Final Report

Get Connected: An Analysis of Public Safety 911 Call Taking, Dispatch, and Command Center Services within Milwaukee County

July 2016

WINBOURNE CONSULTING, LLC
1611 N. Kent St. Suite 802
Arlington, VA 22209
(p) 703.584.5350 • (f) 703.935.1147
www.winbourneconsulting.com

Table of Contents

1.0 EXECUTIVE SUMMARY 6

1.1 OVERVIEW OF PROJECT SCOPE 6

1.3 SUMMARY OF RESEARCH QUESTIONS AND ANSWERS 7

1.4 KEY FINDINGS AND RECOMMENDATIONS 9

1.4.1 SPACE NEEDED FOR COUNTY OEM CONSOLIDATION 9

1.4.2 COUNTYWIDE PSAP CONSOLIDATION 10

1.4.3 CAD-TO-CAD INTEGRATION 10

1.4.4 ESTABLISH A COMMON, COUNTY-WIDE GEOGRAPHICAL INFORMATION SYSTEM MAP FOR PUBLIC SAFETY 11

1.4.5 EXPAND THE USE OF EMERGENCY MEDICAL DISPATCH (EMD) PROTOCOL 13

1.4.6 GENERAL MITCHELL INTERNATIONAL AIRPORT EMERGENCY COMMUNICATIONS 13

1.4.7 MCTS TRANSIT OPERATIONS CENTER 14

1.4.8 MILWAUKEE COUNTY HIGHWAY DIVISION GPS TRACKING SYSTEM 14

1.5 COST ESTIMATES 14

1.6 GOVERNANCE OPTIONS FOR MANAGING NEW INITIATIVES 15

1.7 PSAP CONSOLIDATION CASE STUDY 15

1.8 IMPLEMENTATION TIMELINE 16

2.0 OVERVIEW OF PROJECT SCOPE OF WORK 17

3.0 OUR METHODOLOGY 19

3.1 FOCUS AREAS 19

3.2 SITE VISITS AND INTERVIEWS 19

3.3 USE OF PUBLIC SAFETY COMMUNICATIONS BEST PRACTICES 20

3.3.1 PUBLIC SAFETY DATA INTEGRATION AND SHARING 20

3.3.2 USING A COMMON GIS-BASED MAP 23

3.3.3 USING EMERGENCY MEDICAL DISPATCH (EMD) PROTOCOLS 25

3.3.4 Mission Critical Facility Design Parameters Best Practices 26

3.3.5 Transportation-Public Safety Co-location Best Practices 27

3.3.6 Airport Emergency Calling Practices 29

4.0 PRINCIPAL FINDINGS, RECOMMENDATIONS AND RELATED COST ESTIMATES: COUNTY-WIDE 32

4.1 CAD-to-CAD Integration 32

4.1.1 Overview 32

4.1.2 Benefits of a CAD-to-CAD Solution 32

4.1.3 Recommendation 33

4.1.4 CAD-to-CAD Cost Estimate 34

4.1.5 CAD-to-CAD Estimated Implementation Timeline 34

4.2 Establishing a Common, County-wide Public Safety Geographical Information System (GIS)-based Map 35

4.2.1 Overview 35

4.2.2 Examples of Public Safety GIS Layers and Data Sets 35

4.2.3 GIS-Mapping Recommendation 36

4.2.4 GIS-Mapping Cost Estimate 38

4.2.5 GIS-Mapping Estimated Implementation Timeline 38

4.3 Emergency Medical Services Communications 38

4.3.1 Overview 38

4.3.2 Emergency Medical Pre-Arrival Instructions and Emergency Medical Dispatch 39

4.3.3 EMD in Milwaukee County 39

4.3.4 Recommendations 40

4.3.5 EMD Estimated Cost 41

4.3.6 Estimated EMD Implementation Timeline 41

5.0 PRINCIPAL FINDINGS, RECOMMENDATIONS AND RELATED COST ESTIMATES: MILWAUKEE COUNTY GOVERNMENT 42

5.1 New OEM Facility 42

5.1.1 Overview 42
5.1.2 OEM Facility Space Needs 42
5.1.3 Additional Space Needs 44
5.1.3.2 Impact of Additional Functions and Growth in Call Volume 45
5.1.4 Estimated OEM Facility Schedule 45
5.2 MKE Airport Emergency Communications 46
5.2.1 Overview 46
5.2.2 Recommendations 47
5.2.3 Estimated Implementation Timeline 48
5.3 Transit Operations Center 48
5.3.1 Overview 48
5.3.2 Proposed Options 49
5.3.3 Recommendation 50
5.3.4 TOC Options Cost Estimates 51
5.4 Highway Division GPS Expansion and Use of GPS Mapping 51
5.4.1 Overview 51
5.4.2 Proposed Options 52
5.4.3 Recommendation 53
5.4.4 Highway Division Options Cost Estimate 53

6.0 GOVERNANCE OF PUBLIC SAFETY INTEGRATION INITIATIVES 53

6.1.1 Public Safety Integration Projects Governance Agreement/Amendment 54

7.0 PSAP CONSOLIDATION CASE STUDY 55

7.1 Overview 55
7.2 Wauwatosa PSAP 56
7.2.2 Wauwatosa Call and Dispatching Volume 57
7.2.3 Wauwatosa PSAP Staffing 58
7.3 Consolidation and Current Wauwatosa Non-Emergency Services 58

7.4 Analysis of Capital and Maintenance Cost Impacts of Consolidation Scenario 60

7.4.1 One-Time Start-Up Costs Associated with Movement of Equipment and Technology to OEM Communication Center 61

7.4.2 Five-Year Equipment and Technology Cost Impacts of Consolidation Scenario 64

7.4.3 Other Equipment and Technology Factors 68

7.5 General Operating Cost Impacts of Consolidation Scenario 68

7.5.1 Personnel Costs 68

7.5.2 Other Operating Cost Factors 70

7.6 Overall Financial Analysis Summary 71

7.7 PSAP Consolidation Migration Issues 73

7.8 Benefits of PSAP Consolidation 74

7.9 Conclusion 76

8.0 PROJECTED IMPLEMENTATION TIMELINE 77

APPENDIX A—PSAP SURVEY 79

APPENDIX B—PSAP CONSOLIDATION ADVISORY BOARD MEMBERS 83

1.0 Executive Summary

1.1 Overview of Project Scope

Winbourne Consulting, LLC was engaged by the Public Policy Forum (PPF) on behalf of the Milwaukee County Office of Emergency Management (OEM) to determine the feasibility of furthering the consolidation of County-administered and municipal Public Safety Answering Points (PSAPs) and establishing a centralized Command Center within Milwaukee County. Our analysis addressed these issues with particular emphasis on governance, facilities, staffing, technical, operational, and financial issues.

In addition, we have proposed several initiatives associated with enhancing integration of public safety communications and operations in the County. Each of these recommendations is intended to cost-effectively enhance countywide situational awareness and improve emergency response capability among the multiple public stakeholders in the County.

In order to communicate and receive input from the many different agencies that could be impacted by the project scope, OEM and PPF formed a Project Advisory Committee comprised of stakeholders from various County departments and municipal governments. Our team made several presentations to the Committee for the purpose of reviewing findings and obtaining feedback. Members are identified in Appendix B.

Throughout the project, we also communicated regularly with PPF on our data gathering activities, findings, and recommendations. We met with PPF, OEM, the Advisory Committee, and other stakeholders on three site visits.

This report documents our findings and recommendations. Each recommendation also includes a projected timetable for implementation and a preliminary, budgetary-level cost estimate.

1.2 Our Methodology

Our methodology for conducting the analysis was based on several factors:

- Clarifying study objectives with PPF and OEM
- Conducting data gathering and verification
- Obtaining Best Practice examples from other jurisdictions
- Determining relevant findings associated with the project objectives and developing related recommendations
- Obtaining feedback from stakeholders such as PPF, OEM, other County agencies, municipalities, and the City of Milwaukee
- Maintaining regular communications with PPF and other stakeholders throughout the project

- Documenting our findings and recommendations in project briefings and in this final report

1.3 Summary of Research Questions and Answers

The Statement of Work posed three primary research questions, the answers to which are summarized below:

What are the options for upgrading/replacing the OEM Communication Center and moving it from its current location by December 2018?

Our analysis shows that this date is very ambitious but potentially achievable if the site is selected soon and the budget for the expanded facility is approved by the County. Our estimate shows that in order for the facility to be available for move in by OEM by December 2018, the programming and design process must start immediately.

Are there such options that would logically make the OEM Communication Center attractive as a 911 call taking and dispatching center for other County departments and/or other municipalities in Milwaukee County?

With regard to other County departments, we explored options for consolidating airport, transit, and highway dispatching and communications into the OEM Communication Center. In each case, we found that while full-scale consolidation is not immediately practical or necessary, initiatives should be pursued to improve coordination and the sharing of data between these functions and OEM.

Our analysis of municipal PSAP consolidation options revealed that among the municipal PSAPs in the County, consolidation already is occurring in Oak Creek (now providing dispatch services to St. Francis) and Bayside (now providing services to each of the seven North Shore municipalities). There did not appear to be widespread interest among other municipal PSAPs in the County to pursue further consolidation with either of these centers or the OEM Communication Center in the near future, though Wauwatosa agreed to participate in a modeling exercise, which is presented in the final section of this report.

Despite the lack of widespread interest at this time, we do believe that the need for technological upgrades could make consolidation more attractive to several municipal PSAPs in the not-too-distant future. Furthermore, as discussed below, we believe it is possible and desirable to design the expanded County PSAP to accommodate dispatch functions for multiple municipalities.

We did find interest in developing a more integrated approach to sharing data and improving dispatch capabilities among all the PSAP stakeholders. Consequently, we are recommending integration initiatives related to data interoperability; a common, county-wide, GIS-based map;

and expanded use of Emergency Medical Dispatching protocols among all County PSAPs. These initiatives would be in alignment with ongoing public safety initiatives coordinated by the County, including a new P.25 radio system.

What is the general feasibility of consolidating 911 call-taking, dispatching, and Command Center services at one, two, or three centers in Milwaukee County?

Our analysis revealed that consolidating 911 call-taking, dispatch, and Command Center services into one, two, or three locations in Milwaukee County is feasible. Over the past few years, PSAP consolidation within the County already has occurred in Oak Creek and Bayside. While many of the municipal PSAPs are not considering consolidation at this time, the service levels provided by these two consolidated centers verifies that consolidation is a practical and feasible solution for other PSAPs to consider.

The new OEM facility will provide the central Emergency Operations Center (EOC) or Command Center for managing county-wide disasters or events among all County and municipal stakeholders. Based on the size and complexity of Milwaukee County, the need for a central EOC is apparent. Throughout the United States, county governments manage centralized EOCs coordinating with multiple jurisdictions, public, and private sector organizations within the county and the State government. The new OEM facility, which will include the County 911 center, also would offer municipal PSAPs an alternative to Bayside or Oak Creek for consolidation, as would the City of Milwaukee's two PSAPs (Fire and Police).

In line with this analysis, we prepared a PSAP consolidation case study using data from the Wauwatosa PSAP. The use of that data does not indicate that Wauwatosa has decided or is strongly leaning toward consolidating its PSAP, but simply reflects its willingness to be used as an example. This analysis was performed to illustrate to other municipalities the technical, operational, and cost advantages and disadvantages associated with potential consolidation into the OEM Communication Center.

1.4 Key Findings and Recommendations

The following summarizes key findings and recommendations that emanated from our analysis.

1.4.1 Space Needed for County OEM Consolidation

In 2015, Milwaukee County government formed the Office of Emergency Management (OEM) and folded four emergency services functions previously managed by the Office of the Sheriff, Department of Administrative Services (DAS), Information Management Services Division (IMSD), and the Department of Health and Human Services (DHHS) into the new Office. The new OEM includes:

- Emergency Management
- Emergency Medical Services
- 911 Communications
- Radio Services

One goal of OEM is to consolidate the four operational units into a single facility. OEM had engaged Quorum Architects to prepare a preliminary space requirements program for the facility. At OEM's request, we evaluated the facility analysis. Our evaluation of the space program included the operational and technology areas for the County 911 operation, the Emergency Operations Center (EOC), and the Emergency Medical Services Communication Center (EMS Com). Our analysis of the space requirements did not address the functional use of the area to support each of these OEM operations, since we were not a part of the programming team. Based on this analysis, which included a meeting with Quorum Architects, we recommend expanding the size of the facility presented in the programming document from 23,289 to approximately 33,245 square feet (SF).

Impact of Additional Communications Functions: The above square footage estimate reflects the space that would be required in a facility designed to house all existing OEM functions. Several ideas for incorporating additional functions that surfaced during our research – such as the Healthcare Emergency Readiness Coalition, MCTS' Transit Operations Center, and municipal PSAPs – are not included.

Using a 20-year planning horizon, and assuming that one municipal PSAP will be added to the County OEM facility, we project that the Center will require 25 workstations by 2035. Our estimate for the size of the operations area in the new facility to support these operations and number of workstations is about 2,969 square feet, including circulation and technology support space. This estimate does not include personnel areas such as eating and lockers or administrative space. The space does not have to be immediately outfitted for this number of workstations, but this amount of space should be incorporated into facility planning to account for potential growth over the next 20 years.

This additional space will increase the overall space requirements to 54,866 square feet. If we also include additional personal areas such as lockers and eating areas to accommodate staff associated with added functions, then the space for these functions will increase the overall space requirement to about 55,500 to 56,000 square feet.

1.4.2 Countywide PSAP Consolidation

We met with the largest municipal PSAPs in Milwaukee County to obtain first-hand knowledge about their operations and to discuss potential consolidation and/or options for expanding communications integration with other PSAPs across the County. Those PSAPs included the following:

- Bayside Communications Center
- Oak Creek Communications Center
- City of Franklin
- City of Milwaukee
- City of West Allis
- City of Wauwatosa
- City of Greenfield

We also discussed potential consolidation with the Project Advisory Committee, which was comprised of stakeholders from the County and several municipal governments. Based on these discussions, we believe that widespread consolidation of municipal PSAPs within the County – while technologically feasible and desirable from a financial and operational perspective – is unlikely to occur in the near future because of a lack of interest from the municipal governments.

While we strongly recommend that municipal leaders continue to consider possibilities for consolidating PSAP services – and while we believe that the Milwaukee County OEM would be an appropriate and effective facilitator of such discussions – we suggest that a variety of initiatives to enhance technical integration between the existing PSAPs in the county should be pursued first.

1.4.3 CAD-to-CAD Integration

We recommend the implementation of a county-wide CAD-to-CAD solution in which CAD data from individual dispatch centers throughout the County can be shared with all other dispatch centers. This will provide an enhanced county-wide public safety situational awareness capability, as well as expedite the utilization of mutual aid between neighboring jurisdictions.

The CAD-to-CAD solution will provide OEM and other users the opportunity to view county-wide public safety resource availability and utilization, or can be used by municipal PSAPs solely

to view neighboring municipalities. The amount and type of data shared across the system is determined by each participating jurisdiction.

As an example, Milwaukee County, the City of Milwaukee, and the municipal PSAPs have developed Fire/EMS mutual aid agreements that allow the sharing of resources. Currently, the mutual aid requests require the requesting agency to manually contact the supporting mutual aid agency to determine if a piece of apparatus is available. This triage process adds valuable minutes to the deployment process of the apparatus. This process can be automated using a CAD-to-CAD solution, reducing response time.

We are recommending a CAD-to-CAD integration project that will allow each participating agency to see which mutual aid apparatus is available, and potentially allow it to dispatch and track that piece of apparatus, as if it was their own. Not only will the mutual aid agency see its apparatus being dispatched by the other agency, but it also will see the incident and all of the units assigned to it. This level of transparency eliminates the possibility of the wrong apparatus being dispatched, and it provides visibility into the complexity of an incident. In the case of large-scale incidents, this level of integration provides all agencies a view of the situation and how resources are being deployed. Utilizing this information, the Office of Emergency Management (OEM) and participating agencies can cohesively coordinate responses, resources and evacuation procedures if the incident escalates, requiring a county-wide response.

As discussed below, the CAD-to-CAD integration also will provide the County and all participating agencies with a common map, using Geographical Information System (GIS) data, showing resources and incidents being responded to throughout the region.

Not only can the region benefit from enhanced situational awareness and response capabilities, but the County stakeholders also can benefit from economies of scale and cost savings by creating a regional interoperability network that links all of the PSAPs together.

1.4.4 Establish a Common, County-wide Geographical Information System Map for Public Safety

We recommend the implementation of a common county-wide map that can be used by all public safety agencies and PSAPs to enhance incident location identification. The common GIS-based map will be integrated with the CAD-to-CAD solution. The map will have Geographical Information System (GIS) data for each community that will provide PSAP staff and first responders with data that will assist their response to any incident.

The map will use a single street address (SSA) format, allowing each jurisdiction to dispatch to locations outside of its boundaries with certainty, reducing response time. The common map also will provide the County with the following capabilities, as examples:

- Ability to share information not only pertaining to law enforcement, fire, and emergency medical resources, but also to buses, snow plows, private ambulances, road hazards, public health emergencies, etc.
- Integrate through a single connection a multitude of external data sources, including ShotSpotter, electronic fire/burglar alarms, panic buttons, car telematics,[1] smartphones apps, texting, photos, video, social media, etc.
- Prepare the County for implementing a Next Generation 911 or NG911. This refers to an industry/government initiative to modernize the nationwide 911 public safety emergency communications system. The evolution of mobile consumer communications devices and applications is threatening to make the current 911 system – which is based on 1950s technology – obsolete. NG911 will expand users' ability to call 911 from a phone and to transmit text, images, video, and data to the 911 PSAP. In addition, the NG911 system will provide a dedicated emergency communications and data transfer capability among public safety agencies. This initiative has been led by the National Emergency Number Association (NENA) and supported by the Federal Communications Commission, the U.S. Department of Transportation, and other agencies. Partnerships between industry and government organizations have led to the development of technical and operational standards to guide the implementation process. Already, several U.S. states have implemented NG911 systems, including Vermont, Maine, and Indiana.

Several agencies within the County already share some mapping information, but in order for the CAD-to-CAD interoperability to work effectively, a regional map with all of the centerline street maps and public safety layers needs to be implemented. Much of this information is already available from each jurisdiction's GIS unit.

A key issue in implementing the CAD-to-CAD solution using a common GIS-based map is that the ProPhoenix CAD cannot automatically update its mapping module based on new updates from the Milwaukee County Land Information Office (MCLIO). MCLIO gets monthly GIS updates from each municipality then pushes out the collective updates to each. ProPhoenix does not use a standard GIS format and cannot receive them. Also, ProPhoenix does not have an interface with Pictometry. Pictometry is contracted by MCLIO for aerial mapping to include services during an emergency. Additionally, municipal fire departments use Pictometry to develop their pre-plans

[1] Car telematics refers to vehicular telecommunications technology (typically involving GPS) that makes it possible to record and map where a car is, how fast it's travelling, how a car is being driven, crash data, etc. Such data can be transmitted electronically to a central management system.

for a variety of incident types, but cannot upload these plans to ProPhoenix. Given that 10 municipal PSAPs and the OEM Communication Center use ProPhoenix CAD, we recommend that the County as a whole use its significant leverage to request that ProPhoenix make the changes required to automatically update MCLIO GIS data, as well as develop an interface for the Pictometry data.

The County, City of Milwaukee, and other municipalities will need to create a regional initiative that integrates the existing street centerlines, building footprints, hydrants, police zones, fire districts and other public safety map layers into a single format, useable by the CAD systems. This central repository will be used to update the regional map and the map of each participating agencies CAD map. MCLIO has offered to play a central role in this effort. We proposed that each jurisdiction in the County contribute quarterly updates to the GIS data base.

The regional map also will enable a standardized map view for all of the agencies along with accurate Estimated Time of Arrival calculations for resources throughout the region. A common map also insures that all CAD systems within the region have the same address verification capability, and that resources are deployed to the correct incident on the fastest route. Also, from a county-wide situational awareness perspective, the common map will provide OEM and other decision makers with a graphical overview of the available public safety assets during a county-wide emergency.

1.4.5 Expand the Use of Emergency Medical Dispatch (EMD) Protocol

EMS Com and the Medical College of Wisconsin have implemented a county-wide, condition-specific in-house pre-arrival instructions solution. That solution provides CPR instructions to certain callers in Milwaukee County. However, only three PSAPs are using a formalized EMD program: West Allis, City of Milwaukee, and Oak Creek. In order to bridge the gap, the remaining municipal PSAPs answering 911 emergency medical calls must perform a "live transfer" of the call to a medically trained "secondary PSAP" dispatcher, such as EMS Com.

Our recommendation is to expand full EMD capability throughout the County. For PSAPs that are not currently using a formal EMD program, we recommend implementation of a certified EMD-capable Commercial-Off-The-Shelf (COTS) product at each PSAP in the County. This action will provide standardized, advanced EMD capabilities throughout Milwaukee County.

1.4.6 General Mitchell International Airport Emergency Communications

Our evaluation of the use of the airport-based emergency communications and response systems produced a recommendation to upgrade the Airport Fire Station alerting system and integrate it with the OEM Communication Center, as well as the ATC Control Tower and the Airport Operations Center. Currently, fire personnel have difficultly hearing the alerts. The Fire Station needs an integrated solution to ensure alerting systems are triggered by the FAA crash

phones, the Airport Operations Center (AOC), and the County 911 ProPhoenix CAD, as well as locally by fire staff in the Fire Station. Our evaluation of the use of the airport-based emergency communications and response systems resulted in the following recommendations:

- Redefine the airport's use of the seven-digit emergency number to a non-emergency number and transition to using 911 as the emergency number used by airport travelers, tenants and employees. 911 calls will be handled by the OEM Communication Center.
- Upgrade the Airport Fire Station alerting system and integrate it with the OEM Communication Center, as well as the ATC Control Tower and the Airport Operations Center. Currently, fire personnel have difficultly hearing the alerts, using the old system. The Airport Fire Station needs an integrated solution to insure alerting systems are triggered by the FAA crash phones and the County 911 ProPhoenix CAD, as well as locally by fire staff in the Fire Station.

1.4.7 MCTS Transit Operations Center

We identified a lack of a back-up Transit Operations Center (TOC) to support the Milwaukee County Transit System (MCTS) as a primary risk issue. MCTS and OEM can collaboratively solve the lack of a back-up facility for the TOC. This issue could be addressed immediately by establishing the TOC back-up facility in the OEM Communication Center and permanently by housing the back-up in the new OEM facility. Taking this approach will benefit OEM by providing it with immediate access to TOC bus location data during a disaster, such as a mass casualty incident, allowing OEM to access and use the transit dispatch system to organize the transport of victims and public safety personnel as needed.

1.4.8 Milwaukee County Highway Division GPS Tracking System

The County's Highway Division has implemented GPS tracking devices on some of its vehicles. The vehicle location is available via a web site. We recommend making the website available to the OEM Communication Center and the County Emergency Operations Center (EOC). Giving the Communication Center and the EOC access to the website will enhance the ability to see road status during snow storms and other emergencies. We also recommend expanding the use of the Highway Division's GPS system to all vehicles. Furthermore, we recommend the future consideration of adding the Division's dispatching operation into the new County OEM facility.

1.5 Cost Estimates

We prepared cost estimates for each of our recommended initiatives. We used multiple data sources for these cost estimates to include vendors, open source data (Internet), and our personal experience with the costs for the specific systems. The capital and recurring costs

associated with each recommended initiative are presented in the respective sections of the report.

1.6 Governance Options for Managing New Initiatives

In regard to governance of these initiatives, we recommend using a form of the current governance model that is being used for the county-wide P.25 radio project through an intergovernmental agreement. Options that could be considered for governing the county-wide public safety initiative include:

- Increasing the municipal government representatives on the P.25 board and modifying the decision-making process to give municipalities a greater decision-making role.
- Establishing a separate 911 committee that would separately manage the county-wide public safety initiatives, using separate subcommittees to manage each initiative.

Amendments to this agreement could be added to address the proposed initiatives. Such amendments could document the roles and responsibilities of the partner agencies, cost allocation, and ongoing operational maintenance requirements for each partner.

1.7 PSAP Consolidation Case Study

We also developed a case study of a potential consolidation scenario between the City of Wauwatosa and Milwaukee County that is intended to serve as a guide for any municipality considering potential consolidation of its PSAP into the County 911 Center. Our study is a hypothetical analysis that uses data provided by Wauwatosa and OEM to illustrate potential costs, benefits, and impacts associated with consolidation of a municipal PSAP at OEM.

Our operational plan for the hypothetical consolidation scenario assumes that Wauwatosa would contract with the OEM Communication Center for services to include:

- 911 emergency call taking
- Related non-emergency public safety call taking
- Dispatching services for Wauwatosa Police, Fire and EMS
- Dispatch of towing companies upon Wauwatosa police request
- Provide criminal history information upon Wauwatosa police request
- Serve as the Primary Mutual Aid Box Alarm System (MABAS) dispatch center for Wauwatosa fire department.

We assume that the OEM Communication Center could absorb the public safety calls and dispatch volume for Wauwatosa with two workstations dedicated specifically to Wauwatosa

dispatching (this is a reduction from the three workstations currently used in Wauwatosa). OEM would need to add six full-time positions to its Communication Center to handle the additional dispatching responsibilities. No additional supervisory staff would be required.

We also recommend that non-emergency functions that are currently handled by Wauwatosa's PSAP – such as prisoner monitoring, administrative police calls, and window service – be retained by the Wauwatosa Police Department. Our modeling adds three full-time desk clerk positions to accommodate those responsibilities.

Our analysis indicates potential annual net savings of about $150,000 for Wauwatosa in operating and capital expenditures combined. This estimate takes into account the need for the additional desk clerk positions in Wauwatosa and an overhead charge by the County.

Among the potential operational improvements that would result from our hypothetical consolidation scenario would be improved dispatch processing times for 911 wireless calls emanating from Wauwatosa; cost efficiencies in purchasing, technology maintenance, and PSAP staffing; and higher retention rates and staff effectiveness through new career ladders and opportunities.

1.8 Implementation Timeline

Our proposed timeline for implementing the recommended initiatives are presented in the respective sections of the report. These timelines were developed based on discussions with vendors, open source data (Internet), and our personal experience with implementing these recommended systems.

2.0 Overview of Project Scope of Work

The Project Scope as stated in the Public Policy Forum (PPF) Request for Proposal focused on answering the following questions:

- What are the options for upgrading/replacing the OEM/PSAP and moving it from its current location by December 2018?
- Are there such options that would logically make the 911 PSAP attractive as a 911 call taking and dispatching center for other County departments and municipalities?
- What is the general feasibility of consolidating 911 call-taking, dispatching and Command Center cervices at one, two, or three centers in Milwaukee County?

Additionally, in the future, OEM will include the relocation of four divisions to a secure campus with opportunities for expansion. Based on this future operational concept, the study shall assess how to align 911 call taking and dispatching operations with a central Command Center operation while also taking into account the possibility of including municipal 911 call taking and dispatching.

Specifically the study should consider the following options:

- Options for replacing/upgrading the OEM 911 Communications Center
- Options for consolidating one or more 911 dispatch services that currently reside within County Departments:
- General Mitchell International Airport (GMIA)
- GMIA Fire Department
- Highway Division
- Milwaukee County Transit Services
- OEM's EMS Communications
- OEM's 911 Communications
- Opportunities and options for possibly consolidating municipal 911 call taking and dispatching services with Milwaukee County 911 and dispatch services
- Strategies for consolidating the following into the County Command Center
  - Emergency Alerting
  - 911 call-taking
  - Pre-arrival medical instructions
  - Dispatch operations
  - EMS Communications and Resource Coordination
  - Public Health trend collection/analysis
  - Emergency Operations Center
  - Network Operations Center

In addition, during the course of the study, the possibility emerged of including the Southeast Wisconsin Healthcare Emergency Readiness Coalition (HERC Region 7) in the new County Command Center. Consequently, that option was considered as well.

The Scope of Work also stated the following: "The national consultant and PPF would prepare a final report that would summarize the collected data, lay out potential Milwaukee County PSAP upgrade and consolidation options, and suggest possible paths toward implementation. The final report would be provided to Milwaukee County and the Intergovernmental Cooperation Council and would be released to the public and disseminated with their advice and consent."

3.0 Our Methodology

Our team conducted site visits to the largest PSAPs and dispatch centers in Milwaukee County, interviewed stakeholders from different agencies, and gathered specific budgetary, operational, technical, and facility-related data. We also provided a pre-site visit questionnaire that requested data in numerous areas relevant to the analysis.

3.1 Focus Areas

The areas of focus include the following:

- Services (type of services provided, service level required, actual service activity, methods of delivery, etc.)
- Capacity and technology
- Processes and procedures
- Facilities (location, size, ownership, functional layout, construction, power, etc.)
- Personnel/staffing (organizational structure, staffing size, compensation, positions, job requirements, overlap with non-dispatch functions, tasks, etc.
- Capital and operational costs and future cost projections
- Governance (oversight, funding control, operational directions, etc.)

3.2 Site Visits and Interviews

We conducted site visits and interviews with representatives from the Milwaukee County Office of Emergency Management (OEM), including:

- Emergency Management
- Emergency Medical Services Communications Center (EMS Com)
- County 911 Communications
- Radio Services

Our team also visited or interviewed representatives from the following County agencies:

- General Mitchell International Airport (GMIA)
- GMIA Fire Department
- Highway Division
- Milwaukee County Transit System
- Milwaukee County Land Information Office (MCLIO)
- Milwaukee County Information Management Services Division (IMSD)

We also conducted site visits and interviews with the following municipal PSAPs and public safety agencies:

- Bayside Communications Center (serves Bayside, Brown Deer, Fox Point, Glendale, River Hills, the North Shore Fire Department, Shorewood, and Whitefish Bay)
- Oak Creek Communications Center (serves Oak Creek and St. Francis)
- City of Franklin
- City of Milwaukee, including representatives from the Police and Fire Departments and the City's PSAPs
- City of West Allis
- City of Wauwatosa
- City of Greenfield

3.3 Use of Public Safety Communications Best Practices

Winbourne Consulting gathered Best Practice information from other jurisdictions as part of our analysis and recommendation process. The purpose of reviewing the Best Practice examples is not to merely consider copying them or forcing an application to Milwaukee County. We have used them to clarify the use of multiple operational, organizational, and technical models that can be applied to enhancing public safety services in Milwaukee County.

Below, we describe several national best practices and their specific relevance to Milwaukee County.

3.3.1 Public Safety Data Integration and Sharing

Data interoperability is emerging as a key public safety requirement. It is taking on the imperative that voice interoperability did after the attacks on September 11, 2001. The challenge of public safety data interoperability between Computer Aided Dispatch (CAD) systems is being addressed by a growing number of communities and technology vendors across the U.S. Data interoperability is developing as a requirement for multi-jurisdictional regions that share multiple borders. During the past 5-10 years, the number of regions across the U.S. that are using a form of CAD interoperability or CAD-to-CAD interface has continued to grow.

3.3.1.1 CAD-to-CAD Overview

A key challenge for many PSAPs is the lack of timely access to personnel and resource information in neighboring jurisdictions, particularly when units in the neighboring jurisdiction are the closest available to the incident. When an incident occurs near the border between jurisdictional areas, dispatchers lose time by having to make phone calls to locate and dispatch the closest resources.

CAD-to-CAD interoperability can speed the incident response by using pre-determined dispatch agreements to send the closest available unit automatically. Using this solution, dispatchers

can view all resources available to them, as if they were their own, including those located in neighboring jurisdictions. The PSAP CAD systems can use this information to automatically dispatch resources based on closest distance to the incident and required type of unit.

The major benefits of CAD interoperability include:

- Reduction in response time
- Increased personnel efficiency
- Increased vehicle efficiency
- Situational awareness

The reduction in response time can potentially equate to lives saved, while the increase in personnel and vehicle efficiency can prove valuable to agencies with constrained funding.

The table below presents examples of CAD-to-CAD regional initiatives in large jurisdictions and regions in the U.S. Each of these jurisdictions has reported on incidents aided by the CAD-to-CAD solution they use.

Region	Population
Virginia: Fairfax County, Arlington County and the City of Alexandria	Over 1.6 million residents
California: Silicon Valley Regional Interoperability Project (SVRIP): 19 PSAPs in Santa Clara County	Over 1.8 million residents
California: San Diego Regional Interoperability Project: 14 public safety agencies and PSAPs	Over 1.4 million residents
Oregon: Lake Oswego City, the City of Portland, and the counties of Multnomah, Clackamas, Clark, Columbia, and Washington	Over 2.3 million residents
Arizona: Cities of Phoenix and Mesa	Over 2 million residents
Massachusetts: Boston, Cambridge, Brookline, Chelsea, Everett, Somerville, Quincy, Winthrop, Revere, Northeastern University, Harvard University	Over 4 million residents
California: Los Angeles Fire Department, Verdugo Fire Communications Center (dispatches for 12 fire departments), Los Angeles City Fire Department, Long Beach Fire Department	Over 11 million residents
Tennessee: Nashville Regional Information System includes 24 PSAPs	Over 1.7 million residents

While CAD-to-CAD integration is most valuable to Fire and EMS, it also provides situational awareness and resources for Law Enforcement. Utilizing a CAD-to-CAD solution throughout the County would reduce response time and also would create a cooperative environment for Law Enforcement by providing a view of resources near jurisdictional borders, as well as incidents on the adjoining border that could impact each jurisdiction.

In an integrated environment, all jurisdictions can actively cooperate to provide the fastest and most comprehensive response to all types of incidents. Not only does this solution enhance the Fire and EMS mutual aid capability, but it also provides Law Enforcement with a visual of all Police and Sheriff units in the vicinity of a major incident. In situations such as a high-speed car chase through multiple jurisdictions, the CAD-to-CAD solution prevents the use of too many units trying to follow the suspect; instead, each agency has situational awareness of all units near the suspect vehicle and they can respond more effectively. Such awareness also could enhance the ability of law enforcement entities to engagement in predictive deployment of resources during major incidents.

Having a CAD-to-CAD solution also would improve technological cooperation and coordination between all public safety agencies. For example, in anticipation of changes in 911 communications related to Next Generation 911 (NG911),[2] CAD-to-CAD would allow Milwaukee County to benefit from all of the NG911 data utilization functionality and integration, including electronic fire/burglar alarms, panic buttons, car-telematics, [3] shot-spotter, smartphone apps, texting, photos, video, and social media that will be implemented over the next few years.

Finally, a CAD-to-CAD solution could dovetail effectively with recent developments both on the federal level and locally that will similarly promote enhanced data sharing across jurisdictions:

- The federally funded FirstNet initiative will provide broadband data to public safety agencies using a dedicated network statewide and eventually connect each state into a national network. The FirstNet network will provide a similar capability for sending fingerprints, mug shots, building layouts, and records data among participating agencies. Industry estimates indicate that FirstNet deployment will start in the early 2020s.
- FirstWatch/FirstPass is an Emergency Medical Services dashboard application already being used by North Shore Fire and Rescue, Milwaukee Fire Department, Wauwatosa Fire Department, and the Greenfield PSAP. The product provides real-time surveillance

[2] NG911 is an industry/government initiative to modernize the nationwide 911 public safety emergency communications system in light of the evolution of mobile consumer communications devices and applications. NG911 will expand users' ability to call 911 from a phone and to transmit text, images, video, and data to the 911 PSAP. In addition, the NG911 system will provide a dedicated emergency communications and data transfer capability among public safety agencies.

[3] Car telematics refers to vehicular telecommunications technology (typically involving GPS) that makes it possible to record and map where a car is, how fast it's travelling, how a car is being driven, crash data, etc. Such data can be transmitted electronically to a central management system.

using live analysis of data to identify patterns and trends as they emerge from real-time Records Management Systems, Computer Aided Dispatch, and Electronic Patient Care Reporting data. FirstWatch/FirstPass analyzes 911 call center data for police, fire, or EMS. The dashboard allows supervisors to monitor incidents by determinants, or dispatch levels associated with key metrics in terms of case entry performance. As a future consideration, this application or one like it could serve as a dashboard to monitor and manage multiple public safety assets across the County for coordination during an incident requiring multiple jurisdiction response.

3.3.1.2 Relevance to Milwaukee County

Our data gathering process involved interviews and site visits with multiple County PSAPs and agencies. During this process, we discovered that several of the agencies already had implemented or were exploring data sharing options. For example, the Bayside and Oak Creek communications centers already share data between their participating agencies. The City of Greenfield also is exploring data sharing with neighboring PSAP agencies, but there is no county-wide standard or mechanism to connect all of the PSAPs within the County.

During the interview process, all of the PSAPs expressed interest in sharing information with surrounding agencies in order to expedite mutual aid responses, coordinate resources for major events, and respond to multi-agency incidents. Specifically, the City of Milwaukee Fire Department expressed a desire to electronically share resource information with all of the bordering agencies and Milwaukee County in order to expedite mutual aid responses. The desire to expedite mutual aid responses by utilizing electronic interconnectivity between PSAPs was a universal desire by all PSAPs interviewed.

3.3.2 Using a Common GIS-based Map

A best practice associated with public safety communications systems is the use of a GIS-based map. The use of a common map can contribute significantly to reducing the need for multiple street and address data sources that can slow response time. In addition, a GIS/CAD-centric system with good editing tools can provide the ability to update files more frequently, ensuring greater location accuracy as well as providing a single authoritative source for street and address data accessible to authorized users across the entire region.

3.3.2.1 Mapping and Next Generation 911

Over the next four to five years, a major goal of the Federal Communications Commission is to implement Next Generation 911 systems. As consumer communications technology continues to evolve at an exponential rate, PSAPs are challenged to avoid obsolescence by transforming themselves to updated technologies. For example, the Apple iPhone entered the consumer

market only nine years ago, and during this time period, consumers have come to rely on their Smart phones for all services. Unfortunately, the ability of PSAPs to communicate with people using Smart devices is limited to voice, causing them to fall dramatically behind the technology curve.

Mapping is the core element of a Next Generation 911 system. In an NG911 system, GIS-based maps play a more critical role in determining to which PSAP a 911 call is routed. Geospatial call routing enables more accurate call routing than traditional E911 systems. The accuracy of jurisdictional boundaries and the GIS polygon layers will have a dramatic impact on call routing.

To route 911 calls based on location, the NG911 system must use GIS data depicting the PSAP service area boundaries. If the location provided in the query is a civic location, this will be converted into map coordinates to be intersected with the PSAP on a GIS-based map. This approach adds accuracy to the location determination.

3.3.2.2 Relevance to Milwaukee County

The use of a single, common regional map among PSAPs and first responders in Milwaukee County has potential to improve response times. In addition, the use of a common map would enhance the County public safety agencies' ability to manage resources and response across a Common Operating Picture during a major incident or event, or between two adjacent communities.

Use of a common, GIS-based map also would help prepare County agencies for the transition to NG911. In order to share electronic data between PSAPs, a common County map needs to be created and maintained. While there is already cooperation between Milwaukee County and the City of Milwaukee to share the core street centerline, address and cadastral or land ownership data, the effort to incorporate Public Safety information layers into the common map also is required. Along with the County and City of Milwaukee, all municipal PSAPs also need to participate in order to create a comprehensive map with standardized public safety map layers. All the PSAPs that were interviewed were in favor of a common county map, but had questions about how the common map would be shared with the participating agencies.

We interviewed the Milwaukee County Land Information Office (MCLIO). The discussion revealed that the effort to create and maintain a common countywide map already is in progress. The GIS information will be made available to municipal and county agencies via a portal. The MCLIO is capable of adding the necessary public safety layers and making the complete map available to all of the CAD systems via a portal.

MCLIO also brought to our attention several concerns that would impact the implementation of the CAD-to-CAD solution using a common GIS-based map. The ProPhoenix CAD that is used by

10 municipal PSAPs and the OEM Communication Center cannot automatically update its mapping module based on new updates from MCLIO. The reason is that ProPhoenix does not use a standard GIS format and cannot receive them. An additional issue associated with ProPhoenix and GIS is that ProPhoenix does not have an interface with Pictometry. Pictometry is contracted by MCLIO for aerial mapping to include services during an emergency. This lack of an interface impacts some of the municipal fire departments that use Pictometry to develop their pre-plans for a variety of incident types, since ProPhoenix cannot upload these plans. We recommend, given that 10 municipal PSAPs and the OEM Communication Center use ProPhoenix CAD, that the County as a whole use its significant leverage to request that ProPhoenix make the changes required in order to automatically update MCLIO GIS data as well as develop an interface for the Pictometry data.

3.3.3 Using Emergency Medical Dispatch (EMD) Protocols

Dispatch has historically been the weakest link in the Emergency Medical Services (EMS) delivery chain. The vital role that EMS dispatch plays in operational efficiency and the delivery of patient care is now the focus in controlling the cost of health care. In fact, dispatch is fast becoming the focal point of EMS systems and a key determiner of best practice operations, according to the National Academy of Emergency Medical Dispatch (NAEMD).

As the 911 industry has evolved, it is now widely recognized that PSAPs that receive calls for emergency medical assistance from the public and that dispatch emergency medical personnel should have an emergency medical dispatcher program in use.

ASTM, a leading standards organization, has established ASTM Standard F1258-Standard Practice for Emergency Medical Dispatch. The standard is recognized by many public safety standards organizations such as the National Emergency Number Association (NENA) and Association of Public Safety Communications Officers (APCO).[4]

The ASTM standard is used as a basis in developing a standardized county-wide EMD program. According to the standard, an effective EMD practice is based on the consistent use of medically approved dispatch protocols. These protocols consist of a written system of procedures for the evaluation of, response to, and provision of care to emergency patients. A written dispatch protocol system directs the EMD to complete a chief-complaint-specific, preplanned interrogation of the 911 caller to accurately assess and act on the medical emergency.

[4] Website addresses for these organizations are www.astm.org; www.nena.org; and www.apcointl.org.

It is recommended that emergency medical dispatch protocols:

- Be medically approved.
- Be uniform throughout each EMS jurisdiction.
- Use standard response classification codes to facilitate scientific comparison and study among systems using the same protocols.
- Implement a uniform capability among all the PSAPs to allow dispatchers to direct the most appropriate pre-hospital resource/response based on the condition of the patient.

3.3.3.1 Relevance to Milwaukee County

There is a national trend for the standardization of EMD programs, and Wisconsin's EMS program also is part of this trend. The County EMS Com's mission is to lead a unified/coordinated integrated county-wide EMD System and is supported by being the referral center for any jurisdictional PSAP that may not currently have the capability to provide emergency medical pre-arrival instructions to callers. The EMD expansion initiative would expand the County's current capabilities to a standardized EMD regional training and certification center.

3.3.4 Mission Critical Facility Design Parameters Best Practices

The term "Mission Critical Facilities (MCF)" refers to buildings or equipment, process, procedure, software, etc. that are essential to an organization or its business operation. Failure or disruption of a mission critical facility or system will result in a serious impact on business operations or organization, and even catastrophes. Data centers, hospitals, laboratories, PSAPs, Emergency Operations Centers, and military installations are just a few of the many types of buildings that could be considered mission critical.

Best practices associated with the design, construction, fit-out, and maintenance of MCFs include the following considerations:

Site Selection and Overall Design: Based on the jurisdiction's threat assessment, the primary threats (man-made or natural) are established. The threat assessment provides the design team with requirements for building design for hardening, flood, etc. The facility could be designed to withstand/mitigate the effects of a major disaster, such as a tornado, flood, earthquake, bomb blast, or all of the above. Facility security systems such as closed-circuit television (CCTV), access controls, and guard stations should be included.

Redundancy Systems: The facility's mechanical, electrical, and plumbing (MEP) systems must be designed for redundancy, allowing the facility and its systems and operations to continue to operate independently. Also, the data and voice systems in the facility need to be designed and implemented to provide redundancy in case of failure of any one part of the system; and

diverse network and communications Points of Entry (POE) in building must be included in the design.

Personnel areas: The design should accommodate personal areas such as quiet room, kitchen, eating areas, lactation room, restrooms, exercise room, sleeping area, lockers, and shower facilities since staff may be unable to leave for extended periods of time. Parking must accommodate facility personnel and visitors in separate areas. Surge requirements for personnel reporting to the EOC during an exercise or actual incident must be incorporated, as personnel must have access to parking, secure badging, and personal areas.

3.3.4.1 Relevance to Milwaukee County

Using these design parameters for the OEM's consolidated facility will ensure that the new facility is a protected, redundant communications facility that will continue to operate under a range of disaster-related scenarios. As the OEM facility will house such mission critical functions as the County 911 Center, County Radio Services, Emergency Operations Center, and EMS Com, designing and constructing a resilient, redundant facility is imperative for the County and its ability to provide emergency response and coordination under all conditions.

3.3.5 Transportation-Public Safety Co-location Best Practices

From a best practice perspective, there is a trend to co-locate transportation monitoring and management centers with emergency communications because of the increasing impact that road traffic has on public safety response times and emergency management operations planning and management. Examples of this combined services facility are presented in the table on the following page.

Facility and Location	Services Co-Located
McConnell Public Safety and Transportation Communications Center in Fairfax County, VA http://www.fairfaxcounty.gov/dpwes/construction/pstoc/	• County 911 Center • County Emergency Operations Center • Virginia Department of Transportation SMART Traffic Center • Virginia State Police dispatch center for northern Virginia
Montgomery County, MD Emergency Services facility, http://www.montgomerycountymd.gov/mcfrs/about/911.html	• County Transit Operations Center • County 911 Center • County Emergency Operations Center • County Radio operations and maintenance
Austin Texas Combined Transportation, Emergency, and Communications Center (CTECC) http://www.austintexas.gov/department/combined-transportation-emergency-communications-center-ctecc	• Austin-Travis County Emergency Medical Services • Austin Fire Department • Austin Police Department • Austin Transportation Department • Office of Homeland Security and Emergency Management (HSEM) • Travis County Sheriff's Office • Travis County Constables • Travis County Office of Emergency Management • Texas Department of Transportation • Courtesy Patrol • Intelligent Transportation System • Capital Metropolitan Transportation Authority, Fixed Route Dispatch

Access to transit vehicle location and status can be used by emergency managers to employ buses for mass evacuations and to transport victims in mass casualty incidents. Access to the transit system will provide additional information to the EOC's situational awareness of the common operating picture during an incident.

Over the past 10 years, the trend to either co-locate or closely integrate the transportation systems and emergency communications/dispatch operations has emerged as a best practice. The impact that traffic has on emergency response is recognized as one of the most important public safety issues, not only in the U.S., but internationally.

3.3.5.1 Relevance to Milwaukee County

The Milwaukee County EOC and 911 staff could benefit from having access to WisDOT and MCTS systems in several ways, including:

- Enhanced situational awareness for the EOC and dispatch staff
- Improved ability to respond to mass casualty incidents by managing traffic patterns for emergency vehicles access and use of public transport to move victims

- Faster response times for Sheriff's deputies responding to highway incidents

3.3.6 Airport Emergency Calling Practices

One area of investigation involved emergency call taking at Milwaukee's General Mitchell International Airport (MKE). Winbourne Consulting interviewed several major airports across the U.S. to document the many different ways that emergency calls are handled in airports. The table on the following page presents that information for various U.S. airports. The list is not intended to be comprehensive, but to illustrate the various practices and procedures used by different airport authorities. By comparison, MKE had 3,228,607 enplanements in CY 2014.

Airport	CY 14 Enplanements	Emergency Call Practices
Washington Reagan (DCA)	10,115,546	• Both airports are owned by the Washington Metropolitan Airport Authority (MWAA) • MWAA has own police and fire departments • MWAA has an 11 position PSAP located at DCA, serving both airports. It is a secondary PSAP • 911 calls are transferred to PSAP from Arlington County (primary PSAP) • Use a 10-digit number for alerts regarding alarms (doors, duress buttons, parking area blue lights) • Employees use 10-digit number for emergencies and non-emergencies • Also responsible for emergency calls along Dulles Tollway (Fairfax or Loudon County PSAPs are primary)
Dulles International (IAD)	10,415,948	
Thurgood Marshall-Baltimore Washington International (BWI)	11,022,200	• BWI is managed by the Maryland Department of Transportations' Aviation Administration (MAA) • MAA manages BWI Airport Fire & Rescue Department's Fire Suppression Division • Maryland Transportation Authority Police provides law enforcement • Airport has a secondary PSAP within it, 911 calls are first routed to the Ann Arundel County 911 center then transferred to the airport 911 center • BWI has implemented Keri's law for all administrative, tenant and courtesy phones • Uses a 4-digit number in the airport for non-emergency calls
Indianapolis International Airport (IND)	3,605,908	• IND is owned and operated by the Indianapolis Airport Authority (IAA) • IAA manages 6 airport and one heliport in the County • Airport has its own police and fire departments • 911 calls are routed to the Indianapolis-Marion County 911 Center then transferred to the airport's secondary PSAP (7 positions) • Airport PSAP uses same CAD and radio as the Indianapolis-Marion County 911 Center • Tenants and employees us 911 for emergencies. Although some still call the Airport Operations Center on a 4-digit line
Cleveland Hopkins International Airport (CLE)	3,686,315	• CLE is owned by the City of Cleveland • 911 calls are routed to the City 911 center and dispatched from there for fire, police and emergency medical services • There are courtesy phones throughout the airport that dial "4888" for medical emergencies which go to the airport fire station • Airport law enforcement is provided by a division of the Cleveland Police Department

3.3.6.1 Relevance to Milwaukee County

Currently, emergency calls are handled by both the County 911 Center and the Airport Operations Center. How emergency calls are handled and the speed they are answered can have important consequences. We have proposed changing the use of a 7-digit telephone number by tenants and staff for emergency calls to the Airport Operations Center to dialing directly to 911, which will be answered by the County 911 Center.

This solution will place professional telecommunicators answering all emergency calls. The dispatching for law enforcement, fire, and emergency medical services within the airport boundaries can be performed by the County 911 dispatchers.

4.0 Principal Findings, Recommendations and Related Cost Estimates: County-wide

4.1 CAD-to-CAD Integration

4.1.1 Overview

Based on our discussions with the City, County, and municipal PSAPs, we have found widespread support for establishing a CAD-to-CAD (Computer Aided Dispatch) connectivity between OEM, the City of Milwaukee PSAPs, and all other municipal PSAPs within Milwaukee County. Prior to these discussions, there were steps taken in this direction by some of the municipal PSAPs in developing a ProPhoenix CAD interface for sharing some dispatch data, but a comprehensive county-wide solution has not been attempted.

The CAD-to-CAD solution would provide all the PSAPs with actual dispatch information for incidents. Each PSAP can select at its own discretion only incidents along its boundaries, all county-wide information, or other subsets. The CAD-to-CAD solution can provide adjacent PSAPs access to data from a variety of applications to include shot-spotter, electronic fire/burglar alarms, panic buttons, car-telematics, smartphone apps, texting, photos, video, social media, etc., if available.

Also, the County's EMS Com is seeking to enhance EMS-related communications throughout the County, and a CAD-to-CAD solution could be a practical means of allowing PSAPs to dispatch the closest available unit to the patient. Similarly, this solution could advance efforts to provide closest available unit dispatching for fire and police events.

4.1.2 Benefits of a CAD-to-CAD Solution

Using a CAD-to-CAD solution, the participating PSAPs can receive dispatch information related either to their neighboring community or to the County as a whole, enhancing situational awareness. Each agency maintains complete control over its data and the resources it shares with others, and each plays a role in determining which data and resources it wants to receive. Specific benefits that can be obtained through this integrated approach include the following:

- Provide a County-wide public safety solution for sharing incident information, delivering each entity with incident information in a timely manner.
- Opportunity to evolve to closest available dispatch for ambulance and fire calls for service.
- Add to the capabilities provided by the regional P.25 radio system by adding additional capability for regional response.

- Enhance the regional disaster response by making regional incident data available during a major incident.
- Ability to "Geo-Fence" each municipality region and adjacent areas so municipal public safety officials can see incidents in their municipality and adjacent areas.
- Opportunity to not only connect all of the PSAPs within the County, but also to expand to connect neighboring counties as well, thus forming a regional CAD interoperability solution that will extend situational awareness.

4.1.3 Recommendation

We believe that Milwaukee County should immediately pursue a CAD-to-CAD solution that will involve all PSAPS in the County. Since PSAPs within the County use multiple CAD systems, the CAD-to-CAD solution will require installing interfaces between those CAD products and the base CAD-to-CAD system. Also, a CAD-to-CAD governance agreement and structure will need to be developed that will address membership, decision making, use of the software, system security, and cost allocation. The existing P.25 governance structure could serve as a model for such an agreement, or could be expanded to encompass such an agreement.

Currently, there are four different models of CAD-to-CAD connectivity available for PSAPs in the Public Safety market:

- **Consolidation Model** – Multiple PSAPs join together to form one large center and utilize a single CAD system. The Consolidation Model provides a fully integrated solution for the participating agencies, but it does nothing for neighboring agencies.
- **Point-to-Point Interface Model** – Two PSAPs with different CAD vendors contract each CAD vendor to create an interface between the two CAD systems. The Point-to-Point Interface Model can provide a fully integrated solution between the participating PSAPs. It is typically very expensive and difficult to maintain, however, because each time a CAD vendor upgrades its CAD system, there is a high likelihood that the CAD-to-CAD interface breaks. Furthermore, the Point-to-Point Interface Model, like the Consolidation Model, does not address connectivity with neighboring agencies.
- **Message Broker Model** – Two or more PSAPs with different CAD vendors contract with a third party vendor to create a rudimentary hub that acts as a transfer agent to deliver basic CAD information to each participating CAD system. The Message Broker Model provides a more flexible solution by interconnecting two or more PSAPs CAD systems, but it generally is not robust enough to provide the flexibility and functionality required by most PSAPs.
- **Intelligent Hub Model** - Two or more PSAPs with different CAD vendors, or the same CAD vendor, contract with a third party vendor to create an intelligent hub that acts as a

transfer agent to deliver complex and configurable CAD information between all participating CAD systems. The Intelligent Hub Model is similar to the Message Broker Model in that it connects two or any number of CAD systems, but it is infinitely more flexible and functional for about the same cost.

We recommend using an Intelligent Hub Model. Intelligent Hub is the best two-way CAD-to-CAD solution and also can serve as the bridge that will enable all participating PSAPs and agencies to gain access to external data sources (including, but not limited to, electronic fire/burglar alarms, panic buttons, car-telematics, shot-spotter, smartphone apps, texting, photos, video and social media). Agencies have complete control over the data and resources that they share with others, and which data and resources they consume.

4.1.4 CAD-to-CAD Cost Estimate

While a precise cost estimate would need to be determined after in-depth analysis and determination of the PSAPs that would be involved, we estimate that the total capital cost of implementing this recommendation countywide would be $990,000, consisting of the following components:

- $370,000 for a base CAD-to-CAD solution for all PSAPs in Milwaukee County. The PSAPs include Milwaukee County, the City of Milwaukee (fire and police), Oak Creek, Bayside, and all independent municipal PSAPs.
- $120,000 for the interfaces for the City's two CAD systems to the CAD-to-CAD solution.
- $250,000 for the ProPhoenix interface to the CAD-to-CAD software. This cost estimate assumes a solution for all ProPhoenix CAD PSAPs in the County.
- $250,000 to install and integrate all local CAD systems to the CAD-to-CAD solution.

We also estimate a recurring cost for maintenance of approximately 15-17% of software cost, or between $115-130,000/year.

4.1.5 CAD-to-CAD Estimated Implementation Timeline

Since the CAD-to-CAD integration requires standing up the intelligent hub and connecting it to all of the CAD systems within the county, the implementation timeline involves coordination of the CAD interfaces between the CAD-to-CAD solution and the City of Milwaukee's Tiburon and Archonix CAD systems, as well as with the municipal and County PSAP ProPhoenix CAD system. In addition, the intelligent hub must be installed and connected to all of the participating PSAPs' CAD systems.

Typical CAD integration to the intelligent hub takes up to six months to accomplish. The overall process would take six to 10 months, as shown in the table below:

Implementation Timeline CAD System Integration with Intelligent Hub CAD-to-CAD Solution	
High Level Task	Estimated Timeline
CAD systems Integration with the Intelligent Hub solution—interface development, testing and acceptance	3-6 months
Intelligent Hub solution installation, testing and acceptance	2-3 months
Testing and Acceptance of integrated solution—Intelligent Hub and CAD systems across County	1 month

4.2 Establishing a Common, County-wide Public Safety Geographical Information System (GIS)-based Map

4.2.1 Overview

We analyzed the potential for establishing a common GIS (Geographical Information System) mapping solution between County, City of Milwaukee, and municipal PSAPs within Milwaukee County. A county-wide GIS map would include all relevant public safety layers. These layers can include fire hydrants, Fire/EMS districts, Police zones/districts, school/hospital pre-plans, and other vital information to help first responders throughout the county. Also, for location information, inclusion of political boundaries and street and building information from utilities and tax assessor data can be critical.

Based on our discussion with the Milwaukee County Land Information Office (MCLIO), City of Milwaukee, and many of the municipalities, we have found widespread support for a common GIS mapping solution. In fact, some initial steps already have occurred. Milwaukee County, the City of Milwaukee, and several municipalities are sharing some GIS mapping data. Milwaukee County already maintains a County-wide GIS map that includes detailed street layers and topography. The County GIS office also does periodic fly-overs in order to keep the topography layer current and relevant.

MCLIO has stated that it fully supports the addition of layers specific to public safety, including fire hydrants, Police Zones/Districts, Fire/EMS Districts, school/hospital pre-plan information, as well as any other information that would be helpful to PSAPs and first responders.

4.2.2 Examples of Public Safety GIS Layers and Data Sets

Examples of public safety GIS layer data sets include the following:

Road/Streets

- Street Center Line maps of each jurisdiction including one way streets, speed limits, bridges with height and load, railroad tracks, stop signs, stop lights

- Aerial imagery
- Jurisdictional Boundaries
- Evacuation Zones and routes
- Snow plowing priority roads
- Fire Response Zones
- EMS Response Zones
- Police Response Zones
- Bus routes
- Parcels, including building footprints
- Critical Infrastructure (transmission pipes, etc.)
- Fire Hydrants

Buildings

- Airports
- Police districts/stations/substations/special units
- Fire stations/substations/special units
- EMS stations
- PSAPs
- Schools
- Hospitals and clinics
- Drug stores
- Jails, prisons, detention centers, etc.
- Courts
- Municipal/County/City government buildings

Other

- State law enforcement agencies
- Federal agencies: FBI, Marshalls, etc.
- Coast Guard

4.2.3 GIS-Mapping Recommendation

Based on our investigation into the needs of the Milwaukee County PSAP, the City of Milwaukee PSAP, and the municipal PSAPs within the county, our team has concluded that creating a County-wide GIS map is a viable near-term option. This conclusion is based on the County's willingness to create and maintain a County-wide GIS map, and assumes a willingness and interest by the City of Milwaukee and other Milwaukee County municipalities to contribute timely public safety information to this endeavor. It is also based on the knowledge that the

MCLIO already supports map data input from outside sources, and that the office is capable of adding public safety-specific GIS layers. [5]

Specific components of this recommendation are as follows:

- OEM should work with MCLIO, the City of Milwaukee, and all of the municipal PSAPs to establish the criteria by which each contributing agency will provide the public safety-specific information (such as fire hydrants, Police zones/districts, Fire/EMS districts and school/hospital pre-plan information) to the County GIS on a timely basis for incorporation into the county-wide map.
- In order for the information to be useful, participating jurisdictions should provide updates to the MCLIO on a quarterly basis.
- The MCLIO should publish the updated county-wide map to all participating agencies on a quarterly basis.
- MCLIO and municipalities utilizing the ProPhoenix CAD system should incorporate the updated county-wide map layers into the CAD system.
- County and municipal PSAPs utilizing the ProPhoenix CAD solution should request that ProPhoenix incorporate an ESRI-based GIS mapping option into their CAD systems. This action would enable all of the ProPhoenix CAD users to electronically import the County GIS map data directly into the CAD map without the need to manipulate individual GIS layers manually each time there is an update.
- Because of a limitation of ProPhoenix CAD integration with the Milwaukee County street centerline and addressing system, a manual update process is needed to validate the integrity of the Milwaukee County addresses. This is a major deficiency with the software platform. An automated or enhanced solution is needed due to the seriousness of the CAD program. Other CAD systems have the capability of integrating oblique and orthophotography into the dispatch systems. The MCLIO has partnered with Pictometry International to capture ortho and oblique imagery two times every five years. This initiative is undertaken by the MCLIO and it would be prudent to integrate this vital data source into the Milwaukee County CAD platform also.

[5] Per a resolution recently adopted by the Milwaukee County Board of Supervisors, MCLIO now is governed by an 11-member Land Information Council that includes representatives from the County (including OEM), City of Milwaukee, Milwaukee Metropolitan Sewerage District, the Intergovernmental Cooperation Council, and others. This makes MCLIO even better-suited to play a central role in an intergovernmental GIS mapping effort.

4.2.4 GIS-Mapping Cost Estimate

Based on discussions with MCLIO, we did not identify any capital cost for the City of Milwaukee or municipalities, but there would be data development and project maintenance costs associated with providing the public safety-specific information to the MCLIO. This would depend on the data available for integration. A cost would be expected if data on elements like countywide fire hydrants would have to be collected, as opposed to simply being acquired from municipalities that are already utilizing it. There also could be some technical costs related to the technical requirements. Similarly, there would be no capital cost for the County, but it would incur ongoing maintenance and workload tasks to upload and maintain the public safety information provided by the City of Milwaukee and municipalities.

There would be a possible ProPhoenix CAD upgrade cost to add the ESRI-based GIS mapping option, but there also is a strong likelihood that this functionality would be added by ProPhoenix as an enhancement covered under the annual maintenance agreement for each agency. This is a major limitation of the CAD system, which does not automatically integrate with the Milwaukee County Enterprise Addressing System maintained by MCLIO.

4.2.5 GIS-Mapping Estimated Implementation Timeline

The GIS-Mapping implementation involves the cooperation of all participating agencies to share their street centerline maps and shape files along with their public safety layers such as fire hydrants, police zones and Fire/EMS districts. Once the appropriate agreements between the participating agencies is in place, the implementation of the common map can be implemented within the same time line eight to 10 months as the CAD-to-CAD implementation.

4.3 Emergency Medical Services Communications

4.3.1 Overview

Milwaukee County Emergency Medical Services Communications (EMS Com) currently supports EMS-related communications throughout the county as part of Milwaukee County's role in providing medical direction and infrastructure support to municipal EMS operations. EMS Com has an existing project underway to deliver dispatcher-assisted CPR pre-arrival instructions (when appropriate) to all 911 callers in the county. EMS Com also has the capacity to expand its current monitoring of EMS resources through the use of GIS and CAD-to-CAD technology.

Our analysis focused on the county-wide capability to provide pre-arrival emergency medical dispatch instructions to the citizens of Milwaukee County; and the possible expansion of EMS Com's Emergency Medical Dispatch (EMD) service to municipal public-safety answering points (PSAPs) throughout the county.

4.3.2 Emergency Medical Pre-Arrival Instructions and Emergency Medical Dispatch

The concept of emergency medical pre-arrival instructions is an umbrella term that encompasses the “Just-in-Time” medical education in the form of telephone instructions, referred to as pre-arrival instructions. Pre-arrival instructions provide callers with step-by-step instructions to aid individuals in need of emergency care, such as providing first aid for choking, controlling bleeding, delivering a baby, and performing CPR. Often, these instructions keep a person alive until emergency personnel arrive on the scene. It is essentially a "zero-minute response time" to those in need of life-saving assistance.

Emergency Medical Dispatch (EMD) refers to the formalized system that enhances services provided by PSAP call-takers. For example, dispatchers trained in EMD are able to provide pre-arrival instructions to quickly discern the caller's medical or trauma situation, so as to better dispatch emergency services, and provide quality instruction to the caller before help arrives. A full EMD program provides an enhanced level of service from basic pre-arrival instructions.

The Emergency Medical Dispatcher has been recognized as an essential component of effective EMS systems. Proper and timely training/certification, as well as sound medical protocols, help EMDs deliver quality care to the calling public with emergency medical needs. Over the past decade, Priority Dispatch's EMD Certification Course has become the standard for EMD training. While many states require EMD certification for PSAP dispatchers, the State of Wisconsin currently does not.

4.3.3 EMD in Milwaukee County

EMS Com utilizes an in-house developed EMD software program that provides instructions to 911 callers reporting a known or suspected cardiac arrest. This program – implemented in partnership with the Medical College of Wisconsin – is a "Dispatcher Assisted Bystander CPR Program" that involves all jurisdictions in the County and that aims to increase cardiac arrest survival in Milwaukee County.

Currently, only 10% of out-of-hospital cardiac arrest patients treated in the County survive until hospital discharge. The project aims at making dispatcher-assisted CPR pre-arrival instructions available to all 911 callers in the County to increase CPR survival rates. When CPR is started by bystanders, the odds of survival double. However, bystander CPR is attempted on only 19% of cardiac arrest victims in Milwaukee County.

EMS Com serves as a referral center for any municipal PSAP that doesn’t currently have the capability to provide pre-arrival instructions to callers. For 911 callers who are with a victim suffering from cardiac arrest, municipal PSAPs transfer these calls to EMS Com to provide emergency pre-arrival instructions. EMS Com specialists provide callers with simple but vital

techniques that dramatically increase the victims' chances to stay alive until emergency first-responders reach them.

While the Dispatcher Assisted Bystander has been implemented county-wide, West Allis, Oak Creek (which also serves St. Francis), and the City of Milwaukee are the only PSAPs using a formalized EMD program. That means that approximately 75% of the citizens in Milwaukee County are covered through a formal EMD program, with the remaining 25% relying only on dispatcher-assisted CPR pre-arrival instructions.

4.3.4 Recommendations

While EMS Com and the Medical College have taken several important steps to provide pre-arrival instructions for cardiac arrest patients throughout the county, we believe that additional steps can and should be taken to ensure the same high-quality services exist in each of the municipalities and to fortify EMS Com's ability to coordinate EMS resources. Two of these steps relate to our larger recommendations to integrate CAD systems throughout the County and create a single county-wide map with public safety layers across all PSAPs. Specifically, we recommend the following:

- **Expand the use of full EMD-based dispatching solution to all County PSAPs** – remaining PSAPs that do not have EMD should transition from in-house pre-arrival instructions to a certified EMD-capable product, thus providing advanced EMD capabilities to all. This could be accomplished by leveraging an existing EMD system contract held by one of the Milwaukee County municipalities to negotiate a lower cost structure across all PSAPs within the county. In addition, as part of this recommendation, EMS Com could act as the county-wide EMD center for training and certification of PSAP staff in EMD software and procedures.
- **Expand the utilization of the Milwaukee County EMS Communication Center –** EMS Com's capability for coordinating and tracking EMS resources among all PSAPs could be enhanced through the use of a CAD-to-CAD solution integrated with a single county-wide map across all PSAPs. This would improve the patient tracking capability throughout the Milwaukee County EMS system.
- **Expand Milwaukee County EMS Communications Center access to incident and unit information** – the use of a CAD-to-CAD solution integrated with a single County-wide map, if used across all PSAPs, also could provide all ambulance locations real-time to the Center, thus further enhancing its ability to coordinate response during major incidents.

4.3.5 EMD Estimated Cost

To implement these recommendations, ProQA software would need to be purchased and installed in each PSAP in Milwaukee County. The estimated costs are presented in the following table. The table indicates prices for three different scenarios for providing software, training, and accreditation for each PSAP across the County. We received these cost estimates from Priority Dispatch, the manufacturer of ProQA software.

Costs are presented in an aggregate for licenses, installation, training, and accreditation

Number of ProQA Licenses	Initial Cost*	Annual Maintenance Cost
15	$300,000	$16,800
30	$475,000	$36,600
60	$800,000	$57,000

*Pricing ranges from 15 positions to train EMS Com staff to 60 positions to provide software, training and accreditation for each PSAP and EMS Com

**First year Annual Maintenance cost is included in the Initial co

4.3.6 Estimated EMD Implementation Timeline

We estimate that the implementation of this recommendation will range from 12 to 18 months. Training of the dispatching staff throughout the County and establishing the requisite quality assurance mechanisms are the critical path elements of this project. Quality assurance already is an element provided by OEM's EMS Division.

5.0 Principal Findings, Recommendations and Related Cost Estimates: Milwaukee County Government

5.1 New OEM Facility

5.1.1 Overview

In 2014, the County consolidated emergency services and functions in a new Office of Emergency Management (OEM). The OEM consolidates several emergency services previously managed by the Office of the Sherriff, Department of Administrative Services, Information Services Management Division, and the Department of Health and Human Services. The new Office of Emergency Management includes the following units:

- Emergency Management
- Emergency Medical Services
- 911 Communications
- Radio Services

OEM is planning to relocate its four divisions onto a secure campus with opportunities for expansion. With that objective in mind, OEM engaged Quorum Architects, Inc. to prepare a Space Needs Program Report (Program). The Program is intended to start the facility design and planning processes.

The new facility is planned to house the following OEM business units.

- OEM management
- County 911 Center
- Radio Operations Center
- Emergency Operations Center
- County Emergency Medical Communications Center (EMS Com)

The future OEM building will be a mission critical facility that will support daily emergency services communications and operations throughout the County. In addition, the facility will provide a central point for coordination and decision-making in the event of a major natural or man-made incident in the County. Serving this dual purpose, the facility requires redundant and diverse base-building systems to ensure operations during any type of incident and provide daily 24-hour emergency services.

5.1.2 OEM Facility Space Needs

In June 2015, Quorum Architects developed a space design to plan the consolidation of the OEM organizationally into a single facility. For this phase of the planning process, the Program represented a preliminary space needs evaluation, since not all of the facility or functional

requirements were available to the Quorum team, such as the potential space needs to accommodate consolidated 911 services based on discussions with municipal PSAPs and OEM. Another challenge to the Quorum Architects team was that the facility site had not been selected when they were developing the Program.

Our evaluation of the Program was discussed with OEM and Quorum Architects, leading to a recommendation for additional space. That recommendation takes into account the following factors:

1. There is a need to utilize industry standards for designing a mission critical building. The standards will impact, redundancy, security, and operational areas. The standards that we recommend include: National Fire Protection Association Standard (NFPA) 1221 for emergency services communications (http://www.nfpa.org/codes); NENA Public Safety Answering Point Site Selection Criteria Operations Information Document (OID) NENA 56-506; and others. These are the standards typically associated with a Mission Critical Facility.
2. Mechanical, Electrical, Plumbing (MEP) redundancy to include:
   - Additional Generators
   - Uninterrupted Power Supply (UPS)
   - Space for Heating Ventilation and Air Conditioning (HVAC) systems to include a redundant design
   - Building security systems
   - Changes to adjacency of 911 dispatch floor and other key functions within the facility
   - Increased workstation size to accommodate the number of computer monitors used on County 911 call taking, dispatch, and supervisory consoles
   - Server room expansion to accommodate the number of equipment racks required and work space for maintenance and a development environment in this area
3. Personal area space for quiet room, kitchen, lactation room, restrooms, exercise room, sleeping area, lockers, and shower facilities.
4. Increased circulation factor to accommodate EMS Com, 911, and EOC, operations space.
5. Redesign of Emergency Operations Center (EOC) space from a stadium seating configuration to a flat room layout to accommodate the adjacent work areas required for Integrated Command System (ICS) functions or Emergency Service Function (ESF) work-pods.
6. Space for roof antenna and related support equipment for the Radio Services Division.
7. Add secure access to loading dock area

Based on the above, we recommend adding 25-30% more space to the overall estimate developed by the Quorum Architects. Adding this space will require changing the estimate for the "Approximate Total Square Footage for All Divisions" from 23,289 SF to 29,111 SF (25%) or 30,276 SF (30%). Obviously, this change also would require an increase in estimated funding for the project.

5.1.3 Additional Space Needs

It is important to note that the above square footage estimate reflects the space that would be required in a facility designed to house all existing OEM functions, including EMS Com. Ideas for incorporating additional functions that have surfaced during our research – such as the Healthcare Emergency Readiness Coalition, MCTS' Transit Operations Center, and municipal PSAPs – are not included.

5.1.3.1 Adding the Healthcare Emergency Readiness Coalition, Inc. (HERC)

As our team was finishing our analysis, we became aware of the possibility of adding the HERC to the new OEM facility. The preliminary data that we received from HERC indicates that it would require space for five employees and for its Health Surveillance/Fusion/Watch Center. If HERC's requirements are included in the new facility, space will need to be added in the program for HERC's operational, administrative, and technology areas. The impact of adding HERC to the new OEM would not add time to the design, construction, or fit-out schedule.

In line with OEM's vision for the integration of emergency communications systems in Milwaukee County, we recommend including the HERC communication center into OEM's planning facility. HERC's health and medical regional fusion center will share bio-health related information products across all levels of government to support public safety in preventing, protecting against, and responding to crime and terrorism. Coordination and collaboration between fusion centers, EOCs, and PSAPs can significantly enhance the planning, response, and delivery of public safety services in the County.

In addition, hosting a 24/7 health and medical watch center in the OEM facility would be advantageous because:

1. The Milwaukee County EOC is always partially activated
2. The County would share some operational expenses with the HERC
3. The County would have an on-site fusion center producing information products related to health security
4. The EOC could serve as a hub for coordinated health security plans and programs

Including HERC's fusion center in the County OEM's facility will increase the square footage requirement, based on space needed for three to five employees, furniture, computers, and technology space in the OEM facility data center.

5.1.3.2 Impact of Additional Functions and Growth in Call Volume

The process of estimating the space requirements for the Emergency Communications Operations area in the new facility should take into account potential growth in call volume for a minimum of 20 years. In addition, incorporating other recommendations in this report – such as added call-taking and dispatching space for the HERC, TOC, and the possible addition of municipal PSAPs – would create additional space needs.

It will be difficult for County planners to determine how many (if any) municipal PSAPs might be added in the future. However, using an assumption that space estimates should include the potential to add one municipal PSAP (requiring two workstations), as well as estimates in call volume growth based on U.S. Census data and of space needed for HERC and the TOC, we project that the operations area will require 20 work stations in 2018, growing to 25 workstations by 2035.

Our estimate for the size of the operations area in the new facility to support these operations and number of workstations is about 2,969 square feet, including circulation and technology support space. This space does not include personnel areas such as eating and lockers or administrative space. The space does not have to be immediately outfitted for this number of workstations, but this amount of space should be incorporated into facility planning to account for potential growth over the next 20 years.

This additional space will increase the overall space requirements to 33,245 square feet. If we also include additional personal areas such as lockers and eating areas, then the space for these functions will increase the overall space requirement to about 34,250 to 35,000 square feet.

5.1.4 Estimated OEM Facility Schedule

Winbourne Consulting was asked to address "the options for upgrading/replacing the OEM/PSAP and moving it from its current location by December 2018." Based on the data provided to us from OEM and some planning assumptions that we have made based on experience with the design, construction and fit-out of mission critical buildings, we are presenting the following analysis for meeting that date. We have also presented a conceptual schedule, based on our experience with facility design and construction for similar buildings.

Meeting the December 2018 date for design, construction and fitting out and testing the technology in the new facility – as well as moving each of the OEM units to the new facility – will require that each of the following phases of work are accounted for in the overall process.

From our experience, the process requires the following timeframes. The timeframes are impacted by several factors, including the number of stakeholders involved in the design process.

Project Phase	Time Frame Estimate
Programming Phase	**3-6 months** to include review and approval processes
Design Phase	Completing Schematic, Design Deployment, and Construction Documents generally takes between **12-18 months**
Construction Phase	For a building of this size a minimum of **12-14 months**, to include at least a month (or two) for the contract and construction start
Technology fit-out, testing and staff training Phase	Requires a minimum of **3-6 months** from access to "White Space" in the new facility. This timeframe is impacted by the scope of technology changes
All Phases	**30-46 Months**

Based on these estimates, we project that the new facility will take between 30 and 46 months to complete. Using May 2016 as a starting point, we estimate that the building will be available for operations at the earliest by November 2018 and, more conservatively, by March 2020. Based on this analysis, the new facility *could* be available in December 2018, though that would require each phase to fall within the shortest end of the ranges presented above.

The key factors that are not included in this schedule analysis are the following:

- The site selection, which as of this writing has not been made by the County
- The budget approval process

5.2 MKE Airport Emergency Communications

5.2.1 Overview

As part of our analysis of potential consolidation of emergency communications and dispatch functions from non-OEM Milwaukee County departments and divisions into the new OEM facility, we explored opportunities to improve emergency communications at General Mitchell International Airport, including dispatching for the Airport Fire Station.

We found that emergency calls at the Airport include the following call types:

- Crash phone calls from the ATC tower
    - Air Traffic Control (ATC) staff alerts the Airport Operations Center (AOC) in case of an aircraft emergency by a "Crash Phone."
    - The "Crash Phone" rings at 17 phone locations in the airport, including AOC, National Guard Fire Station, and the Airport Fire Station.

  - An alert is transmitted over loud speakers and opens the bay doors automatically.
  - Response button is used to tell AOC that apparatus are responding.
- 911 calls from passengers and staff – these are received in the OEM Communication Center.
- 7-digit calls from airport staff and tenants for emergencies within the Airport
  - In an emergency, airport tenants are required to dial a 7-digit number instead of dialing 911.

The Milwaukee County Sheriff's Airport office has a dispatch position that is manned by a deputy on a revolving basis. Also, Airport deputies can self-initiate activities. The dispatch position is manual using an access database program developed in-house. Our discussions with Airport deputies indicate their preference for having the OEM Communication Center take over the dispatch operations, either by assigning a dispatcher to the Airport, or moving the dispatch function to the OEM Center.

We also found that the Fire House alerting process at the Airport Fire Station has several weaknesses that need to be addressed. For example, the loudspeaker system has significant volume issues. When standing in the center of the Fire House, a person cannot hear the loud speaker system. Also, the Fire Station dispatch process is mostly based on a phone call to the station which sounds an alarm. Not being able to hear the alarm or notification over the loudspeaker system presents a challenge to firefighters working to meet specific response times.

5.2.2 Recommendations

Overall, we recommend transitioning the receipt of emergency calls originating at the Airport to the OEM Communication Center, except for crash phone calls originating at the ATC tower. In addition, we recommend upgrades to the alerting system at the Airport Fire Station. The following are specific recommendations:

5.2.2.1 Redefine the airport's use of the seven-digit emergency number to a non-emergency number

- Direct employees and tenants to call 911 in an emergency that will be handled by the County 911 center.
- Transfer the dispatch responsibilities of airport management via the Airport Operations Center to the Milwaukee County 911 Center.
- Change the use of the Airport's internal 7-digit emergency/non-emergency number to only non-emergency calls to the AOC from employees and tenants.

5.2.2.2 Re-assign Airport Sheriff's deputies dispatching responsibilities of to OEM

We recommend that the OEM Communication Center handle dispatching of Sheriff's deputies assigned to the Airport. The Sheriff's Airport unit has recommended this change.

5.2.2.3 Integrate the MKE Fire Station alerting system with the OEM Communication Center and update the alerting system in the Airport Fire Station

- Integrate ATC Tower notification to Fire Station via Crash Phones to OEM Communication Center as well as to Fire Station and Airport Operations Center.
- Integrated solution will need to insure that the speaker, doors, other alerting systems in the Airport Fire Station are triggered by the County 911 ProPhoenix CAD as well as locally by fire staff in the Fire Station, in the case of a Crash Phone notification.
- Upgrade the fire house alerting system to include visual and audio alerts enhancements.

Cost estimate for this recommendation is:

- $200k to $250k for a redundant implementation at dispatch, including CAD and radio integration.
- $35k to $70k per station cost for a basic station installation.
- Estimate Total: $235-320,000

5.2.3 Estimated Implementation Timeline

To upgrade the fire house alerting system and acquire and implement the redundant dispatch backup station is estimated to take six to eight months to implement.

5.3 Transit Operations Center

5.3.1 Overview

We also explored the opportunity to include the Transit Operations Center (TOC) in the new OEM facility as part of our broader assessment of the potential for consolidating all dispatch operations associated with Milwaukee County government services in one location. Winbourne Consulting and MCTS personnel discussed this option on several occasions and developed a series of options, including technology integration, cooperation with regard to facility space needs, and collaboration with OEM on Continuity of Operations (COOP) planning, which the County currently is conducting.

The TOC is an operational unit of the Milwaukee County Transit System (MCTS). The TOC staff monitors bus schedules and communicates with drivers, using some transit-specific systems to perform these duties. The TOC operates on a 24-hour, seven days-per-week schedule, and operates on two 12-hour shifts. The TOC can communicate with dispatch centers through a direct dial to police and/or fire center to an administrative phone.

The TOC does not currently have a Continuity of Operations Plan (COOP) for the TOC for supporting dispatch-bus driver communication in the event of a communications or electrical power outage at the TOC.

The TOC utilizes a range of technologies to communicate with bus drivers and supervisors and monitor bus location and schedules. These tools include the following technologies:

- Computer Aided Dispatch (CAD): The TOC has a CAD system called OrbCAD, manufactured by Xerox. They use this CAD software application to track bus route by using Automated Vehicle Location (AVL) bus number on a map. OrbCAD also is the fleet management system used by MCTS. The OrbCAD uses a map provided by Xerox.
- Bus Tracking System: The TOC uses a bus location tracking system that is GPS-based from Clever Devices. This system can run independently of OrbCAD and can project bus locations on Google Map.
- Radio Communications: Each bus has voice communication with the TOC. Also, each bus has two radios onboard.
- Other Systems: Call logging system, telephones (primary and back-up), alarm monitoring for alarms from cashiers that are situated in the transit headquarters building, a silent alarm for bus drivers that is monitored in dispatch.
- Bus Cameras: MCTS is planning to install cameras in buses to provide additional level of security.

5.3.2 Proposed Options

In considering the development of the new OEM facility and how transit dispatching and communications might be integrated, three options emerged:

Option 1) Immediately Create a Back-up Site for the TOC in the OEM Communication Center

Currently, the TOC does not have a back-up site. The OEM Communication Center could serve as such a site. A short-term, back-up position for MCTS in the OEM facility could be added using portable radios and telephones at the position. The bus location tracking system used by the TOC can be installed at the County 911 Center.

In the event that the TOC would have to relocate to the County because it's main operations were down, this capability would allow dispatchers in the OEM Communication Center to track buses. The TOC tracks the buses through a GPS tracking system that can be projected onto a Google map via PCs with web access. Introducing this function to the OEM Communication Center also would provide the County EOC with access to real-time bus location and availability data during a crisis and on an on-going basis.

Estimated costs for this option will range from $50-60,000. Costs would include TOC portable radios, telephones, and computers and monitors to display bus locations on Google map.

Option 2) Add the TOC short-term back-up capability into the new OEM Facility

Adding a short-term back-up facility for the TOC in the new OEM facility will require the addition of work area and equipment storage space to the plans for the new facility. We are anticipating two workstations in the 911 operations area for the TOC dispatchers and one to two racks in the equipment room. Radio traffic will be recorded, but OrbCAD would not be available to dispatchers. Clever Devices AVL solution would be used to track bus location. Communication with drivers would be conducted through supervisors, not directly.

Option 3) Add the full TOC into the New OEM facility

The entire TOC could be transferred to the new OEM facility after its construction. Or, alternatively, space could be set aside within the new building and the relocation of the TOC could be coordinated with the timing of the needed replacement of the OrbCAD system.

The current facility then could be used as a back-up after operations are moved to the new OEM facility.

MCTS officials have voiced opposition to this possibility, saying TOC staff and equipment need to be adjacent to MCTS management staff for coordination in an emergency and for daily operating efficiency. However, those concerns have not been fully fleshed out with OEM officials and staff, and it is possible that they could be ameliorated through technological solutions and further accommodated in the design of the new OEM center.

Costs associated with this option would include purchasing new OrbCAD licenses – those costs could be determined if OEM is interested in pursuing this option. Costs for this option will range from $850,000 to $950,000. OrbCAD pricing is $750,000 (for up to 5 positions, to include the 2 backup positions) for the new version of OrbCAD. Also costs for new furniture, radios, phones, and peripherals.

5.3.3 Recommendation

The primary risk issue that MCTS and OEM can collaboratively solve is the lack of a back-up facility for the TOC. This issue can be addressed immediately by establishing the TOC back-up facility in the OEM Communication Center and permanently by housing the back-up in the new facility.

Meanwhile, taking this approach benefits OEM by providing it with immediate access to the TOC bus location data during a disaster, such as a mass casualty incident. This will allow OEM to access and use the transit dispatch system to organize the transport of victims and public

safety personnel as needed. The bus location data can be displayed in the Emergency Operations Center.

Also, we recommend that OEM and MCTS negotiate a Memorandum of Understanding (MOU) so the County 911 Center can have access to the bus cameras. The MOU also can include provisions to house the TOC back-up facility at the OEM Communication Center.

We believe this approach is more suitable for both OEM's and MCTS' needs than the option of adding the TOC operations into the new OEM facility.

5.3.4 TOC Options Cost Estimates

The following table presents our cost estimates for the different options related to the TOC. Our recommendation of combining the first two options would result in a total estimated cost of $150,000-$210,000.

TOC Option	Cost Estimate	Costs Include
Immediately Create a Back-up Site for the TOC in the OEM Communication Center	$50-60,000	Costs would include TOC portable radios, telephones, and computers and monitors to display bus locations on Google map
Add the TOC short-term back-up capability into the new OEM Facility	$125-175,000	Additional work area and equipment storage space to the plans for the new facility, to include 2 workstations with radio, telephone and computer hardware, two Nice recording channels, and 1-2 racks in the equipment room.
Add the full TOC into the New OEM facility	$850,000 to $950,000	Costs associated with this option would include purchasing new OrbCAD licenses – those costs could be determined if OEM is interested in pursuing this option. OrbCAD pricing is $750,000 (for up to 5 positions, to include the 2 backup positions) for the new version of OrbCAD. Also costs for new furniture, radios, phones, and peripherals.

5.4 Highway Division GPS Expansion and Use of GPS Mapping

5.4.1 Overview

Winbourne Consulting also explored the opportunity of including the Milwaukee County Highway Division in the new OEM facility as part of our broader assessment of the potential for consolidating all dispatch operations associated with Milwaukee County government services in one location. Winbourne Consulting and Highway Division personnel discussed this option on

several occasions and developed a series of options, including technology integration, cooperation with regard to facility space needs, and collaboration with OEM on Continuity of Operations (COOP) planning.

The Highway Division staff is responsible for road repair and snowplow services and monitors 80 vehicles/trucks with 100 personnel, 68 of whom are employed as drivers. The Division operates on a 24-hour, seven days-per-week schedule, and operates on two 12-hour shifts. The Division does not currently communicate with the County dispatch center.

The Wisconsin Department of Transportation (WisDOT) provided a grant to the Highway Division that equipped 30 Milwaukee County DOT vehicles/trucks with a GPS tracking system. The Division is responsible for the monthly service charges associated with tracking vehicles and making that information available through a website. The GPS service tracks each vehicle's location, speed, plow location (up/down), and salt level (if applicable).

All communication with drivers is done via radios. While the Highway Division is on the list to receive the new P25 radios, there is currently no timeline as to when that will happen. Highway Division vehicle/truck routes are well established; while currently kept manually, there is no desire or immediate need to change this process, according to the Division.

5.4.2 Proposed Options

In considering the development of the new OEM facility and how Highway Division dispatching and communications might be integrated, three options emerged:

Option 1) Immediately make the MCDOT vehicle webpage available to the OEM Communication Center and EOC

Make the vehicle/truck GPS webpage available to the OEM Communication Center and the EOC for use in emergency situations within the current County dispatch facility.

Option 2) Add GPS to all vehicles/trucks and integrate GPS with CAD

Add GPS capability to all vehicles/trucks and make the information available as a map layer within CAD. The vehicle/truck GPS information could be interfaced to CAD through the CAD-to-CAD interface and made available for viewing as a layer on the CAD map within the current dispatch center, as well as the new OEM facility when it is constructed.

Option 3) Add the Highway Division dispatch operation into the new OEM facility

The Division's dispatch operation could be transferred to the new OEM facility after its construction. Or, alternatively, space could be set aside within the new building and the relocation of the MCDOT could be coordinated with the obsolescence of the Division's current facility.

While there is no immediate need to relocate the Division's dispatch operations, having those operations co-located within the new OEM facility makes logistical sense. Further evaluation by OEM and the Division would be necessary, however, before a final recommendation can be made.

5.4.3 Recommendation

We are proposing the following recommendations with regard to the Milwaukee County Highway Division:

- Make the vehicle/truck GPS webpage available to the OEM Communication Center immediately
- Add GPS capability to all 50 remaining vehicles/trucks in order to have location and situational awareness for all vehicles/trucks
- Connect the GPS of all Highway Division vehicles/trucks to the dispatch center CAD system and make it available for viewing as a layer on the CAD map as part of the CAD-to-CAD integration.

In the longer term, we recommend further evaluation by the County into the feasibility and practicality of co-locating the Highway Division dispatching operation within the new OEM center.

5.4.4 Highway Division Options Cost Estimate

There is no cost associated with making the vehicle/truck GPS webpage available to dispatcher within the current County 911 Center. The webpage can be made available to dispatch on the current equipment, or if desired a stand-alone monitor could be added for this purpose.

The addition of GPS equipment to each of the remaining 50 vehicles would cost approximately $5,000 for the GPS devices and $30/month per vehicle. The integration of the GPS information into CAD would be dependent upon the implementation of a CAD-to-CAD interface and is estimated at $20,000.

The space requirements for including the MCDOT dispatching operations into the new OEM facility could include adding two more dispatch positions in the 911 operations space in the new facility, as well as computer hardware, radio, and telephone connectivity for those positions. Adding the staff to the facility would require reassessment of personnel areas such as lockers, eating, and other related areas.

6.0 Governance of Public Safety Integration Initiatives

The following section summarizes governance recommendations for managing the initiatives presented in this report. Overall, we recommend using the current model that is being employed by the County and its municipalities (an intergovernmental agreement) to govern the

P.25 radio project. Amendments to this agreement could be added to address the initiatives recommended in this report. Such amendments could document the roles and responsibilities of the partner agencies, cost allocation, and ongoing operational maintenance requirements for each partner. We also recommend establishing new subcommittees within the agreement to manage the three proposed projects.

6.1.1 Public Safety Integration Projects Governance Agreement/Amendment

In general, most multi-jurisdictional public safety governance structures have similar features. We recommend that the amendment to the P.25 radio project agreement to incorporate the recommended projects maintain those features, which generally consist of the following:

- **Governance Agreement.** Establishes a formal agreement between parties and manages the implementation of the agreement.
    - Defines the roles and responsibilities of the parties to the agreement.
    - Creates a structure to manage and implement the agreement.
    - The governance structure shows the operational and management structure in place on the effective date of the agreement.
    - Some of the options for the governance structure include the bodies described below.
- **Governing Board.** Composed of the principal representatives of the partnering agencies from the County, the City, and municipalities.
    - Provides overall programming direction.
    - Provides strategic budget input.
    - Meets quarterly to discuss strategic issues.
    - Facilitates resolution of operational and organizational conflicts.
- **Operations Committees.** Composed of the operational managers from the stakeholder agencies such as the County MCLIO/municipal GIS units, County 911 Center, City 911 Centers (Police and Fire), municipal PSAPs, and public safety leaders, for each specific initiative.
    - Purpose is more tactical than strategic.
    - Provide input to annual submittal of budgets.
    - First meet monthly, then quarterly to discuss operational issues. May need to meet daily during initial operation.
    - Arbiter of operational and organizational conflicts.

7.0 PSAP Consolidation Case Study

7.1 Overview

In this section, we present a case study for PSAP consolidation in Milwaukee County. Our approach involves modeling a hypothetical scenario under which the City of Wauwatosa would close its PSAP and contract for PSAP services with the Milwaukee County OEM Communication Center. Wauwatosa was selected because of the possibility that the new OEM command center would be located on the Milwaukee County Grounds in Wauwatosa and because of its possible interest in considering such a scenario.

It is important to note that we have constructed our hypothetical scenario (and prepared our financial analysis) under the assumption that Wauwatosa's PSAP services would be transferred to the *existing* OEM Communication Center. We use this assumption because we do not know when (or if) a new OEM facility will be constructed. If the contracting scenario were to occur after the new facility is built – and particularly, if the design of the new facility specifically anticipates that Wauwatosa's PSAP (as well as other municipal PSAPs) will be added – then it is possible that revised staffing and operational procedures could be accommodated that could provide for more efficient and cost effective integration of the municipal PSAP services. In fact, if it is certain that a new facility will be constructed to house OEM, then it may make sense to wait until the new facility opens to transfer any municipal PSAP services to OEM.

Over the past 10 years, many communities in Milwaukee County, southeastern Wisconsin, and throughout the country have evaluated options for consolidating PSAPs. In fact, in Ohio, there is a state mandate underway to reduce the number of PSAPs to four per county. Other states are looking at or have passed similar legislation.

While there is no current mandate to consolidate PSAPs in Wisconsin, it is an option that needs to be explored, especially for PSAPs with three or fewer dispatch positions. An additional factor to consider is the anticipated full implementation of Next Generation 911 technology, which will require PSAPs to purchase new or upgrade existing hardware and software and provide enhanced training for dispatchers (in the case of Wauwatosa, some upgrades already have been initiated). The costs associated with those activities may be prohibitive for some local governments, particularly for those who administer small dispatch operations.

The primary goals of any consolidated PSAP initiative are to maintain and/or enhance the quality of the emergency response, leverage the acquisition of the latest technology, and reduce operational costs. Our case study explores the possible consolidation of the Wauwatosa PSAP with the OEM Communication Center with those goals in mind.

7.2 Wauwatosa PSAP

The Wauwatosa PSAP is a primary PSAP receiving 911 wireless calls from the OEM Communication Center and 911 wireline calls directly from the local telephone company (also known as the Incumbent Local Exchange Carrier, or ILEC). The PSAP operation has three combined call-taking and dispatching workstations for operations. It dispatches for fire, police, and emergency medical services in Wauwatosa. The center is equipped with a full complement of systems to support emergency call taking and dispatching.

The PSAP staff also provides a number of non-emergency services for the Wauwatosa Police and Fire Departments. For example, the center supports a large volume of non-emergency and administrative police calls (e.g. related to parking or other non-emergency situations). The Wauwatosa PSAP also provides the following services:

- 24/7 visual prisoner monitoring
- Deployment of towing services at request of police
- Provision of criminal history information at request of police
- Serves as a Primary Mutual Aid Box Alarm System (MABAS) dispatch center
- Window service for 50-60 hours/week for multiple functions, including parking permission receipt-entry, warrant verification/removal, TIME system administrative functions, administrative lines call-taker, and others

The following table shows the current technology that is used by the Wauwatosa PSAP.

Table 1: Wauwatosa Current 911-Related Technology Suite

Equipment type	System Manufacturer	Number of pieces of equipment
911 CPE	Cassidian/Airbus	3 consoles
CAD	ProPhoenix	3+
Logging/recording	NICE Systems	1
Radio dispatch consoles	Motorola	3 consoles
Mobile data computers	Panasonic Toughbooks Panasonic Toughbooks	14 FD 19 PD
AVL devices	GPS is built into the Panasonic Toughbooks and Displayed on the ProPhoenix CAD screen	14 FD 19 PD
Mapping		1
Audio Visual Systems	Panasonic Indigo Visi	20 Arbitrator3 1 for Building Surveillance
Mass Notification System	Code Red	1
Fire House Alerting	US Digital	3

7.2.2 Wauwatosa Call and Dispatching Volume

The Wauwatosa PSAP answers emergency and non-emergency service calls and administrative calls. In 2015, total incoming call volume exceeded 72,000 calls. The following table illustrates the total incoming and outgoing call volume over the past three years.

Table 2: Wauwatosa Annual Call Volume

Annual Call Volume	2013	2014	2015
911 Emergency Calls	4,685	4,589	4,568
Non-Emergency Calls (2015 only)	----------		19,830
Police Administrative Calls (non-emergency, non-911; 2015 only)			46,320
All Incoming Calls			**72,733**
Outgoing calls (2015 only)			**20,742**

Notes:

- 2015 non-emergency and all call totals are based upon projection from call information captured by 911 CPE system beginning July 1, 2015.
- Approximately 2,000 calls per year to the Wauwatosa PSAP are wireless calls that originate in Wauwatosa and that are transferred from the OEM Communication Center. In addition, the Wauwatosa PSAP receives several calls daily that originate in other jurisdictions but are inadvertently transferred to its PSAP (those calls are then transferred to the correct jurisdiction).

The Wauwatosa PSAP dispatches for fire, police, and EMS services, with police dispatching comprising the bulk of dispatch activity. The following table presents the volume of dispatch incidents over the past three years for each service.

Table 3: Wauwatosa Annual Dispatch Volume

Annual Volume of Incident Dispatches	2013	2014	2015
Police Dispatches	31,815	35,944	36,716
Fire Dispatches	1,721	1,696	2,302
EMS Dispatches	4,135	4,569	4,815

7.2.3 Wauwatosa PSAP Staffing

The Wauwatosa 911 Center's 2016 authorized staffing consists of about 11 full-time equivalent employees (FTEs) and is presented in the following table:

Table 4: Current Wauwatosa Staffing Authorization

Position	Staff Size
Dispatcher/Call Taker FT	9.0
Dispatcher/Call Taker PT	0.7
Supervisor	1
Command Staff Supervisors	0.25
Support staff	
Admin Assistant, secretary, etc.	0
Other	0
Total Positions (FTE)	10.95

The department backs up its full-time staff with a group of part-time dispatchers (5-7 at full staffing), who serve as the 'line of first defense' when there is a sick call, vacation, FMLA, or other off time to fill. Full-time dispatchers are only offered or ordered to fill shift vacancies when no part-time dispatcher has volunteered. Part-time dispatchers cannot be ordered to fill vacancies.

7.3 Consolidation and Current Wauwatosa Non-Emergency Services

As noted above, the Wauwatosa PSAP provides an array of non-emergency services, which calls into question how those services would continue to be provided if the City decided to contract with another entity for emergency communications and dispatching services, thereby eliminating its PSAP staff. In the following table, we cite those services and provide recommendations for how they would be continued under a scenario in which Wauwatosa contracted with OEM for PSAP services.

Table 5: Recommendations for Transitioning Wauwatosa Services after Consolidation

Current Non-Emergency Services	Recommendations for Service after Consolidation
24/7 visual prisoner monitoring	• Transition function to desk clerks within the Wauwatosa Police Department
Deployment of towing upon police request	• Shift service to OEM Communication Center
Criminal history info upon police request	• Shift service to OEM Communication Center
Serves as a Primary Mutual Aid Box Alarm System (MABAS) dispatch center	• Shift service to OEM Communication Center
Window service for between 50-60 hours/week for multiple functions, including parking permission receipt-entry, warrant verification-removal, TIME system admin functions, admin lines call-taker, and others	• Transition all functions to desk clerks within Wauwatosa Police Department

Wauwatosa would need to accommodate its retention of the non-emergency functions that would not be shifted to the OEM Communication Center by creating new desk clerk positions to manage those functions. Those positions ostensibly could be filled by staff who currently are employed as dispatchers at the PSAP.

Below, we provide additional detail on our suggestions for addressing the non-emergency functions formerly performed by dispatchers. The added costs associated with new administrative staffing offset savings that would accrued from the elimination of PSAP services and the purchase of such services from the County. This dynamic is taken into account in our cost analysis.

Administrative Calls: The largest potential internal cost impact within the City of Wauwatosa is associated with the City's need to hire or identify new staff to handle police administrative calls, many of which involve special parking permission that occur after regular business hours. As noted above, in 2015, the City handled more than 46,000 such calls. Currently, during first and second shifts, those calls are answered by police department desk clerks and transferred to dispatchers if necessary; during third shift, they are handled solely by PSAP dispatchers.[6] After discussing this matter with City of Wauwatosa officials, we believe that Police Department desk clerks could both answer and act on the calls in the absence of dispatchers, but three additional FTE desk clerk positions would need to be added for third shift. This also would provide the benefit of having an administrative presence at the police department during third shift.

[6] During weekends, desk clerks work only during second shift.

To reduce the need for additional police desk clerks, the City also could consider an on-line overnight parking registration and payment system, which would remove that call burden from the desk clerks would have to absorb. The City of Milwaukee has such a system now (website is http://city.milwaukee.gov/mpw/divisions/administrative/parking/ParkingPermits.htm#.VzxxAPkrLIU). This approach would automate the process by allowing businesses and residents to apply, pay and receive a parking permit online. Currently, those seeking an overnight parking pass in Wauwatosa need to request overnight parking permission by calling the police department's non-emergency number. Online application methods are widely used by jurisdictions across the country, including Washington, DC, Alhambra, CA, Beverly Hills, CA, Pasadena and South Pasadena, CA, and many others.

Alternatively, online parking apps are widely available and used by many jurisdictions across the U.S., allowing drivers to both pay and find parking. Some of the jurisdictions that have implemented web-based pay-by-cell phone parking apps include Alexandria, VA, Arlington County, VA, Washington, DC, New York City, and Miami Beach. This system enables a customer to pay using a cell phone or mobile application. The pay-by-cell phone provider charges the customer for parking fees and reimburses the parking operator. Overnight parking functions can be added to the apps, based on resident registration on the app.

Service Window: Window service functions that currently are provided by Wauwatosa dispatch staff would need to be shifted to other staff or discontinued if the dispatch operations were removed. After discussing this matter with City of Wauwatosa officials, we believe that this could be accommodated via the hiring of the three FTE desk clerk positions noted above.

Video Prisoner Monitoring: We recommend transferring the monitoring of prisoners to administrative staff at the Wauwatosa Police Department. Again, after discussing this matter with Wauwatosa police officials, we believe that this could be accommodated with the new desk clerk capacity.

7.4 Analysis of Capital and Maintenance Cost Impacts of Consolidation Scenario

In this section, we present an analysis of the capital and maintenance cost impacts associated with a scenario in which Wauwatosa eliminates its PSAP and contracts with the County to provide PSAP services through its OEM Communication Center.

A key objective of the consolidation of the Wauwatosa PSAP with the OEM Communication Center is to maintain the level of service that is currently provided by the Wauwatosa PSAP to its residents and first responders. After analyzing activity levels at both PSAPs, we have determined that consolidation provides an opportunity to reduce the number of workstations from the existing three at the Wauwatosa PSAP to two Wauwatosa dispatching positions at the OEM Center. There would be a corresponding reduction in equipment and staffing required to

support the Wauwatosa emergency communications functions because of the ability to leverage the current resources of the OEM Center.

The proposed changes would primarily result from leveraging the existing OEM call taking capacity for Wauwatosa calls. OEM has 10 telecommunicator workstations that support both call-taking and dispatching. Currently, the OEM telecommunicators answer Wauwatosa wireless 911 calls and transfer the calls to the Wauwatosa PSAP. The OEM call-taking operations would continue to provide that service to callers from Wauwatosa seeking police, fire or emergency medical services, but dispatching would take place at OEM.

Wauwatosa officials have stated that the majority of their 911 emergency calls are from landline phones in Wauwatosa. Those approximately 2,500 annual calls – as well as the approximately 20,000 non-emergency public safety-related calls that currently come into the Wauwatosa PSAP annually – would need to be handled by OEM telecommunicators under the contracting scenario. To have these calls handled at the OEM Center would require programming changes at the AT&T Central Office that serves Wauwatosa and the OEM Center. This call volume is about 61 calls per day and it can be absorbed by the existing OEM Call Taking operations.

The two Wauwatosa workstations at the OEM Center would be used for dispatching Wauwatosa police, fire and EMS units (we believe only one workstation would need to be utilized during third shift). Based on discussions with Wauwatosa officials, two dispatching positions can provide coverage for Wauwatosa emergency services, operating within the larger OEM operational environment.

7.4.1 One-Time Start-Up Costs Associated with Movement of Equipment and Technology to OEM Communication Center

The transfer of dispatch operations from Wauwatosa to the OEM Communication Center would require the installation of systems supporting Wauwatosa fire, police and EMS dispatching in the OEM Center. Under such a scenario, we recommend the installation of the systems on two of the existing workstations at OEM that would be dedicated to Wauwatosa dispatching.

This is a reduction from the current three workstation positions housed at the Wauwatosa PSAP. Our analysis is based on an average number of dispatches of 120 per day for police, fire, and EMS. We believe this volume can be managed by two workstations during first and second shifts, with only one needing to be utilized during third shift.

We believe this reduction in workstations (and associated staffing) can be achieved because non-911 police administrative calls will continue to be handled in Wauwatosa, as well as the following factors:

- More than 2,000 calls per year that are received by the Wauwatosa PSAP are wireless 911 calls transferred from the OEM Communication Center in the first place. Thus, the OEM Center already has capacity to handle these calls. The OEM Communication Center already has 10 workstations for call taking and dispatch, which we believe are sufficient to handle the total volume of calls received traditionally by the County plus the 911 landline call volume that now would be transferred from Wauwatosa.
- Wauwatosa's non-emergency public safety calls average about 54 per day. These calls can be handled by any position in the center, as long as information is available to provide the telecommunicators with the Wauwatosa non-emergency services data.

The dispatch workstations at OEM that support Wauwatosa dispatching will need dispatch support systems to include the Wauwatosa-configured ProPhoenix CAD, logging and recording system, telephone, and radio consoles. These positions also would handle Wauwatosa's non-emergency police service calls, as well as MABAS dispatching and requests from police for towing and criminal background information. The workstations, primary and back-up, also will need access to these systems.

In addition, we suggest that one of the existing radio consoles be moved from the Wauwatosa PSAP to the OEM Center. This change would leave Wauwatosa with two radio consoles during the transition for redundancy.

The estimated new equipment/technology needed at the OEM Communication Center to accommodate the Wauwatosa PSAP services is summarized in the table below. We have also provided estimated capital costs for each requirement, using cost estimates provided by Wauwatosa and confirmed by our team. **The total start-up cost is an estimated $68,000**.

Table 6: Estimated Start-Up Costs at OEM for Wauwatosa PSAP Services

Estimated Start-Up Costs at OEM for Wauwatosa PSAP Services		
Current Wauwatosa Technology and Systems	**Need for new software licenses and hardware**	**Cost Estimate**
911 Customer Premise Equipment (CPE)	Wauwatosa calls will be taken on the existing OEM Center 911 CPE. No new CPE is required to support OEM.	N/A
CAD	ProPhoenix CAD Licenses; desktop hardware (computers, monitor, mouse, keyboard); servers; software configuration and set up.	$5,000*
Logging/recording	Per channel licenses for NICE Systems Logging and Recording System for radio and telephones and set up at Wauwatosa workstations.	$5,000**
Radio dispatch consoles	Motorola radio console for one workstation, reconfiguration of training workstation radio console for Wauwatosa use, and set up	$50,000***
Mobile Data Computers	Should be no new costs associated with MDCs; software interface with ProPhoenix CAD already exists	N/A
AVL devices	Should be no new costs associated with AVL devices; software interface with ProPhoenix CAD already exists	N/A
Mapping	Should be no new costs associated with mapping software from ProPhoenix	N/A
Mass Notification System	Code Red is a web-browser accessed, subscription-based system; no new cost is anticipated	N/A****
Fire House Alerting	ProPhoenix software interface with the Fire House Alerting system already exists	N/A
Wiring for moving CCTV from PSAP to Desk Clerk area		**$1,000**
Interactive Voice Response (IVR)/Auto Attendant for Wauwatosa PD HQ Telephone System		$7,000
	Estimated Total Cost	**$68,000**

**Provided by ProPhoenix*
***Provided by Word Systems-Nice System Distributor for Milwaukee County*
**** One radio console will be moved from Wauwatosa to OEM for Wauwatosa dispatch operations*
*****The City did not provide a cost for Code Red. We consider the cost to be a recurring cost*

In terms of facility costs, the new workstations and additional personal areas for new staff would need to be added in the OEM Communication Center's current facility and to its plans for a new facility. However, we do not anticipate that any architectural design or construction costs would be needed to accommodate those additions.

There would be costs for electrical power, telecommunications, radio, and low-voltage data cabling system to support the Wauwatosa systems at the workstations. Additionally, there would be some costs for electrical and low voltage cabling connections for data and power in the OEM Communication Center's technology equipment area. Shutdown of the Wauwatosa 911 Center also would require expenditures for the removal and disposal of unused equipment, furniture, and cabling. Overall, however, we believe that these costs would be inconsequential, and we do not include them in our financial analysis.

7.4.2 Five-Year Equipment and Technology Cost Impacts of Consolidation Scenario

This section presents our estimate of the financial impacts related to emergency communications and dispatch equipment and technology should Wauwatosa's PSAP services move to the OEM Communication Center. We describe impacts both for capital equipment purchases and recurring maintenance costs, normalizing all replacements on a five-year cycle. We also added a CAD replacement cost, which is typical over this period of time, for at least one major version update.

7.4.2.1 Fiscal Impacts: Capital Equipment Purchases

The first step in determining the fiscal impact for equipment/technology related to a scenario in which Wauwatosa contracts for PSAP services is to calculate what Wauwatosa would need to spend if it did not contract out the service and continued to operate its own PSAP. The following table – which is based on information provided by the City of Wauwatosa – estimates technology replacement costs for PSAP-related equipment owned by the City under that status quo scenario.

In the table, we only cite equipment that would be impacted by a contracting scenario, i.e. we do not include any dispatch-related equipment that Wauwatosa would need to continue to own and operate regardless of whether it contracts for PSAP services, such as fire house alerting systems and mobile data computers. Also, where we did not receive a replacement cost, we estimated the cost using input from vendors and professional experience. The table

shows that over the next five years, Wauwatosa would incur a cost of about $382,500 for technology replacement, if it remained an independent PSAP.

Table 7: Wauwatosa Current Technology and Estimated Capital Replacement Cost If Wauwatosa Remained an Independent PSAP

Wauwatosa Current Technology and Estimated Capital Replacement Cost If Wauwatosa Remained an Independent PSAP						
Equipment type	**System Manu-facturer**	**Number of pieces of equipment**	**Age**	**Anticipated year of replacement**	**Typical replace-ment cycle (years)**	**Estimated replacement cost**
911 CPE	Airbus	3 consoles	< 1 year	2022	5	$200,000*
CAD	ProPhoenix	3+	11	2021	5	$22,500**
Logging/recording	NICE			2017	5	$19,000***
Radio dispatch consoles	Motorola	3 consoles	10+	2017	10	$141,000****
			Wauwatosa Total Estimated Capital Replacement Costs			**$382,500**

**Provided by Wauwatosa*

*** Assume that a CAD system product upgrade will occur within 5 years; cost provided by ProPhoenix*

**** Cost Input provided by Nice Systems*

***** Estimated cost for Motorola Dispatch Console, provided by Motorola to Wauwatosa*

Next, we estimated the capital equipment costs that would be incurred by OEM – and ostensibly charged to Wauwatosa under a contracting arrangement – over the same five-year period should OEM assume Wauwatosa's PSAP services. We see that those costs would total $242,834. **The difference produces an estimated five-year savings of approximately $139,666**.

Table 8: Projected 5-Year Capital Expenses After Wauwatosa PSAP Consolidated with OEM Communication Center

Projected 5-Year Capital Expenses After Wauwatosa PSAP Consolidated with OEM Communication Center		
Equipment type	**Number of pieces of equipment**	**Estimated replacement cost**
911 CPE	2	$133,334*
CAD	2	$15,000**
Logging/recording	2	$19,000***
Radio dispatch consoles	2	$70,500****
Fire House Alerting	1	$5,000
		$242,834

**Estimate provided by OEM*

***Provided by ProPhoenix*

****Provided by Word Systems/Nice Systems*

*****Provided by Motorola to Wauwatosa*

The limited equipment replacement costs under the contracting scenario are based on the following factors:

911 Call Processing Equipment (CPE): We added two replacement 911 Call Processing Equipment in the OEM Communication Center in the five-year projection based on Wauwatosa's current call volume. This contrasts with the need to replace three CPE workstations if the service remains in Wauwatosa.

Computer Aided Dispatch (CAD): The CAD system eventually would be integrated between the OEM and Wauwatosa requirements. Initially, one dispatch workstation and a back-up would be dedicated to Wauwatosa dispatch, requiring CAD software licenses. The cost estimate is based on historical data from ProPhoenix, without price increases.

Logging & Recording (L&R): There is only a need for two workstations to be outfitted with the L&R system to support Wauwatosa dispatching. Wauwatosa no longer would require L&R at three positions, since call-taking would be handled by the OEM staff at existing workstations.

Radio Dispatch Consoles: As discussed above, based on dispatch volumes, there is a need for two primary Wauwatosa dispatch workstations at the OEM Center. The estimated cost includes $47,000 for one new console to support Wauwatosa dispatching operations. We also assume that one console that is currently housed in Wauwatosa would be moved to OEM. The cost of reconfiguring that console at OEM would be about $23,500.

Fire House Alerting: Capital costs were based on the need for an updated CAD interface to a new Fire House Alerting system. Most of the capital costs are for equipment installed in fire houses and we assume that cost will remain with the Wauwatosa Fire Department.

7.4.2.2 Fiscal Impacts: Equipment and Technology Maintenance

Analysis of the fiscal impacts of consolidating Wauwatosa's PSAP with the OEM Communication Center also must take into account the maintenance costs associated with communications technology and related equipment. Our analysis of these cost impacts again uses data provided by the City of Wauwatosa, though we also added a budget line item for regular maintenance costs associated with servers, desktop computers, keyboards, mice, portable radios, A/V screens and related equipment.

Also, we again did not include operational costs for mobile data computers and Automated Vehicle Location devices based on the assumption that these devices will be maintained by the Wauwatosa Police and Fire Departments regardless of whether the City contracts with OEM for PSAP services. In addition, we did not include the monthly recurring cost for the commercial wireless communications between the CAD and the MDCs, as we assume that the Wauwatosa

Police and Fire department will continue to pay these fees to continue communications to the MDCs.

In addition, while we do include operating/maintenance costs for CPE workstations, we were informed by Wauwatosa officials that such costs covering a recently-purchased CPE unit already have been paid on an up-front basis. Consequently, if a contracting scenario were to occur within the timeframe covered by that payment, then maintenance cost savings related to that equipment would not be realized, unless Wauwatosa was able to secure a rebate for any future maintenance fees already paid.

The following table shows our estimate of annual and five-year maintenance costs that would be incurred by Wauwatosa if it continues to operate as an independent PSAP.

Table 9: Current and 5-year Projection of Wauwatosa PSAP Technology Operating/Maintenance Costs if Wauwatosa Continues to Operate as an Independent PSAP

Equipment type	System Manu-facturer	Estimated Annual Maintenance Costs (20% of Capital)	Estimated 5-year Maintenance Costs
911 CPE	Airbus	$40,000	$200,000
CAD	ProPhoenix	$60,000	$300,000
Logging/recording	NICE	$3,800	$19,000
Radio dispatch consoles	Motorola	$28,200	$141,000
Consumable items : PCs, keyboard, servers, etc.		$2,700	$13,500
		$134,700	**$673,500**

As with capital costs, technology/equipment maintenance costs could be lowered considerably if the PSAP moves to the OEM Communication Center, as expenses for several systems are already being paid by OEM and would not represent new costs. The following table shows annual and five-year technology maintenance costs that would be incurred by OEM as a result of taking on the Wauwatosa PSAP. We have estimated annual maintenance at 20% of the initial capital costs. Also, our five-year cost projection for technology maintenance uses a straight line projection and does not take into account any vendor price increases.

Table 10: 5-Year Wauwatosa PSAP Technology Operating/Maintenance Expenses After Consolidation with the OEM Communication Center

5-Year Wauwatosa PSAP Technology Maintenance Expenses After Consolidation with the OEM Communication Center		
Equipment type	**One Year System Maintenance Cost**	**5-Yr Straight-line System Maintenance Cost Projection**
911 CPE	$26,667	$133,334
CAD	$40,000	$200,000
Logging/recording	$3,800	$19,000
Radio dispatch consoles	$14,100	$70,500
Consumables (PCs, keyboards, servers	$2,700	$13,500
Annual Operating/Maintenance Projected Cost	**$87,267**	**$436,335**

A comparison of the two tables indicates that **five-year maintenance savings resulting from the consolidation of the Wauwatosa PSAP into the OEM Communication Center would be an estimated $237,165**.

7.4.3 Other Equipment and Technology Factors

While difficult to quantify and likely inconsequential to the overall financial analysis, the following additional factors related to equipment and technology are worth noting:

- **Equipment/technology maintenance**: Overall maintenance costs would be reduced since the OEM Communication Center's IT staff would be able to absorb some maintenance responsibilities for the new equipment, and Wauwatosa no longer would have PSAP equipment maintenance responsibilities.
- **Wauwatosa facility:** Future Wauwatosa PSAP facility costs would be eliminated by consolidating with the OEM Communication Center, and the former PSAP space could be re-appropriated for other functions. There would be some facility costs incurred during the transition, which are cited above.

7.5 General Operating Cost Impacts of Consolidation Scenario

In this section, we present an analysis of the general, non-technology operating cost impacts associated with a scenario in which Wauwatosa eliminates its PSAP and instead contracts with the County to provide PSAP services through its OEM Communication Center. Most of those costs are personnel-related.

7.5.1 Personnel Costs

Our planning assumptions include the following:

Contracting for Service: Wauwatosa will contract with the OEM Communication Center for services to include:

- 911 emergency call taking
- Related non-emergency 911 call taking
- Dispatching services for Wauwatosa Police, Fire and EMS
- Dispatch of towing companies upon Wauwatosa police request
- Provide criminal history information upon Wauwatosa police request
- Serve as the Primary Mutual Aid Box Alarm System (MABAS) dispatch center for Wauwatosa fire department.

Line Staffing: Six full-time positions would need to be added to the OEM Communication Center to staff the new dispatching/call-taking positions required for the Wauwatosa level of activity (two positions on first and second shifts and one on third shift). This assumption is based on discussion with OEM officials and takes into account the need to accommodate vacation time, FMLA, holidays, etc. It is possible that existing employees from the Wauwatosa 911 Center could be provided the initial opportunity to fill those positions.

Supervision: The OEM Communication Center would not need additional supervisory staff to accommodate the transfer of the Wauwatosa PSAP function.

Non-Emergency Functions: As discussed above, we do not recommend transferring all of the "non-emergency" functions now provided by the Wauwatosa PSAP staff to the OEM Communication Center. Specifically, 24/7 visual prisoner monitoring, window services, and police-related non-911 administrative call-taking still would remain with the City of Wauwatosa. We assume that three full-time desk clerk positions would need to be added to the third shift to accommodate those functions. The Wauwatosa Police Department would benefit from having an administrative presence at the department on a 24/7 basis.

The following table summarizes the net staff reductions that would take place in Wauwatosa and the staff additions that would be required at OEM to accommodate the contracting scenario. Our analysis shows that overall – for Wauwatosa and OEM combined – **there would be a collective savings of approximately $217,511 annually in personnel costs** associated with Wauwatosa PSAP services under a contracting scenario.

Table 11: Staffing Impacts of Contracting Scenario

Staffing Impacts of Contracting Scenario			
	Position Changes	Annual Salary Cost/(Savings)*	Annual Benefit Cost/(Savings)****
City of Wauwatosa			
Dispatcher (FT)	(9)	($454,837)	($172,383)
Dispatcher (PT)	(.7)	($35,824)	($5,374)
Supervisor	(1)	($58,332)	($22,108)
Command Staff Supervisor	(.25)	0**	
Desk Clerk	3	$132,672	$50,283
Total Wauwatosa Staff	*(7.95)*	($416,321)	($149,582)
Overtime		($40,253)***	($15,256)
Total Wauwatosa		*($456,574)*	*($164,838)*
OEM			
Dispatcher (FT)	6	$240,380	$102,834
Overtime		$42,504+	$18,183
Total OEM		*$282,884*	*$121,017*
Total	***(1.95)***	***($173,690)***	***($43,821)***

* Based on 2016 average salaries and benefits reported by City of Wauwatosa and Milwaukee County.
** While elimination of Wauwatosa's PSAP's would eliminate the need to devote the equivalent of .25% of a command staff supervisor's time to that function, a command staff position could not be eliminated. Consequently, no financial savings would be realized, though additional command staff capacity to fulfill other functions would be.
*** Based on 2013 total with add-on of 5% for inflation – data obtained for 2013-15, but 2014 and 2015 overtime totals skewed by unusual number of staff vacancies.
**** The City's fringe rate for 2016 for civilian employees is 50.9% of salary; however, approximately 13% of that is for legacy health care, which would not be eliminated if specific positions are reduced. Consequently, we applied a fringe rate of 37.9% to calculate fringe benefit savings for full-time employees (15% was used for part-time employees because no health care is involved). For the County, per OEM, we used an active fringe benefit rate of 42.78%.
+Based on three-year average (2013-2015) County per-dispatcher overtime multiplied by six dispatchers.

7.5.2 Other Operating Cost Factors

The following list describes potential additional costs related to operationally integrating the Wauwatosa operations into the OEM Communications Center.

- **Policy and Procedure Development**: There could be additional minor staff costs associated with development of new policies and procedures for managing the consolidated center. Similarly, new policies and procedures would be required for managing the technical liaison function between the OEM Communication Center and the Wauwatosa Police and Fire Departments. Furthermore, as new operational standard operating procedures are

developed, tested and deployed, there would be staff costs associated with these activities. However, we do not deem these costs significant enough to be included in our financial analysis.

- **Training Costs**: While it would be hoped that several existing Wauwatosa dispatch staff members would transfer to OEM to continue to conduct Wauwatosa dispatching activities, there still would be a need for additional training for those staff members on OEM procedures. In addition, multiple OEM staff members would need to receive training on Wauwatosa dispatching technology and procedures. In fact, it is possible that each OEM staffer assigned to Wauwatosa dispatching would need about 500 hours of training, which would include Wauwatosa fire, police and EMS dispatch operational procedures, radio, and specialized tasks such as records look-up, MABAS, and the operational and organizational structures of the Wauwatosa departments. We cannot calculate a cost for that training time without knowing the specifics of how training would be organized and conducted, but OEM officials should be mindful of this as a potential cost that should be factored into budgeting for the first year of implementation.
- **Administrative Operations**: We assume that the OEM Communication Center could absorb the administrative "back office" functions associated with its additional staff with no extra cost, such as human resources, payroll, and budget planning/management. We assume that no additional staff would be required to perform these functions. This would eliminate similar administrative support costs now incurred by Wauwatosa to support its 911 Center, but we deem it unlikely that position savings would result from such elimination.

7.6 Overall Financial Analysis Summary

Our financial analysis indicates there is potential for substantial collective cost savings if Wauwatosa and OEM decide to pursue a contracting scenario for Wauwatosa's PSAP services. In **Table 12**, we summarize the potential annual savings by annualizing our five-year equipment/technology replacement and equipment/technology maintenance estimates and plugging in our estimated personnel savings. We emphasize that these are merely projections, and that they do not take into account the impacts of annual salary/benefit increases and inflationary adjustments. Also, as noted above, we do not include in our analysis a range of relatively minor financial impacts that do not fall within these three categories.

With those caveats in mind, **we estimate a total annual collective savings of approximately $293,000.** In other words, OEM could administer the Wauwatosa PSAP function at an annual cost that is $293,000 less than Wauwatosa currently is paying, even while accounting for Wauwatosa's need to hire new desk clerks to backfill some of the tasks currently performed by dispatchers.

Table 12: Estimated Collective Annual Savings Associated with Contracting Scenario

Estimated Collective Annual Savings Associated with Contracting Scenario			
	Wauwatosa	**OEM**	**Total**
Personnel	$621,412	($403,901)	$217,511
Equipment/Technology Replacement	$76,500	($48,567)	$27,933
Equipment/Technology Maintenance	$134,700	($87,267)	$47,433
Total	***$832,612***	***($539,735)***	***$292,877***

While the table shows "savings" for Wauwatosa and "costs" for OEM, that obviously is not how a contracting scenario would be effectuated. We can assume that under a potential contract, OEM would charge Wauwatosa both for its additional direct cost of $539,735 per year, and for some percentage of OEM's general overhead cost associated with running its communication center.

We have no way of analyzing what that overhead charge would be, but we can construct a hypothetical scenario in which that charge would be based on Wauwatosa's percentage of the OEM Communication Center's total call volume. In 2015, the call volume at the Wauwatosa PSAP for the types of calls that would be handled by OEM (i.e. 911 and non-911 public safety calls) was 24,398 calls, which was approximately 13% of the 184,643 911 calls handled by OEM. OEM indicates that it incurred approximately $1.1 million in non-personnel costs for its communication center in 2015.[7] If we apply the 13% to the $1.1 million, we come up with a hypothetical overhead charge of $143,000.

As shown in **Table 13**, if the OEM-Wauwatosa contract contained an annual overhead charge of $143,000 and Wauwatosa fully reimbursed OEM for the direct costs outlined above, **Wauwatosa still would experience a savings of about $150,000 annually**. In the first year, if Wauwatosa was fully charged for the $68,000 in start-up costs outlined earlier, then our

[7] It is important to note that we have not conducted an extensive evaluation of OEM's overhead costs to determine the precise nature of those costs and the extent to which they would be shared with Wauwatosa under a contracting scenario. Such deliberation would need to occur during contract deliberations. Consequently, the $1.1 million only should be considered a rough estimate at this time.

analysis shows it still would experience a first-year savings of $82,000.[8] Meanwhile, the County would benefit from an annual allocation of $143,000 to help defray its OEM Communication Center overhead.

Table 13: Annual Charges to Wauwatosa Under Hypothetical Wauwatosa-OEM PSAP Contract

Table 13: Annual Charges to Wauwatosa Under Hypothetical Wauwatosa-OEM PSAP Contract		
	Year 1	Subsequent Years
Direct costs	$539,735	$539,735
Overhead	$143,000	$143,000
Start-Up	$68,000	$0
Total	**$750,735**	**$682,735**
Current Wauwatosa PSAP Cost	*$832,612*	*$832,612*
Total Wauwatosa Savings	***$81,877***	***$149,877***

7.7 PSAP Consolidation Migration Issues

Moving a PSAP into a new facility requires a structured approach to insure that during the migration to the new facility, 911 call taking, dispatching and other emergency services are not interrupted. The following section addresses the key elements for managing the consolidation.

PSAP Migration Plan: A PSAP Migration Plan needs to be prepared and executed. The Migration Plan is a structured approach that addresses technology, testing, vendor management, training and cut-over planning and provides a detailed project management plan. The plan will manage implementation activities and issues to include:

- Facility modifications for technical, operations, administrative, and staff areas, if necessary
- Workstation and technology acquisition, configuration, installation, testing and acceptance
- Training for new technology and operational policies and procedures
- Cut-over plan and close out of the Wauwatosa PSAP facility
- Communications plan for Wauwatosa, OEM, Wauwatosa residents, other stakeholders
- Reporting to Oversight and Management Team

[8] While our analysis indicates a first-year savings, it is very difficult to predict issues that could arise during initial implementation that could generate additional costs, including the need to train existing OEM staff to be able to handle Wauwatosa call-taking and dispatching. Consequently, the affected parties may wish to assume there would be no savings in the first year, though savings in subsequent years should approximate those estimated in this analysis.

PSAP Migration Management and Oversight: A PSAP migration project management team needs to be organized and chartered. This team will coordinate the various aspects of the project and can establish work teams to address specific tasks and activities. The team should be composed of key decision-makers associated with the project as well as the PSAP management from both centers.

PSAP Consolidation Communications Plan: Communications is an essential success factor to managing a successful migration. A PSAP Consolidation Communications Plan must be developed as an integral component of the Migration Plan. The communications plan will keep Wauwatosa and County stakeholders regularly informed on the status of the project. Some communities also establish a website for community residents to monitor the progress of the project. Studies of PSAP consolidation have shown that communication with staff as well as key stakeholders is critical to success. This is especially true for the transitioning staff.

A lesson from PSAP consolidation projects across the U.S. is that there is potential for turnover among staff that ideally would transition to the consolidated PSAP. To mitigate this risk, a number of steps can be taken, including the following:

- Focused communications with staff from the PSAP transitioning to the consolidated center. Bring them to the center early on in the process, familiarizing them with the new facility, location, parking, managers and other telecommunicators.
- Clarify the hiring process and compensation issues early in the transition to include salary, seniority, benefits, pension, leave, shift assignments, etc.
- Describe career opportunities for transition staff, such as the career ladder at OEM and training opportunities.

Consolidation Estimated Timeline: We estimate that the consolidation can take place within six months of an agreement between OEM and Wauwatosa. This period is inclusive of planning, procurement, system implementation and cut-over, personnel transition and training.

7.8 Benefits of PSAP Consolidation

The benefits that can be derived from consolidation of emergency communications not only are financial in nature. We believe that the following operational benefits also could be achieved from the contracting scenario outlined above.

- **Reduced Dispatch Processing Times** – The OEM Communication Center receives all wireless 911 calls for emergency services emanating from Wauwatosa. Currently, if dispatching is required, then the call is transferred from OEM to the Wauwatosa PSAP. For those more than 2,000 calls annually, emergency callers using wireless phones must first talk with an

OEM call taker regarding the nature of the problem and their location, then be transferred to a Wauwatosa call taker to be asked many of the same questions again. Industry averages for this transfer range from 20-60 seconds, depending on the number of questions asked by each call taker to determine caller location and need. Conversely, under the contracting scenario, 911 wireless calls from Wauwatosa would be fielded by a Unified Call Taker position at OEM who would send dispatch information directly to Wauwatosa Fire, Police, and EMS.

- **Cost Effective Purchasing and Maintenance of IT and PSAP Resources** – Wauwatosa's PSAP currently negotiates its own technology contracts and provides its own maintenance of those systems. Consolidation with the County could provide a basis for more cost effective purchasing of technology – such as 911 Call Processing Equipment (CPE) or Logging and Recording systems or Computer Aided Dispatch (CAD) – given that OEM purchases a larger volume of such equipment. In addition, the use of the County's larger IT staff presents an opportunity to make the most efficient operational use of IT staff to maintain systems.
- **Staff Hiring, Retention and Effectiveness** – All Milwaukee County municipal PSAP managers with whom we spoke – including those in Wauwatosa – have experienced challenges in hiring and retaining PSAP staff. As a larger PSAP, the OEM Communication Center would be better positioned than the Wauwatosa PSAP to offer career ladder opportunities that are essential to retention. In addition, given its access to the County's extensive centralized human resources function, OEM likely would be better equipped to engage in recruitment activities and to offer training and professional development opportunities to staff. Also, a larger PSAP provides opportunity for streamlined and standardized call handling and dispatching protocols and training, which can decrease opportunities for error and enhance safety of responders and the public.

Largely as a result of the opportunity to realize these benefits, local governments across the country have pursued PSAP consolidation. Some examples of County-City consolidation are the following:

- Nashville—Davidson County, TN
- Ramsey County—St. Paul, MN
- Fort Lauderdale—Broward County, FL
- Albany-Saratoga County—Rensselaer County, NY
- Monroe County—Rochester, NY

7.9 Conclusion

PSAP consolidation is a national trend and some states are imposing mandatory consolidation timelines. While Wisconsin has not opted to force mandatory consolidation, ongoing capital expenditures and rising personnel costs are prompting agencies to seek alternatives.

The Wauwatosa case study is one example of the potential cost savings and economies of scale that can be realized through consolidation. In this brief analysis, we primarily focused on financial impacts, but there are also potential service improvements that should be taken into account.

Also, as noted in the beginning of this section, our case study assumes that Wauwatosa's PSAP services would be absorbed by OEM in its existing facility, and that Wauwatosa is the only municipal PSAP that would transfer its operations to OEM. Construction of a new facility that would be designed specifically to accommodate one or more municipal PSAP operations could allow for a new staffing paradigm (e.g. distinct workstations for call taking and dispatching) and other operational efficiencies that would enhance service-level effectiveness and financial savings. Hence, the potential savings and service improvements cited in this case study should be viewed as minimum in nature; those savings and improvements likely would be maximized if multiple PSAPs decided to transfer their activities to the OEM Communication Center and those decisions were incorporated into the design of the new OEM facility.

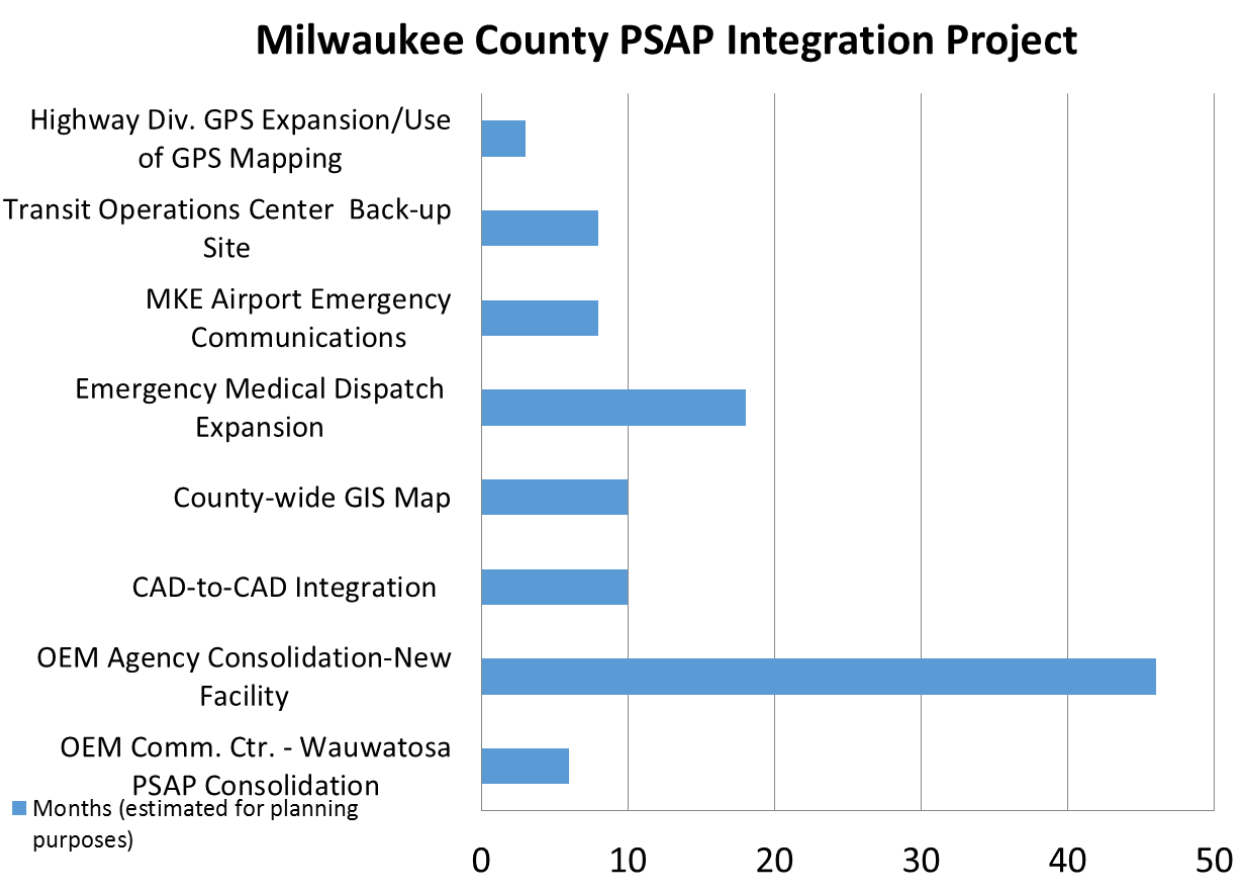
While this case study tried to look at all of the major PSAP costs for both Wauwatosa and the County, there may be additional County costs that were not taken into account. But even if there are additional County costs, the potential collective savings and operational efficiencies/improvements are significant enough to warrant a more rigorous examination to determine the actual savings and benefits that would result from combining Wauwatosa's PSAP operations with the County's.

8.0 Projected Implementation Timeline

Our estimate for the time period required to implement each of the recommended initiatives is presented in the following table. Our estimated time period is limited to the actual implementation period after the project has been approved, funded, and a contract awarded to implement. The time periods are based on our professional experience from similar projects, input from suppliers, and discussions with agency staff.

Project	Minimum Time Frame Estimate
OEM Agency Consolidation Into New Facility	30-46 months
CAD-to-CAD Integration	8-10 months
Geographical Information System (GIS)-Mapping	8-10 months
Emergency Medical Dispatch	12-18 months
Highway Division GPS Expansion and Use of GPS Mapping	1-3 Months
MKE Airport Emergency Communications	6-8 months
Transit Operations Center	
Option1-Establish Short-term Back-up at OEM Communication Center	3-6 months
Option 2-Establish Short-term Back-up at new OEM facility	Based on new OEM facility schedule
Option 3- Add the full TOC into the New OEM facility	Based on new OEM facility schedule
Consolidation of OEM Communications Center and Wauwatosa Communications Center	6-9 months

An alternative view of the projected implementation schedule is presented below.


Milwaukee County PSAP Integration Project
Highway Div. GPS Expansion/Use of GPS Mapping
Transit Operations Center Back-up Site
MKE Airport Emergency Communications
Emergency Medical Dispatch Expansion
County-wide GIS Map
CAD-to-CAD Integration
OEM Agency Consolidation-New Facility
OEM Comm. Ctr. - Wauwatosa PSAP Consolidation
Months (estimated for planning purposes)
0
10
20
30
40
50

Appendix A—PSAP Survey

Public Policy Forum
Impartial research. Informed debate.

CALL AND DISPATCH VOLUME DATA

Please provide emergency 911 and non-emergency call volume for the past 3 years:

	2013	2014	2015
911 Emergency Calls			
Non-Emergency Calls			

Are emergency calls from landlines and mobile phones received directly in your center or are they transferred from another center?

Please provide the number of dispatch incidents over the past three (3) years:

	2013	2014	2015
Police Dispatches			
Fire Dispatches			
EMS Dispatches			

PSAP WORK STATIONS

Please provide the number of 911/dispatch work stations in your center. If these functions are combined, please indicate:

Call Taker	
Dispatcher	
Combined Call Taker/Dispatch	
Supervisor	

SERVICES OTHER THAN COMMUNICATIONS

Please provide a description of services provided by PSAP personnel in addition to call taking and dispatching such as window services, permit sales, prisoner monitoring, etc.

_____

_____

QUALITY ASSURANCE

Does your PSAP have a formal quality Assurance program?

_____

NON-EMERGENCY CALL HANDLING

Are Non-Emergency calls received on a separate non-emergency number? If so, what is the telephone number?

_____

Are there specific procedures for handling non-emergency calls such as for police services, general government services, information? Are the procedures documented?

_____

_____

STAFFING OVERVIEW

Please provide your dispatch center's **2016 staffing numbers** for each of the following categories. We would like to have full-time equivalent (FTE) counts rather than a simple count of individuals. Be sure to place each position in one category and not to duplicate. Please include positions that are now vacant but will be filled in the near-term.

POSITION BY TYPE	**FTE(s)**	**Maximum Salary** (in salary schedule)	**Minimum salary** (in salary schedule)	**2016 Average Salary**
Dispatcher/Call Taker		$	$	$
Supervisor		$	$	$
Support staff		$	$	$
Admin Assistant, secretary, etc.		$	$	$
Other		$	$	$
TOTAL POSITION FTEs/COSTS		$	$	$

STAFFING PER SHIFT	1st	2nd	3rd
Max dispatchers FTE per shift			
Min per shift			
Average off-duty FTE per shift (i.e. vacation, holiday, sick, FMLA, vacant, etc.)			

FINANCIAL OVERVIEW

Please provide your fire department's **2015 actual budget/expenditure figures** for each of the following categories. Be sure to include related expenditures/revenues that support fire department operations but are budgeted outside of the fire department's budget as well.

BUDGET SUMMARY	**2015 Actual**
Expenditures	$
Revenues	$

PERSONNEL	**2015 Actual**		
Total salaries and wages	$		
Total dispatcher salaries	$		
Total supervisor salaries	$		
Total support staff salaries	$		
Overtime (3 year history of actual costs/hrs)	***2013***	***2014***	***2015***
Dispatcher overtime			
Associated overtime hours			
Other overtime			
Associated overtime hours			
Total fringe benefits	$		
Health insurance	***Active employees***	***Retirees***	
Employer health costs	$	$	
Employee health costs	$	$	
Pension			
Employer pension costs	$		
Employee pension costs	$		
Pension or OPEB reserves/pre-payment	$		
Social Security	$		
Medicare	$		
Workers Comp	$		
Life Insurance	$		
Other (please explain)	$		

Other fringe benefits (please explain): _____

Fringe benefit rate: _____ % with just active costs _____ % with all fringe costs (includes legacy/retiree costs)

What is your current OPEB liability? _____

How does your municipality fund this OPEB obligation? _____

NON-PERSONNEL COSTS*	2015 Actual	
	Within dispatch center budget	Costs related to the dispatch center but are budgeted centrally or in another department
Total non-personnel costs	$	$
Total telecom-related costs:	$	$
Total IT costs:	$	$
Total maintenance costs:	$	$
Total training costs:	$	$
Total cost of dispatch center supplies:	$	$
Other (please explain)	$	$

*Please include costs charged from other central service departments, rough estimates are acceptable.

Other (please explain): _____

REVENUE BREAKDOWN	2015 Actual
Locally allocated public resources	$
Intergovernmental revenue	$
Other (please explain)	$

Other (please explain): _____

FACILITIES/ EQUIPMENT

1) Please provide information on your equipment and replacement timeline as dictated by capital budget plans or other replacement schedule. If not Applicable please indicate as N/A.

Equipment type	System Manu-facturer	Number of pieces of equipment	Age	Anticipated year of replacement	Typical replace-ment cycle (years)	Estimated replacement cost
911 CPE						
CAD						
Logging/recording						
Radio dispatch consoles						
Mobile data computers						
AVL devices						
Mapping						
Audio Visual Systems						
Mass Notification System						
Fire House Alerting						
Non-emergency systems						

2) Other (please explain): _____

Appendix B—PSAP Consolidation Advisory Board Members

The following organizations and representatives are members of the advisory Board

Organization	Representative	
City of Wauwatosa	Archambo	James
Milwaukee County Sheriff	Barkow	Brian
Milwaukee Health Department	Biedrzycki	Paul
Milwaukee County IMSD	Carrion	Andy
Milwaukee County EMS	Colella	Riccardo
General Mitchell International Airport	David	Kathie
Oak Creek Police Department	Edwards	John
Milwaukee County Corporation Counsel	Foley	Colleen
General Mitchell International Airport Fire Dept.	Forro	Joe
Milwaukee County Dept. of Transportation	Heisel	Greg
Milwaukee Police Department	Hunt	Kealoha
Milwaukee County Transit System	Kellner	Sandy
Milwaukee County Executive's Office	Koltun	Raisa
City of Greenfield	Neitzke	Michael
Village of Bayside	Pederson	Andy
Milwaukee Police Department	Quigley	Alana
Milwaukee Fire Department	Rohlfing	Mark
Milwaukee County Office of Emergency Management	Simley	Lesley
Milwaukee County Office of Emergency Management	Westrich	Christine
Milwaukee Police Department	Whitman	John