilities with a dispatch position
- Allows for improved communications and customer service with management, subordinates, and subscriber agencies
- Allows for operational efficiency
- Is able to identify areas for growth, remedial training, counseling or discipline, when appropriate
- Is able to address issues upon occurrence, not after the fact
- Is able to set priorities based on the needs of the whole operation
- LEIN/NCIC telecommunicators may require supervisor's approval for broadcast messages and to enter persons, vehicles, etc. into LEIN/NCIC. Confirmation of positive responses for entries into these systems is time-critical. Supervision allows for close oversight of this process.
- Allows for delegation of tasks/responsibilities

Long-term, Kimball recommends the assignment of two dedicated supervisors, or assistant supervisors to each shift to ensure the PSAP and its staff are able to function as efficiently as possible and in order to comply with recommended/best practices as set forth by the NFPA and DHS.

Selection and placement of the supervisory staff should first be attempted through existing qualified staff.

14.3 Quality Assurance and Control

Emergency communications has always been an integral part of emergency responses by law enforcement, fire and EMS agencies. Over the last 25 years the work environment for telecommunicators has become increasingly technical and stressful as telecommunicators work to learn and maintain the necessary skill sets needed. This field has grown from a simplistic approach where calls were received and dispatched with minimal information to a much more complex profession. This new profession requires telecommunicators to:

- Be adept with multiple computer systems and technologies
- Learn how to quickly obtain accurate information from irate, upset or uncooperative citizens
- Learn what interview questions are critical in every conceivable police, fire and EMS incident
- Provide pre-arrival instructions that range from simple direct pressure on a wound to infant CPR.
- React quickly and decisively when needed under high stress conditions
- Effectively multi-task and prioritize multiple high priority calls for service
- Work weekends, nights and holidays

ACRONYMS

Acronym	Definition
ACN	Automatic Crash Notification
ALI	Automatic Location Identification
ANI	Automatic Number Identification
ANSI	American National Standards Institute
APCO	Association of Public-Safety Communications Officials
AVL	Automatic Vehicle Location
CAD	Computer Aided Dispatch
CALEA	Commission on Accreditation for Law Enforcement Agencies
CEMP	Comprehensive Emergency Management Plan
CPE	Customer Premise Equipment
CPR	Cardiopulmonary Resuscitation
DHS	Department of Homeland Security
E9-1-1	Enhanced 9-1-1
EMD	Emergency Medical Dispatch
EMS	Emergency Medical Services
EMAC	Emergency Management Assistance Compact
EMPG	Emergency Management Performance Grants
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
IAFC	International Association of Fire Chiefs
ICMA	International City/County Management Association
ICS	Incident Command System
LEIN	Law Information Network (Michigan)
LERMS	Law Enforcement Records Management System
MIS	Management Information System
MPSCS	Michigan Public Safety Communication System (State Police Radio System)
NCIC	National Crime Information Center
NENA	National Emergency Number Association
NFPA	National Fire Protection Association

NG9-1-1	Next Generation 9-1-1
NIMS	National Incident Management System
NIOSH	National Institute for Occupational Safety and Health
NPGP	National Preparedness Grant Program
PSO	Public Safety Officer (trained to perform both law enforcement and fire duties)
QA/QC	Quality Assurance and Quality Control
RMS	Records Management System
THIRA	Threat Hazard Identification and Risk Assessment
UHF	Ultra-high Frequency
UPS	Universal Power Supply
VHF	Very-high Frequency
VPN	Virtual Private Network

GLOSSARY

9-1-1 Call Answering Equipment	This term may be used interchangeably with customer premise equipment (CPE). Refers to the hardware and software that is used to receive and answer a 9-1-1 call.
Co-Located PSAPs	PSAPs from separate entities sharing the same facility and critical PSAP systems such as computer aided dispatch, radio consoles, 9-1-1 answering equipment and logging recorders. The PSAPs for the City of Kalamazoo, Kalamazoo Township, and Kalamazoo County are currently co-located.
Comprehensive Emergency Management Plan (CEMP)	Also known as a disaster management plan.
Emergency Medical Dispatch (EMD)	EMD is a strictly controlled program where the 9-1-1 call taker provides medical instructions to callers while field responders are enroute. These instructions can range from how to control simple bleeding to CPR instructions. The program is designed to improve patient outcome and match the level of field response to the severity of the medical issue.
Full PSAP Consolidation	Full consolidation is defined as the consolidation of police, fire, and EMS call handling and police and fire dispatch functions for a defined region into a single facility.
Public Safety Answering Point (PSAP)	Also called a 9-1-1 center or dispatch center and is an emergency communications facility that receives 9-1-1 calls. Dispatching of police, fire, and this facility. The PSAPs that are involved in this study provide dispatch services law enforcement and fire services. emergency medical services (EMS) field personnel each may or may not be part of this facility. The PSAPs that are involved in this study provide dispatch services law enforcement and fire services. EMS calls are transferred to the appropriate third party providers.
Shared Technology	May also be called virtual consolidation. Two or more PSAPs share key PSAP systems such as computer-aided dispatch (CAD), radio, 9-1-1 call answering equipment or logging recorders. Although technology is shared, each PSAP retains its existing organizational structure and remain in its own facility. This form of consolidation increases interoperability and allows for cost efficiencies through group purchases.