DEPARTMENT OF EMERGENCY MANAGEMENT:

The 9-1-1 Call Center's Minimum Staffing Levels Exceed the Necessary Number of Staff Required. The Department Should Change Policies and Practices to More Efficiently Meet Workload Demands

January 17, 2014

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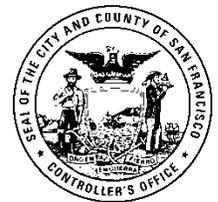
City and County of San Francisco
Office of the Controller – City Services Auditor

Department of Emergency Management
9-1-1 Call Center Staffing and Scheduling Analysis

January 17, 2014

Project Purpose

At the request of the Department of Emergency Management (DEM or the Department), the City Services Auditor performed a staffing and scheduling analysis for the 9-1-1 call center.

Key Questions

The analysis sought to answer the following key questions:

- Is the Department's current staffing level adequate, given existing call volume, leave practices, and training requirements?
- Given the Department's current staffing level, are staff scheduled efficiently and effectively?
- What are the business requirements for an electronic scheduling system?

Project Approach

The analysis included a review of current staffing levels relative to call volume, leave practices, and training requirements. In addition, the project analyzed the efficiency and effectiveness of the Department's scheduling process. The approach included data collection from multiple stakeholders and systems, complex data analysis and modeling, subject matter interviews, document review and a peer survey.

Key Findings

- The Department's minimum call taker staffing levels exceed those levels recommended by CSA's staffing model. At some times during the day, DEM has more call-takers than is necessary to handle workload.
- Wrap time adds considerable time to every call handled, often increasing the total call length by more than 20 percent. DEM's wrap time is longer than its peer agencies.
- Dispatchers are only available to work 58 percent of the total possible hours during the year, once training, leave, breaks and lunches are taken into account.
- On the job breaks and lunches account for 45 percent of total dispatcher absences. With the exception of one other peer jurisdiction San Francisco is the only call center that allows a one hour paid lunch break.
- DEC scheduling processes are manual, time intensive, or reliant on supervisor judgment. As a result, the scheduling process is an inefficient use of supervisor skills, may result in suboptimal schedules, and causes higher staff costs.

Outcomes

In the short-term, this project provides the Department with a data-driven call taker minimum staffing model and process documents that confirm current processes and assist department with acquiring scheduling software. In the long-term, these tools may help the Department improve staffing and scheduling processes and lead to more efficient and effective use of department resources.

Recommendations

The report includes six recommendations for the Department to improve the efficiency and effectiveness of 9-1-1 call center staffing. Specifically, the Department should:

- reduce its current minimum call taker staffing numbers, particularly between the hours of 01:00 and 07:00.

- reduce the 30 second wrap time allowed to more closely align with what other similar jurisdictions mandate.

- more systematically track aggregate leave use, particularly non-accrued leave such as Family and Medical Leave Act (FMLA) Leave.

- consider alternatives to its current hour paid lunch break.

- reevaluate how it allocates staff across hours of the day and consider several policy changes to assist in workload balancing.

- procure scheduling software or develop functionality in PeopleSoft in order to reduce data entry or automate scheduling processes.

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CITY AND COUNTY OF SAN FRANCISCO

OFFICE OF THE CONTROLLER

Ben Rosenfield
Controller

Monique Zmuda
Deputy Controller

January 10, 2014

William T. Lee
Acting Executive Director
Department of Emergency Management
1011 Turk Street
San Francisco, CA 94102

Dear Mr. Lee:

The Controller's Office, City Services Auditor Division, presents its staffing and scheduling analysis for the Department of Emergency Management-Division of Emergency Communications (the Department). Per Executive Director Anne Kronenberg's request we sought to answer three key questions pertaining to the 9-1-1 call center:

- Is the Department's current staffing level adequate, given existing call volume, leave practices, and training requirements?
- Given the Department's current staffing level, are staff scheduled efficiently and effectively?
- What are the business requirements for an electronic scheduling system?

The analysis concluded that the 9-1-1 call center's minimum staffing levels exceed the necessary number of staff needed to handle the Department's workload, based on historical call volumes and processing times. The Department should change scheduling policies and practices to more efficiently meet workload demands. In addition, the report provides detailed documentation of the business requirements for an electronic scheduling system. The electronic scheduling system together with our recommendations will lead to improvements in the efficiency and effectiveness of 9-1-1 call center staffing.

In addition to the attached report, CSA also provided the Department with a dynamic Excel-based staffing model, which may be used by the Department to calculate how policy changes may impact the Department's call taker minimum staffing levels.

We greatly valued the opportunity to work with you and your staff on this project. Every member of your Department showed a high level of professionalism and commitment to providing San Francisco with quality emergency service. We are especially grateful to Lisa Hoffmann, Cecile Soto, Maria Luna and Lynn Feeney who willingly gave their time and knowledge to help us understand the call center's business practices, policies and data.

Respectfully,

Corina Monzón
Project Manager

cc: Mayor's Office

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LIST OF ABBREVIATIONS AND ACRONYMS

ACD   Automated Call Distribution

CAD   Computer Aided Dispatch

CARS   CAD Activity Reporting System

CSA   City Services Auditor

DEC   Division of Emergency Communication

DEM   Department of Emergency Management

MGT   MGT of America

NAED   National Academies of Emergency Dispatch

NAWH   Net Available Work Hours

NENA   The National Emergency Number Association

OT   Overtime

POST   Peace Officer Standards Training

PSAP   Public Safety Answering Point

TESS   Time Entry and Scheduling System

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INTRODUCTION

Background

The San Francisco Department of Emergency Management (DEM or the Department) is charged with providing planning, preparedness, communication, response, and recovery for emergencies in the City. This includes everyday emergencies, larger planned events, and unplanned major disasters. Within DEM, the Division of Emergency Communications (DEC) is the City's Public Safety Answering Point (PSAP), or the call center responsible for answering emergency police, fire, and medical calls. On a daily basis, DEC answers approximately 2,900 9-1-1 emergency and non-emergency calls. Of the Department's workload, about 84 percent of incidents are for Police, 12 percent are for Emergency Medical Systems, and 4 percent are for Fire.[1] The division uses a triage approach where highly trained dispatchers prioritize the importance of the call, collect needed information from the caller, and dispatch the appropriate public safety resources.

Project Scope

DEM faces hiring, staffing and scheduling challenges that cause it to rely heavily on overtime pay and premium pay. At the same time DEM has difficulty managing leave time, hiring and retaining qualified staff.[2] DEM is looking to ensure that the Department is adequately staffed and has a best-in-class work environment given the volume, timing and type of calls received. Overall, DEM would like to ensure that the most efficient protocols are in place to staff and schedule their call center so that they can prioritize and handle calls in an accurate and efficient manner.

Key Questions

The Controller's Office, City Services Auditor (CSA) was tasked with answering the following key questions:

1. *Is the Department of Emergency Management's current staffing level adequate, given existing call volume, leave practices, and training requirements?*

2. *Given the Department's current staffing level, are staff scheduled efficiently and effectively?*

3. *Considering DEM's current use of a paper-based scheduling system and its unique needs in staffing and scheduling the Department, what are DEM's business requirements for an electronic scheduling system?*

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[1] **Department of Emergency Management, Monthly Emergency Communications Report, 01/01/12-12/31/12.**

[2] **Department of Emergency Management, FY11-12 budget submission and FY12-13 budget submission.**

Project Approach

Overview of Staffing Emergency Call Centers

As a first step in our analysis, CSA reviewed the robust literature on staffing for PSAPs. Determining adequate staffing levels for an emergency communications center like DEC is more complex than determining staffing for a typical office. DEC must staff its dispatchers 24 hours a day, 7 days a week, 365 days a year. The National Emergency Number Association (NENA), the professional organization focused on 9-1-1 policy, technology, operations, and education issues, has set staffing guidelines for PSAPs serving 140,000 or fewer residents. It has not set standards for populations over that number. According to NENA, there are two primary methods for calculating communications center staffing – staffing based on set parameters of a jurisdiction and staffing based on known call volume.[3] If both options are available, staffing based on known call volume is preferred because it takes into account all the parameters which drive call volume.

A definitive report on staffing emergency call centers written by Bill Weaver, a public safety consultant and expert in law enforcement operations and emergency communications management, outlines two specific methods for calculating staffing. The first method assumes that the positions filled are fixed post positions – i.e. the positions will be staffed no matter the amount of call activity that the center experiences. A good example of a fixed post position includes a supervisor position. The second method assumes that positions are influenced by the volume of calls received. Good examples of this type of position include call-takers and dispatchers.[4]

CSA's Unique Approach

CSA built on this existing framework for conducting an emergency call center staffing analysis by incorporating a few unique aspects. To complete the staffing analysis, we used a combination of data collection, interviews, and data modeling. CSA first reviewed a previous staffing analysis conducted for the Department by MGT of America, Inc. (MGT) in 2008. The study used the Department's historical call data for calls occurring between January 2007 and August 2007 to determine workload volume. To calculate necessary call taker activity per call, MGT consulted with DEM staff to determine an appropriate call length and used

[3] **PSAP Staffing Guidelines Report as Commissioned by NENA SWAT Operations Team**
[4] **Communications Center Staffing: When is Enough – Enough? Bill Weaver.**

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three different estimates for emergency and non-emergency call lengths for three different staffing models. The study ultimately determined that DEC call taker staffing levels are sufficient to meet workload demand, but challenges related to hiring, retention, and scheduling lead to an inefficient allocation of resources and a strain on division performance.

Unlike the MGT study, for CSA's workload calculation, we used historical data to calculate both the volume of calls as well as estimate the duration of calls. In particular, we analyzed five years (FY 2008 – FY 2012) of historical data on calls received and dispatched by DEM. To calculate staffing availability, CSA also used five years of historical leave data from eMerge PeopleSoft to determine the Net Available Work Hours (NAWH) for a dispatcher, or the number of hours a dispatcher is actually available to answer calls during the year. Previous analysis, including the MGT study, only were able to estimate the amount of time dispatchers are available to work during the year, without using actual data on the Department's historic paid leave, unpaid leave and training.

To inform data collection, CSA conducted interviews with industry experts and a range of staff at the Department. The goal of these interviews was to assess the availability of the Department's staffing and scheduling data. In-depth interviews on DEM's leave policies and use of leave helped inform CSA's calculations of NAWH, while interviews with staff in the training department helped CSA understand the training process for existing dispatchers and also informed the NAWH calculation, which includes training and leave hours. In addition, interviews with watch supervisors and scheduling supervisors helped CSA understand how the Department arrived at its current staffing levels and how those staffing levels impact scheduling. Finally, interviews with subject matter experts in the field of staffing emergency communications centers helped CSA understand general staffing policies and procedures as well as understand how minimum staffing levels are typically calculated.

Once CSA determined what the Department's appropriate call taker minimum staffing levels should be, given historical call volume and duration, and given historical availability of dispatchers, CSA then compared DEM's

current staffing model to its recommended minimum staffing levels to determine the effectiveness of its staffing. Additionally, CSA examined how the Department's current minimum staffing levels lined up with average call volume over the course of one day, as well as over the course of a week, to determine whether the Department's staffing is responsive to fluctuations in call volume. Beyond that, CSA also examined DEM's 11 start times to determine whether staff is scheduled most effectively throughout the day. For a complete discussion of CSA's methodology see Appendix A.

Scheduling Analysis

For the scheduling analysis component of our analysis, CSA conducted interviews with key DEM staff members, documented the Department's policies and procedures for scheduling, conducted a survey of similar jurisdictions to assess typical scheduling protocols for other PSAPs, reviewed existing documents on call center scheduling to determine industry best practices, and used the staffing model to analyze whether DEM staff are scheduled efficiently and effectively using the Department's existing model.

Peer Survey

To place CSA's analysis of DEM's staffing and scheduling practices in context, CSA conducted a survey of peer agencies. The Deputy Director of the Division of Emergency Communications distributed this survey to other PSAP directors, and a total of 140 individuals replied. In consultation with DEC, CSA selected six agencies from this group that, together with SFDEM, comprise the peer group described in this report (Exhibit 1). These agencies are comparable to San Francisco in terms of 9-1-1 personnel, estimated yearly call volume, types of calls handled, and population served. For the complete peer survey results, see Appendix E)

EXHIBIT 1	DEM-Division of Emergency Communications: Peer Agencies			
Jurisdiction	9-1-1 Personnel	Estimated Yearly Call Volume	Fire/Med. Calls?	Population Served
Fairfax County, VA	204	900,000*	Yes	1,100,000
Houston, TX	200	3,000,000	Yes	2,000,000
Louisville, KY	120	650,000*	Yes	750,000
Montgomery County, MD	168	1,200,000	Yes	1,000,000
Phoenix, AZ	250	2,000,000	Yes	1,500,000
San Francisco, CA	187	1,200,000	Yes	800,000
Washington, D.C.	185	2,600,000	Yes	630,000

Source: Controller's Office Peer Survey

CHAPTER 1 – Background on Staffing and Scheduling the 9-1-1 Call Center

Organizational Structure

DEC is divided into three primary functions – training, operations, and administration. Because this analysis focused on PSAP operations, CSA looked at several key classifications involved in the call center operations and supervision. Specifically, this analysis looks at Dispatchers (Classification 8238), Scheduling and Watch Supervisors (Classification 8239), and Watch Coordinators (Classification 8240). The Department currently employs 148 Dispatchers 24 Scheduling and Watch Supervisors, and eight Coordinators.[5] For a full organizational chart, see Appendix D.

A dispatcher is responsible for receiving and processing 9-1-1 calls for police, fire, and medical, including both emergency and non-emergency services. While dispatcher is the general job classification title for both call-taking and dispatching positions, we will use the terms "call-taker" and "dispatcher" to differentiate between call answering duties and radio dispatch duties. At DEM, dispatchers are trained in both call-taking and dispatching and they rotate through both functions during the course of the same shift. Additionally, because San Francisco has combined police and fire/medical emergency communications, dispatchers are also cross-trained on dispatching both police and fire radio channels. Of the agency's peers, only Washington, D.C.'s PSAP also trains its staff in multiple disciplines.[6]

Call-takers receive calls from the Symposium system and are charged with evaluating, documenting, prioritizing, and directing calls to the appropriate resource, whether a police or fire channel or another City resource such as 311. On the dispatch side, dispatchers are charged with dispatching the appropriate emergency personal (police, fire, and medical) and maintaining two-way communication with those personal, evaluating on an ongoing basis the need for additional field units and equipment.

Scheduling supervisors are in charge of overseeing the

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[5] **These numbers represent filled positions, excluding those on long-term leave.**

[6] **See Appendix E, Page A-22.**

development and execution of all scheduling related to DEC's operations. This includes developing and positing biannual schedule sign-ups for shift bidding, posting the daily deployment schedules, approving shift trades, scheduling and managing overtime including mandatory overtime, managing vacation and floating holiday sign-ups, and managing and approving ad hoc time off requests. Scheduling supervisors also generally assist with other scheduling changes as they arise up until about one week before the start of the schedule when responsibility transfers to the watch supervisors. For more on the scheduling process, see Chapter 2: Scheduling.

Watch supervisors manage changes to the schedules and supervise all activity on the call center floor, including oversight of dispatchers. Additionally, watch supervisors help evaluate the effectiveness of dispatchers and are responsible for training new personnel or personnel requiring refresher trainings. Finally, watch supervisors may fill in for dispatchers on an as-needed basis when either staffing numbers fall short or when there is an unplanned emergency event that requires additional assistance.

Watch coordinators oversee the emergency communications center during their assigned shift. Additionally, watch coordinators supervise the operations supervisors who in turn oversee all dispatchers. They are responsible for directing and evaluating the work of all operations supervisors and dispatchers.

Staffing and Scheduling Practices

To ensure adequate staffing at every time of the day, DEM has set "minimum staffing levels", or target staffing levels for the call taker assignment. These levels need to be achieved at every hour of the day to prevent a lapse in the Department's performance goals. These minimum staffing levels are used by the scheduling supervisors to determine scheduling needs. After reviewing documentation from the Department, CSA determined that the minimum staffing levels were not necessarily derived from a specific staffing model; rather the levels were honed by the Department over time given the DEM's historical workload (see Exhibit 2 for the Department's current minimum staffing levels). A key piece of this report examines these existing minimum staffing levels relative to CSA's analysis of workload and leave to determine whether the Department's minimum staffing levels are appropriate.

EXHIBIT 2	DEM-Division of Emergency Communications: Call Taking Minimum Staffing by Watch and Day of Week						
Interval (Watch)	MON	TUES	WED	THUR	FRI	SAT	SUN
2300-0300 (Mids)	8	8	8	8	8	11	11
0300-0700 (Mids)	6	6	6	6	6	6	6
0700-1500 (Day)	10	10	10	10	10	9	9
1500-2300 (Swing)	11	11	11	11	11	11	10

Source: Department of Emergency Management

In addition to the minimum staffing levels that DEM aims for on an hourly basis, the Department also needs to consider its shift and watch structure when scheduling dispatchers. The Department has three watches during a 24 hour period: the Day Watch (07:00-15:00), the Swing Watch (15:00-23:00), and the Midnight Watch (23:00-07:00). DEM, like many of its peer agencies, offers dispatchers an eight hour shift length, and also offers a ten hour shift length. As a result, within each watch there may be multiple start times for dispatchers – not all dispatchers start their shift right at the beginning of a watch. These staggered shift times are the result of needing to provide sufficient lunch and other breaks for dispatchers at staggered intervals during a shift.

The staggered shift times give DEM the flexibility to avoid scheduling break times and lunch at the same time during a shift. While the MOU with the union does not mandate two 15 minute breaks during an 8 hour shift as well as one paid hour lunch during an 8 hour shift, the MOU does specify that in order to change historical break practices, the union and the City would need to meet and confer. Because of these additional considerations of varying shift lengths and the need to provide breaks, in total, the Department has 11 different start times during a 24 hour period (see Exhibit 3).

EXHIBIT 3	DEM-Division of Emergency Communications: Shift Start Times by Watch	
Day Watch	**Swing Watch**	**Midnight Watch**
03:00-13:00	11:00-21:00	19:00-05:00
07:00-15:00	13:00-23:00	21:00-07:00
07:00-17:00	15:00-23:00	23:00-07:00
09:00-19:00	17:00-03:00	

Source: Department of Emergency Management 2012 Fall-Winter Sign-Up Explanatory Posting

CHAPTER 2 – Assessing Minimum Staffing Levels

Key Inputs and Context for Staffing Model

CSA was first tasked with assessing whether or not the Department's minimum staffing levels – the target number of call-takers that DEM aims to schedule at every hour – are sufficient to meet the Department's workload, based on historical call volume and call processing times.

In order to create a model for DEM's call taker staffing, CSA considered two primary components – how many hours during a year dispatchers are typically available to work (the New Available Work Hours, or NAWH, of a dispatcher) and the amount of workload those dispatchers need to be able to process (the Workload). This analysis considers only staffing of dispatchers and specifically focuses solely on the call-taking component of dispatchers. This was primarily due to the difficulty of estimating workload for radio dispatching (see call interval methodology in Appendix A). Radio dispatcher levels depend on the number of channels that DEM has open at any given time, which is driven primarily by coverage needed for each geographic region of the City. Because radio dispatcher levels do not depend on call volume, but rather on the number of active radio channels, it would be difficult for CSA to estimate the workload associated with these channels and therefore difficult to estimate the number of radio dispatchers required to staff those channels. CSA's staffing model also does not incorporate DEC's historical overtime use, though CSA did analyze dispatcher overtime use (see Appendix B).

To calculate NAWH, CSA considered several components affecting dispatcher availability:
- Training requirements
- Historical leave use
- On-the-job breaks and lunches.

Training: Accounts for an average of 25 hours annually, or 3 percent of total dispatcher absence.

To account for time dispatchers spend in training, CSA catalogued all of the ongoing trainings required, not including training required for new hires. It was outside the scope of this analysis to consider whether additional training, above meeting the Department's training requirements, should be considered to improve dispatcher performance. However, the model that CSA provided to the Department would allow DEM to increase its hours of

training and see the resulting effect on its recommended minimum staffing levels.

Exhibit 4 below lists the trainings required by the department along with the agency that mandates the training, how many hours the training requires, how often the training needs to be renewed, and what the equivalent annual hours of training is. Most trainings are required by the National Academies of Emergency Dispatch (NAED), though the Department of Justice and the California Commission on Peace Officer Standards and Training (POST) also require several trainings. On average, a dispatcher will complete about 25 hours of training annually. This accounts for part of the time that dispatchers are unavailable to work and contributes to the NAWH calculation for the model.

| EXHIBIT 4	DEM-Division of Emergency Communications: Training Requirements *DEC Dispatchers are Required to Complete 25 Hours of Training per Year*			
Training	Mandate	Minimum Hours	Renewal Period (Months)	Yearly Estimate Minimum Hours
CPR re-certification	NAED	2	24	1
NAED Continuing Dispatch Education	NAED	36	24	18
NAED Re-certification (fire)	NAED	2	24	1
NAED Re-certification (medical)	NAED	2	24	1
California Law Enforcement Telecommunications System Re-certification	Department of Justice	1	24	0.5
POST CPT*	POST/SFPD	24	24	4
TOTAL				**25.5**

Source: Training Division, Department of Emergency Management.
*Note that while 24 or more hours are required in a 24 month period, 16 of these hours are also satisfied by NAED CDE requirements. Thus, the Yearly Estimate of Minimum Hours for POST CPT is only 4 hours.

Historical Leave Use: Accounts for an average of 457 hours annually, or 52 percent of total dispatcher absence.

A second input to the NAWH calculation is dispatcher leave use. To estimate how much paid and unpaid leave an average dispatcher uses during a typical year, CSA analyzed five years of historical data from the City's eMerge PeopleSoft system from FY 2008 through FY 2012. CSA analysis shows that there has been a 1 percent increase in leave since 2008 (Exhibit 5).

EXHIBIT 5	**DEC Total Paid and Unpaid Leave FY2008 - FY2012 among dispatchers (8237/8238):** *Total leave use has increased by 1 percent, Unpaid Leave Hours' share of Total Leave Hours declined*
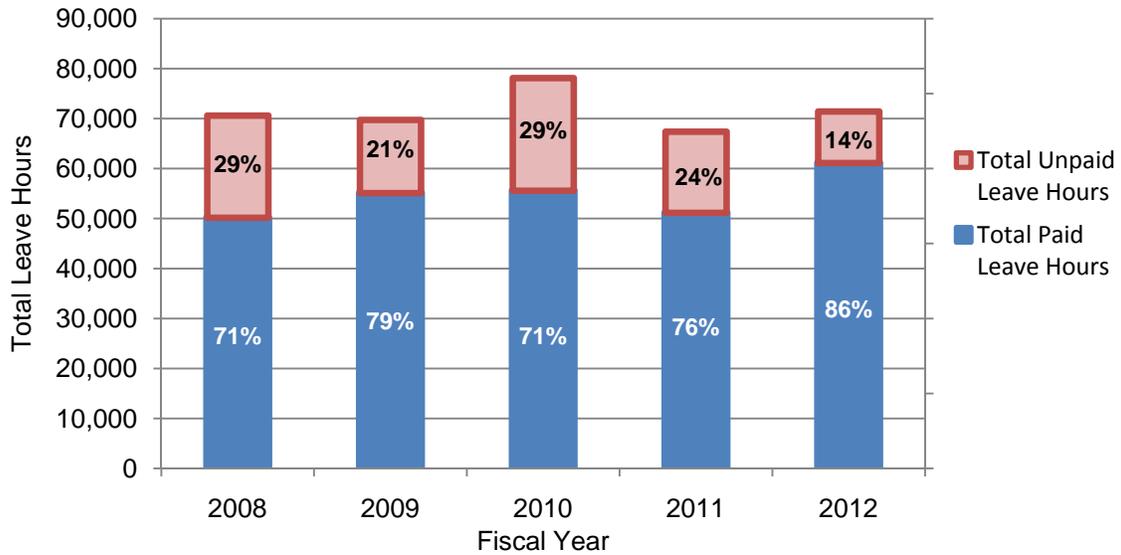
Source: eMerge PeopleSoft.

Over this five year period, paid leave increased by 20 percent, while unpaid leave decreased by 50 percent. Decreases in unpaid leave were most significant for unpaid sick leave and other unpaid leave, including educational leave without pay. The largest contributors of the increase in paid leave are sick pay and vacation. Based on interviews with DEM staff, Family and Medical Leave Act (FMLA) leave is likely a significant factor contributing to the use of these paid leave types. While FMLA leave is unpaid, generally speaking City employees are required to exhaust paid leave balances—sick leave balances first, followed by vacation balances and then floating holiday balances—before continuing on FMLA leave while unpaid. Currently, no consistent source of data currently exists to track FMLA leave in DEM and across the City. However, with the beginning of eMerge Phase II, departments will have new functionality in eMerge PeopleSoft to track FMLA leave.

Exhibit 6 below shows historical annual leave for dispatchers over these five years, as well as the five year average. For a full description of the leave codes included in this analysis, see Appendix A.

Exhibit 6	**Average Paid and Unpaid Leave Hours for Dispatchers (8237/8238), FY 2007-08 – FY 2011-12**

Year	2008	2009	2010	2011	2012	Average
Hours	413	429	509	454	477	457

For leave codes included see Exhibit 19 in Appendix A.

Source: eMerge PeopleSoft

On-the-job Breaks and Lunches: Accounts for an average of 392 hours annually, or 45 percent of total dispatcher absence.

The last input to NAWH, in addition to required training and paid and unpaid leave averages, is the guaranteed breaks during a shift. Specifically, for every eight hour shift worked, dispatchers are provided two 15 minute breaks and one hour paid lunch. Dispatchers who work a ten hour shift are guaranteed an additional 15 minute break. For the purposes of this analysis, CSA simplified the model to assume only eight hour shifts. Assuming only eight hour shifts means that this analysis overestimates the total amount of time dispatchers are available to work, which results in an overestimate of NAWH, and subsequent underestimate of staffing levels in the model.

Net Available Work Hours (NAWH): Dispatchers are available to work an average of 58 percent of the total possible time during a year.

Once CSA calculated how much time dispatchers are typically unavailable during the year (time off for training, leave and breaks) we next calculated how much time dispatchers would be available if they worked the maximum possible for one FTE. To do so, CSA assumed a full time work week of 40 hours (5 days of 8 hour shifts) and multiplied that by 52.14 weeks, or the maximum number of weeks in a year, on average, including leap years. This resulted in a maximum possible work year of about 2086 hours. When the unavailable hours calculation was subtracted from the maximum number of hours possible, CSA calculated the NAWH of one dispatcher at about 1212 hours per year. These hours represent 58 percent of the total time that dispatchers could be available to work in a given year. For the full NAWH calculation including training, leave, and breaks see Exhibit 7 below.

EXHIBIT 7	DEM-Division of Emergency Communications: Net Available Work Hours

	Average Annual Hours
Average Paid and Unpaid Leave	457
Average Training	25.5
Average Break Time[1]	130.5
Average Lunch Time[2]	261
Total Annual Unavailable Hours	**873.5**
Total Annual Hours per FTE	**2085.6**
Annual Net Available Work Hours	**1212.1**

[1]Assuming 2 15 minute breaks per 8 hour shift, with 260 8 hour shifts per year

[2]Assuming 1 60 minute lunch per 8 hour shift, with 260 8 hour shifts per year

All break and lunch calculations based on an 8 hour shift

Source: eMerge PeopleSoft

Workload

Once we analyzed how much time dispatchers are available to work during the year, CSA next considered the amount of workload that those dispatchers would be required to process. Workload is measured by the number of calls received and the amount of time to process those calls. To calculate workload, we obtained five years worth of call data from DEM's CARS for FY 2008 through FY 2012. The CARS data included information about every incident received by the Department during those five years. To get a more granular picture of the Department's workload, CSA looked at incident volume by time of day and by day of week (Exhibit 8). The average number of calls received are highest at 15:00 hours Monday through Wednesday; calls are at their lowest at 05:00 hoursTuesday through Friday. To see average number of calls received by priority type see Exhibit 17 in Appendix A.

EXHIBIT 8	DEM-Division of Emergency Communications: Average Number Calls by Time of Day and Day of Week, FY 2008-2012

Hour	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0	114.8	73.1	70.4	71.1	67.7	69.7	99.2
1	105.5	53.4	53.6	53.4	51.0	57.8	87.2
2	89.8	46.1	40.1	41.3	41.9	46.6	80.0
3	56.7	33.7	32.3	35.2	32.7	35.5	51.2
4	40.2	33.1	31.1	31.2	29.9	31.5	38.4
5	32.2	32.0	30.5	30.6	30.0	29.1	33.3
6	41.5	53.3	51.3	50.9	51.7	46.8	43.4
7	54.1	76.8	80.4	80.5	78.3	71.1	58.5
8	67.4	96.4	102.3	99.8	95.9	87.4	72.9
9	80.0	105.7	112.5	113.0	107.3	97.7	89.4
10	88.7	107.2	112.5	114.2	107.1	103.0	94.0
11	98.5	115.5	116.4	120.8	111.9	104.9	102.1
12	105.2	121.5	124.2	125.2	116.2	111.6	108.8
13	107.2	124.8	127.8	126.3	117.8	117.2	110.6
14	107.1	127.4	126.1	128.2	118.0	114.1	111.1
15	113.7	132.2	130.0	133.6	124.7	121.8	117.2
16	114.9	129.0	127.9	128.9	120.5	118.9	115.3
17	117.2	129.3	131.7	129.7	119.2	123.3	121.7
18	110.7	118.8	121.0	118.2	115.8	114.0	116.1
19	106.6	109.8	110.4	112.8	106.1	107.2	111.2
20	97.8	96.1	97.5	97.7	96.1	99.1	102.6
21	102.3	104.2	100.1	100.3	100.2	106.1	115.0
22	103.5	104.3	103.4	103.6	103.4	115.1	123.9
23	90.7	90.8	91.6	92.6	89.7	111.7	125.0

Source: DEM CARS

In addition to information about the number of incidents, whether the incident was a police or fire call, and the priority of the incident, the CARS data also included time stamp information for important handling points of each call (for example, when the call was received, when the call was dispatched, when emergency personnel arrived on scene etc.) CSA used the call time stamps to calculate the total processing time for each call. For more information about the average call processing time by priority type see Exhibit 18 in Appendix A.

Additionally, to account for the actual total processing time of a call, CSA included the Department's "wrap time" or time allowed for call takers to finish entering information once they have disconnected the call. At DEM, this wrap time is 30 seconds. Compared to other jurisdictions, this is a relatively high wrap time. Most similar jurisdictions have

wrap times under 15 seconds, with many having no wrap time at all (See Exhibit 9). This wrap time is automatically allowed for by the automatic call distribution feature of DEM's phone system, and if necessary, dispatchers may "opt-in" to their next call before a call's wrap time ends. If however, dispatchers need additional time to complete call wrap up, they have the ability to make themselves unavailable for the next call, even after the 30 seconds of wrap time, by "opting out" of the system. There are no limitations on how many times a call taker may opt out of receiving the next call and, for that reason, our analysis may underestimate the total workload associated with a call by underestimating the downtime between calls.

EXHIBIT 9	Comparison of Peer Jurisdiction Wrap Times			
Jurisdiction	**9-1-1 Personnel**	**Estimated Yearly Call Volume**	**Population Served**	**Wrap time**
Fairfax County, VA	204	900,000*	1,100,000	No Wrap Time
Houston, TX	200	3,000,000	2,000,000	No Wrap Time
Louisville, KY	120	650,000*	750,000	3 seconds
Montgomery County, MD	168	1,200,000	1,000,000	No Wrap Time
Phoenix, AZ	250	2,000,000	1,500,000	No Wrap Time
San Francisco, CA	187	1,200,000	800,000	30 seconds
Washington, D.C.	185	2,600,000	630,000	12 seconds

*Emergency Calls Only

Source: CSA Survey of Peer Jurisdictions

In order to calculate the total workload, we multiplied the number of calls by the approximate amount of time that a dispatcher spent to process each call. For the full methodology on how the appropriate call interval was chosen and how different priority calls were weighted see Appendix A. This workload calculation was completed for every hour of the day to account for fluctuations in call volume and types of calls throughout the day. See Appendix A for the workload calculation for both fire calls and police calls.

Basic Staffing Level Calculation

To calculate the number of staff DEM requires, on average, at every hour of the day, CSA divided the workload calculation (described above), by the number of minutes a dispatcher would be expected to work during an hour (60 minutes). This calculation resulted in the number of positions the Department should be expected to fill at every

hour. We then multiplied the positions by a relief factor of 1.7 – a measurement calculated by dividing the maximum number of hours that a dispatcher would be able to work during the year by the number of hours a dispatcher is actually available to work during the year (2085 hours/1212 hours = 1.7). This relief factor accounts for the fact that during any given hour, a dispatcher is not at her post for the full 60 minutes due to training, leave, and breaks (described in the NAWH calculation above). A detailed description of the methodology used to calculate the staffing model can be found in Appendix A.

While CSA estimated the Department's call taker staffing needs using the most data available, there are several caveats to the staffing calculation because of data limitations. CARS includes information on every incident recorded, but not every individual call. Because some incidents may be associated with multiple calls, the CAD data underestimates the actual workload of the department. However our analysis accounts for this by including a call multiplier (see Appendix A for a complete description of the methodology we used to correct for the discrepancy between incidents and calls). Despite this adjustment, the workload calculation likely still underestimates the total volume of work because it cannot capture the time that dispatchers spend processing duplicate calls for the same incident.

Furthermore, because CARS only contains time stamps for specific intervals (call received, call entry, call dispatch etc.) CSA was only able to approximate the total amount of time that a call-taker spends on each type of call. Using the interval from the time a call is received to the time a call is dispatched may overestimate the amount of time that a call-taker spent working on a call, while using the interval from the time a call is received to the time a call is entered may underestimate the amount of time that a call-taker spent working on a call.

In addition to the calls for service that the Department receives, it also receives requests from officers in the field. These calls are designated as "On View" calls in the CARS data. Because these requests from officers come across radio channels, they do not generally have different "call received" and "call dispatched" time stamps. For this reason, these On View calls are not associated with

workload and have been dropped from our analysis. In reality, however, these calls represent workload for dispatchers that we cannot capture. Our estimate of workload is therefore an underestimate of actual workload.

Findings and Recommendations

Exhibit 10 below shows the full staffing model, including the calculation of workload, positions, and staffing numbers for every hour of the day. More detailed tables for each of the inputs (NAWH, Call Volume, Call Intervals) can be found in Appendix A. The CSA minimum staffing model recommends staffing levels in the range of 2.3 to 8.2 dispatchers per hour, depending on the time of day. The Department's current minimum staffing levels range from 6.0 to 10.9 dispatchers per hour, which means DEM could be overstaffed by as little as 2.2 people and as much as 5.3 people per hour (see Exhibit 11). In practice, DEM may not be overstaffed, and, in fact, could be understaffed if unexpected leave prevents scheduling staff from meeting the minimum staffing levels.

EXHIBIT 10	CSA Call-Taker Staffing Model Results *DEM Staffing Requirements Fluctuate During the Day, Reaching a Peak at 17:00 Hours*				
Hour	Average Number of Calls	Average Processing Time +Wrap Time	Workload (Minutes)	Positions Needed	Staffing Requirement
0	70.79	2:49	180.75	3.01	5.2
1	64.17	2:54	166.40	2.77	4.8
2	60.16	2:55	156.74	2.61	4.5
3	41.55	3:02	111.70	1.86	3.2
4	31.37	3:13	87.29	1.45	2.5
5	29.03	3:11	79.30	1.32	2.3
6	40.55	2:53	99.75	1.66	2.9
7	64.05	2:48	152.27	2.54	4.4
8	84.09	2:48	197.79	3.30	5.7
9	95.40	2:47	224.03	3.73	6.4
10	98.43	2:48	232.79	3.88	6.7
11	102.95	2:45	241.82	4.03	6.9
12	104.85	2:41	244.98	4.08	7.0
13	109.40	2:40	255.93	4.27	7.3
14	110.54	2:44	263.08	4.38	7.5
15	118.63	2:42	282.11	4.70	8.1
16	115.79	2:40	272.18	4.54	7.8
17	120.91	2:42	287.21	4.79	8.2
18	119.30	2:41	281.27	4.69	8.1
19	113.58	2:40	268.42	4.47	7.7
20	106.16	2:40	251.68	4.19	7.2
21	99.93	2:40	240.84	4.01	6.9
22	96.68	2:39	232.22	3.87	6.7
23	85.47	2:44	212.38	3.54	6.1

Source: DEM CARS, eMerge PeopleSoft

Finding 1: DEM's minimum staffing levels exceed the numbers recommended by the CSA model.

When comparing the CSA staffing model results to the Department's current minimum staffing levels, we find that DEM's target is more than adequate to staff the call taker assignments (see Exhibit 11). At many times during the day, DEM is inefficiently staffed, with more call-takers than is necessary to handle the workload. CSA's findings are in line with the previous staffing analysis done for the Department by MGT. While CSA's model recommends between 2.3 and 9.0 dispatchers per hour, the MGT analysis recommended between 2.7 and 9.7 dispatchers per hour.

Recommendation 1

DEM should consider reducing its current minimum staffing levels, particularly on weekdays between the hours of 01:00 and 07:00.

EXHIBIT 11	**CSA Staffing Model Compared to DEC Minimum Staffing Levels*:** *DEC Minimum Staffing Level ranges from a weekly average of 6.0 to 10.9 Dispatchers/Hour, while the CSA Staffing Model ranges from 2.3 to 9.0 Dispatchers/Hour*
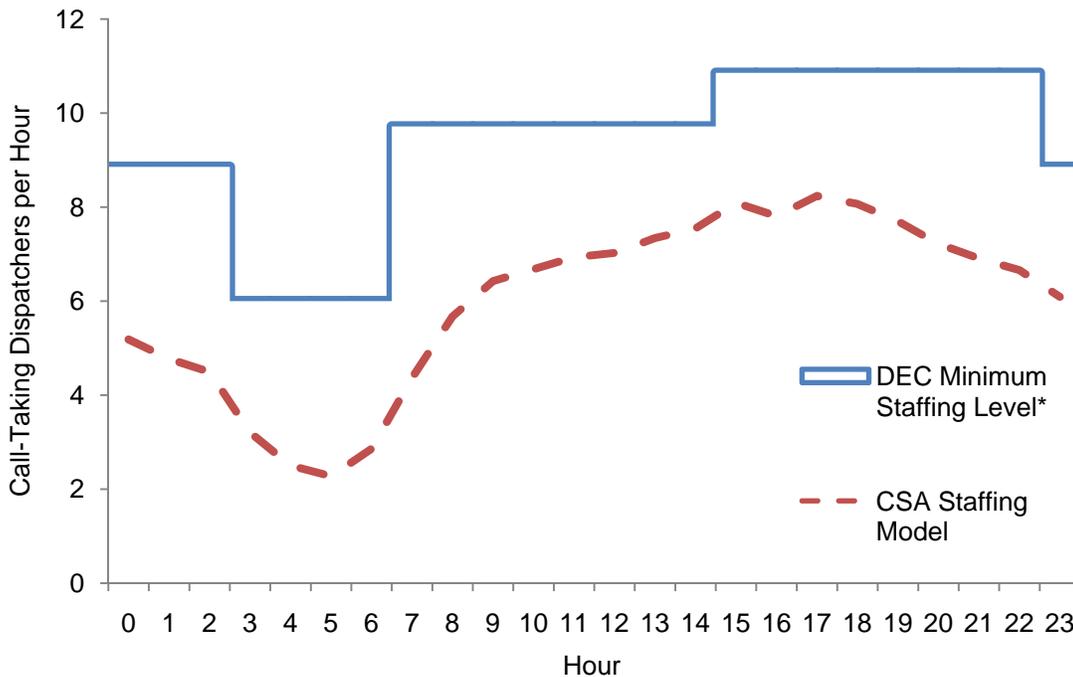
*Presented as the average minimum staffing level by hour for each day of the week.

Source: DEM CARS, DEM PeopleSoft.

Finding 2: Wrap time adds on average 20 percent to call duration.

Wrap time adds considerable time to every call handled, often increasing the total call length by more than 20 percent. In fact, the 30 second wrap time allowed per call may actually be much longer than 30 seconds in practice, if

call-takers opt out of receiving the next call.

Recommendation 2

DEM should more closely evaluate how wrap time is used by dispatchers. The Department should consider reducing the 30 second wrap time allowed to more closely align with what other similar jurisdictions mandate. If the DEM reduced its wrap time by half, to 15 seconds, this would reduce workload by up to 10 percent. A reduction in workload would allow dispatchers to process calls more quickly and receive a greater total number of calls per hour.

Finding 3: Dispatchers are available to work 58 percent of the time.

DEM staff is only available to work 58 percent of the total possible hours during the year, once training, leave, and breaks are taken into account (1212 available hours out of a maximum of 2086 hours. See Net Available Work Hours calculation above). Leave accounts for 52 percent of the unavailable hours of a dispatcher, while mandated lunch and other breaks account for 42 percent of unavailable hours. Looking at DEM as a whole, these leave figures are not out of line with other San Francisco public safety departments.[7]

Already, DEM evaluates the FMLA leave use of individual employees and conducts ad-hoc reviews of total leave usage. The Department's ability to reduce leave use is also constrained by City leave policies and provisions in MOUs.

Recommendation 3A

DEM should systematically track and manage the aggregate leave use of dispatchers on an ongoing basis. In particular, the Department should take advantage of growing functionality in eMerge PeopleSoft to track and report FMLA through assignment codes.

Recommendation 3B

DEM should consider alternatives to its current hour paid lunch break. San Francisco is one of only two PSAPs which allows for an hour paid lunch break (see Exhibit 12). Granting every dispatcher an hour for lunch during every eight hour shift created numerous scheduling difficulties. DEM has to stagger start times in order to make sure that not all staff requires lunch during the same hour. This has led to 11 different start times (the most of any peer jurisdiction), which adds to the complexity of the Department's scheduling process and increases the administrative duties of the Department's scheduling supervisors. If the Department reduced its hour paid lunch to a half an hour paid lunch, it would increase dispatcher availability by 11 percent, or 130 hours per year.

[7] **Calculated using eMerge data for FY 13.**

EXHIBIT 12	**Comparison of Staffing and Scheduling Practices Among SFDEM's Peer Agencies:** *DEC has longer paid lunches and more start times than its peer agencies.*

Jurisdiction	Shift Lengths					# of Start Times	Paid Lunch?
	8h	10h	12h	24h	Other		
Fairfax County, VA			✓			2	60 mins
Houston, TX	✓					5	No Paid Lunch
Louisville, KY	✓					3	30 mins
Montgomery County, MD	✓		✓	✓		8	30 mins
Phoenix, AZ	✓	✓				5	30 mins
San Francisco, CA	✓	✓				11	60 mins
Washington, D.C.					✓[1]	2 to 3	No Paid Lunch

[1] Washington, D.C., which replied "Other", uses 12.5 hour shifts with one 8.5 hour swing day for its 911 personnel.

CHAPTER 3 – Evaluating Minimum Staffing Efficiency and Effectiveness

Basic Staffing Efficiency Calculation

Once we completed a comparison of CSA's staffing model to the Department's current minimum staffing levels, we next evaluated how efficient DEM's current minimum staffing levels are. To do so, we analyzed, at every hour of the day, how much workload each call taker is expected to process. If staff is efficiently allocated throughout the day, we would expect at any given hour to find that dispatchers are asked to process roughly the same number of calls. Exhibit 13 below shows the workload in calls per call taker at every hour of the day for both the Department's current minimum staffing levels as well as the staffing levels recommended by CSA's model.

EXHIBIT 13 **Average Call Volume and Average Calls per Call-Taker Using DEM and CSA Staffing Levels, by Hour**
Staff is Inefficiently Scheduled, with Calls per Call-Taker Fluctuating Significantly During the Day
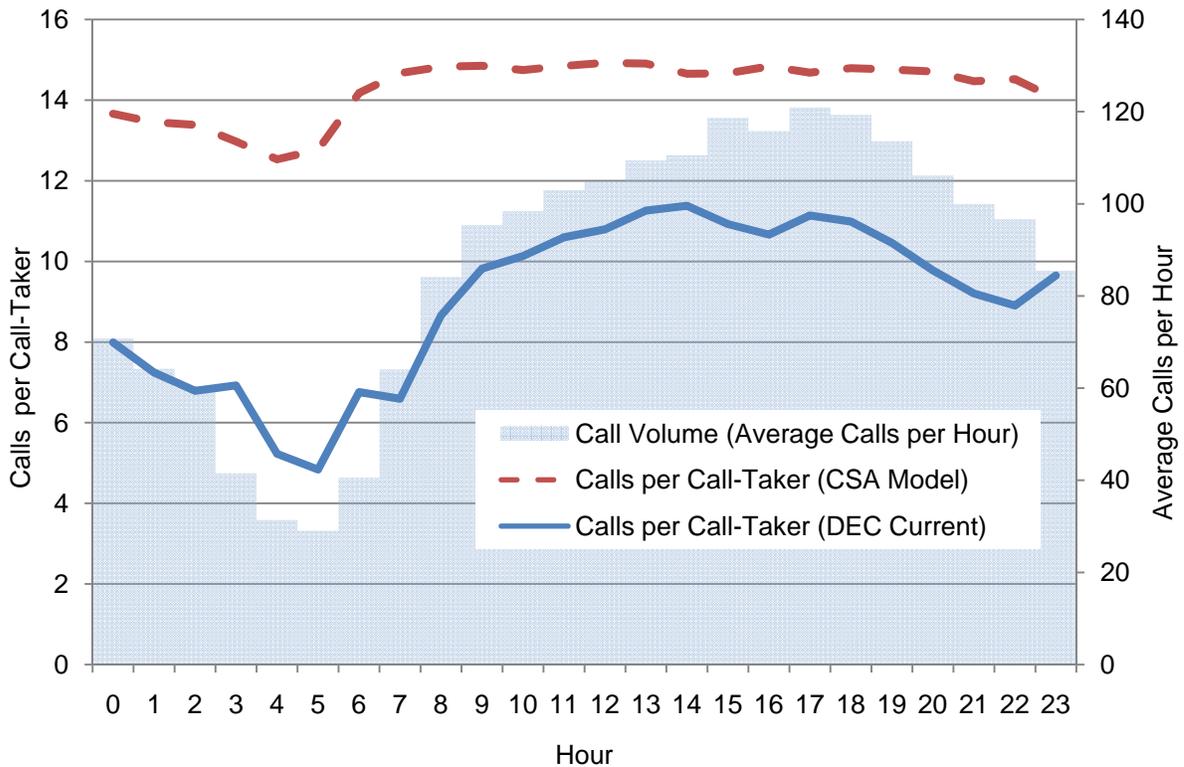
Source: CSA analysis of workload and CSA minimum staffing model.

As a secondary method for calculating the efficiency of DEM's current minimum staffing numbers, CSA sampled a week's worth of actual schedules from the Department in order to see whether the Department achieved its minimum staffing goals. While this approach is limited by the small sample size, it gives the best possible estimate for how DEM performs relative to its target staffing levels without considerably more time intensive data entry (all of DEM's final schedules are paper-based and need to be entered individually).

EXHIBIT 14	Sample DEC Call Center Dispatcher[1] Assignment by Hour
	Department may be understaffed at certain hours when accounting for dispatchers out on lunch.
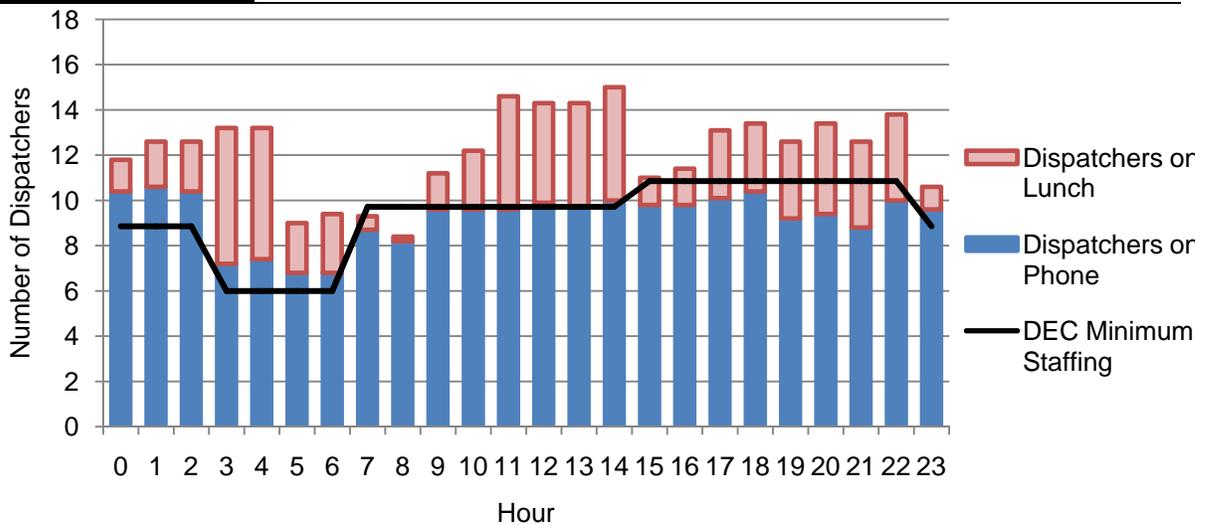
[1]Includes call takers only

Source: DEM Daily Schedules, 5/6/13-5/11/13

Finding 4: Workload is distributed unequally across hours.

Because the Department's minimum staffing levels are not attuned to call volume and call length, there are large fluctuations in the amount of workload that dispatchers are asked to handle. For example, a dispatcher working during the 05:00 hour has many fewer calls to process than a dispatcher working the 14:00 hour. Conversely, the staffing numbers recommended by our model assume an even distribution of workload at every hour of the day.

The unequal distribution in workload by call taker is also affected by the number of dispatchers out on lunch. As Exhibit 14 shows, during busy times of the day—for example, 15:00 through 22:00—the Department is below its minimum staffing numbers when accounting for the number of dispatchers out on lunch. Conversely, at times

of low call volume during the day—for example, between 00:00 and 06:00—the Department is actually overstaffed.

Though the Department's operational scheduling process accounts for staff shortages due to lunches—for instance, more lunches are provided during the 03:00 to 04:00 when call volume is lower, as well as at 19:00 and later, when call volume begins to decline— these adjustments do not significantly alter the unequal distribution of workload.

Certainly, the most efficient possible schedule may not be attainable due to employee availability (e.g., intermittent leave, lunches and channel assignments), preferences (e.g., 8 and 10 hour shifts are preferred by dispatchers) and DEC policies and procedures (e.g., no more than 8 hours of overtime in a week). However, given the large disparity in workload among schedulers, a more efficient schedule structure should be feasible.

Recommendation 4

DEM should reevaluate how it allocates staff during the day through a strategic scheduling analysis to determine the number and allocation of shift and shift lengths across its three watches.

The Department should also consider additional policy changes that will assist in workload balancing, such as:

- Reducing the length of the lunch to half an hour. Although the agency's scheduling supervisors already overlap shifts and assign lunch breaks during less busy hours, through this change DEC could further reduce workload imbalances by increasing the availability of call takers at peak hours. Already, DEC's peer agencies either do not offer a paid lunch, or offer only a half-hour paid lunch.[8]

- Altering shift start times. Given the disparity in workload, DEC should consider changing shift start times so that additional call takers are present during peak call volume in Day Watch. While DEC's 11 start times (more than double the average of its peer agencies[9]) would ideally

[8] **See Appendix E, Page A-24**
[9] **See Appendix E, Page A-23**

provide additional granularity in staffing levels as workload changes over the course of day, DEC dispatchers nevertheless experience a high disparity in workload. Given the complexity required to manage 11 start times, the agency should consider reducing the number of start times, alongside changes to when those shift start times occur and to lunch break policies.

- Hiring part-time staff. Use of part-time positions with shorter shift lengths would allow scheduling supervisors to cover lunches and breaks for full time dispatchers without needing to provide additional breaks for relievers. In other jurisdictions, part-time positions are favored by employees nearing retirement or who have recently retired. While only one of DEC's peer agencies use part-time staff, 52 of the 118 agencies that responded to the survey did use part-time staff. In the City and County of San Francisco, Proposition F (2003) provides a mechanism for departments to rehire retired employees for part-time positions, though possible benefits of part-time positions must be weighed against MOU constraints and the costs of dispatcher recertification and retraining.

CSA Staffing Model also assumes a higher workload for call-takers than they currently experience at DEM (see Exhibit 13). While CSA's model still provides for a thirty-second wrap-time between calls, DEC supervisors will need to closely manage unplanned breaks during the workday.

CHAPTER 4 – REVIEWING SCHEDULING PROCESS

Introduction

Alongside reviews of the adequacy and efficiency of DEC's current minimum staffing levels, CSA also reviewed the efficiency of DEC's operational scheduling processes. Given the Division's largely paper-based scheduling processes and opportunities for efficiency through information technology (IT), CSA prepared a draft business requirements document for scheduling software suited to DEC's requirements. The as-is business process that these requirements are based on are provided in Appendix F.

The objective of operational scheduling is to optimally schedule employees, subject to the constraints of employee preferences, employee availability, and policies and practices (i.e. business rules). At DEC, scheduling is done at three levels of detail:

- Bi-annual allocations of positions to shifts, as well as management of staff bidding for shifts, vacation days, and floating holidays.
- Day-level projections of schedules in "Week at a Glance" documents, including several types of planned leave, trainings, and other employee statuses.
- Hour-level allocations in the Daily Schedule of dispatch and call-taking assignments, lunches, and breaks. All schedule information feeds into these documents, which help supervisors ensure they can meet minimum staffing levels for call takers and staff other essential positions like radio channels.

CSA reviewed the efficiency of major operational scheduling processes independent of the adequacy of staffing or the efficiency of minimum staffing levels (the subjects of other research questions in this report).

CSA's review was timely, given the coming retirement of DEC's most experienced scheduling supervisor and opportunities for more efficient scheduling through the use of IT. Should DEC's scheduling process not operate efficiently, the Division can face challenges such as:

- Overstaffing certain hours of a day (leading to unproductive use of staff time) while understaffing other hours of a day (leading to increased use of overtime to fill shifts).
- Schedules that are difficult to revise as planned and unplanned leave affects employee availability.

- Unequal distribution of workload when certain shifts involve heavier workloads than others.

CSA's Approach

At DEC's request, CSA focused its review on five key scheduling processes, ranging from the bi-annual sign-up (shift bidding) process, to the allocation of channel and call taking assignments to dispatchers by hour of the day (See Exhibit 15). CSA conducted interviews with DEM scheduling supervisors (who are responsible for the majority of all scheduling at DEC), watch supervisors and watch coordinators, and reviewed DEC scheduling forms and other documentation. Based on this analysis, CSA documented the Department's as-is process and business rules, proposed business requirements for scheduling software suited to DEC's processes, and made findings and recommendations related to the agency's scheduling processes.

EXHIBIT 15	DEM-Division of Emergency Communications Major Scheduling Processes[10]
Process	Description
A. Bi-Annual Sign-Up	The Bi-Annual Sign-Up allows dispatchers, supervisors and coordinators to sign-up for a preferred watch and shift, given each employee's current seniority and available shifts.
B. Vacation Sign-Up	The Vacation Sign-Up allows dispatchers, supervisors and coordinators to sign-up for preferred vacation dates, given each employee's current seniority and available vacation day balances.
C. Floating Holiday Sign-Up	The Floating Holiday (FH) Sign-Up allows dispatchers, supervisors and coordinators to sign-up for preferred floating holiday dates, given each employee's current seniority and floating holiday entitlement for the fiscal year.
D. Week at a Glance	Week at a Glance (WAG) pages allow supervisors and coordinators to see in one table information about dispatcher schedules from various sources, including shifts, regularly scheduled days off, planned leave, trades of watch, and training schedules.
E. Daily Schedule and Break Schedule	The Daily Schedule and Break Schedule is the ultimate product of all DEM scheduling activity, and is used by supervisors and coordinators to ensure that DEC can meet its minimum staffing level each hour while staffing other essential positions.

[10] Other scheduling processes not described here include: Voluntary Overtime, Mandatory Overtime, Trades of Watch, Discretionary Time Off Requests, "Write-In" scheduling, Trainee Scheduling, Training Scheduling, and Special Events.

Findings and Recommendations

CSA finds that DEC's scheduling process complies with relevant policies in the Department's General Orders, Memoranda of Understanding, and other City policies. At the same time, CSA identified opportunities to improve the efficiency of scheduling and reduce the risk of error through process changes. Detailed findings and recommendations to the department's process are proposed in Appendix F, while CSA's major finding and recommendations regarding the scheduling process is summarized below.

Finding 5: DEC scheduling processes are manual, time intensive, or reliant on supervisor judgment. As a result, the scheduling process is a poor use of supervisor skills, may result in suboptimal schedules, and causes higher staff costs.

DEC's time intensive scheduling process relies on the manual entry of schedule data into paper forms and Microsoft Word and Excel, as well as the judgment of scheduling supervisors and various rules of thumb. As a result, DEC's scheduling process can be both an inefficient use of staff time and create suboptimal schedules.

Examples of activities in each scheduling process that are manual, time intensive, or reliant on supervisor judgment include:

A. Bi-Annual Sign-Up

When scheduling supervisors create the Bi-Annual Sign-Up Sheet for 11 shifts, they must create a distribution of sign-up slots and watch off days that allow supervisors to reach minimum staffing levels for each hour of the day and day of the week. This optimization process requires a combination of supervisor experience and trial and error, along with testing through the creation of daily schedules based on these bi-annual sign-up sheets.

B. Vacation Sign-Up

After the vacation sign-up sheet is circulated among dispatchers, scheduling supervisors will re-enter the hand-written sign-up sheet into calendars in Microsoft Word. This information (along with shift and floating holiday schedules) will ultimately be manually re-entered six times or more in PeopleSoft, Week at a Glance documents, and Daily Schedules.

C. Floating Holiday Sign-Up

In creating the floating holiday sign-up calendars used for FH bidding, scheduling supervisors determine how many FH sign-up slots to provide for each day in the six month period, based on considerations including

the number of dispatchers who have already bid for vacation and watches off on a day.

D. Week at a Glance (WAG)
    Information previously gathered in other scheduling processes will be manually re-entered into a WAG. Each WAG takes 1 to 2 hours to create, followed by ongoing maintenance as dispatcher schedules change.

E. Daily Schedule and Break Schedule
    As dispatchers take unplanned leave or call in sick, the daily schedule will be modified—often many times—by scheduling supervisors and watch supervisors. Modifications include reassigning channels and phone assignments across the hours of a watch while ensuring minimum staffing levels can be reached each hour. Of the scheduling processes, this process requires the most expertise, skill, and time from supervisors.

Cumulatively, these processes that are manual, time intensive, and reliant on supervisor judgment can result in:

- Decreased use of supervisor time for other tasks, such as employee supervision.
- Less optimal schedules when supervisors with less training or time must conduct scheduling processes.
- Higher staff costs as a result of time-consuming scheduling processes.

Recommendation 5: Procure scheduling software or develop functionality in PeopleSoft in order to reduce data entry or automate scheduling processes.

DEC can reduce the workload of supervisors, risks of suboptimal schedules, and staff costs through the use of scheduling software.

At the least, DEC can implement tools that reduce the need for manual entry of schedule data into various forms. Already, the department has developed PeopleSoft-based shift bidding and schedule viewing tools, though they remain unimplemented. Such software would reduce the need to re-enter sign-up information in Week at a Glance documents and make other modifications by hand.

A more automated scheduling tool would also conduct schedule optimization work currently reliant on supervisor experience and conducted through rules of thumb and trial and error tests of schedules. For instance, the daily

schedule must frequently be "rebuilt" as dispatchers call in sick or plan leave. While experienced supervisors can do this work quickly, those with less experience (or those who must make modifications quickly) may not create optimal schedules. A more sophisticated scheduling system might automatically reallocate call taking, channel, and other assignments for each hour in a watch in response to these changes.

To assist DEC in deploying scheduling software, CSA has documented in a Business Requirements Document (BRD):
1. Each step in DEC's as-is scheduling process
2. Business rules describing conditions to be met as scheduling processes are followed
3. Business requirements that would be required or optional as part of any scheduling software procured for DEC.

Further review is needed to prepare the draft BRD to procure or develop scheduling software tools, including:
1. Documentation of software business requirements for implementing overtime, discretionary leave trades of watch, and other scheduling processes.
2. Incorporation of language regarding vendor support features, security features, and other categories (a partial list is provided in the BRD).
3. Determination of which software requirements are indeed required, or whether some items should be identified as optional.
4. Undertaking a request for proposal (RFP) process to determine whether a vendor and/or product could meet DEC's scheduling needs as described in the Business Requirements Document.

DEC can use the documentation in the Business Requirements Document as a starting point for implementing this recommendation and beginning discussions with dispatchers and other DEM staff regarding wants and needs in a new scheduling system.

APPENDIX A: STAFFING MODEL METHODOLGY

Methodology Overview

Most modeling of emergency call center staffing follows the same essential steps, with different models adding additional layers of complexity to account for factors like size of the jurisdiction, whether the call center handles both fire and police calls, and whether dispatchers are "cross-trained" to handle both call-taking and dispatching duties. There are two main components to most staffing models – a workload calculation involving an estimate of call volume and duration, and a staffing availability calculation involving an estimate of how much time dispatchers are available to work. Keeping these two main components in mind, CSA used the following methodology in developing its staffing model.

Data Description

To calculate DEM's workload, CSA used five years of CAD data from FY 2008 through FY 2012. The data included information about every incident handled by the Department between those dates. While CAD captures considerable information about each incident, this analysis used primarily information about the type of call (fire or police), the call priority, and the time stamp for various handling points of the call. The table below includes a list of the relevant variables used for this analysis.

EXHIBIT 16	DEM CAD Variable List and Description
Variable	**Description**
Year	Year
Month	Month
Day	Day
Call Key	System generated primary key
Agency Type	Type of agency (P=police, F=fire)
Priority	Call priority
On View	On view incident indicator
Received Date	Date call received
Received Time	Time call received
Dispatch Date	Date first unit dispatched
Dispatch Time	Time first unit dispatched
Enroute Date	Date first unit enroute
Enroute Time	Time first unit enroute
On Scene Date	Date first unit on scene
On Scene Time	Time first unit on scene
OK Date	Date first unit noted scene was ok

OK Time	Time first unit noted scene was ok
Close Date	Date last unit cleared from scene
Close Time	Time last unit cleared from scene

Source: DEM CAD Data

Creating a Data Sample

While DEM provided five years worth of data, due to technical errors in processing a large amount of data, CSA opted to create a data sample from those five years in order to avoid delays and error involved with processing a large volume of data. In order to create its data sample, CSA sorted the data by fiscal year and by month. For each month, we pulled that month's worth of data from one of the five years in the sample. The month was chosen by choosing from available months of data that had a full sample (some months were missing data due to errors in processing the large amount of data) and by choosing the year with the median number of observations. For example, if there were three years of accurate data available for January – FY 2008, FY 2009, and FY 2012 – January's data would have been pulled from FY 2012 if that was the month with the median number of observations relative to the other two months. This methodology was repeated to achieve one full year's worth of CAD data, with each month representing a different fiscal year. This approach, while not as robust as using the full five years worth of data, allowed CSA to sample CAD data over a longer time horizon (five years) and gain a greater cross-section of the Department's call data over time.

Once CSA created the data sample, we eliminated observations from the data that were not relevant for this analysis. Specifically, CSA omitted any incidents designated as "On View," or calls that emergency personnel in the field initiate. While these calls represent workload for radio dispatchers, that workload is not captured by the CAD system. On View calls typically have the same "received" time stamp as "dispatched" time stamp, meaning that when we calculate workload, there are zero seconds of work associated with these types of incidents. In addition to eliminating all On View incidents, we also eliminated any incidents that were missing a time stamp for one of three key processing points – call received, call entered, and call dispatched. When any of these processing points was missing, CSA was unable to calculate workload accurately and for that

reason, eliminated those incidents.

Calculating Model Inputs:
Call Volume

To calculate the workload component of the staffing model, CSA used the data sample described above generated from the Department's CARS data. After dropping the incidents as specified previously, CSA calculated the average number of incidents, for each priority type, that DEM process for every hour of the day. Exhibit 17 below shows the average incident volume, by hour and priority type for both fire and police incidents.

EXHIBIT 17					DEM Average Call Volume, by Hour and Priority					
Fire/EMS						**Police**				
Hour	Priority E	Priority 3	Priority 2	Priority 1	Total Calls	Hour	Priority A	Priority B	Priority C	Priority I	Total Calls
0	0.33	6.82	2.96	0.88	11.0	0	9.33	14.75	31.10	4.62	59.8
1	0.34	6.72	2.82	0.80	10.7	1	10.35	13.59	25.81	3.73	53.5
2	0.33	6.31	2.59	0.74	10.0	2	9.90	13.14	23.24	3.89	50.2
3	0.23	4.74	1.90	0.79	7.7	3	5.89	9.93	15.92	2.16	33.9
4	0.19	4.21	1.38	0.61	6.4	4	4.09	7.67	11.59	1.63	25.0
5	0.18	3.77	1.44	0.59	6.0	5	3.08	7.25	11.27	1.44	23.1
6	0.19	4.35	1.68	0.67	6.9	6	2.90	8.92	18.78	3.05	33.7
7	0.25	6.18	2.21	0.86	9.5	7	3.42	12.17	34.59	4.37	54.5
8	0.32	8.21	3.00	1.01	12.5	8	4.27	15.70	45.82	5.75	71.5
9	0.30	9.70	3.16	1.33	14.5	9	5.30	17.76	50.70	7.15	80.9
10	0.37	10.67	3.81	1.37	16.2	10	5.92	18.56	50.51	7.23	82.2
11	0.33	11.21	4.00	1.31	16.8	11	6.47	19.44	52.76	7.43	86.1
12	0.46	11.16	3.96	1.32	16.9	12	6.99	20.66	52.30	8.00	88.0
13	0.44	11.75	4.43	1.33	18.0	13	7.30	20.95	53.58	9.62	91.4
14	0.43	11.80	4.47	1.33	18.0	14	7.75	22.46	53.30	9.01	92.5
15	0.36	11.81	4.58	1.26	18.0	15	8.67	22.26	56.18	13.51	100.6
16	0.39	11.28	4.35	1.22	17.2	16	9.22	21.51	55.50	12.32	98.5
17	0.41	11.37	4.24	1.16	17.2	17	9.89	23.61	54.80	15.44	103.7
18	0.41	11.62	4.19	1.17	17.4	18	10.55	22.71	54.53	14.12	101.9
19	0.48	10.81	3.88	1.12	16.3	19	10.39	21.52	53.10	12.29	97.3
20	0.48	10.39	3.74	1.14	15.7	20	10.65	19.87	48.97	10.92	90.4
21	0.46	9.50	3.70	1.09	14.7	21	10.53	19.76	45.11	9.77	85.2
22	0.39	8.78	3.52	1.08	13.8	22	10.82	17.37	45.25	9.47	82.9
23	0.35	7.92	3.27	0.91	12.4	23	10.12	17.01	39.47	6.42	73.0

Source: DEM CAD Data

While CSA was limited to calculating the number of incidents because CARS only captures information on unique incidents and not individual calls, we did attempt to take into account the workload associated with duplicate calls for the same incident (for example, multiple phone calls received about the same car accident). In consultation with the Department, CSA determined that police Priority A and Priority B calls were the most likely incident types to have multiple calls associated with them. Using data from DEM's Symposium system, which captures information about individual calls, CSA was able to calculate an annual average for how many calls DEM processed between FY 2008 and FY 2012 (953,992 calls) CSA then calculated the

average number of incidents that CSA processed during that same time period by calculating the average number of incidents in our one year data sample (760,579 incidents). Finally, CSA staff then calculated the difference between average calls and average incidents and divided through by the average number of incidents to determine an "incident multiplier" to convert from calls to incidents (953,992-760,579) / 760,579= .2). This incident multiplier was then applied to Priority A and Priority B calls to account for the additional workload associated with these duplicate calls. A range of multipliers was applied to the number of incidents to determine the sensitivity of the model to the incident multiplier. CSA found that multipliers ranging from 1-3 had minimal impact on the staffing levels.

Calculating Model Inputs:
Call Duration

CSA used the same data sample to then calculate the average duration of calls received, by priority type and by hour. To calculate the duration of calls, CSA first had to estimate which time interval most accurately captures the bulk of call taker workload. With limited processing time stamps available in the data, we acknowledge that it was not possible to fully capture workload for every call without over or underestimating call taker workload. Despite this limitation, this analysis gives the closest approximation to total workload given the available data.

For most priority types, CSA decided, in consultation with DEM, that the "Received" to "Entry" interval captured the majority of call taker work. This interval does not capture additional work performed by the call taker after a CAD incident number is entered into the database, but the next best interval (using "Received" to "On Scene") would be a much larger overestimate of call taker work. The one exception on using "Received" to "Entry" for the call interval was for the Code 3 Fire/Medical calls. After consulting DEM, CSA determined that because call-takers often stay on the line until emergency personnel arrive on scene, and sometimes even longer, using a "Received" to "On Scene" interval would more accurately capture the total workload for call takers on these types of calls. Average call processing times, by priority type and by hour are shown in Exhibit 18 below.

EXHIBIT 18	DEM Average Call Duration, by Hour and Priority (Minutes: Seconds)								
Fire/EMS					**Police**				
Hour	*Priority E*	*Priority 3**	*Priority 2*	*Priority 1*	**Hour**	*Priority A*	*Priority B*	*Priority C*	*Priority I*
0	01:10	05:31	01:23	02:01	0	01:42	02:06	01:27	01:50
1	01:06	05:37	01:21	02:04	1	01:39	02:06	01:26	01:55
2	01:04	05:42	01:18	02:05	2	01:38	02:04	01:28	01:51
3	01:11	05:49	01:22	02:08	3	01:43	02:03	01:29	01:54
4	01:12	05:55	01:30	02:06	4	01:45	01:58	01:31	01:47
5	01:17	06:02	01:34	02:04	5	01:43	01:52	01:29	01:43
6	01:10	05:44	01:34	02:03	6	01:45	01:46	01:20	01:17
7	01:05	05:42	01:31	01:58	7	01:38	01:48	01:19	01:21
8	01:14	05:45	01:31	01:57	8	01:37	01:45	01:17	01:16
9	01:13	05:31	01:30	01:58	9	01:37	01:49	01:15	01:16
10	01:17	05:29	01:31	02:00	10	01:38	01:49	01:13	01:17
11	01:11	05:17	01:32	01:58	11	01:36	01:50	01:13	01:19
12	01:10	05:06	01:30	01:59	12	01:37	01:50	01:14	01:25
13	01:13	05:02	01:27	01:59	13	01:37	01:52	01:15	01:21
14	01:12	05:11	01:29	01:56	14	01:40	01:50	01:16	01:26
15	01:07	05:11	01:30	01:59	15	01:40	01:56	01:18	01:25
16	01:08	05:11	01:27	02:02	16	01:38	01:55	01:16	01:26
17	01:09	05:17	01:28	02:03	17	01:39	01:57	01:17	01:27
18	01:07	05:14	01:25	01:59	18	01:39	01:55	01:15	01:27
19	01:14	05:08	01:26	02:00	19	01:40	02:00	01:16	01:26
20	01:08	05:08	01:24	02:00	20	01:40	02:01	01:16	01:24
21	01:09	05:06	01:24	02:04	21	01:40	02:03	01:19	01:31
22	01:03	05:06	01:19	02:00	22	01:36	02:04	01:22	01:33
23	01:07	05:14	01:24	02:01	23	01:42	02:06	01:25	01:44

Source: DEM CAD Data
*Using received to on scene interval

Calculating Model Inputs:
Total Workload

Finally, combining the call volume at every hour, with the call processing times at every hour, we calculated the total workload. First, we added the 30 second wrap time to every call to account for the work performed by call takers after hanging up a call. Next, CSA multiplied the number of calls received by the call processing time (including wrap time) for every hour and every priority type. Finally, CSA calculated a weighted average of workload at every hour in order to account for the unequal distribution of priority call types received. An example of the weighted average calculation (with police data) that CSA used is below:

$$\frac{\left(\begin{array}{l}(\text{Priority A Proccessing Time} \times \text{Number of Priority A Calls}) \\ + (\text{Priority B Proccessing Time} \times \text{Number of Priority B Calls}) \\ + (\text{Priority C Proccessing Time} \times \text{Number of Priority C Calls}) \\ + (\text{Priority I Proccessing Time} \times \text{Number of Priority I Calls})\end{array}\right)}{\left(\begin{array}{l}\text{Number of Priority A Calls}) \\ + \text{Number of Priority B Calls}) \\ + \text{Number of Priority C Calls}) \\ + \text{Number of Priority I Calls})\end{array}\right)} = \text{Weig}$$

These weighted averages for workload are

shown in Exhibit 19 below, for both fire and police calls.

EXHIBIT 19		DEM Workload Calculation, by Hour		

Fire/EMS				
Hour	Weighted* Average Call Processing Time	Average Call Processing Time & Wrap Time**	Average*** Number of Calls Received	Workload (seconds)
0	239.55	269.55	11.0	2,959.9
1	244.89	274.89	10.7	2,937.2
2	248.17	278.17	10.0	2,775.6
3	251.53	281.53	7.7	2,155.1
4	267.60	297.60	6.4	1,899.7
5	265.55	295.55	6.0	1,766.0
6	253.67	283.67	6.9	1,954.6
7	255.82	285.82	9.5	2,717.2
8	258.80	288.80	12.5	3,623.0
9	253.90	283.90	14.5	4,114.6
10	249.71	279.71	16.2	4,539.0
11	242.98	272.98	16.8	4,599.5
12	234.05	264.05	16.9	4,461.4
13	230.08	260.08	18.0	4,669.2
14	236.07	266.07	18.0	4,795.8
15	236.78	266.78	18.0	4,803.5
16	235.82	265.82	17.2	4,583.7
17	241.66	271.66	17.2	4,666.7
18	239.97	269.97	17.4	4,694.5
19	235.63	265.63	16.3	4,325.0
20	233.73	263.73	15.7	4,153.2
21	229.17	259.17	14.7	3,822.2
22	226.90	256.90	13.8	3,536.1
23	232.51	262.51	12.4	3,267.4

Police				
Hour	Weighted Average Call Processing Time	Average Call Processing Time & Wrap Time	Average*** Number of Calls Received	Workload (seconds)
0	101.85	131.85	59.8	7,885.1
1	101.76	131.76	53.5	7,047.0
2	102.09	132.09	50.2	6,629.0
3	104.16	134.16	33.9	4,547.0
4	103.61	133.61	25.0	3,338.0
5	99.78	129.78	23.1	2,991.9
6	89.73	119.73	33.7	4,030.1
7	87.69	117.69	54.5	6,418.9
8	85.22	115.22	71.5	8,244.1
9	85.28	115.28	80.9	9,327.0
10	84.69	114.69	82.2	9,428.5
11	85.09	115.09	86.1	9,909.6
12	86.39	116.39	88.0	10,237.2
13	86.86	116.86	91.4	10,686.8
14	88.78	118.78	92.5	10,988.7
15	90.48	120.48	100.6	12,123.0
16	89.21	119.21	98.5	11,747.0
17	91.14	121.14	103.7	12,565.9
18	89.53	119.53	101.9	12,181.8
19	91.08	121.08	97.3	11,779.9
20	91.08	121.08	90.4	10,947.5
21	94.78	124.78	85.2	10,628.1
22	95.39	125.39	82.9	10,397.0
23	99.76	129.76	73.0	9,475.7

Source: DEM CAD Data

Calculating Model Inputs:
Net Available Work Hours

Once CSA calculated the amount of workload that the Department handles, we next calculated how much time dispatchers are typically available to process that workload – the Net Available Work Hours Calculation. CSA used five years of data from FY 2008 through FY 2012 of eMerge PeopleSoft leave data. Working with DEM, CSA determined which leave codes from the data should be included in the analysis. Exhibit 19 below shows the leave codes used along with the corresponding definition. Leave codes omitted from the analysis include codes that are not regularly billed to by the Department.

EXHIBIT 20	Leave Codes Included in Analysis
Pay Code	**Pay Code Description**
LH	Legal Holiday
FH	Floating Holiday Pay
SP	Sick Pay
VA	Vacation
WS	Workers Comp Supplemental Leave Pay
HI	Holiday
JD	Jury Duty
OU	Overtime Used (Out-Bank)
SD	Unpaid State Disability
SL	Unpaid Sick Leave
WC	Unpaid Workers Comp Leave
AW	Unpaid AWOL
EL	Educational Leave
PL	Unpaid Personal Leave
SN	Unpaid Suspension
XX	Not Employed - No Pay
AL	Administrative Leave - Discipline

Source: eMerge PeopleSoft

In addition to paid and unpaid leave, CSA also considered time dispatchers are unavailable due to training and other mandated breaks, like lunch. Working with DEM, CSA determined how much time dispatchers spend, on average, in mandatory training during the year. Only training mandated for existing dispatchers was considered. CSA did not include training mandated for new employees or remedial training that may be necessary on a dispatcher by dispatcher basis. See Appendix C for a complete listing

of mandated training by employee classification.

Finally, CSA calculated how much time during a typical shift dispatchers spend on breaks. We assumed all eight hour shifts and included the MOU-mandated 15 minute breaks (two of these) and the hour paid lunch. Exhibit 21 below shows the final NAWH calculation, based on dispatcher unavailability due to leave, training, and breaks.

EXHIBIT 21	Leave Codes Included in Analysis		
	Classification		
Annual Hours	*8238*	*8239*	*8240*
Average Paid and Unpaid Leave[1]	457	491	456
Average Training	25.5	25.5	26.5
Average Break Time[2]	130.5	130.5	130.5
Average Lunch Time[3]	261	261	261
Total Annual Unavailable Hours	873.5	908.4	874.1
Total Annual Hours per FTE	2085.6	2085.6	2085.6
Annual Net Available Work Hours	**1212.1**	**1177.2**	**1211.5**

[1] Paid and unpaid leave codes included in this average listed below

[2] Assuming 2 15 minute breaks per 8 hour shift, with 260 8 hour shifts per year (2080/8 hours)

[3] Assuming 1 60 minute lunch per 8 hour shift, with 260 8 hour shifts per year (2080/8 hours)

All break and lunch calculations based on an 8 hour shift

Relief Factor Calculation CSA used the NAWH calculation to calculate a Relief Factor. The Relief Factor is a standard parameter used when determining staffing for 24/7 positions that need to be continuously staffed. The Relief Factor is an adjustment applied to the number of positions a Department needs to fill in order to account for time that employees will be away from those positions due to leave, training, and breaks. In order to calculate the Relief Factor, CSA divided the total number of hours a dispatcher could possibly be available to work during a year (2085.6 hours) by the number of hour a dispatcher typically is available to work on average (1212.1 hours). This calculation resulted in a Relief Factor of 1.7.

In order to calculate how many positions would need to be filled at every hour, CSA divided the workload estimate by 60 minutes, or the maximum possible time a dispatcher would be available to answer calls during an hour. CSA then applied the relief factor described above in order to calculate the number of staff that would be

required to fill these positions. So, for example, at 00:00 hours, the department needs to cover approximately 180 minutes of workload. To do so, DEM would need about 3 dispatchers working continuously during that hour. But because dispatchers require breaks, and may be absent for other reasons already discussed, we have to apply the Relief Factor of 1.7 to calculate the number of staff needed during that hour – about 5 dispatchers. The full staffing model is shown below (Exhibit 21), with workload, positions need, and the staffing requirement for every hour of the day.

EXHIBIT 21	CSA Call-Taker Staffing Model Results				
Hour	*Average Number of Calls*	*Average Processing Time +Wrap Time*	*Workload (Minutes)*	*Positions Needed*	*Staffing Requirement*
0	70.79	2:49	180.75	3.01	5.2
1	64.17	2:54	166.40	2.77	4.8
2	60.16	2:55	156.74	2.61	4.5
3	41.55	3:02	111.70	1.86	3.2
4	31.37	3:13	87.29	1.45	2.5
5	29.03	3:11	79.30	1.32	2.3
6	40.55	2:53	99.75	1.66	2.9
7	64.05	2:48	152.27	2.54	4.4
8	84.09	2:48	197.79	3.30	5.7
9	95.40	2:47	224.03	3.73	6.4
10	98.43	2:48	232.79	3.88	6.7
11	102.95	2:45	241.82	4.03	6.9
12	104.85	2:41	244.98	4.08	7.0
13	109.40	2:40	255.93	4.27	7.3
14	110.54	2:44	263.08	4.38	7.5
15	118.63	2:42	282.11	4.70	8.1
16	115.79	2:40	272.18	4.54	7.8
17	120.91	2:42	287.21	4.79	8.2
18	119.30	2:41	281.27	4.69	8.1
19	113.58	2:40	268.42	4.47	7.7
20	106.16	2:40	251.68	4.19	7.2
21	99.93	2:40	240.84	4.01	6.9
22	96.68	2:39	232.22	3.87	6.7
23	85.47	2:44	212.38	3.54	6.1

Source: DEM CARS, eMerge PeopleSoft

Systems Overview

What follows is a summary of the systems where the data used in CSA's analysis was derived from. These systems are used by dispatchers, their supervisors, and administrative personnel for the following following business needs:

- Call Routing and Management
- Call Dispatching
- Record Keeping
- Human Resources and Payroll
- Scheduling

While these systems are all integral to DEC's operations, they do not necessarily interface or otherwise connect to each other. For instance, the electronic scheduling records maintained in Microsoft Excel by scheduling supervisors do not directly interface with DEM's PeopleSoft system, though administrative personnel will manually enter some information from these scheduling records into PeopleSoft.

Call Routing and Management

Symposium is DEM's call routing and management system. The system is responsible for directing emergency and non-emergency calls to the next available dispatcher as the calls are received. The Symposium system has the capacity to store data on each call for eight months, but it is not a long-term data tracking system for the Department. DEM management has the ability to use Symposium data to run reports on individual dispatchers or to track particular incidents. It uses data from Symposium to run weekly reports for internal management purposes and to monitor the Department's ongoing performance goals, including number of abandoned calls, average answer delay, and percent of emergency and non-emergency calls answered within 10 seconds.

Call Dispatching

DEM uses the Tiburon Stratus Computer Aided Dispatch (CAD) system to initiate calls for service, dispatch calls to personnel in the field, and monitor the status of calls already dispatched.[11] When a dispatcher receives a call through the Department's Symposium system, she begins to input information into the CAD template. At this initial input of information, a CAD incident number is automatically generated, which is then used to track the incident throughout the system. Multiple calls that are

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[11] The Department will begin using Tiburon Command CAD in the Spring of 2014.

received regarding the same incident (for example, multiple reports of the same car accident) are all attached to the same CAD incident number. For this reason, the CAD Activity Reporting System (CARS) stores data on total incidents, but not on total calls. The Department does not currently have a system in place to track and store data on every call received.

Record Keeping

To track the leave use of its employees, DEM uses the City's Time Entry and Scheduling System (TESS) to enter time entry data. Once DEM enters its payroll information into TESS and the time is processed by the City Payroll Department, DEM receives a payroll register which includes all time entry information with the corresponding eMerge PeopleSoft time reporting codes – the Citywide Human Capital Management system. These codes correspond to any time that a DEM employee enters into a time sheet. This includes all information about time the employee spends away from the office, such as short and long-term leave. The system also captures all regular work hours as well as overtime hours.

Human Resources and Payroll

DEM maintains employee, position, job, time and labor, and pay data in its own deployment of Oracle PeopleSoft, a human capital management system. However, a citywide deployment of PeopleSoft remains the system of record for employee information, paid and unpaid hours. The Controller's Office analyzed eMerge PeopleSoft data to understand DEC's patterns of leave, overtime use, and FTEs.

Scheduling

Finally, DEC's scheduling system is managed entirely through a set of paper scheduling documents, with some electronic records stored in Microsoft Word and Excel. These electronic records do not interface to other departmental time entry or HR systems. Of peer agencies, many also use paper-based scheduling processes, with only the City of Phoenix currently using scheduling software. For more on DEC's scheduling process, see Analysis 2: Scheduling.

APPENDIX B: OVERTIME ANALYSIS

Overtime Use

In addition to analyzing both NAWH and Workload as inputs to the overall staffing model, CSA also considered the Department's overtime use. While overtime does not feed directly into the staffing model, it is an important indicator of performance for the Department and provides greater context for DEM's staffing and scheduling challenges.

CSA found that the amount of overtime used by the department has decreased in the last 4 years (Exhibit 22). At the time of the MGT study, overtime hours had increased by 13,282 hours or 43 percent from FY 2004-05 to FY 2005-06, continuing to grow in FY 2006-07.[12] As shown in Figure 1, overtime hours reached an all-time high in FY 2007-08. Overtime hours then dropped by 51 percent in FY 2008-09, and are at their lowest in FY 2011-12 at 18,648 hours. Because a full-time equivalent is equal to 2,080 hours per fiscal year, over time hours used in FY 2011-12 are equivalent to approximately 9 full-time staff.

EXHIBIT 22	**Overtime Hours, FY 2008 - FY 2012:** *Overtime hours dropped by 51% from FY 2007-08 to FY 2008-09*
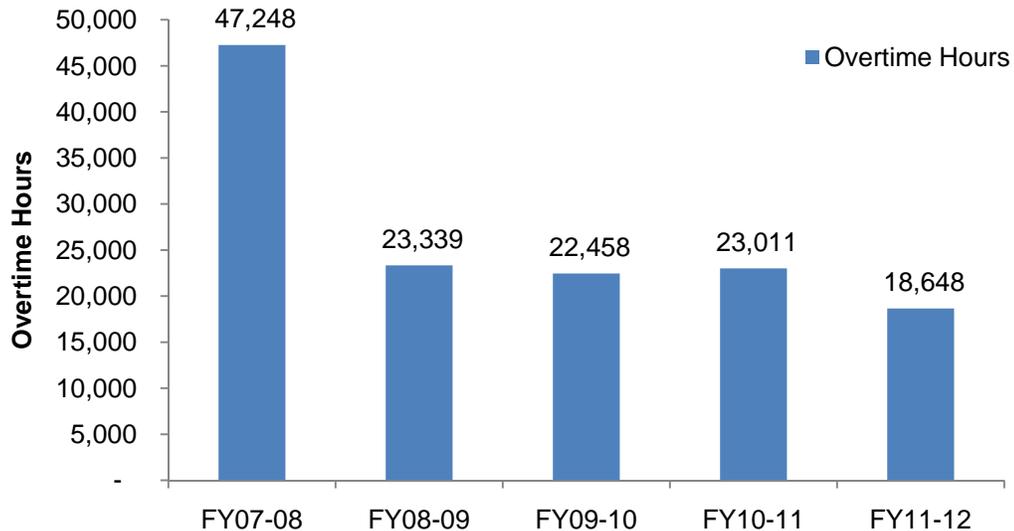
Source: eMerge PeopleSoft

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[12] **MGT of America, Inc. 2008 page 157.**

As shown in Exhibit 23, the majority of overtime hours is "OT", or Overtime paid at 1.5 times the normal pay rate. The second largest share is made up of both OS (Overtime at Straight) which is paid at the regular pay rate, and OE (Comp Earn (In-Bank)), which is overtime earned as time off to be used at a later date.

EXHIBIT 23	Overtime Hours by Type, FY 2007-08 to 2011-12: *OT (Overtime at 1.5) represents the majority of all OT for all fiscal years*
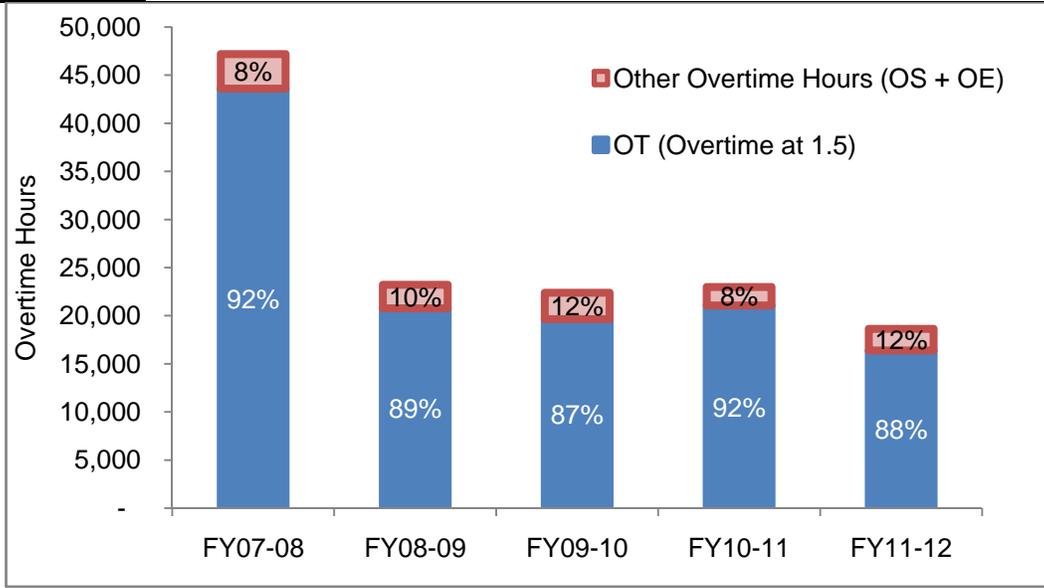
Source: eMerge PeopleSoft

Overtime hours as a share of Regular Hours dropped after FY 2007-08 and have remained steady at approximately 7 percent since FY2008-09 (Exhibit 24). Regular Hours are the normally-scheduled hours that employees work in their jobs. According to the Controller's Office Annual Overtime Report, Citywide overtime hours represented 4.4 percent of regular hours in FY 2011-12.[13] DEM is in the Public Safety major service area along with the Police, Sheriff and Fire Departments, which and had overtime hours representing 5, 7 and 14 percent of regular hours in FY 2011-12, respectively.[14]

[13] **Controller's Office FY 2011-12 Annual Overtime Report page 4.**

[14] **Controller's Office FY 2011-12 Annual Overtime Report page 5.**

EXHIBIT 24	Overtime Hours compared to Regular Hours, FY 2008 to FY 2012
	Overtime hours as a share of regular hours have gone down
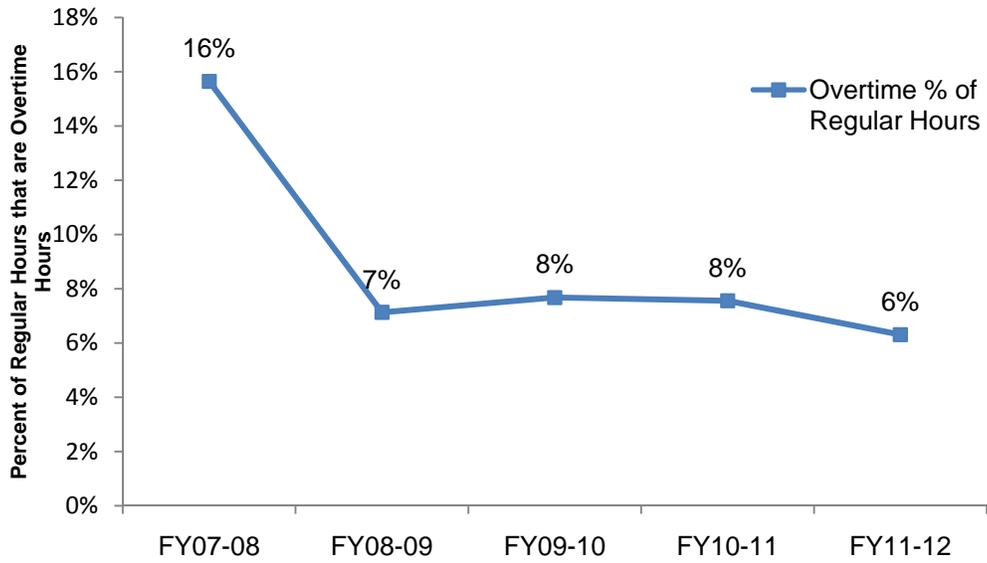
Source: eMerge PeopleSoft

APPENDIX C: TRAINING TABLE

Training	Description	Mandate	Job Class	Minimum Hours	Renewal Period (months)	Yearly Estimate Minimum Hours
CPR Re-certification	Give CPR over the phone	NAED	8238	2	24	1
NAED CDE	36 total hours of relevant continued training; other trainings can apply to this.	NAED	8238	36	24	18
NAED/NAFD Re-certification	Medical calls - medical exam	NAED	8238	2	24	1
NAED/NAFD Re-certification	Medical calls - fire exam	NAED	8238	2	24	1
CLETS Re-certification	Access to databases (DMV, criminal records)	Department of Justice	8238	1	24	0.5
POST CPT		POST(State) Also SFPD	8238	24	24	4
8238 Total						**25.5**

APPENDIX D: ORGANIZATIONAL CHART

Figures in parentheses represent the number of authorized positions for each classification at DEM-DEC, not the number of filled or budgeted positions.
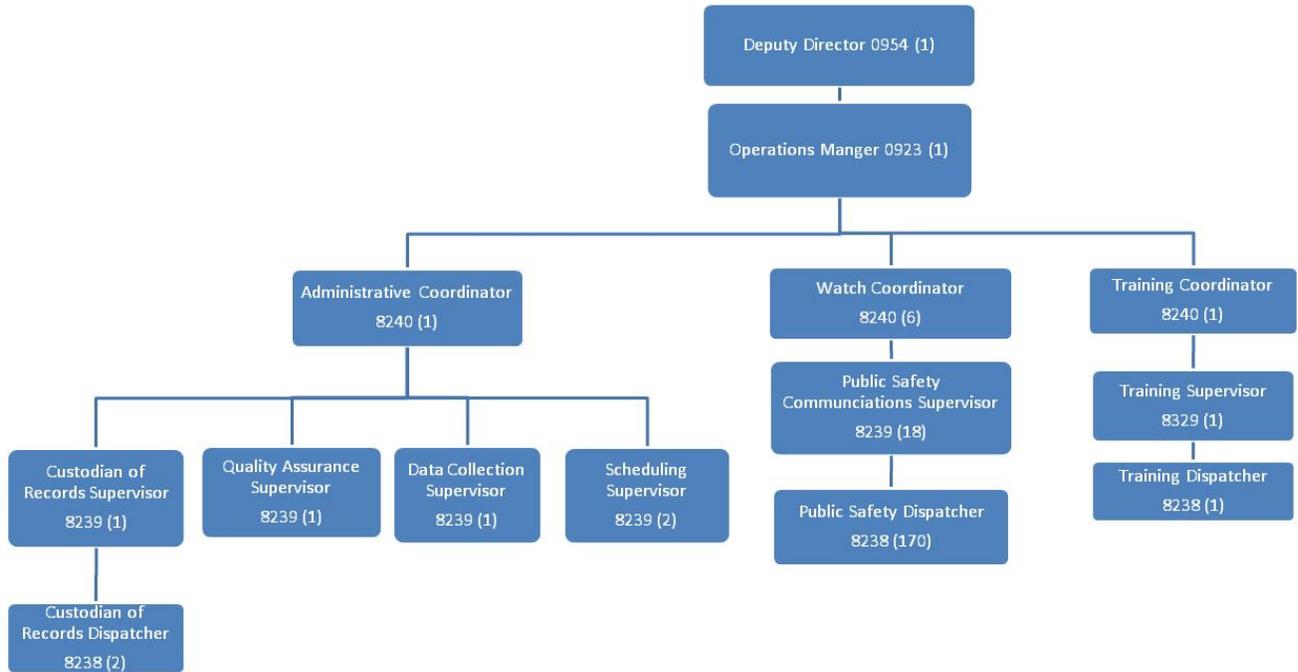
APPENDIX E: PEER SURVEY

San Francisco's peers…	Question #
• **Use automatic call distribution (ACD) systems.**	2
• **Have fewer start times:** While San Francisco has 11 start times, its peer group has an average of 5 start times.	10
• **Use shorter wrap times or no wrap time at all:** San Francisco uses a 30 second wrap time, while others use 12 seconds (Washington, D.C.) and 3 seconds (Louisville, KY).	3,4
• **Let call takers "opt-out" of the next call**, rather than using an "opt-in" approach. Almost all agencies allow call takers to opt-out of taking the next call if they need to finish a call.	5,6
• **Tend not to use part-time or as needed employees**: Only Phoenix, AZ uses part-time employees, and only Montgomery County, MD uses as-needed employees.	11
• **Largely use paper-based scheduling processes:** Only one agency (Phoenix, AZ) uses an electronic process, though Washington, D.C. is currently transitioning to such a system.	12
• **Tend not to train staff in multiple disciplines:** Only Washington, D.C. is similar to San Francisco by training staff in multiple disciplines.	8
• **Have shorter paid lunches:** Only Fairfax County, VA also provides an hour lunch, but the agency also uses 12 hour shift lengths.	14
• **Tend not to have the ability to call employees back from lunch:** Only Fairfax County, VA and Phoenix, AZ can do so.	15
• **Do not have employees answering calls while at a radio position:** Only Louisville, KY does so in certain circumstances.	7
• **Typically use 8 hour shifts** in addition to another shift length: 5 of 7 agencies in the peer group use 8 hour shifts.	9
• **Use a formula or statistical method to set their minimum staffing levels.** Only Louisville, KY reported not doing so.	13

Key Findings (Continued)

Table 1. Summary of Lunch and Shift Responses (Survey Questions 9, 10, 14 & 15).

Jurisdiction	Shift Lengths					# of Start Times	Paid Lunch?	Call Back Staff from Lunch?
	8h	10h	12h	24h	Other			
Fairfax County, VA			✓			2	60 mins	Yes
Houston, TX	✓					5	No Paid Lunch	
Louisville, KY	✓					3	30 mins	
Montgomery County, MD	✓		✓	✓		8	30 mins	
Phoenix, AZ	✓	✓				5	30 mins	Yes
San Francisco, CA	✓	✓				11	60 mins	
Washington, D.C.					✓[1]	2 to 3	No Paid Lunch	
Source Question	Q9					Q10	Q14	Q15

[1] Washington, D.C., which replied "Other", uses 12.5 hour shifts with one 8.5 hour swing day for its 911 personnel.

Table 2. Summary of Wrap Time Responses (Survey Questions 3, 4, & 5).

Jurisdiction	Wrap time	Opt-In or Opt-Out?
Fairfax County, VA	No Wrap Time	N/A
Houston, TX	No Wrap Time	Opt out to make unavailable
Louisville, KY	3 seconds	N/A
Montgomery County, MD	No Wrap Time	N/A
Phoenix, AZ	No Wrap Time	N/A
San Francisco, CA	30 seconds	Opt in to receive next call
Washington, D.C.	12 seconds	Opt out to make unavailable
Source Question	Q3 and Q4	Q5

A. Purpose

This survey reports on the operational practices of public-safety answering points to provide context for findings and recommendations in this memo.

B. Methodology

After consulting with SFDEM on the survey design (see section E, Survey Tool), the Controller's Office prepared a web version of the survey using the website SurveyMonkey. Lisa Hoffman, Deputy Director of the Division of Emergency Communications, distributed this survey on September 24, 2013 in the email listserv "911talk" and directly contacted several other individuals in similar agencies.

Several days into the data collection phase, two questions were modified to obtain more accurate results:

- A follow up question was added to Question 3 ("Does your agency have a built in 'wrap time' that occurs after a call taker finishes a call to prevent their answering the next call?") to ask how long each agency's wrap time is, if applicable.
- Help text was provided for Question 16 ("How many calls does your agency handle in a year, on average?") to instruct agencies to provide figures for both emergency and non-emergency calls.

Because many agencies had already provided this detail in optional comment boxes, no additional data collection was necessary.

In total, the Controller's Office received 140 responses. After removing incomplete, anonymous and duplicate responses, the number of surveys collected totaled 118. Additionally, the Controller's Office recoded some inconsistent responses based on optional comments provided by agencies.

C. Peer Jurisdictions

In consultation with DEM-DEC, the Controller's Office selected six agencies from the 118 that, together with SFDEM, comprise the peer group reported on in the data tables below. These agencies are comparable to San Francisco in terms of 9-1-1 personnel, estimated yearly call volume[15], types of calls handled, and population served. Because these figures were used only to identify jurisdictions that were likely to be comparable to San Francisco, these figures were not verified.

	Jurisdiction	9-1-1 Personnel	Estimated Yearly Call Volume[1]	Fire/Med. Calls?	Population Served
Peer Group	Fairfax County, VA	204	900,000*	Yes	1,100,000
	Houston, TX	200	3,000,000	Yes	2,000,000
	Louisville, KY	120	650,000*	Yes	750,000
	Montgomery County, MD	168	1,200,000	Yes	1,000,000
	Phoenix, AZ	250	2,000,000	Yes[16]	1,500,000
	San Francisco, CA	187	1,200,000	Yes	800,000
	Washington, D.C.	185	2,600,000	Yes	630,000

[15] For ease of survey administration, agencies were only asked to estimate their call volume. For agencies that did not provide this information, the Controller's Office prepared estimates of yearly call volume based on publicly available data. This data was only used to identify agencies with call volumes in an order of magnitude similar to SFDEM.

*Emergency calls only.
[16] Fire and Medical calls are transferred to a secondary PSAP.

D. Survey Responses

2. Does your agency use an automatic call distribution (ACD) system to route incoming calls?

Jurisdiction and Agency Name	Response
Fairfax County, VA: Department of Public Safety Communications	Yes
Houston, TX: Houston Emergency Center	Yes
Louisville, KY: MetroSafe Consolidated Communications	Yes
Montgomery County, Maryland: Emergency Communications Center	Yes
Phoenix, AZ: Phoenix Police Department	Yes
San Francisco, CA: San Francisco Department of Emergency Management	Yes
Washington, D.C.: Office of Unified Communications	Yes

3&4. Does your agency have a built in "wrap time" that occurs after a call taker finishes a call to prevent their answering the next call?

Jurisdiction and Agency Name	Response
Fairfax County, VA: Department of Public Safety Communications	No Wrap Time
Houston, TX: Houston Emergency Center	No Wrap Time
Louisville, KY: MetroSafe Consolidated Communications	3 seconds
Montgomery County, Maryland: Emergency Communications Center	No Wrap Time
Phoenix, AZ: Phoenix Police Department	No Wrap Time
San Francisco, CA: San Francisco Department of Emergency Management	30 seconds
Washington, D.C.: Office of Unified Communications	12 seconds

5. [If your agency has wrap-time,] Do your call-takers have to "opt in" to receive their next call prior to the wrap time conclusion?

Jurisdiction and Agency Name	Response
Fairfax County, VA: Department of Public Safety Communications	n/a
Houston, TX: Houston Emergency Center	n/a
Louisville, KY: MetroSafe Consolidated Communications	Opt out to make unavailable
Montgomery County, Maryland: Emergency Communications Center	n/a
Phoenix, AZ: Phoenix Police Department	n/a
San Francisco, CA: San Francisco Department of Emergency Management	Opt in to receive next call
Washington, D.C.: Office of Unified Communications	Opt out to make unavailable

6. Can your call takers make themselves unavailable if they need additional time to finish a call?

Jurisdiction and Agency Name	Response
Fairfax County, VA: Department of Public Safety Communications	Yes
Houston, TX: Houston Emergency Center	Yes
Louisville, KY: MetroSafe Consolidated Communications	Yes
Montgomery County, Maryland: Emergency Communications Center	No
Phoenix, AZ: Phoenix Police Department	Yes
San Francisco, CA: San Francisco Department of Emergency Management	Yes
Washington, D.C.: Office of Unified Communications	Yes

7. Do your dispatchers answer incoming calls while working a radio position?

Jurisdiction and Agency Name	Response
Washington, D.C.: Office of Unified Communications	No
Fairfax County, VA: Department of Public Safety Communications	No
Louisville, KY: MetroSafe Consolidated Communications	Yes
Montgomery County, Maryland: Emergency Communications Center	No
Phoenix, AZ: Phoenix Police Department	No
San Francisco, CA: San Francisco Department of Emergency Management	No
Houston, TX: Houston Emergency Center	No

Though Metrosafe Consolidated Communications indicated that dispatchers in some cases answered calls while working a radio position, the agency noted in comments that this was done so only on secondary fire channels that did not have any incidents dispatched and on relief positions at times when no breaks were scheduled to occur.

8. If your agency handles multiple disciplines (police, fire, emergency medical), are all of your staff universally trained?

Jurisdiction and Agency Name	Response
Washington, D.C.: Office of Unified Communications	Yes
Fairfax County, VA: Department of Public Safety Communications	No
Louisville, KY: MetroSafe Consolidated Communications	No
Montgomery County, Maryland: Emergency Communications Center	No
Phoenix, AZ: Phoenix Police Department	No
San Francisco, CA: San Francisco Department of Emergency Management	Yes
Houston, TX: Houston Emergency Center	No

Note that the Phoenix Police Department transfers fire and medical calls to a secondary PSAP.

9. What are your shift lengths (in hours)? Please select all that apply.

Jurisdiction & Agency Name	8h	10h	12h	24h	Other
Fairfax County, VA: Department of Public Safety Communications			✓		
Houston, TX: Houston Emergency Center	✓				
Louisville, KY: MetroSafe Consolidated Communications	✓				
Montgomery County, Maryland: Emergency Communications Center	✓		✓	✓	
Phoenix, AZ: Phoenix Police Department	✓	✓			
San Francisco, CA: San Francisco Department of Emergency Management	✓	✓			
Washington, D.C.: Office of Unified Communications					✓
Total	5	2	2	1	1

Washington, D.C., which replied "Other", uses 12.5 hour shifts with one 8.5 hour swing day for its 911 personnel.

10. How many start times do you have for your shifts?

Jurisdiction	# of Start Times
Fairfax County, VA: Department of Public Safety Communications	2
Houston, TX: Houston Emergency Center	5
Louisville, KY: MetroSafe Consolidated Communications	3
Montgomery County, Maryland: Emergency Communications Center	8
Phoenix, AZ: Phoenix Police Department	5
San Francisco, CA: San Francisco Department of Emergency Management	11
Washington, D.C.: Office of Unified Communications	2 to 3

11. Does your agency employ part-time or an as-needed pool of employees? Please check all that apply.

Jurisdiction and Agency Name	Response
Fairfax County, VA: Department of Public Safety Communications	
Houston, TX: Houston Emergency Center	
Louisville, KY: MetroSafe Consolidated Communications	
Montgomery County, Maryland: Emergency Communications Center	As-needed
Phoenix, AZ: Phoenix Police Department	Part-time
San Francisco, CA: San Francisco Department of Emergency Management	
Washington, D.C.: Office of Unified Communications	

12. Does your agency use a paper-based or electronic scheduling process? If electronic, which system?

Jurisdiction and Agency Name	Paper or Electronic
Fairfax County, VA: Department of Public Safety Communications	Paper-based
Houston, TX: Houston Emergency Center	Electronic
Louisville, KY: MetroSafe Consolidated Communications	Paper-based
Montgomery County, Maryland: Emergency Communications Center	Electronic
Phoenix, AZ: Phoenix Police Department	Electronic
San Francisco, CA: San Francisco Department of Emergency Management	Paper-based
Washington, D.C.: Office of Unified Communications	Paper-based

Only Houston Emergency Center uses an electronic scheduling system (Schedule Express). However, Washington, D.C. is currently in the process of transitioning to an electronic system.

13. Does your agency use a formula or statistical model to determine its minimum staffing levels by hour of the day and day of the week?

Jurisdiction & Agency Name	No	Yes
Fairfax County, VA: Department of Public Safety Communications		✓
Houston, TX: Houston Emergency Center		✓
Louisville, KY: MetroSafe Consolidated Communications	✗	
Montgomery County, Maryland: Emergency Communications Center		✓
Phoenix, AZ: Phoenix Police Department		✓
San Francisco, CA: San Francisco Department of Emergency Management		✓
Washington, D.C.: Office of Unified Communications		✓
Grand Total	**1**	**6**

14. If your employees have a paid lunch, how long is it?

15. If your employees have a paid lunch, do you have the ability to call them back to the floor during their lunch if they are needed? What are the requirements for calling them back from lunch?

Jurisdiction and Agency Name	14. Paid Lunch?	15. Call Back?
Fairfax County, VA: Department of Public Safety Communications	60 mins	Yes
Houston, TX: Houston Emergency Center	No Paid Lunch	
Louisville, KY: MetroSafe Consolidated Communications	30 mins	
Montgomery County, Maryland: Emergency Communications Center	30 mins	
Phoenix, AZ: Phoenix Police Department	30 mins	Yes
San Francisco, CA: San Francisco Department of Emergency Management	60 mins	
Washington, D.C.: Office of Unified Communications	No Paid Lunch	

E. Survey Tool

Division of Emergency Communications Peer Jurisdiction Survey

The San Francisco Department of Emergency Management (SFDEM) is reviewing its staffing levels and scheduling processes, and would appreciate your response to this survey by Friday, October 4th. This multiple choice survey should take no longer than 5 minutes to complete.

For questions about this survey or to request a copy of the results, please contact Lisa Hoffmann, Deputy Director of SFDEM, at lisa.hoffmann@sfgov.org.

*Please tell us about your agency. Your contact information will help us follow up with you for further discussion of the survey questions if needed.

Agency Name

Contact First and Last Name

Contact Email

Does your agency use an automatic call distribution (ACD) system to route incoming calls?

◯ Yes

◯ No

Comment:

Does your agency have a built in "wrap time" that occurs after a call taker finishes a call to prevent their answering the next call?

◯ Yes

◯ No

◯ N/A

Comment:

If you have a built-in wrap time, how long is it in seconds?

Page 1

Division of Emergency Communications Peer Jurisdiction Survey

Do your call-takers have to "opt in" to receive their next call prior to the wrap time conclusion?

◯ Opt in to receive next call

◯ Opt out to make unavailable

◯ N/A

Comment:

[   ]

Can your call takers make themselves unavailable if they need additional time to finish a call?

◯ Yes

◯ No

Comment:

[   ]

Do your dispatchers answer incoming calls while working a radio position?

◯ Yes

◯ No

Comment:

[   ]

If your agency handles multiple disciplines (police, fire, emergency medical), are all of your staff universally trained?

◯ Yes

◯ No

Comment:

[   ]

Page 2

Division of Emergency Communications Peer Jurisdiction Survey

What are your shift lengths (in hours)? Please select all that apply.

- [ ] 8h
- [ ] 10h
- [ ] 12h
- [ ] 12h+Variable length shift
- [ ] 13h20m
- [ ] 24h
- [ ] Other (please specify):

How many start times do you have for your shifts?

Does your agency employ part-time or an as-needed pool of employees? Please check all that apply.

- [ ] Part-time
- [ ] As-needed

Comment:

Does your agency use a paper-based or electronic scheduling process? If electronic, which system?

- [ ] Paper-based scheduling process
- [ ] Electronic scheduling system (please enter the name of the system below)

Comment and/or name of electronic scheduling system:

Division of Emergency Communications Peer Jurisdiction Survey

Does your agency use a formula or statistical model to determine its minimum staffing levels by hour of the day and day of the week? If so, can you provide documentation on your approach?

◯ Yes, and we are willing to provide further documentation on approach to setting minimum staffing levels.

◯ Yes

◯ No

Comment

[   ]

If your employees have a paid lunch, how long is it?

◯ Not Applicable - no paid lunch

◯ Yes. Length in minutes:

[   ]

If your employees have a paid lunch, do you have the ability to call them back to the floor during their lunch if they are needed? What are the requirements for calling them back from lunch?

◯ No

◯ Not applicable - no paid lunch

◯ Yes. The requirements for calling employees back from lunch are:

[   ]

How many calls does your agency handle in a year, on average? Please provide figures for both emergency and non-emergency calls.

[   ]

Division of Emergency Communications Peer Jurisdiction Survey

What types of calls does your agency handle? Please check all answers that apply.

☐ Police

☐ Fire

☐ Emergency Medical

☐ Non-Emergency (3-1-1)

☐ Other (please specify):

```
[                                                    ]
```

How many 9-1-1 personnel does your agency currently employ?

```
[                                      ]
```

DEM 9-1-1 Staffing and Scheduling Analysis
Appendix F

Business Process (As-is)*

For Key Scheduling Processes

Controller's Office, City Services Auditor, City Performance Unit

Corina Monzón, Wylie Timmerman, Sarah Swanbeck

January 17, 2014

***Note: Draft Business Rules and Business Requirements have been omitted from this version of the report
while DEM completes further work defining its system requirements for scheduling software.**

Contents

Business Processes

A) Bi-Annual Sign-up

i) Summary of Findings and Recommendations

- **Finding 1:** The paper-based process for preparing for the bi-annual sign-up and distributing related documents causes inefficient use of supervisor time and risks of inaccuracy.

  o Activities that require a significant use of staff time include:
    - A3. Create a draft Bi-Annual Sign-Up Sheet for each of the 11 shifts. This document is prepared manually in Microsoft Word based on the number of slots available for the bi-annual sign-up. This process also requires supervisors to prepare a demonstration daily schedule to confirm the number of slots for each shift is adequate. This process verifies that DEC will generally be able to reach its minimum staffing levels at all hours of the day, but requires the creation of a daily schedule for each watch (three total). This time consuming process is described in section E.
    - A5. Circulate Bi-Annual Sign-Up. While the effort required for this activity appears to be minimal for supervisors and coordinators, the process could be streamlined through the use of sign-up processes available in DEM's PeopleSoft system.
    - A7. Document Change of Watch, Floating Holidays, and Vacation Days for Each Dispatcher. Based on the results of the sign-up process, scheduling supervisors will create a customized single-page summary for all DEC 8238s, 8239s, and 8240s. This process is done manually in Microsoft Word by referencing multiple source documents on paper.
  o Activities at risk of improper execution include:
    - A2. Determine how many dispatchers will be available for the bi-annual sign-up.
      - Not all conditions under which dispatchers are ineligible for sign-up are documented in the General Orders. In addition to circumstances documented in the General Orders, scheduling supervisors also exclude from the sign-up dispatchers who are *planning* long-term leaves of absence or who are pregnant.
      - If DEM staff do not notify the scheduling supervisors of planned absences, the number of dispatchers available will be inaccurately calculated. While this issue can be resolved through the two-week viewing period (Activity A4), inaccuracies lead to rework.

- ▪ A5. Circulate Bi-Annual Sign-Up.
  - • Though a list of dispatchers by seniority can be generated from PeopleSoft, dispatchers and scheduling supervisors have identified errors in the order of seniority produced by PeopleSoft. As a result, the scheduling supervisors maintain a seniority list in their own records that is used to circulate the bi-annual sign-up.
  - • When supervisors and coordinators circulate the bi-annual sign-up, General Orders and union collective bargaining agreements specify the manner in which the process is to be carried out. While the Controller's Office observed no errors in the execution of this process, the myriad business rules to be followed and lengthy circulation process add risk of improper execution.

- **Recommendation 1.1:** Procure scheduling software or develop functionality in PeopleSoft to allow for an electronic bi-annual sign-up. This will result in increasing the convenience of the sign-up process for DEM staff members, reduced workload for scheduling supervisors, and fewer opportunities for error.
- **Recommendation 1.2:** Develop functionality to automatically generate a list of dispatchers eligible for the bi-annual sign-up, ordered by seniority.
  - o Verify the seniority list maintained by the scheduling supervisors and the list generated by PeopleSoft using personnel data and relevant MOU language and city policy. This validation is necessary because an individual dispatcher's start date may not be clear given the length of dispatcher training.
  - o Ensure that individuals in training, on long-term leave, and planning long-term leaves of absences are consistently recorded in PeopleSoft.
  - o Create a PeopleSoft query to provide scheduling supervisors with the list of dispatchers eligible for the bi-annual sign-up by seniority. Ensure that this query can distinguish seniority levels between individuals with the same DEC start date.
- **Recommendation 1.3:** Document in General Orders all circumstances under which employees are not able to participate in the bi-annual sign-up, including circumstances where dispatchers are planning long-term leave or are pregnant. Define long-term leave in General Orders as more than 50 percent of a watch (i.e., 3 out of 6 months), the definition used in side-letter agreements with DEC unions.
- **Finding 2:** "Write-ins" during the bi-annual sign-up process can lead to unequal distributions of workload when "write-in" dispatchers add themselves to shifts that are already filled.

  - o During the bi-annual sign-up process, scheduling supervisors allocate sign-up slots across DEC's eleven start times. Already, Scheduling Supervisors modify the slots offered for sign-up to minimize the impact of write-in dispatchers

returning from leave and to ensure a more level distribution of dispatchers over each hour. This is done by slightly reducing the number of slots available in the shifts most likely to be chosen by write-in dispatchers. However, because write-in dispatchers can also choose their days off, imbalances in workload may still remain.

- o The addition of write-in dispatchers can lead to undesirable distributions of dispatchers throughout shifts and watches off. As a result, some days may be overstaffed, and others may be understaffed. Supervisors must address this uneven distribution by granting discretionary leave to dispatchers in the overstaffed hours, and requesting overtime to fill shifts in understaffed hours.
- o For each change of watch, scheduling supervisors estimate that they must accommodate approximately thirteen write-in dispatchers.

- **Recommendation 2:** Minimize the number of "write-in" sign-ups through managing leave use. In particular, the Department should more closely track non-accrued leave use, like unpaid sick time. The Department should take advantage of the ability to track FMLA through eMerge PeopleSoft assignment codes.

- **Finding 3:** The department's practice is not to reduce the number of sign-up slots offered once the two week bi-annual sign-up viewing period begins in Activity A3. If a dispatcher does not notify of their supervisor(s) of a planned long-term leave of absence prior to the two week bi-annual sign-up viewing period, a surplus of one sign-up slot will be offered in the bi-annual sign-up(see Activity A4). As a result, the distribution of sign-up slots chosen by dispatchers can lead to unequal allocations of workload.
- **Recommendation 3.1:** Reinforce department policy that dispatchers must notify their supervisors of planned leaves of absence (Activity A1).
- **Recommendation 3.2:** Make changes to department policy so that unnecessary sign-up slots may be removed during the two week bi-annual sign-up viewing period (Activity A4).

- **Finding 4:** Scheduling Supervisors comply with policies and procedures described in the General Orders when conducting the bi-annual sign-up.

ii) As-Is Process Narrative

The DEM Bi-Annual Sign-Up allows dispatchers, supervisors and coordinators to sign-up for a preferred watch and shift, given each employee's current seniority and available shifts. This process takes approximately 10 weeks and is completed each year in September and March, in time for the Changes of Watch in those months.

When scheduling 8238s, Scheduling Supervisors begin this process by requesting information on planned leaves of absence from dispatchers and supervisors (Activity A1). This information is used to calculate the number of dispatchers available during the upcoming sign-up, given the rules provided in the General Orders and union collective bargaining agreements (A2). The scheduling supervisors then create a draft bi-annual sign-up sheet in Microsoft Word for each of the 11 shifts (A3). Supervisors post the available slots for two weeks for employees to review for errors, such as discrepancies in the order of seniority (A4). Once this viewing period is complete, watch supervisors and coordinators circulate the sign-up sheets among employees according to their seniority and rules prescribed in the General Orders, union collective bargaining agreements (CBA), and side-letter agreements (A5). Before the bi-annual sign-up is finalized, scheduling supervisors post the sign-up sheets in the break room for an additional two weeks for employees to review and confirm that sign-up sheets were circulated in the order of seniority (A6). Once the vacation and floating holiday processes (B and C) have also been completed for each dispatcher, the results of the bi-annual sign-up are documented for each dispatcher (A7) and the bi-annual sign-up process is completed (A8).

Figure 1. Bi-Annual Sign-Up page for 0300 to 1300 shift. (Note: Dispatcher names removed)

0300-1300

NAME	SAT	SUN	MON	TUE	WED	THU	FRI	MOBILI-ZATION	SUP INT
	H	H	H					LATE	Donohue
		H	H	H				EARLY	Jd
			H	H	H			LATE	Amy
				H	H	H .		EARLY	
				H	H	H		LATE	Amy
					H	H	H	EARLY	
	H					H	H	LATE	
	H	H					H	EARLY	

iii) Table of As-is Process

Table 1. As-Is Bi-Annual Sign-Up and Change of Watch Process

Process ID	Activity	Description
A1.	**Request Information on Planned Leaves of Absences** *Performed by: Scheduling Supervisors*	Approximately two and a half months prior to a change of watch, scheduling supervisors will request that dispatchers notify their supervisors of any planned leaves of absences. Watch supervisors then communicate this information to scheduling supervisors.
A2.	**Determine How Many Dispatchers Will Be Available for the Bi-Annual Sign-Up** *Performed by: Scheduling Supervisors*	Based on feedback from watch supervisors, the scheduling supervisors will calculate the number of dispatchers eligible for the bi-annual sign-up. In recent sign-ups, this number has fluctuated between 124 and 148 individuals. This number determines the number of slots provided for each of eleven shifts (Activity A3). Individuals are eligible for sign-up based on rules established in the General Orders, CBAs and side letter agreements, as well as practices developed by scheduling supervisors. In general, all individuals not on leave or in training are included in the sign-up. Individuals excluded from sign-up also include those who are planning leaves of absence or who are pregnant. If scheduling supervisors are not properly notified of planned absences, the number of bi-annual sign-up slots offered may be incorrect. In order to tabulate this figure, the scheduling supervisors will first update the list of dispatchers by seniority. Though seniority information is maintained in eMerge PeopleSoft, dispatchers and scheduling supervisors identified errors in the order of seniority produced by PeopleSoft. As a result, the scheduling supervisors maintain a seniority list in their own records. Individuals who are not eligible for the bi-annual sign-up are grayed out on this seniority list. Scheduling supervisors will then determine the number of bi-annual sign-up slots by counting the number of remaining names.
A3.	**Create A Draft Bi-Annual Sign-Up Sheet for Each of the 11 Shifts**	Scheduling supervisors distribute the number of sign-up slots in Activity A2 amongst the eleven shifts, seeking a distribution of staff members that will make it practical to meet minimum staffing levels. Supervisors prepare these documents in Microsoft Word, typically by adding or removing slots from a sign-up sheet from the previous

Process ID	Activity	Description
	Performed by: Scheduling Supervisors	change of watch. The department's practice is to make the number of 4-10 shifts only slightly less than the number of 5-8 shifts, given staff preferences for longer shifts. The result of this activity is reviewed by dispatchers in Activity A4. Currently, the process of distributing sign-up slots is heavily reliant on the judgment and expertise of scheduling supervisors. This process is also time consuming, requiring over a week and forty or more hours for a scheduling supervisor to complete. Some considerations of the scheduling supervisors in this process include: • Where the number of slots in a shift is not divisible by seven (the number of days in a week), a shift will be staffed lower on one or more days. In the case of 5-8 shifts, this is because each remainder shift must have watch off on two days, which will result in higher staffing levels on the remaining five days. Scheduling supervisors must determine which days are most appropriate for higher staffing levels and place watch off days accordingly. • Modifying the slots offered for sign-up to minimize the impact of write-in dispatchers returning from leave and to ensure a more level distribution of dispatchers over each hour. This is done by slightly reducing the number of slots available in the shifts most likely to be chosen by write-in dispatchers. • Ensuring overtime is available to fill potential shortfalls in staffing on a shift (e.g., because staff are unlikely to accept overtime between 0300 and 0700, these hours must be adequately staffed). If necessary, the scheduling supervisors will continue to make modifications to the bi-annual sign-up sheets. For a particular slot, these changes may involve changing the slot's days off (e.g., from Saturday and Sunday to Sunday and Monday) or moving the slot to another shift (e.g., dropping one eight hour shift from 0700 to 1500 and adding a ten hour shift from 0300 to 1300). Individuals who are pregnant or planning long-term leave will continue at their current shift and watch-off times. However, these individuals are not considered during the distribution of bi-annual sign-up slots. Before posting the bi-annual sign-up sheets for two weeks (Activity A4), the scheduling supervisors will draft daily schedules for each of the three watches to

Process ID	Activity	Description
		confirm minimum staffing levels can be reached with the sign-up slots provided (see process E for further details).
A4.	**Two Week Bi-Annual Sign-Up Viewing Period** *Performed by:* *Dispatchers*	Bi-annual sign-up pages are posted in the DEC break room for viewing for two weeks before the beginning of the bi-annual sign-up (Activity A5). During this time, dispatchers can check that the order of seniority is correct and make other comments on the sign-up. No changes to the seniority list are made after the two week viewing period ends. If necessary, the scheduling supervisors can add additional sign-up slots, but cannot drop any slots.
A5.	**Circulate Bi-Annual Sign-Up** *Performed by: Watch Supervisors and Coordinators*	The eleven Bi-Annual Sign-Up Sheets are distributed by watch supervisors and coordinators to dispatchers in order of dispatcher seniority. Though it requires a minimal level of effort from staff, this process takes approximately four weeks to complete; during the 2012 Fall-Winter sign-up for the September 2012-March 2013 period, this activity occurred between July 28, 2012 and August 24, 2012. When dispatchers are notified that the bi-annual sign-up sheet is "on them", the individual has up to 12 hours to record their decision. Detailed rules for the circulation of the Bi-Annual Sign-Up are provided in the General Orders, union CBAs, and side-letter agreements. Watch supervisors are responsible for ensuring that the 12 hour rule is followed and that the bi-annual sign-up sheet continues to circulate. Some informality exists in this process: if a dispatcher is skipped and the next dispatcher has not yet submitted their choice, supervisors may still allow to the skipped dispatcher to submit their choice before the next person has made their selection. Watch supervisors communicate to each other when a dispatcher has been notified by using post-its and other informal communication. Employees can facilitate the selection of their shift by completing a Watch Selection Form and depositing it with their supervisor. If an employee fails to make a decision within twelve hours or their selected option is not available, their supervisor selects the available eight or ten hour shift nearest to their current shift. If the dispatcher is not satisfied with the shift selected by their supervisor, the dispatcher may reenter the

Process ID	Activity	Description
		shift bidding process, but may not 'bump' any other dispatchers of lower seniority who have already signed up. As dispatchers sign up for a shift, scheduling supervisors will begin the process of documenting the change of watch for those individuals (see Activity A7). Following the completion of the circulation of the bi-annual sign-up, supervisors will begin distributing the Vacation Openings Calendar (see Activity B2).
A6.	**Final Two Week Bi-Annual Sign-Up Viewing Period** *Performed by: Dispatchers*	At the conclusion of the bi-annual sign-up period, the results of the sign-up are posted for two weeks. After vacation and floating holiday sign-ups are completed (B2 and C3), this information will be used to notify dispatchers of their schedule (A7). During this viewing period, the scheduling supervisors will begin creating draft Week at a Glance and Daily Schedules (see process D and E). The change of watch will take effect one month from the end of this viewing period.
A7.	**Document Change of Watch, Floating Holidays, and Vacation Days for Each Dispatcher** *Performed by: Scheduling Supervisors* *Dependencies:* *B2. Circulate Vacation Sign-Up* *C2. Circulate Floating Holiday Openings Calendar*	Given the shift (A5), floating holidays (C3) and vacation days (B2) selected by a dispatcher, the scheduling supervisors will document the change of watch process for each individual. This consists of a customized single-page summary prepared manually in Microsoft Word by referencing multiple source documents on paper. As soon as a dispatcher has signed up for a shift and watches off, scheduling supervisors will begin this documentation. Though not required by General Orders or the MOU agreement, this document is produced for the convenience of the dispatchers; the only official notification supervisors are required to make is to inform dispatchers of their shift two weeks prior to the Change of Watch.
A8.	**Change of Watch Takes Effect (End of Process)**	The Bi-Annual Sign-Up process ends as the Change of Watch takes effect on a Saturday in March and September. Scheduling Supervisors and Watch Supervisors each keep a copy of the bi-annual sign-up for two years.

B) Annual Vacation Sign-up

i) Summary of Findings and Recommendations

- **Finding 5:** "Write-ins" during the vacation sign-up process can lead to unequal distributions of workload when "write-in" dispatchers add themselves to vacation sign-up slots that are already filled.

- **Recommendation 4:** Minimize the number of "write-in" sign-ups through managing leave use. In particular, the Department should more closely track non-accrued leave use, like unpaid sick time. The Department should take advantage of the ability to track FMLA through eMerge PeopleSoft assignment codes.

- **Finding 6:** Scheduling Supervisors comply with policies and procedures described in the General Orders when conducting the annual vacation sign-up.

ii) As-Is Process Narrative

The DEM Vacation Sign-Up allows dispatchers, supervisors and coordinators to sign-up for preferred vacation dates, given each employee's current seniority and available vacation day balances. This process takes approximately 10 weeks and is completed twice each year: once in September following the Bi-Annual Sign-Up for dates in January through March the following year, and in December for dates in January through December the following year. Scheduling Supervisors begin this process by creating a vacation openings calendar for each watch with several vacation openings available for each day (Activity B1). Supervisors then circulate the vacation openings calendar over a period of four to six weeks (B2). When this process ends, handwritten sign-up sheets are typed into Microsoft Word documents (B3). Once the bi-annual and floating holiday sign-up processes (A and C) have been completed for each dispatcher, the results of the vacation sign-up are documented for each dispatcher (B4).

Figure 2. Blank Vacation Sign-Up Calendar for the Midnight Watch

FEBRUARY 2012

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1	2	3	4

iii) Table of As-is Process

Table 2. As-Is Annual Vacation Sign-Up Process

ID	Activity	Description
B1	**Create Vacation Openings Calendar** *Performed by: Scheduling Supervisors*	A twelve-page monthly calendar and cover sheet are prepared in Microsoft Word for each of the three watches, which will be circulated in Activity B2. Scheduling supervisors monitor the number of dispatchers participating in the bi-annual sign-up, as well as the distribution of dispatchers with fifteen or more years of service, to determine how many vacation slots to offer for each day on vacation openings calendars. For midnight and swing shifts, three sign-up slots are typically provided for each day, while for the day shift, which typically has dispatchers with more seniority, four sign-up slots are provided for each day. This activity typically begins two months prior to the end of the vacation sign-up process.
B2	**Circulate Vacation Openings Calendar** *Performed by: Watch Supervisors and Coordinators*	Vacation Openings Sheets (one set for each watch) are distributed by watch supervisors and coordinators to circulate among dispatchers in order of dispatcher seniority in a watch. Though it requires a minimal level of effort from staff, this process takes approximately four to six weeks to complete; during the 2012 Fall-Winter sign-up for the September '12-March '13 period, this activity occurred between July 28, 2012 and August 24, 2012. When dispatchers are notified that the bi-annual sign-up sheet is "on them", the individual has up to 24 hours to record their decision. Watch supervisors are responsible for ensuring that this rule is followed, and that the sign-up continues to circulate among dispatchers. Detailed rules for the circulation of the Vacation Sign-Up are provided in the General Orders, union CBAs, and side-letter agreements. Notably, the floating holiday slots offered in Activity C2 will only be offered on days where some vacation slots have not been chosen by dispatchers. Scheduling supervisors do so in order to avoid having too many dispatchers off watch during any particular day.
B3	**Type Vacation Sign-Up Cover and Calendar Pages** *Performed by: Scheduling Supervisors*	The scheduling supervisor types up the cover page of the vacation openings calendar in Microsoft Word for reference. Vacation Sign-Up documents are stored in the scheduling supervisors' office for two years, and an additional copy is left on the bridge.

ID	Activity	Description
B4	**Document Change of Watch, FHs, and Vacation Days for Each Dispatcher (End of Process)** *Performed by: Scheduling Supervisors* *Dependencies:* *A5. Circulate Bi-Annual Sign-Up* *C3. Circulate Floating Holiday Openings Calendar*	Given the shift (A2), floating holidays (C3) and vacation days selected by a dispatcher, the scheduling supervisors will document the change of watch process for each individual. This consists of a customized single-page summary prepared manually in Microsoft Word by referencing multiple source documents on paper. **Figure 3. Documentation of Change of Watch information for a dispatcher**

C) Floating Holiday Sign-Up

i) Summary of Findings and Recommendations

- **Finding 7:** "Write-ins" during the vacation sign-up process can lead to unequal distributions of workload when "write-in" dispatchers add themselves to vacation or floating holiday slots that are already filled.

- **Recommendation 5:** Minimize the number of "write-in" sign-ups through managing leave use. In particular, the Department should more closely track non-accrued leave use, like unpaid sick time. The Department should take advantage of the ability to track FMLA through eMerge PeopleSoft assignment codes.

- **Finding 8:** Scheduling Supervisors comply with policies and procedures described in the General Orders when conducting the floating holiday sign-up.

ii) As-Is Process Narrative

The DEM Floating Holiday Sign-Up allows dispatchers, supervisors and coordinators to sign-up for preferred floating holiday dates, given each employee's current seniority and floating holiday entitlement. This process takes approximately 10 weeks and is completed twice each year in September and March alongside the Bi-Annual Signup. Scheduling Supervisors begin this process by calculating the number of floating holiday sign-up slots that must be provided (C1). The scheduling supervisors then create a floating holiday openings calendar for each watch, distributing floating holiday slots so that minimum staffing levels can be reached each day without excessive use of overtime (C2). Supervisors then circulate the floating holiday openings calendar over the course of four to six weeks (C3). When this process ends, handwritten sign-up sheets are typed up into Microsoft Word documents (C3). Once the bi-annual and vacation sign-up processes (A and B) have been completed for each dispatcher, the results of the floating holiday sign-up are documented for each dispatcher (C4).

Figure 4. Blank Floating Holiday Sign-Up Calendar for Day Watch, showing fewer sign-up slots

JUNE 2012-DAYS

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1	2
3	4	5	6	7	8	9

iii) Table of As-is Process

Table 3. Floating Holiday As-is Process

ID	Activity	Description
C1	**Calculate total number of floating holiday sign-up slots that must be provided** *Performed by: Scheduling Supervisors* *Dependencies:* *Union collective bargaining agreement and side-letter information* *Scheduling Supervisor notification of individuals currently on long-term*	Before preparing floating holiday sign-up calendars (Activity C2), scheduling supervisors will determine how many floating holiday sign-up slots to provide. First, scheduling supervisors will calculate the number of floating holiday days that will be added to dispatcher leave balances during the fiscal year. In most years, scheduling supervisors must provide each dispatcher with two floating holiday days in a six month period. This can vary as a result of union contract negotiations and an individual's years of service. Dispatchers who have reached twenty years of service receive an additional floating holiday each year. As in other processes, individuals currently on long-term leave or who are planning to go on long-term leave during the upcoming change of watch are excluded from the floating holiday sign-up and this calculation. These individuals will write-in their

ID	Activity	Description
	leave and those planning long-term leave.	preferences for floating holidays after the floating holiday sign-up has been circulated. Second, based on the number of floating holidays that must be provided to dispatchers, the scheduling supervisors will determine the number of floating holiday slots that must be offered during the floating holiday sign-up. The number of slots offered each day must be high enough to ensure that floating holiday balances can be used, but low enough to ensure that no particular day has too many dispatchers off duty. Limiting the number of floating holiday slots on each particular day helps to ensure that DEC staffing will be adequate given the number of vacation days that have already been provided. However, scheduling supervisors must offer a surplus of floating holiday sign-up slots because some slots may not be usable by dispatchers, given each dispatcher's scheduled days off and vacation requests. While dispatchers may have unused floating holidays from previous years, DEC typically does not allow dispatchers to schedule these days through the FH sign-up process; rather, the discretionary leave process is used. For example, if dispatchers had a balance of eighty floating holidays in total, scheduling supervisors would need to provide for approximately 120 slots of floating holiday days across a six month period of time.
C2	**Create Floating Holiday Openings Calendar** *Performed by: Scheduling Supervisors* *Dependencies:* *Completion of Vacation Sign-Up*	A twelve-page monthly calendar and cover sheet are prepared for each of the three watches, in a format identical to the vacation sign-up sheets. Scheduling Supervisors will distribute a number of sign-up slots on these days equal to the figure calculated in Activity C1. In this process, supervisors attempt to ensure that minimum staffing levels can be reached each day without excessive use of overtime to fill the shifts of individuals on leave. Scheduling Supervisors complete this process as follows: • Scheduling Supervisors begin with a blank monthly calendar with three to four blank sign-up slots for each day. • Scheduling Supervisors remove slots on legal holidays because of the difficulty of filling these days with overtime. • For remaining days, a floating holiday slot is removed for each vacation day scheduled

ID	Activity	Description
		for that day. For instance, if two dispatchers requested vacation on April 4th, two floating holiday slots on that day would be removed.
		• On days with three or more floating holiday slots remaining, scheduling supervisors remove additional slots until no more than two slots remain.
		• Supervisors will make a tally of how many floating holiday slots are provided on each page, and check the six month total against the figure calculated in Activity C1.
		• Scheduling supervisors will add or subtract FH slots on particular days to match the figure from C1. While the addition of slots may lead to days with too many individuals on leave, scheduling supervisors will add those days selectively. For instance, the scheduling supervisors may add slots for a watch on days that have relatively few individuals off-duty on other watches. As a result, scheduling supervisors will create situations where it is easier to obtain overtime from other watches. Typically, scheduling supervisors do not check the impact of FH slot placement against a draft daily schedule.
		This time intensive process takes roughly fifteen hours over one to two weeks to complete.
C3	**Circulate Floating Holiday Openings Calendar** *Performed by: Watch Supervisors and Coordinators*	One calendar for each watch is distributed by watch supervisors and coordinators to dispatchers in order of dispatcher seniority within a watch. Though it requires a minimal level of effort from staff, this process takes approximately four to six weeks to complete. When dispatchers are notified that the bi-annual sign-up sheet is "on them", the individual has up to 24 hours to record their floating holiday preferences on two floating holiday sign-up slots. Dispatchers with twenty or more years of service will complete this sign-up process twice during the March sign-up: first, selecting two floating holidays; second, once the floating holiday calendar has been circulated through all dispatchers, the calendar will be circulated amongst these dispatchers once more for them to request dates for their additional floating holidays. If the MOU provides dispatchers with more than four floating holidays in one year, scheduling supervisors may allow all dispatchers to sign-up for more than two floating holiday days in a sign-up period. Detailed rules for the circulation of the Floating Holiday calendars are provided in the General Orders, union CBAs, and side-letter agreements.

ID	Activity	Description
C4	**Type Floating Holiday Sign-Up Cover and Calendar Pages** *Performed by: Scheduling Supervisors*	The scheduling supervisors type into Microsoft Word the completed floating holiday monthly calendars for each watch (C3). Floating Holiday Sign-Up documents are stored in the scheduling supervisors' office for two years, and an additional copy of the sign-up is left on the supervisors' bridge.
C5	**Document Change of Watch, Vacation Days, and FH for Each Dispatcher (End of Process)** *Performed by: Scheduling Supervisors* *Dependencies:* *A5. Circulate Bi-Annual Sign-Up* *C2. Circulate Floating Holiday Openings Calendar*	Given the shift (A5), floating holidays (C3) and vacation days (B2) selected by a dispatcher, the scheduling supervisors will document the change of watch process for each individual. This consists of a customized single-page summary prepared manually in Microsoft Word by referencing multiple source documents on paper. Depending on how quickly the floating holiday sign-up is completed, dispatchers may be notified of their floating holiday decisions after they are notified of their shifts/watches off and vacation days.

D) Week at a Glance

i) Summary of Findings and Recommendations

- **Finding 9:** Information from Bi-Annual Sign-Up, Vacation Sign-Up, and Floating Holiday Sign-Up documents is transferred by hand into the week at a glance.

  - To this point, scheduling supervisors have transferred each dispatcher's shift, vacation dates, and floating holiday dates manually between several documents. For instance, once a dispatcher records their vacation days on both a vacation sign-up cover page and monthly calendars, scheduling supervisors enter this information into Microsoft Word twice (cover page summary and monthly calendars), and re-enter this information into "masked out" weeks at a glance in Microsoft Excel (Activity D2). In Process E. Daily Schedule and Break Schedule, this information will also be manually transferred from WAGs into corresponding daily schedules. In total, this information is recorded in six places by supervisors and dispatchers leading up to the daily schedule. A similar transferral process exists for the bi-annual sign-up and floating holiday sign-up processes.

- **Recommendation 6:** To the extent possible, automatically generate week-at-glance documents based on information in the bi-annual sign-up, vacation sign-up, floating holiday sign-up, and other department processes.

- **Finding 10:** Write-in dispatchers make it difficult for scheduling supervisors to ensure that fire rotations are evenly distributed across a watch.

- **Recommendation 7:** Minimize the number of "write-in" sign-ups through managing leave use. In particular, the Department should more closely track non-accrued leave use, like unpaid sick time. The Department should take advantage of the ability to track FMLA through eMerge PeopleSoft assignment codes.

ii) As-Is Process Narrative

The DEM Week at a Glance (WAG) pages allow supervisors and coordinators to see information about dispatcher schedules from various sources in one table. For a given week and watch, the document shows each day as a column and each employee as a row. The employee's status (on duty, off duty, in training, etc.) is recorded in each cell of the table.

Figure 5. "Masked Out" Week at a Glance Document

WEEK AT A GLANCE

		14-Sep	15-Sep	16-Sep	17-Sep	18-Sep	19-Sep	20-Sep
	1100-2100	SAT	SUN	MON	TUE	WED	THU	FRI
F2	Dispatcher 1	H	H	H				
F3	Dispatcher 2		H	H	H			
F1	Dispatcher 3	VA	H	H	H			

Based on the results of the bi-annual sign-up, scheduling supervisors will prepare a master week at a glance document (D1) that will be used to generate week at a glance documents for each week (see Activity D2).

These "masked out" week at a glance documents will include the following schedule information for dispatchers:

- Shift and Regularly Scheduled Days Off from Bi-Annual Sign-Up (Process A)
- Vacation Days from Vacation Sign-Up (Process B)
- Floating Holidays from Floating Holiday Sign-Up (Process C)
- Trades of Watch
- Discretionary Time Off
- Fire Rotations
- Training
- Write-In Status
- Other Leave (e.g., FMLA, WC, etc.)
- Modified schedule (e.g., 2300 to 0300 schedule)

iii) Table of As-is Process

Table 4. As-is Week at a Glance Process

ID	Activity	Description
D1.	**Prepare Master Week at a Glance** *Performed by: Scheduling Supervisors* *Dependencies: A5. Circulate Bi-Annual Sign-Up* *B2. Circulate Vacation Openings Calendar* *C2. Circulate Floating Holiday Openings Calendar*	As a dispatcher signs up for a shift and watches off during the bi-annual sign-up, scheduling supervisors will add the individual's name to a master week at a glance document that will be used to generate week at a glance documents for each week (see Activity D2). Supervisors document each watch in separate WAG documents. This process continues until all dispatchers have completed the bi-annual sign-up. The master WAG shows one column for each day of the week (Saturday through Friday) and one row for each dispatcher. Dispatchers are grouped by shift start time, and sorted by watch off and seniority. The master WAG table will show each employee's fire tour and regular watches off, but otherwise no schedule information. Write-in dispatchers, dispatchers who are planning leave and are not eligible for the bi-annual sign-up, and empty slots ("No filled in sign-[ups]") are highlighted in the master WAG to help answer questions regarding the distribution of staff. This information is also necessary to determine whether fire rotations are evenly distributed across a watch; if need be, scheduling supervisors will reassign fire tours during this activity. The Master WAG is prepared in Microsoft Excel, and when printed, the watches are shown in the order of Mids, Days, and Swings. **Figure 6. Week at a Glance Example** <table><tr><td colspan="9" align="center">WEEK AT A GLANCE</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2" align="center">0300-1300</td><td>SAT</td><td>SUN</td><td>MON</td><td>TUE</td><td>WED</td><td>THU</td><td>FRI</td></tr><tr><td>F1</td><td>DISPATCHER 1</td><td>H</td><td>H</td><td>H</td><td></td><td></td><td></td><td></td></tr><tr><td>F2</td><td>DISPATCHER 2</td><td></td><td>H</td><td>H</td><td>H</td><td></td><td></td><td></td></tr><tr><td>F3</td><td>DISPATCHER 3</td><td></td><td></td><td>H</td><td>H</td><td>H</td><td></td><td></td></tr></table>
D2.	**"Mask Out" Week at a Glance**	Scheduling supervisors add schedule information to the week at a glance in a process called "masking." Upon completing this activity, scheduling supervisors transfer "masked out" weeks at a glance to watch supervisors and coordinators in Activity D3.

ID	Activity	Description
	(End of Process) *Performed by: Scheduling Supervisors* *Other schedule information* • *Training Schedule* • *Event calendar* • *Discretionary time off* • *Trades of watch*	Scheduling supervisors mask out the WAG by entering vacation time, floating holidays, discretionary time off, trades of watch, requests for a special schedule that have been approved, other leave (FMLA, Workers Comp), and trades of watch (shown as the name of the person fulfilling the trade). Other types of leave, such as unscheduled sick leave when dispatchers call in sick, are not entered into the WAG. This process takes 1 to 2 hours for each week, including all three watches. Scheduling Supervisors will prepare WAGs for the first several weeks of a change of watch as the bi-annual sign-up is in the second two week viewing period (A7). After the bi-annual sign-up, scheduling supervisors will attempt to complete a week's masked out WAG two months ahead of the week in question. Typically, scheduling supervisors will ask another supervisor to double check this data entry for errors such as missing fire tour assignments and misspelled names. WAGs for past weeks are stored on the DEC server, where they are accessible to supervisors and coordinators. **Figure 7. "Masked Out" Week at a Glance Showing Vacation Days and Write-In Status**

WEEK AT A GLANCE

	1100-2100	14-Sep SAT	15-Sep SUN	16-Sep MON	17-Sep TUE	18-Sep WED	19-Sep THU	20-Sep FRI
F2	Dispatcher 1	H	H	H				
F3	Dispatcher 2		H	H	H			
F1	Dispatcher 3	VA	H	H	H			

E) Daily Schedule and Break Schedule

i) Summary of Findings and Recommendations

- **Finding 11:** Information from Week at a Glance documents is transferred by hand into daily schedules. This process is time consuming for scheduling supervisors.

  o To this point, scheduling supervisors have transferred each dispatcher's shift, vacation dates, and floating holiday dates manually between several documents. For instance, once a dispatcher records their vacation days on both a vacation sign-up cover page and monthly calendars, scheduling supervisors enter this information into Microsoft Word twice (cover page summary and monthly calendars), re-enter it into "masked out" weeks at a glance in Microsoft Excel, and then manually transfer this information from WAGs into corresponding daily schedules. In total, this information is recorded in six places by supervisors and dispatchers leading up to the daily schedule. A similar transferral process exists for the bi-annual sign-up and floating holiday sign-up processes.

- **Recommendation 8:** To the extent possible, automatically generate daily schedules based on information in the week at a glance.

- **Finding 12:** Supervisors may repeat the process of distributing assignments among dispatchers several times as dispatcher schedules change.

  o As dispatchers take unplanned leave or call in sick, the daily schedule will be modified—often many times—by scheduling supervisors and watch supervisors. Modifications include reassigning channels and phone assignments across the hours of a watch while ensuring minimum staffing levels can be reached each hour. Of the scheduling processes, this process requires the most expertise, skill, and time from supervisors.

- **Recommendation 9:** To the extent possible, procure scheduling software or develop functionality in PeopleSoft to allow for an electronic daily schedule where assignments can be automatically redistributed as the schedules of dispatchers change.

- **Finding 13:** Sick leave is inconsistently recorded and may result in unnecessary overtime or inaccurate daily schedules.

  o When a dispatcher calls in sick, these individuals may do so during the watch prior to their own. Watch supervisors during that watch will generally record the information on a "sick board" in the watch supervisors office, but in some circumstances this information is not recorded. In other cases, individuals who are sick will be noted on the sick board but

their names will not be erased at the end of the watch, leading watch supervisors to fill their position with overtime unnecessarily.

- **Recommendation 10**: Alongside the name of the individual written on the sick board, record the date that the dispatcher has called in sick for. If an individual's shift overlaps two watches, write their name on both sick boards.

ii) As-Is Process Narrative

The daily schedule and break schedule is the ultimate product of all DEM scheduling activity, and is used by supervisors and coordinators to ensure that DEC can meet its minimum staffing level throughout the day while serving dispatch, training, and other PSAP needs. Each daily schedule covers the eight hour period of one watch; as a result, there are three daily schedules for each day.

Figure 8. Daily Schedule Excerpt

MIDNIGHTS-TOUR 1			WEDNESDAY				DATE MAY 1,2013			
		1700-0300	2300	2400	0100	0200	0300	0400	0500	0600
	F1	Dispatcher 1	FS	E	F3	F3				
VA	F2	Dispatcher 2								
	F3	Dispatcher 3	(1)			(R)				
	F3	Dispatcher 4	2			8				
	F1	Dispatcher 5		F2	F2					
		1900-0500	2300	2400	0100	0200	0300	0400	0500	0600
	F3	Dispatcher 6	E	2	M			7	7	

A break schedule complements a daily schedule by providing additional detail on the fifteen minute intervals in which dispatchers may take a break. Generally, these fifteen minute breaks are covered by reliever positions shown on the daily schedule (see additional detail in activities E5, E7, and E11 below).

Figure 9. Break Schedule Excerpt (Note: Dispatcher Names Blurred)

MIDNIGHT BREAK SCHEDULE

RELIEVER :_____ FIRE RELIEVER:_____ DATE:___5-1-13___

TIME	RELIEVER	FIRE RELIEVER	PHONES	PHONES
2300	_____ 3	_____ F2	_____	
2315	_____ E	_____ F1		
2330		_____ F3		
2345				

After preparing a Master Week at a Glance (Activity D1) and completing the Change of Watch Process (A9), scheduling supervisors can begin to create a daily schedule template in Microsoft Excel (E1). Once a corresponding "masked out" week at a glance has been finished (D2), scheduling supervisors will load leave and training information from that document into a printed daily schedule by hand (E2). After scheduling supervisors write schedule information from the WAG and Training WAG into a printed daily schedule (E2), they will add lunches and reliever positions into the schedule (E3) to help understand whether the number of call takers will be adequate (E4). Once any necessary overtime has been obtained, scheduling supervisors will continue to add necessary details to the daily schedule, including fire, police and sheriff channel assignments and other key assignments (E5). The final steps for scheduling supervisors before transferring a daily schedule to watch supervisors (E8) are to remove rows of dispatchers on leave (E6) and to create a clean version of the daily schedule for the watch supervisors (E7). For an experienced scheduling supervisor, one day's worth of three watches will take twenty minutes to produce. A less experienced scheduling supervisor may take up to an hour to complete the same process.

After receiving daily schedules, watch supervisors and coordinators will continue to monitor changes to staff levels and make necessary changes to the schedule (E9), including in the hours leading up to the start of a watch. When no further changes to staff levels are expected in the hour prior to a watch, watch supervisors will create a break schedule (E10) and distribute both the daily schedule and break schedule at the watch's dispatcher line-up (E11). Further modifications to the daily schedule will likely be necessary as the watch proceeds (E12), including obtaining additional overtime and rebalancing the distribution of assignments to ensure DEC reaches call-taker minimum staffing levels. When the watch ends, watch coordinators complete the scheduling process by preparing a Daily Watch Coordinator Report (E13).

iii) Table of As-is Process

Table 5 As-Is Daily Schedule and Mask Processes

ID	Activity	Description
E1.	**Create Daily Schedule Template** *Performed by: Scheduling Supervisors* *Dependencies:* *A5. Document Change of Watch* *D1. Prepare Master WAG*	Based on the results of the bi-annual sign-up (A5), scheduling supervisors begin to develop daily schedule templates for each week in the upcoming change of watch in Microsoft Excel. These templates show one column for each hour of the watch (e.g., 2300 to 0700 for midnight watch) and one row for each dispatcher who does not have a watch off day. Dispatchers are grouped by shift start time, and sorted by seniority. Unlike the Week at a Glance, shifts that begin in one watch and end in the next watch are shown in daily schedules for both watches. In these cases, for hours of each watch that a dispatcher is not scheduled to work, these cells are colored black in Microsoft Excel. For instance, for individuals who work 1700-0300, the midnight watch daily schedule will have the cells under 0300, 0400, 0500 and 0600 blacked out next to their names. The daily schedule template will also show each employee's fire rotation as recorded in the Master WAG (D1).
E2.	**Load WAG into Daily Schedule Template for First Time** *Performed by: Scheduling Supervisors* *Dependencies:* *D2. "Mask Out" Week at a Glance*	After actual week at a glance documents are prepared (D2) and Daily Schedule templates are ready (E1), scheduling supervisors can begin daily schedule "pre-masking." In this activity, scheduling supervisors transfer schedule information from a WAG to a printed daily schedule template by hand in order to quickly check staffing levels for a watch. Typically, scheduling supervisors begin pre-masking schedules no more than two to three weeks in advance of the date in question. Color-coded folders in the scheduling supervisors' office hold a week's worth of daily schedules. Pre-Masking steps include: 1) Noting individuals on leave next to the name (e.g., "FH" or "VA") and highlighting the cells in their row in blue to denote their unavailability. 2) Showing individuals in training (both new dispatchers and those returning from leave), highlighted in green to denote that they are not available for all assignments. 3) Highlighting the dispatchers on a fire tour on the day in question. 4) Modifying schedules of dispatchers who have changed watch and have current and new

ID	Activity	Description
		schedules that conflict. Remedies to this issue may include changing a dispatcher's start time for one day.
E3.	**Assign Lunch Break Times And Reliever Positions, Ensuring A Level Number Of Call Takers Throughout The Day** *Performed by: Scheduling Supervisors*	After scheduling supervisors write schedule information from the WAG and Training WAG into a printed daily schedule (E2), they will add lunches and reliever positions into the schedule to help understand whether the number of call takers will be adequate (E4). This process is done by hand on a printed copy of a daily schedule, and takes an experienced scheduling supervisor less than ten minutes to complete. In order to ensure that the number of dispatchers on the floor throughout the day is adequate, scheduling supervisors must stagger the hours that they provide lunches to dispatchers. A dispatcher's lunch break is indicated with an "M" at the intersection of their row and the column of the hour in which their lunch break will be. All employees who work eight hours or more in a day are provided with an hour for lunch, though during this "pre-masking" phase scheduling supervisors have not noted dispatchers who have a shortened schedule. Lunches are never assigned during the first or last hour of an employee's workday. Typically, scheduling supervisors set a dispatcher's breaks two hours before and two hours after the dispatcher has lunch. Dispatchers who work ten hour shifts must also receive a third break during their shift. While scheduling supervisors will not add specific fifteen minute break times into the daily schedule during this activity, they will ensure that breaks can be covered by assigning reliever positions. "Relievers" take over the workstations of a dispatcher as the dispatcher takes a fifteen minute break. As a result, relievers can cover the breaks of four dispatchers per hour. An "R1" on the schedule represents a police reliever position that will cover breaks for dispatchers on phones and police channels, while an "R2" represents a fire reliever position that will cover breaks for dispatchers on phones and fire channels. After lunch times and reliever positions are assigned, scheduling supervisors will proceed to activity E4. **Figure 10. Daily Schedule Template Excerpt with Lunch Breaks and Reliever Positions Added**

ID	Activity	Description

ID	Activity	Description
E4.	**Determine Whether The Number Of Call Takers Meets Minimum Staffing Levels** *Performed by: Scheduling Supervisors*	Using the partial daily schedule prepared in Activity E3, scheduling supervisors will determine whether the number of call takers will be adequate to meet minimum staffing levels. This is an important step for supervisors in determining whether overtime will be necessary. This activity is conducted for each hour of the daily schedule as follows: a) Count the total number of channels needed for police, fire and other positions (varies based on the day of the week and hour of the day). b) Count the number of dispatchers on lunch (see activity E3). c) Count the total number of dispatchers on the floor at each hour (all dispatchers not assigned lunch, the reliever position, on leave, in training, or off duty at that hour). d) Determine the number of call takers by subtracting a) and b) from c). This number is written in the bottom row of the daily schedule, and is an indication to scheduling supervisors of how well staffed DEC is at a particular time. In cases when a dispatcher is "detailed" for a half-an-hour period (e.g., to meet with a supervisor for the first 30 minutes of an hour), scheduling supervisors will note that call taker level varies (e.g., they will write "9/10" when one dispatcher is off the floor for the first 30 minutes of an hour with 10 call takers). If the number of call takers meets the minimum staffing level, scheduling supervisors will proceed to assign channels and other positions (E5). If not, scheduling supervisors will request Overtime (OT) until the number of call takers is adequate.
E5.	**Assign Channels And**	On the same copy of the daily schedule produced in Activity E3, scheduling supervisors will

ID	Activity	Description
	Other Positions *Performed by: Scheduling Supervisors* *Dependencies:* *Event Schedule (if applicable)*	continue to add necessary details to the daily schedule. Compared to other scheduling processes, this activity demands the greatest level of expertise and skill from scheduling supervisors to be done correctly. An experienced scheduling supervisor can complete this process in ten minutes, though it may be repeated several times as dispatcher availability changes. The process is as follows: 1) Scheduling supervisors will assign dispatchers currently on a fire tour to at least three hours at a fire channel position. The fire dispatch channels are as follows. <table><tr><td>Label</td><td>Description</td></tr><tr><td>HS</td><td>"Hot Seat," or dispatching for fire suppression and medical fleet. Level of activity is higher than fire control channels, but not as high as police channels.</td></tr><tr><td>FS</td><td>"Fleet Seat," or dispatching for medical and medical fleet. Level of activity is higher than fire control channels, but not as high as police channels.</td></tr><tr><td>HS/FS</td><td>From 0100 to 0700, scheduling supervisors combine the Hot Seat and Fleet Seat because of the lower number of incidents during those hours. The combined hot seat and fleet seat are noted in this manner.</td></tr><tr><td>F1</td><td>"Control" channel used to provide additional information or resources to on-scene fire and medical personnel.</td></tr><tr><td>F2</td><td>"Control" channel used to provide additional information or resources to on-scene fire and medical personnel.</td></tr><tr><td>F3</td><td>"Control" channel used to provide additional information or resources to on-scene fire and medical personnel.</td></tr></table> Although no rules specify how fire dispatch channels are to be distributed among those on a fire tour, scheduling supervisors attempt to evenly distribute the fleet seat and hot seat positions that are highly sought after. **Figure 11. Daily Schedule with Fire Channel Positions**

ID	Activity	Description
		  2) Scheduling supervisors will then distribute police channels, call-taking positions, and other assignments among the remaining dispatchers. The police channels are as follows:

Label	Description	Police District(s)
1	Dispatch	Central, Southern, and Tenderloin
2	Service	Central, Southern, and Tenderloin
3	Dispatch	Bayview and Mission
4	Service	Bayview and Mission
5	Dispatch	Park and Northern
6	Service	Park and Northern
7	Dispatch	Ingleside and Taraval
8	Service	Ingleside and Taraval

Non-SFPD district station assignments are as follows:

Label	Description
A11	SFPD Traffic Company (does not operate: between 0000 and 0700 Sunday through Thursday; between 0300 and 0700 on Friday and Saturday). Level of activity varies.
A16	Sheriff's Department (does not operate: between 2000 and 0700 Monday through Thursday; after 2200 Friday; on weekends). Level of activity is typically low.
E	Emergency calls call-taking
*	Dropped calls
[blank]	Call-taking assignment

ID	Activity	Description
		If provided advance notice, scheduling supervisors may also plan to add an additional police channel for special events, such as the America's Cup. Business rules followed by scheduling supervisors in this process are documented in Section 2. Business Rules. Having added position assignments, scheduling supervisors will have nearly completed the draft daily schedule. Remaining steps in activities E6 and E7 will prepare the daily schedule for transfer to the watch supervisors in activity E8.
E6.	**Remove Rows Of Dispatchers On Leave And Note At Bottom Of Daily Schedule** *Performed by: Scheduling Supervisors* *Dependencies:* *E2. Load WAG into Daily Schedule Template for First Time*	After entering channel assignments (E5), scheduling supervisors will remove the rows of individuals on leave in the Microsoft Excel file to create room in the printed document for any dispatchers who will be added to the schedule while serving overtime.
E7.	**Type Daily Schedule Information Into Excel And Reprint** *Performed by: Scheduling Supervisors*	Scheduling supervisors will enter some information from the daily schedule prepared in Activity E5 back into Microsoft Excel for record keeping purposes and to make permanent the fire rotation assignments in E5. **Figure 12. Daily Schedule with Fire Channel Positions and Relievers Typed In**

ID	Activity	Description

Description

MIDNIGHTS-TOUR 2   **SATURDAY**   **DATE**

1700-0300			2300	2400	0100	0200	0300	0400	0500	0600
2OT	F1	Dispatcher 1								
2OT	F2	Dispatcher 2	F2	F2						
FMLA	F3	Dispatcher 3								
VA	F1	Dispatcher 4								
	F2	Dispatcher 5	R2	R2	R2	R2				
	F3	Dispatcher 6	R	R	R	R				

After entering this information, scheduling supervisors will reprint the daily schedule and enter in blue pencil the non-fire assignments (police, sheriff, etc.). Writing this information in pencil allows the watch supervisors and coordinators to continue to make changes to the schedule after responsibility for the schedule has been transferred to them (see activity E8).

Figure 13. Daily Schedule Excerpt Showing Police and Other Channels Added

1900-0500		2300	2400	0100	0200	0300	0400	0500	0600
F3	Dispatcher 1	6	2	M		7	7		
F3	Dispatcher 2	3	3	M	E	2	2		
F1	Dispatcher 3	F2	M	E	F1	F1			
F2	Dispatcher 4		M	7	7		5		

| E8. | **Transfer Schedule to Watch Supervisors**

Performed by: Scheduling Supervisors | As soon as a draft daily schedule is adequately staffed and masked out, scheduling supervisors will transfer the daily schedule created in E7 to watch supervisors. Typically, this is at least seven days prior the day in question.

This transfer is done by pinning the daily schedule to the "sick board" in the watch supervisors' office. Watch Supervisors will then load the daily schedules into a three-ring binder that stays at the watch supervisors' designated scheduling desk. At this point, responsibility for ensuring the watch is adequately staffed and scheduled shifts to the watch supervisors and coordinators.

Figure 14. Daily Schedules transferred to watch coordinators and supervisors on sick board (Note: Dispatcher names blurred) |

ID	Activity	Description
E9.	**Monitor Changes to Schedule Before Watch Begins and Alter Schedule to Accommodate Special Circumstances** *Performed by:* *Watch Supervisors and Coordinators*	After receiving the daily schedule, watch supervisors may continue to alter the schedule in the week leading up to the day in question. Watch supervisors look for changes to the daily schedule in post-it notes left in the schedule binder on the day in question and in emails to supervisors. In some cases, watch supervisors may need to plan for an additional police channel to support a special event, a dispatcher's training needs, or a dispatcher's unscheduled leave. Changes to the call-taker levels may require rebalancing of the schedule or overtime requests (see associated processes). Several hours before a watch begins, watch supervisors and coordinators will arrive for their watch at DEC and begin steps to prepare the daily schedule for the upcoming watch. When a dispatcher calls in sick (at least one hour before the start of their shift), supervisors write the name of the dispatcher on a dry-erase board that corresponds to their watch, known as the "sick board." Watch supervisors beginning their shift prepare the daily schedule by checking the "sick board" in the Watch Supervisors office for any dispatchers who have called in sick during the previous watch (note that for Swing watch, some supervisors are designated as the administrative supervisor in charge of scheduling responsibilities for a given day. In other watches, these responsibilities are assigned on a more ad-hoc basis). At times, confusion can arise when watch supervisors do not consistently erase the "sick board" after each day. In some cases, supervisors have reported that they assumed an individual remaining on the board was still sick when the person had not actually called in again.

ID	Activity	Description
E10.	**Create Break Schedule** *Performed by: Watch Supervisors and Coordinators*	Watch supervisors will prepare a break schedule in the hours before a watch begins. This schedule is prepared by hand from a blank, printed template in the watch supervisors' schedule binder. When this document has been prepared, the daily schedule can be distributed with the break schedule in the watch line-up (E11). The break schedule contains rows for each 15 minute period during a watch, and four columns. The first and second columns represent breaks covered by relievers 1 and 2, respectively, while the third and fourth columns represent breaks that will be covered only if additional relievers are added by supervisors or coordinators. According to department policy and best practices: 1) Dispatchers will typically have a break two hours before and two hours after their scheduled lunch break. 2) Relievers will fill in for these dispatchers during their 15 minute breaks. 3) Reliever positions do not need additional relievers, as when relievers take breaks, the number of call takers is not affected. 4) The first hour and last hour of a dispatcher's regular shift will not have a break. This is typically the case for watches as well. 5) In some cases, supervisors will assign more than three breaks during a fifteen minute period. If necessary, a third reliever position may be assigned by watch supervisors. 6) At the bottom of the next watch's break schedule, individuals who need a third break on this watch will be noted. This may be the case for individuals who work ten hour shifts that overlap two watches. 7) If necessary, supervisors can move breaks and remove a reliever position for one hour in the case that an extra call taking position is needed. If a break schedule meeting these practices cannot be created, supervisors will make alterations to lunch schedules and assignments until a break schedule can be completed. **Figure 15. Break Schedule** (Note: Dispatcher Names Blurred)

ID	Activity	Description
E11.	**Make Copies And Distribute Schedule At Line-Up** *Performed by: Watch Supervisors and Coordinators*	Supervisors will copy the daily schedule (E7 to E9) and the break schedule (E10) onto one double-sided legal sized page, and distribute this schedule during the watch's line-up meeting ten minutes before the start of the watch. Additional copies of the schedule are left in the line-up room for dispatchers beginning their shift mid-way through the watch.
E12.	**Ongoing Modifications As Watch Proceeds** *Performed by: Watch Supervisors and Coordinators*	Once the daily schedule has been distributed, watch supervisors and coordinators will continue to make modifications to the schedule as circumstances change. Over the course of an eight hour shift, the original schedule prepared in E7 can change dramatically. If more dispatchers call in sick in the middle of a watch (i.e., those working ten hour shifts), typically supervisors will ask dispatchers already on the dispatch floor to extend their shift to cover a staff shortage. If supervisors reassign channels during the course of a watch, they will typically only inform the dispatchers affected by the change and not distribute a new daily schedule. Supervisors may also fill a position themselves if necessary. In situations where a large number of dispatchers call in sick and changes cannot easily be made in the current copy, watch supervisors may need to redo the daily

ID	Activity	Description
		schedule and break schedule entirely.
E13.	**Prepare Daily Watch Coordinator Report (End of Process)** *Performed by: Watch Supervisors and Coordinators*	At the end of the watch, watch coordinators prepare a Daily Watch Coordinator Report that includes the final daily schedule, as well as staffing information and a description of major incidents. Coordinators send this report to the DEC Deputy Director Lisa Hoffmann, and store copies of the daily schedule for two years.