Staffing Study and Plan for the Bureau of Emergency Communications

---

PORTLAND, OREGON

FINAL REPORT

matrix
consulting group

April, 2017

TABLE OF CONTENTS

1 Introduction

The Matrix Consulting Group was hired by the City of Portland Bureau of Emergency Communication (BOEC)[1] to conduct a comprehensive operational review and staffing analysis of the center. The following summarizes the key efforts undertaken and approach to reading this report.

1.   Introduction and Study Background.

This report of the BOEC provides our evaluation, analysis, findings, conclusions and recommendations. The report focuses on a wide range of issues including staffing, workload allocation, policies and procedures, alternative operational and organizational approaches, and other important issues. To develop this analysis the project team conducted an extensive number of internal interviews (over 35), collected detailed data, performed an employee survey, and remained in regular contact with the project coordinator in an effort to develop a comprehensive understanding of BOEC dispatch operations.

The following introduction and executive summary provide a synopsis of the scope of work and overall context for the study, the methodologies used in evaluating the services of the department, and a summary of the recommendations made. The scope of work for the study included the following elements:

*   Analysis of shift deployment, work schedules, service levels, workload, and staffing – make recommendations for change where appropriate in order to maximize safety and efficiency.

*   Analysis of the organizational structure of the bureau as it relates to accepted standards of organization theory and practice.

---

[1] BOEC and Bureau will be used interchangeably in this report.

- Determine how many staff should be assigned to BOEC operations to provide acceptable service levels to meet the demands of the workload and community and partner agency expected levels of service.

- Identify policies, procedures, or other factors that impede productivity and effectiveness.

- Based on historical data and the current tenure of employees, project BOEC's attrition for the next five to ten years.

- Determine if the organizational structure complies with professionally accepted concepts, such as: unity of command; span of control; and the logical grouping of activities, functions, and organizational components.

- Provide a projection of future workload and service demands and additional resources that would be required to meet that workload. Recommend ways to address those demands.

- Define critical issues facing BOEC over the next five years. Provide an analysis of the impact of these anticipated issues.

- Evaluate the effects of emerging trends in technology on the services BOEC delivers to the public and partner agencies.

- Determine enhancements which may be justified in the future with regard to additional staffing and/or the modification to the organizational structure.

- Recommend alternatives that will enable BOEC to deliver services in the most efficient and effective manner possible.

- Identify and recommend any other organizational improvements that can be made to enhance BOEC's operations.

- Other relevant factors identified by proposer and/or BOEC management.

    In order to conduct this Study, the Matrix Consulting Group project team engaged

in the following activities:

- Interviews with managerial, supervisory, technical and line staff in BOEC.

- Collection and review of data from a wide range of sources, both electronic (e.g. CAD) as well as budget and statistical reports.

- Review of key documents including program budgets, operating policies, employee contracts, and other germane documents.

• Developed a descriptive profile of BOEC describing current operations, workload, deployment, scheduling, use of leave, etc.

• Conducted an anonymous employee survey to solicit opinion regarding BOEC operations.

Collectively, these steps were intended to provide the project team with a full understanding of the current methods of service delivery by BOEC, its operations and the environment within which the City of Portland and Multnomah County services are provided. This approach is further intended to ensure that key participants have had relevant input into the study process.

2. Reviewing Report Key Concepts.

The following chapter provides an Executive Summary which is a primer for reading this report in both a cursory or detailed fashion. The body of the report is developed along formatting concepts that allow for a core understanding of the contents by focusing on three reporting and formatting approaches. Examples of these are as follows:

1. BOLDED, CAPITALIZED, AND NUMBERED SECTION HEADERS PROVIDING AN OVERVIEW OF CONTENTS WHICH FOLLOWS.

(1) Bolded and Numbered Sub-Headers Which Provide Information on Key Topics of Interest.

Recommendation: **Recommendations are found at the conclusion of many chapter sections and sub-sections.**

By reading only the three areas as noted above, a reasonable understanding of this report's contents can be gleaned in approximately 30 minutes. Furthermore, the report is developed in a fashion that allows the reader to delve deeper into topics or sub-sections of greater interest. While we encourage review of the entire report, we understanding this is not practical for a large portion of the potential readership.

2 Executive Summary

The analysis presented in this report is extensive and to summarize the details of a complex report in a few pages does not do justice to the important findings, conclusions, and recommendations contained herein. There are far too many topics to summarize succinctly. The report is developed in six (6) chapters plus an appendix. These chapters include:

- The Introduction.

- This Executive Summary Chapter.

- An Overview of BOEC to include Employee Survey results.

- Staffing Analysis.

- Technology Analysis.

- Organization and Operations Analysis.

- Appendices.

1.   KEY FINDINGS AND CONCLUSIONS.

In the course of an emergency communication center review and study the focus tends to be on the areas within the organization where opportunities exist or where change is needed. However, there are a number of positive attributes of the BOEC operation that are acknowledged throughout this report. The management desired a full assessment of BOEC staffing and operations, and the impact these have on service delivery. Consequently, a variety of analyses was undertaken with respect to improvement opportunities. This should not overshadow many of the significant accomplishments of the BOEC, including the fact that 88% of employees agree or strongly agree that BOEC provides a high level of service to their public safety partners

and the community. The information contained within this report should be used to better inform decision-making in the future.

The following summarizes key findings and conclusions noted in this report. These are further detailed in Chapter's 4 through 6 in the report's body.

• Sophisticated Erlang-C and APCO-based staff modeling results in a total staffing contingent of **118** positions that would be considered EC Call Takers, EC Police Dispatchers, and EC Senior Dispatchers compared to currently authorized staffing levels of 107 positions and the 97 actual positions.

• The following scheduling model shows the number of fixed post call taking positions required by month of the year and hour of day.

AGENTS NEEDED BY HOUR AND MONTH													
Hour	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	Avg
12a	6	6	6	6	6	7	7	7	6	6	6	6	6
1a	6	6	6	6	6	6	6	6	6	6	6	6	6
2a	5	5	5	5	5	6	6	6	5	5	5	6	5
3a	5	5	5	5	5	5	5	5	5	5	5	5	5
4a	4	4	4	4	4	4	5	5	4	4	4	4	4
5a	4	4	4	4	4	4	4	4	4	4	4	5	4
6a	5	5	5	5	5	5	5	5	5	5	5	5	5
7a	6	6	6	6	6	7	6	6	7	6	6	6	6
8a	7	7	7	7	7	7	7	8	8	8	8	8	7
9a	8	8	8	8	8	9	8	8	9	9	9	8	8
10a	8	8	8	8	9	9	9	9	9	9	9	8	9
11a	9	9	9	9	9	10	9	9	9	9	9	9	9
12a	9	9	9	9	9	10	10	10	9	9	9	8	9
1p	9	9	9	10	10	10	10	10	10	10	9	9	10
2p	9	9	9	10	10	10	10	10	10	10	9	9	10
3p	9	10	10	10	10	10	10	10	10	10	10	9	10
4p	9	10	10	10	10	10	10	10	10	10	10	9	10
5p	10	10	9	10	10	10	10	10	10	10	10	9	10
6p	9	9	9	10	10	10	10	10	10	9	9	9	9
7p	9	9	9	9	9	10	9	10	9	9	9	9	9
8p	8	8	8	9	9	9	9	9	9	8	8	8	9
9p	8	8	8	9	9	9	10	9	9	8	8	8	8
10p	7	7	7	8	8	9	10	9	8	8	8	8	8
11p	7	7	7	7	7	8	8	8	7	7	7	7	7
Avg.	7	7	7	8	8	8	8	8	8	8	8	7	8

As shown, based on workload fixed-post call taker needs range from four (4) to ten (10) fixed-posts. This "heat map" style graph, in conjunction with the hour per day chart discussed previously provides significant information for BOEC Operations Management and Supervisors to refine fixed-post call taker deployments.

• An alternative 12-hour shift model provided in this report would have two "squads" or "teams" assigned to them with opposing days of the week off. Under this deployment model, 45 call taker and dispatchers would be needed on each of the opposing 12-hour schedules for a total of 90 floor operations personnel that would be considered Emergency Communications Call Takers, Police Dispatchers, and

Senior Dispatchers. The reduction of needed staff under a 12-hour shift model results in significant potential cost savings for BOEC, while still increasing staffing levels when needed most. This scheduling change would need to be negotiated.

• The Metro Council estimates that the seven-county region will grow by approximately 400,000 residents by 2035. The rapid growth in the region, and indeed within Multnomah County and the City of Portland, combined with the existing challenges with recruiting and retaining staff at BOEC will provide challenges in meeting workload demands. Based upon CAD, Radio, and other workload-related variables, BOEC projected staffing needs range from 119 full-time equivalent (FTE) dispatch-related positions in 2022, to 123 FTEs in 2027 to adequately staff the communications center floor.

• Technological advances are already changing the 911 industry and agencies such as BOEC will need to be ready to address and take advantage of these advances as they arise. Updating of various technology solutions in the shorter-term has been provided in this report.

• Modest revisions to the BOEC organizational structure are recommended based upon the eight Guiding Principles for Effective Organizational Structures.

• Suggested approaches to addressing some training, quality improvement/control, and employee retention and attrition issues have been provided in the body of the report. This includes such areas as formally following APCO/NENA Quality Assurance and Quality Improvement program, recommended turnover rate for future staffing calculations, etc.

• In general, the policies, procedures and Standard Operating Practices (SOPs) currently in use by the BOEC are comprehensive and address the majority of best practices in emergency communications. The BOEC should consider adding the policies listed in the Key Policy Review section. The most significant best practice finding is that the BOEC's current (written) emergency call answering benchmarks are out of alignment with national standards.

These key findings and conclusions, as well as other issue areas, are summarized

in the following chapters.

2.   LIST OF RECOMMENDATIONS IN THE ORDER PRESENTED IN THE REPORT.

The following exhibit provides a numbered list of the recommendations, with quick

reference page numbers identifying where each recommendation can be found within the

report. The chapters within this report should be reviewed for a detailed discussion and

analysis of each issue and the background behind each recommendation.

Recommendations		
Chapter 4 - Staffing		
#1	Create BOEC budget allocations for a total of 118 dispatcher and call taker positions that would be considered EC Call Takers, EC Police Dispatchers, and EC Senior Dispatchers.	pg. 66
#2	BOEC operations supervisors should modify call taker shift deployments to match the "optimal" fixed-post staffing levels as closely as possible to best meet workload demands.	pg. 66
#3	BOEC operations supervisors should modify dispatcher deployments during the late-night hours, reducing the number of fixed-posts from 9 to 7, through not staffing the TRO 2 and Police Service positions during these hours.	pg. 66
#4	Maintain existing authorized staffing levels of 14 first-line Emergency Communications Supervisor positions.	pg. 66
#5	Strategically plan and budget for 57.8 call taker and 60.9 dispatcher positions by the year 2022, and 57.8 call taker and 65.4 dispatcher positions by the year 2027 to accommodate increased workload.	pg. 66
Chapter 5 - Technology		
#6	BOEC in cooperation with the City of Portland GIS department and other local municipalities should investigate a shared edit in place style GIS data management system such as the solutions offered by GeoComm to allow for the quick updating of mapping information.	pg. 74
#7	Replace the current Pyxis recording system with an industry specific solution such as those offered by Nice, Stancil, or Eventide that are more user friendly and better support QA needs within a communications center.	pg. 74
#8	Work with the City of Portland GIS department to facilitate the upgrade of the ArcMap software to the most current version offered.	pg. 74
Chapter 6 - Organization and Operations		
#9	The Training and Development staff should be moved to the Operations division, with the Training and Development Officer reporting directly to the Operations Manager.	pg. 82
#10	The Bureau should fill the vacant Assistant Operations Manager position.	pg. 84
#11	The Bureau should adjust the schedule of the two Assistant Operations Managers so that they offset and cover an expanded portion of the day.	pg. 84
#12	The Support Specialists should report to the Operations Manager.	pg. 85

#13	Consider implementation of the revised BOEC organizational structure detailed in this report.	pg. 87
#14	Consider the revised 4/10 shift schedule program as provided and detailed in this report.	pg. 91
#15	BOEC should negotiate the ability to deploy staff using a 12-hour shift model allowing for a reduction of needed staff to 90 operations floor staff, and potentially saving $557,854.00 in salary costs per year.	pg. 91
#16	The BOEC should formally allow separate "call-taker" and "dispatcher" positions rather than requiring staff to be trained in both disciplines.	pg. 95
#17	The BOEC's new hire academy and coaching program should be segmented into phases for call-taking and dispatching to accommodate the distinct roles of the 2 positions.	pg. 95
#18	The length of new hire academy should remain consistent, by official policy, from session to session.	pg. 98
#19	The curriculum, assessments, and pacing of new hire academies should be formally codified and remain consistent from session to session.	pg. 98
#20	The Emergency Communications Training Supervisor should become a certified APCO Agency Instructor.	pg. 98
#21	The Emergency Communications Training Supervisor should take the leading role in training new recruits through the academy.	pg. 98
#22	The BOEC should formalize the post-academy coaching program format and standards in writing, and enforce it universally.	pg. 100
#23	The BOEC should formalize the requirements for CTO's in writing and enforce them universally.	pg. 100
#24	If the BOEC continues to have difficulty getting enough CTO's to mentor recruits, additional actions should be considered as incentives.	pg. 100
#25	The BOEC should reinstitute a Quality Assurance and Quality Improvement system following the APCO/NENA Quality Assurance and Quality Improvement Program for PSAPs standard 1.107.1.2015, and make QA and QI a priority within the agency.	pg. 103
#26	Reduce the current attrition rate to 8% by revising the existing training model as recommended in Training and Development section of this report.	pg. 110
#27	Under the current training model, estimate staffing needs for the next five to ten years utilizing 15% as the average expected attrition rate for BOEC operations staff. Expect this rate to increase to 17% to 19% as the number hired per year increases.	pg.111
#28	Include the six (6) programmatic topics discussed in this report (e.g. telephony system failure) and devise standard operating practices (SOPs) in the BOEC policy and procedures manual.	pg. 115

#29	For those SOPs deemed 'sensitive' for perusal, identify a separate secure location for storing these documents for reference by supervision and management (e.g. Homeland Security/Terrorism Notifications).	pg.115
#30	The BOEC should adopt in their policy the current NENA Call Answering Standard and adjust accordingly as standards are revised.	pg. 116
#31	The BOEC should structure and re-organize the SOPs consistent with the steps described in this report.	pg. 117
#32	The BOEC should provide on-going supervisory and management training surrounding the consistent application of policies and procedures, particular those emphasizing Human Resource areas. This will help alleviate potential supervisor liability for allegations of unfair employment practices.	pg. 122
#33	BOEC management should strictly follow their internal policies regarding the use of sick, and other types of leave, and should thoroughly investigate suspected cases of abuse.	pg. 122
#34	BOEC should reduce the frequency of duty assignment rotations "reliefs" to either daily or bi-daily.	pg. 122
#35	When duty assignment rotations do occur, they should be managed by floor Supervisors, allowing only 1-2 staff to rotate at any one given time.	pg. 123
#36	BOEC should utilize the best management practices check-list provided to identify key areas in which it wishes to implement a best practice initiative.	pg. 124

3 BOEC Overview and Survey Results

The following chapter provides an overview of the Bureau of Emergency Communications (BOEC) to include a brief description of the organization followed by the results of the employee survey. This serves as a foundation for further analysis found later in the report.

1. INTRODUCTION TO THE BUREAU OF EMERGENCY COMMUNICATIONS.

The City of Portland Bureau of Emergency Communications BOEC serves as the single public safety answering point (PSAP) for all municipalities located within Multnomah County the Portland Police and Fire Bureaus, Gresham Police and Fire Departments, Multnomah County Sheriff's Office, which also provides contract police services to the cities of Fairview and Troutdale, and the Corbett and Sauvie Island volunteer fire departments. Members also work closely with AMR, a contracted private ambulance service, dispatching emergency responders. The population of Multnomah County is approximately 777,490.

"BOEC provides 9-1-1 call-taking and police and fire dispatch services to all of the public safety agencies within Multnomah County and the five (5) incorporated cities within; Fairview, Gresham, Mayview Park, Portland and Troutdale. Six (6) major highways run throughout the county; I5, I205, I405, and Highways 26, 30 and 99. Multnomah County is the smallest in area in Oregon, with a total of 466 square miles, of which 431 square miles are land and 34 square miles are water.

The following table summarizes the agencies which rely on the Dispatch Center for emergency communications.

DISPATCHED AGENCIES	
Law Enforcement	
Portland Police Bureau	Multnomah Sheriff contract cities:
Gresham PD	- Fairview
Multnomah County Sheriff	- Troutdale
Multnomah County Parole & Probation	
Fire Departments	
Portland Fire Bureau	Corbett RFPD #14
Gresham FD	Sauvie Island RFPD #30
EMS	
Multnomah County EMS	American Medical Response (AMR)

The mission of the BOEC is *"to be the vital connection between the community and emergency service responders by answering 9-1-1 and non-emergency public safety calls, triaging for proper response, and dispatching appropriate resources."*

The organizational structure and staffing levels of the Portland BOEC are shown in the following organizational charts of employees. The first chart shows operations staff, which accounts for the majority of positions within the organization. The second chart shows administrative and support staff.

OPERATIONS STAFF[2]

---
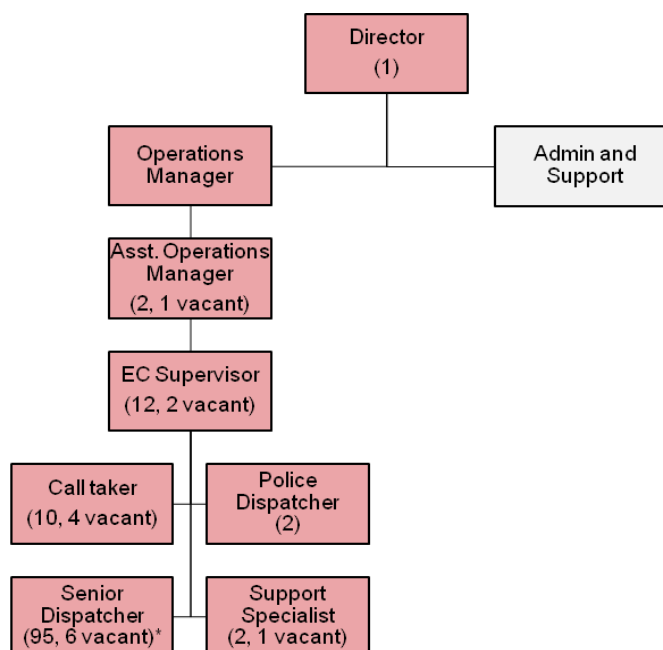
[2] 16 of the filled positions were done so by trainees at the time of the profile.

ADMINISTRATIVE AND SUPPORT STAFF
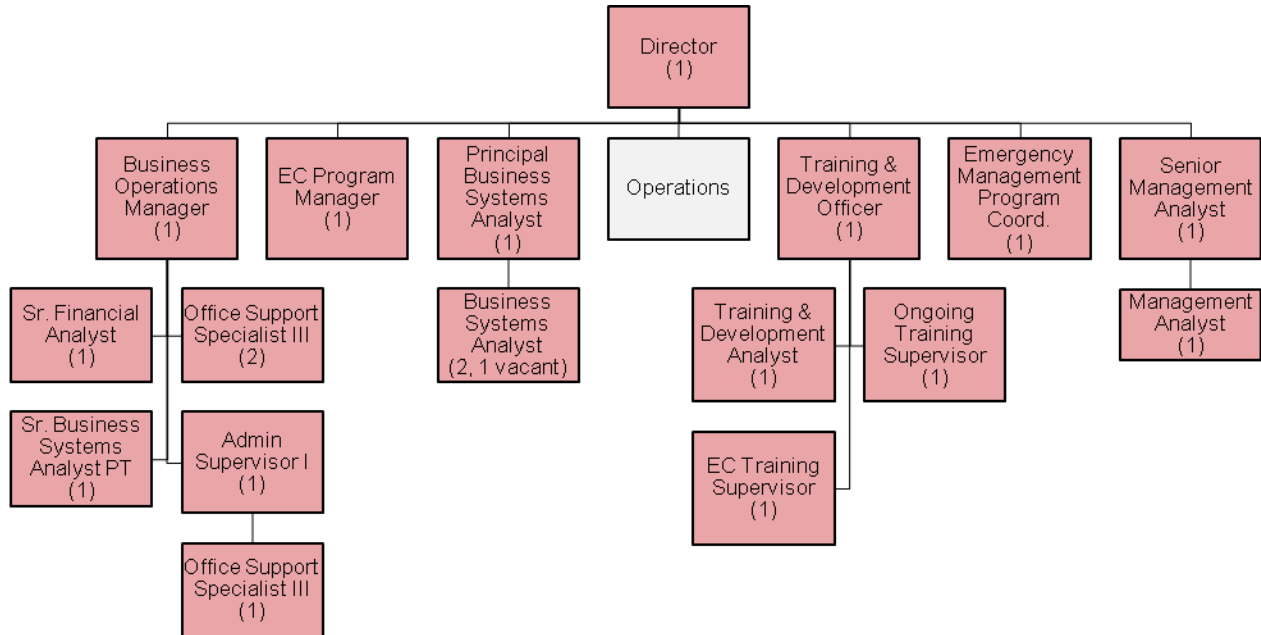
As shown in the organizational charts above, vacancies have a greater impact on operations staff than administrative and support staff. This will be discussed in further detail later in this report.

2. RESULTS OF THE EMPLOYEE SURVEY PROVIDE IMPORTANT OBSERVATIONS TO FRAME THE STUDY.

As part of the Matrix Consulting Group's staffing study and plan for the Portland BOEC, the project team distributed a survey to the employees of the Bureau to gauge their opinion on a number of topics related to the operations of the organization and its potential for improvement. This report summarizes the results of the survey. The survey was divided into four sections:

- The first section asked respondents to indicate their level of agreement with several statements about the Bureau's operations and business practices.

- The second section asked them to indicate the amount of time that it takes them to perform common call-taking and dispatch tasks.

- The third section asked respondents to rate the impact of various factors which may affect employee morale.

- The fourth section asked respondents to express their opinions about the Bureau's strengths and weaknesses in their own words.

The survey was distributed in February via email to Bureau staff. A total of 101 employees responded to the survey, in varying degrees of completion. While responses to the survey were confidential, the project team asked respondents to indicate some information about their position for comparison purposes. The following tables show the responses received.

Please check the box that reflects your present assignment:

SHIFT	
Shift	**Responses**
Day Shift	48
Afternoon Shift	15
Night Shift	35
TOTAL	**98**

There are multiple shifts for dispatchers at the agency (10 shifts per day), which are subdivided into three groupings by time of day in the above question. "Day Shift" includes Early Morning, Morning, and Mid-Morning shifts. "Afternoon Shift" includes Late Morning, Early Afternoon, and Afternoon shifts. "Night Shift" includes: Evening, Late Evening, First Night, and Second Night shifts. This was outlined in the question, and Bureau staff responded accordingly.

Please choose all that are applicable to you. I am:

POSITION TYPE	
Position Type	**Responses**
Dispatcher/Call Taker	75
Supervisory/Management	19
Support Personnel	7
TOTAL	**101**

The categorizations above are intended to group staff by their role or their approximate position in the organizational structure. Respondents could choose multiple selections in response to these questions if they so desired.

Please choose the answer that is most applicable to you:

YEARS OF SERVICE	
Years of Service	**Responses**
0 to 3 years	26
4 to 9 years	21
10+ years	54
TOTAL	**101**

The differences in responses from these two groups are explored, where they are notable, in the analysis sections below.

(1)   Multiple Choice Statement Outcomes.

The first section of the survey asked respondents to indicate their level of agreement or disagreement with 32 statements about the Bureau's operations and business practices. The response options were "strongly agree", "somewhat agree", "somewhat disagree", and "strongly disagree". Respondents could also choose "no opinion".

The following table summarizes the number of responses received for each of the statements in this section. They are ranked in order of agreement to disagreement – the statements that received heavy agreement are shown first, and those that received more

disagreement come at the end of the table. The average response score of each statement is also shown. This average runs on a 1-4 scale, with 1 being "strongly disagree" and 4 being "strongly agree".

#	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	No Opinion	Average
	AGREEMENT AND DISAGREEMENT WITH MULTIPLE CHOICE STATEMENTS						
30	Our entire agency works too much overtime.	**54**	18	4	0	3	3.7
3	We provide professional services to our public safety partners in the field.	32	**45**	1	0	1	3.4
1	Our dispatch agency provides a high level of service to our public safety partners and the community.	**35**	34	7	1	1	3.3
28	I personally work too much mandated (forced) overtime.	**35**	14	14	2	14	3.3
6	I'm intending to make a career at my dispatch agency.	25	**26**	12	5	11	3.0
2	We provide quality customer service to the public that calls in.	18	**46**	11	2	2	3.0
20	We have a good working relationship with the law enforcement and fire agencies for which we dispatch.	11	**43**	17	6	2	2.8
15	The agency provides staff with a strong and consistent initial training program so they are prepared to do their jobs.	13	**36**	17	8	5	2.7
4	We provide a consistent level of service (day-to-day, shift-by-shift).	14	**37**	15	10	3	2.7
23	Workload is equitably distributed among individual call taking work-stations.	8	**45**	10	9	7	2.7
27	Our agency's work ethic is good.	8	**42**	21	4	4	2.7
24	Workload is equitably distributed among individual dispatch work-stations (law, fire/medical).	4	**45**	17	5	8	2.7
25	Staff rotational practices (reliefs) among our work-stations result in equitable workload distribution.	6	**37**	20	6	10	2.6
29	I personally work too much voluntary overtime.	15	14	**22**	13	15	2.5
5	Our entire compensation package (salary and benefits) is fair and equitable compared to most dispatch agencies.	12	24	**26**	14	3	2.4
17	The training program for new hires (trainees) is appropriate in length and content.	3	**33**	27	8	7	2.4
22	We have the proper tools and technology necessary to effectively do our jobs.	2	**42**	19	14	1	2.4

| #	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree	No Opinion	Average
16	I am able to attend adequate in-service and continuous training.	5	**30**	20	17	7	2.3
10	Our shift manager is available and responsive to my needs.	7	**24**	15	19	14	2.3
31	Sick leave is abused at my agency.	8	20	**28**	16	7	2.3
13	We do a good job recruiting qualified applicants. We take the appropriate steps to hire the best suited candidates for the agency.	2	**33**	17	19	8	2.3
9	My direct supervisor spends sufficient time with me to accurately evaluate my work performance.	6	**24**	19	21	9	2.2
19	Our policies and procedures are clear and answer nearly all questions we may have.	1	26	**32**	16	4	2.2
32	Our work environment is clean, healthy and conducive to effective operations.	2	22	**29**	25	1	2.0
21	My work morale is currently high.	3	27	13	**33**	3	2.0
26	Staff rotations (reliefs) occur too frequently disrupting the efficiency of center operations.	6	10	**33**	23	7	2.0
18	The training our CTOs (coaches) provide to recruits is performed consistently among the training staff.	2	15	**31**	24	7	1.9
12	Our managers provide adequate direction and leadership which motivates me to work well.	2	18	22	**31**	6	1.9
11	Operations managers supervise, operate, and employ our policies & procedures consistently.	3	14	21	**29**	11	1.9
14	Our agency does a good job retaining qualified applicants.	0	11	19	**42**	7	1.6
8	We are appropriately staffed with dispatchers to meet our agency's needs.	0	4	14	**59**	2	1.3
7	We are appropriately staffed with call takers to meet our agency's needs.	1	2	13	**61**	2	1.3

The statements receiving the greatest level of agreement show that staff feel they provide a high level of professional service to the community and emergency responders (#1 and #3), while being forced to work too much overtime (#28 and #30). The statements receiving the most disagreement show that staff feel dispatcher and call-taker staffing is

a serious issue (#8 and #7), as well as staff retention (#14). The following sections dig

deeper into the responses received.

(1.1)   Staff Believe They Provide A High Level of Service to the Community.

The following table and chart show responses received to statements about the

Bureau's level of service to the community.

#	Statement	SA	A	D	SD	N/A
	LEVEL OF SERVICE TO THE COMMUNITY					
1	Our dispatch agency provides a high level of service to our public safety partners and the community.	**35**	34	7	1	1
2	We provide quality customer service to the public that calls in.	18	**46**	11	2	2
3	We provide professional services to our public safety partners in the field.	32	**45**	1	0	1
4	We provide a consistent level of service (day-to-day, shift-by-shift).	14	**37**	15	10	3
27	Our agency's work ethic is good.	8	**42**	21	4	4

Agreement and Disagreement Re: Level of Service to the Community
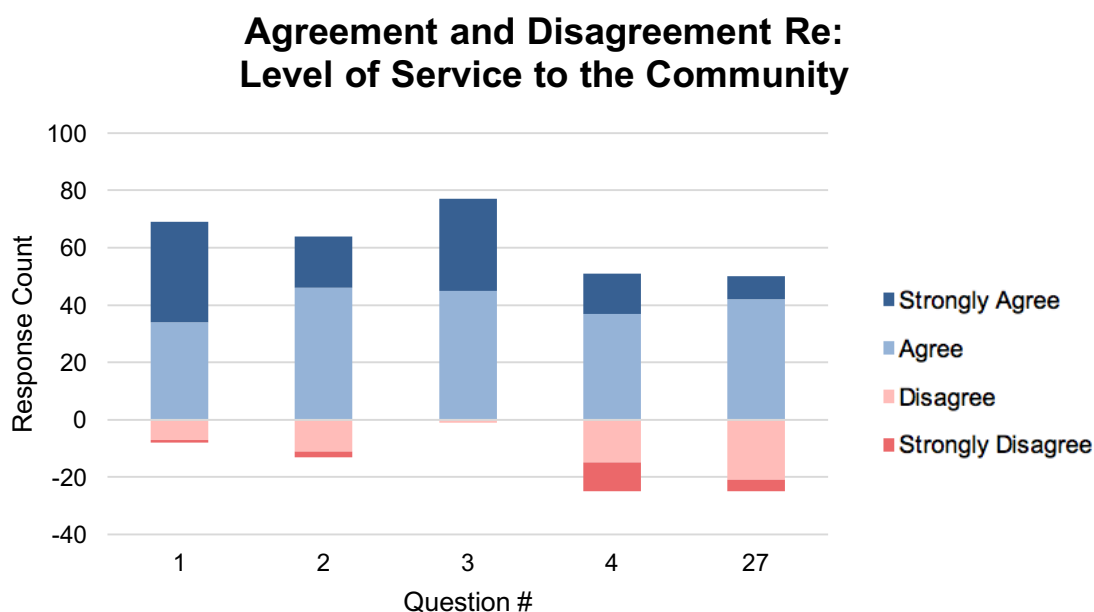
- In general, employees feel that they provide a consistently high level of service to the community and emergency responders, and that their work effort is good.

- One anomaly was spotted in <u>Statement #4</u>, where the staff who indicated that they work the day shifts (there were 12 of them) averaged a weighted response of 2.08, compared to the 2.78 and 2.85 averages of the night and morning shifts.

Staff see level of service and work ethic as a point of strength for the Bureau. Where inconsistencies in service level do exist, they are most quickly noticed by staff on the day shifts.

(1.2) Staff Have Generally Negative Opinions About Their Working Conditions.

The following table and chart show responses received to statements about working conditions in the Bureau.

WORKING CONDITIONS FOR STAFF						
#	Statement	SA	A	D	SD	N/A
5	Our entire compensation package (salary and benefits) is fair and equitable compared to most dispatch agencies.	12	24	**26**	14	3
19	Our policies and procedures are clear and answer nearly all questions we may have.	1	26	**32**	16	4
22	We have the proper tools and technology necessary to effectively do our jobs.	2	**42**	19	14	1
32	Our work environment is clean, healthy and conducive to effective operations.	2	22	**29**	25	1

## Agreement and Disagreement Re: Staff Working Conditions
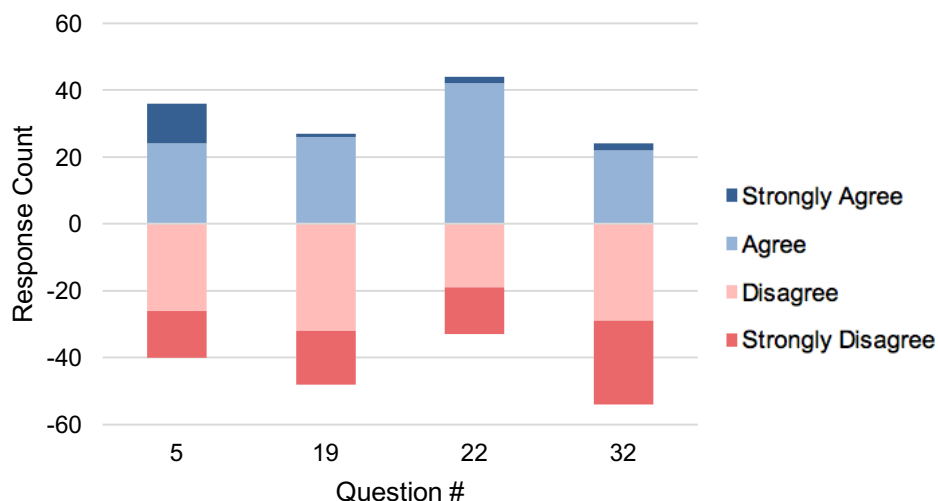
- Each of these statements drew some measure (at least double digits) of "strong disagreement", and 3 out of 4 of them received more total disagreement than agreement.

- Staff identifying as call-takers and dispatchers (line staff), disagreed more than other groups with Statement #5 about compensation. They produced a weighted average of 2.19, compared to at least 3.00 from supervisors/management and support personnel.

Most staff feel that working conditions need improvement at the Bureau, especially when it comes to clear policies and procedures and the physical cleanliness of the dispatch floor. While opinions were generally similar across different groups of respondents, line staff have more negative opinions about compensation than other groups.

(1.3)   Staff Attitudes Vary On Some Topics, but Morale Is Generally Low.

The following table and chart show responses received to statements about the attitude and morale of Bureau employees.

STAFF ATTITUDES AND MORALE						
#	**Statement**	**SA**	**A**	**D**	**SD**	**N/A**
6	I'm intending to make a career at my dispatch agency.	25	**26**	12	5	11
20	We have a good working relationship with the law enforcement and fire agencies for which we dispatch.	11	**43**	17	6	2
21	My work morale is currently high.	3	27	13	**33**	3
31	Sick leave is abused at my agency.	8	20	**28**	16	7

Agreement and Disagreement Re: Staff Attitudes and Morale
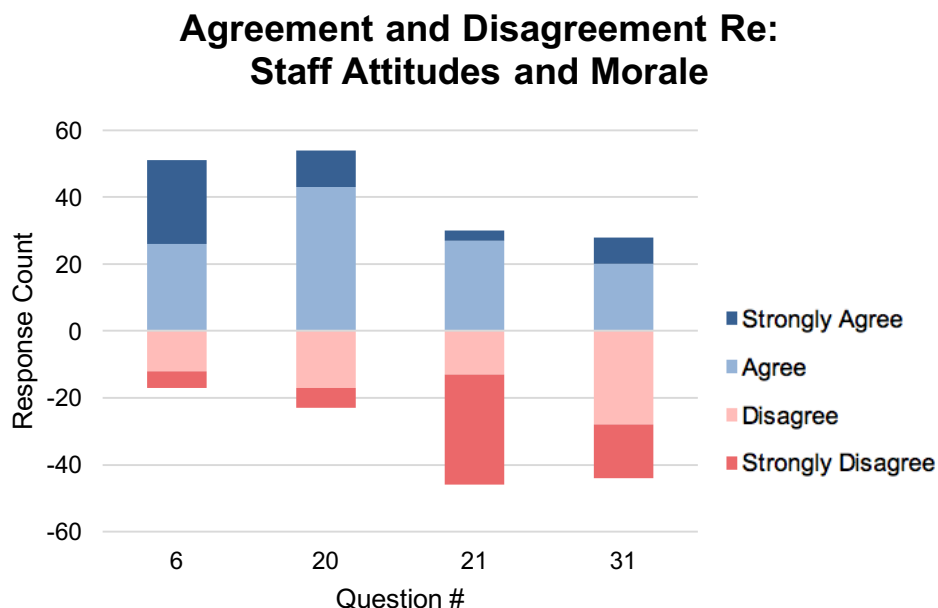
- The morale of staff is very low at the agency across various respondent groups. Only 3 statements received more "strongly disagree" responses than Statement #21.

- While Statement #31 generally incited more disagreement than agreement, staff in management/supervisory roles tended to agree (weighted average of 3.5) far more than other groups (weighted average of 1.98).

These statements covered a variety of subtopics, and varying responses were received accordingly. Most staff say that they plan to make a career at the Bureau, and that they have a good working relationship with emergency response agencies. It should be noted that morale is low, and supervisors perceive an issue with sick leave abuse where other respondent groups do not.

(1.4)   Staff Believe that Rotations and Workload Distribution Are Appropriate, But Staffing Is Insufficient to Meet Workload Demands.

The following table and chart show responses received to statements about staffing and workload distribution at the Bureau.

#	STAFFING AND WORKLOAD					
#	**Statement**	**SA**	**A**	**D**	**SD**	**N/A**
7	We are appropriately staffed with call takers to meet our agency's needs.	1	2	13	**61**	2
8	We are appropriately staffed with dispatchers to meet our agency's needs.	0	4	14	**59**	2
23	Workload is equitably distributed among individual call taking work-stations.	8	**45**	10	9	7
24	Workload is equitably distributed among individual dispatch work-stations (law, fire/medical).	4	**45**	17	5	8
25	Staff rotational practices (reliefs) among our work-stations result in equitable workload distribution.	6	**37**	20	6	10
26	Staff rotations (reliefs) occur too frequently disrupting the efficiency of center operations.	6	10	**33**	23	7

Agreement and Disagreement Re: Staffing and Workload

- Statements #7 and #8 received more strong disagreement and lower weighted response averages than any other statements in the survey. Across all respondent groups, there was a consistent belief that the Bureau is understaffed.

- Staff generally agreed that workload and rotations distribute the Bureau's workload well. Statements #23, #24, and #25 received more agreement than disagreement, and it was evenly distributed among respondent groups.

- Statement #26 received much more disagreement than agreement, indicating that staff feel frequent rotations *do not* cause issues on the floor. Staff in management/supervisory roles, however, tended to agree with this statement (weighted response average of 3.17) more than other groups (weighted response average of 1.76).

Staff believe strongly that workload exceeds capacity, but that the Bureau's means of dealing with existing workload are appropriate – the overwhelming sentiment expressed in this section is that the issue springs purely from understaffing. Management and supervisors see a problem with frequent transitions between shots on the floor, where other groups do not.

(1.5) Staff Have Generally Unfavorable Opinions of the Bureau's Management and Supervision.

The following table and chart show responses received to statements about management and supervision at the Bureau.

	MANAGEMENT AND SUPERVISION					
#	**Statement**	**SA**	**A**	**D**	**SD**	**N/A**
9	My direct supervisor spends sufficient time with me to accurately evaluate my work performance.	6	**24**	19	21	9
10	Our shift manager is available and responsive to my needs.	7	**24**	15	19	14
11	Operations managers supervise, operate, and employ our policies & procedures consistently.	3	14	21	**29**	11
12	Our managers provide adequate direction and leadership which motivates me to work well.	2	18	22	**31**	6

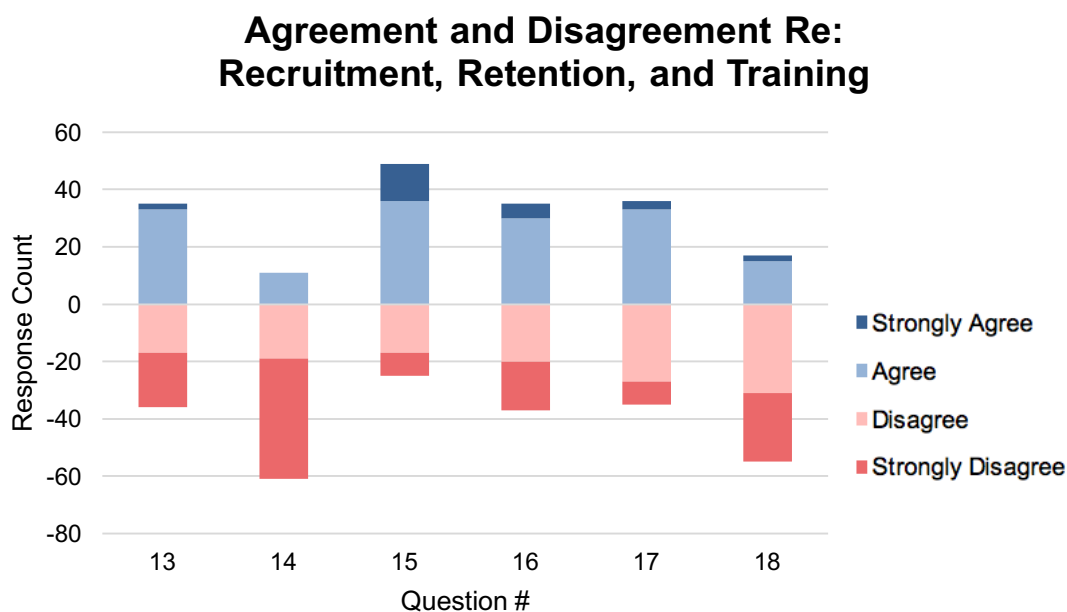## Agreement and Disagreement Re: Management and Supervision
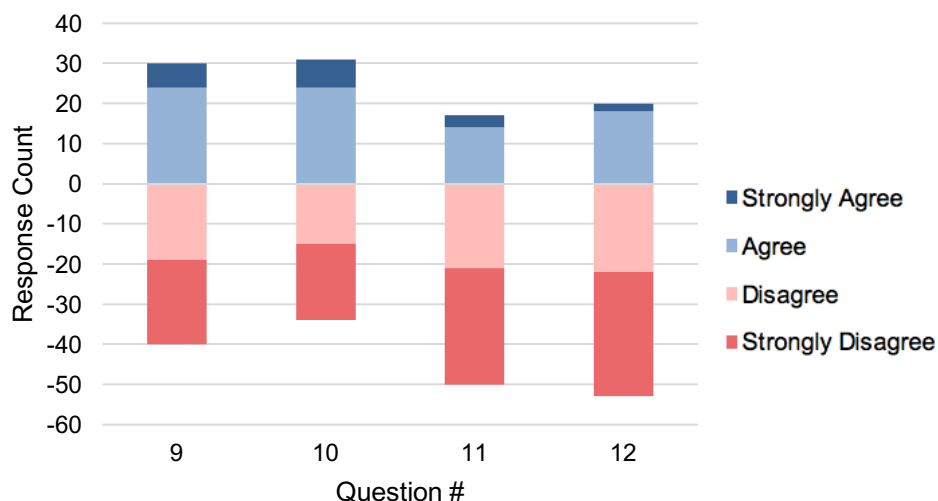
- • Statements #9 and #10 both received more overall disagreement than agreement, and levels of "strong disagreement" were strong for both. Support staff had a more positive response than other groups for both of these statements, and so did employees with just 0-3 years of experience.

- • Statements #11 and #12 both received more "strong disagreement" than any other type of response by far. Like the other statements in this group, the most positive responses came from support staff and employees with 0-3 years of experience.

The response trends indicate that staff see clear issues with management. Even staff identifying as managers and supervisors managed to produce a weighted average response greater than the midpoint of 2.5 on only one of the four statements (#10). While support staff and newer employees have slightly more positive opinions, operations employees and those with more years of service – even supervisors themselves – view this as an opportunity for improvement.

(1.6) Staff Have Mixed Opinions on Recruitment, But They Generally Believe That Training for Recruits Is Inconsistent, and Retention Is a Huge Issue.

The following table and chart show responses received to statements about the Bureau's ability to recruit, retain, and train staff.

#	Statement	SA	A	D	SD	N/A
	RECRUITMENT, RETENTION, AND TRAINING					
13	We do a good job recruiting qualified applicants. We take the appropriate steps to hire the best suited candidates for the agency.	2	**33**	17	19	8
14	Our agency does a good job retaining qualified applicants.	0	11	19	**42**	7
15	The agency provides staff with a strong and consistent initial training program so they are prepared to do their jobs.	13	**36**	17	8	5
16	I am able to attend adequate in-service and continuous training.	5	**30**	20	17	7
17	The training program for new hires (trainees) is appropriate in length and content.	3	**33**	27	8	7
18	The training our CTOs (coaches) provide to recruits is performed consistently among the training staff.	2	15	**31**	24	7

Agreement and Disagreement Re: Recruitment, Retention, and Training

- Most statements in this group received slightly more agreement than disagreement, and responses did not vary significantly across respondent groups. This suggests that staff are in agreement about where the issues lie with recruitment, training, and retention.

- Only two statements on the survey received lower average weighted response scores than Statement #14, indicating that retention is a huge issue for the Bureau.

- Statement #18 also received heavy disagreement. Employees believe that standardizing the new staff training provided by coaches should be a priority.

Employees mostly believe that trainees receive strong initial training, and opinions are mixed on the availability of ongoing training, recruitment, and whether initial training is the appropriate length and contains the right content. In the areas of retention and consistent coaching, employees across all respondent groups indicated that there is ample opportunity for improvement.

(1.7) Staff Strongly Believe That They Are Required to Work Too Much Forced Overtime.

The following table and chart show responses received to statements about the amount of overtime worked by the Bureau's staff.

	OVERTIME					
#	Statement	SA	A	D	SD	N/A
28	I personally work too much mandated (forced) overtime.	**35**	14	14	2	14
29	I personally work too much voluntary overtime.	15	14	**22**	13	15
30	Our entire agency works too much overtime.	**54**	18	4	0	3

Agreement and Disagreement Re: Overtime
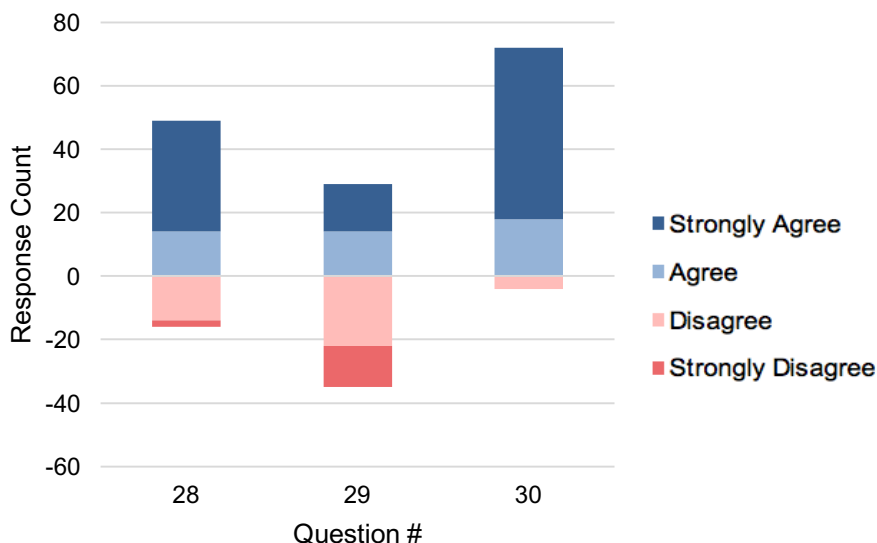
- Statement #28 received more "strong agreement" than all other response types combined. Staff generally believe that they work too much overtime. Line staff agreed more than supervisory staff with this statement (weighted response averages of 3.43 vs 2.89, respectively).

- Statement #29, regarding voluntary overtime, was met with more disagreement than agreement. There was little difference in the responses of line staff and management/supervisors.

- Statement #30, regarding the agency-wide occurrence of forced overtime, received very heavy overall agreement and more "strong agreement" than any in the survey. This was true across all respondent groups.

While staff have little issue with voluntary overtime, they all tend to agree that

forced overtime is an issue. Even staff who do not personally feel overworked believe that

the agency as a whole works too much forced overtime.

(1.8)   Staff Generally Feel Workload is Too High.

The final question in this section asked respondents to indicate how they feel about

their workload. They were given the choice of 4 statements and instructed to choose the

statement that most closely reflects their workload. The table and chart below show the results received.

STAFF OPINIONS ON WORKLOAD	
Response	**Count**
I am always busy and can never catch up.	26
I am often busy but can usually keep up.	40
I have the right balance of work and time available.	10
I could handle more work given them available time.	3
TOTAL	**79**

Most Staff Believe Their Workload to be Either "Heavy But Manageable" or "Excessive"
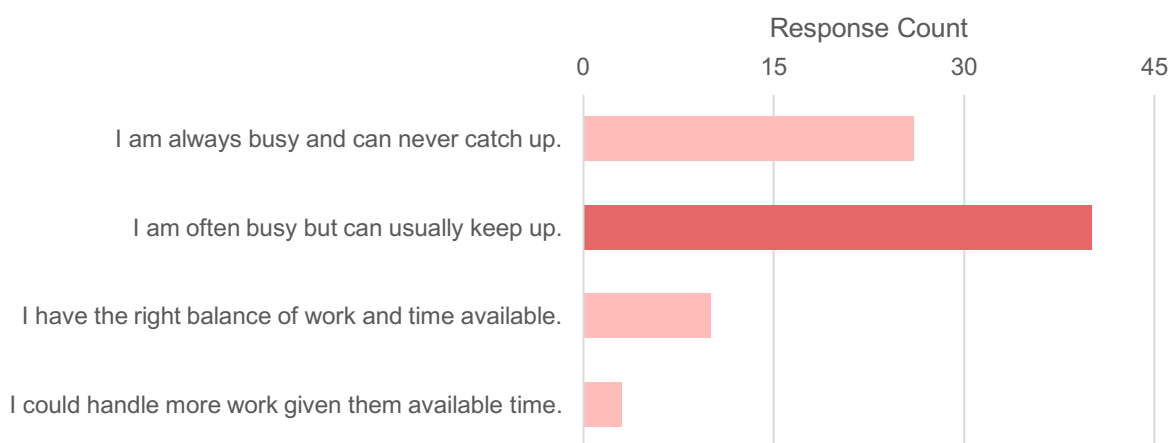
The responses to this question indicate that all but 13 staff feel overworked, to varying degrees. Responses did not vary tremendously across respondent groups, although employees on the afternoon shift actually provided 7 "always busy" responses and 5 "often busy" responses, suggesting that they may feel more overworked than other shifts.

**(2)   Results of Call and Dispatcher Processing Time.**

The second section of the survey asked respondents to indicate the amount of time required to complete common call-taking and dispatch tasks. These included the following:

• Time required to fully process a law enforcement call before hang-up
• Time required to fully process a fire call before hang-up
• Time required to fully process a medical call before hang-up
• Time required to dispatch and complete a CAD record for a law enforcement call
• Time required to transact and complete a CAD record for officer-initiated activity
• Time required to dispatch and complete a CAD record for a medical call
• Time required to dispatch and complete a CAD record for a fire call

The table and chart below show the responses received. The table shows the number of responses received for each task, the range of the middle 50% of responses, and the average response for that task. The chart below the table gives a visual representation of the middle 50% of responses in order to give an idea of how much time staff believe each task requires, and how closely they tended to agree with each other for each task.

TIME REQUIRED FOR COMMON CALL-TAKING AND DISPATCH TASKS			
Task	**Response Count**	**Middle 50% of responses**	**Average (in seconds)**
The average time taken (seconds) to process a law enforcement telephone call for service before "hang up."	55	53 - 175	**121.5**
The average time taken (seconds) to process a fire telephone call for service before "hang-up."	54	45 – 131	**100.3**
The average time taken (seconds) to process a medical telephone call for service before "hang-up."	54	59 – 180	**120.9**
The average dispatch time taken (seconds) to dispatch and complete a CAD record for a law enforcement call.	49	30 - 90	**71.7**
The average dispatch time taken (seconds) to transact and fully process an officer/deputy self-initiated activity.	49	15 - 31	**27.9**
The average dispatch time taken (seconds) to dispatch and complete a CAD record for a medical call.	44	20 - 54	**52.1**
The average dispatch time taken (seconds) to dispatch and complete a CAD record for a fire call.	44	20 - 56	**61.4**

## Average Time Required for Given Tasks - Middle 50% of Responses
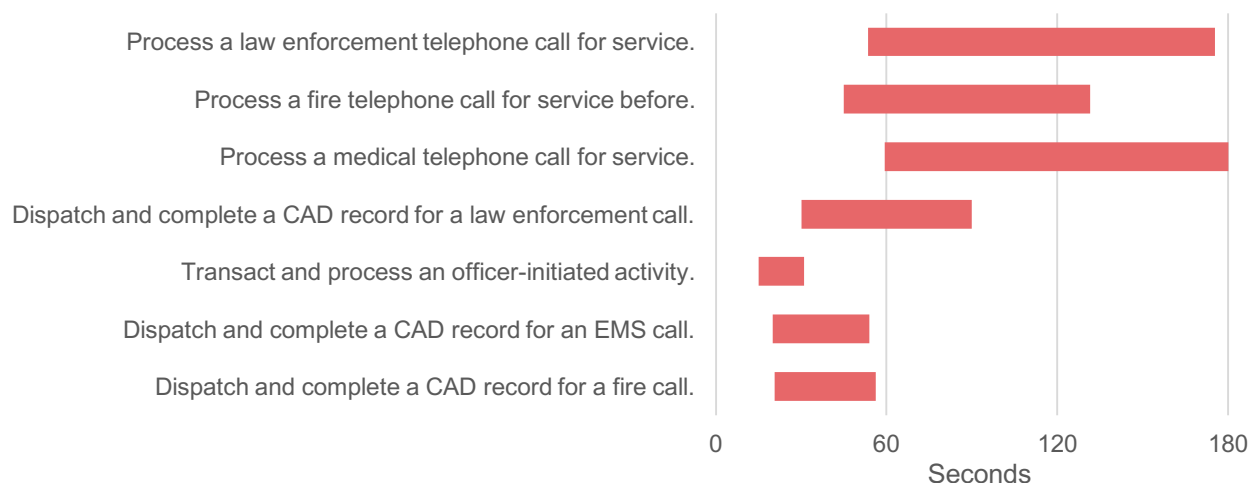
(3)   Factors Impacting Employee Morale.

The third section of the survey asked respondents to rate the level of impact that a number of factors have on employee morale. They were asked to rate each factor as "not a factor", "minor factor", or "major factor". The table and chart below show the factors and the responses they received, ranked from those deemed to be high impact factors to those considered non-factors. Please note that the "Average" score assigned in the table for responses to this section runs on a 1-5 scale, with 1 being "not a factor", 3 being "minor factor", and 5 being "major factor".

FACTORS IMPACTING STAFF MORALE			
Factor	Not a Factor	Minor Factor	Major Factor	Average
Staffing Levels	0	8	**69**	4.8
Too Much Overtime	1	15	**61**	4.6

Inconsistency in the enforcement of rules and policies	7	28	**41**	3.9
Inconsistency in Supervision	7	29	**41**	3.9
Unnecessary rules or policies	6	33	**37**	3.8
Salary and Benefits	18	26	**33**	3.4
Poor Equipment	14	**44**	19	3.1
Physical Work Environment	16	**42**	19	3.1
Relationship Conflicts	21	**41**	14	2.8
Job Security	**45**	11	21	2.4

Staffing Levels and Overtime are the Biggest Factors Impacting Morale
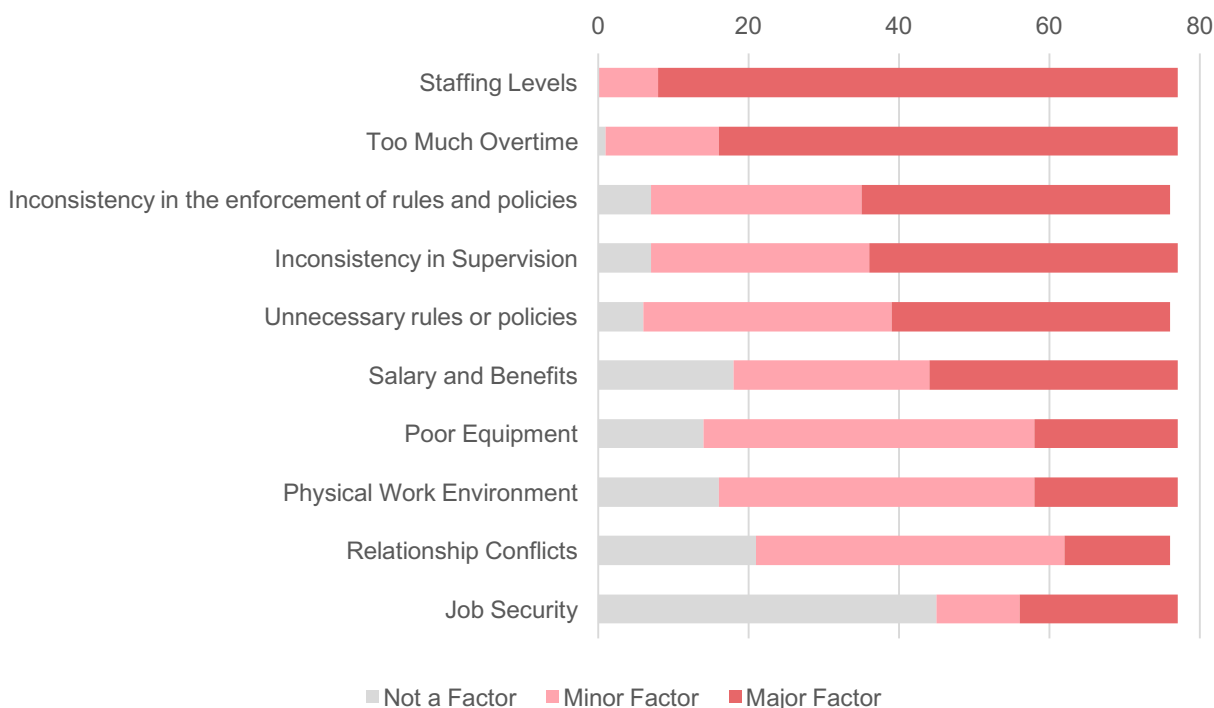
- Line staff provided slightly different responses to some of these factors than other staff. While supervisors and support staff gave an average weighted response of 3.45 to the issue of "relationship conflicts", it did not seem to bother line staff, who averaged just 2.62 in response to the topic. Salary and benefits, however, were a point of concern for line staff, who produced an average weighted response of 3.71 on the topic, as opposed to the 2.33 for managers/supervisors and support staff.

- Differences in experience levels produced some different responses as well. Staff with 10+ years said that "inconsistencies in supervision" were more of an issue (average weighted response of 4.36) than other staff (average of 3.24). Staff with

0-3 years of experience exhibited more concern about "job security" (average of 3.29) than other staff (average of 2.17), and they also saw "relationship conflicts" as more of a morale-killer (average of 3.57) than other staff (average of 2.64).

While a number of factors contribute to low morale, the clear driver is the perceived insufficiency of staffing and the excessive amount of overtime related to it. These primary issues, along with the secondary issues of supervision, policy and procedures problems, and salary concerns, are preventing morale from improving.

(4)   Open Response Question Results.

The survey's final section asked respondents to answer questions about the organization in their own words. A summary of their responses can be seen below.

(4.1) Strengths

The first open-ended question asked respondents what they feel the greatest strengths of the Bureau are. The following table shows the most common themes from their responses, and the "word cloud[3]" provides a visualization of the most common words found in responses.

GREATEST STRENGTHS OF THE BUREAU	
Theme of Response	**Count**
Staff Commitment	14
Staff Teamwork	10
Professionalism of Staff	7
Quality of Line Staff	7
Staff Skill	7
Compensation	2
Training	2
Organizational Factors	1
Support for Staff	1
TOTAL	**51**

---

[3] The definition of a word cloud an image composed of words used in a particular text or subject, in which the size of each word indicates its frequency or importance.

Support Taking Dedicated Consistently Job PAID
Employees Training Doing Big Incident
Matter Staff Care Accuracy Dispatchers Strong
Group of People

As the table shows, the vast majority of responses spoke highly of the Bureau's staff, particularly the line staff. The five most common response types all praised the commitment and professionalism and skill of the floor staff. These themes accounted for 88% of responses.

(4.2) Improvement Opportunities

The second open-ended question asked respondents what they feel the greatest opportunity for improvement is at the Bureau. The most common themes from their responses are shown in the following table, and the "word cloud" below it provides a visualization of the most common words found in responses

IMPROVEMENT OPPORTUNTIES	
Theme of Response	**Count**
Staffing	16
Management	15
Morale Improvements	7
Retention	6
Communication	4
Compensation	4
Policy Consistency	3
Accountability	2
Coaching	2
Technology	2
Training	2
Other	4
TOTAL	**67**

Leadership Overtime Training Coaching Needs
Retention Management Environment
Staffing Trying Employees Dispatchers Staff
Place Supervisors

As the table above shows, the vast majority of responses focused on the working conditions for operations staff. The need for additional staff and improved retention accounted for 33% of total responses. Issues with management's style formed another 22% of the response total, while communication and the desire for improved morale represented another 16%. The remaining 28% of responses were a mix of compensation issues, training and coaching improvements, accountability and consistency, and other suggestions.

(4.3) Other Comments

The final section of the survey allowed respondents to provide additional thoughts to the project team. While many of the responses to this prompt simply reiterated themes which surfaced earlier in the survey, a handful of comments brought up new issues.

- One response stated that the building needs updates, citing roof leaks and poorly functioning office furniture.

- One employee expressed confusion about what the Bureau's administrative staff do, and stated that this contributes to their perception of being unduly overworked by comparison.

- A number of responses emphasized the adversarial relationship that they see between the Bureau's management and the operations line staff.

- One response stated that staff feel like a low priority for the City because of the way contract arbitrations are handled.

The survey in general reveals that employees see themselves as committed employees for the Bureau, delivering a high level of service under unfavorable conditions. However, staff and their supervisors/management have perceived relationship issues, and these are compounded by the perceived lack of sufficient staff and the heavy workload and resulting overtime.

4 BOEC Extended Staffing Analysis

The following chapter represents Matrix Consulting Group's (MCG) analysis of BOEC core staff positions. This is an extension of an interim deliverable provided midway through the engagement.

1. STAFFING MODELS USE NUMEROUS VARIABLES TO DRIVE OVERALL DISPATCHER STAFFING REQUIREMENTS.

Developing an appropriate staffing model for a dispatch operation is not only critical to ensure effective service to the citizens, but also for those public safety agencies being serviced. Emergency communication centers have an obligation to those they serve to operate in the most efficient and effective manner possible while remaining fiscally responsible. It is therefore important to "right-size" the operation's staff, based on various factors such as workload, attrition rates, and contractual obligations.   The Matrix Consulting Group has reviewed and used a variety of dispatcher staffing models over the last several years, and has refined these models as new information becomes available. Due to the importance in accurately predicting staffing requirements, the project team utilized a variety of models to evaluate staffing requirements for BOEC and to provide recommended dispatch-related staffing levels based upon these modeling outcomes.

Development of an accurate staffing model begins with understanding and calculating several variables. The following sub-sections provide thorough explanation of each of the variables utilized.

(1) Net Dispatcher Availability Approximates 1,510 Hours Per Year.

While traditionally one Full-time Equivalent (FTE) staff position is based on a standard Monday through Friday, 0800 hours to 1700 hours work schedule consisting of

2,080 hours per year. In public safety professions, such as emergency communications, this is not always the case and it is common for non-traditional schedules to be utilized to meet service level demands. These often include 10-hour or 12-hour daily schedules where staff, such as dispatchers and call-takers at BOEC, are scheduled to work either 2,080 or 2,190 respective hours per year.

As discussed in the Profile section of this report eleven staff members work a modified shift schedule utilizing 12-hour shifts instead of the 10-hour shifts. While typically working 12-hour shifts would result in 2,190 total work hours in a year this is not the case for BOEC employees. The current scheduling approach for the 12-hour shifts at BOEC is based on a two-week work period, whereby the employee works forty-eight hours in the first week but only thirty-two hours the second week, resulting in a more traditional 2,080 hour total.

A critical workload element to determine staffing requirements is the amount of annual time available for dispatch personnel to perform their work, their "Net Availability". The Matrix Consulting Group uses net availability in our modeling and defines it as the number of hours that a dispatcher or call takers is available to perform their key roles and responsibilities <u>after</u> calculating the impact of such things as scheduled leave, sick leave, training time, meals and breaks, etc. Based on leave information provided by BOEC, this "unavailable time" has been subtracted from their gross annual scheduled hours of work (2,080) providing the Net Available time of 1,510 hrs.

Average Annual Leave Taken by Type	Average Annual Hours Taken
Vacation Hours	190.2
Sick Hours	105.06
Comp/Personnel Leave	39.03
Training Leave	n/a
FMLA, Military Leave	25.9
Bereavement	3.35
Meals/Break (if taken)	167.78[1]
OTHER leaves	38.62
Total Unavailable Time	**569.94**
NET ANNUAL AVAILABLE WORK HOURS PER POSITION	**1510.06[2]**

[1] Meals/Break times were calculated using the current BOEC employee contract and averaged down to 1 hour of total break time per shift.
[2] Based on 2080 hours per year as described in the narrative.

The Net Available time noted above is heavily affected by the higher than normal use of leave taken on average per year. Removing the hours attributed to meals and breaks (167.78) results in a total of yearly average of approximately 402 hours of leave used, or just over forty (40) workdays. These days taken in conjunction with normally scheduled weekends on the 4-10 work shift means that on average BOEC employees are unavailable to work for approximately two and half months each year. Of this two and a half months over three weeks of this is comprised of sick and FMLA time.

(2)   Attrition Rate.

The attrition rate, also called turnover, is the loss of any staff due to retirement, termination, or separation by the employee. While attrition is inherent in any profession, it's impact on emergency communications is a key factor that must be accounted for in order for staff modeling to be accurate. For comparative purposes, dispatcher turnover nationally averages 17%[4] to 19%. In reviewing recent historical data provided by the BOEC, the three-year average attrition rate was 15%, ranging from 11% in 2014 to 17%

---

[4] 2005 APCO Project RETAINS.

in 2016, which is just below the national averages. This percentage was used by the project team in staffing calculations to help ensure appropriate coverage of positions that could be vacant as a result of retirements, resignations, etc.

(3) Current Fixed-Post Staffing Requirements.

A fixed-post position is an assignment that is typically deployed every day, irrespective of workload. Typically, it is in reference to 24-hour, 7-day/week, 365-days/year deployment, although some fixed-posts are only for a portion of a 24-hour period to accommodate a higher workload during that time. The MCG compares existing fixed-post deployment strategies against alternative deployment strategies based on workload and service-level modeling to ultimately determine staffing recommendations.

(3.1) Dispatching Fixed-Posts.

BOEC currently deploys nine (9) fixed-post dispatch positions covering the assignments as shown in the diagram below. This is reflective of existing approaches and not yet subject to scrutiny as will be accomplished later in this report.

Fixed Dispatch Posts		
1	Fire Dispatch	Resource Dispatch
2	Fire Dispatch	Operations 1 Talk group
3	Fire Tactical Resource Operator 1	Emergency Phones and tactical dispatch
4	Fire Tactical Resource Operator 2	All phones and backup tactical dispatch
5	Police Dispatch	Multnomah County talk group
6	Police Dispatch	Portland Police East Precinct talk group
7	Police Dispatch	Portland Police Central precinct talk group
8	Police Dispatch	Portland Police North precinct talk group
9	Police Services Desk	Service talk group

(3.2) Call Taking Fixed-Posts.

For call taking positions the BOEC utilizes "target" staffing numbers based on the day and time of week. The target numbers start with a minimum of six (6) positions staffed on a 24-hour per day basis and adds additional staff in varying time blocks throughout the

day, peaking with a total of 10 positions during their busiest hours. These targeted staffing

numbers and times are as shown below.

Target Call Taking Posts	
Number of Call Takers	Hours of Coverage
8	0100 – 0300[1]
6	0300 - 0700
7	0700 - 0900
9	0900 - 1100
10	1100 - 0100

[1]On Friday and Saturday nights the number of call takers during these hours remain at 10.

Based on these target staffing numbers, the fixed-post average was calculated for

a 24-hour period. Thus, the fixed-post average per day is 8.83 positions, irrespective of

the time period covered.

(4)   Dispatcher Utilization Rate.

The calculation for net (hour) annual availability for dispatchers noted previously

essentially results in the amount of time each dispatcher is available to perform work.

However, as in any profession, no position is occupied 100% of the time. By example,

most blue-collar professions, such as fleet mechanics, are ideally occupied 80% of the

time performing direct work on vehicles. This helps ensure productivity and, in the private

sector, profitability. In the public safety field, law enforcement agencies would typically

strive for patrol staff to have from 35%-50% unobligated patrol time, thereby allowing

them to selectively work in this "free time" on community-oriented problems, and proactive

enforcement opportunities. This proportion of unobligated time also allows for patrol units

to generally be available for relatively rapid response to community generated calls for

service.

The amount of time dedicated to actual work in emergency communications is

based on several inter-related variables and an allowance needs to be made regarding

the proportion of time a dispatcher or call taker is actively involved in call handling. An allowance needs to be made regarding the proportion of time desirable to have a dispatcher actually involved in call handling, radio transmissions, keyboard entry, records search, etc. There are several reasons why tasks performed by BOEC staff should not occupy 100% of their time. A brief summary of a few of these are:

- Dispatch centers which have excessively high utilization levels tend to "burn-out" staff and consequently have high levels of employee turnover.

- Professions which require extreme concentration during work activities, such as dispatch, air traffic control, trauma centers, or other professions in which failure brings unacceptable risk, should have lower work utilization rates to incorporate "down time."

- Dispatch centers which have high utilization levels experience "queuing" problems in which responses to incoming telephone calls and radio transmissions are regularly delayed because the dispatcher is pre-occupied with other concurrent workload.

- In dispatch centers with high utilization levels quality begins to suffer because dispatchers must cut calls and radio exchanges short, thereby impacting dispatcher effectiveness, perceived customer-friendly service, and potentially safety in the field for law enforcement, fire, and emergency medical response professionals.

    Based on these variables the MCG continually refines the utilization rate based on prevailing practices. These include the following:

- For many years MCG used a utilization rate of **50%** for dispatchers to perform core dispatcher-related functions. This implies that dispatchers will be busy performing work an average of 30 minutes per hour or one second every two seconds of net available time. It should be noted that this utilization or "occupancy rate" is one of the primary drivers in workload-driven staffing requirements. Modifying this variable by relatively small increments can have an important impact on staffing requirements.

- Recent literature has suggested that the utilization rate can be raised somewhat to approximately **65%.** This has been the experience of various dispatch agencies throughout the country including Scottsdale, AZ; Middleton, TX and NORCOMM, WA.

    These utilization rates will be used in the following staff modeling exercises.

(5) **Workload Data Elements Utilized.**

There are some very important workload elements that must be captured to provide accurate staff modeling. These include major work elements such as:

- Total CAD incidents.
- Total 911 calls.
- Total inbound non-emergency calls.
- Total outbound calls.
- Radio airtime and push to talk events.

All of these data elements were utilized during the project team's analysis.

2. **DISPATCHER AND CALL-TAKER STAFFING ANALYSIS BASED ON WORK REQUIREMENTS.**

The Association of Public Safety Communications Officials (APCO) has published a staffing model as part of their Project RETAINS efforts, developed by the University of Denver Research Institute. In effect, the APCO project RETAINS model requires several discreet data elements based on actual workloads to be effective. These include:

- **Net (actual) annual staffing availability** as shown earlier in this chapter.

- **Average telephone busy time** (call duration in seconds), from phone or other records. This should ideally distinguish between law and fire E-9-1-1 calls and administrative calls for service.

- **Average call completion time** (in minutes, this includes time for keyboard data entry, radio transmission, address verification, etc.). Average call completion time is often not accurately available. While some agencies are capable of collecting accurate radio transmission time, other dispatcher-related workload, such as records checks or keyboard data entry by staff, is most often not available.

- **Average Processing Time**, or APT— which is the sum of the two above bullets.

- **Agent Occupancy Rate** (AO) which reflects the proportion of time that the agency desires a dispatcher to be occupied with workload. This is, in effect the same as the definition of Utilization Rate which calculates the proportion of time a dispatcher should have downtime as opposed to engaged with workload.

In brief, the APCO project RETAINS staffing model is an accepted methodology within the industry but it has its limitations. These include:

- The model is originally designed for a call-taker/dispatcher position whereby staff performs both functions simultaneously. This is often referred to as a "vertical" dispatch environment. Many dispatch agencies, such as BOEC, now operate with distinct call-taker positions and dispatcher positions performing separate functions, often referred to as a "horizontal" dispatch environment.

- The APCO model fails to account for the workload directly related to *other* activities that are unrelated to the tasks resulting from telephone calls. That is, by example, police officer self-initiated activities and the variety of tasks associated thereto.

- The APCO model suggests some kind of "estimate" for call wrap-up time, keyboard data entry, records checks, etc., with no suggested benchmark for this kind of workload.

For these reasons, the Matrix Consulting Group uses the APCO model merely as a baseline, and has augmented it by addressing the issues noted above, for determining call taker and dispatcher staffing levels.

(2.1) Radio Times "Transactions" are a Major Workload Driver in this APCO-Based Model.

The APCO-based model can use the actual number of radio transmission transaction time as a primary workload driver. Dispatchers are responsible for relaying information effectively via the radio and are usually multi-tasking (keyboard entry or console monitoring) while such "air time" is transacting. It is a primary responsibility of dispatch staff. The total time associated with radio transactions is calculated to determine an average amount of time spent in this key task.

Based on the 2016 radio airtime data provided by BOEC, we calculated the average amount of radio time that could be allocated to each unique incident noted previously. The result is as follows:

Radio Transaction Data	
Total Airtime Seconds	30,885,590
Total Airtime Minutes	514,759.85
Total Annual CAD Incidents	619,271
ESTIMATED RADIO MINUTES PER CAD INCIDENT	**.83**

Recognize that not every CAD incident requires the same amount of radio time, many are shorter and some are longer. However, for modeling purposes all radio time must be captured by a key workload element.

(2.2) Like Most Dispatch Agencies Dispatching all Public Safety, Law Enforcement Workload is Significantly Greater than Fire-related Workload.

Foundationally, a core workload metric for dispatchers is the number of unique computer-aided dispatch (CAD) incidents that are managed. The following chart shows the number of unique incidents for BOEC for 2016 by service category.
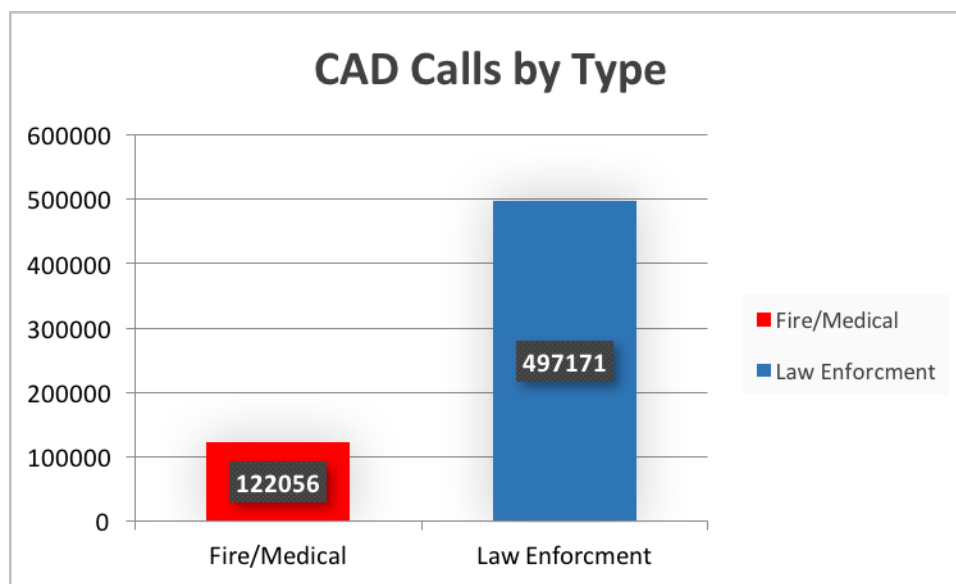
As illustrated in the graph above, of the 619,271 incidents the largest majority (80%) are related to handling law enforcement calls for service for the Portland Police Bureau, Multnomah County Sheriff (and their contract municipalities), Gresham Police

Department, and Multnomah County Parole and Probation. The remaining incidents (20%) are Fire/Medical related to the handling of calls by the Portland Fire Bureau, Gresham Fire Department, Corbett and Sauvie Island Rural Fire Protection Districts, Multnomah County EMS, and American Medical Response. This disparity of incident types, and dispatcher workload, is an important factor for call taker modeling discussed later in this report as it allows for two of the four fixed-post Fire dispatch positions to provide call taking duties for a majority of their time.

(2.3) APCO Suggests Estimating Time Associated with Other Tasks Performed by Dispatchers in Staff Modeling.

Perhaps one of the most difficult workload elements to capture is the task time associated with an incident that is unrelated to radio time. This includes the aforementioned keystroke entries, record checks off-line, display monitoring, administrative data entry, e-mail checking, etc. APCO, NENA and others have not provided any benchmarks with respect to this kind of workload, suggesting an estimate be developed for such work. Other dispatch organizations have developed estimates ranging from 90 seconds for each call for service (as opposed to a CAD incident), to ten seconds per telephone call (NOT dispatcher activity) for call wrap-up, to no time allocation for such activities given many of them are accomplished during radio traffic as part of multi-tasking. Consequently, developing a reasonable time estimate for BOEC is the only current approach beyond an industrial engineering exercise which is beyond the scope of this study.

Given the MCG's experience in a broad array of dispatch agencies, we believe that given the current operational environment at the BOEC, ***2.5 minutes per incident*** is a very reasonable estimate to capture incident "wrap-up" and related activities that include

such things as keyboard entry, outbound telephone calls, display monitoring, etc. The result of this estimate is used in the following models.

Based on the totality of the information and assumptions above, as well as data associated with unique incidents for law enforcement and fire, net hour availability for dispatcher staff, noted utilization rates and current turnover rates, staff planning related to this particular APCO model can be developed for the dispatch positions. The following tables reflect the staffing baseline necessary to handle the workload related to all unique incident activity with different staffing levels calculated dependent upon changes in staff availability and utilization.

APCO Staffing Calculations for Dispatchers
50% Staff Utilization Rate

Category	SPD
Workload	
Average Task Completion Time Per CAD Incident (in minutes)	2.5
Average Radio Time Per CAD Incident (in minutes)	0.83
Average Processing Time (APT) for CAD Incidents (in minutes)	**3.33**
Avg. Hourly Processing Capability (HPC)	18
Total CAD Incidents	619,271
Workload Hours for Dispatchers	**34,380**
Net Availability	
Net Annual Available Work Hours	1,510
Agent Occupancy Rate (AOR)	**50.0%**
True Annual Availability (After AOR)	**755**
FTE Needed	
Turnover Rate – Three year average	15%
FTE Required to Accommodate Turnover @ 50% AOR	**52.2**

APCO Staffing Calculations for Dispatchers
65% Staff Utilization Rate

Category	SPD
Workload	
Average Task Completion Time Per CAD Incident (in minutes)	2.5
Average Radio Time Per CAD Incident (in minutes)	0.83
Average Processing Time (APT) for CAD Incidents (in minutes)	**3.33**
Avg. Hourly Processing Capability (HPC)	18
Total CAD Incidents	619,271
Workload Hours for Dispatchers	**34,380**
Net Availability	
Net Annual Available Work Hours	1,510
Agent Occupancy Rate (AOR)	**65.0%**
True Annual Availability (After AOR)	**981.5**
FTE Needed	
Turnover Rate – Three year average	15%
FTE Required to Accommodate Turnover @ 50% AOR	**40.2**

In summary, based upon the CAD, Radio, and other workload-related variables noted earlier, BOEC staffing needs range from 40.2 full-time equivalent (FTE) dispatcher positions at the 65% Occupancy Rate, to 52.2 FTEs at the 50% Occupancy Rate to adequately staff the communications center floor.

The resultant of the workload models above (40.2 and 52.2) can be compared to the staffing required to fill nine (9) dispatch fixed-posts regardless of workload requirements. Based on net availability, 52.07 dispatcher positions would be required; this however, does not accommodate for turnover. Given staffing levels should be driven by workload requirements, and the workload outcome is close to existing dispatcher fixed-post deployment strategies, the MCG is confident in a recommendation of deploying approximately **52-53** dispatcher positions.

(2) Overview of the Approach on Developing Call-taker Staffing Based on the Erlang Model.

Call taker staffing needs are not determined using the APCO RETAINS model, and are instead calculated using a process based on the work of Danish engineer Agner Erlang. Unlike the APCO model which estimates staffing based upon different kinds of work outputs, the Erlang model uses workload variables but the primary driver is related to developing staffing recommendations based on desired levels of performance or "response time."   In effect, the Erlang Model is a predicted performance model that calculates the probability of a certain average wait time that a caller would experience. One of the primary criticisms of the Erlang model is that it assumes an acceptable "on-hold" time for the caller. While initially this may seem to make the Erlang model impractical for use in an E9-1-1 Public Safety Answering Point (PSAP) environment, using national or local policy-driven standards for call answering times eliminates the shortcoming of an assumed hold time. The Erlang model uses calculations to find the amount of time it takes to answer a call based on a certain level of staffing; these times can then be compared to standards to assure performance minimums are achieved. Although the Erlang model has been traditionally used to estimate staffing needs and performance predictions for non-emergency call center operations, the input values can be manipulated such that the model is well adaptable to a Public Safety Answering Point.

Current BOEC policy states that **90%** incoming emergency calls (911 and 10-digit emergency) should be answered within **twenty** seconds, which appears to have been based on the National Emergency Number Association (NENA) standard. This standard is currently in the process of being updated by NENA and should be formally adopted by March of 2017. The new standard states that 911 Centers should meet or exceed the

minimum standard of **95%** of emergency calls being answered within **fifteen** seconds, and **99%** within **forty** seconds. For comparative purposes the project team conducted Erlang modeling using both standards.

(2.1)   Call-taker Requirements Based on Telephone Call Workload.

Receiving telephone calls occupies a significant portion of dispatcher/call taker workload, and therefore represents an important step in analyzing the staffing needs of an emergency communications center. Emergency and non-emergency calls can be handled differently, both in terms of the performance requirements for responding, as well as the staff members assigned to the complete the task. Data collected by the project team shows that the BOEC handled approximately 838,211 inbound telephone calls, including 911, 10-digit emergency, and 10-digit non-emergency calls. The breakout of these call types is illustrated in the graph below.
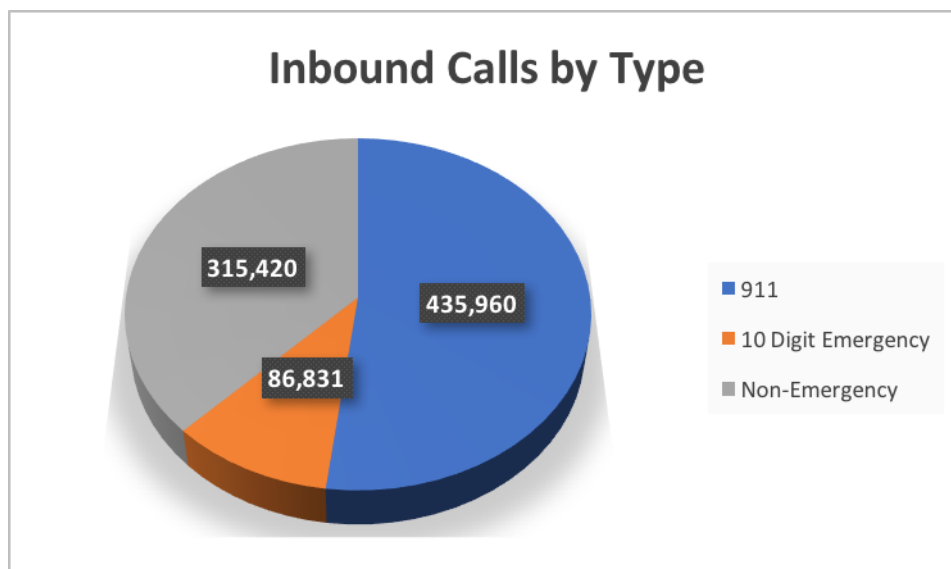
As shown in the graph above 911 calls make up 52% of the inbound call volume, with 10-digit emergency calls comprising an additional 10%, meaning that 62% of BEOCs inbound calls are considered "emergency" in nature, which is higher than MCG typically

sees.   Interestingly while non-emergency calls comprise only 38% of the inbound call volume they consume 52% of call taker time due to their longer average processing times. The following graphs illustrate the average duration of each call type in comparison with the percentage of call taker time spent processing each call type.
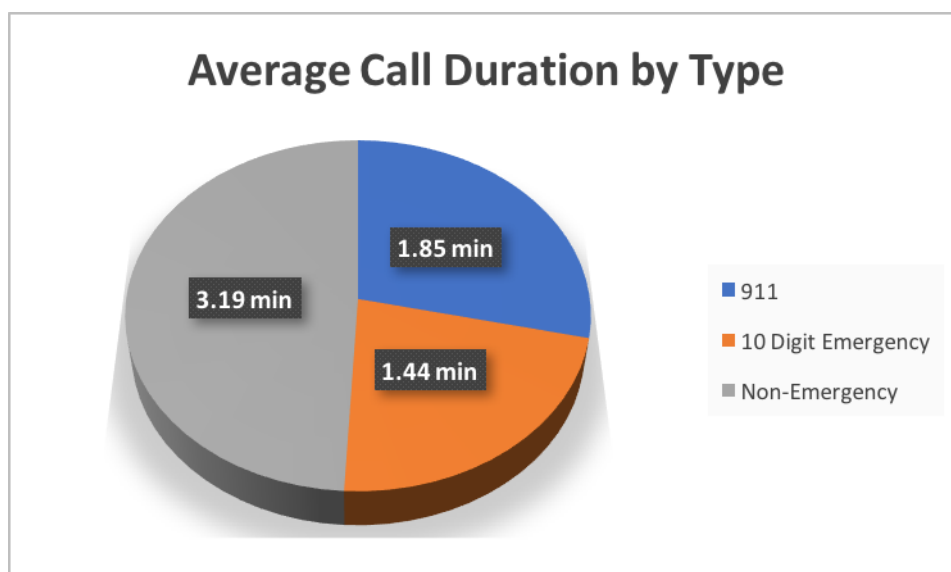
(2.2)   Outbound Call Workload.

Outgoing calls are not directly factored into the modeling discussed previously and is accounted for by evaluating the amount of time available to call taking staff. Generally outbound calls occur during call-takers' and dispatchers' downtime. Specifically, with regard to call takers, they cannot practically speaking be receiving an inbound call, while also placing an outbound call at the same time. Furthermore, most out-going calls have a lower priority than incoming 911 calls, with many having no "response time" requirement as they are purely administrative or personal in nature. Additionally, a significant portion of outbound calls are conducted by dispatch and Supervisory staff reducing the burden on call takers.

As discussed however it is important to account for time availability of staff to place these calls assuring that the Agent Occupancy (AO) rate is within the acceptable modeled range of 50%. As the graph below illustrates the addition of outbound call workload, added to the workload of all incoming calls brings the AO rate for BOEC call takers to 51%. In short BOEC call taking staff would be busy approximately one half of every hour worked.
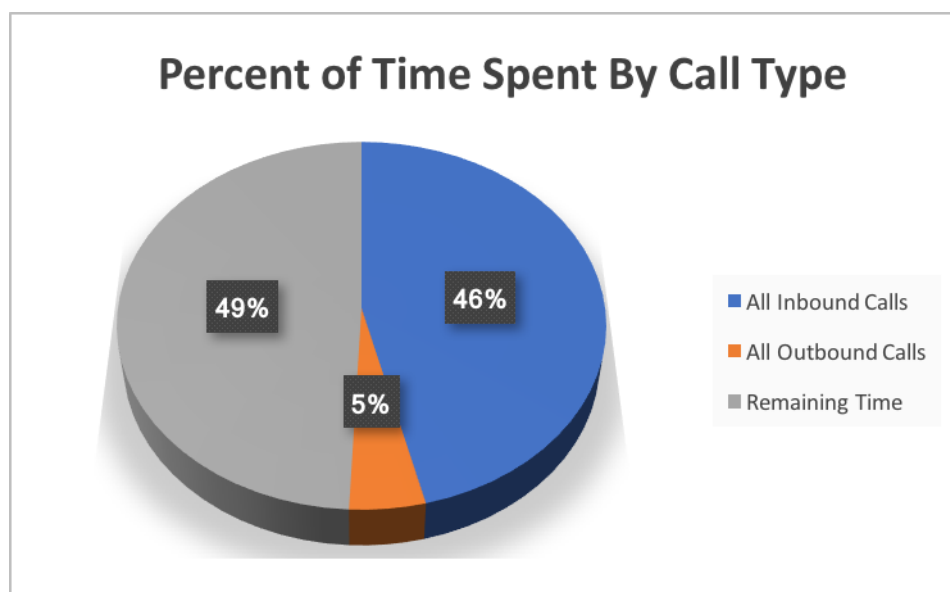
(2.3) Results of the Erlang Model Fixed Staffing Needs for Call-takers.

Performance requirements of answering non-emergency lines is usually substantively different than that of emergency calls. As discussed earlier the current BOEC standard for 911 call answer is **90%** of calls in **ten seconds**, and the new NENA standard is **95%** within **fifteen seconds**. While staff modeling must address the receipt of all incoming calls, to provide a complete understanding of BOEC call taking needs our modeling was conducted first with 911 calls only, and then with all inbound calls utilizing the overall higher standards of call pick-up regardless of call source.

The following tables present the results of the Erlang-C formula and calculations for answering <u>911 inbound calls only</u>, which calculates the fixed post staffing needs for BOEC based on the two performance standards discussed above.

911 Call Workload Calculation Based on Erlang-C
(Current BOEC Standard - 90% in 20 seconds)

Category	Combined
Avg. Incoming call rate –calls **(per ½ hour)**	24.87
Avg. Call Duration (sec.)	111.2
Target Answer Time (sec.)	**20**
Service Level Required	**90.0%**
# of Fixed Post Call-takers Required for Incoming Calls	**4**
Percentage of calls answered within 20 seconds	93.57%

911 Call Workload Calculation Based on Erlang-C
(New NENA Standard - 95% in 15 seconds)

Category	Combined
Avg. Incoming call rate –calls **(per ½ hour)**	24.87
Avg. Call Duration (sec.)	111.2
Target Answer Time (sec.)	**15**
Service Level Required	**95.0%**
# of Fixed Post Call-takers Required for Incoming Calls	**5**
Percentage of calls answered within 15 seconds	98.61%

As shown in the Erlang tables on the previous page, the number of <u>911 call-takers</u> required averages **4** (Fixed-Posts) during any given time period under the current BOEC policy, and **5** (Fixed-Posts) under the new NENA standard. The tables below present the results of the Erlang-C formula and calculations for answering of <u>all inbound calls</u>**,** again based on the two performance standards.

All Call Workload Calculation Based on Erlang-C
(Current BOEC Standard - 90% in 20 seconds)

Category	Combined
Avg. Incoming call rate –calls **(per ½ hour)**	47.84
Avg. Call Duration (sec.)	138.88
Target Answer Time (sec.)	**20**
Service Level Required	**90.0%**
# of Fixed Post Call-takers Required for Incoming Calls	**7**
Percentage of calls answered within 20 seconds	94.03%

All Call Workload Calculation Based on Erlang-C
(New NENA Standard - 95% in 15 seconds)

Category	Combined
Avg. Incoming call rate –calls **(per ½ hour)**	47.84
Avg. Call Duration (sec.)	138.88
Target Answer Time (sec.)	**15**
Service Level Required	**95.0%**
# of Fixed Post Call-takers Required for Incoming Calls	**8**
Percentage of calls answered within 15 seconds	97.53%

As before, the Erlang tables above calculate the number of call-takers required to answer all incoming calls averages **7** (Fixed-Posts) during any given time period under the current BOEC policy, and **8** (Fixed-Posts) under the new NENA standard.

(2.4)   Total Call-taker Staff Needed.

The results of these fixed post staffing calculations are then used to determine the actual number of full time staff needed to fill those call taker positions, taking into account the net availability and the attrition rate calculated previously. The results of the 911 call taker only calculations above result in either four (4) fixed-posts under BOEC policy, or five (5) fixed-post under the NENA standard, which results in a staffing level of approximately **twenty-six** (26), and **thirty-three** (33), full-time 911 call-takers respectively to achieve the recommended and noted targets which should be achieved,

based on Erlang modeling, approximately 93% and 98% of the time. The results of this

modeling are shown the graph below.

FTEs Needed for Fixed-Post Call Answering Requirements (911 Only)

Category	Call Takers	Call Takers
Total # of Required Fixed-Post Positions	4	5
Net Annual Available Work Hours	1,510	1,510
Turnover Rate – (Three-year average)	15%	15%
FTE Required for Call-taker Fixed Post Positions	26.55	33.19

The results of the calculations for the answer of all incoming calls result in either

seven (7) fixed-posts under BEOC policy, or eight (8) fixed-post positions under the new

NENA standard, which results in a staffing level of approximately **forty-six** (46), and **fifty-**

three (53), full-time 911 call-takers respectively to achieve the recommended and noted

targets which should be achieved, based on Erlang modeling, approximately 94% and

97% of the time. The results of the modeling for all inbound calls is shown the graph

below.

FTEs Needed for Fixed-Post Call Answering Requirements (All Calls)

Category	Call Takers	Call Takers
Total # of Required Fixed-Post Positions	7	8
Net Annual Available Work Hours	1,510	1,510
Turnover Rate – (Three-year average)	15%	15%
FTE Required for Call-taker Fixed Post Positions	46.46	53.1

The project team chose to use the eight (8) fixed post positions modeled under the

new NENA standard as it is near the current average number of call-taker fixed posts

deployed over a 24-hour period by BOEC, and it is expected that BOEC will adopt the

new NENA standard once implemented.

In summary, based upon the telephone related workload data, the BOEC needs 53.1 full-time equivalent (FTE) call taker positions to adequately staff the communications center floor.

3.   BOEC DISPATCHER AND CALL-TAKER NEEDS UNDER CURRENT DEPLOYMENT MODEL.

Based on a thorough analysis of the data and utilizing workload performance modeling, the BOEC requires **52.2** dispatcher positions and **53.1** call taker positions to effectively process the amount of work identified by the workload and performance objective metrics and fixed-post data used. This is a total of **105.3** positions that would be considered Emergency Communication (EC) Call Takers, EC Police Dispatchers, and EC Senior Dispatchers.

(1)   Reconciling Existing BOEC Staffing Versus Modeling.

There are various reasons internal staffing deployments can conflict with modeling. The modeling implies, by example, the most efficient shift structuring, precisely balancing workload to staff needs. All shift schedules which are not equally divisible into 24 hours of the day suffer from cost and deployment inefficiencies. The staffing requirements for a 9 or 10-hour schedule increases the number of staff needed on duty; and where some effectiveness can potentially be gained by the shift overlaps provided in these types of schedules, it is clearly costlier and thus less efficient than schedules equally divisible in a 24-hour time period. The number of overall 2,080 hour positions required to cover 365-days, 24-hours a day is notably different than the number of positions to cover a 4/10 shift as shown in the table below:

# of 2,080 hour Positions Required for Yearly Coverage	8-hour Shift	10-hour Shift
	4.21	5.26

As shown by the table, the 4/10 work schedule is 25% less cost-effective and efficient than the 5-day, 8-hour schedule (or 3/12 schedule alternatives). Consequently, despite workload calculations based on the models, the BOEC staff, which are largely on the 4/10 shift schedules, are handicapped with respect to deploying in the most efficient and effective manner possible. This is further demonstrated on the following table by showing how the "ideal" deployment should be for call-taker fixed-posts based on call volume and by hour of day.

Call Taker Time Blocks	Call Taker Fixed Posts Needed Based on Inbound Telephone Workload
0000 – 0200 hours	6 fixed posts
0200 – 0400 hours	5 fixed posts
0400 – 0600 hours	4 fixed posts
0600 – 0700 hours	5 fixed posts
0700 – 0800 hours	6 fixed posts
0800 – 0900 hours	7 fixed posts
0900 – 1000 hours	8 fixed posts
1000 – 1300 hours	9 fixed posts
1300 – 1900 hours	10 fixed posts
1900 – 2200 hours	9 fixed posts
2200 – 2300 hours	8 fixed posts
2300 – 0000 hours	7 fixed posts

Staffing requirement calculations are designed to fill these fluctuating fixed-posts based on workload needs irrespective of other scheduling considerations such as shift continuity for staff, contractual obligations, etc. In effect, based on factors such as the fluctuation of needed call-taking staffing above, and the 25% "inefficiency" of the 4/10

shift program, accommodating APCO and Erlang-C modeled staffing requirements by an

"inefficiency margin" would not be inappropriate. Generally speaking, "good planning can

help resolve inefficient schedules" and as such providing a 12.5% accommodation (25/2)

is suitable for staff planning purposes. In short, placing half of the responsibility to deal

with this inefficiency issue, or 12.5%, on the agency, with the other half being applied to

the number of staff recommended thus the 25% divided by 2 = 12.5%.

This then results in a total staffing contingent of **118** positions that would be

considered EC Call Takers, EC Police Dispatchers, and EC Senior Dispatchers compared

to currently authorized staffing levels of 107 positions and the 97 actual positions.

(2)   Modifying Call Taking Staff Deployments Based on Workload Modeling Offers Advantages.

The staffing levels calculated and discussed in the previous sections were done

utilizing the existing BEOC deployment strategies. In this section, we will explore

alternate shift deployments and the assignment of fixed-posts based on workload

irrespective of current operational standards.

As discussed earlier in the staff modeling section of this report BEOC sets "target"

fixed-posts for call taking duties, starting with a minimum of six (6) fixed-post scheduled

on a 24-hour basis. Additional fixed-posts are added to this base number at varying

numbers based on the time of day, topping out with a maximum of ten (10) fixed call

taking stations between 1100 hours and 1700 hours where call volumes are the highest.

In analyzing BOEC data, efficiencies in staff deployment can be realized without

negatively affecting the service levels provided. The following table shows the current

BOEC daily call taker fixed post deployments as compared to the number needed based

on inbound call workload.

Call Taker Time Blocks	Fixed Posts Deployed by BOEC	Fixed Posts Needed Based on Workload	Number of Posts Over Needed
0000 – 0100 hours	10	6	4
0100 – 0200 hours	8	6	2
0200 – 0300 hours	8	5	3
0300 – 0400 hours	6	5	1
0400 – 0600 hours	6	4	2
0600 – 0700 hours	6	5	1
0700 – 0800 hours	7	6	1
0800 – 0900 hours	7	7	0
0900 – 1000 hours	9	8	1
1000 – 1100 hours	9	9	0
1100 – 1300 hours	10	9	1
1300 – 1900 hours	10	10	0
1900 – 2200 hours	10	9	1
2200 – 2300 hours	10	8	2
2300 – 0000 hours	10	7	3
Total Fixed Posts	**126 Deployed**	**104[5] Needed**	**22 Over Deployed**

As the table above shows, based on workload the required number of call taking positions varies from **four** (4) fixed-posts between 0400 hours and 0600 hours, to a high of **ten** (10) fixed-posts between 1300 hours and 1900 hours. When comparing results for a 24-hour period, the number of fixed post required by workload is **104**, which is significantly less (22) than the current BOEC deployment strategy of **126.** The times

---

[5]Needed fixed posts based on 2016 BOEC data and averaged for all days of the week.

where fixed-posts are "over deployed" is <u>not</u> necessarily an indicator of overall staffing needs, rather they are an indicator of opportunities to refine call taker deployment. The necessity of the total number of staff needed and refinement of their deployment is supported by perceptions received in the BOEC staff survey. By example:

- 96% of survey respondents disagree or strongly disagree that BOEC is staffed with enough call takers to meet the agency's needs.

- 95% of survey respondents agree or strongly agree that BOEC employees work too much overtime to cover shifts.

As noted earlier, the incremental breakout of these fixed-post needs must also be balanced against acceptable work periods for proper scheduling. The following Poisson distribution model shows the number of fixed post call taking positions required by month of the year and hour of day.

AGENTS NEEDED BY HOUR AND MONTH													
Hour	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	Avg
12a	6	6	6	6	6	7	7	7	6	6	6	6	6
1a	6	6	6	6	6	6	6	6	6	6	6	6	6
2a	5	5	5	5	5	6	6	6	5	5	5	6	5
3a	5	5	5	5	5	5	5	5	5	5	5	5	5
4a	4	4	4	4	4	4	5	5	4	4	4	4	4
5a	4	4	4	4	4	4	4	4	4	4	4	5	4
6a	5	5	5	5	5	5	5	5	5	5	5	5	5
7a	6	6	6	6	6	7	6	6	7	6	6	6	6
8a	7	7	7	7	7	7	7	8	8	8	8	8	7
9a	8	8	8	8	8	9	8	8	9	9	9	8	8
10a	8	8	8	8	9	9	9	9	9	9	9	8	9
11a	9	9	9	9	9	10	9	9	9	9	9	9	9
12a	9	9	9	9	9	10	10	10	9	9	9	8	9
1p	9	9	9	10	10	10	10	10	10	10	9	9	10
2p	9	9	9	10	10	10	10	10	10	10	9	9	10
3p	9	10	10	10	10	10	10	10	10	10	10	9	10
4p	9	10	10	10	10	10	10	10	10	10	10	9	10
5p	10	10	9	10	10	10	10	10	10	10	10	9	10
6p	9	9	9	10	10	10	10	10	10	9	9	9	9
7p	9	9	9	9	9	10	9	10	9	9	9	9	9
8p	8	8	8	9	9	9	9	9	9	8	8	8	9
9p	8	8	8	9	9	9	10	9	9	8	8	8	8
10p	7	7	7	8	8	9	10	9	8	8	8	8	8
11p	7	7	7	7	7	8	8	8	7	7	7	7	7
Avg.	7	7	7	8	8	8	8	8	8	8	8	7	8

As shown, based on workload fixed-post call taker needs range from four (4) to ten (10) fixed-posts. This "heat map" style graph, in conjunction with the hour per day chart

discussed previously provides significant information for BOEC Operations Management and Supervisors to refine fixed-post call taker deployments.

(3)   Modifying Dispatch Staff Deployments Based on Workload Modeling Offers Advantages.

As discussed earlier BOEC currently deploys nine (9) fixed-post for dispatch related duties, regardless of workload, to cover the various radio talk group, operation, and service channels. While call taking positions can be adjusted relatively easily to match work load, adjusting radio talk group coverage is somewhat more complex. Where inbound telephone calls can be answered in priority, with some calls holding in queue, radio transmissions from field units generally cannot. In smaller communication centers it is common for a single dispatcher to monitor multiple radio channels, particularly if the second channel monitored is less frequently utilized, such as one used strictly for fire dispatch. However, for an agency the size of BOEC this would not be advisable for primary talk groups. With that said there are opportunities for deployment options that would result in staffing efficiencies with little or no reduction in service provision.

Workload within the communications center is primarily driven by calls for service from the public and as such dispatcher workload is generally very closely related to call taker workload. Law enforcement dispatching however has one caveat to this workload, and that is in a lack of public driven calls for service law enforcement units conduct proactive patrol, conducting traffic and person stops, and field investigations. This proactive field driven workload means that law enforcement radio channels must be manned at all times, with little adjustment opportunities.

What can be adjusted are tactical dispatch and in some cases service channels.

In the case of BOEC the Fire Tactical Resource Operators (TRO) and the Police Services Desk could be reassessed during the late-night hours when calls for service are at their lowest. As these positions relate to call taking positions, during the late night between 0200 hours and 0700 hours, when the call taking positions required drop to four and five positions, the TRO 2 position and Police Services Desk could be removed from service. During this time, the four police dispatch positions could handle the service requests from their respective talk groups, and the TRO 1 position could cover any tactical dispatch needs and still assist with call taking duties. Should an event occur requiring additional tactical dispatch assistance a Supervisor could assist the TRO position. This would result in a five-hour period where the total fixed-post for dispatch services would be **seven** positions instead of **nine,** saving 3,650 total staff hours per year that can be redeployed during hours where extra staffing is needed to meet workload demands.

(4)   The Bureau Has Appropriate Staffing Authorized for the Emergency Communications Supervisor Position.

The Bureau currently has 14 Emergency Communications Supervisors budgeted. In order to average 2 Supervisors on the floor at all times, the Bureau would need to have 11.6 FTE's in this position, requiring 12 FT staff. See the calculation below:

Supervisor Staff Based on Net Availability	
EC Supervisors (fixed post)	2
Annual Hours per fixed post	8,760
Net Available Hours per position	1,510
FTE's Needed	**11.6**

The following chart shows a potential shift schedule for 12 Supervisors, with 6 shifts of 10 hours each, with the coverage hours represented in red. This assumes that 2 supervisors are assigned to each shift, and it ensures that each hour of the day is

covered by at least 2 shifts.

Potential Supervisor 4/10 Shift Schedule											
0100	0300	0500	0700	0900	1100	1300	1500	1700	1900	2100	2300

An authorized number of 14 Supervisors is 17% greater than the 12 staff needed. Considering that the average turnover rate for emergency communications centers nationally is 15%, this is an appropriate number of authorized staff.

4. FIVE AND TEN YEAR PROJECTIONS FOR BOEC WORKLOAD AND STAFFING.

Multnomah County and the City of Portland, along with the surrounding seven county region, have become one of the fastest growing areas in the united states, with the region growing by 1.72%, or 40,621, new residents from 2014 to 2015 alone[6]. As the population in an area grows, so does the use of public safety resources including calls to 911 to access those resources. In order to assist BOEC with strategically planning for future workload demands and staffing needs the MCG conducted an analysis of U.S. census data, BOEC workload data, and evaluated possible future area development that may impact the demands placed on BOEC.

According to U.S. census data the population of Multnomah County, including the city of Portland, increased 37%[7] in the twenty-six-year period from 1990 to 2016, an increase of 216,228 new residents. Further, the Metro Council estimates that the seven-

---

[6] According to 2016 U.S. census data.
[7] Figured calculate using 2016 U.S. census population estimates.

county region will grow by approximately 400,000 residents by 2035. The rapid growth

in the region, and indeed within Multnomah County and the City of Portland, combined

with the existing challenges with recruiting and retaining staff at BOEC will provide

challenges in meeting workload demands. To acceptably meet these demands without

service levels being disrupted the project team projected future staffing needs utilizing the

same modeling applied in the staffing analysis section of this report, based on the

following assumptions:

•   Population growth was based on the 2016 U.S. Census population estimates.

•   The 26-year averaged growth rate of 1.22% would remain consistent.

•   The current area for which BOEC provides service would not change.

•   The average processing times for CAD and telephone calls would remain the
        same.

•   The current telephone answer performance benchmarks do not change.

        Based on these assumptions the future workload and staffing needs to receive and

process this workload was calculated for both five (5) and ten (10) years into the future.

To project future workload demands the project team utilized the data provided and the

current population served by BOEC. With this data as a base reference, the ratio of

telephone call and CAD calls per person were calculated. The project team then

projected the growth of the population by the 26-year average growth rate of 1.22% for

both five and ten years, and then applied the per person workload ratio. The CAD

workload projections were estimated to be approximately 721,590 by 2022, and 774,681

by 2027. The telephone workload projections were estimated to be 1,140,369 by 2022,

and 1,224,271 by 2027. These calculations were then utilized within the two staffing

models.

(1)   Projected Call Taking Workload and Staffing Needs.

The tables below present the results of the Erlang-C formula and calculations for answering of all inbound calls, using the new NENA call answer standard and the workload projections as calculated above.

5 Year Workload Calculation Based on Erlang-C
(New NENA Standard - 95% in 15 seconds)

Category	Combined
Avg. Incoming call rate –calls **(per ½ hour) 5 Year**	65.22
Avg. Call Duration (sec.)	138.88
Target Answer Time (sec.)	**15**
Service Level Required	**95.0%**
# of Fixed Post Call-takers Required for Incoming Calls	**10**
Percentage of calls answered within 15 seconds	97.81%

10 Year Workload Calculation Based on Erlang-C
(New NENA Standard - 95% in 15 seconds)

Category	Combined
Avg. Incoming call rate –calls **(per ½ hour) 5 Year**	69.87
Avg. Call Duration (sec.)	138.88
Target Answer Time (sec.)	**15**
Service Level Required	**95.0%**
# of Fixed Post Call-takers Required for Incoming Calls	**10**
Percentage of calls answered within 15 seconds	96.62%

The Erlang tables above calculate the number of fixed-post call taking positions required to answer all projected incoming calls in the year 2022 and 2027 to be ten **10** (Fixed-Posts). While the number of incoming calls does increase from 2022 to 2027 the Agent Occupancy rate remains within 4% of each other, at 50% and 54% respectively, and the probability that a call will be answered within the performance requirements are even closer at 97.81% and 96.62% respectively. The following table presents the projected staffing needs based on this modeling.

FTEs Needed for Fixed-Post Call Answering Requirements (911 Only)

Category	Call Takers
Total # of Required Fixed-Post Positions	**10**
Net Annual Available Work Hours	1,510
Turnover Rate – (Three-year average)	15%
FTE Required for Call-taker Fixed Post Positions	**57.85**

As the table above shows the projected staffing for the ten (10) fixed-posts, assuming the net availability for BOEC call takers is **57.85** FTEs.

(2)   Projected Dispatching Workload and Staffing Needs.

Based on the workload projections conducted, and the operational assumptions discussed previously, the APCO model was used to estimate BOEC dispatch staffing needs, again for five (5) and then (10) years in the future. The following tables reflect the staffing baseline necessary to handle the workload related to all unique incident activity with different staffing levels calculated dependent upon changes in staff availability and utilization.

5 Year APCO Staffing Calculations for Dispatchers
50% Staff Utilization Rate

Category	SPD
Workload	
Average Task Completion Time Per CAD Incident (in minutes)	2.5
Average Radio Time Per CAD Incident (in minutes)	0.83
Average Processing Time (APT) for CAD Incidents (in minutes)	**3.33**
Avg. Hourly Processing Capability (HPC)	18
Total CAD Incidents	721,590
Workload Hours for Dispatchers	**40,060**
Net Availability	
Net Annual Available Work Hours	1,510
Agent Occupancy Rate (AOR)	**50.0%**
True Annual Availability (After AOR)	**755**
FTE Needed	
Turnover Rate – Three year average	15%
FTE Required to Accommodate Turnover @ 50% AOR	**60.9**

10 Year APCO Staffing Calculations for Dispatchers
50% Staff Utilization Rate

Category	SPD
Workload	
Average Task Completion Time Per CAD Incident (in minutes)	2.5
Average Radio Time Per CAD Incident (in minutes)	0.83
Average Processing Time (APT) for CAD Incidents (in minutes)	**3.33**
Avg. Hourly Processing Capability (HPC)	18
Total CAD Incidents	774,681
Workload Hours for Dispatchers	**43,008**
Net Availability	
Net Annual Available Work Hours	1,510
Agent Occupancy Rate (AOR)	**50.0%**
True Annual Availability (After AOR)	**755**
FTE Needed	
Turnover Rate – Three year average	15%
FTE Required to Accommodate Turnover @ 50% AOR	**65.4**

In summary, based upon CAD, Radio, and other <u>workload-related</u> variables as previously discussed, BOEC projected staffing needs range from **60.9** full-time equivalent (FTE) dispatcher positions in 2022, to **65.4** FTEs in 2027 to adequately staff the communications center floor.

Recommendations:

Create BOEC budget allocations for a total of 118 dispatcher and call taker positions that would be considered EC Call Takers, EC Police Dispatchers, and EC Senior Dispatchers.

BOEC operations supervisors should modify call taker shift deployments to match the "optimal" fixed-post staffing levels as closely as possible to best meet workload demands.

BOEC operations supervisors should modify dispatcher deployments during the late-night hours, reducing the number of fixed-posts from 9 to 7, through not staffing the TRO 2 and Police Service positions during these hours.

Maintain existing authorized staffing levels of 14 first-line Emergency Communications Supervisor positions.

Strategically plan and budget for 57.8 call taker and 60.9 dispatcher positions by the year 2022, and 57.8 call taker and 65.4 dispatcher positions by the year 2027 to accommodate increased workload.

5 BOEC Technology Analysis

The following chapter focuses on emerging trends in technology and its potential effect on BOEC operations and service delivery. Technology in the public safety arena, as it is in other areas, is changing at an exponential rate and while this evolution brings new possibilities it can be daunting for public safety entities to keep pace with public expectations. Traditionally public safety information and technology systems where kept in their own "silo" with only minimal interaction via controlled interfaces. Now, and increasingly in the future, these "silo" walls are disappearing with more and more technology being integrated together for better information flow. This and other emerging technologies will change how the public accesses emergency services and also the way public safety agencies use the information provided to deliver that service.

While this chapter will primarily focus on new and emerging technology, it is appropriate to first briefly review the technology currently in place at BOEC.

As a part or our research and data gathering, we reviewed BOEC from a technological point of view.

(1)   As in many Dispatch Centers, BOEC Technology is Diverse and has Strengths and Opportunities for Improvement.

Information contained in this section was acquired based on interviews, tours and other data gathering techniques. We do not attempt to recapitulate all technological and related operational facets of the BOEC, but rather those that are key to operations.

Importantly, we note that while BOEC is modestly positioned from a technology perspective they are also not "cutting edge" and there are opportunities for improvement. A fairly recent upgrade of BOEC's CAD platform to the Versaterm product suite and the

implementation of the TCS text to 911 service, are examples of good technological

positioning. Additionally, the center uses industry standard adjustable console furniture,

Motorola Smartzone radio consoles, and utilizes the PageMaster EX paging system to

quickly alert responders via SMS text, email, and alpha numeric paging. While these

systems are common in the industry and provide emergency service level technical ability

to BOEC staff, there are opportunities for improvement. Some of these systems include:

- The current Vesta Meridian v2 911 phone system is an aging legacy system that is not NG911 capable, cannot be upgraded to accept text to 911, and has reached the end of its service life.

- BOEC currently uses an older, non-industry specific, Pyxis 5 recording system. The Pyxis platform was intended for the audio and video editing profession and was not designed with public safety recording and Quality Assurance (QA) processes in mind. Interviews with BOEC staff indicate that the Pyxis software is difficult to use, and was "tweaked to make it work."

- The ArcMap 10.2 software used by the City of Portland GIS department was released in 2013 and is now two versions behind the current release. While still a capable product, call routing in the NG 911 environment will become solely GIS based in the future placing even more importance on accurate and easy up to date mapping layers.

- The current Medical call guides are "home grown" and are not interfaced with the Versaterm CAD system. Modern offerings of Medical protocol systems from vendors such as Priority Dispatch, PowerPhone, and APCO offer software based versions of their products that interface with the CAD system reducing redundant data entry, standardizes interrogations and incident type selection, and most importantly shifts legal ramifications from poor outcomes away from local authorities to a body of experts.

The project team is aware that there is a pending upgrade of the current phone

system to a fully NG911 capable Airbus Vesta 4 phone system later in 2017, which will

address the first bullet point. However, there was no indication given during the interviews

that the remaining items were being considered for upgrade. These are examples of

some the technologies and systems in place that could negatively affect BOEC service

delivery and should be a part of the strategic planning process for replacement. The mix of older or difficult to use equipment and systems, somewhat more modern equipment, and the promise of newer systems perhaps explains the only marginally favorable perceptions by BOEC staff about the technology they use. Only 57% of survey respondents agreed or strongly agreed that they have the proper tools and technology to do their jobs. This marginally favorable perception is further supported by 57% of respondents stating that poor equipment is a minor factor in negatively impacting staff morale.

(2) Emerging Technology Trends and BOEC.

As stated earlier, technology is evolving rapidly and as fast as it brings new capabilities it also brings new expectations from the general public, public safety system users, and cyber security threats. The advent of the cellular phone is perhaps one of the best examples of how technology influences public behavior, and thus it's expectations of public service. In 1983 Motorola publicly released its first cellular phone, now approximately nine out of ten adults in the U.S. own a cellphone[8]. This dramatic rise in the use of cellphones has caused financial, technological, and operational issues for emergency communications centers with many 911 centers now receiving well over 70%[9] of their calls via the cellular network.

The following sections will discuss some of the trends in technology that have the potential to affect BOEC and its delivery of services if not appropriately addressed. They are:

---

[8] According to a 2015 PEW research study.
[9] https://www.fcc.gov/consumers/guides/911-wireless-services.

(2.1) Picture, Video, and Streaming of Content to 911.

As text to 911 capability and use increases so does the publics expectation that emergency services can receive not only SMS texts, but also Multi Media Service (MMS) messages containing pictures and videos. Currently BOEC policy forbids an employee from opening any media attached to a 911 text message. This policy is fairly common in the industry today, as agencies and professional bodies work to fully address the myriad of potential issues inherent in the receipt of this kind of data. However, as the use of text messaging to 911 becomes more common, it is expected that the publics use of pictures, video, and other media to report a crime will also increase. This expectation will likely drive the necessity for 911 centers to accept and process this content in some way. Indeed, in some ways this movement has already begun with the 2016 law suit filed against the State of Arizona citing that the citizens lack of access to 911 services via text was discriminatory against the deaf and hard of hearing community. If successful this suit has implications beyond text messaging, as it would set a precedence that the publics expectations of "how" it accesses emergency service is as relevant as simply "being able" to access it. It is reasonable to infer that with time the publics *expectation* that 911 be able to receive media via text will drive our *necessity* to receive it. With the expanding use of this, and other technology, BOEC should be prepared to:

- Revisit its policy and procedures for the receipt and processing of MMS messages via text to 911.

- Identify what types of information will be processed within the 911 center or that transmitted, or attached to a case record for use by field responders.

- Establish the technology and protocols to allow the safe opening of media files attached with 911 texts. This could include working with Airbus to provision MMS attachments into a folder on a virtualized computer allowing the attachment to be opened in a controlled environment, or having all media files converted to a different format whereby any malicious coding is rendered ineffective.

• Work with law enforcement agencies to identify evidentiary chain of custody protocols for the transmittal and storage of this "evidence" once received.

(2.2) GIS Based Routing of 911 Calls.

As the telecommunications provider's transition increasing amounts of the traditional legacy telephone network to Voice over Internet Protocol (VoIP) solutions, and States move to Emergency Service IP Networks (ESInets) the current selective router based call routing technology will be replaced. The State of Oregon is in the process of deploying just such a network and once completed 911 centers will be migrated to this new IP based call network.

In a true NG911 environment the call routing will be Geographic Information System (GIS) based, and the current approach of each jurisdiction keeping an independent Master Street Address Guide (MSAG) will no longer be used. This change to GIS based call routing will provide more accurate call location identification, and will provide the ability for agencies to dynamically route their calls to other Public Safety Answering Points (PSAPs), or selected call answer positions, on the fly. This also means that PSAPs, and their supporting GIS agencies or departments, will become crucial to proper call routing through the mapping and addressing they provide. For a PSAP providing 911 coverage across multiple county and municipal boundaries, cooperation and the timely in the updating of GIS map databases becomes paramount for proper service delivery.

To prepare for this technological change BOEC should begin planning with the agencies it serves, and the departments it relies on for mapping services, on how best to mitigate the issues of moving to GIS based call routing. Some issues to discuss are:

- Identify the GIS agency that will coordinate the receipt and upload of all GIS data for use by the 911 center.

- The possible need to standardize existing GIS data entry standards and modify the required frequency of data editing and address creation to prioritize 911 service.

- Identify any technology needed to allow for a county wide GIS database, such as an edit in place system.

- Outline a process for the submission and tracking of error corrections within the GIS data.

(2.3) First Responder Network Authority (FirstNet).

The First Responder Network Authority (FirstNet) was established in 2012 under the Middle-Class Tax Relief and Job Creation Act. FirstNet is an independent authority designated to provide the first nationwide, high-speed, broadband network that is dedicated to public safety. The FirstNet network is in the consultation and design phases and likely won't see service in the Oregon area for several years to come, however when it does it will bring significant enhancement in the use of technology between BOEC and the agencies it serves.

A limitation to the use of broadband network technology as the primary communication mode in public service today is that fact that the network is open to the public. During emergencies, especially large emergencies, these networks can become overwhelmed with traffic making them unreliable as the primary means for emergency service agencies to communicate. FirstNet will change this, allowing agencies to migrate more and more of its communications to alternate technologies, likely resulting in the replacement of Land Mobile Radio (LMR) networks. While much of this technology will be field centric, any changes in how communication is being conducted should be

coordinated with the 911 center receiving calls from the public. The following are

recommended steps for BOEC regarding FirstNet:

• Identify a BOEC representative for FirstNet information and coordination.

• Identify who the State of Oregon's Single Point of Contact (SPOC) for FirstNet is and ensure the BOEC representative is on the contact list for information updates and meetings.

• Include BOEC technical staff on future planning discussions regarding FirstNet deployment to ensure technology integration issues are identified and strategic planning regarding technology expenditures align with user agencies.

(2.4) Cyber Security Threats.

With the increasing reliance on computer based systems in emergency

communications and public service also comes the increasing threat of cyber-attacks.

Public safety, 911 centers in particular, are vulnerable as its sole purpose is to provide

access to the public. It is this very access that makes 911 vulnerable to cyber threats.

As mentioned earlier, malicious applications embedded within text messages, email links,

etc. have the potential to cripple the critical systems needed in providing emergency

service to the public. An excellent example of how vulnerable 911 is to cyber-attack

occurred on October 25th and 26th, 2016. In this Telephony Denial of Service (TDoS)

attack, a malicious script was embedded in a social media posting, that once clicked

caused the device to begin calling 911 repeatedly without the phones owner being aware.

The post was shared and each additional infected device also began calling 911. The

attack quickly spread overwhelming the 911 phone lines dedicated to cellular calls to

numerous agencies across the U.S. While not a dedicated terrorist attack on 911 it did

highlight how easily access to emergency services can be denied to the public. According

to the FCC, NENA, and technical experts from telecommunications providers there is not

currently a way to prevent a future attack of this type from happening again. Some steps

that can be taken to mitigate the affect that this type of attack could have on BOEC are:

- Upon identification of a suspected attack, isolate 911 trunks to prevent them from rolling over to additional lines if possible.

- Be prepared to advise local field units and the public via social media, radio, and other means that the 911 service via cellular device has been compromised and provide them with a 10-digit number to use in place of dialing 911.

- Prepare Public Safety Announcements (PSA) advising the public of the attack, and not to open or click on messages or media containing the corrupt link.

- It is also possible to have redundant, but un-used, cellular 911 trunks in place that will more quickly allow recovery from a cyber-attack, however this can be costly and requires coordination with the local telecommunication provider.

In summary, technological advances are already changing the 911 industry and

agencies such as BOEC will need to be ready to address and take advantage of these

advances as they arise. There is a myriad of topics that could be discussed, and that

may affect BOEC that are technology related, but not solely based on technology

hardware and software solutions. A few examples of this are: regionally or statewide

sharing of backroom equipment and systems, and virtual consolidation of services with

other agencies. These options can be further explored by BOEC in the future as the

technology-related 911 landscape changes.

Recommendations:

BOEC in cooperation with the City of Portland GIS department and other local municipalities should investigate a shared edit in place style GIS data management system such as the solutions offered by GeoComm to allow for the quick updating of mapping information.

Replace the current Pyxis recording system with an industry specific solution such as those offered by Nice, Stancil, or Eventide that are more user friendly and better support QA needs within a communications center.

Work with the City of Portland GIS department to facilitate the upgrade of the ArcMap software to the most current version offered.

6 Organization and Operations Analysis

The preceding chapters with respect to employee survey outcomes, staffing and technology resulted in findings and conclusions that have laid the groundwork for a better understanding of BOEC organization and operational strengths and opportunities for improvement. There can be little argument among any service provider that an ultimate goal is to deliver *the most productive level of service to the consumer*. This essentially translates into the most effective (i.e. quality) level of service that can be provided in the most cost-efficient manner. And while cost is quantifiable, effectiveness elements have important <u>quantitative and qualitative characteristics</u>. As such, a framework for evaluating these operational and organizational characteristics is helpful.

1. **FOUR FRAMING ELEMENTS FOR DISPATCH ORGANIZATIONAL AND OPERATIONAL REVIEW.**

To help frame decision-making for alternative approaches to BOEC dispatch service delivery these *Four Framing Elements* are critical in developing the analysis which follows.

- **It is Crucial to Minimize Delays in Public Safety Service Response for Effective Service Delivery to the Community.** As noted in detail throughout the body of this report, the impact in delivering timely public safety personnel and apparatus to a call for service scene can be critical. It should be considered an imperative service delivery goal, particularly with respect to the highest priority requests for service.

- **Highly-Trained Professional Dispatchers Employing Consistent Protocols are the Ideal Solution to Effective Public Safety Service Delivery.** Those that make a full-time profession providing public safety dispatch services are typically the most well-trained and thus reliable dispatcher staff. There are assignment approaches in effect throughout the country which use part-time dispatchers positions, sworn staff on temporary assignment, and staff that are performing multiple assignments at a single duty station (i.e. concurrently dispatching fire, medical, EMS and call-taking). While these models work, and by necessity must be used all of the time or part of the time in some (particularly smaller) locales, the

ideal model is deploying a fully-trained dispatcher professional able to focus on a few key service delivery tasks.

• **In an Era of Government Fiscal Constraint, Taxpayers Deserve Highly Effective Dispatch Services at the Most Reasonable Cost.** Performing effective dispatch service at the most reasonable cost should be considered a vital few priority. This requires careful balancing of operating costs against service level requirements and requires some of the most difficult decisions in a dispatch organization.

• **Operational Changes from Alternative Dispatch Delivery Initiatives should have a Net Operational Benefit to Public Safety Services Overall.** Determining "net" benefit is not only a quantitative effort but a qualitative effort as well. Agencies and customers with disparate needs will judge this differently. Nevertheless, it is important to attempt to articulate the "net benefit" from any operational or organizational change.

Based on this framework, and using these essential elements as core principles, the Matrix Consulting Group will provide organizational and operational modifications for consideration in this chapter. Our analysis is presented in the following sections.

2. GUIDING PRINCIPLES FOR EFFECTIVE ORGANIZATIONAL STRUCTURES.

The purpose of an organizational structure is not only to provide the traditional command and control of an agency, but also to help define job duties and responsibilities, ensure efficient and effective workflow, establish a reporting hierarchy, and ultimately determine appropriate lines of authority and accountability. To accomplish this, the design of an organizational structure and placement of employees within the organization should be established on general principles that provide the organizational cohesion necessary to accomplish the primary mission of the work unit, in this case, BOEC. These organizational principles include:

• ***Responsibility & Authority:*** A structure must have clear lines of responsibility to accomplish the mission and goals of the organization; and the authority within the organization to manage assigned operations to accomplish the organizational mission and stated goals.

- **Accountability:** A structure that provides clear lines of accountability among management and supervisory staff. While this is highly dependent upon the individuals assigned to the functions, the organizational structure itself should facilitate, and not impede, general supervision of employees and the daily performance of an organization.

- **Complementary Functions:** Like functions are grouped together to support regular interaction for planning and scheduling approaches and for effective service delivery.

- **Coordination of Work Efforts:** The organizational structure should facilitate communication and working relationships among staff and work units. Many functions need close or indirect alignment in order to maximize efficiency and effectiveness. The structure should also provide easy identification of job function to people outside the organization, including other government partners and user agencies.

- **Degree of Organizational Risk:** This relates to how much risk a function incurs if an activity is not performed or is performed poorly. Risk might involve operations, consequence of error, or service level concerns. Generally, higher risk functions have closer management oversight.

- **Degree of Public Scrutiny:** This factor is concerned with the degree to which public attention is routinely paid to a given activity. Activities with potentially high public scrutiny, such as a communications center, are best performed under closer supervision.

- **Supervisor & Management Span of Control:** This relates to whether supervisors are fully devoted to overseeing a select few primary activities or a broader set of duties and responsibilities. Appropriate spans of control are related to both the number of staff directly supervised as well as the complexity of activities overseen.

- **Degree of Centralization:** The geographic or physical dispersal of functions also relates to supervisory and management requirements – the greater the level of physical decentralization, the greater the number of managers and/or supervisors are generally required.

These important principles provide guidance with respect to determining various

organization and operational changes as discussed below.

3.   REVIEW OF BOEC ORGANIZATIONAL STRUCTURE.

The following section explores the Bureau's organizational structure, examining its benefits and drawbacks for optimizing performance, and analyzing its compliance with professionally accepted concepts such as: unity of command; span of control; and the logical grouping of activities, functions, and organizational components. The current state of the organization is considered, and recommendations are offered for improving its structure to better support the activities of the Bureau.

(1)   Existing Organizational Structure.

The organizational structure and staffing levels of the Bureau are shown in the following two organizational charts. The first chart shows operations staff, which accounts for the majority of positions within the organization. The second chart shows administrative and support staff.
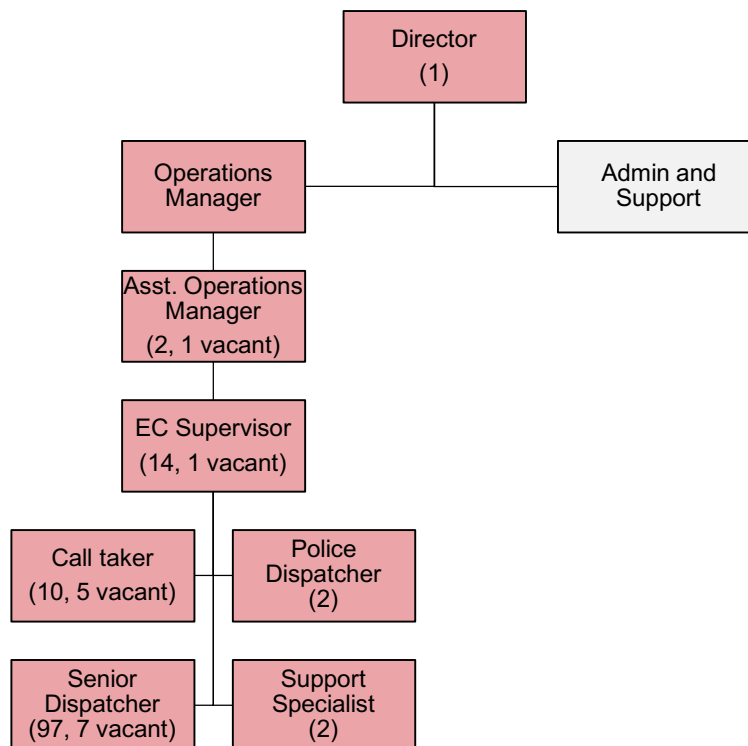
OPERATIONS STAFF

ADMINISTRATIVE AND SUPPORT STAFF
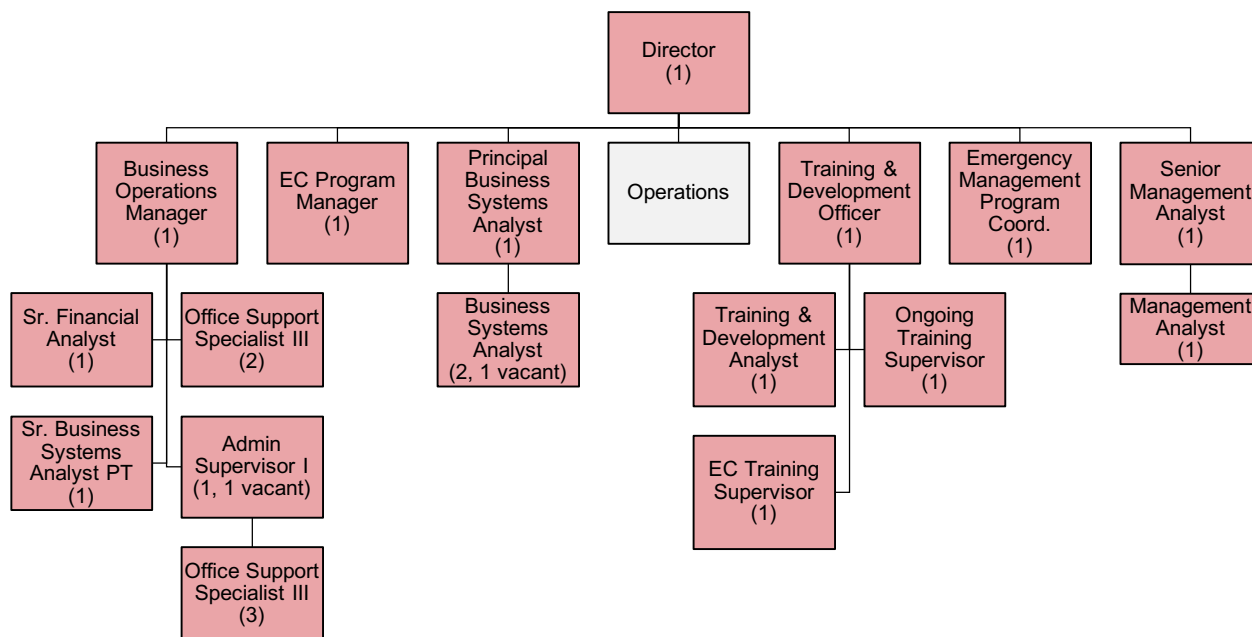
The Bureau's existing structure places the Director over seven direct reports. Six of these are various administrative and support functions, while an Operations Manager oversees the activity of the dispatch floor. In organizations divided between operational functions and administrative support functions (such as the BOEC), it is common to see a single manager placed over one of the groupings while the Director directly supervises the others. With the Operations Manager supervising all floor operations and the Director supervising all support functions, this is the type of structure currently employed by the Bureau. A similar but alternative approach, for example, might have an Administrative Manager overseeing the support functions while the Director takes supervisory responsibility for the Assistant Operations Managers.

(2) Strengths of Existing Structure.

The existing organizational structure of the Bureau exhibits a number of strengths. When analyzing the appropriateness of an organizational chart for a department or

bureau, several concepts are considered. These include: span of control (this should

generally fall in the range of 5-8); organizational "flatness" (the number of layers should

not exceed four); and grouping of similar functions. The organizational structure of the

Bureau mostly performs well by these standards. For example:

- The span of control at the Director level is seven. This is typically considered an appropriate range of supervisory responsibility, allowing efficiency while remaining manageable.

- Similarly, the number of organizational layers is not excessive – there are only two layers beneath the Director in most of the Bureau's groupings, with four layers only in the largest functional area: the Operations group, which contains more than 100 employees.

- In terms of functional arrangement, most positions are organized so that they work with and report to employees with similar or related duties. This helps to ensure that employees focusing on similar tasks are able to work closely with each other, and it prevents the duplication of efforts in separate parts of the organization.

The Principal Business Systems Analyst oversees the other Business Systems

Analysts, and together the three staff are responsible for responding to the Bureau's

technology needs. The Principal Analyst reports directly to the Director. This arrangement

is appropriate, since the technology needs of the Bureau extend from the Operations floor

to the administrative and support functions.

The Emergency Communications Program Manager and Emergency

Management Program Coordinator both report directly to the BOEC's Director. This fits

with their inter-agency roles and broad scope of duties.

The Business Operations Manager oversees six staff directly, with a total of nine

employees in the division. They are responsible for the Bureau's financial and

administrative health, developing policies, communicating with other jurisdictions, and

performing a variety of transactional tasks. Their positioning makes sense in light of the

administrative/financial nature of their work and the interaction that they have with other

agencies.

The Management Analysts report directly to the Director, which is also appropriate

given the nature of their work, which is assigned directly by the Director and can be

applied to the operations or administrative side of the BOEC.

The following subsections address specific opportunities for improving the existing

organizational structure and provide recommendations for doing so.

(3)   The Training and Development Function Should Be Relocated to the Operations Division.

The Training and Development Officer currently reports directly to the BOEC

Director. While this presents no issue in terms of the number of staff or supervisory span

of control, Training and Development is a function focused almost exclusively on

operations staff. Placing this group outside of the Operations division is an example of

failing to group similar functions together. The Training and Development function can be

improved operationally, but those recommendations are addressed in a later section.

From a strictly organizational standpoint, the Training and Development staff should be

moved to the Operations division, with the Training and Development Officer reporting

directly to the Operations Manager. Specifically, this is because:

- Training and staff development is deeply integrated with the activity of Operations staff. Quality assurance, in-service training, and maintaining certifications all require interaction with – and the participation of – floor staff. Coaching of new employees, similarly, is performed by operations staff and heavily involves training and development staff.

- The focus of Training and Development is strictly on operations staff. The training academy, quality assurance, and the other functions performed by this group are not intended to enhance the performance of administrative or other support staff, and they are not responsible to interface with any outside jurisdictions or agencies. Training staff must be in lockstep with operations staff to properly execute their function, and locating them within the same organizational unit will allow a "unity

of command" to ensure that this is the case.

When polled about the BOEC's training and development capabilities, responses were mixed from staff. See the summary table of survey results below:

#	TRAINING AND DEVELOPMENT					
	Statement	SA	A	D	SD	N/A
15	The agency provides staff with a strong and consistent initial training program so they are prepared to do their jobs.	13	**36**	17	8	5
16	I am able to attend adequate in-service and continuous training.	5	**30**	20	17	7
17	The training program for new hires (trainees) is appropriate in length and content.	3	**33**	27	8	7
18	The training our CTOs (coaches) provide to recruits is performed consistently among the training staff.	2	15	**31**	24	7

Employees mostly believe that trainees receive strong initial training, but they are split on the length and content of the training program and the sufficiency of the in-service and continuous training available to them. In the area of consistent coaching, employees indicated that there is ample opportunity for improvement. Placing the Training and Development function under the Operations manager will provide opportunity for coordination to realize this improvement.

Recommendation:

The Training and Development staff should be moved to the Operations division, with the Training and Development Officer reporting directly to the Operations Manager.

(4)   The Bureau Should Fill the Vacant Assistant Operations Manager Position and Adjust the Scheduling of This Position.

The Assistant Operations Manager position, which reports to the Operations Manager, is responsible for overseeing day-to-day operations on the floor, which means managing the Emergency Communications Supervisors, leading performance measurement initiatives, and developing staff work plans and policies to ensure that

operations staff deliver the highest level of service possible and comply with applicable rules and regulations.

The Bureau is currently authorized for 2 full-time staff in this position, of which one is vacant. This requires one employee to do the work of two. Without vacancy, there would be a 1:7 span of control, with 2 Assistant Operations Managers overseeing 14 Emergency Communications Supervisors. The span of control under current conditions is 1:12, which is excessive. It also leaves a gap in the level of supervision experienced by employees. The results of the employee survey question below highlight the disproportionate impact that this has on line staff:

#12. Our managers provide adequate direction and leadership which motivates me to work well.	SA	A	D	SD	N/A
Line Staff	2	11	**19**	**26**	2
Supervisors/Managers	0	5	2	5	4
Support Personnel	0	2	1	0	0

As the table shows, 75% of line staff who responded expressed some level of disagreement with this statement, compared to only 42% of supervisors/managers and support personnel.

The Bureau should fill the vacant Assistant Operations Manager position. This will bring the span of control back to a manageable range, allowing adequate capacity for the managerial duties assigned to the position. It will also help to address the perception of inadequate "direction and leadership" held by operations staff.

Among the issues that line staff have with the management of the Bureau, a disconnect between management and night staff is a major concern. This repeatedly surfaced in on-site interviews. In order to improve the management presence on the operations floor and provide more staff contact with managers, the schedule of the two

Assistant Operations Managers should be adjusted to offset and cover an expanded portion of the day. For example, one could work a shift from 0600 to 1400, while the other works from 1200 to 2000, as shown in the chart below. This would allow them to:

•   Work five 8-hour shifts per week

•   Cover 14 of the 24 hours in the day

•   Overlap with each other for 2 hours per day

•   Have at least one hour of overlap with each Emergency Communications Supervisor (if a schedule like the one recommended earlier in this section is adopted for Emergency Communications Supervisors).

2400	0200	0400	0600	0800	1000	1200	1400	1600	1800	2000	2200

While this will not provide continuous supervision of the operations floor, it will represent a marked improvement over the current level of management presence and a significant step toward remediating the disconnect that staff on the night shift feel with their management.

Recommendations:

The Bureau should fill the vacant Assistant Operations Manager position.

The Bureau should adjust the schedule of the two Assistant Operations Managers so that they offset and cover an expanded portion of the day.

(5)   The Bureau Should Move the Support Specialists So They Report to the Operations Manager.

In the BOEC's current organizational structure the Emergency Communications Support Specialists report to the Emergency Communications Supervisors. These staff are responsible for ensuring smooth operations on the floor, which includes recording

calls for quality assurance purposes, updating CAD stations monthly, replacing defective desktop equipment, and supplying floor staff with office supplies, triage cards, evacuation kits, and sundries.

The role that these staff play, which impacts all line level staff and supervisors, is related to strategically enhancing the efficiency of the operations floor and measuring its performance. Because of the nature of their role, the Support Specialists should report to the Operations Manager. The operations manager should be overseeing, for example, the ongoing training of line staff through the Training and Development Officer. The Support Specialists play a crucial role in this by recording and distributing calls for quality assurance.

Moving these staff so that they report directly to the Operations Manager will ensure that their position within the organization aligns with their function. By adopting this organizational structure, the BOEC can be assured that the Support Specialists are not supervised or influenced by Emergency Communications Supervisors (who are directly impacted by the support and QA work that Support Specialists do), and that the Operations Manager has the appropriate level of direct authority over functions that impact the entire operations division.

Recommendation:

The Support Specialists should report to the Operations Manager.

(6)   Recommended Revised Organizational Structure for the Operations Division.

Upon implementation of the recommendations above, the organizational structure of the Operations Division would look like the following:
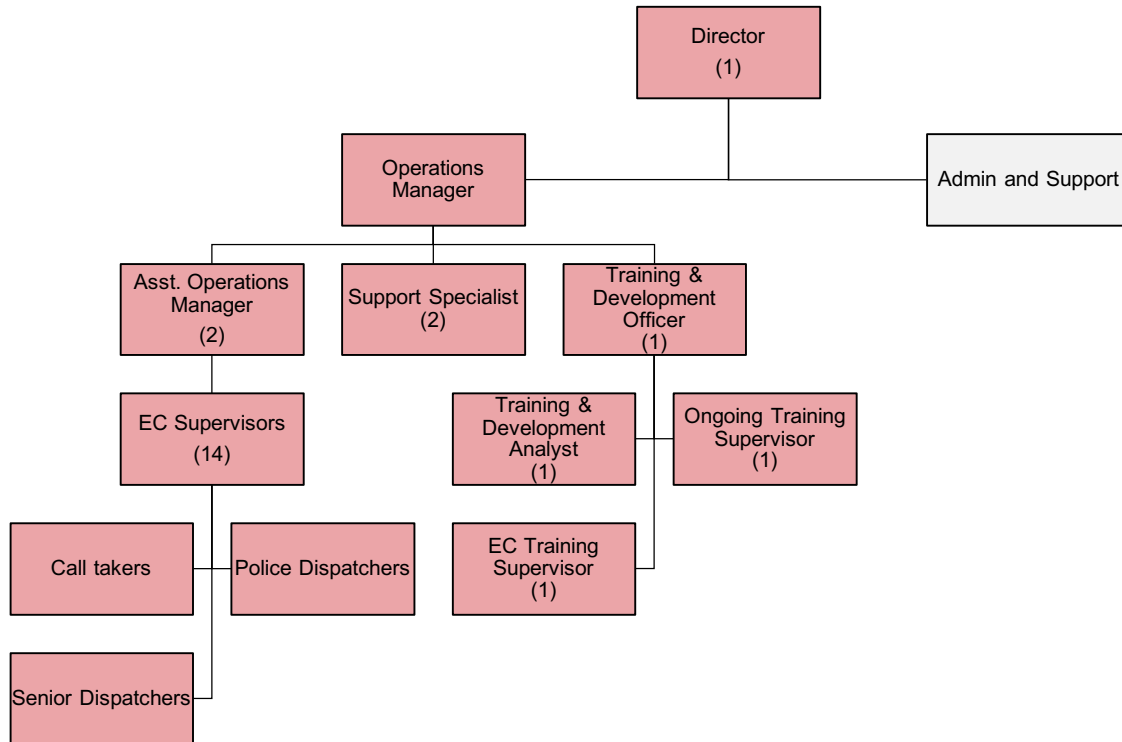
This organizational structure maintains the model discussed previously, wherein the Director a single manager (the Operations Manager) is placed over one of the groupings (in this case, the operations side) while the Director directly supervises each of the administrative and support divisions.

• In this model, the Operations Manager directly supervises 5 staff. This is more efficient than the 2 direct reports in the existing structure, and it give the Operations Manager immediate authority over the functions that primarily impact operations.

• The Assistant Operations Managers oversee 6-7 staff each, as opposed to the wider span of control caused by the current vacancy.

• The number of organizational layers under the Director remains at four. This is acceptable, given the large size of the Operations Division.

• Similar functions are grouped more closely together, providing an opportunity for Support Specialists and the Training and Development function to more completely integrate with dispatch and call-taking operations.

In summary, the suggested BOEC organizational structure is consistent with the Guiding Principles for effective organizational structures discussed at the introduction of this Section.

Recommendation:

Consider implementation of the revised BOEC organizational structure detailed in this report.

4.   ALTERNATIVE SHIFT SCHEDULES.

The most cost effective work schedules are those scheduling options that are equally divisible in a 24-hour period. This includes typical 8-hour and more recently devised 12-hour shift programs. All shift schedules which are not equally divisible into 24 hours of the day suffer from cost inefficiencies, and as a consequence "violate" one of the Four Framing Elements-- *In an Era of Government Fiscal Constraint, Taxpayers Deserve Highly Effective Dispatch Services at the Most Reasonable Cost.*

The current BOEC scheduling model is a 4-day 10-hour shift program that utilizes ten (10) staggered shift start times in an attempt to best match varying staffing needs, and is done using "target" numbers for call taker fixed-post, and a set number of nine (9) dispatching fixed-post. While there is room for staffing efficiencies as discussed in the previous chapter, the model currently memorialized in the BOEC employee contract is reasonably effective in meeting BOEC staffing needs. With the contractual constraints dictating shift start times, shift hours, and the number of shifts that must be offered, there are limited refinement opportunities the project team can recommend under the current contract. With that said, BOEC Operations Management should utilize the workload analysis for fixed-post call taking and dispatching positions as discussed previously to

modify their target staffing numbers under the existing shift model to the extent the contract allows.

To aid in this process the project team is providing the following chart which shows the total number of staff (call takers and dispatchers) needed according to workload by hour of the day, with the current BOEC shift deployments hours overlaid. The new target staffing numbers incorporate a Net Availability factor, as discussed earlier, with the number of staff needed rounded to the nearest whole number. For efficient scheduling the number of total staff needed per hour would be spread across the various scheduled shifts in amounts that add up to, or just exceed, the number indicated at the bottom of each column.

4/10 hr Target Call Taker and Dispatching Staffing Needs

	0000 hrs	0100 hrs	0200 hrs	0300 hrs	0400 hrs	0500 hrs	0600 hrs	0700 hrs	0800 hrs	0900 hrs	1000 hrs	1100 hrs	1200 hrs	1300 hrs	1400 hrs	1500 hrs	1600 hrs	1700 hrs	1800 hrs	1900 hrs	2000 hrs	2100 hrs	2200 hrs	2300 hrs
Early Morning 0500-1500	15	15	12	12	11																			
Morning 0700-1700	15	15	12	12	11																			
Mid-Morning 0900 - 1900	15	15	12	12	11																			
Late Morning 1100 - 2100	15	15	12	12	11																			
Early Afternoon 1300-2300	15	15	12	12	11																			
Afternoon 1500 - 0100																								
Evening 1700 - 0300																								
Late Evening 1900 - 0500																								
First Night 2100 - 0700																								
Second Night 2300 - 0900																								
Staff Target with NA Factor	19	19	15	15	14	14	15	19	20	22	23	23	23	24	24	24	24	24	24	23	23	23	22	20

All target staff numbers indicated in the previous chart were calculated from the workload modeling discussed earlier and assume the staffing of nine (9) dispatch positions, with the exception of the cells that are highlighted in blue, which indicate the hours when the fixed dispatching posts have been reduced to the seven (7) positions as recommended.

(1)   Modified Shift Based on a 12-hour Program.

As discussed earlier in this section the current four 4/10 work schedule is inherently inefficient and as such requires more overall staff to provide coverage over a 24-hour period.   Schedules that are equally divisible in a 24-hour period offer more efficient coverage using fewer staff, and at lower cost.   It is recommended that BOEC management pursue additional shift scheduling options in future contract negotiations to capitalize on these efficiencies.

The following table is an example of a 12-hour shift model with the number of staff needed per hour of day. In this table the numbers in each cell represent the number of staff assigned to that start time, or shift, with the total staffing level for each hour represented at the bottom of each column.   The project team chose to use shift deployment start times that are similar to the current BOEC schedule for comparison purposes, however countless shift and start time combinations could be used.

Call Taker and Dispatching Staff - 12 Hr Shift Model																								
	0000 hrs	0100 hrs	0200 hrs	0300 hrs	0400 hrs	0500 hrs	0600 hrs	0700 hrs	0800 hrs	0900 hrs	1000 hrs	1100 hrs	1200 hrs	1300 hrs	1400 hrs	1500 hrs	1600 hrs	1700 hrs	1800 hrs	1900 hrs	2000 hrs	2100 hrs	2200 hrs	2300 hrs
Early Morning 0500-1700						5	5	5	5	5	5	5	5	5	5	5	5							
Morning 0700-1700								6	6	6	6	6	6	6	6	6	6	6						
Mid-Morning 0900 - 1900										7	7	7	7	7	7	7	7	7	7	7				
Late Morning 1100 - 2300												6	6	6	6	6	6	6	6	6	6	6	6	
Early Afternoon 1400-0200	4	4													4	4	4	4	4	4	4	4	4	4
Evening 1700 - 0500	4	4	4	4	4													4	4	4	4	4	4	4
Late Evening 1900 - 0700	4	4	4	4	4	4	4													4	4	4	4	4
First Night 2100 - 0900	4	4	4	4	4	4	4	4	4													4	4	4
Second Night 2300 - 1100	5	5	5	5	5	5	5	5	5	5	5													5
Total Staff Scheduled	21	21	17	17	17	18	18	20	20	23	23	24	24	24	28	28	28	27	27	25	25	22	22	21
Staff Target with NA factor	19.1	19.1	15.2	15.2	14	14	15.2	19.1	20.3	21.6	22.9	22.9	22.9	24.1	24.1	24.1	24.1	24.1	24.1	22.9	22.9	22.9	21.6	20.3

The table above illustrates one possible 12-hour shift deployment. In this model, each of the shifts shown above would have two "squads" or "teams" assigned to them with opposing days of the week off. Under this deployment model 45 call taker and dispatchers would be needed on each of the opposing 12-hour schedules for a total of 90 floor operations personnel that would be considered Emergency Communications Call Takers, Police Dispatchers, and Senior Dispatchers. The reduction of needed staff under a 12-hour shift model results in significant potential cost savings for BOEC, while still increasing staffing levels when needed most.

To project potential cost savings for BOEC in the most conservative manner the project team utilized the median annual salary of a EC Senior Dispatcher ($64,338.50)[10] as the wage for all staff deployed under the 12-hour model above, and assumed that BOEC would payout the four (4) hours of OT per two week pay period rather than modify scheduling to reduce this cost. Based on a total of 90 total staff, and including 9,360

---

[10] Figures from BOEC adopted FY16-17 budget documents.

overtime hours paid at an average time and half rate for a EC Senior Dispatcher of $46.39 per hour, the approximate salary cost for BOEC under this revised model would be $6,224,749, as opposed to the current staff cost of $6,782,604 without overtime.

12-hour Shift Cost Savings					
	Call Takers	Dispatchers	Senior Dispatchers	Overtime	Total
BOEC Floor Staff Salaries	$502,628.00	$139,992.00	$6,139,984.00	n/a	$6,782,604.00
12-hour Shift Floor Staff Salaries	n/a	n/a	$5,790,465.00	$434,284.88	$6,224,749.88
				Savings	**$557,854.00**

As the table above shows this results in a conservative estimated cost savings of approximately **$557,854 per year**. Many agencies utilizing 12-hour work schedules modify shift hours to eliminate the built in 4 hours of overtime, which if done by BOEC would result in additional savings to what is shown here. Further, it should be noted that overtime costs for the current BOEC 4/10 deployment method were not factored into these projections. While overtime would certainly be needed in some instances with any schedule, the additional staff assigned under the 12-hour shift model as shown would need significantly less due to the net availability of staff being accounted for. This would likely result in even greater cost savings for BOEC.

Recommendations:

Consider the revised 4/10 shift schedule program as provided and detailed in this report.

BOEC should negotiate the ability to deploy staff using a 12-hour shift model allowing for a reduction of needed staff to 90 operations floor staff, and potentially saving $557,854.00 in salary costs per year.

5.   ANALYSIS OF TRAINING AND DEVELOPMENT.

The initial and continued training of PSAP staff is essential to the provision of professional service to the public and emergency first responders. The training and development staff of the BOEC are led by a Training and Development Officer, who reports to the Director. This position oversees three other staff – a Training and Development Analyst, an Emergency Communications Training Supervisor, and an Ongoing Training Supervisor. These staff manage the Bureau's training program, which includes onboarding of new staff, new hire academy and certification training programs, ongoing training, and performance management.

Currently, the training and development function is facing a number of serious issues which limit the Bureau's ability to effectively recruit new applicants, train new staff, and maintain the skill levels of employees. In particular:

- The rate of successful onboarding for new recruits is low, as shown in the table below. More than half of trainees hired since 2008[11] have resigned or been terminated before reaching certification. Of those who have made it to certification, 27% have resigned between that time and the present, with an average total employment duration – *including their training period* – of just 3.61 years.

TRAINEES SINCE 2008		
Current Status	**Count**	**Average Years**
Employed by BOEC	35	5.58
Resigned After Certification	13	3.61
Resigned Before Certification	30	0.74
Terminated	34	0.44
Still Training	27	N/A
Total	**139**	

- The training provided to new staff is inconsistent and does not adhere to a formal handbook or curriculum. The length of the training academy, the content taught, and the rigor of the assessments can all benefit from standardization.

---

[11] "Trainees Hired Since 2008" BOEC provided material.

When asked about the BOEC's ability to train and retain staff, employees responded with mixed opinions that revealed some strong perceptions of deficiency. The following table outlines those responses:

#	Statement	SA	A	D	SD	N/A
	RECRUITMENT, RETENTION, AND TRAINING					
13	We do a good job recruiting qualified applicants. We take the appropriate steps to hire the best suited candidates for the agency.	2	**33**	17	19	8
14	Our agency does a good job retaining qualified applicants.	0	11	19	**42**	7
15	The agency provides staff with a strong and consistent initial training program so they are prepared to do their jobs.	13	**36**	17	8	5
16	I am able to attend adequate in-service and continuous training.	5	**30**	20	17	7
17	The training program for new hires (trainees) is appropriate in length and content.	3	**33**	27	8	7
18	The training our CTOs (coaches) provide to recruits is performed consistently among the training staff.	2	15	**31**	24	7

As the table shows, Employees mostly believe that trainees receive strong initial training, while opinions are mixed on the availability of ongoing training, recruitment, and whether initial training is the appropriate length and contains the right content. In the areas of retention and consistent coaching, employees across all respondent groups indicated that there is a need for improvement. The subsections below provide recommendations to address the Bureau's training and development needs.

(1) The Bureau Should Allow – and Train – Separate Call-Taker and Dispatcher Positions.

In a small dispatch center, there is typically not enough call volume to justify separate call-taking and dispatching roles, and staff must work both roles concurrently. In a center the size of the Portland BOEC, however, the call-taking and dispatching jobs are segregated because the volume of work associated with each justifies such a separation. In the Bureau, staff will work both jobs within a given shift, but only one at a time for any 2-hour stretch within that shift.

In spite of the fact that staff work differentiated call-taking and dispatch roles, the Bureau's current model does not allow staff to be simply a call-taker or a dispatcher; they must be both. The training model is designed accordingly to teach both call-taking and dispatch skills before releasing staff onto the floor for mentoring and on-the-job training. This creates a number of issues for the Bureau.

- It takes longer to fully train a new recruit than it would to simply train them as a call-taker without the dispatch component.

- New hires who enjoy taking calls but do not want to work as a dispatcher are not allowed to remain at the call-taker level. If they refuse to be trained as a dispatcher, they are terminated and the Bureau loses an employee on the phone lines.

- The Bureau must pay staff the same rate whether they are dispatching or taking calls on a particular shift. There is no accounting in the compensation model for the complexity of work being performed.

To address these issues, the Bureau should change its rules and training model to accommodate separate "call-taker" and "dispatcher" positions. This should begin at the new hire academy stage. The new hire academy should be offered in two phases. In the first phase, recruits would be trained to take calls. Upon graduating, they would be coached by a CTO as a call-taker until they demonstrate proficiency to advance beyond the trainee stage. At this point, the employee would have the option, if they so desired, to either 1) enter a second academy phase and coaching session in order to become a dispatcher, or 2) remain a call-taker. This will resolve a number of issues for the Bureau:

- It will allow new staff to complete their initial training faster, which means that they are able to help handle the Bureau's workload more quickly. It will likely help the agency's retention rate improve as well, because the individual training phases can be reduced in length and more focused in content. In this more focused approach recruits will have higher success rates and less time to wash out of the training program before becoming full-time staff.

- It will eliminate one of the factors leading to staff discouragement or dissatisfaction by providing new hires with the option to either remain in their current position or pursue dispatcher training and the additional responsibilities and compensation

that would accompany that role.

- Keeping several staff who only take calls would help to improve the morale of the many current staff who prefer dispatching to working the phones, because they would be required to take calls less frequently.

- It will provide an additional step in the career path for BOEC employees.

The creation of separate call-taking and dispatching positions will help to alleviate

some of the staffing and workplace morale issues facing the Bureau, and it will align with

common practice of other large PSAP's nationwide. The Bureau may opt to further

separate training for law enforcement dispatching and fire/EMS dispatching, or group

those together in a single phase of dispatcher training.

Recommendations:

The BOEC should formally allow separate "call-taker" and "dispatcher" positions rather than requiring staff to be trained in both disciplines.

The BOEC's new hire academy and coaching program should be segmented into phases for call-taking and dispatching to accommodate the distinct roles of the 2 positions.

(2)   The BOEC's New Hire Academy Should Be Formalized and Taught by a Certified Emergency Communications Training Supervisor.

The training academy for new hires is designed to prepare them for the coaching

phase and full-time call-taking and dispatching. It includes a mix of classroom instruction,

practicing commands in the Bureau's simulation room, and floor training. Following the

academy, trainees complete two (2) weeks of state police dispatcher training in the state

capitol of Salem.

The academy is taught by a Senior Dispatcher who volunteers and is selected to

lead the session. Currently, the academy is taught according to a general curriculum

developed by the Bureau's training and development staff, but the Senior Dispatcher has

significant authority to determine the length of the academy, the amount of on-the-floor training, the pace at which material is covered, and the content of assessments used to test mastery.

The curriculum, pacing, and assessments of the training academy should be standardized and enforced universally. When the length of each academy differs, or the amount of on-the-floor experience changes between sessions, or the requirements to pass the assessments do not remain consistent, it has a number of negative effects on staff. The perception may exist that some staff are more qualified than others as a result of different training requirements and durations, and it is difficult to make updates or corrections to the training academy when it is not being conducted in accordance with established standards.

The Emergency Communications Training Supervisor should clarify the standards for every academy session. Particularly, expectations for the following areas should remain constant:

- The number of weeks in new hire academy should remain constant. This number has traditionally been 10 weeks, but it need not necessarily be a 10-week course, as long as it remains the same length each session. The length of time for call-taker training and dispatcher training may differ.

- The quizzes administered at the end of each week should maintain the same level of rigor. If the Bureau wishes to offer different quizzes in each academy, a pool of test questions can be developed for each stage. If the Bureau opts to let the Senior Dispatcher assigned to academy develop the questions, the assessments for the entire session should be reviewed by the Emergency Communications Training Supervisor and approved to ensure an appropriate degree of difficulty and coverage.

- The pace at which new material is covered should remain the same in each academy. This includes learning new concepts and the amount of on-the-floor training time that trainees receive. These should not differ from session to session.

While the scheduling of state dispatcher training in Salem may be different from

session to session, this should not impact the length or content of the academy. Standardizing the curriculum and format of each session will make it easier to manage and develop the program, and it will ensure that trainees graduate with adequate experience and mastery of the required concepts.

Training and development staff should take a leading role in teaching the new hire academy. The provision of training curricula to adult learners is a complex and nuanced task that requires skills and techniques best learned through formal instructor education courses. Similarly, training programs and their content must be comprehensive, well laid out, and address the varied adult learning styles to provide all staff with an equal opportunity of learning and mastering the materials. Because of this, it is most effective to have the Emergency Communications Training Supervisor take a leading role in the Bureau's new hire academy.

- The Emergency Communications Training Supervisor should take the classes required to become an Agency Instructor through APCO (or another comparable dispatcher training certification) and refine the standardized curriculum for the academy, as described above.

- The Emergency Communications Training Supervisor should take the leading role in training new recruits through the academy. This includes creating and administering quizzes and tests, assessing recruits' progress and determining when additional instruction or coaching is necessary, being present and visible at the academy every day, and taking the bulk (ideally 50% or more) of instructional duties.

The BOEC should still have a senior dispatcher help the EC Training Supervisor by doing some classroom instruction, providing coaching and clarification as necessary, grading exams, and otherwise ensuring the success of recruits. The Training and Development Officer should also take a role in the academy, making themselves visible regularly and occasionally administering classroom instruction. This will ensure that the

individual leading the academy has the proper certification and expertise to do so, and

that they have support from other staff who are committed to spending significant time on

the academy class.

Recommendations:

The length of new hire academy should remain consistent, by official policy, from session to session.

The curriculum, assessments, and pacing of new hire academies should be formally codified and remain consistent from session to session.

The Emergency Communications Training Supervisor should become a certified APCO Agency Instructor.

The Emergency Communications Training Supervisor should take the leading role in training new recruits through the academy.

(3)   The BOEC's New Hire Academy and CTO Program Should Be Formalized.

The post-academy phase of one-on-one coaching by CTO's is vital to providing

real-time experience to new staff. As new hires progress through the phases of training,

they gradually work more independently until they are able to manage without the

supervision of a CTO. The coaching phase should be a time when academy graduates

gain confidence and become part of the fabric of the operations staff. Currently, the new

hire coaching program is facing a number of challenges:

*   There are not enough willing and available CTO's to provide a sufficient number of training hours for academy graduates to meet the intended training schedule. This slows down the matriculation rate and creates a bottleneck of new staff joining the ranks.

*   Staff who have volunteered as CTO's feel that their work is underappreciated, their comments on daily observations report are discarded, and the recruit coaching program is generally undervalued.

*   Staff who have volunteered as CTO's are only selectively mentoring recruits, picking and choosing who/when they will coach rather than consistently executing their mentorship role.

- There is a lack of consistency in the type of coaching provided to recruits by CTO's. From different key codes and dispatching methods, to different expectations for demonstrating mastery of a task, staff generally agree that consistency is lacking in the existing coaching arrangement. See the mostly disagreeing responses to Statement #18 below:

#	Statement	SA	A	D	SD	N/A
18	The training our CTOs (coaches) provide to recruits is performed consistently among the training staff.	2	15	**31**	24	7

As the retention data earlier demonstrated, recruits have a heavy washout rate, a condition which could be ameliorated by improving the coaching program. To do this, the coaching requirements and expectations for CTO's should be standardized and enforced universally. The BOEC should take action in two stages. In the first stage:

- The post-academy coaching program format should be formalized in writing and included in the Bureau's training handbook. This should include distinctions such as the process for creating and reviewing daily observation reports, the type and frequency of feedback to be provided to CTO's, and the criteria for considering a recruit to have mastered a particular skill.

- The requirements for CTO's should also be formalized in writing and included in the training handbook. The scope and duration of CTO obligations should be spelled out, including the experience required to take on a trainee, the required forms and feedback, any meetings or additional time commitment, the required degree of compliance with standard Bureau call-taking/dispatching protocol, and the method for CTO's to lodge complaints regarding their coaching status with the Training and Development Officer for review.

- CTO meetings should be scheduled quarterly to discuss training methods, the status of current trainees, and any other issues affecting the recruit training program.

- Coaches should receive refresher CTO training on a biannual basis to keep their teaching skills current with adult teaching techniques, and allow them to network with other trainers.
  These standardized expectations for the coaching program and those who participate in it, once formalized and compiled, should be enforced without exception. The

Training and Development Officer should make it clear to all staff that would-be CTO's

can expect a certain level of consistency, feedback, and support, and that they will in turn

be expected to fully comply with BOEC policy for mentoring trainees. This will address

the erratic nature prevalent in the current mentorship program and the sense of futility

that some CTO's face because they feel under-supported. If the Bureau continues to have

difficulty getting enough CTO's to mentor recruits, a second stage of actions should be

considered to incentivize dispatchers, such as:

- Providing a bonus to CTO's when their trainees meet the established criteria for moving to the next phase of independence.

- Providing certificates of recognition to CTO's when their trainees meet the established criteria for moving to the next phase of independence, perhaps accompanied by BOEC promotional items.

- Allowing CTO's to move up in the order of selecting their shift in order to make it easier for them to get a shift that is compatible with a trainee.

- Providing preferred parking spots to CTO's.

The right mix of incentives would need to be developed by the Bureau and the

appropriate bargaining unit, with the goal of having sufficient coaching to advance

trainees to fully independent call-taking and dispatching without any delay on the part of

coaches or the Bureau.

Recommendations:

The BOEC should formalize the post-academy coaching program format and standards in writing, and enforce it universally.

The BOEC should formalize the requirements for CTO's in writing and enforce them universally.

If the BOEC continues to have difficulty getting enough CTO's to mentor recruits, additional actions should be considered as incentives.

(4)   The BOEC Should Reinstitute a Quality Assurance/Quality Improvement Plan Following APCO/NENA Standards.

The Quality Assurance and Quality Improvement processes are integral pieces in

the modern emergency communications center operational model. To ensure that emergency calls and radio dispatch actions are completed in an effective and efficient manner, and to the highest standards possible, telephone and radio traffic must be monitored and feedback provided to telecommunicators. This is best achieved through a comprehensive Quality Assurance (QA) and Quality Improvement (QI) process.

Quality Assurance (QA) is the process of measuring a call taker or dispatchers' performance against approved policies, procedures, and standards. The QA process benefits a communication center in several ways:

- First and foremost, it validates what the center and its staff are doing correctly, i.e. where performance standards are being met, and where staff are following internal policy and procedures.

- Secondly, the QA process identifies training or performance deficiencies, allowing for specific Continuing Dispatch Education (CDE) to be developed to correct deficiencies, or in some instances for policies and procedures to be modified. The deficiencies may be for an individual, for a shift, or center wide.

Quality Improvement (QI) is an organized system or process taken to correct areas of concern, typically identified through the QA process. The QI process supports QA efforts by providing a consistent, trackable approach to correct deficiencies or areas of concern. In short QA identifies opportunities for improvement, QI is the process and lessons used to rectify the deficiencies.

In order for QA and QI to be effective they must be conducted together as a comprehensive program, and should at minimum contain random case review evaluating call taking and dispatching performance, feedback to staff, and retraining or remediation as necessary. The data from this process should be tracked over time and utilized to for commendations and promotions, as well as to identify trends in performance that may affect the center.

In the lack of a more comprehensive process, such as the Accredited Center of Excellence (ACE) process offered by the International Academies of Emergency Dispatch (IAED), the APCO/NENA Quality Assurance and Quality Improvement Program for PSAPs standard 1.107.1.2015 is an excellent standard all communication centers should strive to implement. The following is not meant to be a full recitation of the APCO/NENA standard and are offered only as the core criteria as outlined in that standard:

- **Case Review Criteria –** The written directive defining agency performance expectations, case review criteria, data evaluation, performance measurement criteria, documentation and reporting procedures and requirements, and confidentiality rules for the QA/QI process.

- **Evaluation Guidelines -** Standard evaluation guidelines defining minimum performance expectations, with specific categories and their required elements should be outlined. Categories to include should be; callback telephone number, caller's name, incident type selection, location validation, post-dispatch instructions, pre-arrival instructions, and the use of interrogation questions.

- **Oversight Committee as per protocol and/or agency guidelines –** Discipline specific oversight committees should meet formally to ensure compliance with agency policies and procedures, and to recommend continuing dispatch education opportunities.

- **Program Monitoring –** The requirements and objectives for the review process controls, design considerations for achieving those objectives, and documentation when objectives are not met. Objectives should include the review of at least 2% of all calls for service.

- **Record Keeping –** The agency shall establish a record-keeping system for the storage of report forms and case evaluation records in a confidential manner.

- **Reporting and Feedback –** The agency shall develop a reporting system to inform management and employees about performance levels and identify areas of superior performance as well as areas for improvement.

- **Written Directives –** Recommendations for improvement should be derived from a structured QA/QI process and should be clearly articulated during the review process. Recommendations should be reviewed on a regular basis and in conjunction with employee evaluation procedures.

During the project team's interviews with BOEC staff it was indicated that due to

staffing issues the Quality Assurance and Quality improvement program within the agency was abandoned. This has led to low morale and according to the opinions of many staff, low compliance to agency policies and poor performance. This is reflected in the staff survey where 68% disagree or strongly disagree with the statement that BOEC Operations Managers and Supervisors operate and employ policies and procedures consistently. Similarly, only 37% of staff surveyed agree or strongly agree that their direct supervisor spends sufficient time with them to accurately evaluate their work performance.

In summary, it is common during budget and or staffing crisis to reduce or abandon processes that are seen as non-critical in nature, such as training and QA / QI. While in the short-term reduction in these services offers little detriment to the health of the agencies employees, in the long term they lead to malcontented employees, reduced quality and efficiency of work product, and a higher liability risk. BOEC should immediately take steps to reintroduce, and where needed, enhance their QA/QI processes.

Recommendation:

The BOEC should reinstitute a Quality Assurance and Quality Improvement system following the APCO/NENA Quality Assurance and Quality Improvement Program for PSAPs standard 1.107.1.2015, and make QA and QI a priority within the agency.

6.   BOEC EMPLOYEE RETENTION AND ATTRITION.

In the staffing analysis section of this report the attrition rate for BOEC communication center floor staff was discussed as it directly relates to staff modeling. This section focuses on employee recruitment, retention, and attrition in a more

comprehensive fashion providing attrition rate projections as well as trends that may affect BOEC staffing.

(1)   Factors Driving Separation Trends.

Based on BOEC data from 2008 through 2016 the attrition rate for all staff classifications was 12.6%[12], with the rate increasing to 15% when calculated for BOEC operations floor staff only. During this period, total BOEC separations ranged from a low of eleven (11) positions in 2009 to a high of twenty-three (23) in 2016, with an average of 17.87 separations occurring each year. As the graph below illustrates staff separations were down from 2008 to 2011, however, despite the sharp dip in 2014, have had an overall upward trend from 2011 to present.
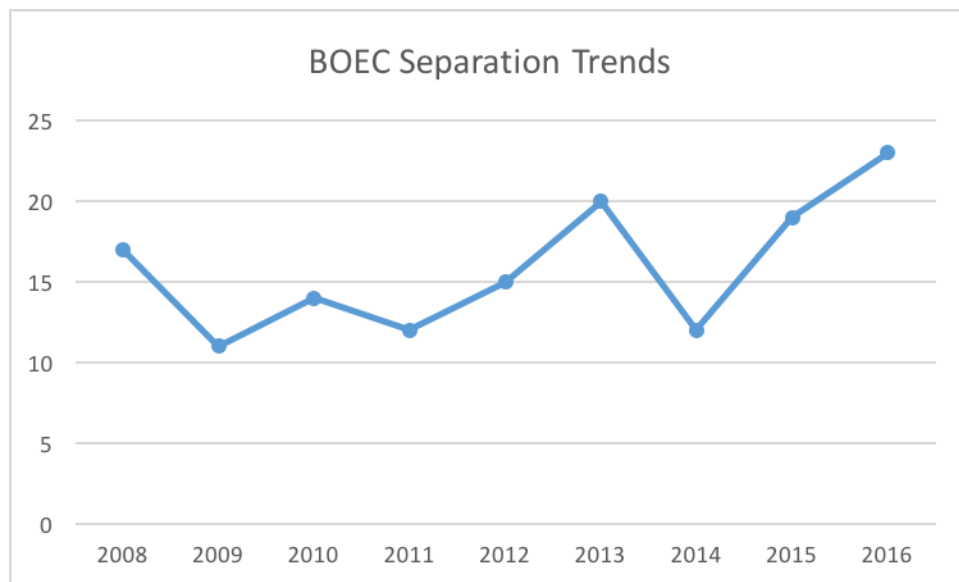
Not surprisingly given the makeup of BOEC staff, the highest percentage of staff separations (72%) comes from the operations staff, coming from either resignation (47%) or termination (25%), most of which are attributed to Emergency Communication (EC) trainees. The following graph shows BOEC separations by type.

---

[12] Percentage based on BOEC total staff of 141 positions.
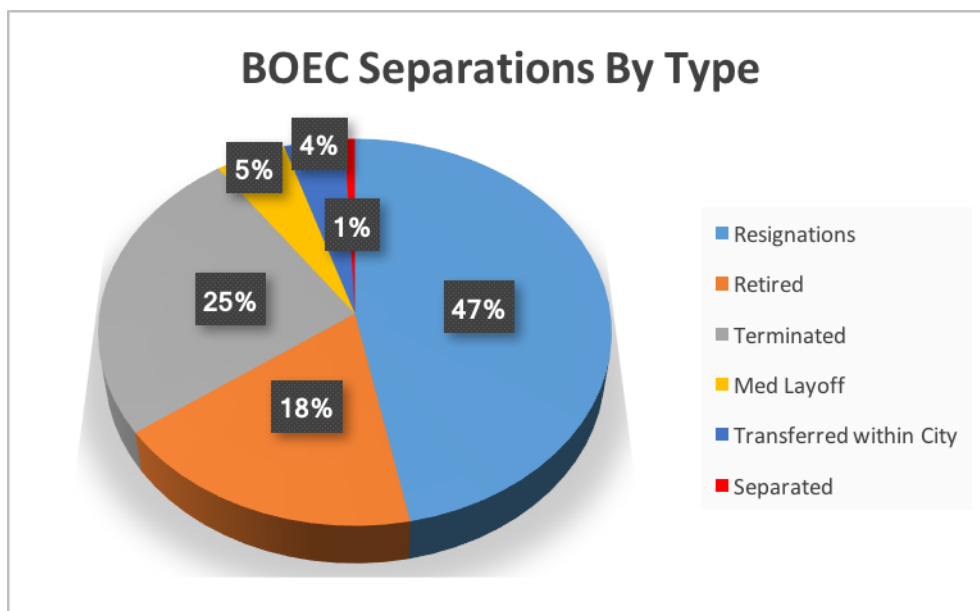
As observed in the graph above, the third highest separation from BOEC employment was retirement (18%) which has the potential for increasing over the next 10 years. According to BOEC data provided in March of 2017, twenty-four (24) of the eighty-two (82) or **29%** call takers and dispatchers <u>not currently in training</u> are "eligible" for retirement within the next ten years[13]. Of that 29% of staff, fifteen (15) or 18%, are eligible within six years, and two are eligible in less than two years. These "eligible" retirement figures assume an employee will complete a full 30 years of service prior to retirement, however it should be noted that the average length of service for BOEC retirees has only been **24.9 years.**

The following graph illustrates a percentage breakdown of current employees nearing retirement as compared to all fully trained and certified staff that have more than ten years before eligibility.

---

[13] Eligibility based on 30 years of service under State of Oregon PERS guidelines.

Employee Eligibility to Retire
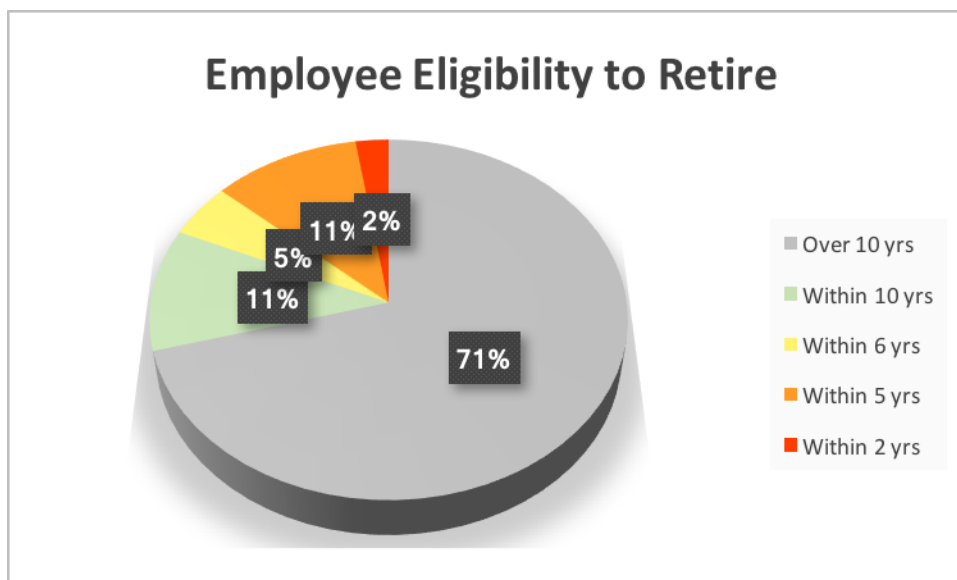
As the graph above shows 71% of BOEC staff have at least 10+ years of service to complete before separation through retirement should become a factor in staffing. However, as noted earlier this does not include trainees which changes the overall staffing picture and will be addressed subsequently.

While the analysis focuses primarily on line level operations staff, as they are the largest group affecting BOEC, it is worth discussing both the Management / Administrative staff and the EC Supervisor groups as they were not included in the operation floor staff analysis. Of the 13 EC Supervisors only two (2) or 15%, are within ten years of retirement eligibility, with one of those being eligible within five years. Further, as candidates for Supervisory positions are filled from the line level staff their attrition and hiring rates have no appreciable difference. Management and Administrative staff attrition rates can be more difficult to forecast due to the nature of their job classifications. For example, senior management positions are generally filled with experienced individuals with a strong background in emergency communications often garnered from years of service at multiple agencies. It is common for candidates for these positions to

be recruited from other agencies, thus their tenure with BOEC may be dramatically shorter than their actual accrued years of service. It is not surprising that because of their professional backgrounds the Administrative and Management group have the highest average years of tenure (13.9) of all BOEC employees. Taking the staff tenure data provided as the actual years of service counted towards retirement, the Administrative and Management group have 27%, or five (5) employees, within 10 years of retirement. However, the provided tenure figures likely due not accurately reflect the true years of service for this group and thus the application of the all staff attrition rate of approximately 12.6% would be reasonable.

(2)   Staff Recruitment and Retention.

Recruitment and retention of telecommunications staff has become an increasing concern in the emergency services industry, and for good reason. The cost of recruiting, training, and then losing a candidate is more than financial, it takes an emotional toll on trainers and co-workers as well. The recent reduction in job tenure expectancy has also added to difficulty of fully staffing emergency communication centers. According to a September, 2016 Bureau of Labor Statistics report the median employee tenure of workers ages 25 to 34 years was 2.8 years, or more than <u>three times less</u> than that of workers ages 55 to 64 which have a medial tenure of 10.1 year. The shorter tenure of younger workers, combined with the traditionally lengthy training period for new emergency service recruits, greatly reduces the "productive" time a trainee provides to an employing agency. This reduced productive time highlights the need for efficient training models to maximize an employee's benefit to an agency.

According to the data provided at the time of this report BOEC had a total of twenty-seven (27) EC trainees in varying stages of their certification training, seventeen (17) of

which had six months or less of training time. The retention rate of EC trainees between 2008 and January of 2017 was 44.6%. However, to accurately calculate the true retention rate of trainees, the most recent hires with six months or less time were removed from the calculations due to the fact that they are so new to the training program they have yet to reach a point where their performance has been reasonably assessed. This lack of assessment, whether by BOEC or by the individuals themselves, leads to a 100% retention rate for this group which inaccurately inflates the average. By removing the seventeen newest hires, the retention rate drops to 36.8%.

It should be noted that in 2016 BOEC hired three groups of trainees, the largest number of trainees (25) in the eight-year period for which data was provided. Assuming the retention of these groups of trainees is consistent with the eight-year average, the attrition rate for 2017 is also likely to rise slightly as well.

The graph, which follows, shows the hiring of trainees as compared to the separations of all BOEC operations staff.
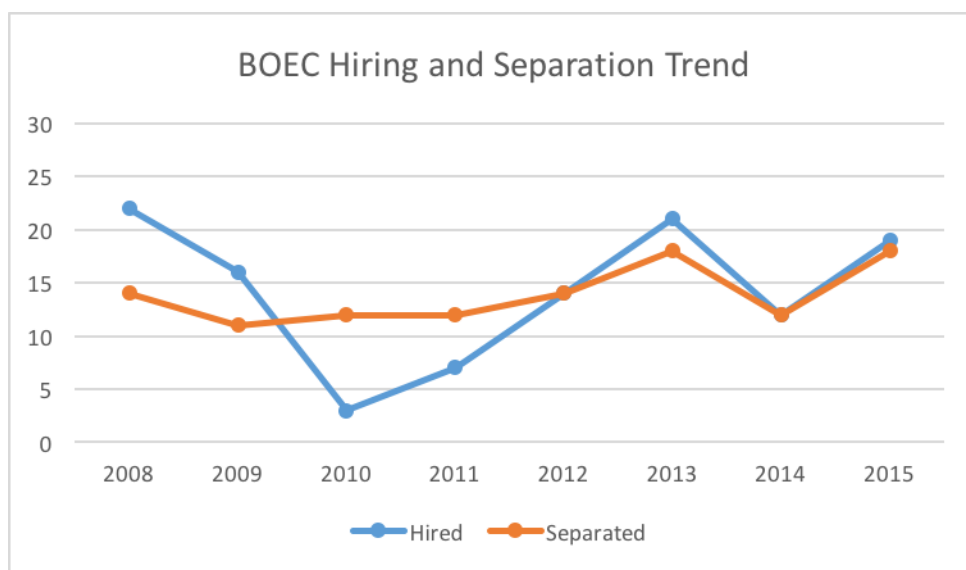
As the graph above illustrates, the hiring and separations of BOEC staff from 2012

to 2015 have mirrored each other, with the largest net staff increase of three (3) coming

in 2013. As discussed earlier in this section 2016 data was excluded. The hiring and

separation trend, if not rectified, will make the filling of current budgeted positions difficult

and filling the additional positions recommended in this report even more so. As

mentioned the high turnover of applicants has an effect on employee morale. It is not

surprising then that the opinions of BOEC staff regarding applicant recruitment and

retention indicate a strong awareness of the trends shown above. Of those that answered

the question, only 49% agree or strongly agree that BOEC does a good job recruiting

qualified applicants, and 84% either disagreed or strongly disagreed that BOEC does a

good job of retaining qualified applicants.

Trainees currently comprise a full 22% of the BOEC operations workforce. This

ratio of trainees to fully certified staff is noteworthy given their average attrition rate is

63%. Combined with the BOEC floor staff average attrition rate, and the number of those

that are within 10 years of retirement as discussed previously, and there is cause for

concern for BOEC meeting their staffing needs. The following graph illustrates the

composition of floor staff as discussed herein, and shows that 55% of BOEC staff are fully

trained and have more than 10 years of estimated future employment tenure to offer

BOEC.
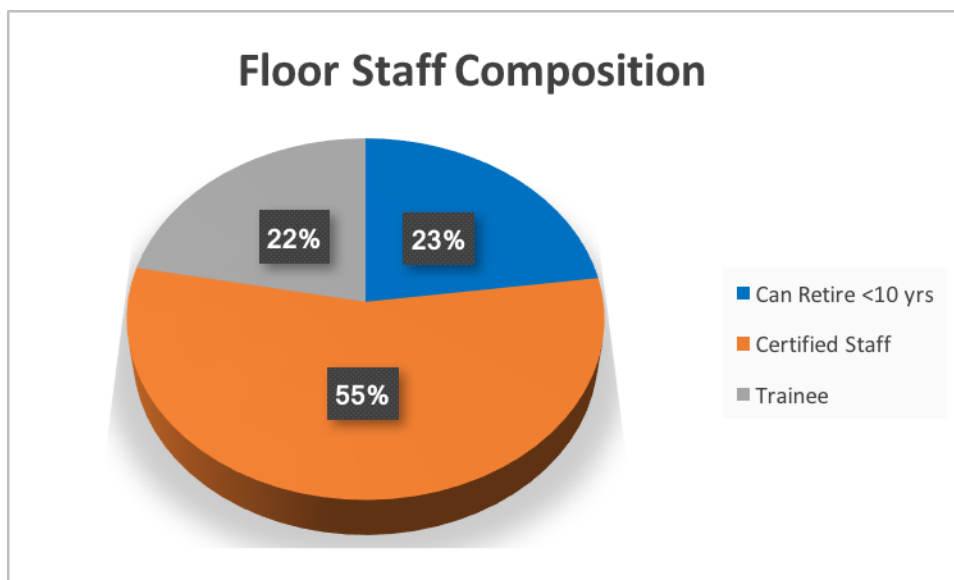
Given the project teams thorough analysis of BOEC data, a change in the recruitment and training model currently used is warranted as discussed in the Training and Development section of this report. The staffing analysis section of this report recommend increasing the number of FTE operations staff to 118, an increase of eleven (11) personnel, which will be difficult under the current training model.

Under the current recruitment and hiring practice it is reasonable for BOEC to continue utilizing 15% as the attrition rate for both the five and ten-year projection milestones. However, should BOEC attempt to fill their current unfilled FTE positions, or the additional recommended positions, by merely accelerating recruitment and hiring under their current model, without addressing the underlying issues causing the 63% trainee attrition rate, increasing the overall attrition rate to 17% to 19% would be recommended.

Recommendations:

Reduce the current attrition rate to 8% by revising the existing training model as recommended in Training and Development section of this report.

Under the current training model, estimate staffing needs for the next five to ten years utilizing 15% as the average expected attrition rate for BOEC operations staff. Expect this rate to increase to 17% to 19% as the number hired per year increases.

7.   BOEC POLICIES AND PROCEDURES REVIEW.

Part of the project team's responsibilities included collecting and reviewing policies

and procedures currently in use by the BOEC. The purpose of this review is to determine

the following:

*   If the current policies and procedures promote and support the effective and efficient operation of the BOEC.

*   If the policies and procedures are in alignment with emergency communications best practices.

*   If key standards and best practices are present in the current policies and procedures.

(1)   Summary of Observations.

In general, the policies, procedures and Standard Operating Practices (SOPs)

currently in use by the BOEC are comprehensive and address the majority of best

practices in emergency communications. The BOEC should consider adding the policies

listed in the Key Policy Review section.

The most significant best practice finding is that the BOEC's current emergency

call answering benchmarks are out of alignment with national standards. In addition to

these findings, there is a general perception that the Bureau's policies and procedures

are not consistently applied or enforced by management. This perception should be

addressed in order to enhance consistency and ultimately help improve employee morale.

(2)   Current Policies and Procedures.

The BOEC's current policies and procedures and reference guides are organized

into 9 categories, including:

1. Administrative Work Rules
2. Core Standard Operating Procedures
3. Emergency Ops
4. Fire/EMS Ops
5. General Ops
6. Police Ops
7. Workplace Reference Guide
8. Fire Call Guide (not reviewed as part of this assessment)
9. Multnomah County EMS Triage Guide (not reviewed as part of this assessment)

In addition to these documents, the BOEC also follows directives from the City of

Portland and complies with the collective bargaining agreement in place between the City

and Oregon AFSCME Council 75 Local 189-2.

New and updated policies and procedures are distributed to employees in several

ways. First, employees may receive an electronic notification or "roll call alert" of a new

policy or update upon logging in to the Intranet. Second, a shift supervisor may send an

e-mail to his or her direct reports containing the new information. Third, supervisors may

have individual conversations with employees. Currently, no consistent method of

tracking receipt of a new policy or update by each employee is in place which can lead to

a lack of employee knowledge and accountability.

Access to policies and procedures in the event of a systems failure at the primary

PSAP or at the back-up facility is accomplished through hard copies, CDs and remote

access to the Intranet.

(3)   Policy and Procedures Document Organization.

This subsection provides an overview of how the documents are organized within

each of seven (7) key categories listed above.

1. **Administrative Work Rules** – These documents pertain to administrative topics
   such as petty cash, document management, required meeting documentation and
   other documents of this type.

2. **Core Standard Operating Procedures (SOP)** – These documents are a combination of administrative and operational policy and procedures. For example, SOPs regarding facility security, workplace harassment, drug and alcohol usage and general duties and responsibilities for call takers and dispatchers can be found in this category.

3. **Emergency Ops** – This category contains documents that include a mix of response SOPs for major incidents and SOPs related specifically to emergency or systems failures within the BOEC such as a CAD system or power failure. These documents utilize an efficient color-coded format. Each portion of the documents is color-coded by job title for quick reference by employees.

4. **Fire/EMS Ops** – This category contains fire and EMS related policies and procedures. They are color-coded in the same manner as Emergency Ops documents.

5. **General Orders** – This category contains a variety of administrative, BOEC equipment failure and operational SOPs. These documents follow the color-coding format as well. Topics covered by the SOPs in this category include radio failure, Trauma Intervention Program (TIP), language services and codes.

6. **Police Ops** – This category contains law enforcement response related policies and procedures. They are color-coded in the same manner as Emergency Ops, Fire/EMS Ops and General Orders.

7. **Workplace Reference Guide** – This category contains workplace SOPs such as shift trades, scheduling, overtime and exercise room usage. These documents are formatted in the same manner as those found in Administrative Work Rules.

(4)   Review of Key Policies.

In the course of reviewing the BOEC's documents, the project team noted that the

following policies and procedures, which are commonly found in similar PSAPs, are not

reflected in the existing SOPs and reference guides:

- **Customer Premise Equipment (CPE) Failure** – The purpose of this SOP is to provide step-by-step instructions to all staff in the event of a CPE failure. This SOP is essential to continuity of 9-1-1 operations therefore employees should be familiar with it and participate in testing it on a semi-annual basis, at minimum.

- **Interoperability Plan** – This SOP outlines how communications will be established and maintained for large scale incidents that may require federal, state

and local law enforcement, fire and EMS responses. The SOP should articulate any pre-determined channel/talkgroup configurations for interoperability, guidelines for usage, locations of equipment caches (if any exist) and/or portable interoperability devices, who has access to them and notification lists. If the information is considered too sensitive for a SOP, then an SOP with direction on where to find the required information is recommended.

- **Access to and Use of Audio Recordings** – The purpose of this SOP is to define who has access to digital recording equipment and under what circumstances it may be accessed. This policy does not refer to instant playback functionality that may be present at each work station. The audio recordings made and stored by the PSAP are utilized for many purposes including investigations, evidence, quality control, training and civil and criminal litigation. Given the potential importance of these recordings, a SOP should define who has access to the recordings including remote users such as city or county attorneys or law enforcement, who may replicate them and for what purposes and what security measures or encrypted delivery methods will be used if e-mail is allowed as a distribution method. The SOP should also include guidelines for recordings that will require long-term storage.

- **Homeland Security / Terrorism Notifications** – The purpose of this SOP is to define circumstances under which state and federal level homeland security agencies should be notified. This SOP should also provide supervisors and above with the appropriate local, state and federal points of contact for notification. Given the sensitive nature of some of this information, the SOP should, at minimum, direct supervision to where the information can be located if inclusion of all information in the SOP is deemed not advisable.

- **Public Education Program Overview** – This SOP provides an overview of the BOEC's public education program. Since each employee serves as a representative of the BOEC and the City, each should be aware of what resources the BOEC has to further public education efforts and fully understand how the BOEC wishes to portray itself to the public. Educating employees internally and encouraging involvement will translate to external opportunities for the BOEC.

- **FCC Requirements** - This SOP outlines basic rules of radio conduct for dispatchers as defined by the FCC.

Recommendations:

Include the six (6) programmatic topics discussed in this report (e.g. telephony system failure) and devise standard operating practices (SOPs) in the BOEC policy and procedures manual.

For those SOPs deemed 'sensitive' for perusal, identify a separate secure location for storing these documents for reference by supervision and management (e.g. Homeland Security/Terrorism Notifications).

(5)   Policy-driven Call Answering Time Standard.

According to Core SOP – General Call Taker, the existing BOEC call answering benchmark for emergency calls, 9-1-1 and 10-digit, is 20 seconds 90% of the time. However, both The National Emergency Number Association (NENA) and the National Fire Protection Association (NFPA) promote higher standards. This discrepancy is addressed in other chapters of our report, but should be addressed to ensure that the Bureau complies with nationally-recognized best practices.

The NENA Call Answering Standard/Model Recommendation Document 56-005 states: "Ninety percent (90%) of all 9-1-1 calls arriving at the Public Safety Answering Point (PSAP) shall be answered within ten (10) seconds during the busy hour (the hour each day with the greatest call volume, as defined in the NENA Master Glossary). Ninety-five (95%) of all 9-1-1 calls should be answered within twenty (20) seconds." It should be noted that in April 2017 this standard will apparently be "consolidated" and revised to 95% call answering in 15 seconds. This has been discussed throughout this report.

The 2016 version of NFPA 1221 Standard for Installation, Maintenance and Use of Emergency Services Communications Systems Chapter 7 Section 7.4.1 states: "Ninety-fire percent of alarms received on emergency lines will be answered in 15 seconds and ninety-nine percent of alarms shall be answered in 40 seconds."

Recommendation:

The BOEC should adopt in their policy the current NENA Call Answering Standard and adjust accordingly as standards are revised.

(6) **Structure and Organization of Current Standard Operating Practices.**

The BOEC should be commended for the comprehensive nature of the existing manuals and reference guides. The color-coding of the operational SOPs is excellent.

One of the purposes of an SOP manual is to provide written documentation and instructions on administrative, operational and technical topics and responses. A well-organized and easy-to-use manual will promote high quality work and reduce errors. The following steps are made to increase ease of use, version control and accountability:

• Develop a process where employees must sign for new or updated SOPs. The signature can be in digital or written form or as an e-mail receipt. The method itself is not as important as consistent application and documentation. Signing for new and updated policies will not only ensure that employees are receiving new and updated information, but establish accountability as well.

• If the BOEC or any of the law enforcement agencies it serves is pursuing accreditation by the Commission on Accreditation for Law Enforcement Agencies (CALEA), then organizing a combined manual in line with CALEA's standards should be considered.

• Incorporate all of the categories into a single manual. Reformat the documents with a header that includes a policy number, title, date of issue, issuing authority, and the date of the latest revision so that all sections are consistent in appearance. Include a detailed table of contents for quick references.

• Digital versions of a single manual should have a search function or links from the table of content to move directly to desired content.

• Review and re-arrange the documents so that similar documents are in the same section. For example, currently the Core SOPs contain a mix of administrative work rules and policies as well as operational SOPs which detail responsibilities of the TRO desk, service desk, general call taker, police and fire dispatchers. Employees will be able to locate information more easily if each policy type is grouped with other similar documents. This is particularly true for technology issues. Rather than having CAD failures under Emergency Ops and radio failures

under General Orders, consider grouping these types of documents together under its own category.

- Where possible, combine call taking, police and fire SOPs into a single document. For example, police and fire each have an active shooter SOP. The fire SOP refers back to the police SOP. Combining them into a single document would simplify and expedite the process for employees. The Trauma Intervention Program (TIP) SOP serves as an example of this single document format.

Recommendation:

The BOEC should structure and re-organize the SOPs consistent with the steps described in this report.

(7)   Consistent Application of Policies and Procedures.

In the course of the project team's interviews and data collection on site, it became apparent that a strong prevailing sentiment exists that the Bureau's personnel policies are not consistently applied or enforced. This was further reinforced by the responses gathered through the employee survey.

During confidential interviews with the project team, many BOEC staff expressed frustration with consistency among management/supervision, pointing repeatedly to the administration of personnel policies as a primary example. The following issues were raised:

- Sick leave (SL) and FMLA leave are overused/abused, "forcing" staff to cover shifts.

- Staff sometimes work overtime shifts and then use sick leave for their regular shift, causing additional "forced OT."

- Clear patterns of SL abuse are not pursued administratively.

- Some employees refuse to cover "forced" shifts, which leaves these vacancies to be covered by staff who comply with the force policy.

- Some employees refuse to come in for scheduled training on their off day, which requires adjusting the schedule so that they are "on duty" during training.

- Staff take 2 hours off during their shift to complete online PowerDMS training, when it should require only 30 minutes.

- Some staff have failed or refused to be trained in all three workstation areas, yet remain employed while others have been let go for the same reason.

- Some staff have been certified in all areas, but always trade out of fire/EMS shifts; thus, they forget how to do fire dispatching as a result and are unable to cover that position effectively when necessitated.

The insights gathered from on-site interviews were largely reinforced by the results of the employee survey administered by the project team. In particular, the following statements dealt with policies and procedures, and the effect that they have on staff morale (SA- strongly agree; SD- strongly disagree).

#	STAFF REPORTED INCONSISTENCY IN POLICIES AND LOW MORALE					
	Statement	**SA**	**A**	**D**	**SD**	**N/A**
11	Operations managers supervise, operate, and employ our policies & procedures consistently.	3	14	21	**29**	11
19	Our policies and procedures are clear and answer nearly all questions we may have.	1	26	**32**	16	4
21	My work morale is currently high.	3	27	13	**33**	3
31	Sick leave is abused at my agency.	8	20	**28**	16	7

As the statement responses show, staff do not generally believe that policies and procedures are clear, and they do not think that managers are consistent in employing them. They also generally state that their work morale is low. Also, while Statement #31 generally had more disagreement than agreement, staff in management/supervisory roles tended to agree with sick leave abuse (weighted average of 3.5) far more than other groups (weighted average of 1.98), showing that they perceive this as a significant issue while others staff do not.

Also, when asked to rate the impact of various factors on staff morale, staff gave the following responses for "inconsistency in the enforcement of rules and policies".

IS INCONSISTENCY IN RULES ENFORCEMENT IMPACTING MORALE?	
Not a factor	7
Minor factor	28
Major factor	**41**

These results are consistent with the opinions expressed in on-site interviews and suggest that staff see inconsistent policy enforcement as a major factor in the lower morale prevalent in the BOEC currently.

While these reports and survey results alone do not quantitatively prove that there is an issue with the enforcement of policies at the Bureau, the number of issues raised and the similarity in themes among them suggest that there is at least a strong perception of inconsistency which must be addressed in order to remediate its negative impact on employee morale.

For example, many staff (38% of survey respondents) believe that sick leave is repeatedly abused and that management does not investigate or address the issue. The project team conducted a sample investigation to determine whether evidence exists to substantiate this belief. To complete this sample investigation the project team utilized BOEC payroll report and a 2016 leave use by type document, looking for key indicators for sick leave abuse. Some of these key indicators are:

- The use of sick leave days in conjunction with regularly scheduled weekends.

- The use of sick leave either preceding or following holiday weekends.

- The use of sick leave days in conjunction with scheduled vacation time.

- An extremely low or expended sick leave balance.

- The use of sick leave days as soon they are accrued.

- The use of sick leave days and social media posts indicating the individual may not have been sick.

While there are obviously occasions where sick leave will justifiably be used in conjunction with holidays and weekends, it is the pattern of use or the consistent use of sick leave in this manner that justifies further investigation and documentation by management.

In conducting a cursory analysis of the data provided there were discernable patterns in some employees use of sick, and other types of leave, that would justify scrutiny by BOEC management. By sorting the leave use data by employee and date of use, several employees had distinct patterns in the use of their sick leave, compensatory time, and vacation time which are suspect. For example, during the month of August one employee utilized 3 days of vacation time, with the fourth day of that week being taken off with the use of compensatory time and sick leave. After the employees regularly scheduled days off, they then used vacation time to take an additional day off. While individual circumstances will vary and things like chronic health issues may necessitate the use of vacation and sick leave to cover true medical issues, these instances should be investigated and documented through doctor's waivers, etc.   While this analysis is not definitive, it does support the comments from Supervisors that sick leave abuse may be a problem within BOEC.

Regardless of whether abuse of leave is occurring or not it is recommended that Supervisors and Operations Management strictly adhere to BOEC policy regarding the documentation and use of sick, and other types of leave, while also looking for key indicators of abuse. Should abuse be suspected a thorough investigations should be completed and any remedial action should be taken. To further deter sick leave abuse policies can be enacted where by an employee that uses more than a defined amount of

sick leave in a given period are then no longer able to sign up for and work "voluntary" overtime shifts.

Another issue raised by floor Supervisors during our interviews was the frequency and uncontrolled manner that duty assignment swaps, or "reliefs", between call taking and dispatching are done. According to those the project team spoke to, the reliefs usually occur every two hours, and are supposed to be done with staff rotating in small numbers, beginning at fifteen minutes to the top of an hour and concluding by the top of the hour as to minimize the impact on operations. Supervisors report, however, that the relief process is unmonitored and often the staff rotate in large numbers, often using the rotational time as an opportunity to check schedules and visit with co-workers resulting in staffing issues during these periods. Along with the self-imposed staffing shortages during these times, staff are allowed to trade duty stations requiring Supervisors to repeatedly re-work "daily" schedules to track the number of hours' employees spend performing each of the two duties.

The rotation of floor staff between call taking and dispatching duties is common in the industry and can provide benefits with regard to the maintenance of the specific skill sets needed for each of the duties. With that said, the project team usually sees this rotation process done on a weekly, daily, or at most on a half day rotational basis. The current practice of rotating every two hours is excessive, and overall negatively impacts the efficiency of the center from both an operational and supervisory level. Additionally, an industry leading cause for liability concern within an emergency communication center is improper or ineffective transfer of call information and responder locations during shift changes. With the current relief practice BOEC has essentially created artificial shift

changes every two hours of each scheduled shift, which increases the risk that an incident could happen.

It is recommended that BOEC modify the current duty rotation process, reducing the frequency of trades to either daily or bi-daily. If duty rotations are done on a bi-daily, or more frequent basis, the floor Supervisors should manage this process allowing only one to two (1-2) staff to be in the process of swapping at any one time. This will maintain staffing levels to handle workload and allow supervisors to better monitor the status of employees, ensuring a more efficient rotation.

While these reports and survey results alone do not quantitatively prove that there is an issue with the enforcement of policies at the Bureau, the number of issues raised and the similarity in themes among them suggest that there is at least a strong perception of inconsistency which must be addressed in order to remediate its negative impact on employee morale. There are several online resources available to help guide consistent application of policies and procedures among managers and supervisors as illustrated by the following (footnote).[14]

Recommendation:

The BOEC should provide on-going supervisory and management training surrounding the consistent application of policies and procedures, particular those emphasizing Human Resource areas. This will help alleviate potential supervisor liability for allegations of unfair employment practices.

BOEC management should strictly follow their internal policies regarding the use of sick, and other types of leave, and should thoroughly investigate suspected cases of abuse.

BOEC should reduce the frequency of duty assignment rotations "reliefs" to either daily or bi-daily.

---

[14] http://smallbusiness.chron.com/enforce-policies-consistently-work-10970.html

When duty assignment rotations do occur, they should be managed by floor Supervisors, allowing only 1-2 staff to rotate at any one given time.

8. DISPATCH ORGANIZATION BEST MANAGEMENT PRACTICES.

In order to conduct business effectively, all organizations should implement Best Management Practices as practical. These go beyond what is considered common practice. It should be noted, however, that agencies may not be able (or are unwilling) to completely implement a best practice for a variety of reasons that include:

- Insufficient resources, whether personnel or fiscal, to adopt a best practice.

- Inadequate available time to emphasize and proactively implement new practices as a consequence of focus on managing critical day-to-day issues (core business).

- Insufficient support from political, executive, or managerial personnel to adopt a best practice.

- Inadequate buy-in from line staff to implement a best practice.

- Disagreement that the best practice, although successfully implemented in other agencies, would not be successful in the agency under BMP review (for various cultural, organizational, or local/regional issues), and therefore is not a "best practice" from said agency's perspective.

Although there are relevant reasons, as noted above, to not implement an identified best practice, the ultimate intent should be to strive for implementing as many practices as feasible within the capabilities of the organization.

Located within the Appendix of the report is a check-list of dispatch-related best management practices surrounding a variety of functional areas in the dispatch profession. Our scope of services did not entail the comprehensive evaluation of each service provided against a particular best practice; nevertheless, the check-list is provided for BOEC's future use with our observations regarding BOEC and such practices placed in the following context:

- Based on the variety of data collection conducted, BOEC performs a number of best practices, several of them related to the manner in which operations are performed.

- While some best practices are obviously in place, others are not. BOEC should utilize the best management practices check-list to identify key areas in which it wishes to implement a best practice initiative. Some best practice areas in which the Matrix Consulting Group suggests BOEC could benefit from include:

  - Enhanced and transparent reporting of key performance metrics (e.g. % of calls answered within 15 seconds; dropped E911 calls);

  - Eventual CALEA, ACE and/or IAED certification.

  - Enhanced work environment.

  - Consistent application of policies and procedures.

  - Improved recruitment and selection protocols.

In summary, the implementation of Best Management Practices can help distinguish the average agency from those widely recognized as a best-in-class operation.

Recommendation:

BOEC should utilize the best management practices check-list provided to identify key areas in which it wishes to implement a best practice initiative.

APPENDIX A – BEST MANAGEMENT PRACTICES CHECKLIST

Best Practices Target / Initiative	Yes / No	If no, why not?
A public safety dispatch center is utilized, that jointly dispatches law enforcement and fire calls for service.		
Communication centers perform operations consistent with the Office of the Legislative Auditors "Seven Actions for PSAPs" to include: 1. Develop and use SOPs. 2. Support a trained and qualified workforce. 3. Maintain adequate communications and network equipment. 4. Explore cooperative equipment-sharing and dispatching opportunities. 5. Keep records and measure performance. 6. Promote info. Exchanges among public safety response agencies. 7. Educate the public on the 9-1-1 system and services.		
A backup PSAP has been established for the communication center(s).		
Uninterruptible power supplies and backup generators are available to prevent power disruptions from interrupting calls in progress or incoming calls.		
All dispatchers have training that meets or exceeds APCO (Association of Public-Safety Communications Officials International, Inc) or equivalent training guidelines.		
Communication centers have developed and utilize written procedures to standardize effective dispatch practices.		
Communications centers have developed a Strategic Plan outlining future direction and opportunities based on growth, changing technologies, etc.		
90% of the 9-1-1 calls are answered within 10 seconds.		
A call priority system has been developed and is implemented that effectively distinguishes between low, medium and high priority calls for service. Centers that dispatch medical have a MPDS (medical priority dispatch system) in place.		
A quality assurance (QA) program is in place to assure calls for service compliance with established protocols.		
Calls for service reports are run on a regular basis to track performance to standards and assist in management decision making.		

Best Practices Target / Initiative	Yes / No	If no, why not?
The communications center has established a complaint tracking and resolution program.		
Communication centers have designed and maintain a MSAG (master street address guide) on a consistent basis.		
In-vehicle computers are utilized in patrol sedans to reduce the extent of dispatcher workload such as records checks.		
The communication center is CALEA (Commission on Accreditation for Law Enforcement Agencies, Inc.) accredited and/or NAED (National Academy of Emergency Dispatchers) ACE (Accredited Center of Excellence) certified.		
Communication center staff are largely Civilians.		
A 9-1-1 telephone cost recovery fee is utilized to finance the operations of the dispatch center.		
Equipment, furniture and facilities have been spatially and ergonomically designed to reduce environmental stresses, the risk of repetitive motion injuries, eye strain due to lighting and constant use of CRT/LCD screens, etc.		
The dispatch and radio equipment is well maintained by telecommunications staff. Equipment and software is upgraded and/or exchanged on an appropriate replacement cycle.		
The organization has a formal Recruitment (Strategic) Plan containing a clear marketing/outreach plan with measureable outputs and outcomes to determine success.		
Marketing efforts formalized in a strategic plan or otherwise, focus on key job satisfaction (e.g. community service) and compensatory benefits of becoming a dispatcher versus pursuing other professions.		
As part of effective marketing, the organization has developed an effective "employer brand" to attract qualified applicants (e.g. best technology in the region).		
As part of strategic planning, The organization has developed a formal criterion, and profile, for the types of applicants desired, resulting in attracting the "right" candidate types as opposed to weeding out the "wrong" candidates.		
Recruitment is coordinated with other public safety entities within the larger government agency.		
The organization offers a competitive compensation package consistent with the region.		

Best Practices Target / Initiative	Yes / No	If no, why not?
The job description is consistent with the expectations and knowledge, skills, and abilities required of the job.		
Job classifications are regularly reviewed and updated to ensure changes in job complexity; duties and responsibilities are properly represented and subsequently reflected in job descriptions; this includes response by HR to requests from The organization for review.		
The organization effectively advertises in various local, regional and national mediums and has a dedicated budget for such advertising.		
The organization participates in various recruiting methods, including career days, job fairs, and other events.		
The organization uses a dedicated and regularly updated website as a cornerstone of cost-effective recruitment marketing.		
The website publishes the organization's vision, mission, history, job expectations, and prominently displays the minimum qualifications for employment.		
The website includes a video advertisement of agency dispatch operations in streaming video or similar technology.		
Recruitment focuses reasonable efforts on professions often dominated by women.		
Hot Links" to the organization's website are hosted on community woman's organizations websites.		
To expedite self-screening given the technological requirements of a dispatch position, applications are only accepted through the internet.		
Market surveys are periodically conducted (full comp/class every 6-8 years) by Human Resources to compare salaries and benefits against market competitors.		
The organization has a recruitment committee providing oversight of the recruitment program.		
The organization has formal and identified recruiters.		
A thorough process of identifying, selecting, training, and evaluating recruiters has been completed. The organization communicates that effective recruitment is a high priority.		
Identified recruiters have received formal recruitment training consistent with CALEA or other professional standards.		
The organization encourages word-of-mouth advertising, and rewards employees for identifying qualified applicants who join the organization.		

Best Practices Target / Initiative	Yes / No	If no, why not?
The process for selection of recruits is thorough in terms of assessing a candidate's qualifications and job suitability.		
The application/selection process has been streamlined to contain only essential steps necessary to confirm a candidate's probable job success. The process is consistent with other dispatcher selection programs.		
Lateral candidates undergo a streamlined application/selection process.		
The application process is expedited to limit wait time from the prospective candidate's perspective. By example, Background Investigations take a reasonable amount of time (an average of less than two months from initial application received until the background check is completed).		
The organization has an independent and formalized Retention Plan or similar document as a component of a broader strategic plan. This plan starts by identifying factors that employees like and dislike about the organization, as well as what would encourage employees to stay longer.		
The organization offers a competitive compensation package consistent with the region.		
The organization offers cost-of-living salary adjustments.		
The organization offers incentives such as longevity pay, tuition reimbursement, etc., consistent with regional competitors.		
Compensation practices recognize the achievement of specialized skills (e.g. CTOs) and/or certifications.		
The organization offers job-sharing, part-time employment and other flexible work options.		
The organization has up-to-date facilities and technologies and ergonomically-designed work stations.		
The organization provides breaks and allows meals to be taken away from work stations.		
Managers take a professional interest in the individual objectives and priorities of employees.		
The organization supports the employees and demonstrates they value employee contributions to ensure long-term employee commitment.		
The organization communicates effectively to ensure that employees feel both informed and listened to. The organization follows through on expectations that have been created, thereby ensuring long-term employee commitment.		

Best Practices Target / Initiative	Yes / No	If no, why not?
The organization has an effective performance management program (annual written evaluations) to award high performance and discourage/remediate low performance.		
The annual performance evaluation includes a career development component including: development of annual training plan, development of annual performance goals, etc.		
The organization has a process that encourages and includes employee input about decisions that impact the workplace.		
There is a formalized and regularly updated training needs assessment process that includes all staff.		
There is a systematic review of the in-service training curriculum to ensure needs are met.		
Training is provided to meet basic in-service update training and required certifications.		
In-service training hours average at least 40 hours per employee per year.		
All newly assigned supervisors attend a mandatory supervisory class.		
Employees are able to participate in task forces, when feasible, in areas of personal interest.		
Periodic rotation of individuals assigned to specialized positions (e.g. training, technology support, etc.) is conducted to provide opportunities for all interested employees to participate.		
The collective bargaining agreement provides a clear policy for filing grievances.		
Dedicated staff is assigned to the Labor Relations function to provide support, administration, interpretation, and application of the collective bargaining agreement.		
An existing, viable, formal mentoring program for new employees is available.		
The organization employs a formal career development program to promote professional growth, to inspire personal motivation and to enhance effectiveness.		
Exit interviews are routinely conducted to determine the causes for turnover, and data collected and analyzed to determine possible trends that can be rectified.		

APPENDIX B - DESCRIPTIVE PROFILE OF THE BUREAU OF EMERGENCY COMMUNICATIONS

This document provides a descriptive profile of the Portland Bureau of Emergency Communications (BOEC). The purpose of this profile is to document the project team's understanding of the current organization, staffing, levels of service, operations, technology, and costs for the BOEC, as well as key issues impacting and shaping service requirements for the Bureau. The data contained in the profile was developed based on the work conducted by the project team, including:

• Interviews conducted with staff;

• Collection of workload and service provision workload;

• Review of strategic documents and reports, budget data, organizational structure, and key practices.

The descriptive profile is not intended to include every organizational and operational facet of the organization, but rather to provide an overview and to serve as the "base line" or "status quo" against which any recommendations made at the conclusion of the study can be compared to demonstrate the change in roles, organizational structure, or operational practice.

The profile includes a summary of the organizational structure, budget, services provided, roles and responsibilities of staff, and technology used by the BOEC. As part of this review, the project team spoke directly with various members of the Bureau's staff, and collected and reviewed various data describing the organization and work processes.

Information contained in this descriptive profile will be employed in the analysis of issues during subsequent stages of the project.

1.   INTRODUCTION

The City of Portland Bureau of Emergency Communications BOEC serves as the single public safety answering point (PSAP) for all municipalities located within Multnomah County the Portland Police and Fire Bureaus, Gresham Police and Fire Departments, Multnomah County Sheriff's Office, which also provides contract police services to the cities of Fairview and Troutdale, and the Corbett and Sauvie Island volunteer fire departments. Members also work closely with AMR, a contracted private ambulance service, dispatching emergency responders. The population of Multnomah County is approximately 777,490.

"BOEC provides 9-1-1 call-taking and police and fire dispatch services to all of the public safety agencies within Multnomah County and the five (5) incorporated cities within; Fairview, Gresham, Mayview Park, Portland and Troutdale. Six (6) major highways run throughout the county; I5, I205, I405, and Highways 26, 30 and 99. Multnomah County is the smallest in area in Oregon, with a total of 466 square miles, of which 431 square miles are land and 34 square miles are water.

The following table summarizes the agencies which rely on the Dispatch Center for emergency communications.

DISPATCHED AGENCIES	
Law Enforcement	
Portland Police Bureau	Multnomah Sheriff contract cities:
Gresham PD	- Fairview
Multnomah County Sheriff	- Troutdale
Multnomah County Parole & Probation	
Fire Departments	
Portland Fire Bureau	Corbett RFPD #14
Gresham FD	Sauvie Island RFPD #30
EMS	
Multnomah County EMS	American Medical Response (AMR)

The mission of the BOEC is *"to be the vital connection between the community and emergency service responders by answering 9-1-1 and non-emergency public safety*

calls, triaging for proper response, and dispatching appropriate resources."

The following sections of this profile explore the 911 Dispatch Center's budget, staffing and organizational structure, technology, staff roles and responsibilities, and workload/performance benchmarks.

2.   BUDGET

The following table shows the Bureau's budget for the last three fiscal years as provided to the project team. Actual budget numbers are used for FY15, while the City's revised figures are used for FY16 and the current adopted budget is used for FY17.
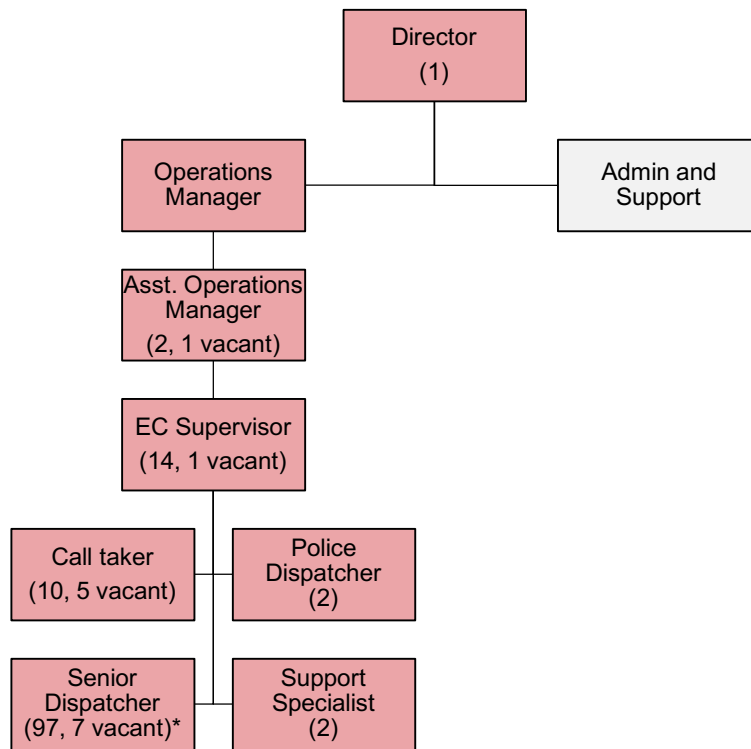
PORTLAND BOEC BUDGET			
	FY15 Actual	**FY16 Revised**	**FY17 Adopted**
Beginning Fund Balance	**$2,617,343**	**$1,528,081**	**$1,085,886**
Revenues			
External Revenue			
Charges for Service	$357,937	$350,000	$349,000
Intergovernmental	$6,836,238	$7,531,416	$7,784,545
Miscellaneous	$32,198	$10,000	$10,000
Internal Revenue			
Fund Transfers	$15,805,043	$16,017,266	$15,681,759
TOTAL	**$23,031,416**	**$23,908,682**	**$23,825,304**
Expenditures			
Operations			
Personnel Service	$14,349,345	$15,314,982	$16,222,467
External Materials and Services	$927,300	$1,170,805	$819,511
Internal Materials and Services	$3,864,713	$4,584,009	$4,498,227
Capital Outlay	$-	$900,000	$-
Fund Expenditures			
Debt Services	$1,364,098	$1,395,141	$1,412,541
Contingency	$-	$987,923	$1,075,736
Fund Transfers	$3,615,305	$1,083,903	$882,708
TOTAL	**$24,120,761**	**$25,436,763**	**$24,911,190**
Ending Fund Balance	**$1,527,998**	**$-**	**$-**

Expenditures for the Bureau have risen over the last 3 years, due primarily to a 13% ($1.9m) increase in personnel spending over that same period. Revenue has not increased at the same rate, so fund expenditures have been used to cover the difference, resulting in a shrinking fund balance.

3.   ORGANIZATIONAL STRUCTURE

The organizational structure and staffing levels of the Portland BOEC are shown in the following organizational charts of employees. The first chart shows operations staff, which accounts for the majority of positions within the organization. The second chart shows administrative and support staff.

OPERATIONS STAFF

```
                        Director
                          (1)
                           |
        +------------------+------------------+
   Operations                            Admin and
   Manager                                Support
        |
  Asst. Operations
     Manager
   (2, 1 vacant)
        |
   EC Supervisor
   (14, 1 vacant)
        |
   +----+---------+
Call taker      Police
(10, 5 vacant)  Dispatcher
                   (2)

Senior          Support
Dispatcher      Specialist
(97, 7 vacant)*    (2)
```

*16 of the filled positions filled by trainees

ADMINISTRATIVE AND SUPPORT STAFF
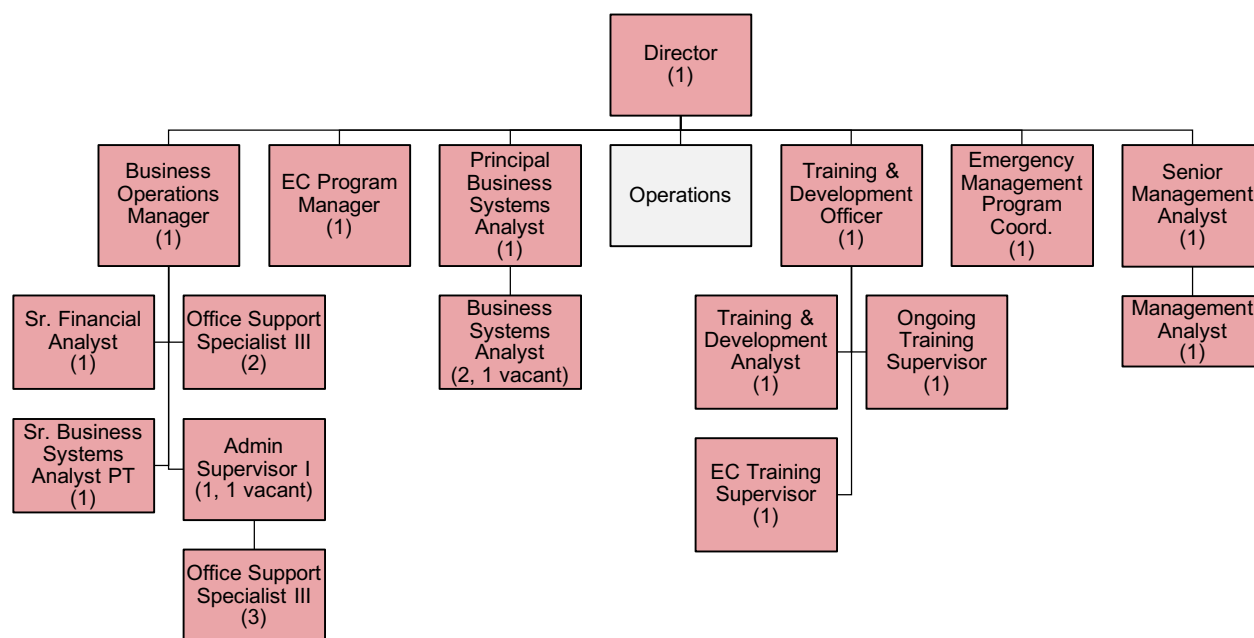
As shown in the organizational charts above, vacancies have a greater impact on operations staff than administrative and support staff.

4.   ROLES AND RESPONSIBILITIES

The following table shows the number of staff by position in the BOEC and the key roles and responsibilities assigned to each position. While this table is not intended to provide the level of detail that would be found in a formal job description, it is designed to summarize the primary duties and functions associated with each position in the Bureau. "The BOEC's current operations staffing level includes 97 dispatcher/call taker positions, but the Bureau is authorized for 107 FTE (this number excludes supervisors, Operations Managers, and administrative staff)."

(Filled positions are as reported February 2016.)

KEY ROLES AND RESPONSIBILITIES			
Position Title	**Authorized Positions**	**Filled Positions**	**Key Roles and Responsibilities**
Emergency Communications Director	1.0	1.0	• Plans, organizes, and oversees all operational and administrative functions to ensure the Bureau remains efficient and on-mission. • Plans and integrates the work of the operational and administrative supervisors, and evaluates their work. • Directs the development and execution of programs, initiatives, and systems to achieve the Bureau's goals. • Oversees the BOEC's relationships with partner agencies. Ensures that the Bureau meets the needs of Portland and partner agencies. • Establishes and tracks performance targets and professional development targets for Bureau staff and management. Ensures that staff perform at optimal levels. • Ensures that BOEC's technology infrastructure is optimized to allow the highest level of service provision possible.
Operations			
Operations Manager	1.0	1.0	• Reports to Emergency Communications Director. • Plans, organizes, monitors, and evaluates the work of the assistant operations managers and emergency communications supervisors. • Plans, organizes and directs the operations of bureau police, fire and emergency medical services call- taking and dispatch activities. • Participates in the development of the Bureau's annual budget, and tracks the operations division's financial performance throughout the year. • Establishes performance requirements and personal development targets for operations staff. • Works with supervisors to develop and retain highly competent, service- oriented staff. • Conducts research and operational studies to enhance the Bureau's performance and presents resulting findings and recommendations to management.

KEY ROLES AND RESPONSIBILITIES			
Position Title	**Authorized Positions**	**Filled Positions**	**Key Roles and Responsibilities**
Assistant Operations Manager	2.0	1.0	• Reports to Emergency Communications Operations Manager. • Oversees day-to-day operations at BOEC to ensure compliance with applicable regulations and a high level of service. • Supervises and evaluates the emergency communications supervisors. • Develops and monitors staff work plans and establishes policies and initiatives to ensure that BOES meets performance benchmarks. • Participates in the Bureau's budget development process. • Manages employees on the operations floor, handles investigations regarding allegations, dispenses discipline, and monitors use of leave. • Acts as the Bureau's liaison to partner emergency response agencies.
Emergency Communications Supervisor	14.0	12.0	• Provides direct supervision of call takers and dispatchers. • Enforce BOEC Policy and Procedures, handles problems between employees, and dispenses discipline as necessary. • Develop and edit staff schedules. • Provide performance feedback to line staff. • Handles complaints from citizens and field units. • Conducts outbound notifications for outside resources. • Accepts and processes overflow 911 calls as needed. • Troubleshoots problems with CAD, radio, and telephone systems.

KEY ROLES AND RESPONSIBILITIES			
Position Title	Authorized Positions	Filled Positions	Key Roles and Responsibilities
Emergency Communications Operator			See compounding duties below:
Call Taker	10.0	6.0	• Reports directly to the assigned Supervisor. • As needed, interfaces with assigned Coaches. • Accepts and processes inbound 911 and administrative telephone calls for police, fire, and medical service. • Inputs call information into CAD system and transfers the information to dispatcher staff.
Police Dispatcher	2.0	2.0	• All duties of Call Taker. • Dispatches all police related calls requiring a response from law enforcement. • Enters all officer initiated incidents into CAD to include pedestrian and traffic stops. • Conducts wants, warrants, license, and other checks on persons of interest and vehicles. • Maintains radio contact with field staff
Senior Dispatcher	95.0	72.0 (16 are trainees)	• All duties of Call Taker. • All duties of Police Dispatcher. • Dispatches fire and EMS agencies in addition to law enforcement agencies. • Combines information from multiple sources and produce and accurate narrative with key facts.
Emergency Communications Support Specialist	2.0	2.0	• Reports to Emergency Communications Supervisor. • Records calls for quality assurance and sends to appropriate supervisor for review. • Ensures monthly update of CAD stations and facilitates replacement/repair of broken headsets and keyboards. • Keeps floor positions equipped with office supplies and triage cards, maintains evacuation kit. • Maintains employee files on the operations floor.
Administrative and Support			

KEY ROLES AND RESPONSIBILITIES			
Position Title	**Authorized Positions**	**Filled Positions**	**Key Roles and Responsibilities**
Business Operations Manager	1.0	1.0	• Reports to the Emergency Communications Director. • Supervises 4 business operations staff directly and 5 total, including hiring, performance evaluations, and discipline. • Writes administrative SOP's and ensures that they remain current and in force. Distributes access keys and ensures that access protocols are enforced. • Acts as Bureau's liaison with partner administrative (non-emergency responder) organizations. • Leads Bureau's participation in Citywide initiatives related to technology and business operations. • Oversees contract and configuration of SAP, and supervises staff in financial, timekeeping, purchasing, and payroll functions.
Senior Financial Analyst	1.0	1.0	• Reports to Business Operations Manager • Plans, develops, and submits the annual BOEC budget subject to review and approval through the established City process. • Uses budgeting and business software to compile financial information for budget development. • Monitors expenses and revenues for the current fiscal year and adjusts anticipated budget accordingly. • Monitors cash flow and fund balances, and performs year-end reconciliations and refunds to partners as appropriate. • Invoices BOEC partners and other vendors, and tracks accounts receivable. • Develops and submits periodic reports to BOEC management and the State.

KEY ROLES AND RESPONSIBILITIES			
Position Title	**Authorized Positions**	**Filled Positions**	**Key Roles and Responsibilities**
Office Support Specialist III	2.0	2.0	• Reports to Business Operations Manager. • Processes a wide variety of materials, information and transactions. • Composes complex documents, newsletters, and brochures requiring specific organizational and program knowledge. • Creates and maintains specialty physical and electronic files. Produces reports from electronic databases, spreadsheets, files and other materials. • Answers inquiries by telephone or in person, takes service requests, provides information when possible and routes to appropriate parties for response. • Coordinates arrangements for and schedules meetings, conferences and other events, orders office supplies, takes and transcribes minutes of meetings.
Administrative Supervisor I	1.0	1.0	• Reports to Business Operations Manager. • Oversees the timekeeping and payroll functions of the Business Operations Office, including scheduling payroll functions. • Supervises the Timekeeping Specialist. • Ensures that all employees' payroll status is appropriately reflected in SAP system. • Represents BOEC at meetings regarding SAP issues. • Coordinates coverage of the administrative office, including records management, with the rest of the business operations staff. • Manages FMLA and OFLA for the Bureau, including answering questions, collecting paperwork, eligibility verification, claim determinations, and communicating with supervisors.

KEY ROLES AND RESPONSIBILITIES			
Position Title	**Authorized Positions**	**Filled Positions**	**Key Roles and Responsibilities**
Office Support (timekeeping) Specialist III	1.0	1.0	• Reports to Administrative Supervisor I. • Serves as timekeeper, enters hours from time cards into SAP timekeeping system and reconciles any differences between time cards and leave slips. • Processes a wide variety of materials, information and transactions to compose complex program-specific documents. • Creates, maintains, and produces reports from files and electronic databases and spreadsheets. • Answers inquiries by telephone or in person, takes service requests, provides information when possible and routes to appropriate parties for response. • Coordinates arrangements for and schedules meetings, conferences and other events, orders office supplies, takes and transcribes minutes of meetings.
Senior Business Systems Analyst (PT)	1.0	1.0	• Reports to Business Operations Manager. • Analyzes work processes, meets with customers, and examines business rules and requirements to identify inefficiencies in business processes. • Recommends changes to work processes in response to business needs and translates into computer software designs. • Analyzes system data and processes interactions to identify alternative systems and data interfaces. • Participates in evaluating vendor products, recommends hardware, network and/or software requirements. Develops specifications for technology solutions. • Trains bureau customers to use new applications; coordinates customer support and develops customer manuals for applications.

KEY ROLES AND RESPONSIBILITIES			
Position Title	**Authorized Positions**	**Filled Positions**	**Key Roles and Responsibilities**
Training and Development Officer	1.0	1.0	• Reports to Emergency Communications Director. • Directs and oversees the BOEC's organization-wide training plan. • Manages the Bureau's academy and certification training programs for communication operators and trainees. • Oversees and participates in presenting on-the-job and classroom training. • Develops the curriculum used for training academy and designs individualized training plans. • Assesses the effectiveness of training programming and initiatives, and evaluates training staff.
Training and Development Analyst	1.0	1.0	• Reports to Training and Development Officer. • Coordinates BOEC training academies to include recruitment, processing of applicants, devising academy schedules, and scheduling of instructors. • Tracks key dates for BOEC staff such as dates of hire, promotion dates, and tracking of training hours for recruits. • Assists with the monitoring performance against the biennial unit budget. • Provides data to training unit for the development of new training materials and models.
Ongoing Training Supervisor	1.0	1.0	• Reports to Training and Development Officer. • Develops Continuing Dispatch Education curriculum for BOEC including lessons as required to educate staff on policy or procedure changes. • Participates in developing plans, policies, and system procedures within the training unit. • Assist with evaluating the performance of floor training coaching staff. • Works collaboratively with other training staff to asses training methods and needs and implement new models when needed. • Assists with call taking and dispatching as needed.

KEY ROLES AND RESPONSIBILITIES			
Position Title	**Authorized Positions**	**Filled Positions**	**Key Roles and Responsibilities**
Emergency Communications Training Supervisor	1.0	1.0	• Reports to Training and Development Officer. • Coordinates BOEC academies, evaluates practical exams, and reviews Daily Observation Reports (DORs). • Compiles training hours and documents completed tasks for recruits. • Works collaboratively with other training staff to asses training methods and needs and implement new models when needed. • Evaluates recruit application packets. • Conducts background checks of all recruits. • Assists with direct supervision of BOEC line staff as needed.
Principal Business Systems Analyst	1.0	1.0	• Reports to Emergency Communications Director. • Manages BOEC's Versaterm CAD application to ensure maximum functionality and efficiency, including user profiles and access, talk groups, GIS integration, system commands, call type configurations, paging and station alert interfaces, and all other system parameters. • Reviews and answers CAD feedback, and submits issue reports when the system has problems. • Provides technical support on the CAD interface to operators and supervisors. • Responds to questions from staff and trains operators on CAD usage. • Supervises Business System Analyst(s).
Senior Business Systems Analyst	2.0	1.0	• Administers and troubleshoots BOEC's Versaterm CAD system, and serves as liaison between Versaterm and public safety agencies regarding the use of mobile CAD. • Creates, manages, and deletes employee login ID's and passwords for the CAD and Vesta telephone system when staff are hired or terminated. • Manages pager system data to include entry and removal of pager device numbers and page groupings. • Reviews and answers CAD feedback, and submits issue reports when the system has problems. • Provides technical support on the CAD interface to operators and supervisors. • Responds to questions from staff and trains operators on CAD usage.

KEY ROLES AND RESPONSIBILITIES			
Position Title	**Authorized Positions**	**Filled Positions**	**Key Roles and Responsibilities**
Emergency Communications Program Manager	1.0	1.0	• Reports to Emergency Communications Director. • Works with partner agencies to craft policies and protocols for emergency response and keep them up to date with service requirements, technology, and statutory requirements. • Compiles and analyzes data to gauge BOEC performance, identify areas for improvement, and evaluate effectiveness of performance initiatives. • Represents the Bureau in regional commissions and committees addressing regional concerns and protocol integration. • Manages operations-related complaints from other agencies. • Promotes a high-performance operations atmosphere for BOEC employees.
Senior Management Analyst	1.0	1.0	• Reports to Emergency Communications Director. • Performs complex analytical work to resolve management and legislative issues. • Determines appropriate methodology for statistical analysis, gathers data, presents findings to management, and recommends solutions. • Assists in developing and monitoring implementation plans for recommended initiatives. • Assists in developing Bureau budgets and financial projections. • Oversees the development of grant applications and administration.
Management Analyst	1.0	1.0	• Reports to Senior Management Analyst. • Develops financial projections and documents such as revenue and expenditure analyses, and budget status and monitoring reports. • Assists in drafting financial models and documents such as policy and procedure documents, proposed contracts, briefing packets, and proposed statutory changes. • Conducts research on assigned projects, compiles and analyzes data. • Provides technical assistance to Bureau staff by developing new data collection instruments and analytical tools. • Supervises the preparation of bureau documents and materials for release in response to public records requests.

5.   CURRENT PERSONNEL SCHEDULING

The Bureau generally utilizes a "4-10" shift schedule, wherein staff work four consecutive 10-hour shifts followed by three consecutive day off per week. The starting times for each of these 10-hour shifts is staggered every two hours with the first shift beginning at 0500 hrs and the last shift beginning at 2300 hrs. The following table outlines the current approach to staff scheduling utilized by the BOEC.

SHIFT	START TIME
Early Morning	0500 - 1500
Morning	0700 - 1700
Mid-Morning	0900 - 1900
Late Morning	1100 - 2100
Early Afternoon	1300 - 2300
Afternoon	1500 - 0100
Evening	1700 - 0300
Late Evening	1900 - 0500
First Night	2100 - 0700
Second Night	2300 - 0900

Some staff (11 as of January, 2017) work on a modified schedule consisting of the following:

- Two (2) days with twelve (12) hour shifts each day, followed by
- Three (3) days off, followed by
- Two (2) days with twelve (12) hour shifts each day, followed by
- Two (2) days off, followed by
- Two (2) days with twelve (12) hour shifts each day, followed by
- One (1) day with an eight (8) hour shift, followed by
- Two (2) days off.

The start times for the modified schedule are 0500 hrs, 1700 hrs, and 1900 hrs.

Every 6 months, the shift schedule is reconfigured based on anticipated coverage needs, and staff bid for shifts and vacation days in order of seniority.

6. KEY TECHNOLOGY UTILIZATION

The following table provides a summary description of the core technology tools utilized by the BOEC to process calls, store data, locate events occurring in the Bureau's service area, and communicate with emergency responders. The name of each technology tool or application is accompanied by a description of its functionality and the primary ways in which the Bureau uses it.

TECHNOLOGY UTILIZATION	
Technology	**Description**
Versaterm CAD version 7.4.1014	• 911-specific computer-aided dispatch application integrated with GIS map viewer. • Used by the Dispatch Center to direct public safety personnel through mobile devices in responding units.
Versadex (Region)	• Also called "region", a CAD-integrated filing application managing case and call histories. • Used by staff to research call-relevant information like license plates and criminal backgrounds.
Vesta Meridian version 2.2 sp5	• 911-specific multi-trunk phone system used by the Dispatch Center to receive and prioritize emergency calls. • Multi-screen interface allows operators to operate and answer the phone queue and simultaneously map call locations.
SAP	• Citywide accounting management system used by Business Operations staff to record and maintain employee payroll status, record time worked, and generate overtime reports.
Motorola Radio Smartzone version 7.15	• 911-specific dispatch radio system used by dispatchers and agencies to direct public safety personnel and communicate in the field.
PageMaster EX 2013	• Windows based application that sends text messages to cellphones, alphanumeric pagers, numeric pagers, and any other devices capable of receiving text and SMS messages.

TECHNOLOGY UTILIZATION	
Technology	**Description**
Office Automation (O.A.)	• Bureau-wide virtual desktop supporting Microsoft Office applications and internet access. • Used by staff to access email, internet browsing, the Bureau's 911 text line, call recordings, OregonDOT traffic cameras, and other emergency response agencies' data.
TCS	• Web based application allowing for text to 911 calls to be answered in the center.
Pyxis 5.0	• Telephone and radio audio recording system.
ArcMap 10.2	• ESRI based mapping software utilized for rendering and editing map layers in the 911 center.

7. WORKLOAD PERFORMANCE MEASURES

The following table provides a summary of some key metrics gathered by the project team for the BOEC. The project team will collect more data as part of the analysis portion of this engagement, but these measures provide a sense of the Bureau's current performance environment. Note that some metrics are shown beginning FY15 and include FY17 targets, while others are available beginning FY14 and go up to FY16 estimates.

WORKLOAD AND PERFORMANCE MEASURES			
	FY15 Actual	**FY16 Estimate**	**FY17 Target**
Workload			
Total 911 Calls	526,243	500,000	500,000
Total Non-Emergency Calls	299,007	300,000	300,000
Total Calls	825,250	800,000	800,000
Total Calls per Operator	7,502	7,000	8,000
Overtime Hours Worked	10,969	14,000	15,000
Effectiveness			
Average Seconds of Ring Time	1	5	8
Percentage of 911 Calls Answered Within 20 Seconds	99.7%	90.0%	85.0%
Percentage of Urgent Calls Dispatched:			

Police - within 120 seconds	70.0%	80.0%	75.0%
Fire - within 60 seconds	67.0%	75.0%	70.0%
EMS - within 90 seconds	72.0%	80.0%	75.0%
	FY14 Actual	**FY15 Actual**	**FY16 Estimate**
Other Metrics			
# of Certified Operators	88	88	81
# of New Certifications	4	6	7
# of Separations	3	6	8
Sick Leave Hours Taken	16,490	16,394	18,138
Number of Public Complaints	169	310	TBD

Call volume is predicted to hold approximately steady, though the calls per operator and overtime are projected to rise as the number of certified operators falls. Responsiveness to 911 calls is also projected to fall, with longer ring times and markedly fewer calls answered within 20 seconds. Sick leave also sees a significant change; it is projected to rise by 10.4% this year.