Redwood Empire Dispatch Communications Authority Fire & EMS Consolidation Feasibility Study Report

FINAL

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Executive Summary

The Redwood Empire Dispatch Communications Authority (REDCOM) contracted with Federal Engineering (***FE***) to study the feasibility of REDCOM providing dispatch services for the sixteen (16) Marin County fire agencies. The scope of this study was to gather and analyze data and information to identify any roadblocks and requirements that must be considered to significantly expand REDCOM's operation and geographic coverage. ***FE*** provides an assessment of the feasibility of this expansion with recommendations regarding management structure, workload, staffing, space, technology needs, and high-level cost estimates in this report.

FE reviewed both the existing REDCOM Joint Powers Agreement (JPA) (Agreement) and the new state laws enacted in 2019 related to transferring 9-1-1 calls from a public agency. ***FE***'s assessment is that REDCOM can modify the Agreement to allow the Marin County fire agencies' participation and complies with California Code to receive and dispatch fire and Emergency Medical Service (EMS) calls from Marin County.

FE interviewed individual and groups of stakeholders to identify service issues experienced by the Marin County fire agencies and requirements expressed for potential future dispatch services by REDCOM. The key operational areas noted include command and control, input in operations, mapping, and Computer Aided Dispatch (CAD) reporting, with the goal of facilitating cross-county interoperability, and improving response times as well as call processing time to bring the Marin County fire agencies more in line with industry standards.

There are some operational and technical concerns or limitations that will need to be addressed should REDCOM and the Marin County fire agencies decide to move forward with a transfer of dispatch services for these agencies.

The primary operational issue is the desire and need for REDCOM to become a command and control dispatch center. Marin County Fire is a contract county for the California Department of Forestry and Fire Protection (CAL FIRE), and Marin County fire agencies are requesting REDCOM to adopt the CAL FIRE command and control model for a dispatch center, staffed by fire captains, with field experience, in supervisory roles. Since fire captains work 24-hour shifts, there is a requirement for sleeping, cooking, and personal hygiene facilities adjacent to the dispatch center. Based on ***FE's*** research, sleeping and personal hygiene facilities are not currently available in the building that REDCOM is housed in, and there is no available space in the building to construct such facilities. The command and control model is also different than the current REDCOM management structure, which utilizes dispatch professionals in the supervisory positions. An option would be a hybrid model for command and control at REDCOM through additional training

of its supervisory staff to meet the needs of Marin County fire agencies and the CAL FIRE contract.

Another option that REDCOM and the Marin County fire agencies may want to consider is to create a REDCOM-staffed communication center in Marin County (REDCOM Marin), managed by the REDCOM JPA, dispatching only Marin fire / EMS agencies. The best location for a new Marin County fire communications center would be in open space at the Marin County building located at 1600 Los Gamos Drive in San Rafael. ***FE*** provides a preliminary staffing analysis for this option and a discussion of differences between anticipated costs for a combined REDCOM model and a separate Marin County fire communications center model in this report.

FE estimated high-level costs that will be required for REDCOM to provide dispatch services for the Marin County fire agencies. ***FE***'s goal is to provide cost considerations that will facilitate an eventual decision by REDCOM and the Marin fire agencies on whether it is in the interests of both parties to proceed with a transfer of dispatch services from the Marin County Sheriff's Office (MCSO) and Woodacre Emergency Communication Center (WECC) to REDCOM.

FE reviewed the technology issues that will need to be addressed and provides high-level cost estimates associated with each technology area. In some areas, such as the addition of dispatch positions at REDCOM, plans are already in place to implement these projects. However, ***FE*** identified high-level costs for these items so that they are not overlooked. Allocation of specific costs between REDCOM and the Marin fire agencies will need to be negotiated should the Marin fire agencies decide to proceed with a transfer of dispatch services to REDCOM.

FE also computed the estimated high-level annual operational costs for each dispatch option based on the results of the staffing analysis, MCFD-recommended command staffing, and annual facility costs, in the case of a Marin Fire Dispatch Center.

The following table summarizes the estimated capital costs for technology areas and annual operational costs for each of the two dispatch options.

Estimated High-level Costs		
Cost Type	**REDCOM**	**RECOM Marin**
Capital Costs (Technology)	$2,000,000.00	$2,600,000.00
Annual Labor Costs	$2,228,933.00	$3,186,802.00
Annual Resource Bridge Subscription	$60,000.00	$60,000.00
Annual Facility Costs		$165,900.00
TOTAL ESTIMATED ANNUAL COST	**$2,288,933.00**	**$3,412,702.00**

The primary technical issue that impacts the consolidation of dispatch services is the need to connect REDCOM to the Marin Emergency Radio Authority (MERA) trunked radio system. The radio consoles that are currently in use at REDCOM are provided by ModUcom and are not capable of directly connecting to the MERA radio system. Alternative or upgraded radio consoles would need to be purchased and installed in at least three positions, but ***FE*** recommends that all radio consoles be replaced. Other technical areas to be discussed are:

- Expanding the footprint of the Sonoma CAD system
- The need for a single combined Geographic Information System (GIS) for Sonoma and Marin Counties for use by the Sonoma CAD system
- Logging recorder capabilities to record the MERA radio talk groups at REDCOM
- The impending move to Next Generation 9-1-1 statewide

To demonstrate the ability for REDCOM to accommodate the anticipated workload for an expanded fire communications center serving the two counties, ***FE*** calculated:

- The projected number of positions needed to handle the workload
- The number of Full Time Equivalent (FTE) employees needed to staff the positions during normal, slow, and peak periods around the clock

The calculations were made using industry standard estimating tools and are based on cited industry standards and best practices.

The following table displays the current REDCOM staffing.

Authorized Positions - REDCOM				
Job Title	**Authorized Employees - Full Time**	**Actual Employees - Full Time**	**Authorized Employees - Part Time**	**Actual Employees - Part Time**
Shift Supervisors	4	4	0	0
Telecommunicators	18	16	6	4
Total	**22**	**20**	**6**	**4**

FE calculated the recommended staffing for a combined Sonoma and Marin County fire / EMS operation based on our estimate of the combined call volume, 9-1-1 and ten-digit, using industry standard manpower forecasting tools. The following table displays the recommended staffing for a combined center.

Multi-Agency ECC	
Position Title	**Total Number of Employees**
Supervisors	4
Dispatchers	20
Call Takers	9
Total PSAP Staff	**33**

Based on ***FE***'s estimate, a combined REDCOM operation will require an additional 11 staff positions.

FE also calculated the minimum number of console positions that a combined center will need based on the historical busy day of week / time of day. The minimum number of required positions is nine, named positions in the following table. An additional five positions are recommended for extended operations, overflow, or training.

Positions	
#	Position Type
1	Supervisor
2	REDCOM Dispatch
3	Control 2 Dispatcher
4	Control 3/4 Dispatcher
5	Fire 13 Dispatcher
6	Fire 14 Dispatcher
7	Call Taker 1
8	Call Taker 2
9	Call Taker 3
10	Overflow/Training 1
11	Overflow/Training 2
12	Overflow/Training 3
13	Overflow/Training 4
14	Overflow/Training 5

REDCOM currently has ten positions. REDCOM is in the preliminary design stage for an expansion of the communications center that will add four positions. Based on ***FE***'s calculations, an expanded 14-position communications center will have enough telecommunicator consoles to accommodate the estimated combined call volume and allow enough additional consoles to accommodate expanded operations.

With the above issues addressed or mitigated and the financing determined, ***FE*** considers the addition of dispatching for the 16 Marin County fire agencies by REDCOM to be feasible.

In the final section of this report, ***FE*** identifies steps that should be taken if REDCOM and the Marin County fire agencies decide it is in their collective interest to pursue transitioning dispatch services for the Marin County fire agencies from MCSO / WECC to REDCOM. The project phases required for a transition of dispatch services include:

- Decision to Proceed:
  - Marin County fire agencies decide if it is in their interest to proceed with a transfer of dispatch services
  - If the Marin County fire agencies decide to proceed with a transition of their dispatch services, then they will need to have discussions with REDCOM to identify the support model to be pursed, e.g., REDCOM dispatch or a new Marin County fire dispatch center, the scope of services, and allocation of costs
- Governance:
  - Two options to consider:
    - Add Marin County to the JPA
    - Negotiate a contract with the Marin County fire agencies for dispatching services
- Planning:
  - Timeline
  - Organization
  - Finance
  - Expansion of Facilities
  - Personnel
  - Technical Support
  - Vendor Contracts
- Implementation:
  - Designated project manager or management team
  - Identification of affected stakeholders and member agency liaisons
  - Identification of risks
  - Schedules of all plan paths:

- Required vendor contracts
- Required technology upgrades and transition coordination
- New employee hiring and training / certification
- Required GIS updates
- Provisioning the Sonoma County CAD for Marin operations, e.g. response plans
- CAD data import
- Facility changes
- Operational acclimation, training, and transition plans
- Noted milestones and determination of decision points to proceed with or abandon a plan or the project with alternate paths defined

- Cutover:
  - New / revised policies and procedures in place
  - Completion of training for all employees on Marin operations
  - CAD, 9-1-1, and radio consoles installed and operational
  - Functional testing of Sonoma County CAD to support Marin County fire dispatch
  - Coordination with MCSO and WECC on the date and time of the cutover
  - Development of a detailed cutover plan with rollback decision points
  - Coordination with the CA 9-1-1 Branch on transition of 9-1-1 trunks and speed dials

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1. Background

The Redwood Empire Dispatch Communications Authority (REDCOM) is a Joint Powers Authority (JPA) established in 2002 under the California Joint Exercise of Powers Act to provide centralized emergency Fire and Emergency Medical Services (EMS) dispatching to emergency response agencies within Sonoma County. REDCOM is governed by a seven-member Board of Directors (BOD) and has contracted with a private company, American Medical Response (AMR) West, to provide dispatch operations. REDCOM currently provides E9-1-1 call taking and dispatching for 31 public and private agencies in Sonoma County. In October 2018, REDCOM was approached by representatives from the Marin County Fire Chiefs Association requesting to begin discussions regarding E9-1-1 call taking and dispatching services by REDCOM.

REDCOM is evaluating the possible inclusion of an additional 16 Fire and EMS agencies operating in Marin County, CA. Marin County fire and EMS agencies are currently dispatched from two centers:

- Marin County Sheriff's Office (MCSO) on a fee schedule based on Computer Aided Dispatch (CAD) activity
- Marin County Fire Department, Woodacre Emergency Command Center (WECC). Marin County Fire is one of six Contract Counties to CAL FIRE providing state mission responsibilities, including dispatch services, in Marin County

FE was contracted by REDCOM to provide professional services to assist them in determining the capability for REDCOM to incorporate Marin County Fire and EMS agencies into its service delivery model.

In addition to determining the feasibility and capability for REDCOM to provide dispatch services to the Marin County fire and EMS agencies, the project also includes an assessment and recommendations for organizational changes that may be required, such as:

- Inclusion of Marin County fire and EMS agencies in the existing REDCOM JPA
- Restructuring the REDCOM JPA and governance
- The formation of a new JPA
- Contracting of services

2. Methodology

FE approached this project using a discovery process in which statistical, demographic, technology inventory, budgets, contracts, JPAs, and associated documents are gathered and analyzed. Observation sessions with REDCOM and the Marin County Public Safety Answering Points (PSAP) were conducted to assist ***FE*** in understanding the current operational methodologies and workflow processes. Interviews with individual decision makers and group interviews with stakeholders, and the response agencies, provided critical insight into the concerns and expectations of those affected by any change in the current organizational structures and operations.

On February 11, 2020, a project initiation meeting was held to confirm the project scope, schedule, discuss ***FE***'s project methodology, and confirm the schedule for the interviews, focus groups and observations. REDCOM, Marin fire agency representatives, and the ***FE*** team confirmed mutual agreement regarding the expected report deliverable content, proposed review process and acceptance, and the final presentation. Following the initiation meeting the ***FE*** team began the discovery process through focus group meetings, PSAP observations, and individual interviews that took place February 11 through February 14, 2020.

The following groups and staff / positions were interviewed and / or contributed their input to this assessment:

- Focus Group Sessions:
  - REDCOM Management
  - Marin County Fire Chiefs
  - Technology Managers
- PSAP Observations:
  - REDCOM
  - MCSO
  - WECC
- Interviews:
  - Jason Weber, Marin County Fire Chief
  - K.T. McNulty, REDCOM Executive Director

- Heather Costello, MCSO Executive Director

In addition, ***FE*** made a brief presentation of the project methodology, deliverables, and schedule to the REDCOM BOD during their regularly scheduled meeting on February 13, 2020.

3. Marin County Fire Chiefs Association Goals

The Marin County Fire Chiefs that ***FE*** met with during focus groups and interviews expressed the following goals they wanted to assess in evaluating dispatch services from MSCO and REDCOM:

- Call processing:
  - Call handling performance, e.g., call transfer time from primary to secondary PSAP
  - Publish call performance measures on a monthly basis
  - Meet or exceed national standards
- CAD statistical reporting:
  - Monthly statistical reports
  - Routine management reports
  - Ad hoc queries and reports
  - Management dashboards
- Establishment of a Fire Command Center:
  - The communications center would follow the CAL FIRE Command Center model
  - The difference between a Dispatch Center and Command Center is that a Command Center is the Incident Commander of an incident until a command structure is established at the scene and an Incident Commander is announced. This allows the Command Center to augment or amend the assignment as needed from gathered information. A qualified fire officer is always on duty
  - Due to the extended duty periods, e.g., 24 hours, rest and shower facilities in proximity to the dispatch center are required
  - Duties of the Command Center Fire Officer:
    - Move up and cover

- Preposition resources (Red Flag)
- Ability to modify responses
- Mutual aid / call backs
- Anticipate additional resource requests
- Knowledge of air assets
- Provide information, planning, and logistical support for new and emerging incidents

- Technology Support:
  - Support for the implementation of Marin County fire agencies' objectives and initiatives, e.g., Automatic Vehicle Location (AVL) location of units and proximity dispatch, full Tablet Command integration, and future integrations
  - Support from a proactive technology team that will assist with the evaluation of new public safety technology that can provide enhanced responses and service levels. Support would include identification of technology hurdles for implementation, alternatives, costs, and implementations timelines

4. Existing Conditions

FE's first task was to evaluate the existing conditions at the three communications centers, REDCOM, WECC, and the MCSO's Public Safety Communications Center (PSCC). Areas evaluated included:

- Organizational structures
- Existing governance models
- Contracts for service
- Physical location and infrastructure of the dispatch centers
- Services currently being provided
- Cost structure
- Legal barriers
- Staffing models
- Command and control
- Technology barriers

4.1 REDCOM

4.1.1 Description

REDCOM is a JPA, established in 2002 under the California Joint Exercise of Powers Act, to provide centralized emergency Fire and EMS dispatch services to emergency response agencies within Sonoma County. REDCOM is governed by a seven-member BOD and contracts with a private company, AMR West to provide dispatch services for the participating agencies. REDCOM currently provides 9-1-1 call taking and dispatching for 31 public and private fire and EMS agencies in Sonoma County. REDCOM is located within the Sonoma County Sheriff's facility on Ventura Avenue in Santa Rosa, CA.

4.1.2 Control and Staffing

REDCOM has ten workstations on the dispatch floor. All positions are identical, allowing telecommunicators to sit at any position to work. With a minimum staffing of five telecommunicators, this allows enough additional positions to accommodate broken

equipment or maintenance. Normal assignments are three radio positions: REDCOM dispatch (Primary out bound channel), Control 2 (North and West County), Control 3 (Central County) and Control 4 (South and East County). The other two telecommunicators are assigned to call taking.

Each workstation has five monitors: three for the CAD system, one for the radio console, and one for the 9-1-1 phone console. Large screens on the wall display call processing statistics, hospital diversion status, and video feeds from mountain top fire lookout cameras.

While hospital diversion status is displayed on the wall monitor, using ImageTrend Resource Bridge software, the telecommunicators or the individual hospitals must enter hospital diversions into ImageTrend, and then reenter diversions into CAD, so that EMS units will get a warning if they try to transport to a diverted hospital. The call processing monitor displays event status, with events highlighted if they go over the 70 second call processing standard. This alerts supervisors and staff to events that exceed the 70 second standard and triggers the need to document why the event dispatch exceeded the standard. The display of the mountain-top cameras is for reference or incident locating if there are reports of smoke or fire in the areas covered by the cameras.

Average staffing is six people on duty, which includes one Supervisor. Telecommunicators and Supervisors work 12-hour shifts. Two telecommunicators are on a schedule of working four, 12-hour shifts, then off for four days. The remainder of the staff is on the prevailing schedule: work three shifts, then four days off, then work four shifts, and three days off. This results in a 42-hour work week, calculated over the two-week pay period.

Hiring of Telecommunicators is done by AMR West Human Resources, and upper management positions report directly to the AMR Regional Director. The JPA BOD exercises oversight of the REDCOM Executive Director. Telecommunicators are under a Collective Bargaining Agreement (CBA), and are represented by AFSCME Local 4911 United EMS Workers.

Training for new hires consists of four to six months of on-the-job training with a Communications Training Officer (CTO). There is no formal classroom training. CTOs are either Association of Public Safety Communications Officials (APCO) or CA POST certified. CTOs receive an additional two dollars per hour added to their base pay.

4.1.3 Call Processing

REDCOM is the California Governor's Office of Emergency Services (CA OES) Sonoma County Operational Area mutual aid dispatch center. Requests for in-county mutual aid are coordinated through REDCOM, as well as, requests for mutual aid outside of Sonoma

County. Telecommunicators receive training to utilize the Resource Ordering and Status System (ROSS) to maintain county-wide resource status. This system will be replaced by the Interagency Resource Ordering Capability (IROC) system in 2020. IROC will be a flexible and scalable application for resource ordering for all hazard incidents. IROC is web-based and supports both PCs and mobile devices. Mutual and Automatic aid is assigned by a pre-designated list maintained on the Sonoma County Fire Chiefs Association's web site[1].

4.1.4 Operations

Calls for service are received from the Sonoma County Primary PSAPs, the law enforcement agencies such as Sonoma County Sheriff, and the City of Santa Rosa Police Department. In some cases, events are entered into the CAD system, which makes response recommendations. Ambulance response is by closest unit, fire response is by hard coded agency response plans or closest units in urban areas. Dispatch information is then sent electronically to the responding units and via radio broadcast or stations, and a voice dispatch is broadcast. Responding units are assigned radio channels as dictated by policy.

REDCOM has a web-based backup CAD, with paper tickets and manual EMD cards in case of a CAD failure or the evacuation of the dispatch center. Telecommunicators train twice a year on system down scenarios, CAD, radios, and phones.

Ambulance System Status Management (SSM) is currently done manually by the telecommunicators. They have a software product from DECCAN International called LiveMUM, but according to management staff, the software is still not yet configured to meet the needs of the Exclusive Operating Area (EOA) ambulance provider. REDCOM will be using a new software application from Genesis Pulse that will potentially perform SSM for all REDCOM resources.

Agencies can provide feedback to REDCOM using an on-line feedback form or contact a Supervisor or Manager at any time. There is a Dispatch Operations Advisory Committee that meets periodically to discuss global operational issues.

4.1.5 Budget

REDCOM receives funding from its member agencies. An annual budget is created by REDCOM management and is approved or modified by the JPA BOD. The budget costs

[1]sonomacountyfirechiefs.org

are then allocated to the member agencies based on a funding model approved by the JPA BOD.

4.1.6 Sonoma County Public Safety Technology

4.1.6.1 Computer Aided Dispatch

REDCOM is a part of the Sonoma County Public Safety Consortium, which operates, maintains and improves the public safety communication and data management system comprised of CAD, Records Management System (RMS) and Mobile Data Computing (MDC) technology. The following agencies in Sonoma County are members of the Consortium:

- Cotati Police Department
- Petaluma Police Department
- REDCOM
- Rohnert Park Department of Public Safety
- Santa Rosa Junior College Police
- Santa Rosa Police Department
- Sonoma County Probation Department
- Sonoma County Sheriff's Office
- Sonoma Police Department
- Sonoma State University Police
- Windsor Police Department

The CAD and MDC systems are Hexagon (Intergraph) systems, with a Law Enforcement Records Management System (LERMS) system from Central Square Systems. REDCOM is on Hexagon software version 9.3.4 now but will upgrade to version 9.4 after this year's fire season, i.e., third or fourth quarter 2020. The Sonoma County CAD system is administered by the Sonoma County Sheriff's Office (SCSO). Fire agencies use RMS systems from Firehouse (ESO), Zoll, or ImageTrend.

4.1.6.2 Radio

REDCOM operates on a simulcast Very High Frequency (VHF) system with multiple towers throughout the county. Field units operate on a variety of brand name mobiles and portables. REDCOM utilizes ModUcom radio consoles. It was noted that the current Marin County 400MHz system and planned 700 MHz trunked radio system cannot be operated using the ModUcom consoles.

4.1.6.3 Mobile Technology

REDCOM utilizes Mobile Public Safety (MPS), which is a Windows 10 product that is specifically configured for law enforcement or fire. It tracks the units and they can status themselves.

Hexagon's IPAD application, Mobile Responder, will be deployed with the CAD 9.4 upgrade to provide personnel with a comprehensive set of tools that can be used from within or close to their vehicles, making many control-room facilities remotely available to mobile users. Users of Mobile Dispatch can update their location and availability status, thus reducing the amount of routine radio traffic in the dispatch center.

REDCOM is moving towards a tablet-based solution called Tablet Command. Tablet Command is incident command and response software that increases situational awareness and improves firefighter accountability. With Tablet Command, an incident commander can tap and drag responding apparatus onto an emergency scene, track progress against critical checklists, and timestamp every maneuver and benchmark throughout an incident.

4.1.6.4 Geographic Information System

Geographic Information System (GIS) is a technology that combines information with maps to visualize the landscape in a variety of unique ways. Sonoma County Information Systems Division (ISD) GIS maintains the countywide base map, such as addresses, streets, and parcels, and supports programs such as the Fire Run Book, and CAD 9-1-1 system.

4.1.6.5 Emergency Medical Dispatch

REDCOM is an Emergency Medical Dispatch (EMD) Accredited Center of Excellence through the International Academies of Emergency Dispatch (IAED), they are also working on their Emergency Fire Dispatch accreditation. REDCOM uses the National Q service provided by Priority Dispatch Corporation. National Q provides an effective and structured Quality Assurance (QA) program. It includes case review, quality assurance, and

accreditation services backed and supported by the IAED using certified Emergency Dispatch Quality Improvement (ED-Q) faculty. The QA goal is to review three percent of all EMD certified telecommunicators. A future goal of REDCOM management is to implement a QA program for radio as well.

4.1.6.6 Station Alerting

REDCOM sends station alerts via radio broadcast (two tone, five tone, or Dual Tone Multi Frequency (DTMF)). Each department has their own product to activate their stations.

4.1.6.7 Paging

Responding personnel receive two types of pages, text paging from CAD, and Active911. Texts are sent containing the basic call information, location, type of call, responding units and map page. Active911 is a digital messaging system that instantly delivers alarms, maps, and other critical information to first responders while allowing response efforts to be monitored in real time by command personnel.

4.1.6.8 Reporting

Fire agencies do their own National Fire Incident Reporting System (NFIRS) and California Fire Incident Reporting System (CFIRS) reporting from within their own RMS systems. Specialized reports are created by the REDCOM technical services team by running Structured Query Language (SQL) queries via MS Access on a county-wide data warehouse and exports data to Excel for manipulation.

4.2 Marin County Public Safety Communications Center

4.2.1 Description

The Communications Division of MCSO operates the Marin County PSCC located in San Rafael. The PSCC is the primary 9-1-1 PSAP for all unincorporated areas of Marin County, as well as the cities of:

- Belvedere
- Corte Madera
- Larkspur
- Mill Valley

- San Anselmo
- Sausalito
- Tiburon

PSCC also provides dispatch services for six paramedic service areas, Marin County Department of Public Works, and many other city and county government service departments. The center provides EMD services for the entire county.

4.2.2 Control and Staffing

There are 15 workstations on the dispatch floor. Four of those workstations are specifically for fire dispatching, the remainder are for call taking and MCSO radio dispatching.

PSCC is budgeted for 37 telecommunicator positions, although only 26 positions are currently filled. There are eight part-time dispatchers and one full time records clerk. Management staff includes six supervisors, one executive director, and two assistant managers.

PSCC telecommunicators work 12-hour shifts. Day shift is 0600 hours to 1800 hours, and night shift is 1800 hours to 0600 hours. Crews work four shifts, then are off three days, then work three shifts and off four days for a two-week pay period of 42 hours. Shifts rotate from day to night every four months. There are three fire telecommunicators from 0800 hours to 2400 hours, then it drops down to two fire telecommunicators.

Of the 26 telecommunicators, 14 are certified to dispatch fire calls for service, plus all six supervisors are fire certified. All fire telecommunicators are required to be signed off on law dispatching before they can begin fire dispatch training, so are effectively cross trained in both disciplines. The training program for the fire telecommunicators is 16 weeks, three to four weeks on EMD / ProQA, then 12 to 13 weeks on-the-job training with a Fire CTO and participate in classroom simulations as time allows. They normally will accept four trainees per year for fire training.

4.2.3 Call Processing

9-1-1 calls come into the PSCC law call takers, who ask if it is a law, fire, or medical emergency. The call taker will keep the call for law emergencies and transfer callers to the fire personnel, across the room, for fire calls. The fire positions have 9-1-1 trunks specifically for fire call taking. The fire positions also receive 9-1-1 transfers from other primary PSAPs in Marin County. If the call is in the areas covered by the Marin County WECC, they will transfer the call to that facility. If the call is during the time when the

Woodacre telecommunicator is sleeping, they will call and wake them up. (Refer to the Woodacre section for information on the Woodacre staffing and duty shifts.)

4.2.4 Operations

Both sides of the PSCC, fire and law, appear to work seamlessly together. Joint fire / law responses are coordinated as a team. It was noted that several former REDCOM telecommunicators were recently hired by the PSCC.

There is no formal process for the fire agencies to request operational changes. There is no operations committee. Requests for changes from the fire agencies are handled on a case-by-case basis. Issues with the CAD system go to the MCSO Technical Support Unit.

There is a monitor for the ReddiNet system to check hospital availability, but PSCC does not have the responsibility for changing hospital status in that system. They will update CAD with hospital diversions.

PSCC feels that they have a good relationship with the Marin County fire crews. Battalion Chiefs will come into the center regularly (although we received comments from Marin County fire agencies that they were not allowed in the PSCC). The fire agencies will include MCSO dispatchers in post-incident analysis. PSCC will also request a chief officer to be present during unusual or extended emergencies, such as power outages and wildfires. Nurses have been deployed in expanded dispatch during power outages to assist in screening callers. There are sleeping rooms for extended events. They have a Mobile Command Center vehicle to use in case of evacuations.

4.2.5 Budget

Marin County fire agencies are charged for dispatching services on a cost per call basis, based on the previous two years of call volume. MCSO pays for any overtime created by fire events. Services received for the fee include CAD maintenance, dispatch functions, and an interface to the fire MDCs. PSCC doesn’t manage the MDCs.

4.2.6 Marin County Public Safety Technology

The public safety technology used by both PSCC and WECC is used county-wide; therefore, the following information in this section is not repeated for WECC.

4.2.6.1 CAD

PSCC uses a Hexagon (Intergraph) CAD system. This is a separate and independent system from the Sonoma County Public Safety Consortium system. They are moving to

software version 9.4, along with a hardware upgrade in about a year. When that is accomplished, the old hardware will go to the Novato backup center as a backup CAD system.

Currently the PSCC backup for a CAD failure is paper and pen. If they had to evacuate their center, but if the computer systems are still running, they can send dispatchers to Woodacre, although there are only three total workstations there. Management staff and supervisors do most of the CAD configuration maintenance. They have a technical systems administrator dedicated to PSCC, but any additional technicians are provided by MCSO IT staff.

CAD is reported to be very stable. Servers are rebooted every three months. All servers are physical servers, not virtual.

CAD databases are maintained by the PSCC. Event data is available to the fire agencies via their RMS.

WECC's three CAD workstations are also part of a hosted solution with PSCC. CAD software issues go to the technical manager at PSCC. Hardware issues go to an on-call Marin County IT person that MCFD shares with Marin County Public Works.

WECC is responsible for their response plans but have issues with the current response recommendations.

4.2.6.2 Radio

The PSCC utilizes the Marin Emergency Radio Authority (MERA) for trunked radio communications operating in the current 400 MHz and planned 700 MHz band. MERA is a JPA in Marin County, formed in 1998 to plan, implement and manage a countywide public safety and emergency radio system for the use of all member agencies. This system helps unify public safety response and facilitates communication among individual agencies and departments. The system of 17 base station radio and receiver sites provides regional or countywide radio communications among dispatch centers and mobile units throughout the county.

MERA is governed by a board comprised of representatives from Marin County, all cities, towns, and fire districts in Marin County, and other special districts such as the Marin Municipal Water District. The Executive Officer and Operations Officer serve the Governing Board via contract. MERA is currently working on a project to deploy a P25 digital trunked radio system countywide in the next two years.

4.2.6.3 Mobile Technology

Currently some Marin fire agencies are using Hexagon Mobile Responder software. Other agencies, primarily in the Southern Marin area, as well as Marin County Fire, have adopted and deployed Tablet Command. Those agencies that adopted and deployed Mobile Responder are migrating away from that hardware and software and are moving to deploy iPads running Tablet Command.

4.2.6.4 GIS

PSCC contracts with GeoComm, a private GIS firm, to create the CAD map by first downloading the base map from MarinMap, integrating it with public safety layers using ArcView, and then converting it to the Hexagon GIS format before updating the PSCC CAD. MarinMap is a group of local governments, special districts, and other public agencies that have joined to create a county-wide map. Any additional layers are completed by GeoComm, although the Marin County fire agencies reported that it doesn't appear that any fire-related layers are present in the system. The PSCC CAD GIS is updated quarterly.

4.2.6.5 Emergency Medical Dispatch

PSCC provides EMD services for all agencies in Marin County. All PSCC fire telecommunicators are certified in EMD by IAED. When an emergency medical call is received at the PSCC the call is transferred to the fire telecommunicators. The caller is then questioned for the basic information: location, callback, and chief complaint. If the event is in WECC's area, the call is then transferred to WECC. For in-house responses, a pre-alert is then sent over the fire station alerting system, while the fire telecommunicator continues with call interrogation and pre-arrival instructions.

Quality Assurance for EMD is accomplished by peer or supervisor review on a random basis, or by request. All cardiac arrest and trauma events are automatically reviewed. PSCC has not chosen to become an accredited center with the IAED.

PSCC does not use the Emergency Fire Dispatch Protocols provided by Priority Dispatch Corp.

4.2.6.6 Station Alerting

Marin County uses Motorola's **Mo**torola **S**upervisory **C**ontrol **A**nd **D**ata Acquisition (MOSCAD) for station alerting. MOSCAD operates by the PSCC CAD setting off DTMF

tones for station alerting, and activating a printer, giving a printed message with the dispatch information.

4.2.6.7 Paging

Responding personnel receive text pages from CAD.

4.2.6.8 Reporting

PSCC does not use the report features provided with the CAD due to difficulty of use issues. The PSCC technical system administrator uses Crystal Reports and SQL scripts to extract data directly from CAD. The fire agencies report that PSCC has not been forthcoming with requested reports.

Marin fire agencies have event data access through their RMS.

4.3 Woodacre

4.3.1 Description

The WECC is owned and managed by Marin County Fire Department (MCFD), which is a CAL FIRE Contract County. There are six CAL FIRE contract counties in California, five counties in Southern California, and Marin County being the only one in Northern California. The WECC dispatchers and clerks are included in the CAL FIRE contract.

WECC is a secondary 9-1-1 PSAP for fire agencies in unincorporated Marin County providing fire dispatching services. WECC is also the California Governor's Office of Emergency Services Operational Area Dispatch Center, coordinating mutual aid inside Marin County and sending resources throughout California when requested. Agencies served by WECC are:

- Bolinas FD
- Inverness FPD
- Marin County Fire Department
- Muir Beach Volunteer Fire Department (VFD)
- Nicasio VFD
- Skywalker Fire Brigade

- Stinson Beach FPD

WECC is located in Woodacre (Marin County), CA.

4.3.2 Control and Staffing

There are three full time dispatchers at WECC. They act as the initial attack dispatcher, as well as handling some command and control functions. Dispatchers are included in the Marin County Fire Department Firefighters Association (MCFDFA) contract.

WECC has three workstations, all identical in configuration. Each position has CAD (remote consoles from the MCSO Hexagon CAD), Vesta 9-1-1 (remote consoles from the MCSO Vesta system), and Motorola Gold Elite Radio consoles.

Staffing the WECC depends on the time of year. The start and end of fire season is dependent on rainfall and fuel moisture levels and is determined by CAL FIRE. Fire season typically starts around May and will usually last six to nine months. During the summer fire season, there is one dispatcher who works a 24-hour shift, and two dispatch clerks each working a ten-hour shift. Clerks come on one month before fire season to get updated training and are laid off when fire season is over. Some clerks return season after season, which gives WECC an experienced work staff. During the winter, staffing is one 24-hour dispatcher working a 48 to 96-hour schedule, which equates to a 56-hour work week. Dispatchers also have the authority to call back other dispatchers for high volume periods.

During large working events, either the on-duty MCFD Battalion Chief, or the on-call Duty Chief will respond to the dispatch center to assist with command and control duties.

Due to the extended shift, dispatchers are allowed to sleep at night, in provided facilities, if there are no ongoing incidents. After the WECC dispatcher has gone to bed, PSCC calls the WECC dispatcher to notify them of pending events.

California Peace Officer Standards and Training Basic Telecommunicator certification is a desirable requirement for hiring full time dispatchers, but not a requirement. Training for WECC dispatchers is a minimum of eight weeks, plus time learning aircraft dispatching procedures. They are required to attend the four-week Initial Attack Dispatcher training at the CAL FIRE Training Center in Ione, CA.

Other duties performed by the full-time dispatchers:

- Updating Telestaff for MCFD
- Processing payroll documentation for MCFD
- MCFD Business lines

- Taking weather readings (Burn Indexes)
- Making Red Flag warning notifications
- Notifying hazardous materials teams for response
- Activating Urban Search and Rescue responders
- Notifying Fire Investigation Teams
- Making Swift Water Rescue personnel notifications
- Other special projects for MCFD administrators

There is no expectation of passing on extra duties as part of a REDCOM transfer, MCFD will absorb the non-dispatch responsibilities into their administrative staff.

4.3.3 Call Processing

When there is an event, WECC will tone out on the Dispatch Channel, then move the response to one of two Command Channels. They will assign a tactical channel as needed.

PSCC performs EMD for all calls within Marin County; therefore, when there is a report of a medical event in the WECC area of responsibility, PSCC enters the call into the CAD system and does EMD. An automated notification is sent to WECC via the CAD system of the pending event that they then pull up and dispatch fire resources. WECC dispatchers report that while they do get the call before the EMD determinant is available, sometimes it takes a long time to get the determinant from PSCC via CAD.

4.3.4 Operations

WECC is a part of the statewide CAL FIRE microwave system, linking with the site on Mt. Tamalpais via local microwave. This system is connected at all of the CAL FIRE ECCs in the state, allowing for resource and response coordination.

There are two fire lookouts in the County, staffed by volunteers. Lookouts will report smoke and give weather reports two times a day. If a lookout reports smoke, the WECC dispatchers can reference a large display with multiple remote cameras in the county to verify lookout reports and gauge the progress of a fire.

Woodacre does their own CAD response plans and resource updates. MCFD uses Emergency Reporting for RMS

4.3.5 Budget

WECC's funding is a part of the CAL FIRE Contract for Marin County, which totals just over $6 million. WECC is funded for fire captains and seasonal dispatch clerks. CAL FIRE provides funding based on what they interpret as the staffing required, and associated salaries, at a similar sized center.

5. Staffing Analysis

5.1 REDCOM

5.1.1 Operational Methodology

Incoming 9-1-1 calls are routed to one of the primary law enforcement PSAPs for Sonoma County based on the caller's location. REDCOM is a secondary PSAP, so if the incident is either fire or emergency medical in nature then the caller is manually transferred to REDCOM for processing and dispatch.

Incoming ten-digit phone lines are also answered and processed by REDCOM to determine the following:

- If a public safety response is needed
- If the caller needs to be routed, transferred, or referred to another department, municipal service, or to another PSAP
- If information is needed by the caller that the answering PSAP can provide

Dispatched events are those events documented in CAD from calls received from 9-1-1, emergency and non-emergency lines, or conveyed via unit-initiated activities. These events are documented to track workload and maintain a record of the service provided. Generally, an event record in CAD contains the following at a minimum:

- Event type
- Location
- Complainant's name and phone number
- Description of the event to include what occurred, patient information, current conditions, etc.

5.1.2 Workload Analysis and Staffing Review

The information in this section covers those public safety agencies dispatched by the REDCOM ECC. It also includes statistical information for incoming telephone calls and CAD events processed by REDCOM.

5.1.2.1 Performance Goals / Data

REDCOM provided the following call processing time performance goals:

- Answer 90 percent of all 9-1-1 calls within ten (10) seconds or less
- Answer 95 percent of all calls within twenty (20) seconds or less
- Maintain call processing times (9-1-1 call pick-up to tone out of resources) of seventy (70) seconds or less 90 percent of the time

Based on data provided for the past four years REDCOM consistently exceeded each of the above performance goals.

REDCOM reported the following additional information regarding telephone answering performance:

- Sixty-one seconds (1:01) to process an incoming phone call
- Not able to provide a wrap-up time (after call work) [industry average is 45 seconds]
- The busiest month of the year in 2019 was October
- The busiest day is Thursday
- The busy hour is 09:00 (9:00AM)

5.1.2.2 Phone Call Volume

Table 1 displays the telephone statistics, provided by REDCOM, for the years 2016 through 2019.

Table 1 - Total Call Volume - REDCOM

REDCOM					
	2016	2017	2018	2019	Average
Total Wireline 9-1-1 Calls	18,683	18,841	17,943	16,238	17,926
Total Wireless 9-1-1 Calls	18,605	22,839	21,836	23,258	21,635
Total Ten-Digit Calls	96,014	95,935	91,090	93,817	94,214
Outgoing Phone Calls	50,385	45,019	38,839	41,625	43,967
Total	**183,687**	**182,634**	**169,708**	**174,938**	**177,742**

5.1.2.3 CAD Dispatch Statistics

Table 2 displays CAD statistics, provided by REDCOM, showing the breakdown of fire and EMS incidents for the years 2016 through 2019.

Table 2 – Total REDCOM CAD Incident Statistics

REDCOM					
	2016	2017	2018	2019	Average
Fire Incidents Dispatched	11,256	13,428	11,506	13,848	12,510
EMS Incidents Dispatched	53,986	53,246	54,121	56,404	54,439
Total	**65,242**	**66,674**	**65,627**	**70,252**	**66,949**

5.1.2.4 Staffing / Scheduling

The following sections provide current information regarding ECC supervision, staffing, employees, and scheduling environment.

5.1.2.4.1 Current Employees

Table 3 displays the number of authorized communication center employees that have been assigned supervisory, dispatching and call taking responsibilities at REDCOM.

Table 3 – REDCOM Authorized Positions – PSAP Only

Authorized Positions - REDCOM				
Job Title	**Authorized Employees - Full Time**	**Actual Employees - Full Time**	**Authorized Employees - Part Time**	**Actual Employees - Part Time**
Shift Supervisors	4	4	0	0
Telecommunicators	18	16	6	4
Total	**22**	**20**	**6**	**4**

REDCOM also has the following management and support positions:

- Executive Director (1)
- Manager (2): Operations and Communication
- Administrative / Clerical (1)
- Technical Support (1)

This brings the total number of REDCOM employees to twenty-seven, of which twenty-two positions staff the communications center daily. Also, there are currently four part-time telecommunicator positions.

5.1.2.4.2 Staffing / Shifts

The typical staffing in the communications center is six people on duty, which includes one Supervisor. Telecommunicators, call takers and dispatchers, and Supervisors each work 12-hour shifts. Two telecommunicators are on a schedule working four, 12-hour shifts, then off for four days. The remainder of the staff is on the prevailing schedule, working three 12-hour shifts, then four days off, then work four 12-hour shifts, and three days off. This results in a 42-hour work week, calculated over the two-week pay period.

5.1.2.4.3 Minimum / Typical Staffing Numbers

Table 4 displays the number of positions in the communications center that must be staffed (minimum) at any given time. Table 5 displays the typical staffing that is attained in the center daily. Telecommunicators in a dispatch center are assigned to perform one of three roles:

- Call Taker: Answer incoming phone calls, including 9-1-1, emergency, and non-emergency ten-digit calls. Collect all pertinent information, such as, but not limited to, the type of event, location, involved parties, and enter that

information into the CAD system. Call takers may use dispatch protocol software that guides them through specific questions to ask and the pre-arrival instructions to give to the caller

- Primary Dispatcher: Reviews and assigns recommended units to respond to CAD events and alerts the required stations, apparatus, and field personnel via a radio broadcast and other notification systems. The primary dispatcher staffs the primary outbound radio channel

- Control Dispatcher: Monitor units that have been dispatched and are assigned to operate on a radio control channel. The control dispatcher updates the CAD event with unit status changes and other details specific to the event response. They staff the operational radio channels that cover defined geographical areas

Depending on the volume of calls processed by a communications center and time of day one or more personnel may be assigned to each role or roles may be combined.

Table 4 – REDCOM Minimum Staffing

REDCOM - Minimum Staffing						
Days	**Shifts**	**Supervisor**	**Call Taker**	**REDCOM Dispatcher**	**Control Dispatcher**	**Total**
All Days	All Hours	1	1	1	2	**5**

Table 5 – REDCOM Typical Staffing

REDCOM - Typical Staffing						
Days	**Shifts**	**Supervisor**	**Call Taker**	**REDCOM Dispatcher**	**Control Dispatcher**	**Total**
All Days	00:00 to 12:00	1	1	1	2	**5**
All Days	12:00 to 24:00	1	1	1	3	**6**

5.1.3 System Furniture Positions

Table 6 displays the current ten positions in the communications center. Each position has Watson system console furniture that was originally installed in 2014. The furniture is ergonomically friendly in that it is sit-to-stand and has installed environmental features. REDCOM is following best practices in that they have all the critical technology such as

CAD, radio dispatch consoles and telephone answering equipment installed at each position.

Table 6 – REDCOM System Furniture Positions

System Furniture				
#	Position Type	9-1-1 CPE	CAD	Radio Dispatch Console
1	Supervisor	Yes	Yes	Yes
2	Dispatcher	Yes	Yes	Yes
3	Dispatcher	Yes	Yes	Yes
4	Dispatcher	Yes	Yes	Yes
5	Dispatcher	Yes	Yes	Yes
6	Call Taker 1	Yes	Yes	Yes
7	Call Taker 2	Yes	Yes	Yes
8	Overflow/Back-up 1	Yes	Yes	Yes
9	Overflow/Back-up 2	Yes	Yes	Yes
10	Overflow/Back-up 3	Yes	Yes	Yes

Each workstation has five monitors: three for the CAD system, one for the radio console, and one for the 9-1-1 phone console.

5.1.4 Current Hourly Pay Ranges

Table 7 displays the current pay steps and associated hourly ranges for the REDCOM employees working twelve-hour shifts.

Table 7 – 2020 Hourly Pay Ranges - REDCOM

Current Hourly Pay Ranges - REDCOM						
Steps	**Step 1**	**Step 2**	**Step 3**	**Step 4**	**Step 5**	**Step 6**
Shift Type	**Less than 6 Months**	**6 months to 1 Year**	**1-3 Years**	**3-5 Years**	**5-7 Years**	**7+ Years**
Twelve / 42	$29.80	$30.72	$33.57	$35.87	$38.08	$40.54

5.2 Current Marin County Fire / EMS Dispatch Services

Dispatch services for Marin County fire and EMS agencies are currently provided by the MSCO's PSCC, or Marin County Fire's WECC.

5.2.1 Marin County Public Safety Communications Center

The following is a brief description and call processing flow for the Marin County PSCC.

5.2.1.1 Description

The Communications Division of the Marin County Sheriff's Office operates the PSCC located in San Rafael.

The center provides EMD services for the entire county.

5.2.1.2 Operational Methodology

9-1-1 calls come into the PSCC law call takers who ask the caller if their emergency is law, fire, or medical. The call taker will keep the call for law emergencies and transfer callers to the fire personnel, across the room, for fire / EMS calls. The fire / EMS positions have 9-1-1 trunks specifically for fire call taking. The fire positions also receive 9-1-1 transfers from other primary PSAPs in Marin County. If the call is for fire in the areas covered by the Marin County Fire Woodacre ECC, they will transfer the call to that facility. If the call is for medical in the Woodacre response area, the PSCC will perform EMD and enter the call into CAD for dispatch by the WECC.

5.2.2 Woodacre Emergency Communications Center

The following is a brief description and call processing for the Woodacre ECC.

5.2.2.1 Description

WECC is owned and managed by the MCFD, which is a CAL FIRE Contract County. The WECC dispatchers and clerks are included in the CAL FIRE contract.

5.2.2.2 Operational Methodology

WECC is a secondary 9-1-1 PSAP for fire agencies in unincorporated Marin County providing fire dispatching services. WECC is also the California Governor's Office of Emergency Services Operational Area Dispatch Center, coordinating mutual aid inside Marin County and sending Marin County resources throughout California when requested.

When there is an event, WECC will tone out on the dispatch channel, then move the response to one of two command channels based on the location of the event. They will assign a tactical channel as needed or requested.

5.2.2.3 Performance Goals / Data

WECC provided the following call processing time performance goals:

- Answer 90 percent of all 9-1-1 calls within ten (10) seconds or less
- Answer 95 percent of all calls within twenty (20) seconds or less

Based on data provided for the past three years WECC consistently exceeded each of the above performance goals.

WECC reported the following additional information regarding telephone answering performance:

- Ninety-eight seconds (1:38) to process an incoming phone call
- Not able to provide a wrap-up time (after call work) [industry average is 45 seconds]

5.2.2.4 Phone Call Volume

Table 8 displays telephone statistics, provided by WECC, for the years 2016 through 2019.

Table 8 – 9-1-1 Call Volume – WECC

WECC				
	2017	2018	2019	Average
Total 9-1-1 Calls	470	536	703	570

5.3 Staffing Analysis – Combined REDCOM

5.3.1 Call Volume / Call Taking Function

The first step in calculating staffing levels for a combined REDCOM and Marin County fire agencies is to estimate the total call volume the combined ECC will handle, including both 9-1-1 and ten-digit emergency and non-emergency phone calls. To determine these statistics, we used the following:

- 2019 Monthly Average Phone Calls per Hour, REDCOM
- 2019 Annual CAD Events per Hour, Marin County fire agencies
- 2019 November Phone Calls per Hour, MCSO

MCSO was not able to provide specific fire / EMS 9-1-1 and ten-digit emergency and non-emergency phone call statistics for the fire agencies for which they dispatch or transfer calls to the WECC for the agencies they dispatch. The statistics they provided were for all three disciplines, police, fire and EMS.

WECC was able to provide total 9-1-1 call volume for the years 2017 through 2019. The WECC could not provide the specific phone reports on the number of ten-digit emergency and non-emergency phone calls they received. In the absence of these phone reports and to review hour by day activity, ***FE*** used the hourly CAD incident data provided by those respective agencies. These reports were generated using their Emergency Reporting FRMS applications.

To utilize the standard tools to determine call taking staffing for a combined center ***FE*** needs to establish the expected number of phone calls, 9-1-1, ten digit emergency and non-emergency, that will be used per hour and the estimated number of total phone calls that the combined center, REDCOM for both Sonoma and Marin Counties, is anticipated to receive. During our review of available hourly reports, it was evident that the REDCOM 2019 Monthly Average Phone Calls per hour and the Marin County 2019 Annual CAD Events per hour times were very comparable. So, for this report, ***FE*** used the actual hourly phone reports provided by REDCOM.

The next estimate that ***FE*** made was the total number of phone calls that would be processed by the combined center. REDCOM was able to provide detailed phone statistics; however, an estimate had to be determined for the number of additional calls that would be received by adding the Marin County fire agencies. Based on our past experience with similar sized projects and in reviewing various call volume statistics that were available, the number and size of agencies, and the number of incidents handled,

FE estimates that the combined center would receive an additional 19,780 9-1-1 calls and 39,496 ten-digit emergency and non-emergency phone calls for a total of 59,276. Basically, this is half the number of 9-1-1 calls REDCOM received in 2019 and the number of ten-digit calls were estimated at double the number of 9-1-1 calls. Table 9 displays the estimated combined call volume.

Table 9 – Estimated Combined Center Call Volume

Estimated Combined Call Volume	
	2019
Total 9-1-1 Calls	59,344
Total Ten-Digit Calls	133,313
Total	**192,657**

The next step is to calculate the number of call taker positions required to manage the estimated call volume. The following table reflects the monthly and per-hour estimated call volume determined from the annual statistics provided and the assumptions made above. As indicated, the REDCOM annual hourly report provided hourly and monthly call volumes for a one-year period and we used that data to determine the combined busy hour estimates based on the hourly averages for the year.

Table 10 highlights the slowest and busiest hours in the hourly table. We arrived at the number of call taker positions listed in the hourly table by using an Erlang C calculator methodology with the following best practice call performance standards.

The Erlang C formula is a mathematical equation for calculating the number of telecommunicators needed in a communications center for call taking, given the call volume and the service level that you want to achieve.

The Erlang C formula allows you to work out the probability that a call waits to be answered, given the call volume and the number of call takers available.

These averages consider the time necessary to operate effectively, using any adopted dispatch protocol programs such as EMD, Emergency Fire Dispatch (EFD), or similar protocol guide program(s). Management of a combined ECC must consider that any protocol programs used are accompanied by a robust quality assurance program. The service level parameters that ***FE*** used in its analysis are:

- Service level objective of 90 percent calls answered within 10 seconds or less

- Average talk time of 61 seconds
- Average after-call wrap up time of 45 seconds

Table 10 – Estimated Hourly Call Volume – Combined Center

Estimated Combined Center Phone Calls			
Hour	% per Hour	Per Hour	Call Takers Needed
0:00	2.24%	15.2	1
1:00	1.88%	12.8	1
2:00	1.60%	10.9	1
3:00	1.51%	10.3	1
4:00	1.53%	10.4	1
5:00	1.79%	12.2	1
6:00	2.50%	17.0	1
7:00	4.02%	27.4	2
8:00	5.81%	39.5	3
9:00	6.93%	47.1	3
10:00	6.81%	46.3	3
11:00	6.41%	43.6	3
12:00	6.15%	41.8	3
13:00	6.10%	41.5	3
14:00	5.81%	39.5	3
15:00	5.60%	38.1	3
16:00	5.40%	36.7	2
17:00	5.22%	35.5	2
18:00	4.88%	33.2	2
19:00	4.62%	31.4	2
20:00	3.94%	26.8	2
21:00	3.61%	24.5	2
22:00	3.12%	21.2	2
23:00	2.53%	17.2	1
Average	100.00%	679.90	2.00

Note - There are several limitations to be aware of when using the industry standard Erlang-C calculator tool. First, the Erlang-C calculator was designed to be used to estimate call taking staffing levels in call centers that function in a fully horizonal operational model. This simply means that the calculator assumes that all incoming phone calls will be answered and processed by the call takers and no other on-duty staff. If there are

additional staff in the communications center who will answer and process phone calls then this must be taken into consideration when estimating the final number of call takers needed.

Second, the Erlang-C calculator will never recommend less than two call takers. That said, when looking at the slow hours (midnight shift), it is hard to recommend two call takers when the incoming call volume is ten calls or less per hour and there is a call taker, four dispatchers and a supervisor in the room monitoring the radio channels.

Finally, the Erlang-C calculator is not designed to use multiple performance goals, for example:

a. 90 percent of 9-1-1 calls answered in ten seconds or less

b. A separate answering time goal for incoming ten-digit / non-emergency calls

This simply means the staffing recommendation should be enough to allow for all calls to be answered within ten seconds or less.

For this project, several steps were taken in consideration of or to mitigate the above issues. Based on the estimated size and anticipated operational configuration of the combined center it is anticipated that the control or operational dispatchers would be capable and required to answer some phone calls. When possible, these calls should be limited to the non-emergency phone calls and allow the call taker(s) to answer incoming 9-1-1 and ten-digit phone lines.

FE recommends that management review the workload during the slow hours when determining final staffing and scheduling for the overnight shift. For the purposes of this report, only one call taker is recommended during the anticipated slow hours when the projected call volume drops below ten. This recommendation is based on our review of current REDCOM operations and experience with similar sized projects involving fire / EMS communication centers.

The other consideration that management needs to review is if and how much the control dispatchers can assist in answering the phones. Certainly, if the number of in-progress events is low then those employees should be available to help answer incoming phone calls. The problem is that there is no formula that can be used to determine how this affects the number of call takers or calculate the number of calls they can handle. ***FE*** can make a recommendation, again based on our review of current statistics, and our past experience; however, this type of knowledge and ensuing judgement can only be made and approved by those who manage the communications center daily and are most familiar with its current workflow and operations.

Based on our observations of REDCOM, it is quite evident that the control dispatchers are currently helping with the phones in their current operation. If that is working now there is no reason it would not also work in the combined center.

For the purposes of this preliminary staffing estimate, we used the average number of positions that need to be staffed. In this case, the average number of call taker positions required to manage the incoming call volume would be 2.75 call taking positions. Since call volume is not evenly distributed on a 24/7 basis, some hours of the day will require no more than one call taking position, while others will require as many as four equipped and active call taking positions.

5.3.2 Dispatching Function

The next step in estimating staffing for a combined center is based on the number of dispatch positions needed. Currently, there is not a nationally recognized workload-based calculation / formula to accurately determine the number of dispatchers required. However, if radio traffic / usage studies are available, they can be used to determine the level of use or available airtime of a talk-group / channel[2]. This type of study can assist an ECC in determining the number of talk-groups needed to support operations but does not directly provide the number of dispatchers to staff the required positions.

While there is no formula for calculating dispatch positions, ***FE*** has found success in calculating the number of required dispatch positions based on the number of incidents or CAD events. Table 11 depicts the number of 2018 and 2019 CAD events reported and they were used to assist in providing an estimated number of dispatch workstations required. The other significant factor in determining the number of dispatchers needed is the number of primary dispatch talk groups that are required to be staffed and active.

Table 11 – Combined Center Fire / EMS Incidents

Combined Center Fire/EMS Incidents			
	2018	2019	Average
Fire/EMS Incidents Dispatched	100,495	104,874	102,685

To maximize the efficiencies gained by combining the dispatch of various agencies, each existing dispatch position must be reviewed to see if combining the additional agencies on to the same primary dispatch talk-group makes sense. If a single primary dispatch talk-

[2] A conventional radio system uses a dedicated channel (frequency). A trunked radio system uses virtual radio channels called talk groups created to be used by a group of users. For the purposes of this report, the term talk-group could refer to either talk-group or channel dependent on the system being used.

group is not feasible, then reducing the number of primary dispatch talk-groups to the lowest number possible is ultimately the best scenario.

It is not a recommended best practice to assign primary fire / EMS dispatchers additional talk-groups to monitor, as well as non-dispatch tasks, so they can remain available and ready as soon as a new event arrives for dispatch. This is completed by thoroughly reviewing and considering the following:

- Current radio platforms in use by each user agency - do participating agencies utilize the same, or disparate radio systems? This is the case in this situation where the fire / EMS agencies in Sonoma County are using a VHF radio system and the fire / EMS agencies in Marin County are using a trunked Ultra High Frequency (UHF) radio system

- Geography - When migrating agencies from one dispatch center to another, the planning team needs to determine if any existing primary dispatch or control talk-groups can be shared by all dispatched agencies. Thought must be given to whether the combination is even feasible from a geographic and current radio coverage perspective. Agencies that share geographic boundaries often assist each other on a routine basis. Therefore, combining agencies onto the same talk-groups would be beneficial and potentially more efficient for the communications center and provide a higher level of situational awareness for the participating agencies

- This is an issue for this project as the agencies in Marin County are using a different radio system than the agencies in Sonoma County. These disparate radio systems provide coverage for specific ‘geographical footprints,’ which makes the sharing of existing dispatch and control talk-groups problematic for this project. However, the best scenario for the staffing of a communications center is to reduce the number of primary dispatch talk-groups and share as many control talk-groups as possible for which a dispatcher needs to be assigned 24 x 7 x 365

- Assignment of multiple primary dispatch talk-groups - It is a recommended best practice to not assign multiple primary dispatch talk-groups to a single dispatcher. Sooner or later there will be two emergencies on each talk-group requiring immediate attention and action of that single dispatcher and simply put, that is not possible for one person

- Number of talk-groups each dispatcher is responsible for - Combining control talk-groups may offer the opportunity to reduce the number of personnel, create a more efficient call flow process in the ECC, and improve field communications

by having those agencies that commonly work together on the same talk-group. If a fire and / or EMS dispatcher is responsible for more than one talk-group, then the agencies need to understand that assigning multiple talk-groups to a single dispatcher may eventually result in an overload condition causing radio messages to be unheard or overlooked and go unanswered. Sooner or later there are going to be units simultaneously calling the same dispatcher on separate talk-groups and that dispatcher can only communicate with one at a time

- The use of current technology - Technology such as mobile data and AVL should be used to its fullest extent to help reduce voice radio traffic

- Tactical or operational talk-groups - The use of tactical or operational talk-groups is common in public safety communications to properly manage event communications, operations, and incident management. A dispatcher should be assigned to monitor and support field personnel during active multi-unit incidents, and incident command scenarios

Table 12 illustrates the number and type of physical workstations and operational assignments needed for the combined center to meet established standards and best practices. The minimum number of required positions is nine, named positions in the following table. An additional five positions are recommended for extended operations, overflow, or training.

Table 12 – Workstation Distribution – Recommended

Positions	
#	**Position Type**
1	Supervisor
2	REDCOM Dispatch
3	Control 2 Dispatcher
4	Control 3/4 Dispatcher
5	Fire 13 Dispatcher
6	Fire 14 Dispatcher
7	Call Taker 1
8	Call Taker 2
9	Call Taker 3
10	Overflow/Training 1
11	Overflow/Training 2
12	Overflow/Training 3
13	Overflow/Training 4
14	Overflow/Training 5

This model places the dispatching of all agencies with the REDCOM dispatcher and requires new radio dispatch consoles to be procured

It is important to understand that the above workstation distribution table is conceptual. Multiple options exist for the actual configuration or operational and work distribution for the combined fire / EMS communications center. Those options are examined during the implementation planning process and when a final workflow and operational model are put in place. However, to estimate staffing needs and personnel costs, the ***FE*** team developed the above model based on our knowledge and experience in the development of regional communications centers.

The rationale ***FE*** used to determine the workstation configuration in Table 12 follows:

- This model recommends that all the primary dispatching be conducted by the REDCOM Dispatcher. For this to occur, the current ModUcom radio dispatch consoles must be replaced with equipment that is capable for integrating the existing Sonoma County and Marin County radio networks. The current ModUcom consoles will not work with the Marin County UHF trunked radio system

- It is ***FE's*** recommendation that all positions be equipped with the same critical technology such as CAD, 9-1-1 answering equipment and radio dispatch consoles, if economically feasible. This would allow any communications center function, call taking or dispatching, to be conducted at any position in the center. This allows decision makers, such as supervisors, to easily change operational assignments as needed, e.g., the four call taker and three dispatcher positions recommended could easily be changed to three call takers and four dispatchers based on actual ongoing operations in the center

- Table 12 shows three (3) call taker workstations staffed during the busiest time of the day. For this model to work, the dispatchers who are assigned to monitor radio control talk-groups will need to assist the call takers in answering phone calls. It is recommended that the 9-1-1 and ten-digit emergency phones be answered by call takers, when available, allowing the dispatchers to only answer the non-emergency phone calls that can be placed on hold if they need to address radio traffic

- Significant events may require reallocating a call taker position to monitor an operational talk-group until the conclusion of the event

- ***FE*** is recommending the addition of four positions that would be used for overflow or training and can be staffed during times when there is an

anticipated spike in call volume, e.g., elevated fire danger, weather events, etc. These positions can also be used for future growth, or as available back-up positions for the adjacent communication center

All staff would be cross trained for all job functions. While daily job function assignments would change, any employee could be utilized at any position. This methodology provides a higher level of efficiency and lower overtime costs. The ability to cross train all staff is a benefit of an ECC of this size. As centers grow and become more complex there is a need to split job functions by specialty, dispatcher and call taker. While this structure works well, it does add a layer of complexity to scheduling and training.

5.3.3 Staffing / Scheduling

The following sections provide information regarding a combined center's requirements for supervision, staffing, employees and scheduling.

5.3.3.1 Staffing Model

The staffing needs of a 24/7 public safety operation require constant monitoring of the workload and staffing assignments to maximize coverage across all shifts. It is rare that a set number of staff is on duty at any given time. The work hours and assigned positions per shift are based on need, skill sets, experience and anticipated call volume. Center management and supervisory staff are responsible for monitoring these factors and assigning staff as such.

5.3.3.2 Staffing Recommendation Methodology

FE uses the APCO Project "Responsive Efforts to Address Integral Staffing Needs" (RETAINS) criteria to determine the number of employees required to staff the projected number of workstations.

APCO Project RETAINS was created to provide managers with tools and strategies to increase the effectiveness of their own management practices, thereby improving staffing, retention and employee satisfaction in public safety communications centers throughout the country.

The RETAINS Toolkit 2.0 includes three tools: staffing, retention, and the employee satisfaction survey. In addition, the toolkit can create a customized report detailing estimated staffing needs. The toolkit also includes the dispatcher guidelines functions within the staffing tool. This capability will generate a report based upon information provided by the user and compare it to data collected in the RETAINS Next Generation

study. This tool is intended to help educate and be used as a starting point when considering dispatcher staffing levels and workload.

The following steps, data application, and calculations are performed in accordance with the RETAINS guidance.

The annual number of work hours per employee working a typical 42-hour work week is 2,184. The formula begins by subtracting the reported standard leave such as vacation, training, and sick time, to arrive at the total available work hours per employee. The total number of annual work hours in this study is 2,004 hours per employee, based on the following average human resources criteria provided by REDCOM:

- Vacation and holiday time – 180 hours
- Sick leave – 0 hours (included with vacation)
- Personal and compensatory time – 0 hours
- Training leave - 0 hours
- Military / FMLA leave - 0 hours
- Daily lunch and break time – 0 hours – time off the floor is provided when the workload allows, and others provide temporary coverage for that position
- Other activities (meetings, etc.) – 0 hours
- 12-hour shifts
- 2184 hours per year, 42 hours per week
- Four to six part-time employees

To arrive at the recommended model, the final number of employees required to cover call taking functions is added to the number required for dispatch functions and the dedicated supervisor positions to determine the required number of telecommunicator staff.

5.3.3.3 Recommended Staffing Model

Table 13 provides the personnel count for the multi-agency communications center to incorporate the sixteen Marin County fire agencies into REDCOM based on the estimates and assumptions included in the previous sections.

Table 13 - Multi-Agency ECC Staffing – Recommended

Multi-Agency ECC	
Position Title	**Total Number of Employees**
Supervisors	4
Dispatchers	20
Call Takers	9
Total PSAP Staff	**33**

The above model assumes the following:

- Twelve-hour shifts
- Dedicated Shift Supervisors who would not routinely be tasked with any call taking or dispatching responsibilities
- Five (5) dispatch positions 24/7; one (1) primary fire / EMS dispatch position staffed and four (4) fire / EMS control or operations dispatch positions staffed
- Although not recommended, the Fire / EMS dispatcher will be assigned multiple primary dispatch talk-groups
- Part-time employees would continue to be used in the same capacity as they are today
- Between the hours of 23:00 to 07:00 the number of control dispatchers will be reduced from five to four.

Based on Erlang-C calculations and the RETAINS formula, the minimum projected communications staff for REDCOM ECC to incorporate the sixteen Marin County fire agencies is 33. ***FE*** calculated this minimum projection, using the reported 9-1-1 and administrative, non-emergency call volume and CAD events. It is important to remember the positions listed here reflect functions and not necessarily trained employees with specific skills, e.g., call taker and fire dispatcher. Cross training in both call taking and dispatching would be the goal for all employees.

5.3.3.4 Staffing / Deployment – By Hour of the Day – Recommended

Table 14 – Recommended Combined ECC Staffing by Hour – Recommended

Estimated Combined Center Phone Calls						
Hour	% per Hour	Per Hour	Call Takers Needed	Dispatchers	Supervisors	Total Positions
0:00	2.24%	15.2	1	4	1	6
1:00	1.88%	12.8	1	4	1	6
2:00	1.60%	10.9	1	4	1	6
3:00	1.51%	10.3	1	4	1	6
4:00	1.53%	10.4	1	4	1	6
5:00	1.79%	12.2	1	4	1	6
6:00	2.50%	17.0	1	4	1	6
7:00	4.02%	27.4	2	4	1	7
8:00	5.81%	39.5	3	5	1	9
9:00	6.93%	47.1	3	5	1	9
10:00	6.81%	46.3	3	5	1	9
11:00	6.41%	43.6	3	5	1	9
12:00	6.15%	41.8	3	5	1	9
13:00	6.10%	41.5	3	5	1	9
14:00	5.81%	39.5	3	5	1	9
15:00	5.60%	38.1	3	5	1	9
16:00	5.40%	36.7	2	5	1	8
17:00	5.22%	35.5	2	5	1	8
18:00	4.88%	33.2	2	5	1	8
19:00	4.62%	31.4	2	5	1	8
20:00	3.94%	26.8	2	5	1	8
21:00	3.61%	24.5	2	5	1	8
22:00	3.12%	21.2	2	5	1	8
23:00	2.53%	17.2	1	4	1	6
Average	100.00%	679.90	2.00	4.63	1.00	7.63

The staffing projections represent the number of Full Time Equivalent (FTE) employees required to staff, at a minimum, one call taking position, four dispatch positions and one supervisor position during the slower periods of the day. Additional FTE staff is projected for the other positions to be staffed during the higher call volume periods of the day. These busier periods will require staffing of three call taking positions, five dispatch positions and one supervisor position. While completely cross-trained telecommunicators are desired,

projected minimum certified staff is provided as guidance toward meeting call volume and dispatching needs.

A re-evaluation of available statistical call volume and data should be performed every three to six months during the planning and implementation phases of a business model change to enhance accuracy in staffing projections.

5.3.4 Ancillary Functions

Note - These projections do not include management / administrative as well as any required support / maintenance functions, such as, but not limited to, training, QA, CAD, and radio for either the recommended (above) or optional (below) staffing models.

5.3.4.1 Supervision Recommendation

Public safety best practices and existing standards require 24/7 supervision. The National Fire Protection Association (NFPA) has developed codes, standards and recommended practices through a process approved by the American National Standards Institute (ANSI). To comply with these standards, i.e., if there are at least two telecommunicators on duty, there will be a supervisor in the communications center at all times, five full-time employees are needed to maintain one supervisor on duty around the clock, with occasional gapping by an acting supervisor. This group can be supplemented by senior telecommunicators or assistant supervisors functioning in an acting supervisory capacity.

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

While NFPA standards and ICS require dedicated supervisory personnel, in-house considerations exist as well. A combined multi-agency ECC will have greater geographic boundaries and agency responsibilities and having a dedicated supervisor assigned to each shift will provide:

- Coordination and direction during major emergency incidents, such as severe weather or high-profile incidents
- Problem solving support to operations staff and to ECC management

- A single point of contact for communicating with stakeholder agencies during normal operations
- Information on areas for growth among subordinate employees
- Input to formalized career path development
- Documentation of employee performance for annual / periodic reviews
- A focused scope of supervision when implementing new policies and procedures
- Direct supervision for diversified, complex tasks
- An ability to stay current with technological changes / advancements impacted by the daily use of the systems
- Guidance, coaching and mentoring to new and existing employees
- A working knowledge of procedures and administrative processes
- Concentration and attention to the operations of the ECC without the split responsibilities of occupying a call taker or dispatch position
- Immediate customer service to public and stakeholder agencies
- Improved communications with management, subordinates, and stakeholder agencies
- Promotion of operational efficiency
- Identification of areas for remedial training, counseling or discipline of staff
- Expedient resolution of operational issues
- Development and performance of operational priorities
- Opportunity for delegation of tasks / responsibilities

5.4 Stand-Alone Model – Marin County Fire / EMS ECC

Due to facility space limitations that preclude the provision of sleeping, cooking and personal hygiene areas for an assigned fire duty officer at REDCOM, an option that REDCOM and the Marin County fire agencies may want to consider is to create a

REDCOM-staffed center in Marin County (REDCOM Marin), managed by the REDCOM JPA, dispatching only Marin fire / EMS agencies. For a further discussion of this option refer to section 9: Findings.

5.4.1 Call Volume / Call Taking Function

As described above, because 9-1-1 and ten-digit phone call statistics were not available for the Marin County fire / EMS agencies ***FE*** had to estimate those numbers at approximately 19,748 9-1-1 calls and 39,496 ten-digit emergency and non-emergency phone calls. This is a total of 59,244 phone calls. The formula result used was 50 percent of the 9-1-1 calls REDCOM received in 2019 and the number of ten-digit calls were double the number of 9-1-1 calls.

Table 15 – Estimated Marin County Fire / EMS Phone Calls

Marin County Fire Departments					
	2016	2017	2018	2019	Average
Total 9-1-1 Calls	18,644	20,840	19,890	19,748	19,780
Total Ten-Digit Calls	37,288	41,680	39,779	39,496	39,561
Total	**55,932**	**62,520**	**59,669**	**59,244**	**59,341**

Table 16 displays the estimated call volume for a stand-alone center. The same service level objectives were used for this model as with the combined center model.

- Service level objective of 90 percent calls answered within 10 seconds or less
- Average talk time of 61 seconds
- Average after-call wrap up time of 45 seconds

Table 16 – Estimated Hourly Call Volume – Marin County Fire / EMS ECC

Marin County Fire/EMS ECC			
Hour	% per Hour	Per Hour	Call Takers Needed
0:00	2.24%	4.3	0
1:00	1.88%	3.7	0
2:00	1.60%	3.1	0
3:00	1.51%	2.9	0
4:00	1.53%	3.0	0
5:00	1.79%	3.5	0
6:00	2.50%	4.9	0
7:00	4.02%	7.8	1
8:00	5.81%	11.3	1
9:00	6.93%	13.5	1
10:00	6.81%	13.2	1
11:00	6.41%	12.5	1
12:00	6.15%	12.0	1
13:00	6.10%	11.9	1
14:00	5.81%	11.3	1
15:00	5.60%	10.9	1
16:00	5.40%	10.5	1
17:00	5.22%	10.2	1
18:00	4.88%	9.5	1
19:00	4.62%	9.0	1
20:00	3.94%	7.7	1
21:00	3.61%	7.0	1
22:00	3.12%	6.1	1
23:00	2.53%	4.9	1
Average	100.00%	194.52	0.71

Note - the same Erlang C tool limitations apply to this stand-alone model as with the combined model:

- The calculator is not designed to use multiple performance goals
- The calculator never recommends less than two call takers. For call volumes below ten per hour it does not make sense to have a dedicated call taker on

duty if there are three other employees in the room available to answer the phone

- The calculator assumes that all incoming phone calls will only be processed by call takers. This model does have the expectation that the Control Dispatchers will be assisting in the answering of phone calls
- For the purposes of this report, there are no dedicated call takers recommended during the anticipated slow hours when the anticipated call volume drops below 5 per hour

For the purposes of this preliminary staffing estimate, we used the average number of workstations that need to be staffed. In this case, the average number of call taker positions required to manage the incoming call volume would be .71 call taking positions. Since call volume is not evenly distributed on a 24/7 basis, some hours of the day will require no call taking positions, while others will require one equipped and active call taking position.

5.4.2 Dispatching Function

Table 17 illustrates the number and type of physical workstations and operational assignments needed for the recommended stand-alone communications center to meet established standards and best practices. The minimum number of required positions is five, named positions in the following table. An additional three positions are recommended for extended operations, overflow or training.

Table 17 – Marin Fire / EMS Positions

Marin Fire/EMS Positions	
#	**Position Type**
1	Supervisor
2	Marin Fire/EMS Dispatcher
3	Fire 13 Dispatcher
4	Fire 14 Dispatcher
5	Call Taker 1
6	Overflow/Training 1
7	Overflow/Training 2
8	Overflow/Training 3

5.4.3 Staffing / Scheduling

As with the combined center model, the following Net Available Work Hours used is 2,004 hours per employee, based on the following criteria:

- Vacation and holiday time – 180 hours
- Sick leave – 0 hours (included with vacation)
- Personal and compensatory time – 0 hours
- Training leave - 0 hours
- Military / FMLA leave - 0 hours
- Daily lunch and break time – 0 hours – time off the floor is provided when the workload allows, and others provide temporary coverage for that position
- Other activities (meetings, etc.) – 0 hours
- 12-hour shifts
- 2184 hours per year, 42 hours per week

Table 18 provides the personnel count for a stand-alone fire / EMS communications center to incorporate the sixteen Marin County fire agencies.

Table 18 - Stand-Alone ECC Staffing – Recommended

Marin County Fire/EMS ECC	
Position Title	**Total Number of Employees**
Shift Supervisors	4
Dispatchers	12
Call Takers	3
Total PSAP Staff	**19**

The above model assumes the following:

- Twelve-hour shifts
- Dedicated Shift Supervisors who would not routinely be tasked with any call taking or dispatching responsibilities

- Three (3) dispatch positions 24/7; one (1) primary fire / EMS dispatch position staffed and two (2) fire / EMS control dispatch positions staffed most of the time, except during the slower overnight hours

- The number of control dispatch positions would be reduced from two to one from 23:00 to 07:00

- The two control dispatch positions will answer the phones when no dedicated call takers are on duty and they will be the back-up when there is a call taker when they are on duty. The Supervisor and Primary Dispatcher can help as necessary

5.4.4 Staffing / Deployment – By Hour of the Day – Recommended

Table 19 – Recommended Stand-alone ECC Staffing by Hour

Marin County Fire/EMS ECC						
Hour	% per Hour	Per Hour	Call Takers Needed	Dispatchers	Supervisors	Total Positions
0:00	2.24%	4.3	0	2	1	3
1:00	1.88%	3.7	0	2	1	3
2:00	1.60%	3.1	0	2	1	3
3:00	1.51%	2.9	0	2	1	3
4:00	1.53%	3.0	0	2	1	3
5:00	1.79%	3.5	0	2	1	3
6:00	2.50%	4.9	0	2	1	3
7:00	4.02%	7.8	1	3	1	5
8:00	5.81%	11.3	1	3	1	5
9:00	6.93%	13.5	1	3	1	5
10:00	6.81%	13.2	1	3	1	5
11:00	6.41%	12.5	1	3	1	5
12:00	6.15%	12.0	1	3	1	5
13:00	6.10%	11.9	1	3	1	5
14:00	5.81%	11.3	1	3	1	5
15:00	5.60%	10.9	1	3	1	5
16:00	5.40%	10.5	1	3	1	5
17:00	5.22%	10.2	1	3	1	5
18:00	4.88%	9.5	1	3	1	5
19:00	4.62%	9.0	1	3	1	5
20:00	3.94%	7.7	1	3	1	5
21:00	3.61%	7.0	1	3	1	5
22:00	3.12%	6.1	1	3	1	5
23:00	2.53%	4.9	1	2	1	4
Average	100.00%	194.52	0.71	2.67	1.00	4.38

The staffing projections represent the number of FTE employees required to staff, at a minimum, zero call taking position, two dispatch positions and one supervisor position during the slower periods of the day. Additional FTE staff is projected for the other positions to be staffed during the higher call volume periods of the day. These busier periods will require staffing of one call taking position, three dispatch positions and one supervisor position. While completely cross-trained telecommunicators are desired, projected

minimum certified staff is provided as guidance toward meeting call volume and dispatching needs.

A re-evaluation of available statistical call volume and data should be performed every three to six months during the planning and implementation phases of a business model change to enhance accuracy in staffing projections.

5.4.5 Supervision Recommendation

As with the combined center model, the same public safety best practices and existing standards that requires 24/7 supervision as outlined in section 5.3.4.1, Supervision Recommendation. Section 5.3.4.1 also lists why this supervision is needed and the typical tasks they would be assigned.

5.4.6 Function Descriptions / Titles

Because this is a new stand-alone center model there will be a need for various management and support positions.

The following subsections present some sample definitions for functions of multi-agency operations comprised exclusively of civilian staff. Although the functions must be fulfilled, it may not be necessary for a dedicated person to perform each function, since individuals may act in multiple roles. For example, dependent on workload, the training and QA functions may be combined. It is also possible for QA to be performed by the supervisors, and training to be conducted by experienced and certified dispatchers.

In addition, some of these functions may be provided by participating county support agencies such as, but not limited to, GIS and Information Technology. The important thing to remember is that while these functions do not necessarily translate into paid full-time staff positions (except for the dedicated Director / Manager position and possibly administrative support), they all need to be performed competently to enhance effective operations.

5.4.6.1 Director or Manager

The Director or Manager has overall responsibility for providing leadership and has ultimate responsibility for all the ECC operational, technological, budgetary and administrative functions. The Director / Manager is charged with setting the direction for the ECC, planning for future operational and technological changes and ensuring that the ECC meets the mission set by the oversight body and the agency approved service level agreements. The reporting relationship for this function is determined by the type of governance established.

5.4.6.2 Deputy Director / Manager - Operations

This function reports to the Director / Manager. If the position is staffed, a Deputy Director / Manager oversees the shift supervisors and support programs, such as training and QA. This function is responsible for assisting the Director / Manager in budget preparation, making staffing decisions, scheduling, performing complaint investigations, working with agencies served by the PSAP and other operational support.

5.4.6.3 Technology Manager

The Technology Manager function typically reports to the Director / Manager and oversees all technical and equipment issues concerning the PSAP's technology. This function oversees IT and GIS support staff, works with vendors on maintenance and repair issues, plans for upgrades and supports the technology needs of the ECC. These include, but are not limited to, CAD, mobile data, radio dispatch consoles, radio system back-bone, logging recorder, 9-1-1 answering equipment, 9-1-1, notification systems and associated system interfaces.

5.4.6.4 GIS and Technology Support

These function(s) report to the Director / Manager (or Technology Manager) and are responsible for providing GIS and / or IT support for various technology found in the PSAP. This support could be dedicated to IT, CAD, radio, telephony, networks, logging recorder or a combination of technologies.

5.4.6.5 Training Program Support

The Training Coordination program function reports to the Director / Manager (or Deputy) and may have one or more training support staff. This program is responsible for the coordination and training of all PSAP operational personnel, and for developing and interacting with CTOs. In addition to new-hire training, 40-hours continuing education (in-service training) per year per telecommunicator is typically recommended and / or required to maintain certifications and / or update skills. Specialized certifications may require a minimum number of continuing education hours per year. Training staff is responsible for initial training and certification maintenance programs and for tracking and monitoring on-the-job training.

5.4.6.6 Quality Assurance Program Support

The QA Coordination program function reports to the Director / Manager (or Deputy) and may have one or more staff that reviews call taking and dispatching activities, documents findings and provides feedback on performance, and manages compliance with best

practices and policies. This process provides evidence needed to establish and maintain that services provided by the ECC are of high quality and performed effectively. This function helps identify organizational and individual training deficiencies and provides plans to rectify them. The QA function is required of any agency administering pre-arrival instructions and / or pursuing accreditation through National Academies of Emergency Dispatch (NAED). This program is typically responsible for the creation of recordings for investigations, use in court or other official proceedings. This program is also responsible for the ECC's compliance with dispatch protocol systems for law enforcement, medical and fire dispatch.

5.4.6.7 Shift Supervisor

To properly manage a multi-agency ECC, a strong supervisory structure is recommended for two primary reasons; to foster compliance with public safety standards and best practices and to maximize operational efficiency. In ***FE's*** view, we strongly recommended that shift supervision not be assigned to a primary call taker or dispatch position and that shift supervisors are present around the clock.

5.4.6.8 Telecommunicators: Call Takers and / or Dispatchers

This function reports to the shift supervisor and is responsible for call taking and dispatch functions. These core operational staff may also be responsible for, or participate in, the on-the-job training of new hires, input to maintenance of policies and procedures, and community education and job fairs.

5.4.6.9 Administrative Support and other Ancillary Functions

This function reports to the Director / Manager and is responsible for providing administrative support and managing other office responsibilities. These functions include, but are not limited to, things such as human resources, benefits administration, and payroll.

6. Potential Impacts of California State Law

Two sections of California Government Code that need to be considered when analyzing the feasibility of REDCOM providing dispatch services for the Marin county fire agencies are:

- California Government Code Section 6500: Joint Powers Agreements[3]
- California Government Code Section 53110 (as amended by Senate Bill 438)[4]

6.1 California Government Code Section 6500: Joint Powers Agreements

California Government Code Section 6500 defines a joint powers authority as a public agency: "*As used in this article, **public agency includes**, but is not limited to, the federal government or any federal department or agency, this state, another state or any state department or agency, a county, county board of education, county superintendent of schools, city, public corporation, public district, regional transportation commission of this state or another state, a federally recognized Indian tribe, **or any joint powers authority formed pursuant to this article by any of these agencies***."

6.2 California Government Code Section 53110 (as amended by Senate Bill 438)

California Senate Bill (SB) 438 was introduced in February 2019. This bill prohibits a public agency from entering into a contract for 9-1-1 call processing services unless the contract is with another public agency, with specified exceptions, and defines medical control, etc. SB 438 was approved by the California Legislature, and signed by the Governor in October 2019. California Government Code 53110 contains the provisions of SB 438. There has been a question if REDCOM, as a JPA contracting dispatch services from American Medical Response West (AMR), is or is not a public agency, and would several of the exceptions in the bill prohibit REDCOM from dispatching for Marin County fire agencies.

[3] TITLE 1. GENERAL [100 – 7914], DIVISION 7. MISCELLANEOUS [6000 - 7599.2], CHAPTER 5. Joint Exercise of Powers [6500 - 6599.3], ARTICLE 1. Joint Powers Agreements [6500 - 6539.6]

[4] TITLE 5. LOCAL AGENCIES [50001 - 57607], DIVISION 2. CITIES, COUNTIES, AND OTHER AGENCIES [53000 - 55821], PART 1. POWERS AND DUTIES COMMON TO CITIES, COUNTIES, AND OTHER AGENCIES [53000 - 54999.7], CHAPTER 1. General [53000 - 53170], ARTICLE 6. Local Emergency Telephone Systems [53100 - 53122]

California Government Code 53110(c)(1) states that "*A joint powers authority that delegated, assigned, or contracted for "911" call processing services* ***on or before January 1, 2019****, may continue to delegate, assign, or contract for those services and may, upon the expiration of the delegation, assignment, or contract, renegotiate or adopt new contracts, if the membership of the joint powers authority includes all public safety agencies that provide prehospital emergency medical services and the joint powers authority consents to the continued delegation, assignment, or renegotiation or adoption of the contract*."

In ***FE***'s research of SB 438, we talked to two fire service members that participated in the development of the bill. While the original bill language dealt with fire department "201" rights, (the right for fire agencies to provide medical assistance and transportation in their jurisdictions), 9-1-1 and dispatch centers were added during further markups.

Our sources indicated that JPAs such as REDCOM, Valley Regional Emergency Communications Center in Stanislaus County, and Fresno County EMS Communications Center were considered when drafting the final bill language to safeguard that they would be able to continue operating with the same capabilities they have had in the past. This was the reason for inserting a "…delegated, assigned, or contracted for "911" call processing services before January 1, 2019…" clause in the bill. The drafters of the bill wanted to make certain that as long as the overarching management of these dispatch centers was a public agency, responsible to the public agency members being dispatched, they would be in compliance with this new law.

It was the opinion of these fire service members that if the Marin fire agencies want to be dispatched by REDCOM, there is no issue since the REDCOM contracted dispatch service was in existence before the January 1, 2019 cutoff.

It is also ***FE***'s analysis that California Government Code 53110 will not preclude Marin County fire agencies from joining the REDCOM JPA and being dispatched by them. It would be prudent to get an opinion from both the Marin and Sonoma County Counsel's Offices since they would be involved in any challenges to this effort.

7. Financial Assessment

This section provides ***FE***'s assessment of costs that will be required for REDCOM to provide dispatch services for the Marin County fire agencies. This is a feasibility study, rather than a consolidation study, where decisions have been made on location, systems, etc. ***FE***'s goal is to provide cost considerations that will facilitate an eventual decision by REDCOM and the Marin fire agencies on whether it is in the interests of both parties to proceed with a transfer of dispatch services from the MCSO to REDCOM.

7.1 Reasons to Consider Transfer of Dispatch Services

Stakeholder agencies may consider the transfer of dispatch services from one PSAP to another for many reasons. Commonly cited reasons include:

1. Service level improvements – An important benefit of transferring dispatch services is service level improvements. The degree and nature of the improvements will vary depending on the efficiency of each individual PSAP being compared. 9-1-1 call takers and dispatchers are truly the "first responder on the scene" and can substantially influence the outcome of an incident. The types of service improvements typically achieved following a transfer of services include:
    a. If call volume is large enough, transferring services to an existing PSAP can utilize a call taker / dispatcher organizational structure. This structure enables the call takers to focus solely on the incoming call and obtain the best information possible. The dispatcher's ability to focus solely on field personnel improves field personnel safety
    b. Standardized training of all PSAP employees increases regional consistency
    c. A consolidated environment resulting from the transfer of services may offer the benefit of state-of-the-art technology, improved training, and expanded career opportunities that would not be otherwise financially or organizationally feasible
2. Another primary reason cited for transfer of services is cost savings. In ***FE***'s experience, while cost savings could be a possibility in the future, it is critical that decision makers understand two points.
    a. First, the goal of a services transfer should not be cost savings, but rather service level improvements

b. Second, during a project such as this, there can be significant up-front capital costs associated with bringing the new agencies on board. Any potential savings may not occur for a few years; however, future cost efficiencies can be realized. Savings can be achieved by adding additional agencies to an existing JPA spreading out the costs to fund operations and technology. Another benefit is the sharing of technology systems provides not only additional cost efficiencies, but it can also provide improved regional or event situational awareness

7.2 Types of Costs

There are two types of costs that will need to be considered:

- One-time startup costs required to provide the infrastructure and systems that would allow REDCOM to provide dispatch services to Marin County fire agencies. These costs are often referred to as capital costs
- Ongoing annual costs to pay for systems, e.g., CAD, staff, support, maintenance, and technical services, e.g., GIS. These costs are often referred to as operational costs

7.2.1 Capital Costs

FE reviewed the technology issues that will need to be addressed and is providing high-level cost estimates associated with each technology area. In some areas, such as the addition of dispatch positions at REDCOM, plans are already in place to implement these projects. However, ***FE*** has identified high-level cost estimates for these items so that they are not overlooked. Allocation of specific costs between REDCOM and the Marin fire agencies will need to be negotiated should the Marin fire agencies decide to proceed with a transfer of dispatch services to REDCOM.

7.2.2 Operational Costs

FE worked with REDCOM and MCFD to determine additional positions and staffing that will be required for each of the location options: REDCOM or a Marin dispatch center, in addition to the staffing levels calculated during the staffing analysis.

Based on labor costs for each position, ***FE*** calculated the estimated high-level annual cost for each of the dispatch location options. In addition to estimated labor costs, ***FE*** also calculated the estimated facility rental and maintenance charges associated with a Marin dispatch center.

8. Capital Cost Estimate

8.1 Combined REDCOM Emergency Communications Center

This section describes the high-level estimated costs for updated technology that will be needed to support a combined REDCOM ECC. These estimates are based on technology that will be needed to combine the sixteen (16) Marin County fire agencies into REDCOM.

There are no concrete rules that apply to a project like this when it comes to who is the responsible party for a technology or a particular cost, either the migrating agency(s) or the communications center. This funding decision must be made locally and depends on several factors, such as, but not limited to, the technology involved, project participants, agency(s) that will derive benefit from the technology, local politics, and available funding.

During the project's transition planning, REDCOM and the Marin County agencies must decide on budget and funding mechanisms. At the same time, technology lines of demarcation should also be determined for those systems that will be used in the communications center versus those that will be used by the emergency responders out in the field.

The agencies and ultimate decision makers need to understand that the costs provided are high-level cost estimates based on ***FE***'s experience with the associated technology and with similar projects in the past. For many technology solutions there may be multiple alternate methods of providing the needed technology or the functionality it provides. These alternate methods may differ significantly in cost. If the project proceeds, additional steps will be needed during the planning phase to make certain all possible solutions are explored. More detailed cost data may be needed from specific vendors. There may also be significant differences in cost based on the vendor and the solution they can provide.

These high-level cost estimates are provided to help guide the agencies.

Each of the following sections includes a description of the assumptions that were used in calculating the high-level cost estimate for that item.

8.1.1 Computer Aided Dispatch

Rather than remaining on the MCSO Hexagon CAD system, the Marin County fire agencies would prefer to become a part of the Sonoma County Public Safety Consortium (SCPSC) for CAD. Utilizing the Sonoma County CAD system will give the Marin County fire agencies better control over changing configurations, reports and statistics; control they do not have today. Marin County fire agencies also want to implement closest unit

(proximity) dispatch, which MCSO has been reluctant to implement. This will be less of an issue since REDCOM is using closest unit dispatching today.

CAD software licenses will be needed for the additional four system furniture positions that will be added to REDCOM. ***FE*** verified with Hexagon that licenses are not transferable between CAD systems. Four licenses at $25,000 a piece for a total of $100,000.

A Personal Computer (PC) will need to be installed at each of the four new positions for the CAD system. Four PCs at $2,500 a piece for a total of $10,000. Three computer monitors will be needed for each of the new CAD PCs for a total of 12 monitors. Twelve monitors at $1,000 a piece for a total of $12,000.

8.1.1.1 CAD Interfaces

The following subsections describe CAD interfaces that will be required.

8.1.1.1.1 CAD-to CAD

A CAD-to-CAD interface will need to be developed and added between the Sonoma County CAD system and the MCSO CAD system. The CAD-to-CAD interface will allow the creation of joint LE/Fire/EMS events from either CAD system, and Fire/EMS units to view comments entered in the associated LE event. With CAD-to-CAD interfaces there is typically a cost for development and programming for each system. The high-level cost estimate covers the cost for both the Sonoma and the MCSO CAD systems, i.e., each system requires the interface. Interfaces for each CAD system at $25,000 each plus five years of maintenance at $25,000 for a total of $75,000.

8.1.1.1.2 Marin County Fire Records Management Systems

The Marin County fire agencies use Emergency Reporting Fire Records Management Systems (FRMS). REDCOM will need to configure a link to Emergency Reporting to transfer CAD data. The estimated cost to establish the link is $25,000.

8.1.1.1.3 Marin County Electronic Patient Care Reporting

A new CAD interface will be needed for the ESO Electronic Patient Care Reporting (ePCR) solution that is being used by the Marin County agencies This interface sends out CAD data to the ePCR system at dispatch and typically is updated based on certain triggers. The ISD cost to configure the interface is $1,500.

8.1.2 Tablet Command

The Marin County agencies report they are in a transition to Tablet Command for their mobile solution with some agencies currently using Mobile Responder on PCs and some using Tablet Command on IOS. Most likely all Marin fire agencies will be moving to Tablet Command. A Marin County group is working on contract negotiations now. For this report, ***FE*** is assuming that all Marin County fire agencies will be using Tablet Command in lieu of other mobile technologies. The estimated cost to implement a two-way Tablet Command interface on the Sonoma County CAD system is $20,000.

8.1.3 Emergency Dispatch Protocols

Emergency dispatch protocols are used to provide call taker question standardization, uniform instructions, and to prioritize recommended responses. REDCOM uses both emergency medical and fire dispatch protocols in their daily operation.

Both REDCOM and MCSO are licensed users of the Medical Priority Dispatch System (MPDS) emergency medical dispatch protocols. REDCOM will be providing EMD for the Marin County agencies that will be joining. MPDS users are required to complete a MPDS dispatcher training course at $750 per person. The training cost for the 11 new telecommunicators is $8,250.

REDCOM is a licensed user of the MPDS EFD protocols. The Marin fire agencies do not currently use EFD, but for consistency with current REDCOM procedures, agreed that REDCOM should continue using it for the Marin agencies' fire calls.

Additional EMD and EFD software licenses will need to be added for the four new console positions. Cost for each position is $7,500, for four positions the cost is $30,000.

8.1.4 Radio Dispatch Consoles

One of the most significant technology challenges for combining Marin County fire dispatch with REDCOM is the integration of two different radio systems: Sonoma County's VHF simulcast analog system with Marin County's current UHF T-band and future 700 MHz P25 Phase 2 Time Division Multiple Access (TDMA) trunked radio system. There are several possible solutions, and each has its own financial impact:

- Purchase MCC7500 radio consoles and connect them via network connections to MERA at specific dispatch positions. An operational disadvantage to this solution is that it will require telecommunicators to be trained on two separate solutions and then dedicates specific positions to either REDCOM or Marin County operations

- Purchase MCC7500 radio consoles for each REDCOM dispatch position in addition to the current ModUcom radio consoles. This will result in adding an additional monitor, mouse and keyboard at each dispatch position. This option has significant operational disadvantages resulting in two separate radio solutions for the employees, potential console real estate issues and most likely headset arbitration concerns

- Purchase MCC7500 radio consoles with backend technology that will allow the control of both Sonoma and Marin County radio channels from the same dispatch console position

FE's recommendation is to purchase and implement MCC7500 consoles with the capability to monitor and control both Sonoma and Marin radios. Although this is a costly procurement, this will provide REDCOM with maximum flexibility for the day to day assignment of dispatch positions and provide the center with a modern state of the art radio console solution. ***FE*** contacted the MERA upgrade project manager to identify any MCC7500 consoles that are going to be provided as part of the MERA upgrade. Woodacre is scheduled to receive three MC7500 consoles in June/July 2021 although the schedule is likely to slip to early 2022. The estimated cost for each MCC7500 is $48,000. Cost for 11 MCC7500 consoles (three MCC7500 consoles being provided by MERA) is $528,000.

The Motorola MCC7500 radio control console is cable of controlling both analog and digital radio systems. In addition to the actual MCC7500 consoles, the solution will require the following backend technology:

- Conventional controller, in a redundant configuration, estimated cost $100,000

- Connection to the Sonoma radio system via Conventional Channel Gateways (two for the REDCOM ECC and at least two for Sonoma RF sites), estimated cost $7,000 each, total cost for four, $28,000

- Digital IP logger with an Archiving Interface Server (AIS) to log radio traffic over the IP network, estimated cost $150,000

- Microwave link (or fiber network connection, if less expensive) to Marin radio transmitters, estimated cost $75,000

- Motorola installation services, estimated cost $350,000

REDCOM will also need to access to Marin County's back-up VHF overlay resources.

8.1.5 9-1-1 Telephone Routing

The telephony network and 9-1-1 answering will need to be programmed to allow the MCSO PSAP, and other law enforcement primary PSAPs in Marin County, to transfer 9-1-1 calls with enhanced data to the REDCOM secondary PSAP.

Any ten-digit phone lines dedicated to fire / EMS operations installed at the Marin County PSAP or the WECC should be transferred to REDCOM so that they can be answered there and there will be no need to transfer. Other ten-digit phone calls received at the SCSO center will need to be manually transferred to REDCOM.

Adjacent mutual aid dispatch centers and agencies will need to be notified when REDCOM takes over dispatching for the Marin agencies. This may require programming changes to their local telephone equipment, specifically their 9-1-1 answering equipment, speed dials, etc. Estimated cost $5,000.

8.1.6 9-1-1 Customer Premise Equipment

9-1-1 answering equipment (PC, monitor, and software) will need to be added to the four new console positions at REDCOM. While it is possible that the California 9-1-1 Office will reimburse for the additional positions, it will need to be reviewed with the 9-1-1 Advisors at the 9-1-1 Office. Estimated cost $55,000 each, total cost for four positions is $220,000.

8.1.7 Geographical Information Systems

Sonoma County ISD currently maintains the REDCOM CAD mapping applications. This includes the countywide base map including address points, street centerlines, parcels, and other significant data layers.

Sonoma County ISD will need to be provided with the Marin County GIS / mapping data to integrate and consolidate that data into the proper format that is placed into a single file for use in the Sonoma CAD system. This work will require significant resource time and effort on a routine basis by the ISD staff. In addition, the ISD staff will need to assess the quality of the Marin GIS data. Workflows and processes will need to be developed to make certain all mapping / GIS data is routinely updated to include the most recent changes.

REDCOM made multiple attempts to schedule time with the ISD GIS staff to discuss:

- Their assessment of the effort required to analyze and prepare Marin County GIS/map data to merge with the Sonoma County GIS data
- Preparation of the data in the Hexagon GIS format for use with the SCSO CAD system

- An estimate of the ongoing GIS maintenance effort that will be required to perform quarterly GIS updates

ISD GIS was not available to provide the requested information due to other commitments such as the upcoming SCSO CAD upgrade.

To complete this report in a timely fashion, account for the GIS setup, and annual maintenance cost, ***FE*** is proposing the following estimating methodology. Use the annual salary for an ISD Geographic Information Technician II as the basis for the GIS cost estimates. A Sonoma County Geographic Information Technician II is defined with the following knowledge set and capabilities:

- *Under general supervision, prepares, revises, and maintains a variety of maps and mapping related records, documents, and reports; creates, revises, manipulates, and maintains spatial database records used with computer based geographic information systems; produces visual aids and graphics for presentation; provides spatial analysis; explains and interprets maps as requested by county departments and the general public; and performs related duties as required.*

- *Geographic Information Technician II is the full working level in the Geographic Information series. Incumbents in this class are expected to perform advanced computer map design, spatial data management and spatial analysis using a variety of computer programs to complete various assignments. Positions may be assigned to the department responsible for the County's primary GIS or to departments using the system and other geographic data.*

REDCOM confirms this is an appropriate labor classification to use for the GIS work that will be required. The annual estimated burdened salary range for this position is $77,789.66 to $92,399.50. ***FE*** recommends that the high end of the salary range be used for the cost estimate. For the cost to prepare the Marin GIS data for initial consolidation with the Sonoma CAD GIS, a conservative estimate would be the annual cost. Likewise, a conservative estimate for ongoing quarterly GIS updates would be the annual cost. Estimated GIS setup cost and annual maintenance cost is $92,400.00 for each.

For comparison purposes, MCSO told REDCOM they currently pay GeoComm $130,000.00 annually to maintain their GIS and do quarterly updates of the CAD GIS.

8.1.8 System Furniture Positions

An additional four system furniture positions will need to be installed at REDCOM. This is in addition to the existing ten positions that are currently installed and will bring the total

number of positions to fourteen. Estimated cost is $20,000 per position. Four positions will cost $80,000. Four additional dispatch chairs will also be required, one for each console at $2,000 per chair, total estimated cost, $8,000.

8.1.9 Switched Ethernet Circuit

Sonoma County ISD indicated that an additional AT&T Switched Ethernet (ASE) circuit will likely be needed. Estimated cost $2,500.

8.1.10 Hospital Status Reporting

Sonoma County uses ImageTrend Resource Bridge to track hospital bed counts and diversion status in the county. REDCOM monitors the diversion status for each hospital and updates CAD when a county hospital is in diversion so that dispatchers can advise transporting EMS units. Resource Bridge uses a browser-based user interface.

Marin County hospitals currently use ReddiNet to report hospital diversion status. Based on ***FE***'s review of the Sonoma County Resource Bridge hospital training documentation, Resource Bridge appears to be straight forward and user friendly. To provide continuity with REDCOM's current operating procedures, ***FE*** recommends that the Marin County hospitals be migrated to Resource Bridge in a combined dispatch operation.

Resource Bridge is a subscription-based service with annual subscription costs. Refer to Section 9.1 Estimated Annual Subscription Cost for estimated annual cost.

8.1.11 Historical CAD Data Import

The Marin County fire agencies would like some of their historical MCSO CAD data imported into the Sonoma CAD system. At a minimum, they would like to import event / incident history and premise information. The estimated cost for REDCOM IT to import the Marin CAD data is $10,000.

8.1.12 Technology Areas with No Additional Cost

The following technology areas were reviewed but have no additional cost associated with them.

8.1.12.1.1 Marin County Fire Station Alerting

As part of the MERA upgrade project, the Marin County fire agencies will be transitioning to Mach Alert. ***FE*** contacted the MERA Upgrade Project Manager and learned the current Motorola schedule for implementation of Mach Alert is January to October 2022.

8.1.12.2 CAD Server Hardware and SQL Licenses

The current Sonoma County CAD servers are nearing maximum capacity. These are virtual servers that will need to be expanded. Additional server hardware is scheduled to be added in the July 2020 time frame, which will address the current capacity issue. This will also alleviate any sizing concerns caused by adding the Marin fire agencies. The hardware expansion will also include required additional SQL licensing.

8.1.12.3 Logging Recorders

REDCOM has recently received a new audio logging recorder. ***FE*** has been advised that there is sufficient capacity in the new recorder to handle Marin County needs, such as 9-1-1 trunks and ten-digit phone lines.

A radio logging recorder is included as part of the proposed radio console solution, refer to Section 8.1.4, Radio Dispatch Consoles.

Marin radio trunk talk groups are also recorded at the MERA control site in San Rafael and can be accessed remotely using a browser.

8.1.12.4 Radio System and Infrastructure

MERA[5] is a JPA in Marin County, California, formed in 1998 to plan, implement and manage a countywide public safety and emergency radio system for the use of all member agencies. MERA is governed by a Governing Board comprised of representatives from Marin County, all cities, towns, and fire districts in Marin, and other special districts such as the Marin Municipal Water District.

The process for getting permission to access MERA via the radio consoles is the MERA Operations Officer presents a proposal to the MERA Operational Issues Working Group. If the Working Group approves the proposal, they make a recommendation to the MERA Governing Board, who provides the final approval.

8.1.12.5 Interagency Resource Ordering Capability

REDCOM users on the Interagency Resource Ordering Capability (IROC) system will need to have Marin County (XMR) added to their profiles to enable them to coordinate resources for Marin County.

[5] http://meraonline.org/

8.1.12.6 Personnel Paging and Notification

The following paging and notification systems will need to be updated to include the Marin County fire / EMS agencies. The Marin County agencies will need to be added to:

- The CAD text paging system
- REDCOM's Active 911 notification system

The REDCOM IT staff will make the updates.

8.1.12.7 Reporting

The Marin County fire agencies will continue to provide their own NFIRS and CFIRS reporting via their FRMS systems. The FRMS systems will be provided the required event information via one of the new CAD interfaces that is required.

The REDCOM technical services team will provide any specialized reports that are required.

8.1.12.8 PulsePoint

Both REDCOM (Sonoma County) and Marin County fire agencies are interfaced to PulsePoint. PulsePoint licensing is done in tiers based on the population of areas served.

Tier	Population Range	Population
1	<300,000	Marin County 259,725
2	300,000 to 750,000	Sonoma County 503,246
3	750,000 to 1,500,000	Marin and Sonoma Counties 762,971
4	>1,500,000	

FE verified with PulsePoint that the cost for tier three licensing is the combination of tiers one and two; therefore, there will be no additional cost for PulsePoint licensing.

8.1.12.9 CAL FIRE Microwave Intercom System

REDCOM is currently a part of the statewide CAL FIRE microwave intercom system.

8.1.13 REDCOM ECC Estimated Cost Summary

Table 20 provides a summary of the high-level estimated costs for updated technology that will be needed to support a combined REDCOM ECC.

Table 20 - High-level REDCOM Technology Budgetary Estimated Cost

High-level REDCOM Technology Budgetary Estimated Costs			
System	**Quantity**	**Individual Cost**	**Total Estimated Cost**
CAD Software Licenses	4	$ 25,000	$ 100,000
CAD Workstation	4	$ 2,500	$ 10,000
CAD Workstation Monitors	12	$ 1,000	$ 12,000
CAD to CAD Interface	1	$ 75,000	$ 75,000
CAD FRMS Interface	1	$ 25,000	$ 25,000
CAD ePCR Interface	1	$ 1,500	$ 1,500
Tablet Command Two-way Interface	1	$ 20,000	$ 20,000
MPDS EMD and EFD Workstation License	4	$ 7,500	$ 30,000
EMD Training	11	$ 750	$ 8,250
MCC7500 Radio Console	11	$ 48,000	$ 528,000
Redundant Conventional Controller	1	$ 100,000	$ 100,000
Conventional Channel Gateways	4	$ 7,000	$ 28,000
Digital IP Looger with AIS	1	$ 150,000	$ 150,000
Microwave Link to Marin Radio Transmitters	1	$ 75,000	$ 75,000
Motorola Installation Services	1	$ 350,000	$ 350,000
9-1-1 Telephone Routing	1	$ 5,000	$ 5,000
9-1-1 Answering Equipment	4	$ 55,000	$ 220,000
GIS Conversion (ISD GIS Technician II)	1	$ 92,400	$ 92,400
Console Furniture	4	$ 20,000	$ 80,000
Dispatch Chairs	4	$ 2,000	$ 8,000
MCSO CAD Data Import	1	$ 10,000	$ 10,000
TOTAL (rounded up to nearest 100K)			**$ 2,000,000.00**

8.2 New Fire Dispatch Center in Marin County

An option that REDCOM and the Marin County fire agencies may want to consider is to create a REDCOM-staffed center in Marin County (REDCOM Marin), managed by the REDCOM JPA, dispatching only Marin fire / EMS agencies. The best location for this new dispatch center would be in open space at the Marin County building located at 1600 Los Gamos Drive in San Rafael, the current site of the MCSO PSCC. There are several advantages to this option:

- The 1600 Los Gamos Drive building is controlled by Marin County, which could allow for flexibility in space allocation and cost recovery
- There will be no need to extend connections from the MERA trunked radio system into REDCOM. There is already a node on the MERA system at the 1600 Los Gamos Drive building
- Telecommunicators at this new facility would only need to work with Marin County operational procedures, geography, and fire agencies.

Each of the following sections includes a description of the differences between a REDCOM Combined ECC and a Marin Fire ECC.

8.2.1 Facility

The Marin County office building is located at 1600 Los Gamos Drive, San Rafael. MCSO has use of the second floor, where the MCSO PSCC is located. MCSO reported that the building was built or remodeled to meet the requirements of an Essential Services Building, able to withstand natural disasters. There are adequate parking facilities on site, and the building has perimeter security measures in place. In addition, the building management provides a free shuttle service to the nearest SMART station.

FE estimates that approximately 3,500 square feet should satisfy the needs of the dispatch center, offices, equipment room and sleeping area. For comparison, the existing REDCOM Sonoma footprint is approximately 2,500 square feet but does not include sleeping areas or shower facilities. Architectural design work will confirm the space requirements.

The space allocated to REDCOM would require a contractor to make modifications and add equipment:

- Walls, doors, interior windows, etc. to isolate the allocated space from public areas, create offices for administrative personnel, locker rooms for dispatch staff and sleeping areas for 24-hour shift personnel. Access to or construction of shower and kitchen facilities would also be required
- Install electrical and network connections to support the additional technology
- Install dispatch workstation positions
- Create cable pathways to existing technology room(s)
- Build rack space in the technology room(s) to accommodate servers and network appliances

- Construction and physical security features should meet the National Fire Protection Association (NFPA) Technical Standard 1221 requirements

Marin County provided an estimate that working with an architect and construction manager to develop a Total Project Cost will cost $25,000.

Based on estimates provided by Marin County, construction costs for a highly technical area such as a dispatch center are approximately $225 per square foot. Estimated construction cost is $787,500 ($225 x 3,500 square feet).

8.2.2 Computer Aided Dispatch

CAD software licenses will be needed for the anticipated eight system furniture positions that will be installed for a REDCOM Marin, estimated cost $200,000.

Eight PCs will need to be installed for the CAD system at the consoles, estimated cost $20,000.

Three computer monitors will be needed for each of the new CAD PCs estimated cost $24,000.

8.2.3 Emergency Dispatch Protocols

MPDS users are required to complete a MPDS dispatcher training course at $750 per person. The training cost for the four new supervisors and 15 new telecommunicators, total 19 people is $14,250.

Additional EMD and EFD software licenses will need to be added for the eight new console positions. Cost for each position is $7,500, for eight positions the cost is $60,000.

8.2.4 Radio Dispatch Consoles

The estimated cost for each MCC7500 radio console is $48,000. Cost for five MCC7500 consoles (three MCC7500 consoles being provided by MERA) is $240,000. Note: these radio consoles will not be configured, i.e., backroom equipment for the Sonoma County radio system is not included, to access or control Sonoma County radio channels. Motorola installation services, estimated cost $100,000

8.2.5 9-1-1 Customer Premise Equipment

9-1-1 answering equipment will need to be added to each of the eight console positions. Estimated cost for each position is $55,000, for eight positions the cost is $440,000.

8.2.6 Logging Recorders

A new digital IP logger with an AIS to log radio traffic over the IP network will need to be procured and installed. The recorder will also need to be configured to record any 9-1-1 trunks, phone lines, and the 9-1-1 answering and radio dispatch positions. Estimated cost is $150,000.

8.2.7 System Furniture Positions

Eight system furniture positions will need to be installed at REDCOM Marin. Estimated cost for each position is $20,000, for eight positions the cost is $160,000. Eight additional dispatch chairs will also be required, one for each console at $2,000 per chair, total estimated cost, $16,000.

8.2.8 Office Furniture

There should be separate rooms in the new facility for the following positions:

- Operations Manager's Office
- IT Support Office
- Supervisor's Office
- Sleeping Quarters
- Breakroom
- Shower facilities
- Lockers

A separate, sound-proof room or rooms should be made available for the 24-hour command and control officer. Minimal furniture is required, bed, chair, lockers, and nightstand.

Lockers will be required for staff to be able to store headsets, manuals, etc. This could be either a separate room or located in a wide hallway.

Estimated cost to furnish the non-dispatch offices / rooms with furniture and technology, e.g., telephones, computers, etc. is $5,000 each, total for seven offices or rooms is $35,000.

8.2.9 CAL FIRE Microwave Intercom System

Marin County Communications confirmed there is currently a talk group "CDF Intercom" on the MERA system, which can be configured to be on the MERA system dispatch consoles.

8.2.10 Marin County Fire Dispatch Estimated Cost Summary

Table 21 provides high-level budgetary costs for updated and new technology that will be needed to support REDCOM Marin. Because some costs will be the same as the combined REDCOM ECC and others will be different the table indicates where costs are different.

Table 21 - High-level RECOM Marin Estimated Technology Costs

High-level REDCOM Marin Estimated Technology Costs				
System	**Quantity**	**Individual Cost**	**Total Estimated Cost**	**Same as REDCOM ECC**
Facility Design Cost	1	$ 25,000	$ 25,000	
Facility Construction Cost	3,500	$ 225	$ 787,500	
CAD Software Licenses	8	$ 25,000	$ 200,000	
CAD Workstation	8	$ 2,500	$ 20,000	
CAD Workstation Monitors	24	$ 1,000	$ 24,000	
CAD to CAD Interface	1	$ 75,000	$ 75,000	X
CAD FRMS Interface	1	$ 25,000	$ 25,000	X
CAD ePCR Interface	1	$ 1,500	$ 1,500	X
Tablet Command Two-way Interface	1	$ 20,000	$ 20,000	X
MPDS EMD and EFD Workstation License	8	$ 7,500	$ 60,000	
EMD Training	19	$ 750	$ 14,250	
MCC7500 Radio Console	5	$ 48,000	$ 240,000	
Redundant Conventional Controller				
Conventional Channel Gateways				
Digital IP Looger with AIS	1	$ 150,000	$ 150,000	
Motorola Installation Services	1	$ 100,000	$ 100,000	
9-1-1 Telephone Routing	1	$ 5,000	$ 5,000	X
9-1-1 Answering Equipment	8	$ 55,000	$ 440,000	
GIS Conversion (ISD GIS Technician II)	1	$ 92,400	$ 92,400	X
Console Furniture	8	$ 20,000	$ 160,000	
Dispatch Chairs	8	$ 2,000	$ 16,000	
Office Furniture	7	$ 5,000	$ 35,000	
MCSO CAD Data Import	1	$ 10,000	$ 10,000	X
TOTAL (rounded up to nearest 100K)			**$ 2,600,000**	

9. Operational Cost Estimates

9.1 Estimated Annual Subscription Costs

Resource Bridge is a subscription-based hospital reporting service with annual subscription costs. Licensing is by named users to comply with HIPPA requirements. ImageTrend said that, typically, hospitals will have at least two licenses, one for a primary administrative user and a second user to act as a backup if the primary user is not available. Estimated annual cost per named user is $5,000.00 each. Six Marin County hospitals with two named users each, total 12 named users, is $60,000.00 per year.

9.2 Estimated Labor Costs

The largest component of annual operating cost is labor. Based on the staffing analysis for a combined REDCOM dispatch center and a new REDCOM Marin, command positions, and additional technology support, ***FE*** has calculated the estimated annual labor cost for each option.

The personnel forecast models ***FE*** uses (see Section 5, Staffing Analysis) estimates the number of staff needed for call taking and dispatch. REDCOM cross trains their staff to fill either role, so for this analysis the recommended numbers of call takers and dispatchers have been combined and reported as telecommunicators.

MCFD will require two command positions to be added to the REDCOM staff at either of the dispatch center locations. They are:

- Command Officer, based on a 56-hour week
- Fire Dispatch Assistant, this position is only needed for the duration of the fire season, estimated to be eight months

REDCOM estimates that three additional technology positions will be required at either of the dispatch center locations to support the Marin fire agencies. They are:

- REDCOM Data Systems Administrator
- ISD Programmer Analyst
- ISD GIS Technician II

9.2.1 REDCOM ECC

The estimated annual burdened labor costs for a REDCOM ECC are displayed in the following table. The annual burdened salary for REDCOM telecommunicators was computed by doing a weighted average of the telecommunicator pay steps based on the number of current REDCOM full time employees in each pay step.

Table 22 – Combined REDCOM Dispatch Staffing Estimated Cost

Combined REDCOM Dispatch Staffing					
Position Title	**Current Staffing**	**Combined Staffing**	**Required Additional Employees**	**Annual Burdended Salary**	**Estimated Cost**
Supervisor	4	4	0	$ 113,968.00	$ -
Telecommunicator	18	29	11	$ 94,600.00	$ 1,040,600.00
Dispatcher		*20*			
Call Taker		*9*			
Command Officer			3	$ 239,723.00	$ 719,169.00
Fire Dispatcher Assistant (eight months)			4	$ 32,941.00	$ 131,764.00
REDCOM Data Systems Administrator			1	$ 115,000.00	$ 115,000.00
ISD Programer Analyst			1	$ 130,000.00	$ 130,000.00
ISD GIS Technician II			1	$ 92,400.00	$ 92,400.00
TOTAL					**$ 2,228,933.00**

9.2.2 REDCOM Marin

9.2.2.1 Annual Labor Cost

The estimated annual burdened labor costs for a REDCOM Marin fire dispatch center are displayed in the following table.

In addition to the positions identified in the previous section, REDCOM will also require an Operations Manager at a REDCOM Marin fire dispatch center.

Table 23 – REDCOM Marin Estimated Staffing Cost

Marin Center Dispatch Staffing			
Position Title	**Required Additional Employees**	**Annual Burdended Salary**	**Estimated Cost**
Operations Manager	1	$123,597.00	$ 123,597.00
Supervisor	4	$113,968.00	$ 455,872.00
Telecommunicator	15	$ 94,600.00	$ 1,419,000.00
Dispatcher	*12*		
Call Taker	*3*		
Command Officer	3	$239,723.00	$ 719,169.00
Fire Dispatcher Assistant (eight months)	4	$ 32,941.00	$ 131,764.00
REDCOM Data Systems Administrator	1	$115,000.00	$ 115,000.00
ISD Programer Analyst	1	$130,000.00	$ 130,000.00
ISD GIS Technician II	1	$ 92,400.00	$ 92,400.00
TOTAL			**$ 3,186,802.00**

9.2.2.2 Annual Facility Cost

In addition to labor, a REDCOM Marin dispatch center will also have annual costs for rent. Marin County provided a commercial rate of $2.75 per square foot. For a 3,500 square foot facility the estimated monthly rental would be $9,625 with an annual estimated rental fee of $115,500.

Utilities, power, water, and sewer, are coordinated through Marin County. The cost of utilities is based on total square feet occupied by the tenant. Marin County also performs all maintenance on the building, including janitorial services. The County charges a flat rate of $1.20 per square foot per month for utilities and maintenance. The estimated monthly utilities and maintenance cost for a 3,500 square foot facility is $4,200 with an annual estimated cost of $50,400.

9.2.2.3 Total Annual Cost

The total annual estimated cost for a REDCOM Marin dispatch center is provided in Table 24.

Table 24 – REDCOM Marin Estimated Annual Cost

Marin Fire Dispatch Center Estimated Cost	
Cost Element	**Estimated Cost**
Labor	$ 3,186,802.00
Annual Rent	$ 115,500.00
Annual Utilities and Maintenance	$ 50,400.00
Annual Resource Bridge Subscription	$ 60,000.00
TOTAL	**$ 3,412,702.00**

9.3 Dispatch Center Funding Models

Both REDCOM and MCSO use similar methodologies to assess annual operating costs for dispatch services to the member agencies. Both organizations allocate annual costs based on historical call data volume as a percentage of the total call volume across all participating agencies.

9.3.1 REDCOM

REDCOM uses average call volume for the previous five years to compute the percentage of costs to be allocated to each agency. The annual REDCOM budget, including Sonoma CAD Consortium costs are divided into two categories: Call Budget and Base Call Budget. An allocation, based on an agency's percentage of total call volume, is done for the Call Budget. The Base Call Budget allocation is done by call volume tiers, e.g., each agency that falls within a particular tier is assessed the same amount.

9.3.2 MCSO

MCSO uses average call volume for the previous two years to compute the percentage of costs allocated to each agency. The first allocation is for the MCSO CAD system. The annual cost is allocated across all agencies that use the MCSO CAD, e.g., law enforcement and fire. The second allocation is for fire dispatch services and takes the cost of staffing fire dispatch and allocates that cost to fire agencies based on the percentage of total fire call volume. Note: Marin County Fire, and the agencies dispatched by the WECC only pay the CAD allocation because they staff their own dispatch center separately. A third allocation is computed for mobile maintenance based on the number of mobiles

maintained for an agency as a percentage of the total number of mobiles being maintained by MCSO.

9.3.3 Comparison of Operational Costs

FE did a high-level comparison of the price per call between REDCOM, REDCOM Marin, and MCSO to identify cost differences between the three options. The REDCOM and REDCOM Marin price per call was based on the estimated annual cost divided by 2019 agency call volume. The MCSO data was based on 2019-20 data.

Table 25 provides a cost per call comparison for Marin County fire agencies between REDCOM, REDCOM Marin, and MCSO dispatch services. The MCSO cost per call is not directly comparable to the REDCOM options since MCSO does not include command staff. MCSO cost per call data is not available for MCFD and the other WECC dispatched agencies since MCSO does not provide dispatch services for them.

Table 25 - Comparison of REDCOM, REDCOM Marin, and MCSO Estimated Cost per Call

Estimated Cost per Call for REDCOM, REDCOM Marin and MCSO							
			Allocated Cost		Estimated Cost per Call		
Agency	2019 Annual Calls	Percent of Calls	REDCOM	REDCOM Marin	REDCOM	REDCOM Marin	2019 MCSO
Annual Estimated Cost			$ 2,288,933.00	$ 3,412,702.00			
San Rafael FD	8,728	25.21%	$ 577,026.38	$ 860,321.85	$ 66.11	$ 98.57	$ 63.30
Novato FD	7,137	20.61%	$ 471,842.03	$ 703,496.45	$ 66.11	$ 98.57	$ 60.58
Southern Marin FD	3,502	10.11%	$ 231,524.56	$ 345,193.30	$ 66.11	$ 98.57	$ 62.75
Central Marin FD	3,318	9.58%	$ 219,359.94	$ 327,056.36	$ 66.11	$ 98.57	$ 56.86
Ross Valley FD	2,813	8.12%	$ 185,973.33	$ 277,278.34	$ 66.11	$ 98.57	$ 60.84
MCFD	2,336	6.75%	$ 154,437.86	$ 230,260.29	$ 66.11	$ 98.57	WECC
Mill Valley FD	2,120	6.12%	$ 140,157.64	$ 208,969.10	$ 66.11	$ 98.57	$ 56.65
Tiburon FD	1,302	3.76%	$ 86,077.95	$ 128,338.57	$ 66.11	$ 98.57	$ 59.57
Kentfield FD	1,133	3.27%	$ 74,905.01	$ 111,680.19	$ 66.11	$ 98.57	$ 58.12
Marinwood FD	1,424	4.11%	$ 94,143.63	$ 140,364.15	$ 66.11	$ 98.57	WECC
Stinson Beach FD	235	0.68%	$ 15,536.34	$ 23,164.03	$ 66.11	$ 98.57	WECC
Bolinas FD	246	0.71%	$ 16,263.58	$ 24,248.30	$ 66.11	$ 98.57	WECC
Inverness FD	123	0.36%	$ 8,131.79	$ 12,124.15	$ 66.11	$ 98.57	WECC
Nicasio FD	123	0.36%	$ 8,131.79	$ 12,124.15	$ 66.11	$ 98.57	WECC
Muir Beach FD	69	0.20%	$ 4,561.73	$ 6,801.35	$ 66.11	$ 98.57	WECC
Skywalker FD	13	0.04%	$ 859.46	$ 1,281.41	$ 66.11	$ 98.57	WECC
Total	**34,622**	100%					

10. Findings

Based on the findings of this feasibility study, ***FE***'s assessment is that dispatching Marin County fire agencies from REDCOM faces a major issue that can prevent such a consolidation. Implementing a command and control management model, based on fire officers being added to the dispatch staff in the current REDCOM facility, would not be feasible. The primary reason for this assessment is the inability for the REDCOM facility to accommodate fire department officers working 24-hour shifts and the resulting need for sleeping, cooking and personal hygiene areas. There is no space available to create these areas in the current SCSO building.

Two alternatives are available that would make a consolidation still feasible:

- REDCOM work with SCSO to find a way to support duty fire officer's 24-hour shifts, e.g., get permission to use SCSO shower facilities, or Marin fire agencies work with the REDCOM to find a workable compromise on duty officer sleeping, cooking, and personal hygiene accommodations

- Marin County fire agencies forego strict adherence to the command and control model and allow a hybrid model - training REDCOM supervisory staff on the concepts of command and control to allow them to perform the same functions as a fire officer. Most REDCOM supervisory staff have many years of experience and should be able to function in this role with training and coaching

A second Marin County fire dispatch option is to create a new REDCOM Marin dispatch center at the Marin County building. This option will be more expensive than expanding REDCOM Sonoma due to:

- Design and construction costs to retrofit the facilities in San Rafael

- Additional telecommunicator, management, and support staff that would be required for a stand-alone REDCOM Marin dispatch center

- Annual rent and maintenance for a new facility

This option has several advantages:

- Potential to better serve the residents of Marin County by having telecommunicators who are more familiar with Marin County geography and Marin County fire agency procedures and personnel

- The ability to accommodate command and control staffing would be resolved if appropriate sleeping, cooking, and hygiene facilities are provided in a new center

- Provide each dispatch center with a backup facility (this would require a change of radio consoles at REDCOM Sonoma to handle the MERA radio system). Note: backup center capability assumes that the Sonoma CAD servers are still operational

FE does not recommend one option over the other. REDCOM and the Marin fire agencies will need to evaluate which option will provide the best level of service at the best cost. They will also want to consider the anticipated implementation schedule for each option, e.g., designing, building, staffing, and provisioning a separate fire dispatch center will likely take significantly longer than implementing combined operations at REDCOM Sonoma.

Changes to the JPA will need to be made regardless of the option selected. REDCOM will also need to determine startup costs for the option(s) under consideration and which costs will be apportioned to the Marin County fire agencies solely, and which costs would benefit all JPA members and be apportioned to the existing member agencies. As with all major projects, finding funding for this effort will need to be determined – grants, one-time capital expenditures, general fund, etc.

If the Marin County fire agencies and REDCOM decide to proceed with consolidation of dispatch services at the REDCOM facility in Santa Rosa, ***FE*** is providing the following recommendations in the areas of:

- Governance
- Staffing
- Facilities
- Technology

10.1 Governance

FE recommends that the REDCOM JPA be updated to add the Marin County fire agencies by modifying the REDCOM JPA to include Marin County, the JPA currently only includes Sonoma County agencies. The JPA BOD may also want to consider allowing additional BOD members to include the Marin County fire agencies. If it is the desire of the JPA BOD to keep the size of the BOD at a manageable level, two additional members could be added, representing Marin County fire and EMS agencies. This will require a unanimous vote of all current JPA members, and the submission of the JPA modifications to the California Secretary of State.

If it is the JPA members' desire to create a service contract for the Marin County fire agencies instead, such an agreement will need to be crafted and agreed upon by both the JPA BOD and the Marin County fire agencies. It will be important that a contract for services include the ability for the Marin County fire agencies to have a voice in the REDCOM financial and operational issues.

Discussions will need to be initiated with CAL FIRE to address any issues or concerns related to the Marin County State Responsibility Area (SRA) Contract (Gray Book) and REDCOM providing the dispatch services.

10.2 Staffing

As noted in the staffing section of this report, ***FE*** estimates an additional 11 telecommunicator staff positions will be required to handle the increase in 9-1-1 and event volumes for Marin County in REDCOM. Dispatchers currently employed at the WECC facility should be considered to fill some of these additional positions, as well as, fire-certified telecommunicators currently working at the PSCC, if there is a reduction in staff for that facility.

10.3 Facility

Plans for the expansion of the current REDCOM facility are already in the design stage, with a project kickoff planned for the first quarter of 2021. This expansion will give REDCOM 40 percent of the remaining available space on the SCSO headquarters second floor, with the remainder being reserved by other Sonoma County agencies.

The REDCOM expansion includes four additional dispatch positions and additional office space. This will give REDCOM not only the number of needed positions to add the Marin County fire agencies but will also provide the needed extra positions for high call volume / expanded dispatch needs. This will also reduce the need for support staff to share office space. Costs for this expansion will include construction, ergonomic console furniture, chairs, computer hardware, and workstation license costs.

10.4 Technology

The largest capital expense associated with consolidating the Marin County fire agencies into REDCOM will be for required technology changes:

- CAD – As noted above, plans for the expansion should also include adding four additional CAD workstations and monitors to these positions including additional seat licenses

- Mapping/GIS – the Marin County GIS/map will need to be added to the current Sonoma County GIS/map used with the Sonoma County CAD system. See Section 8.1.7.

- Radio – Because Marin County is on a trunked UHF system that is incompatible with the current ModUcom radio consoles in REDCOM, ***FE*** recommends that all 14 positions be upgraded to radio consoles compatible with both analog and digital radio systems. This will include backend hardware and software that will allow the new radio consoles to access both the Marin and the Sonoma County radio systems

- Telephone – Four additional sets of 9-1-1 Customer Premises Equipment (CPE) will need to be purchased for the new consoles. This may require additional backroom equipment. It is possible that REDCOM can negotiate a full or partial reimbursement from the California 9-1-1 Branch, since they will be able to shut down the three positions at WECC after cutover. All allied agencies will need to reprogram their speed dials

- EMD, EFD – Additional seat licenses for the protocol systems will need to be added. All new staff positions that are not already certified in EMD and EFD will require training to become certified

11. Next Steps - Implementation Outline for Recommendations

This section identifies steps that should be taken if REDCOM and the Marin County fire agencies decide it is in their collective interest to pursue transitioning dispatch services for the Marin County fire agencies from MCSO / WECC to REDCOM.

11.1 Decision to Proceed

Based on the data provided in this report, the Marin County fire agencies will need to decide if it is in their interest to proceed with a transfer of dispatch services. At a high-level, a first step will be to analyze the benefits of the project and then compare these with the associated costs.

If the Marin County fire agencies decide to proceed with a transition of their dispatch services, then they will need to have discussions with the REDCOM BOD, or a designated subcommittee, to identify the support model to be pursed, e.g., REDCOM dispatch or a new Marin County fire dispatch center, the scope of services and allocation of costs. These discussions will need to be iterative and sequential because one decision could impact subsequent decisions.

A project to implement transition of services will require basic project phases. In the following sections ***FE*** has identified the high-level phases and actions that should occur during each phase. The phases are:

- Governance
- Planning
- Implementation
- Cutover

11.2 Governance Phase

The stakeholders and decision makers for REDCOM should address governance first. There are two options to consider:

- Modify the First Amended Joint Powers Agreement Establishing a Coordinated Public Safety Dispatch System for Fire and Emergency Medical Services in Sonoma County

- Negotiate a contract with the Marin County fire agencies for dispatching services

11.2.1 Adding Marin County to the JPA

If the REDCOM BOD decides to add the Marin fire agencies to its JPA it must draft changes to the JPA and obtain a unanimous vote of all current members approving the changes (18)[6]. Modifications that need to be made are:

- Determine the number and composition of the Board of Directors (6.a.i.)
- Add "Marin County" where only "Sonoma County" is currently cited in the document (2, 5a, and 17)
- Determine any changes needed to the voting structure (7.d.)
- Determine the cost to admit the new members (startup costs) (17.b.)

Modifications to the JPA require a unanimous vote of the current members. Once the JPA has been modified, then the BOD is required to hold a public meeting to discuss adding new members (17.a.) and approve the new members by a unanimous vote.

11.2.2 Developing a Contract for Service with the Marin County Fire Agencies

If a contract for service, or Intergovernmental Agreement (IGA), is the agreed upon method for REDCOM to provide dispatch services for the Marin County fire agencies, the following components should be included:

- Contract Agency Rights:
  - Input on JPA decisions
  - Ability to make operational changes that affect the contract agencies
- Financial Obligations:
  - Startup costs
  - Annual cost percentage allocations

[6] References are to sections of the current REDCOM JPA

  - Input on budgetary items

- Termination for Cause:
  - Failure to abide by the contract
  - Failure to make annual or semi-annual payments
  - Cost obligations
- Termination for No Cause:
  - Desire for the agencies to terminate their contract
  - Advance notification
  - Cost obligations
- Dispatch Training Obligations:
  - Annual training sessions
  - Hosted geography tours

Each Marin County fire agency contracting with REDCOM will need to sign the contract / IGA, which will require action by their respective governing bodies.

11.3 Planning Phase

Initial planning activities will include meetings of key stakeholders to determine REDCOM's scope, and engage Sonoma County IT / GIS resources, AMR human resources and REDCOM / Marin County legal representatives in the planning process. Some of the key decisions include:

- Timeline – establishing a timeline and identifying key decision points in order to move to the next action item
- Organization – What form of command and control hierarchy will be used? Decisions will need to be made on how this form of organization will work for REDCOM and what changes will need to be made to policy, procedures, organizational charts, etc.

- Finance – A cost allocation plan will need to be developed as well as determination and allocation of startup costs from the Marin County fire agencies

- Expansion of Facilities – A status report on the REDCOM expansion project will need to be produced to determine the needed funding to move forward. Currently, only design costs have been funded. The expansion must be completed before the Marin County fire agencies can be incorporated into REDCOM

- Personnel - Decisions will need to be made regarding human resource needs such as the timing for recruiting, hiring, and training for required new employees. As the project progresses, management will also need to consider a method to accurately document the number of phone calls that the control dispatchers can help process each hour. For this feasibility study, that number was estimated and that's appropriate at this stage; however, as the project moves forward there will be time before staffing decisions are made to delve into and determine a more accurate number. At the same time, management should continue to review the workload during the slow overnight hours to help determine the number of phone calls the control dispatchers can handle during these slower times. Both have an important influence on the final number of call takers needed. The manpower planning activities should also include quantifying workload and associated cost of providing technical support to the combined center to make certain that support is adequate. While identifying additional IT support needs for the combined center, management should include costs associated with expanding skill sets and staff to accommodate additional workload and / or changes in technology and technical support

- Technical Support – Determining external technical support costs will require identifying an appropriate level of technology support needed for planning, provisioning and transition, specifically for the major critical systems such as radio, telephone, CAD, network, and recording systems. Technical support to configure CAD, 9-1-1, network, and radio consoles will need to be scheduled with the corresponding departments and vendors. A detailed review of the Marin County GIS should also be conducted to determine the extent of services that will be required to prepare the Marin County GIS for inclusion with the Sonoma County GIS

- Vendor Contracts – Contracting vehicles for any required vendor services, e.g., radio, CAD interfaces and implementation services, etc. will need to be put in place to support implementation. This step could have a long lead time to allow

for Request for Proposal (RFP) development, proposal evaluation, selection and negotiations

11.4 Implementation Phase

Once the governance and funding are established, the implementation plan can be expanded with enough detail to allow execution by the key stakeholders, staff and supporting parties including vendors. The plan should include a narrative and schedule describing the transition from the current operation to the post-cutover of consolidated operations. Key plan components include:

- Designated project manager or management team
- Identification of affected stakeholders and member agency liaisons by name, title, roles, and responsibilities
- Identification of:
  - Known risks, tracking and resolution of same
  - Unknown risks and mitigation of same
- Schedules of all plan paths to include:
  - Required vendor contracts
  - Required technology upgrades and transition coordination
  - New employee hiring and training / certification
  - Required GIS updates
  - Provisioning the Sonoma County CAD for Marin operations, e.g. response plans
  - Legacy CAD data import
  - Facility changes
  - Operational acclimation, training, and transition plans
  - Noted milestones and determination decision points to proceed with or abandon a plan or the project with alternate paths defined

11.5 Cutover Phase

A transition / cutover plan will need to be developed for the transition from PSCC and WECC to REDCOM. Cutover planning will need to include the following:

- New / revised policies and procedures in place
- Completion of training for all employees on Marin operations
- CAD, 9-1-1, and radio consoles installed and operational
- Functional testing of Sonoma County CAD to support Marin County fire dispatch
- Coordination with PSCC and WECC on the date and time of the cutover
- Provision of adequate staffing for cutover at all three PSAPs
- Development of a detailed cutover plan with rollback decision points
- Coordination with the CA 9-1-1 Branch on transition of 9-1-1 trunks and speed dials