Proposed Merger

Honolulu Fire Department
and
Honolulu Emergency Services Department

- **EMS Division**
- **Ocean Safety Lifeguard Services Division**

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Emergency Services Consulting International

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Honolulu Fire Department and

Honolulu Emergency Services Department

Hawaii

Proposed Merger

2011

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Executive Summary

Emergency Services Consulting International (ESCI) was retained by the Honolulu Fire Department (HFD) to develop recommendations for the proposed merger of HFD and the Honolulu Emergency Services Department (Department of Emergency Services or HESD, consisting of the Emergency Medical Services Division [EMS] and the Ocean Safety Lifeguard Services Division [OSLD or Ocean Safety]). Specifically, ESCI was tasked with conducting a baseline assessment of the current system for delivering emergency services, developing an integration report, and delivering a final report for the proposed merger of the organizations. This report reflects the firm's findings and recommendations for merging the Honolulu Fire Department and the Department of Emergency Services. The report provides an assessment of the current environment, which includes an analysis of the organizational structures within the respective departments, functions within each agency that support the organizational mission, financial analysis of the various functions and opportunities for cost savings through a merger of the organizations, and recommendations for alternative service delivery models specifically for the delivery of emergency medical services within a merged environment.

ESCI evaluated the proposed merger based on three strategic opportunities for improving the system: improved quality, reduced costs, and faster response. Our assessment of the current emergency services system reflects that the proposed merger of the organizations is feasible and will improve the delivery of emergency services to the citizens and visitors of Oahu in a cost effective and efficient manner. Throughout our on-site evaluation, ESCI interviewed representatives of the affected agencies and allied organizations, including elected officials, city administrative staff members, fire department personnel, physicians, field personnel, labor representatives, and others related to the project. We reviewed documentation from the various system participants; referenced local ordinances; and evaluated current medical research, previous studies on the system, and other literature available in the industry.

The level of staff interaction with the consulting team impressed ESCI consultants. Our assessment of the system would not have been possible without the support of the Mayor, Managing Director, Fire Chief, Emergency Services Director, finance personnel, administrative teams, fire officers, EMS personnel, Ocean Safety staff, and many others. As such, we thank the members of the agencies who supported us in our information gathering and data analysis visits.

Based upon our assessment of the organizations providing emergency services to the residents of the City and County of Honolulu we are confident that the merger would achieve various cost efficiencies and elimination in duplication of services. **ESCI estimates that a merger of the organizations has the ability to generate savings in excess of $10,000,000 within the next five years.**

It is also our opinion that through a performance-based contract additional opportunities for efficiency can be achieved. In addition, one of the greatest benefits that can be gained from a merger is improving

the delivery of emergency medical services to the citizens of Oahu. The following statement is an accurate description of the current environment of the EMS System:

> *The EMS System for Oahu was once a state-of-the-art system with sufficient units and cadre of highly trained and motivated personnel whose patient care was comparable to the best in the nation. Today, however, the system has fallen behind in several areas. It can best be characterized by a staff of highly motivated and dedicated employees who are proud of the care they deliver. However, they are working in a system that is highly inefficient and operating in some parts of the island at close to a breaking point.* [1]

These comments summarize the general findings of a comprehensive performance audit of the organization, management, and operations of the pre-hospital emergency medical care and emergency ambulance service program of the Department of Health of the City and County of Honolulu. It should be noted these comments were extracted from a study conducted in 1992 by some of the leading experts in the field of emergency medical services.

Unfortunately, the same system issues that were identified almost two decades ago continue to present challenges to the EMS system today and prevent the system from reaching its full potential in meeting the long-term needs of the City and County of Honolulu. The structural issues identified in the previous report and present in the system today include the following:

- A dependence upon overtime to meet daily EMS system operational demand.
- Lack of adequate number of advanced life support personnel entering the system.
- Competition for staff from federal fire agencies providing emergency medical services.
- Reliance on a staffing model that magnifies the shortage of advanced life support personnel.
- Lack of career opportunities and advancement for EMS personnel.
- Insufficient resources in some of the urban areas resulting in high unit utilization rates.
- Lack of stability in organizational leadership.

What clearly has not changed is the dedication of the personnel who continue to deliver quality healthcare in a system that relies on an inefficient service delivery model and is constrained by minimum staff career opportunities and frequent turnover.

The international lifeguard community recognizes that the Ocean Safety Lifeguard Services Division, the other organizational unit located under the umbrella of the Emergency Services Department, is a world leader in ocean safety. It is our opinion that the merger of the organizations will not have an adverse impact on the services provided by this organizational unit and, in fact, may be enhanced by expanding the responsibility of the division to include all water safety and rescue functions.

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[1] JEMS Communications, *Comprehensive Performance Audit of the Organization, Management and Operations, of the Prehospital Emergency Medical Care and Emergency Ambulance Service Program of the Department of Health of the City and County of Honolulu*. April 1992, Page et al.

Any effort toward merging the current organizations must take into consideration the critical factors that can impact the success of the merger. ESCI has identified the following as significant issues that will affect the ability of the organizations to operate effectively in a merged environment. These factors have also been taken into consideration in the development of a model for service delivery and overall system improvement.

- The HESD EMS workforce reflects a diverse population that includes many female paramedics and EMTs. A perception exists that there may be few opportunities for these paramedics if the agencies merge.
- Various aspects of the current system deployment model are predicated on requirements contained within the collective bargaining agreement with the United Public Workers Union.
- Each participating organization has distinct cultural differences.
- Ability to initiate improvements in EMS system design will be a long-term process.
- The organizations have distinctly different opportunities for career advancement.
- Integration and acceptance of the workforce into a single work environment.
- Loss of identity with respect to chosen career path.
- System design changes prior to operating in a merged environment.

The merger has the potential to significantly improve the delivery of emergency medical services currently being provided by the various organizations. In addition to achieving cost savings through the elimination of duplicated support services programs, the merger will have the capability to institute the following:

- A system of coordinated response and care from entry into the system through delivery of the patient to an appropriate healthcare facility.
- A system that ensures adequate resources are available through the integration of the assets of the individual agencies.
- A system that has the capacity to modify the emergency services delivery model over time and as system demands change.
- A system that prepares the emergency medical services system to meet the challenges of the future.
- A system that creates additional career opportunities for the combined workforces.
- A system that enhances the ability of utilizing HFD resources to maximize the deployment of current organizational assets, especially to meet EMS system demands.
- A system that enables the institution of a single medical director to oversee and provide medical direction from a single agency and system perspective.
- A program that provides enhanced coordination between all system providers.
- An organizational structure in which personnel operate under a unified chain-of-command structure.

- A system that improves the delivery of advanced life support services through the addition of trained MICTs (mobile intensive care technician) on engine companies.
- A system that eliminates duplication of services and resources.
- A system that has the capability to achieve long-term savings utilizing dual-role cross-trained personnel.
- An organizational structure that achieves immediate savings through the consolidation of support services functions.
- A structure that allows for coordinated system planning.
- A program that allows for consistency in training and certification of personnel.
- A process that improves the delivery of public education and information.
- A system that provides continuity in organizational leadership.
- A process that improves the recruitment and retention of system personnel.
- A system that ensures compliance with state EMS contractual requirements.

In our opinion, the merger of the organizations has the capacity to resolve some of the critical issues facing the Division of Emergency Medical Services as well as to position the merged organization to meet future challenges. These challenges include an increase in demand for services, adequate financial resources to meet future growth in demand, the impact of a changing healthcare environment, and an aging population. In addition, a merger of the organizations will result in more effective utilization of existing fire department resources and assets. Finally, ESCI believes that the merger will be in the best interest of system participants, including the individual workforces of the respective agencies.

The merger of the organizations provides ample opportunities for implementing cost efficiencies and improving overall organizational effectiveness in the delivery of emergency services. Implementing this merger should occur over time in a phased approach based on demonstrated efficiencies and organizational commitment. Using a phased-in approach should assist in alleviating significant concerns of the incumbent workforce, especially the men and women currently employed by HESD.

Summary of Potential Benefits of Consolidating Services

1. Effective use of existing fire service assets and resources in the delivery of emergency medical services resulting in significant cost reductions to meet current and future service delivery demands.
2. Cost savings generated through the elimination of duplicate support services functions.
3. Comprehensive and inclusive planning for emergency services.
4. Continuity in chain-of-command both from an operational as well an administrative perspective.
5. Opportunity to eliminate duplicate operational facilities in the future.
6. Continuity in medical oversight for patient care events from initial call to hospital delivery.
7. Improved dispatch performance and timekeeping reliability.
8. Stability of leadership.
9. Enhanced career opportunities for HESD staff.
10. Reduction in dependence on overtime for ambulance staffing by redeploying existing HESD EMS resources.
11. Uniform utilization of system performance standards

Methods Used in Conducting the Assessment

In 1966, the National Academy of Sciences and the National Research Council published a landmark report on the state of emergency medical services in the United States. That report, *Accidental Death and Disability: The Neglected Disease of Modern Society*, provided the initial framework around which a number of Emergency Medical Services (EMS) systems were organized.[2] Importantly, the report provided the impetus for states and localities to begin to regulate EMS because, as the report noted, mortuaries operated more than half of the ambulance services in the United States.

Research compiled since that report makes it clear that EMS systems are much more than simply ambulance transport services and that problems continue to exist in EMS system design.[3] Yet, the evidence from that report was so compelling that Congress passed the Highway Safety Act of 1966 that established the first organized EMS systems in the United States.

EMS systems structured based on traditional paradigms are changing rapidly. Many people view EMS as simply ambulance transport or fire department response to medical events. However, those views are being challenged as regulators demand more accountability for ambulance transport and emergency care, fire departments seek better and more efficient use of resources, ambulance agencies struggle with increased system demand, and all system participants are faced with economic constraints.

EMS systems are important considerations for regulators, elected officials and the citizens they are intended to serve. In most areas, a body of elected officials has overall responsibility for one or more components of the system, such as fire service first response or transport, or for regulating ambulance service contracts. In some cases, multiple local agencies exert some level of control over components.

Factors Considered in Reviewing the Oahu EMS System

The evaluation process consisted of input from key members of the participating agencies, review of documents produced both inside and outside the system, review of statutes and ordinances in place in the state and in the area, and discussions with others who have a stakeholder interest in the EMS system.

In analyzing and developing the baseline assessment of the current EMS System, ESCI reviewed the following elements of contemporary EMS system design:

- EMS Governance and Administration
- System Planning
- Human Resources

[2] National Research Council. 1966. *Accidental Death and Disability: The Neglected Disease of Modern Society.* Washington: National Academy of Sciences.

[3] See also: Committee on Trauma Research, National Research Council and Institute of Medicine. 1985. *Injury in America: A Continuing Public Health Problem*. National Academy Press: Washington D.C.

- Equipment and Facilities
- Communications
- Medical Direction
- System Financing
- EMS System Delivery
- Quality Assurance

Assessment Process and Method

Few local governments understand the complexity of comprehensive EMS structures because EMS systems are usually poorly defined. One widely accepted EMS definition is based on NFPA 450.[4] NFPA defines an EMS system as: "A comprehensive, coordinated arrangement of resources and functions which are organized to respond in a timely, staged manner to medical emergencies regardless of their cause."

At a minimum, EMS systems include public information and education, system access and dispatch components, first response, ambulance transport, and definitive hospital care. Though it is beyond the scope of this report to discuss the hospital component of the local EMS system, ESCI has evaluated the HESD EMS system based on an EMS system matrix that provides local EMS agencies with appropriate EMS system considerations and with adequate measures of system quality.

The baseline EMS assessment conducted by ESCI strives to consider system structures and functions rather than simply any agency within the context of the proposed merger. ESCI believes that EMS requires a number of interrelating components working together in order to maximize patient outcomes. As a result, this part of the report focuses on the structures and functions of effective EMS systems, the findings of published research (if any), and ESCI's experience. In each section that follows, ESCI describes the benchmarks that are applicable to the EMS system in Oahu.

In reviewing the EMS system, ESCI used its proprietary EMS system matrix as a model for evaluation. The matrix is based not only on the expertise of analysts, but also on contemporary, professional literature regarding EMS and regulatory systems. This component list, derived from material provided by the National Highway Traffic Safety Administration (NHTSA), the American Society of Testing and Materials (ASTM), the Commission on Accreditation of Ambulance Services, and other sources, should be considered as the appropriate factors required for the operation of the Honolulu EMS System. These resources, as well as ESCI's expertise, provided the background information necessary to develop a component list of the items critical to the effective operation of this system.

[4] NFPA is now the name of what was previously known as the National Fire Protection Association. This association creates standards and guidelines for emergency services, prevention activities, and for emergency operations.

Strengths and Weaknesses

As with all EMS systems, the Honolulu EMS system[5] is subject to a number of strengths and weaknesses that enable or limit the potential for system changes. ESCI analyzed these elements within the context of how a merged organizational structure would eliminate system weaknesses and improve the strengths of the combined organizations to deliver emergency medical services.

Strengths - The strengths of the system currently include:

1. Commitment of personnel. The personnel participating in the system—from personnel at the dispatch agencies to field personnel to medical authorities and management—are interested in and committed to the system as well as their service to the public.
2. Local officials willing to make improvements. In our conversations with elected and administrative officials, it is readily apparent that they recognize opportunities are present to make significant improvements in the system. We believe that they are willing to make those improvements.
3. A single medical protocol. All emergency care providers in the system, both first responders and ambulance personnel, are required to operate under a unified set of medical protocols.
4. Committed management workforce. All participants that were interviewed are interested in the system and willing to make organizational changes to improve the system for all residents in the service area. EMTs and managers appear to have the needs of the community first in their organizational goals.
5. Shared facilities. The organizations' emergency response units currently share or are co-located in some facilities.

Weaknesses - The weaknesses of the system tend to offset the strengths in certain areas. The most prominent of those are described below:

1. Fragmented system. Elements of the system are fragmented with multiple agencies operating essentially independent of each other. This fragmentation is evident through various aspects of the current system design, including lack of a formalized EMS System Plan at the county level, level-of-effort versus a performance-based approach to system design, lack of uniform system performance standards utilized by the responder agencies, independent medical oversight throughout the continuum of the EMS event, and minimum quality assurance programs.
2. Lack of system planning. The system operates under a state contract that provides oversight of ambulance service but no formal planning process for evaluating, designing, or modifying other system components.
3. Medical direction. Multiple medical directors are engaged in the system with no single medical authority responsible for the entire patient care continuum.
4. Emergency dispatch and communications. The role of the emergency dispatch and communications system is fragmented with multiple communication centers involved in dispatching resources to emergency medical events; the structure is not developed sufficiently

[5] The system that we refer to here is the system that is made up of the principal agencies that participate in the delivery of emergency medical services.

to address system performance or the role of this integral system element within the delivery of patient care services.

5. Inadequate quality measures. There are limited performance requirements defined in the state contract. The current system participants are unable to provide contemporary, professional quality reporting methods on their collective roles within the context of the EMS system; subsequently, they have limited comprehensive reporting capabilities.
6. State contract. The state contract reflects a level-of-effort rather than performance-based contract. As a result, planning efforts at the local level focus on contract compliance activities rather than overall EMS system design encompassing the various organizations that have a role in the EMS System. A comprehensive approach to local planning ensures that system design modifications capture and utilize multiple system resources effectively and efficiently.
7. Collective bargaining agreements. Bargaining Unit 10 of the United Public Workers (UPW) represents EMS personnel employed by the Emergency Medical Services Division; Bargaining Unit 1 represents maintenance personnel within HESD EMS. Current contract requirements impede the ability to modify shift schedules and unit deployment, and the UPW has economic incentives to resist the merger of the agencies.

One of the disadvantages of describing strengths and weaknesses as part of a planning process is that the assessment does not necessarily provide direction about how to make improvements. The discussion on improving the system will be provided throughout this document.

Baseline Assessment

ESCI conducted a baseline assessment of the Honolulu Fire Department (HFD) and Honolulu Emergency Services Department (HESD) consisting of the Emergency Medical Services (EMS) Division and the Ocean Safety Lifeguard Services Division (OSLD or Ocean Safety). In addition, we evaluated the State of Hawaii's participation in the EMS system as well as how the EMS system components work in concert to deliver out-of-hospital medical care.

The baseline assessment was conducted to establish a benchmark from which any options for future service delivery can be measured. The assessment was also designed to identify any critical issues that may have an impact on the operational integration of the organizations. The assessment consisted of the following elements:

1. Review of the organizational design of the affected agencies, including:
    - Organizational Structure
    - Chain of Command and Reporting Relationships
    - Existing Ranks and Titles
    - Compensation and Benefits
    - Recruitment, Application, and Appointment Process
    - Collective Bargaining Representation
    - Administration and Support Staff
    - Operations
2. Review of the services supporting the operations of the agencies:
    - Communications
    - Training
    - Clerical and Administrative Support
    - Maintenance
    - Logistics

Oahu and the Local EMS System

The Island of Oahu encompasses approximately 604 square miles and has witnessed, and will continue to see, growth in both residential and commercial development due to the popularity of the island as a vacation destination, diverse geography, and attractiveness as a retirement community. Since the last de-centennial census (2000), the island's population has increased to an estimated 953,207 residents in 2010, reflecting a growth rate of approximately 8 percent during the last decade. Currently, Honolulu County represents approximately 70 percent of Hawaii's population.[6] As a popular resort destination, the area witnesses significant spikes in population above community norms during seasonal periods. It is projected that as many as 150,000 visitors may be present on any given day.

[6] Source: U.S. Census Bureau, 2010 Census Redistricting Data (Public Law 94-171) Summary File (February 2011) calculations by the Hawaii State Department of Business, Economic Development & Tourism, Hawaii State Data Center.

Based on the current growth rate, the county is expected to increase its resident population to more than 1,000,000 by the year 2020. A significant portion of this growth will be reflected in the expansion of the urban core.

The EMS transport system on the Island of Oahu has primarily evolved as a third-service municipal program. Prior to the enactment of the Comprehensive Emergency Medical Services Law in 1979 by the State of Hawaii, control of the EMS system on Oahu resided with the City and County of Honolulu. Subsequent to its passage, the state took control of the EMS system for all jurisdictions and placed responsibility for program management under the aegis of the State Department of Health, where it resides today. By contract, the state reimburses the City and County of Honolulu for expenses associated with the delivery of emergency medical services, including management, ambulance, and dispatch personnel; variable expenses such as supplies, fuel, and other expendable items; capital costs, including fleet and facilities; as well as direct and indirect overhead costs. The ambulance service has operated under various administrative structures, including being a unit of the City/County Department of Health and more recently as a division of the Department of Emergency Services.

Calls for emergency services are received at a single 9-1-1 communications center managed by the City and County of Honolulu Police Department from which the caller is routed to the appropriate agency or agencies. Medical care, training, and certification are generally established through applicable Hawaii statutes. Patient transports are the responsibility of HESD's EMS Division, which holds the license for the provision of ambulance services under the authority granted to it by the State Department of Health. Operating under a Memorandum of Understanding, HFD responds as a first responder to designated emergency medical calls.

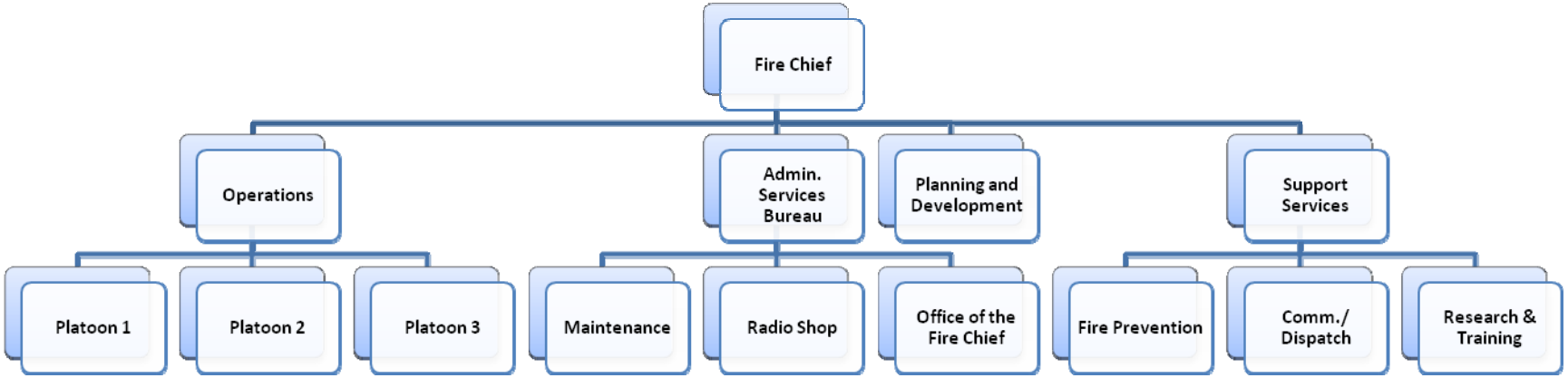
Honolulu Fire Department

The Honolulu Fire Department has a long and storied history in the community. Originally chartered by King Kamehameha in the late 1800s, the agency has a more than 100-year history of protecting the community. The City Charter of the City and County of Honolulu designates the Honolulu Fire Department (HFD) as the fire protection agency for the City. That charter provides HFD the authority and responsibility to provide fire protection, rescue, emergency medical services, and hazardous materials response for the Island of Oahu. The fire chief and the deputy fire chief manage the operation and administration of the HFD and are responsible for carrying out the following functions mandated by the City Charter:

- Firefighting and rescue work in order to save lives and property from fires and emergencies emanating from hazardous terrain, ocean rescues, and hazardous materials.
- Response to emergency medical incidents.
- Training, equipping, maintaining, and supervising fire fighters and rescue personnel.
- Monitoring building construction and occupancy standards for the purpose of fire prevention.
- Providing educational programs related to fire prevention.
- Performing other duties as may be required by law.

The organization consists of the fire chief providing oversight of uniformed and civilian personnel organized into four administrative sections: the Administrative Services Bureau, the Operations Section, Planning and Development, and Support Services. The organization chart that follows provides an overview of the organizational structure of the fire department.

Figure 1: HFD Organization Chart



Honolulu Fire Department Administration

The HFD has an authorized force of 1,153 personnel assigned to the various functions and divisions of the organization. The International Association of Firefighters, Local 46, is the collective bargaining agent representing uniformed personnel. The Hawaii Government Employees Association, Unit 3, represents civilian employees of the organization. The table below shows the number of employees assigned to HFD administration as well as the Administrative Services Bureau (ASB).

Figure 2: HFD Administrative Staffing

HFD Administration Staffing	
Administration	34
Administrative Services Bureau	23

The administration of the HFD consists of 34 positions that assist the fire chief in the management and day-to-day operations of the department. Administration functions are delivered from a headquarters complex consisting of approximately 70,000 square feet of space on 1.6 acres of land. The complex includes a 31,750-square foot headquarters building, the HFD museum, the Kakaako Fire Station (which houses Engine 9 and Tower 9), and a 75-stall parking lot. The facility has the capability to absorb the administrative functions of the Department of Emergency Services through the relocation of the Fire Prevention Bureau to the adjacent office complex housing the HFD museum.

Administrative Services Bureau

The ASB consists of 23 personnel and provides administrative, personnel, logistic, and maintenance support to the operations of the organization. These duties include:

- Providing executive assistance to the fire chief.
- Providing administrative services for all personnel.
- Developing, reviewing, and controlling the department's budget.
- Serving as a liaison between other City departments, government agencies, and private organizations.
- Developing, implementing, and evaluating procedures, and organizational structure.
- Developing, implementing, and evaluating programs for personnel management, capital improvements, building and equipment maintenance, and property and supplies.

The ASB is headed by an assistant chief (AC) whose staff includes two battalion chiefs (BC), two fire captains, an administrative services officer, a human resource specialist, a safety specialist, a personal assistant, and a pool of clerical support staff. The ASB oversees HFD's operating budget; property and inventory; personnel administration; and the administration of safety and health-related programs, such as the Drug and Alcohol Program and the Infectious Disease Program. HFD's Capital Improvement Program and Community Development Block Grant funds are also under the purview of this bureau.

The ASB also oversees the operations of the Vehicle Maintenance Facility, the Occupational Safety and Health Office (OSHO), and the Storeroom.

The Vehicle Maintenance Facility, co-located with the department's storeroom, repairs and maintains HFD's fleet of firefighting apparatus: 75 firefighting pumpers, 10 aerial ladder trucks, 6 quints, 21 specialty apparatus, 4 rescue apparatus, 2 hazardous materials response vehicles, 11 tankers, 2 aerial tower apparatus, a 110-foot fire boat, watercraft, and approximately 78 auxiliary vehicles. The mechanic shop also repairs and maintains over 30,000 pieces of equipment and tools, ranging from rescue power tools and fire hoses to hand lights. Other types of critical services provided by the mechanic shop include specialty design and fabrication of custom accessories for fire fighter equipment, apparatus and annual pump testing, aerial ladder testing, and ground ladder testing for fire-fighting apparatuses.

The Mechanic Shop staff consists of a fire equipment superintendent, a fire equipment repair supervisor, three lead fire equipment mechanics, an automotive repair assistant, a parts technician, a small engine mechanic, eight fire equipment mechanics, and a senior clerk-typist. Space is currently available to house vehicle maintenance functions for the emergency services department; however, an initial investment of approximately $100,000 would be required to make the space functional.

The Occupational Safety and Health Office is responsible for safety and health programs. The OSHO reviews and revises policies, procedures, and programs to ensure the safety and health of HFD personnel. It also establishes new safety and health programs to maintain compliance with applicable federal, state, and local safety laws to meet the growing needs of the department.

The Storeroom is the department's central warehouse where equipment and supplies are received, stored, and distributed. Three personnel staff the storeroom and are responsible for purchasing, record keeping, warehousing, and distribution of supplies and equipment. The current facility has sufficient space to warehouse emergency services equipment and supplies.

Operations Section

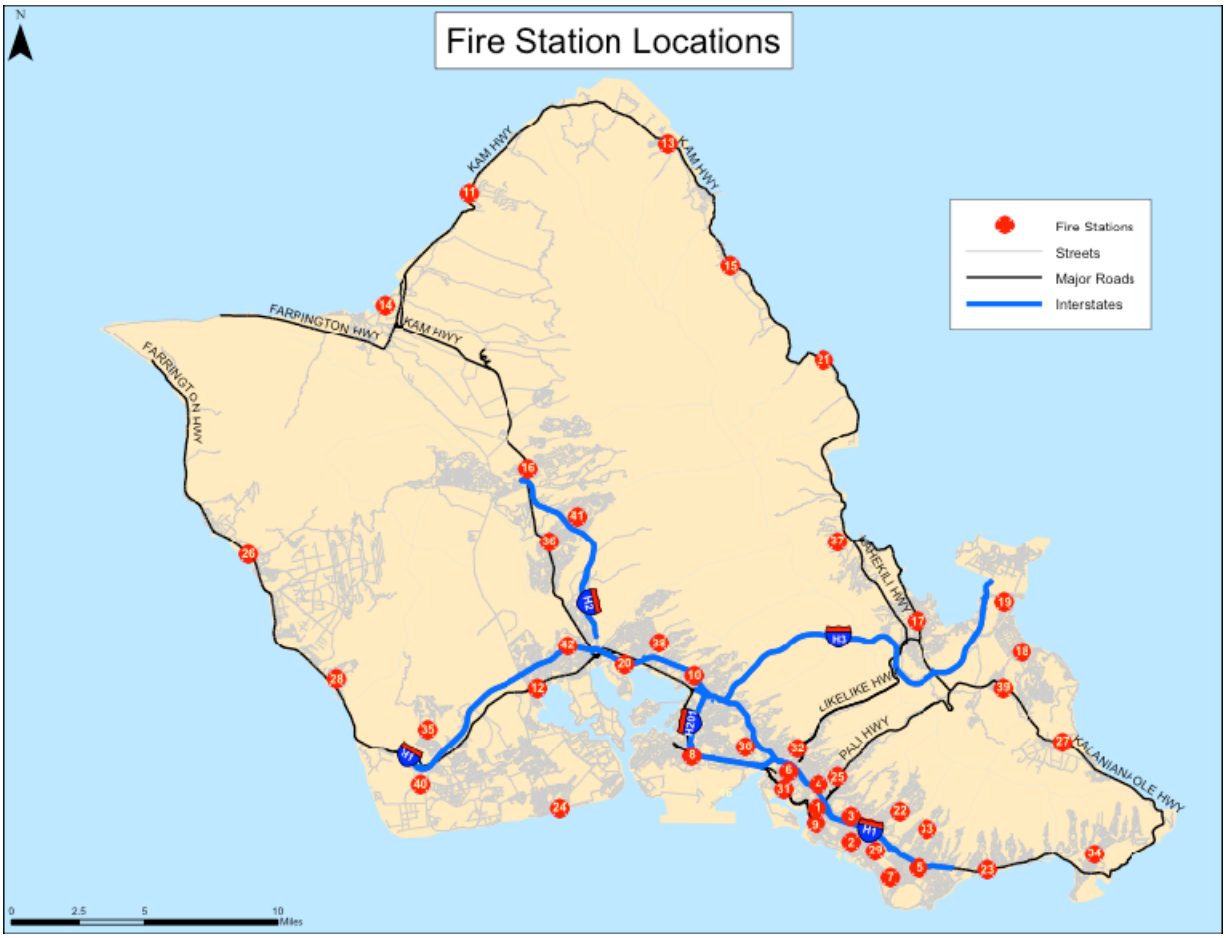
Operations staff consists of approximately 1,007 personnel. The section is under the direction of an AC and is divided into three platoons (a platoon is the complement of fire personnel on any given day). The total number of companies in a platoon is 42 engines, 13 ladders or quints, 2 rescues, 2 hazardous materials units, 2 towers, 1 fireboat, 5 water tenders, 2 helicopters, and 1 helicopter tender. Each platoon is divided into five battalions, each headed by a battalion chief (BC). Each BC oversees approximately 12 companies. Fire Operations accounts for the majority of the activity in the Honolulu Fire Department.

Figure 3: HFD Unit Staffing

HFD Unit Staffing—Number of Personnel per Unit						
	Captain	FF3	FF2	FF1	Total	# Units
Engine Company	1	1		3	5	42
Ladder Company	1	1	1	2	5	7
Tower Company	1	1	1	2	5	2
Quint Company	1	1	1	2	5	6
Rescue Company	1	1	3		5	2
Haz-Mat Company	1	1	3		5	2
Tanker Company	1	1		3	5	5

HFD operates from 42 fire stations strategically located throughout the Island of Oahu. Stations are located based upon a comprehensive risk analysis designed to ensure that staff and units can respond within prescribed time limits to major fire events. The map that follows shows the locations of fire stations on the island.

Figure 4: Oahu Fire Station Locations



Of the 42 stations, 13 currently house or have ambulances co-located within the fire stations. HFD facilities staff estimates that an additional seven stations have the capacity to add ambulance units.

Figure 5: HFD Facilities and Unit Deployment

HFD Facilities and Fire Apparatus Assignments									
		Fire Companies assigned by Station							EMS
		Engine	Ladder	Rescue	Quint	Tower	Tanker	Haz Mat	Amb.
Facility	*Name*	*All fire apparatus operate on a 24-hour shift schedule*							
Sta. 1	Central	E-1							
Sta. 2	Pawaa	E-2	L-2	R-1					
Sta. 3	Makiki	E-3							
Sta. 4	Kuakini	E-4	L-4						
Sta. 5	Kaimuki	E-5	L-5						
Sta. 6	Kalihi	E-6							
Sta. 7	Waikiki	E-7	L-7						M5
Sta. 8	Mokulele	E-8							
Sta. 9	Kakaako	E-9				TW-9			
Sta. 10	Alea	E-10							
Sta. 11	Sunset Beach	E-11							
Sta. 12	Waipahu	E-12			Q-12		T-12		M10
Sta. 13	Kahaku	E-13							M13
Sta. 14	Waialua	E-14							M6
Sta. 15	Hauula	E-15					T-15		
Sta. 16	Wahiawa	E-16					T-16		M12
Sta. 17	Kaneohe	E-17	L-17						M4
Sta. 18	Kailua	E-18			Q-18				M3
Sta. 19	Aikahi	E-19							
Sta. 20	Pearl City	E-20							
Sta. 21	Kaaawa	E-21							
Sta. 22	Manao	E-22							
Sta. 23	Wailupe	E-23							M8
Sta. 24	Ewa Beach	E-24							
Sta. 25	Nuuna	E-25							
Sta. 26	Waianae	E-26			Q-26		T-26		M7
Sta. 27	Waimanalo	E-27							M9
Sta. 28	Nanakuli	E-28					T-28		
Sta. 29	McCully-Moililili	E-29	L-29						
Sta. 30	Moanalua	E-30	L-30						
Sta. 31	Kalihi Kai	E-31			Q-31				
Sta. 32	Kalihi Uka	E-32						HM1	
Sta. 33	Palolo	E-33							

HFD Facilities and Fire Apparatus Assignments									
		Fire Companies assigned by Station							EMS
		Engine	Ladder	Rescue	Quint	Tower	Tanker	Haz Mat	Amb.
Facility	*Name*	*All fire apparatus operate on a 24-hour shift schedule*							
Sta. 34	Hawaii Kai	E-34			Q-34				M15
Sta. 35	Makakilo	E-35							
Sta. 36	Mililani	E-36							
Sta. 37	Kahaluu	E-37							
Sta. 38	Waiau	E-38			Q-38				
Sta. 39	Olomana	E-39							
Sta. 40	Kapolei	E-40				TW-40		HM2	M16
Sta. 41	Mililani Mauka	E-41		R-2					
Sta. 42	Waikele	E-42							

Denotes facilities that currently have ambulances co-located.
Denotes facilities that have the capacity to house ambulances.

Planning and Development

Under the direction of an assistant chief (AC), Planning and Development (P&D) assists the fire chief and deputy fire chief by coordinating the department's overall short and long-term planning and operational and quality improvement processes. P&D reviews, researches, and monitors emerging national, state, and City and County of Honolulu (City) legislation, regulations, trends and events, and past department performance to establish goals and objectives necessary to realize the organization's mission.

P&D develops and maintains other critical department plans, which include emergency operations/disaster plans, Standards of Response Coverage plans, deployment and risk mitigation plans, and preparedness strategies. The AC of P&D is the department's liaison for interagency coordination with the City's Administration, Department of Emergency Management (DEM), and the Hawaii State Civil Defense on island-wide and statewide issues.

P&D monitors and evaluates the Records Management System (RMS) and recommends improvements to enhance the department's data collection and reporting processes. A management analyst conducts statistical analyses on all aspects of the department's operations and establishes benchmarks and performance measures to ensure that goals and objectives are achieved. P&D also researches and develops new programs and evaluates existing programs and services, such as interoperable voice and data communications, the RMS, and its geographical information system to improve department efficiency and effectiveness.

Support Services

Under the direction of an assistant chief, Support Services, consisting of 88 employees, manages and coordinates the Fire Prevention Bureau (FPB), Communications, and the Training and Research Bureau (TRB).

Fire Prevention Bureau

The FPB's mission is to effectively promote fire and life safety programs that assist the Honolulu Fire Department (HFD) in mitigating loss of life and property and damage to the environment. Hawaii State law and the Charter of the City and County of Honolulu (City) assign the following fire prevention responsibilities to the fire chief:

- Review and adoption of the fire code
- Conduct fire code compliance inspections
- Investigation of fires to determine origin and cause
- Review of building construction fire plans
- Provide fire safety education to the community

The fire chief fulfills these responsibilities through the efforts of the FPB, which is staffed with 34 uniformed employees and 2 civilians. The FPB is organized functionally into the following sections: Administration, Codes Enforcement, Fire Investigations, and Plans Checking.

Training and Research Bureau

The TRB is located at the Charles H. Thurston Training Center and assists with planning, coordinating, and evaluating HFD's training activities. The TRB conducts new and continuous research and testing on the latest technology and techniques in the areas of weapons of mass destruction, terrorism, hazardous materials, firefighting, water safety, driver training, apparatus operation, emergency medical response, etc. to assist personnel in accomplishing the Department's mission. The TRB also coordinates cardiopulmonary resuscitation training and other safety courses for city employees and the public. A master plan has been developed for the Training Center capable of meeting the training needs of a consolidated organization.

Communications

The HFD operates the fire communications center with responsibilities for dispatching all fire service resources to emergency events received. Calls are transferred to the fire dispatch center from the primary PSAP (911 Center) operated by the Honolulu Police Department. In addition, calls are received from the EMS dispatch center when first responder units are required for emergency medical services events.[7]

[7]A comprehensive analysis of the Communication Centers is provided as an appendix to this report.

Compensation

The Honolulu Fire Department participates in the City/County of Honolulu compensation plan. Job descriptions and position classifications have been developed for all personnel within the organization.

Figure 6: HFD Pay Classification

Human Resource Pay and Classification System - Fire		
Class	Class Title	Monthly Salary
SR 15	Firefighter Recruit	$3,546
SR 17	Firefighter I	$3,835 - $5,045
SR 19	Firefighter II	$4,146 - $5,458
SR 21	Firefighter III	$4,485 - $5,902
SR 25	Fire Captain	$5,247 - $6,904
SR 26	Fire Helicopter Pilot	$5,458 - $7,181
SR 27	Senior Fire Helicopter Pilot	$5,674 - $7,468
EM 05	Battalion Fire Chief	$6,586 - $9,799
EM 08	Assistant Fire Chief	$7,620 - $11,345

HFD Financial Structure

The HFD authorized budget for FY 2011 is approximately $101,551,055 and is allocated to various functions and programs within the organization.

Figure 7: HFD Budget, 2009 - 2011

Honolulu Fire Department Consolidated Budget			
	2009	2010	2011
Total Fire Administration Budget	$2,676,413	$2,953,919	$2,771,533
Total Fire Operations Budget	71,358,385	79,504,204	80,452,729
Total Fire Prevention Budget	3,242,136	3,658,485	3,392,310
Total Fire Communications Budget	1,899,142	2,242,033	2,222,575
Total Fleet Maintenance Budget	1,980,776	2,043,168	1,946,149
Total Training and Research Budget	1,895,827	2,299,601	1,988,573
Total Radio Shop Budget	294,929	282,450	270,653
Total Fireboat Budget	1,565,984	3,216,515	1,951,185
Total Radio City Budget	195,388	241,065	156,362
Total APEC Budget	--	--	4,765,285
Total Vacant Position Budget	--	--	1,618,844
Total HFD Budget	$85,111,680	$96,449,159	$101,551,055

Honolulu Emergency Services Department

The City of Honolulu has a long history of providing ambulance service on the island. Emergency ambulance transportation began in Honolulu in 1916 when the Honolulu Police Department started the

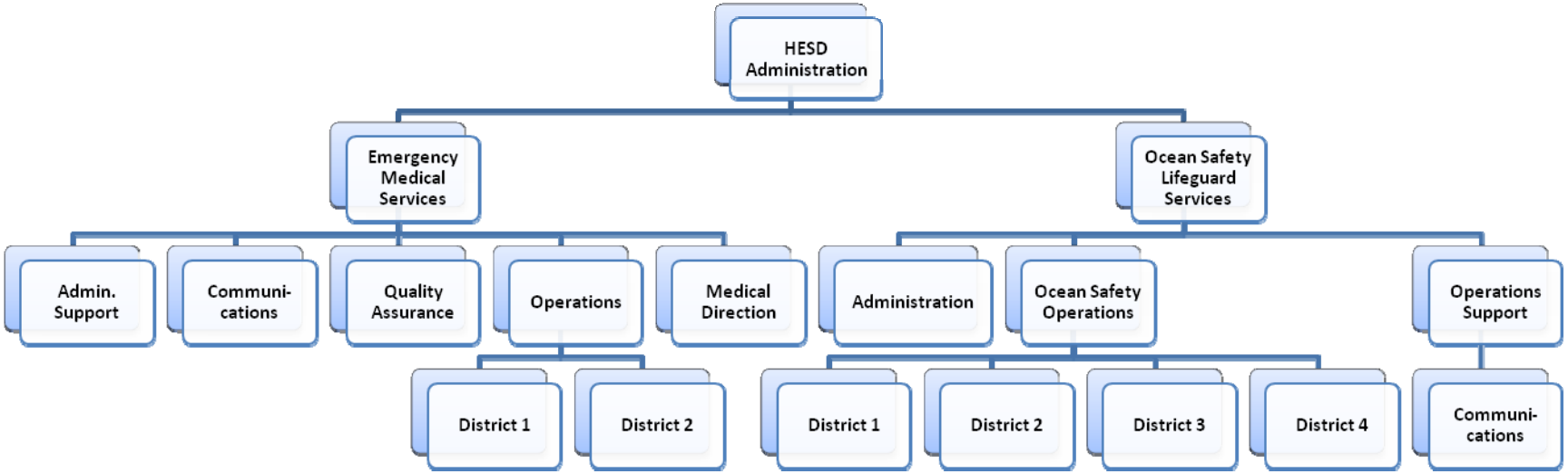
city's first ambulance service. The Department of Health took over the service with limited operations in 1917 and began around-the-clock service in 1931. The service began training its first EMTs in 1971 after the Hawaii Medical Association received a funding grant for EMT training. That initial training provided EMTs with more than 400 hours of basic training—a standard that would begin a process that would provide basic EMTs with significantly more training than was standard on the mainland.

In 1971, the City began providing medical communications between medical personnel and physicians. In 1975, the Hawaii Medical Association established the Mobile Intensive Care Technician (MICT) program, training paramedics for medical services throughout the islands. The department began a program of co-response with the Honolulu Fire Department in 1976. This helped to bring aid to the sickest patients in the shortest period of time. The departments developed a Standard Ambulance Report Form to aid in data collection.

In 1997, the Honolulu Emergency Services Department was transferred from the Department of Health into a stand-alone department and the Ocean Safety Lifeguard Services Division was added (after being transferred from the Parks and Recreation Department).

The Honolulu Emergency Services Department consists of two organizational units: the Ocean Safety Lifeguard Services Division and the Emergency Medical Services Division. The Director of HESD, Dr. James Ireland, is appointed by the Mayor and confirmed by the Honolulu City Council. The following figure describes the organization of HESD, including the EMS and Ocean Safety Divisions.

Figure 8: HESD Organization Chart



The HESD coordinates the activities between the agencies within the department and with other City, State, Federal, and private organizations. The department's administration staff is responsible for providing appropriate support services that allow the agencies to function effectively. It also develops programs and delivers services related to emergency medical care ambulance services, ocean safety services, and during times of disaster or emergency events.

Figure 9: HESD Administrative Staffing

HESD Administration			
Staffing			
Administration	Shifts	Positions	Total
Director	1	1	1
Deputy Director	1	1	1
Administrative Assistant	1	1	1
Office Staff	1	1	1

The HESD, through the EMS Division budget, operates a leased administrative facility located in an industrial complex adjacent to the Honolulu International Airport. Co-located within this facility is the department's emergency communications dispatch center; support services functions, including space for minor vehicle maintenance; storeroom for supplies and equipment; as well as classroom space for training and instruction. The department expends approximately $400,000 per year for its leased space, including funding for co-located ambulances at fire stations.

HESD Budget

The HESD budget does not reflect approximately $2,460,732 in salaries for vacant positions that were not filled during FY 2011.

Figure 10: HESD Budget by Division

HESD Budget	
Division	2011
HESD Administration	$354,552
EMS Division	22,156,752
Ocean Life Safety	7,874,049
Total HESD Budget	$30,385,353

Emergency Medical Services Division

The Emergency Medical Services Division has the primary responsibility for ambulance service and for ensuring that the City and County of Honolulu comply with the requirements of the ambulance service contract with the State of Hawaii Department of Health. Those requirements include:

- Public access to emergency services through telephone communication, through a single seven-digit number or an emergency 9-1-1 telephone number.

- Central dispatch to expedite emergency medical services and assist in the coordination of emergency services.
- Coordination with emergency medical services' activities of public safety agencies and with the public to provide first response assistance to emergencies, including disaster situations.
- Emergency ambulance vehicles in compliance with section 11-72-45, Hawaii Administrative Rules.
- A communications system consisting of a 9-1-1 or similar system for receiving and referring calls for emergency service from the public, a central dispatch system for dispatching and coordinating emergency medical personnel and vehicles, and a telecommunications system for coordination of medical communications between emergency medical services personnel and emergency physicians.
- Prescribed pre-hospital standing orders for the guidance of trained advanced life support personnel.
- Quality assurance control of the emergency medical services system.
- The identification of the readiness and capabilities of hospitals and their staffs to adequately, expeditiously, and efficiently receive and treat emergency patients.

The EMS Division has a division chief as the administrative head of the department assisted by two assistant chiefs. The agency head reports to the Deputy Director of the Emergency Services Department. The EMS Division accomplishes its mission of providing emergency medical services care and transport through the provision of 19 ambulance units and two quick response units organized under two geographic districts. Supervisors are assigned to each shift and each district to provide administrative support and supervision of ambulance service personnel. All ambulance units are designated as advanced life support (ALS) units, meaning they are staffed by a minimum of two people. Emergency Medical Technicians (EMT) are trained in basic life support. Mobile Intensive Care Technicians (MICT) are trained and authorized to perform advanced life support and invasive medical techniques. To maintain their licenses from the State of Hawaii Board of Medical Examiners, paramedics (also referred to as MICTs) must attend at least 72 hours of retraining and continuing medical education courses every two years.

The following chart delineates the composition of the current workforce. Personnel assignments are based on a senior bidding process authorized under a collective bargaining agreement. The United Public Workers Union (UPW) Bargaining Unit 10 represents uniformed members of the organization.

Figure 11: HESD Staffing by Division

HESD EMS Division					
Staffing					
	Shifts	Positions	Total	Coverage Ratio	Total
Administration					
Chief of EMS	1	1	1		1
Assistant Chief - Operations	1	1	1		1
Assistant Chief - QA	1	1	1		1
Administrative Assistant	1	1	1		1
Office Staff	1	5	5		5
Total					9
Medical Director		0.75	0.75		0.75
Communications					
Communications Supervisor	1	1	1		1
Dispatchers	3	4	12	1.7	21
Scheduling Coordinator	2	1	2	1.7	4
TeleStaff Coordinator	1	1	1		1
Total					27
Field Operations					
Supervisors (2 Districts)	3	2	6	1.7	8
Ambulances (19)	3	2	102	1.7	195
Paramedics = 131					
Basic EMTs = 64					
Quick Response	2	1	4	1.7	7
Total					210
Support Services					
Safety and Health	1	1	1		1
Injury Prevention	1	1	1		1
Equipment Coordinator	1	1	1		1
Fleet Coordinator	1	1	1		1
Supply Coordinator	1	1	1		1
Utility Clerks	1	3	3		3
IT Specialists	1	3	3		3
Total					11
*Training Positions	2	10	20		20

**The HESD maintains a roster of 20 personnel for training positions; these positions remain vacant unless there is a need to send staff to paramedic school.*

Field operations for the emergency medical services division are conducted from fixed facilities located throughout the island, including 13 fire stations, several medical institutions, and stand-alone EMS facilities.

The organization uses a combination of personnel to staff the ambulances and quick response units. The staffing model is predicated on the contract with UPW, which focuses on maintaining two paramedics and one EMT on each unit. However, the minimum required staffing per the state contract is one MICT and one EMT. The organization utilizes a staffing model consisting of eight-hour shifts for all transport units. The agency also deploys two quick-response vehicles on a 16-hour staffing schedule. Operational supervision is provided through two district supervisors assigned to each eight-hour shift.

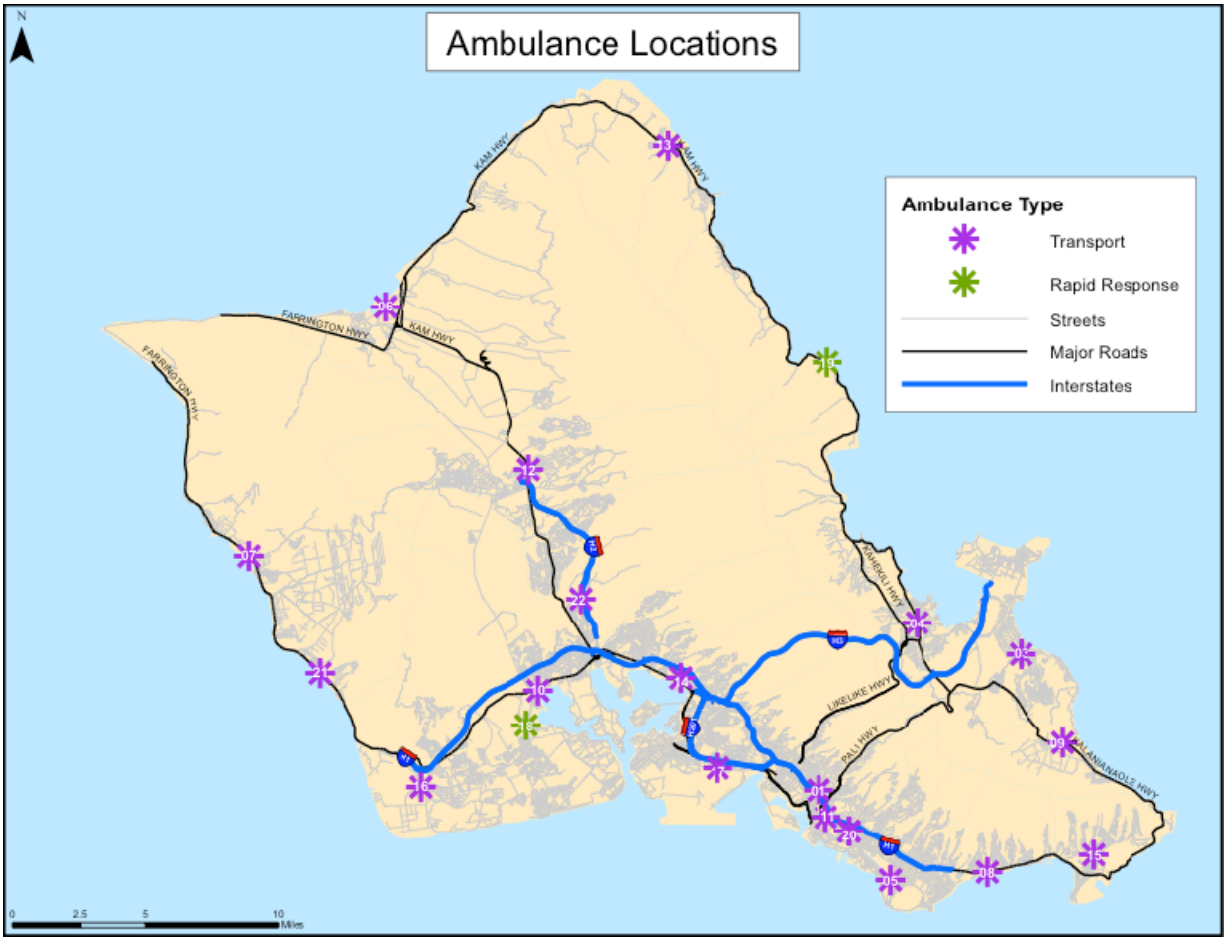
Figure 12: HESD Emergency Medical Unit Staffing

Emergency Medical Unit Staffing Per Shift		
Unit Type	MICT	EMT
Ambulance	2	1
Quick Response Vehicle	1	

The organization maintains a front line fleet of 19 ambulances and approximately 18 reserve units, reflecting a 1:1 ratio of backup capability. Part of the rationale for maintaining a high back-up ratio is the recognition that the island must be self-sufficient given the relative absence of additional mutual aid resources. The front-line fleet has an average of 34,120 miles. Seven additional new units are expected in preparation for the Asia Pacific Economic Conference (APEC) scheduled for later this year. In addition to its ambulance fleet, the department has approximately 17 additional staff vehicles and 7 specialty use trailers.

Ambulances are distributed around the island to provide coverage to both meet response requirements and to cover territory. In addition to ambulances, the service fields two rapid response vehicles (also referred to as quick response vehicles or QRVs) to cover more rural areas when and where ambulances are not available. The rapid response vehicles are staffed by a single paramedic. The map that follows shows the deployment of ambulances and rapid response vehicles throughout the island.

Figure 13: Ambulance and Rapid Response Unit Locations



The Division of Emergency Medical Services operates its own communications center with responsibilities for dispatching ambulance resources to emergency medical calls received via the primary PSAP (911 Center) operated by the Honolulu Police Department. In addition, calls are received from the fire dispatch center when units are required for other emergency services events. The cost for providing emergency medical dispatch and communications is estimated to be approximately $1,821,910.

Compensation

The Honolulu Emergency Services Department EMS Division participates in the City/County of Honolulu compensation plan. Job descriptions and position classifications have been developed for all personnel within the organization.

Figure 14: HESD Pay and Classification

Human Resource Pay and Classification System - EMS		
Class	Class Title	Monthly Salary
AM 01	EMT Trainee	$3,104 - $3,759
AM 03	EMT I	$3,347 - $4,079
AM 05	EMT III	$3,617 - $4,420
AM 07	EMS Support Tech	$3,911 - $4,805
AM 09	MICT I (Paramedic)	$4,242 - $5,233
AM 10	MICT II (Preceptor)	$4,420 - $5,449
AM 12	MICT III (Working Sup)	$4,805 - $5,932
AM 14	EMS Field Supervisor	$5,223 - $6,472
EM 05	Assistant EMS Chief	$6,586 - $9,799
EM 08	Chief of EMS	$7,620 - $11,345

Ocean Safety Lifeguard Services Division

The Ocean Safety Lifeguard Services Division has a long history of providing near-shore lifesaving services for the island of Oahu. The City Charter gives the Department of Emergency Services the responsibility to be the "primary responder to emergencies arising on the beach and in the near shore waters".[8] The OSLD, together with the fire department, provides ocean rescues on the island—the fire department providing deep-water rescues and the OSLD providing near-shore rescues. However, the OSLD is generally considered to be the expert in ocean rescues of all types.

The Ocean Safety Lifeguard Services Division deploys staff and resources utilizing 38 fixed lifeguard towers as well as 14 mobile backup units. The agency deploys these resources based on a predictive pre-deployment model developed by the agency. Approximately 198 miles of shoreline have been segmented to produce a quantitative response matrix that utilizes lifeguard response times as well as shore topography, wind speeds, surf conditions, peak utilization, and seasonality to determine concentration ratio as well as fixed deployment sites for staff and resources. The organization operates generally only during daylight hours and lifeguard stations are closed during evening and nighttime hours. The organization has an authorized staff of 178 personnel.

Operationally the OSLD allocates staff to four districts, including District 1- Honolulu, District 2 – Windward, District 3 – North Shore, and District 4 – Leeward. Similar to the EMS Division, OSLD operates on an eight-hour shift schedule and utilizes district supervisors to provide administrative support for ocean safety personnel.

Ocean Safety plays a large role in public relations and education at the beaches for locals and tourist. At the individual towers, public relations range from providing map directions, band-aids, beach information, current water hazards, and fixing problems with beach restrooms. The staffed lifeguard

[8] City of Honolulu City Charter, Chapter 6, Section 6-603.

towers are likened to the patrol beat officer, or community policing. They are an EMS first responder, but also a 'go to' person for locals and tourists alike for a wide variety of questions, issues, and information. During a water rescue, Ocean Safety attempts to backfill the tower providing constant radio communications and ongoing monitoring for beach safety.

The service prides itself in its prevention and public education efforts. Each of the lifeguard personnel receives specialized training in public education and preventing water safety incidents. In 2009, OSLD provided services at more than 90,000 first aid events, 567 surfing incidents, 1,900 water rescues, and 3 drownings. In addition, the service made more than 525,000 public contacts for the purposes of preventative services.

Figure 15: Location of Lifeguard Stations

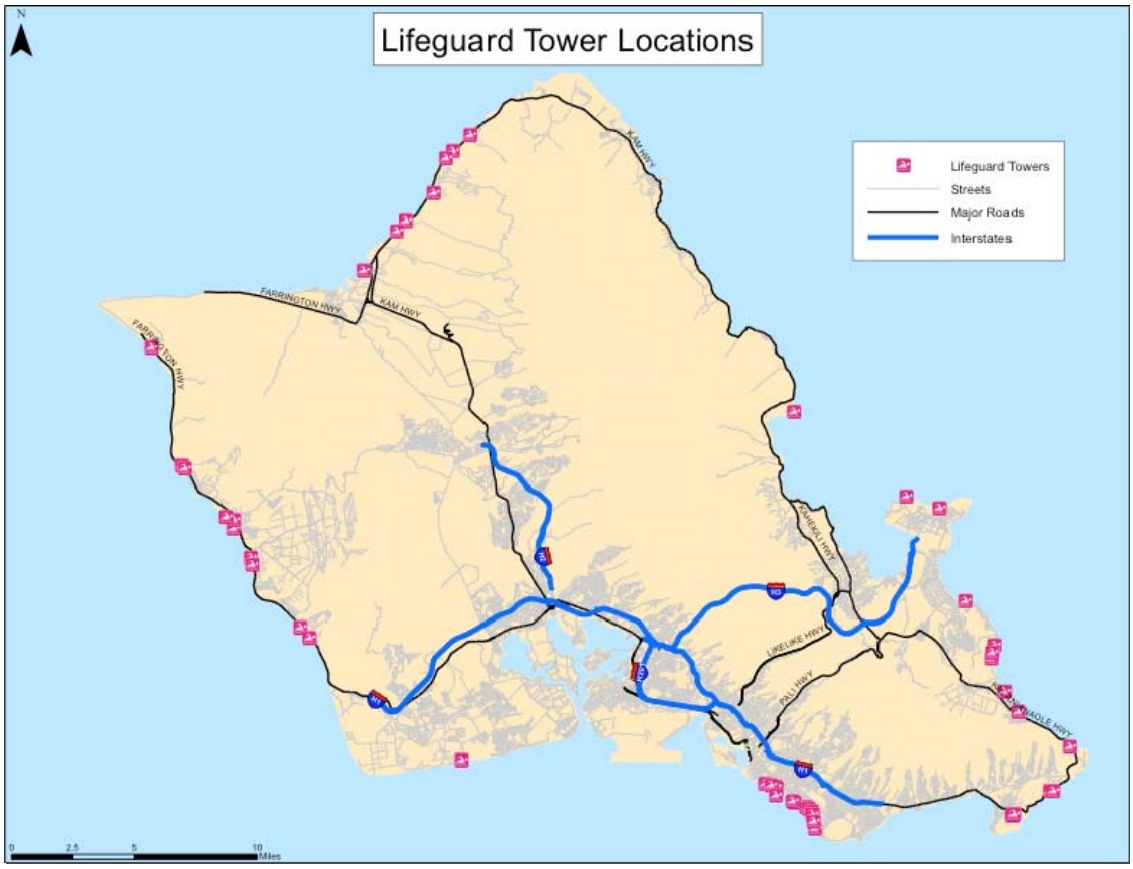


Figure 16: Ocean Safety Budget

Ocean Safety Lifeguard Division Budget	
Category	FY 2011
Salaries	$7,140,516
Vacant Position	--
Current Expenses	709,533
Equipment	24,000
Total OSLD Budget	$7,874,049

Communications

While not an official PSAP within the E-911 Communications System, the OSLD operates a communication center utilizing three water safety officers. The center is separate from the fire and EMS dispatch centers. While the center does not receive 9-1-1 calls from the public, the dispatchers at the communications center will assist in coordinating resources during ocean rescues.[9]

Compensation

The Honolulu Emergency Services Department EMS Division participates in the City/County of Honolulu compensation plan. Job descriptions and position classifications have been developed for all personnel within the organization.

Figure 17: OSLD Pay and Classification

Human Resource Pay and Classification System – Ocean Safety		
Class	Class Title	Monthly Salary
SR 15	Water Safety Officer Trainee	$2,813 - $4,328
SR 17	Water Safety Officer I	$2,813 - $4,328
SR 19	Water Safety Officer III	$3,290 - $5,062
SR 21	Water Safety Officer IV	$3,557 - $5,482
SR 26	Water Safety Officer V	$4,328 - $6,666
EM 07	Ocean Safety Administrator	$7,259 - $10,803

State of Hawaii

The State of Hawaii has a centralized planning and EMS system administration process that is managed and overseen by the Hawaii State Department of Health. By administrative rule (11-71-8), the Department of Health is required to

> *…establish, administer, and maintain the state comprehensive emergency medical services system, which shall consist of the emergency medical services systems in the counties of Hawaii, Maui, Kauai, and the city and county of Honolulu.*

[9] More information on the dispatch function for Ocean Safety can be found in Appendix B

The state applies the following criteria in the development and administration of each county's EMS system:

- Consideration of the entire county and all its residents in providing emergency medical services.
- Application of emergency medical services component standards throughout the county in determining needs and setting priorities.
- Delineation of administrative responsibility for system implementation of specific components within a system.
- Standardization of emergency medical services throughout the counties insofar as possible.
- Development of budget and implementation schedules to reflect existing and future resources and expenditures.
- Accessibility to emergency medical services as required by the state comprehensive emergency medical services system to all individuals regardless of the ability of the individual to pay therefore or of the lack of prepaid health care coverage or proof of such ability or coverage.

As part of these criteria, the state requires that the EMS plan for a county delineate administrative responsibility for implementing specific system components. Within the City/County of Honolulu multiple divisions of the city are given different levels of authority for components of the system.

The State of Hawaii exercises significant local control over ambulances in the state, but provides less oversight over first response agencies. Ambulance services, including personnel, staffing, equipment, supplies, communications, and other factors are determined contractually by the state. The Department of Health determines the appropriate minimum ambulance deployment for each county in the state. However, first response agencies are not so regulated. The state requirements for first response agencies are much more limited.

The State Department of Health establishes rates for ambulance services, submits fees for services to patients and insurance companies and establishes contracts with local ambulance providers for services. Hawaii also establishes the EMS system plan for the county and identifies critical components that all plans must meet prior to approval.

Figure 18: State of Hawaii Authority for EMS Regulation

Hawaii Ambulance and EMS Regulations		
EMS Component	Regulated by	Authority
EMS systems	Hawaii Department of Health (State and County EMS Systems)	HRS 321-226
EMS system planning	Hawaii State EMS Advisory Committee	HRS 321-233; HAR 11-72-8
Authority to provide ambulance service	Hawaii Department of Health	HRS 321-223; HRS 224; HAR 11-72-43
Ambulance service regulation	Hawaii Department of Health	HRS 321-224; HRS 321-227; HAR 11-72-43
Paramedic and EMT training	Hawaii Department of Health	HRS 321-229; HRS 453
Paramedic and EMT certification	Hawaii Department of Health	HRS 453
Medical scope of practice	Hawaii Department of Health	HRS 453-33
Physician oversight	Hawaii Department of Health	HRS 321-228; HAR 11-72-10
Ambulance equipment	Hawaii Department of Health	HRS 321-227; HAR 11-72-55
Dispatcher standards and training	Hawaii Department of Health	HRS 321-224
Reporting and data requirements	Hawaii Department of Health	HRS 321-230

Hawaii statutes give the state substantial control over local EMS system design and planning. Operational management of the factors of production for emergency medical services is overseen by the City and County of Honolulu through the HFD and HESD. The management structure of the City and County of Honolulu is clear, as is the management structure of the State of Hawaii. There may be some areas of interaction between the state responsibilities and the local responsibilities. The state provides critical EMS system functions in addition to simply regulating ambulances and EMTs. For example, the State of Hawaii manages all of the billing for ambulance transport and then pays contracted ambulance agencies for services rendered.

The State of Hawaii has the statutory responsibility to develop a statewide EMS system plan. In doing so, the Hawaii Department of Health is required to develop county EMS plans contain specific components (see Hawaii Administrative Rules 11-71-8-B).

The county plans from each of the counties of Hawaii, Kauai, Maui, and the city and county of Honolulu are developed to support and align with the state EMS plan. By rule, the Hawaii Department of Health establishes, administers, and maintains the state's comprehensive EMS systems.

The State of Hawaii requires county plans to "delineate administrative responsibility for overall system implementation of specific components within a system…" As such, it appears that a single thread of

authority and responsibility flows from the state legislature to the Department of Health and to the counties through the county plans for emergency medical services.

The State Department of Health is provided funding from the State Legislature through the General Fund for the delivery of pre-hospital health emergency care. The agency contracts with counties and/or private entities to deliver patient care and ambulance transport. Funding allocated to these contracts has been stable over the last several years; the public safety agencies, including the Honolulu City/County HESD EMS, were spared from budget cuts and mandated furloughs experienced by other government employees. Although exempt from many of the recent budget cuts resulting from the recession, system participants recognize the fiscal challenges that lie ahead as a result of a continued difficult economic environment. In addition, revenues generated from patient transports are subject to being impacted by the changing national healthcare landscape as well as financial pressures facing the Medicare program.

Hawaii Revised Statutes (321-225) establish a state EMS advisory committee that is charged with providing advice and recommendations on all matters related to the state EMS system. As the state system is comprised of the four county systems, the committee advises the Department of Health on county EMS system components as well. By statute, the EMS Advisory Committee is charged with the following:

- Monitor, review, and evaluate on an ongoing basis the operations, administration, and efficacy of the state system, or any components thereof, to determine conformity with and maximum implementation of this part.
- Prepare and submit periodic assessments, reports, and other documents relating to the state system to ensure the implementation of this part, as deemed necessary or desirable in the discretion of the advisory committee.
- Seek the input of the public in relation to the state system to ensure adequate fulfillment of the emergency medical services needs of the state consistent with this part.
- Participate in any planning or other policymaking with regard to the state system and seek the participation of the public, including subarea health planning councils, in its consideration of plans and policies relating to the state system.
- Perform other functions, and have other duties necessary to ensuring the fullest implementation and maintenance of the state system.

Advise the department of health in formulating a master plan for emergency medical services, including MediCom, the "911" system, and other components necessary to meet the emergency medical needs of the people of the State which shall be submitted to the legislature.

While the statute does not clearly specify medical issues nor does it specify activities at the county level, it appears that the legislature intended the advisory committee to have broad authority to make recommendations—including recommendations in local areas and recommendations regarding medical issues.

Current EMS System Design

EMS System Governance and Oversight

In November 2006, Honolulu citizens passed a city charter amendment that revised the responsibilities of both the Honolulu Emergency Services Director and the fire chief. Section 6-603 of the City Charter now states that the Emergency Services Director is responsible as the "primary" provider of emergency medical care, while Section 6-1004 specifies that the fire chief is responsible to provide emergency medical care. The charter identifies the Emergency Services Director as the primary "responder" to beaches and near-shore areas while the fire chief is responsible for responding to emergencies on the sea and on hazardous terrain.

Both the fire chief and the emergency services director report to the managing director of the City and County of Honolulu; therefore, the system is largely overseen by a single agency. However, both of the departments operate with substantial autonomy, resulting in fragmentation of certain elements within the system. A merger of the organizations would resolve the primacy of administrative responsibility for the delivery of emergency medical services.

The Emergency Services Department holds the primary license for ground ambulance transport on Oahu. AMR (American Medical Response) holds an ambulance license and provides back-up services and inter-hospital transfers. In addition to HESD EMS and AMR, federal installations provide their own ambulance transport services and are exempted from the state's regulatory authority.

Critical Issue:

Will the state continue to fund the system at the current levels if the fundamental structure of the system is changed?

Impact:

The State Department of Health contracts with the City/County of Honolulu for the provision of emergency medical services. Within the context of the contract the State defers to the City/County in determining the organizational structure to deliver those services. It is within the purview of the City/County to merge the organizations into single consolidated agency. There is no requirement to seek administrative authority from the state to merge the organizations. However, there is also no guarantee that the state will fund the EMS system at the current levels or that the state will even provide any significant funding if the State Department of Health does not believe that the proposed changes will improve response performance, improve medical outcomes, or reduce costs.

EMS System Planning

Comprehensive EMS Plan

While both of the agencies (HFD and HESD) have different approaches to strategic planning, neither has established an overarching plan for the EMS system. Both have some planning components that involve the entire EMS system, but strategic planning goals for the agencies are primarily focused on the individual agencies.

HFD has established a Master Strategic Plan for the services provided by the fire department. That plan is the result of a significant effort by the senior leadership team of the fire department with input solicited from the Hawaii Firefighters Association. As part of that process the fire department confirms its commitment to save lives, property, and the environment through services provided on both the land and sea. One part of that plan considers the potential for a merger between the Honolulu Emergency Services Department, including Ocean Safety, and the Honolulu Fire Department.

HFD's Master Strategic Plan incorporates a number of components that impact the provision of EMS although the nature of comprehensive EMS system planning has not been considered by HFD. The following table describes the components of HFD's strategic plan and how those components will affect associated components in the ambulance service.

Figure 19: HFD Strategic Plan, EMS Considerations

HFD Strategic Objectives and Considerations for EMS			
Section	Term	Objective	EMS Consideration
Assessment and Planning	Medium	Improve the Department's response times.	Could link with ambulance times.
Assessment and Planning	Medium	Improve RMS (records management system)	RMS system is independent of ambulance reporting.
Financial Resources	Short	Develop the Rescue Watercraft (RWC) Program.	Ocean Safety has an in-place, structured watercraft program.
Financial	Medium	Fund upgrades to training facility.	Fire and ambulance training are independent.
Programs	Short	Plan for minimum staffing of operational units.	Ambulance integration could amend plan.
Programs	Short	Integrate natural disaster response plans.	HESD plans should be integrated.
Programs	Medium	Continue the Emergency Medical Technician-Basic (EMT-B)	A merger between HFD and HESD will change the dynamic of the EMT training program.
Human Resources	Medium	Review and update job descriptions.	A merger will require a rewriting of job descriptions within HFD.
Training and Competency	Short	Provide and support professional development and leadership training.	Leadership development planning will change in the event of a merger.

HFD Strategic Objectives and Considerations for EMS			
Section	Term	Objective	EMS Consideration
Essential Resources	Medium	Modernize the Fire Communications Center.	Modernization could include both communications centers.

HESD has no established internal strategic plan. . Instead, it relies on the state contract to establish its annual goals. . Those goals are created in the contexts of annual performance standards established by the state and a financial plan that is codified by statute, thereby allowing the state funding to manage the financial requirements of the service.

Considerations for how long-term changes to reimbursement at either the state or federal are not established by the ambulance service. . If changes are needed on an annual basis, the state and the ambulance provider negotiate to allow those changes. A long-term consideration of how implementing changes could affect the performance of the system in the in the future has not been formally considered by the HESD. HESD uses the following state requirements as its annual plan:

Figure 20: HESD State Requirements and Annual Plan

HESD Performance and State Requirements			
Number	Section	Type	Discussion
1	Medical Oversight	Provide medical direction.	Provides medical oversight
2	Medical Oversight	Medicom Required	Provides on-line medical control
3	Service Activities	Response Time compliance required	Requires urban, urban/rural, and rural response times.
5	Service Activities	Standing Orders	Sets minimum standing order requirements and compliance
6	Service Activities	Quality assurance	Establishes QA minimums
7	Districts and ambulances	Required locations and availability	Establishes locations for ambulances & hours of service
8	Districts and ambulances	Required vehicles	Requires Rapid Response Vehicles in specified locations
9	Ambulance personnel	Required Staffing	Requires 1 paramedic and 1 EMT staffing each ambulance
11	Ambulance personnel	Required record keeping	Requires maintenance of training records
12	Personnel	Operations Manager	Specifies qualifications

HESD Performance and State Requirements			
Number	Section	Type	Discussion
13	Personnel	Medical Director	Specifies qualifications and duties
14	Personnel	Injury Prevention Coordinator	Requires IPC with specified qualifications and duties
15	Quality Assurance	QA Program required	Requires quality program
17	Quality Assurance	Reports required	Requires quality reports
18	Quality Assurance	ePCR (electronic patient care report) review	Requires use, minimum data, and review of EPCR
21	Documentation	Reports required	Requires monthly workload reports to state
22	Documentation	Billing information	Billing face sheets must be submitted to state
26	Equipment	Ambulances required	25 vehicles (18 front line and 7 reserve) are required. 200k miles and 7 year limit on usage
27	Equipment	Rapid response vehicles required	Two rapid response vehicles required
30	Performance	Response Time	Two-minute out-of-chute interval required
31	Performance	Response Time	10-minute urban response time required @ 90%
32	Performance	Response Time	15-minute urban/rural response time required @ 90%
33	Performance	Response Time	20-minute rural response time required @ 90%
34	Performance	Response Time	60-minute response time required for non-emergent calls
36	Dispatch	Priority Dispatch	AMPDS required
37	Dispatch	Staffing	3-person minimum staffing required
38	Performance	Dispatch	60-second call processing intervals required

Despite the variances in the planning processes, the agencies jointly plan for emergencies. HFD, HESD, and the OSLD have implemented a Memorandum of Agreement (MOA) that describes the duties and

responsibilities of each of the agencies related to co-responses for emergency events.[10] The MOA was signed in 1997 and continues to be in place.

The EMS components (and all other components) of the HFD Master Strategic Plan is reviewed every six months, or sooner, as determined by the fire chief. Changes to the plan are made on a regular basis as components are completed and as new strategies or strategic goals and objectives are added.

The process for updating the HESD plan is based on reviewing and renegotiating changes to the state contract. HESD staff report that the state is willing to amend the contract if EMS staff can develop reasonable improvements.

Performance Data

Each agency has established a data collection process to assist in the evaluation of performance in the EMS system. The fire department uses its standard of cover document as the basis for evaluating performance and as the basic structure for collecting data. Using the standard of cover, the department analyzes response performance and compares that performance against baseline and benchmark data.

HESD performance is based on the state contract for ambulance service. To meet its performance requirements, the ambulance service collects its data using its WebCur records management system as well as the data provided by the dispatch center. WebCur data is used not only for evaluating response performance but also to measure call types and incident types and to collect other outcome data.

Data from multiple emergency services agencies is analyzed and evaluated to monitor the performance of individual components throughout the EMS system; however, there is no organized process to determine the response performance of the system as a whole.

The HFD has established a standard of cover that requires response time performance for fire, medical, and other emergencies in specific response time goals. For medical events, the fire department has a benchmark goal of arriving within 7 minutes in the urban areas, within 9 minutes in the suburban areas, and within 11 minutes in the rural areas. All of the response requirements are based on an 80 percent reliability standard. The clock starts when the unit is committed to the call and stops when the unit arrives on the scene.

HESD has not established a response time standard independent of the contractual requirements of the state agreement for ambulance service. The agreement requires an ALS response time of 10 minutes in the urban areas, 15 minutes in the urban/rural (suburban) areas, and 20 minutes in the rural areas. The contract requires a 90 percent reliability standard and establishes the time interval as beginning when the telephone is picked up in the HESD dispatch center and stops when the ambulance arrives at the scene of the incident.

[10] Memorandum of Agreement: Procedures for Co-Response of Water Safety and EMS Personnel, 1997.

The two agencies' response requirements are identified in the following table:

Figure 21: Fire and Ambulance Response Requirements

Response Requirements						
Agency	Urban (minutes)	Reliability	Suburban (minutes)	Reliability	Rural (minutes)	Reliability
HFD	7	80%	9	80%	11	80%
HESD EMS	10	90%	15	90%	20	90%

In addition to the response requirements, HESD is required by contract to meet call-processing time requirements and to meet out-of-chute time requirements. Appendix A of the contract between the State of Hawaii and HESD requires a call processing interval of 60 seconds or less and an out-of-chute performance of two minutes or less. ESCI believes that, although the contract is not entirely clear, the performance reliability for call processing and en-route intervals is also 90 percent.[11.]

ESCI evaluated both ambulance service and fire department performance based on dispatch data provided by the dispatch center. As part of that analysis, we made assumptions that caused outliers in the data (those outliers that we considered to be flawed or unreasonable were removed for the purposes of the analysis).[12] (See Appendix A of this report.)

Each agency evaluates data according to the performance requirements for that agency. HFD collects and reviews data on a very specific basis—by district, by unit, and battalion. The specifics of the data analysis include not only response time performance but also other components of response analysis including concentration, distribution, and reliability analysis.

HESD collects data related to the analysis of response time performance and reports on that performance. The agency also reports on employee vacancies, numbers of responses and transports, hospital admissions, chart completion times, and cardiac arrest statistics. The data is provided quarterly to the state and compared with previous reports to assist in evaluating trends in the system.

Quality Reports

The HESD quality manager provides reports to the State of Hawaii on a quarterly basis. The quality report provided by HESD includes a summary of various components of the ambulance performance, including:

- Recent highlights of system changes
- Medical director changes

[11] See section C.6.c of Exhibit A of the ambulance contract.

[12] Treatment of outliers is one cause of critical "selection error" in data analysis. For this reason, we carefully considered what we treated as an outlier, and were overly conservative in our approach.

- Vacancy rates
- Transports and refusals by type
- Chart completions of more than 24 hours
- Chart completion times by receiving hospital
- Ambulance admissions by receiving hospital
- Top ten call volumes by city served
- Transported cardiac arrest by gender and age
- Top ten provider impressions (nature of calls)
- Annual and fourth quarter "average" response time reports

HFD does limited medical reporting in the context of medical responses. As such, there are opportunities to develop improvements based on a merger between the organizations.

Quality Data Sharing

Response data is not generally shared between agencies in the EMS system, and there is no structured process by which the agencies can collaborate on sharing response performance data. As such, the agencies are not able to reliably determine how the overall system performs. While each agency can determine how reliably it performs, the agencies have no process to determine how long it takes for the first unit to arrive on the scene.

Quality data is shared in the system through two processes: the medical committee (MEDCOM) and the Morbidity and Mortality (M&M) Committee. Each of the processes is managed somewhat differently.

Dr. Craig Thomas, the medical director for HFD and Honolulu Police Department, chairs the MEDCOM meetings, which occur bimonthly. Representatives from HESD, HPD, HFD, and AMR (American Medical Response) attend the meetings. HFD reports on its training efforts, such as CPR and AED projects. Medical or operational challenges may be discussed as they present themselves. HESD participates to lend expertise and provide solutions as needed. The committee has been successful in making system improvements such as access improvements for ambulances at medical incidents and clarifying supply distribution, management, and cleaning issues.

The Oahu Morbidity and Mortality (M&M) Committee is overseen by the State of Hawaii; committee meetings are held six times a year. The state calls the meetings to review cases where emergency medical services were provided by AMR or Federal Fire or HESD. The state also uses the M&M meetings to inform or discuss emerging fiscal issues, new procedures, standing orders, and equipment.

The chair of the M&M Committee is the Oahu District Medical Director. Members of the committee are emergency department physicians from the 14 state-designated receiving agencies. Guests of the

Committee include representatives from HESD, HPD, HFD, Federal Fire, AMR, Kapi'olani Community College, and nurses from the 14 receiving agencies.

Requests for case review are submitted to the Chair prior to each meeting. The Committee members review the case(s) and provide feedback that is taken into consideration by the Chair. Findings from the case reviews, which may include corrective actions such as education or other improvement opportunities, are provided for review at the next meeting. System improvements through the M&M Committee input have resulted in new supplies, new equipment, standing order revisions (medications), and changes to policies and procedures.

Critical Issue:

EMS system planning is limited to individual agency efforts based on data relevant to the individual agency rather than comprehensive system performance data.

Impact:

The merger creates the capability to generate system performance data that represents the continuum of the emergency event from initial notification to call conclusion.

EMS System Financing

HESD EMS is prohibited from charging patients for transports. Instead, patient billing is conducted by the State Department of Health and revenues generated from patient transports are retained by the State of Hawaii. Patient transport fees billed by the State Department of Health are limited to Advanced Life Support (ALS) transports. The current fee structure reflects the following charges for those services contracted by the state:

ALS 1:	$725.00
ALS 2:	$725.00
Specialty/Critical Care:	$725.00
Mileage:	$10.00

HESD EMS is a contracted provider for advanced life support ambulance transport services through the State Department of Health. The following table defines the growth of contract revenue since 2007 (funding has remained constant for the last two fiscal years).

Figure 22: State Finding of Ambulance Service, 2007 - 2010

State Contract Funding for HESD EMS			
Year	General Fund Contribution	Special Fund Contribution	Total EMS Budget
FY 2007	$24,276,697	$180,000	$24,456,697
FY 2008	$28,749,440	$404,997	$29,154,437
FY 2009	$31,457,372	$815,782	$32,273,154
FY 2010	$31,457,372	$815,782	$32,273,154

The HFD receives limited funding for its first responder role within the EMS System. Approximately $60,000 per year is generated through leased space for ambulances. Emergency medical responses are considered part of the operations budget. Funding for the medical director position is also identified as part of the operational expense.

Basic Life Support (BLS) transports are not considered part of the contracted requirement between State Department of Health and HESD EMS. On the island of Oahu, American Medical Response conducts BLS transports through a contract with the City and County of Honolulu. The contract was last amended on March 23, 2010, and expires March 31, 2011. Provisions within the contract require AMR to respond on an "as needed basis" for calls triaged by the EMS Communications Center as "Minor", "Non-Emergent", and "Cold Calls". AMR bills patients for BLS transports at a rate of $644.00. In addition to responsibility for BLS transports, AMR provides back-up ALS response to HESD EMS and charges HESD directly for those transports.

The contract between AMR and the City/County of Honolulu reflects the following charges for services rendered.

Figure 23: Financial Contributions for Backup and BLS Services

HESD EMS - AMR Contract			
Services	Quantity	Unit Price	Total
BLS – Transport	10	$518.40	$5,814.00
BLS – Multiple Patients	2	$259.20	518.40
BLS - Non-Transport	2	$259.20	518.40
ALS – Transports	425	$576.00	244,800.00
ALS – Multiple Patients	10	$288.00	2,880.00
ALS – Non Transport	100	$288.00	28,800.00
		Total Contract	$283,330.80

According to the State Department of Health, annual revenues generated from patient transports account for approximately 50 percent of revenue needed for contract requirements throughout the state. The balance of funding to support ambulance transport services is supported through the State General Fund.

No regional plan exists to anticipate changes in system financing. The State legislature annually appropriates funds for the Department of Health and for EMS services. During the last legislative process, the various EMS systems were spared from budget cuts witnessed by other agencies.

Critical Issue:

Funding for the provision of emergency medical services will continue to face pressures from various external and internal factors.

Impact:

The merger has the capacity to significantly lower overall service costs through the elimination of duplicate support services, through more efficient and effective utilization of existing fire service resources and assets and by creating additional surge capacity through the redeployment of existing EMS resources.

Human Resources

Personnel

The current system has difficulty ensuring there are adequate personnel within HESD EMS to meet current and future system demands as reflected through high utilization of overtime to cover system demand peaks and daily minimum staffing requirements. There are multiple reasons for the current deficiency, including lack of system coordination between the EMS transport provider and the first responder agencies and barriers to entry in the state certification program for individuals who are licensed through other systems or states. Specific to HESD EMS the following factors limit the availability of EMS personnel: internally mandated paramedic training requirements on behalf of the HESD EMS; competitive environment for MICTs, especially with Federal military installations; UPW agreement for staffing; staffing model for transport units; mandated overtime requirements; lack of career advancement; lack of equity in compensation plans; and no system plan for future personnel requirements.

Minimum Standards

Minimum standards for personnel have been established by the State Department of Health, including minimum certification at the National Registry Intermediate EMT level, considered as the equivalent of the State-certified Basic EMT. Paramedic training standards significantly exceed current National Registry standards utilized by the majority of mainland states. Recent efforts in creating a bridge program between the National Registry Basic EMT certification and the State of Hawaii Basic EMT certification have been successful within the Honolulu Fire Department. This curriculum has allowed approximately 50 of the 500 Basic EMTs in the department to achieve state certification at the Basic EMT level. The state has established minimum requirements for first responder personnel utilizing the Hawaii Department of Transportation's (DOT) Emergency Training Course.

Training and Certification

The comprehensive training plan for HESD pre-hospital personnel plan requires that all Basic EMTs attend the paramedic training program at Kapi'olani Community College within two years of employment. All annual recertification and specialty certifications such as ACLS and PALS are provided through the community college. The state has established minimum annual recertification requirements for both Basic EMTs and MICTs (paramedics) consisting of 24 hours refresher training, recertification in CPR, and 48 hours continuing education in prescribed curricula for the Basic EMT. Paramedic annual training includes 48 hours refresher training that may include ACLS or equivalent training, CPR

recertification, and 24 hours additional training in prescribed curricula. In addition, documentation of skill maintenance is required. Through its quality assurance process, the HESD EMS annually documents the number of advanced skills utilized by paramedics in the system. Failure to complete an adequate number of skills or failure to perform a specific skill results in refresher training.

Standard Curriculum

Training courses delivered through the community college system exceed national standard training curricula as established by the United States Department of Transportation (DOT) for EMT Basic and EMT Paramedic and are compliant with the minimum standards established through the State Department of Health as identified in §16-85-56. The training program for state-certified Basic EMTs includes 180 hours of didactic experience and 135 hours of clinical experience. The MICT training program includes 400 hours of classroom instruction and 815 hours of clinical experience. Training courses for the majority of FF/EMTs within HFD are consistent with DOT standards and meeting National Registry certification.

Roles

The State Department of Health, through its administrative authority in HRS §11-72-30, has established the roles for participants who deliver pre-hospital care as part of a licensed ambulance service. The state has not defined the role of the first-responder agencies or their personnel. The scope of practice for Basic EMTs is restricted to providing basic life support services. Similarly, the scope of practice for paramedics is restricted to the provision of basic and advanced life support services. Paramedics employed by HFD do not utilize their advanced life support skills and generally function in the same capacity as BLS providers. HRS §§453-33 identifies the scope of practice for pre-hospital providers.

The ambulance transport system currently has an authorized force of 162 full-time paramedics and 10 part-time paramedics as part of HESD EMS. A minimum number of personnel within HFD (approximately five firefighters) have paramedic certification but are not authorized to utilize their skills. The Ocean Safety Division has one lifeguard certified as a paramedic; the lifeguard's ALS skills are not authorized for use outside the ambulance setting. The following table describes the distribution of emergency medical providers in the Honolulu EMS system.

Figure 24: Personnel by EMT Certification

Personnel Available to Respond to Medical Events				
Personnel	HESD EMS	OSLD	HFD	Total
Paramedics	162 FT 10 PT	1	5	168 FT 10 PT
State-Certified EMTs	79	2	32	113
National Registry-Certified EMTs	0	29	502	531
First Responders	0	151	477	628
Total	241	32 EMTs	539 EMTs	1,440 FT 10 PT

In addition to the 502 Basic EMTs employed by the HFD, another approximately 477 personnel have been trained as first responders. The OSLD has approximately 151 additional personnel who have received first responder training.

Labor Agreements

Labor agreements exist for all agencies within the system including the HFD whose collective bargaining agent is the International Association of Firefighters (IAFF) Local 46. The EMS personnel employed by the Division of Emergency Services are represented through Bargaining Unit 10 of the United Public Workers (UPW); maintenance personnel within the HESD EMS are represented by UPW Bargaining Unit 1. The Hawaii Government Employees Association (HGEA), Bargaining Units 3 and 4, represents Ocean Safety employees. Currently master agreement negotiations are underway between the City/County of Honolulu and the IAFF representing the HFD workforce. Compensation plans are predicated on certifications and job functions and are shown in the following table.

Figure 25: Pay Classifications, HFD and HESD

Human Resource Pay and Classification System								
Fire Services			Department of Emergency Services					
			EMS			Ocean Life Safety		
Class	*Class Title*	*Salary*	*Class*	*Class Title*	*Salary*	*Class*	*Class Title*	*Salary*
SR 15	Firefighter Recruit	$3,546	AM 01	EMT Trainee	$3,104 - $3,759	SR 15	Water Safety Officer Trainee	$2,813 - $4,328
SR 17	Firefighter I	$3,835 - $5,045	AM 03	EMT I	$3,347 - $4,079	SR 17	Water Safety Officer I	$2,813 - $4,328
SR 19	Firefighter II	$4,146 - $5,458	AM 05	EMT III	$3,617 - $4,420	SR 19	Water Safety Officer III	$3,290 - $5,062
SR 21	Firefighter III	$4,485 - $5,902	AM 07	EMS Support Tech	$3,911 - $4,805	SR 21	Water Safety Officer IV	$3,557 - $5,482

Human Resource Pay and Classification System								
Fire Services			Department of Emergency Services					
			EMS			Ocean Life Safety		
Class	*Class Title*	*Salary*	*Class*	*Class Title*	*Salary*	*Class*	*Class Title*	*Salary*
SR 25	Fire Captain	$5,247 - $6,904	AM 09	MICT I (Paramedic)	$4,242 - $5,233	SR 26	Water Safety Officer V	$4,328 - $6,666
			AM 10	MICT II (Preceptor)	$4,420 - $5,449			
			AM 12	MICT III (Working Sup)	$4,805 - $5,932			
SR 26	Fire Helicopter Pilot	$5,458 - $7,181	AM 14	EMS Field Supervisor	$5,223 - $6,472			
SR 27	Senior Fire Helicopter Pilot	$5,674 - $7,468						
EM 05	Battalion Fire Chief	$6,586 - $9,799	EM 05	Assistant EMS Chief	$6,586 - $9,799			
						EM 07	Ocean Safety Administrator	$7,259 - $10,803
EM 08	Assistant Fire Chief	$7,620 - $11,345	EM 08	Chief of EMS	$7,620 - $11,345			

Similarly, the following table reflects positions within the respective organizations that are equivalent in compensation to the classification for Firefighter II and III and for a Paramedic (MICT I).

Critical Issue:

Potential job elimination is a recognized concern in the merger of the affected organizations specifically in light of the diversity of the EMS workforce.

Impact:

The merger has the capability to enhance the career ladder of the current EMS workforce not only from the perspective of being cross-trained but also with regard to other positions potentially available within the merged organization including the quality assurance program, training academy, and public education programs. There is no anticipated reduction in force for field operations personnel.

Medical Direction

Medical Authority

The State Department of Health has a single medical director with responsibility for system oversight. However, the principal responsibility of the director is to ensure that the contract agency complies with

the provisions of the contract. HESD's EMS division employs a medical director on a 0.75 FTE basis. The medical director functions under a bi-annual contract and has been the HESD EMS medical director for the past 9 years. The ambulance service's medical director primarily conducts retrospective analysis of patient care records for protocol compliance and all critical patient encounters, including cardiac arrests, multi-system trauma, and procedures performed including administration of paralytics and patients who are intubated. The current director for the Emergency Services Department is also a physician, board certified in internal medicine. HESD EMS also contracts with an on-call physician who specializes in infectious diseases.

The HFD uses a contracted physician on a 0.25 FTE basis for review of all AED (automated external defibrillator) utilizations by the department. The contract is effective for three years and is based upon an hourly rate with a not-to-exceed annual cost of $42,900.

Linda Rosen, M.D., provides EMS system oversight from the State Department of Health. While technically not providing medical oversight to the system, Dr. Rosen's experience with the system and in the state provides an additional level of medical oversight at the system level. In that role, Dr. Rosen can provide high-level medical perspective in addition to the perspectives provided to other physicians in the system. The role allows Dr. Rosen to help determine whether state contract requirements are consistent with contemporary medical practice and consistent with both the wisdom and details of the state rules and statutes.

Standard protocols as promulgated by the State Department of Health are utilized by the HESD EMS for advanced level of care.

The role of the medical authority is clearly defined in state statute. A single medical director is employed by the state to oversee the provision of EMS and as such functions as the Director for the State Department of Health's EMS Division. The island of Oahu also has a Medical Director employed through the State Department of Health. In addition, individual provider agencies also employ their own medical directors. Interaction between the various medical directors appears to be limited and confined to periodic meetings of the Department of Health EMS Advisory Board and other health care meetings such as the State Trauma System meeting. There does not appear to be a coordinated and integrated system of medical direction. The HESD EMS employs a medical director to perform the following functions as defined under HRS §§321-228, 321-233:

- MEDICOM communication reviews
- Retrospective review of a patient care records
- Counseling of EMS personnel
- Case review with providers
- Recommend continuing education programs
- Participate in continuing education programs

In addition, to the primary medical director, HESD EMS also contracts with an on-call infectious disease specialist to review cases involving exposure to blood borne pathogens and diseases.

The HFD employs a medical director specifically for its Automated External Defibrillator Program. Duties of the medical director include the following:

- Review and make recommendations regarding standard operating procedures
- Conduct assessments and maintenance of quality control measures
- Oversee training, certification, and monitoring of HFD personnel
- Direct and manage all aspects of the HFD's medical training program
- Serve as medical liaison between HFD, HPD and HESD EMS

In the absence of a coordinated process of medical direction, responsibility for EMS standards appears to be focused on meeting minimum contract and state health system requirements. Individual agencies tend to concentrate their activities to those essential in carrying out the agency's responsibilities within the context of their roles within the EMS System.

Protocols

Medical protocols are developed at the state level and each EMS agency is responsible for compliance activities as defined by the individual agency's medical director. Medical protocols are uniform between first responder and ambulance transport providers, reflecting a standardization of system medical protocols. The contracted medical director has specific responsibility for evaluating patient care rendered by providers; however, due to the inherent fragmentation of medical direction within the system, the care delivered by personnel is only evaluated from the perspective of the individual agency. As a result, the continuum of patient care from dispatch, to first responder, through delivery at a tertiary care facility is not evaluated. In the absence of a coordinated process of evaluation of care it is difficult to determine the efficacy of care provided throughout the patient encounter cycle.

There appears to be limited medical research with respect to overall EMS system design. Instead, research tends to be focused on individual efforts rather than from a coordinated systems approach. In the absence of a coordinated system of medical direction, research efforts may fail to take into consideration the entire cycle of patient care activities from by-stander through definitive care.

Medical Control

On-line medical control is available through 11 base station hospitals designated as MEDICOM facilities.

Figure 26: Hospitals with MEDICOM Capabilities

MEDICOM Facilities
Queen's Medical Center
Kaiser Medical Center
Hawaii Medical Center East

MEDICOM Facilities
Hawaii Medical Center West
Straub Clinic and Hospital
Kuakini Medical Center
Kapi'olani Medical Center
Pali Momi Medical Center
Castle Medical Center
Wahiawa General Hospital
Tripler Army Medical Center

Not all on-line physicians are certified as emergency physicians; however, those that function at centers designated as base station facilities are required to be Board Certified in Emergency Medicine.

Critical Issue:

The current system has multiple medical directors whose focus is specific to the agency that they represent.

Impact:

The merger should allow for a consistent and uniform method for the provision of medical direction from a single agency perspective.

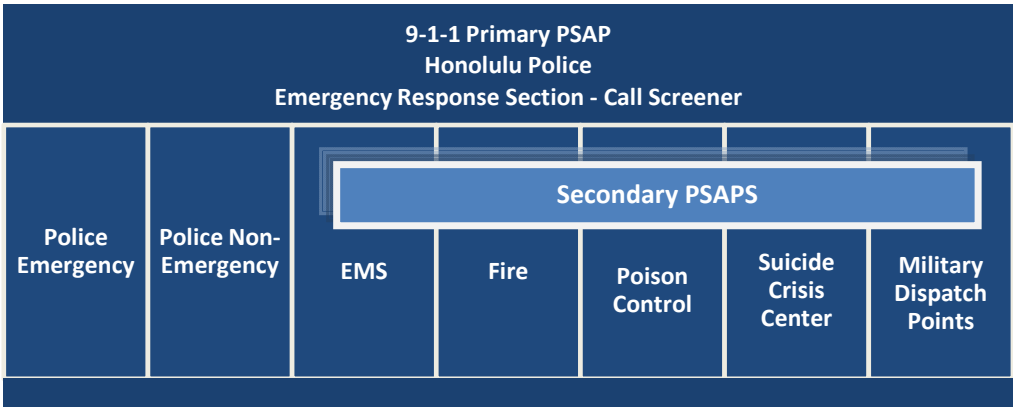
Communications

Public Safety Communications and dispatch services are essential and time critical functions. The Honolulu 9-1-1 Public Safety Answering Point (PSAP) is the main entry point for services delivered by Honolulu Fire, EMS, and Ocean Safety on the Island of Oahu. All three entities operate separate dispatch centers and receive calls for service transferred either directly or indirectly from the Primary Public Safety Answering Point (PSAP) located at Honolulu Police Department. The Honolulu Police Department (HPD) serves as the Primary PSAP for the City and County of Honolulu.

The City/County of Honolulu 9-1-1 Communication System consists of the following elements:

- Call screener for the initial entry of 9-1-1 calls into the system. The call screener ascertains the type of services needed and routes the call to the appropriate secondary PSAP agency. The call screener's responsibility is to transfer calls to the appropriate agency, upon determination of the nature of the call, for further information gathering and dispatch.
- The agencies receiving call transfers are secondary PSAPs. The Honolulu Fire Communications Center (FCC) and Emergency Medical Services Dispatch (EMS) operate as secondary PSAPs. Ocean Safety has PSAP equipment; however, is not formally recognized as a secondary PSAP, therefore does not receive direct transfer from the Honolulu 9-1-1 Primary PSAP.

Figure 27: PSAP Organizational Chart

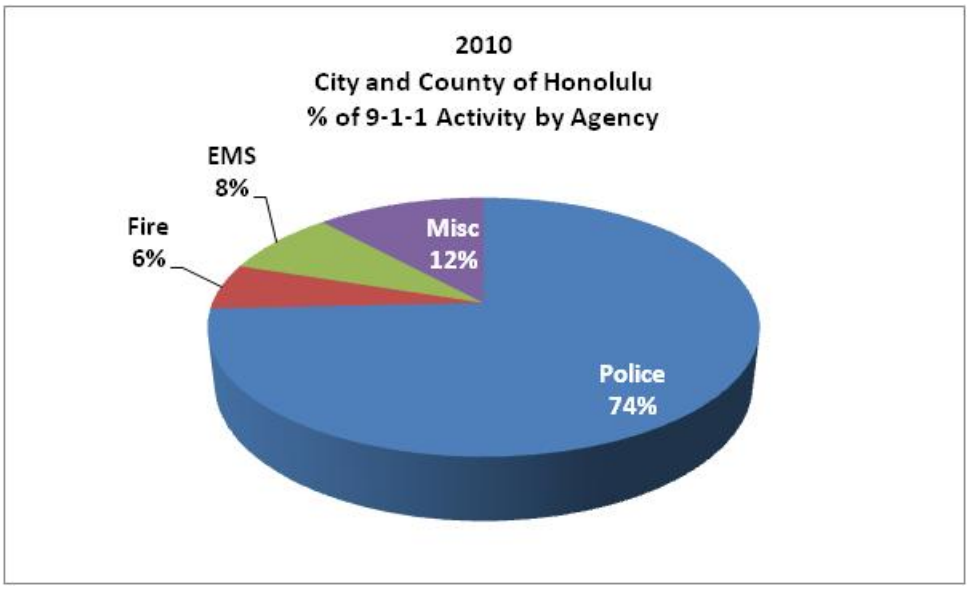


Hawaiian Telcom provides 9-1-1 CML Answering Equipment for PSAPs and secondary PSAPs in the State of Hawaii. Fire Communications and EMS receive ANI/ALI data (Automatic Number Identification and Automatic Location Identification). OSLD has the capability to receive ANI/ALI information but rarely receives a direct CML 9-1-1 transfer call.

In 2009, the HPD 9-1-1/dispatch center received 896,940 calls for service. Incoming 9-1-1 call activity data for 2010 indicates 900,345 calls for service, an increase of 3,405 calls in 2010.

- 9-1-1 statistics indicate 6 percent of the total received calls were transferred to Fire Communications in 2010 (51,724 fire 9-1-1 calls).
- 8 percent of 9-1-1 calls were transferred to EMS (72,932 EMS 9-1-1 calls).
- 12 percent (105,875) of 9-1-1 calls were categorized as miscellaneous, were transferred to the military dispatch center, poison control, or other required services.
- OSLD typically does not receive direct transfer of 9-1-1 calls from the Honolulu Emergency Response Section. Ocean Safety generally receives emergency call notification via administrative telephone landline from FCC (Fire Communications Center) creating a third relay, transfer, or conference within the 9-1-1 system. (Additionally, notification of emergencies for Ocean Safety may be initiated 'on view' from lifeguard tower locations via radio to lifeguard dispatch.) Note: Ocean Safety dispatch does not track or maintain records on the originating source for emergency calls for service; e.g., FCC transfer, EMS transfer, lifeguard tower 'on view', etc. As there is no tracking of the call source, ESCI assumes Ocean Safety receives a majority of emergency calls for service by the 'on view' method through the staffed lifeguard towers.

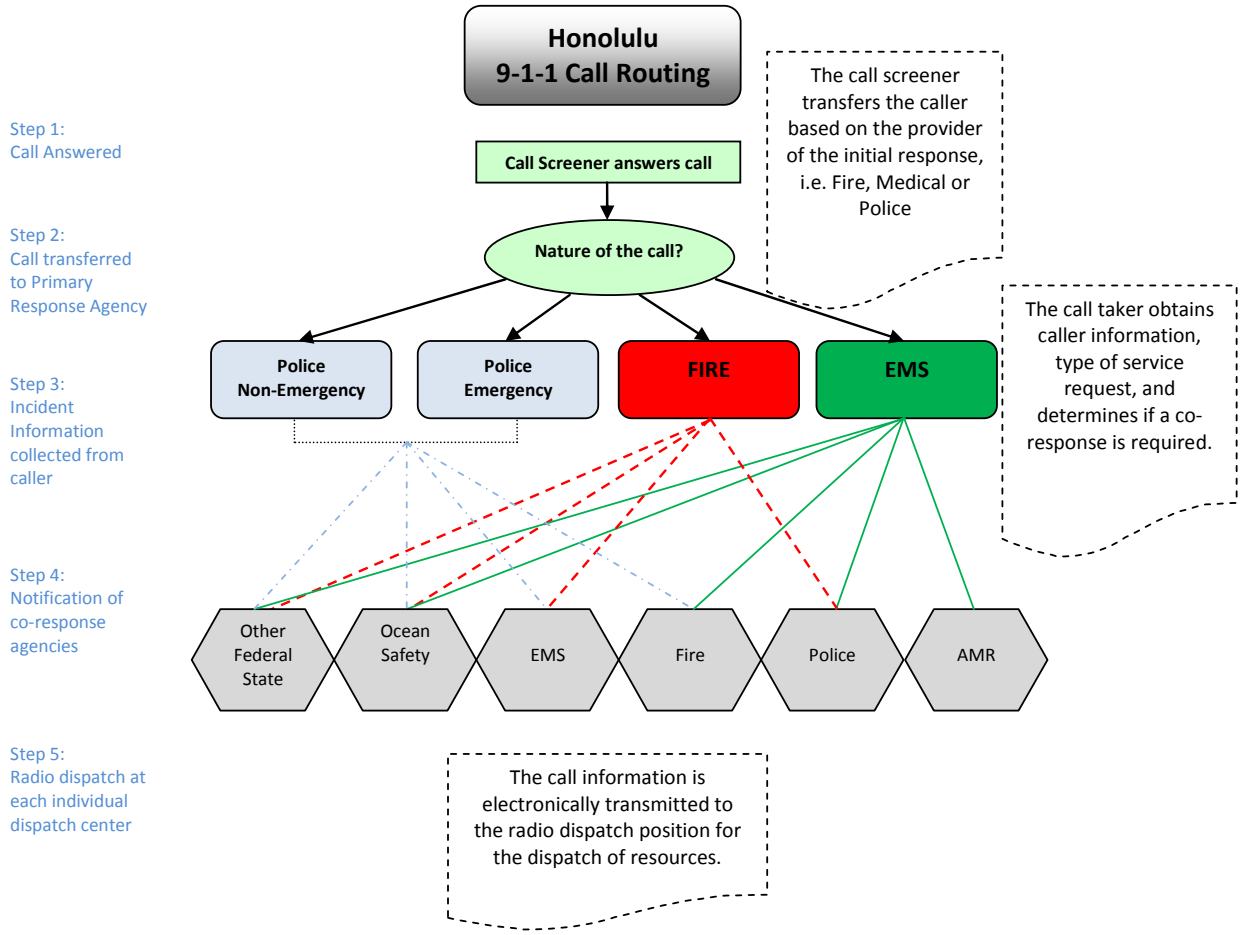
Figure 28: Honolulu 9-1-1 Activity



The 9-1-1 system on Oahu is a 'layered' workflow process, requiring call transfers of each 9-1-1 call from the Honolulu Primary PSAP (call screening position) to EMS, FCC, or the HPD call taker. Call screeners do not perform detailed call interrogation. All three agencies (police, fire, and EMS) operate with call takers and radio dispatchers, with each position providing distinct operational functions.

The process initiates with the 9-1-1 PSAP call screener transferring the call for service to the appropriate or lead emergency response dispatch center. Under the layered process, the respective call takers, in this case fire or EMS, obtain caller and incident information. The call taker at fire or EMS initiates a CAD (computer-aided dispatch) incident and forwards the call information via the CAD system to the radio dispatcher for unit assignment and notification (dispatch) of the primary response units. In the event a co-response is needed, the call taker initiates a verbal relay of information to the appropriate co-response agency. Call entry and dispatch at the co-response agency subsequently occurs. The figure that follows describes the workflow through the 9-1-1 dispatch system.

Figure 29: Dispatch Call Routing



Current Honolulu 9-1-1 Call Routing is complex with a requirement of multiple steps and numerous administrative calls between responding agencies.

- Additional 9-1-1 calls with updated information on a specific incident requires the duplication of steps providing verbal updates to each co-response dispatch center.
- Updated information from response units, additional coordination, or requests for other agencies, requires verbal relay from the initial Secondary PSAP to the dispatch centers of the co-responders.
- Cancellation of a response works in reverse requiring the initiating dispatch center to notify all responders dispatch point by telephone.
- A significant event with police, fire, medical, and Ocean Safety response, requiring 2 updates of information between the agencies during the incident, creates a minimum of 8 verbal relays (telephone calls) to adequately coordinate the update of information.

If the call for service pertains to Ocean Safety, such as a life threatening water incident, FCC receives the initial transfer from the HPD PSAP. Upon call entry by FCC, the FCC call taker may conference the caller

to Ocean Safety or may elect to complete the call and then notify Ocean Safety Dispatch. Additionally, EMS dispatch is notified of the need for a co-response via telephone landline call relay.

An additional scenario example involves a motor vehicle crash (MVC). If the MVC is a non-injury, the call screener transfers the call to the police call taker as the primary responder. If the caller indicates injuries, the call screener transfers the call to EMS. EMS moves through the call process and notifies fire and police, respectively, via landline for fire and police unit secondary response.

Life threatening or potential life threatening water safety calls originating from the lifeguard towers are relayed via radio to OSLD Dispatch. Lifeguard dispatch initiates water safety resource(s) response based on the type of call and notifies EMS Dispatch and/or FCC for unit standby or response via telephone landline.

Under all of the above scenarios, additional 9-1-1 calls to the Primary PSAP providing further information route through the same process, although in a normally shorter time expenditure. Upon cancellation of a call for response, agencies reverse the process for notifications. Additionally, other resources (such as U.S. Coast Guard, Federal/military or other auxiliary response agencies, depending on the location or type of call) require initial and/or reverse notification.

Comparative Summary

ESCI conducted a side-by-side comparison of existing systems, equipment, staffing, and operational readiness. The analysis compares operational observations with industry standards or best practice from a variety of sources, including:

- National Emergency Number Association (NENA)
- Associated Public Safety Communications Officials (APCO)
- National Fire Protection Association (NFPA)
- Commission on Fire Accreditation International (CFAI)
- Commission on Accreditation for Law Enforcement Agencies (CALEA)[13]
- Professional articles and documents

The resulting comparative analysis provides an assessment assisting in the feasibility analysis of merging communications services for both Divisions of the Emergency Services Department and Honolulu Fire Communications Center (FCC) and Ocean Safety Lifeguard Division communication requirements.[14]

[13] CALEA is the parent organization providing accreditation for Public Safety Communications Centers.
[14] See Appendix B for a detailed analysis of the individual communication centers.

Figure 30: Communication Center Comparison Summary

Communication Centers			
	Fire Dispatch	EMS Dispatch	OSLD Dispatch
Staffing			
Supervisors	4	1	1
Dispatchers	23	20	2
Total positions allocated	27	21	3
Certifications	Firefighter II	MICT/EMT	Water Safety Specialist
Collective Bargaining Unit	IAFF Local 1463	UPW Unit 10	HGEA Unit 3
Workload (2010)			
Incoming Calls (per month)	4,292	6,319	No data
Daily Average	141	208	No data
Hourly Average	6	9	No data
Dispatch Incidents (per month)	3,392	5,504	No data
Daily Average	112	181	No data
Hourly Average	5	8	No data
Percent of Incidents Dispatched (EMS)	65%	100%	No data
Non-Emergency Administrative Calls	4,950	5,910	No data
Daily Average	165	197	No data
Hourly Average	7	8	No data
Radio System			
Dispatch	Honolulu 800 Mhz	MEDICOM UHF	Honolulu 800 Mhz
Operations	Honolulu 800 Mhz	MEDICOM UHF	Honolulu 800 Mhz
Field to Hospital	N/A	Honolulu 800 Mhz	N/A
Budget	$2,222,575	$1,821,910 Estimated	$250,000 Estimated
Performance Standards			
PSAP Transfer Ring Time - Pickup	3 rings	3 rings	N/A
Call Dispatch Time (90% compliance)	< 60 seconds	< 60 seconds	N/A

The feasibility and integration analysis component for dispatch operations consists of an operational review evaluating nine infrastructure core areas for Honolulu Fire, Honolulu EMS, and Ocean Safety. This provides the starting point for identifying operational and infrastructure similarities, differences, and core areas not meeting industry standard Best Practice and completing the analysis for integration of dispatch services.

Core Criteria Findings

The comparison of Fire Communications (FCC), EMS Communications, and Lifeguard Dispatch reveals similar conditions and requirements specific to Public Safety Communications; however, there are

disparate organizational differences specific to labor organizations, pay structure, shifts, supervision, hiring, and testing practices.

The comparative assessment reveals capabilities of the dispatch agencies to meet industry standards and Best Practices by identifying areas either meeting or requiring improvement in core assessment criteria. ESCI findings indicate the following:

- Honolulu 9-1-1 workflow requires multiple handling processes, each of which creates call processing delays.
- Honolulu Fire Communications (FCC) achieves the uppermost ratings in the core areas either meeting or partially meeting criteria in a majority of critical core areas.
- EMS requires improvements in significant critical areas.
- Ocean Safety requires significant improvement.

Significant Dispatch/Communication Findings

There is a lack of public safety coordination and oversight among the three dispatch agencies. Additionally, a lack of operational direction manifests itself resulting in the need for development and implementation of Quality Assurance and Training Programs, Risk Management, and formalized Disaster Recovery Plans.

Multiple centers (Fire/EMS/Ocean Safety) create a delay in response as telephone relays increase notification, coordination, and processing times, with risk exposure for unintentional information distortion.

Separate CAD platforms and lack of CAD at Ocean Safety prevents interoperability, increasing processing and service delivery response times.

There is a significant duplication of infrastructure requirements (facility and technologies) thereby creating higher costs for emergency services.

Integration Analysis

The comparison provides key information for integration analysis of FCC, EMS Dispatch, and Lifeguard Dispatch. These areas include Workload, Staffing, Performance Measures, Workflow, Infrastructure Requirements, and Costs.

Workload and Workflow - **The analysis indicates integration will streamline workflow and workload processes.** Currently, the three dispatch centers duplicate workload and efforts for call processing and dispatch. Workload analysis of a fully integrated center for fire, EMS, and Ocean Safety reveals a reduction in the number of duplicate dispatch incidents and administrative phone calls between the separate agencies, thus reducing workload requirements. Current 9-1-1 workflow has multiple areas where delays occur due to relay processes, creating risk for call mishandling and/or failure to dispatch resources and increasing call processing and dispatch time.

Staffing - The analysis indicates integration of fire, EMS, and Ocean Safety dispatch reduces FTE staffing requirements. The staffing review and analysis indicates FCC and Ocean Safety currently provide sufficient staffing for dispatch operations. EMS has a significant dispatch staffing shortfall of 12.5 FTEs. EMS requires additional operational personnel, supervisory positions, and support staff to meet workload and Best Practices if integration does not occur. The current number of authorized FTEs for FCC, EMS, and Ocean Safety is 51 positions. If the agencies remain separate, the recommended staffing requires 63.5 FTEs.

Figure 31: Communication Center Staffing Requirements and Current Staffing

Communications Center FTE Requirements Staffing Analysis	Separate Agencies			Combined Total
	Fire (FCC)	EMS	Ocean Safety	
Recommended Staffing: *Current Workload/Meet Best Practices*	27.0	33.5	3.0	63.5
Current Staffing (2011)	27.0	21.0	3.0	51.0
Difference/(Staffing Shortfall)	0.0	(12.5)	0.0	(12.5)

The staffing analysis for an integrated center indicates a requirement of 46 FTE. When compared to current staffing levels, integration results in a reduction of five FTE with an integrated center, but most importantly, the recommended integrated staffing of 46 FTE provides operational, supervisory, quality assurance, training, and support staff. The reduction in staffing levels for an integrated center from the current level of 51 to 46 provides an estimated annual savings of $500,000. Achieving recommended staffing levels in the absence of integration requires an annual operating cost increase of $1.3 million for EMS Communications.

Performance: The analysis indicates call processing performance measures require improvement.

Primary PSAP: The 9-1-1 Primary PSAP performance measures and data for ring time or duration of a call were not provided. The Honolulu PSAP call interval has a potential for negative impact during periods of high workload. This may occur when calls are queued and there is significant wait time prior to call answer. During this scenario, the call, electronically answered with a recording, receives a 'live' answer upon call screener availability. The queuing wait time data for the Honolulu PSAP was not provided.

Fire (FCC): Data presented for fire indicates agency performance targets are met; however, the call time interval at the Primary PSAP is unknown.

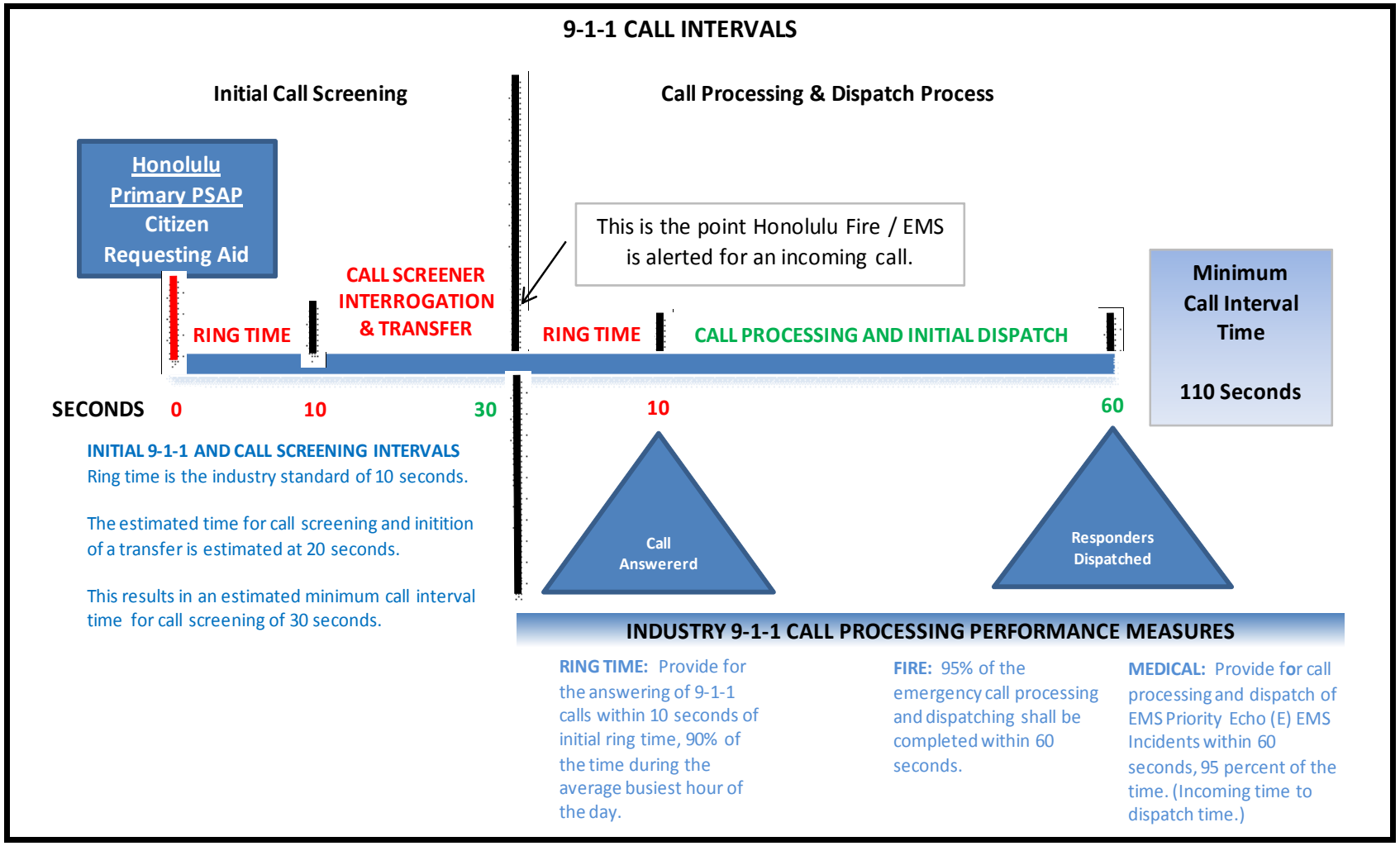
EMS: Data presented for EMS indicates an inability to meet agency performance targets. Additionally, time intervals at the Primary PSAP extend processing times, thereby slowing response.

Ocean Safety: Ocean Safety does not measure call taking or dispatch processing times.

Fire and EMS agencies currently provide specific agency performance targets. The agency targets, however, while similar to industry standards, are not inclusive and as comprehensive as the public safety industry standards. The agencies must aggressively pursue development of agency performance standards and verify adherence establishing a high level of 9-1-1 call processing for the citizens on Honolulu.

The 9-1-1 Call Interval Diagram that follows illustrates time intervals and industry performance targets. The illustration is an estimate based on operational knowledge and industry standards for ring time. It is important to recognize, the best-case scenario before dispatch of responders is estimated at 110 seconds, or almost 2 minutes. Potentially, it takes approximately 40 seconds before the caller requesting assistance talks to a fire or medical call taker.

Figure 32: 9-1-1 Call Intervals



Operating Costs – The analysis indicates an integration of dispatch provides operational cost savings. The reduction of FTE positions and operating costs for a combined center indicates an estimated annual cost savings of $600,000. The combined cost savings inclusive of the recommended required staffing levels for the EMS Communications Center without the merger ($1.3 million) provides an estimated overall savings of $1.9 million per year over the next five-year period.

Integration Cost Requirements – The analysis indicates a requirement for an integrated Communication Center of $2 million - $2.65 million for technological infrastructure. The capital requirement for infrastructure addresses facility, CAD, workstations, radio consoles, and technical support costs. It is important to recognize the existing centers currently require upgrades and improvements in key infrastructure areas. Estimates for each individual center to complete required upgrades are estimated at $3.2 million. The integration 'up front' costs necessary for the technological infrastructure offsets the individual center upgrade costs. A one-time savings of approximately $780,000 can result with integration and implementation of a single CAD platform including additional infrastructure support requirements as opposed to individual center upgrades. Long-term operational costs and ongoing savings in infrastructure support costs are minimized, reducing the duplication experienced in today's environment.

Critical Issue:

The existing communication centers duplicate processes, facilities, and infrastructures, fragmenting call receipt, dispatch, operational communications, and creating significant risks.

Impact:

Integrating the three communication centers into a single entity will result in the elimination of multiple call processing steps, operate under a standard set of protocols, improve responder communications by operating on common communication radio channels, ensure adequate staffing for current dispatch workloads, and reduce current operational expense associated with the multiple centers.

Service Levels and Agency Performance

Response Analysis

ESCI evaluated the response data for both ambulance and first response from January 2008 through December 2010. As part of that analysis, we examined both the geographic and temporal aspects of the demand in the system as well as the system's ability to generate supply to match that demand. Generally, EMS demand follows population.[15] As populations shift within a response area, that shift tends to affect demand for services. By analyzing the demand, we can determine whether the EMS system can meet the needs of the service area.

[15] For example, during the workday, populations shift from residential areas to employment areas, and between areas of employment. During the week, employment has a significant impact on demand; during the workday, movement of population impacts demand. On weekends, recreation creates shifts in demand.

Overview

The response analysis helps to determine whether the response times are appropriate for the EMS system, whether response performance can be affected by the nature of call demand on the system, and whether resources are sufficient to provide necessary services. For example, if multiple events occur at roughly the same location at the same time, the ambulance resource is immediately exhausted, and the response performance for the second ambulance will be inordinately longer. Demand analysis typically considers time of day, day of week, and month of year to determine when the calls occur. In addition, it considers the frequency that events occur at the same time. We also examine seasonality (the shift in demand between seasons of the year) and trend (the shift in demand from one year to the next). Understanding demand and predicting future demand is the key to providing long-term EMS services in the community.

Day of Week

Responses in virtually all EMS systems vary, sometimes significantly according to the day of week. The following table describes the call frequency by day-of-week within the Oahu response area for emergency events. As shown in the table rankings, emergency events are more likely during the latter part of the week.[16]

Figure 33: Oahu EMS Call Distribution by Day of Week, 2008 - 2010

EMS Call Distribution			
Day of Week	Total Calls	Calls/Day	Rank
Sunday	29,015	185.99	3
Monday	28,853	184.96	4
Tuesday	28,607	182.21	7
Wednesday	28,721	182.94	6
Thursday	28,987	184.63	5
Friday	30,152	192.05	2
Saturday	30,819	197.56	1

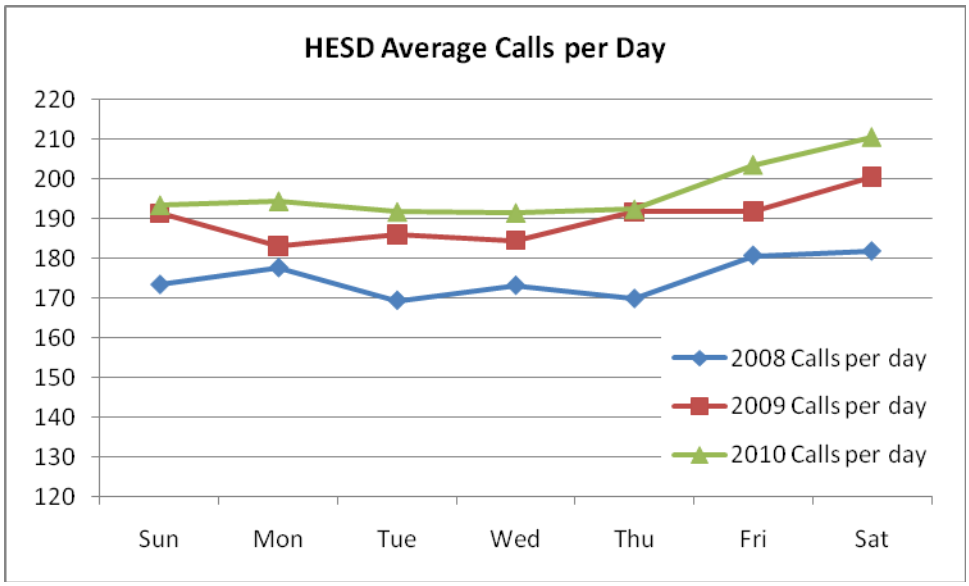
The table shows the response demand for all emergency and non-emergency responses for the three-year period. The call frequency is highest on Fridays and Saturdays. The goal here is to determine whether the Oahu EMS system has sufficient resources available per day to manage the demand of the system.

Ultimately, if training or non-clinical hours are required, they should be planned for on the days with the lowest demand (Tuesday, Wednesday, and Thursday), and additional resources should be planned for the days with the highest demand (Friday and Saturday).

[16] For this analysis, we used data directly from the HESD dispatch communications center.

We note from the data that the number of calls per day is not consistent from year to year. Though the variance from day to day is relatively consistent, the number of calls per day during the last three years is rising consistently, as illustrated in the following figure.

Figure 34: HESD Calls per Day, 2008 - 2010



Time of Day

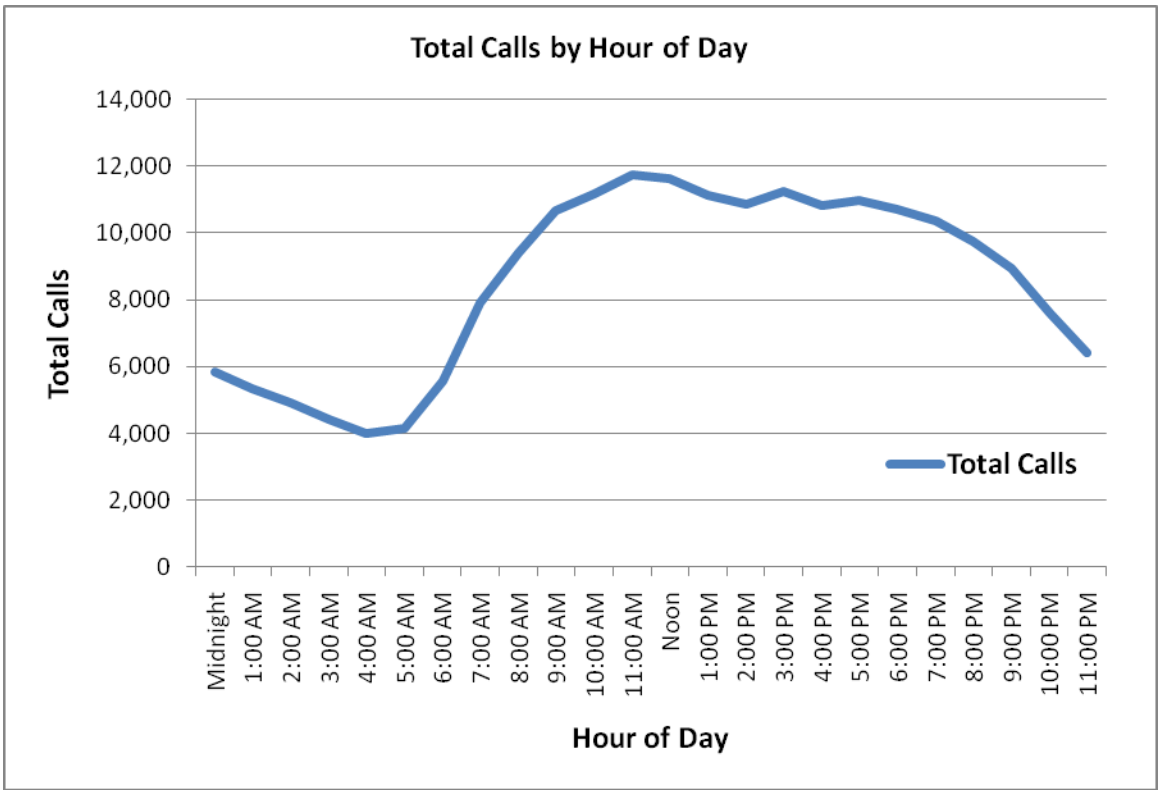
Just as responses vary according to day of the week, the hour of the day affects demand. While intuition alone suggests that there will be more calls at 3 p.m. than at 3 a.m., a more rigorous analysis is required to determine if the variation is enough to warrant adding additional resources, realigning resources, or if the current resources are appropriately aligned with demand. The following table shows the frequency of emergency events for the three-year period from January 2008 through December 2010.

Figure 35: Oahu EMS Call Distribution by Hour of Day and Day of Week, 2008 - 2010

EMS Events by Hour of Day and Day of Week								
Hour	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total
Midnight	1,071	715	781	667	756	791	1,048	5,829
1 a.m.	1,044	663	590	613	617	680	1,126	5,333
2 a.m.	936	564	607	554	599	619	1,038	4,917
3 a.m.	925	546	491	493	541	551	887	4,434
4 a.m.	748	502	439	456	538	523	810	4,016
5 a.m.	587	605	553	580	601	601	611	4,138
6 a.m.	673	854	821	863	874	777	715	5,577
7 a.m.	968	1,185	1,207	1,145	1,211	1,186	997	7,899
8 a.m.	1,162	1,402	1,510	1,336	1,368	1,406	1,214	9,398
9 a.m.	1,363	1,566	1,545	1,548	1,577	1,591	1,462	10,652
10 a.m.	1,426	1,613	1,596	1,640	1,695	1,592	1,600	11,162
11 a.m.	1,493	1,757	1,773	1,550	1,843	1,714	1,619	11,749
Noon	1,496	1,710	1,629	1,677	1,676	1,718	1,730	11,636
1 p.m.	1,518	1,514	1,569	1,714	1,633	1,645	1,540	11,133
2 p.m.	1,495	1,579	1,538	1,630	1,509	1,584	1,529	10,864
3 p.m.	1,489	1,639	1,554	1,626	1,593	1,790	1,532	11,223
4 p.m.	1,461	1,509	1,513	1,663	1,533	1,548	1,595	10,822
5 p.m.	1,488	1,664	1,514	1,568	1,606	1,573	1,540	10,953
6 p.m.	1,622	1,438	1,591	1,502	1,491	1,544	1,515	10,703
7 p.m.	1,498	1,494	1,504	1,534	1,413	1,465	1,467	10,735
8 p.m.	1,336	1,379	1,362	1,328	1,431	1,440	1,454	9,730
9 p.m.	1,277	1,214	1,279	1,221	1,210	1,333	1,401	8,935
10 p.m.	1,042	932	1023	990	1,007	1,332	1,285	7,611
11 p.m.	897	809	788	823	835	1,149	1,104	6,405
Total	29,015	28,853	28,777	28,721	29,157	30,152	30,819	205,494

Not surprisingly, the majority of the events are clustered around the 13-hour period from about 8 a.m. to 9 p.m. In fact, more than 72 percent of all calls fall within this 13-hour period. The figure below describes the distribution of calls by time of day for emergency events (as processed by HESD).

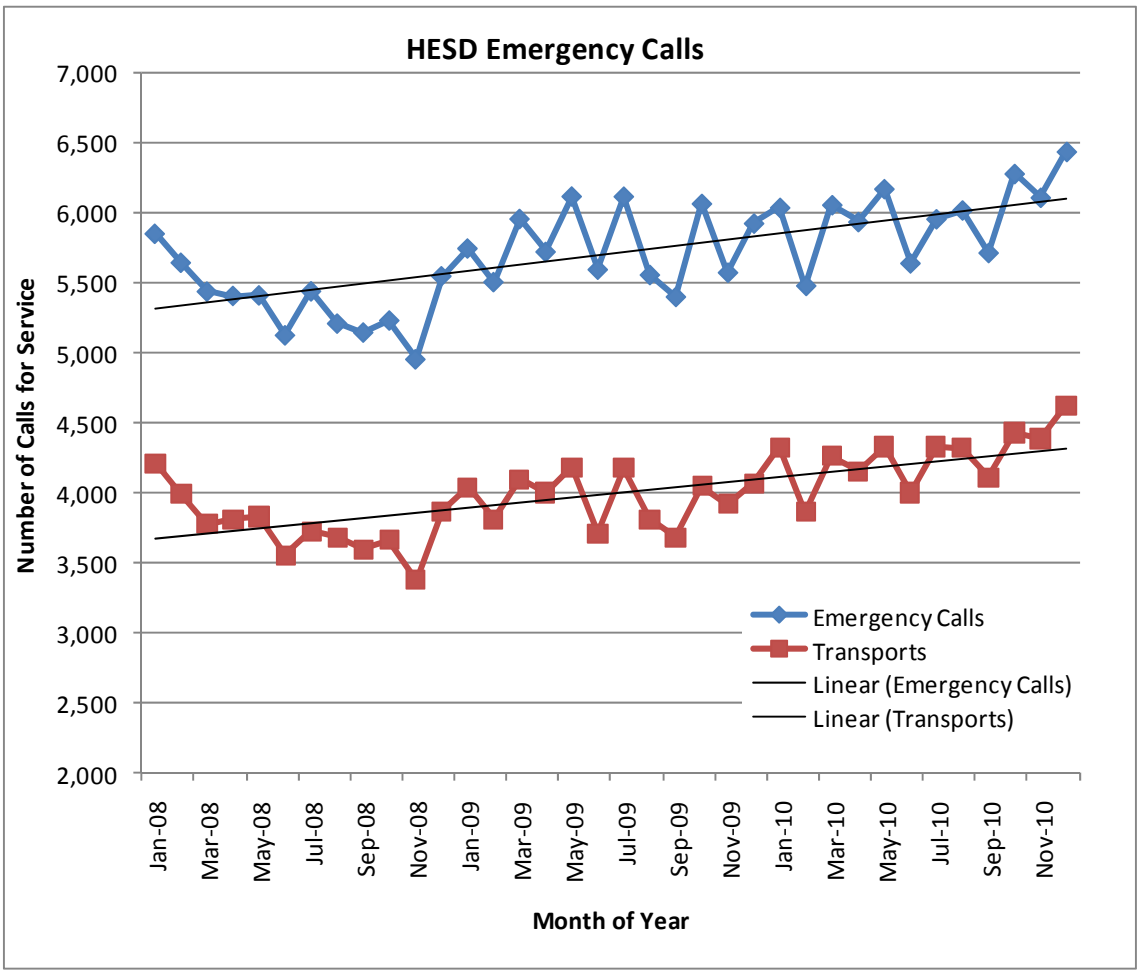
Figure 36: HESD Calls by Hour of Day, 2008 - 2010



Emergency Events and Transports

In 2008, the HESD responded to more than to more than 64,000 emergency events. Since then, the call volume has grown to more than 70,000 calls per year. Yet, not every call results in a transport. As such, the agency must consider the relative number of both calls and transports during the analysis period because transports take a significantly greater resource commitment that transports. Based on the data, we have determined that approximately 70 percent of the calls resulted in a transport. This growth in emergency events and transports is shown in the following figure along with a trend line showing the projected growth over time.

Figure 37: HESD Calls and Transports, 2008 - 2010

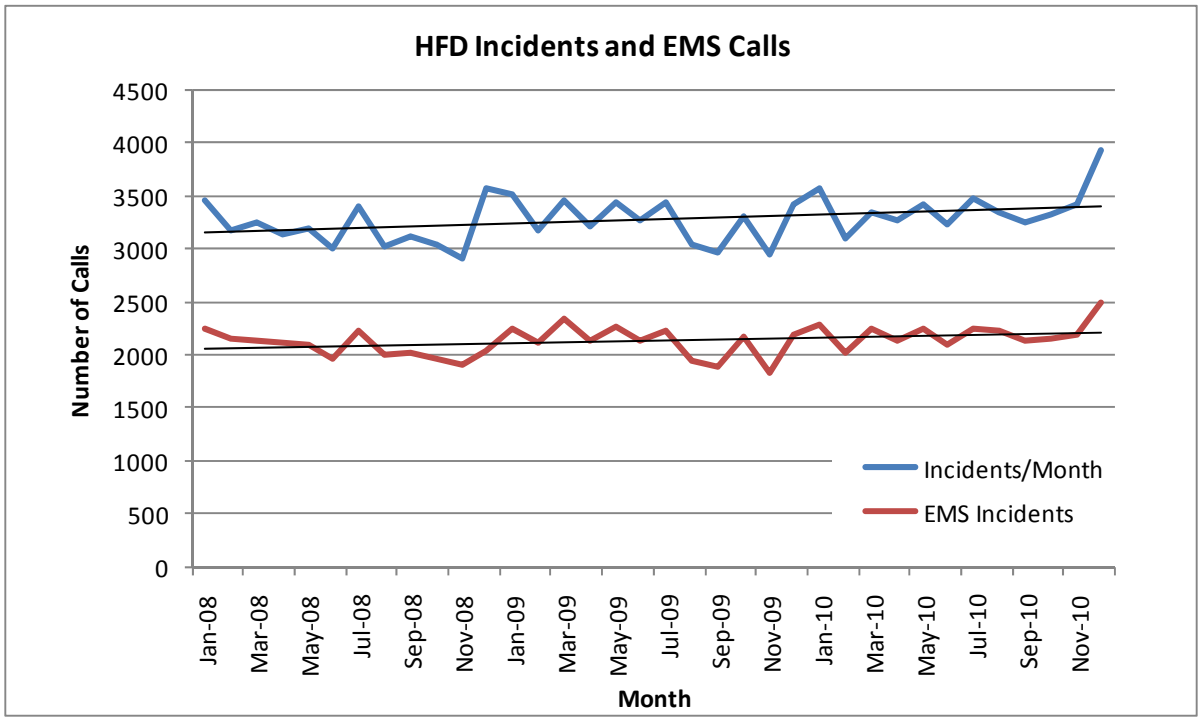


HESD is not the only responder the medical events on the island. The Honolulu Fire Department responds to medical events in the system based on the medical priority and criticality of the calls. The HESD dispatch center triages the calls and dispatches fire first responders when the medical triage determinants call for additional resources on the scene. As such, the medical response data of the fire department is a subset of the ambulance data because the fire department responds only to medical calls that are first triaged through the ambulance dispatch.

Yet while the ambulance service responds almost totally to medical events, the fire agency responds to multiple events that are not related to EMS. The fire agency's responses are therefore divided between "fire" events that include structure fires, hazardous materials events, rescues, and open water rescues.[17] The following figure provides a breakdown of the total calls and the calls to which the department responds in support of the EMS system.

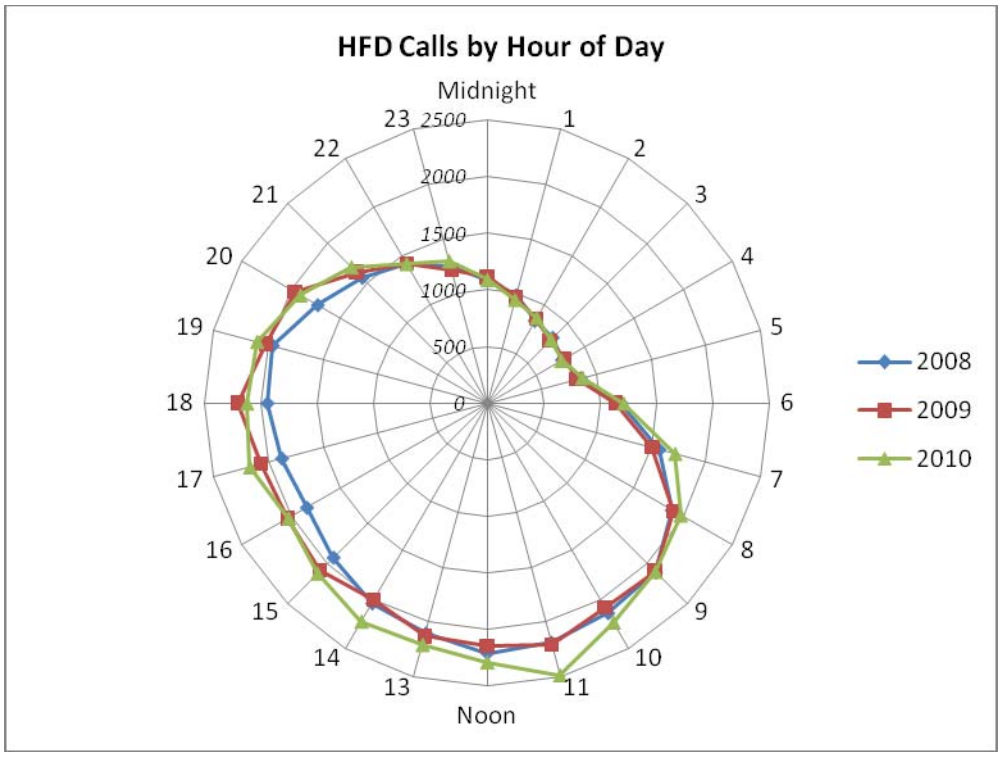
[17] The island divides its water rescue services between "near-shore" rescues (provided by the Ocean Safety and Lifeguard Division) and the "off-shore" rescues provided by the fire department.

Figure 38: HFD Total Events and EMS Events, 2008 - 2010



Just as the ambulance service demand varies by hour of day, the HFD responses are sensitive to the hour of the day during which the event takes place.

Figure 39: HFD Calls by Hour of Day, 2008 - 2010



Service Intervals

Analysis of the time it takes to complete a call[18] (sometimes called the "total unit interval" or the "service interval") is an important consideration; the amount of time a vehicle is out of service on a call, the less time that it is available to respond to other events in the system. Our analysis of service times reveals that to complete an emergency ambulance call takes about 1 hour and 30 minutes (in the rural areas)—regardless of whether a transport occurs. HFD requires about 40 minutes (for the first arriving unit) although the fire department may require more than one unit to serve an EMS event. As such, the level of effort required to provide services is more significant.

The longer it takes to serve a customer, the less likely the provider will be available to respond to additional events. Most EMS studies conducted across the United States show that the average time to complete an ambulance call is slightly less than one hour—usually between 45 and 56 minutes. The ambulance service commits an ambulance to an event for approximately 53 minutes on average for urban and urban/rural calls and for slightly more than one hour for rural events. The fire department commits its resources to medical events for slightly less than half the time commitment of an ambulance. The table below compares the time commitment to emergency events from both the fire department and the ambulance service.

[18] That is the time from when the response unit is first notified of the event until it is available to respond again to another event.

Figure 40: HESD and HFD Total Unit Intervals, 2010

HESD Emergency Responses			
Fractile	Urban	Urban/Rural	Rural
90%	1:12:15	1:14:40	1:28:54
80%	1:04:41	1:05:34	1:19:42
70%	0:59:35	0:59:51	1:13:37
60%	0:55:26	0:55:19	1:07:36
50%	0:51:49	0:51:35	1:02:07
Average	0:53:17	0:53:43	1:03:00
Dataset	21,469	29,591	1,072

HFD Emergency Medical Responses			
Fractile	Urban	Suburban	Rural
90%	0:36:15	0:36:53	0:40:03
80%	0:29:17	0:30:28	0:31:37
70%	0:25:47	0:26:46	0:27:13
60%	0:23:14	0:24:06	0:24:22
50%	0:21:07	0:21:59	0:21:46
Average	0:23:29	0:24:50	0:25:42
Dataset	9,175	12,958	4,335

EMS System Performance

Each of the two response agencies report performance—HESD reports to the State of Hawaii, HFD reports internally as part of its standard of cover requirements. The two agencies' response requirements are identified in the following table.

Figure 41: Response Requirements, HFD and HESD

Response Requirements						
Agency	Urban (minutes)	Standard	Suburban (minutes)	Standard	Rural (minutes)	Standard
Honolulu FD	7	80%	9	80%	11	80%
Honolulu ESD	10	90%	15	90%	20	90%

In addition to the response requirements, HESD is required by contract to meet call-processing time requirements and to meet out-of-chute interval requirements. Appendix A of the contract between the State of Hawaii and HESD requires a call processing interval of 60 seconds or less and an out-of-chute performance of two minutes or less. ESCI believes that, although the contract is not entirely clear, the performance reliability for call processing and en-route intervals is also 90 percent.[19.]

ESCI evaluated both ambulance service and fire department performance based on dispatch data provided by the respective dispatch centers. As part of that analysis, we made assumptions to effectively deal with outliers in the data (i.e. those outliers that we considered to be flawed or unreasonable) to be removed for the purposes of the analysis.[20] (See Appendix A of this report.)

[19] See section C.6.c of Exhibit A of the ambulance contract.

[20] Treatment of outliers is one cause of critical "selection error" in data analysis. For this reason, we carefully considered what we treated as an outlier, and were overly conservative in our approach.

Each agency evaluates its response time performance and provides those performance reports to the appropriate officials. HFD provides reporting as part of its standard of cover requirements and bases those reports on the response time reliability of the individual units. Those reports describe in detail the calls that exceed performance requirements based on call processing, turnout, and response intervals. HFD's annual response performance for 2010 urban, suburban, and rural response areas is listed in the three tables below.

Figure 42: HFD Urban Response Performance - EMS, 2010

HFD Urban Response Performance					
Fractile Measure	Call Processing Interval	Enroute Interval	Travel Interval	Response Interval	Total Unit Interval
90%	0:00:57	0:02:17	0:04:33	0:06:51	0:36:15
80%	0:00:43	0:01:59	0:03:45	0:05:54	0:29:17
70%	0:00:37	0:01:45	0:03:16	0:05:22	0:25:47
60%	0:00:32	0:01:34	0:02:54	0:04:58	0:23:14
50%	0:00:29	0:01:24	0:02:34	0:04:37	0:21:07
Average	0:00:36	0:01:27	0:02:51	0:04:54	0:23:29
Dataset	9,153	9,149	9,170	9,179	9,175

Figure 43: HFD Suburban Response Performance - EMS, 2010

HFD Suburban Response Performance					
Fractile Measure	Call Processing Interval	Enroute Interval	Travel Interval	Response Interval	Total Unit Interval
90%	0:00:57	0:01:35	0:06:34	0:08:48	0:36:53
80%	0:00:43	0:01:28	0:05:26	0:07:33	0:30:28
70%	0:00:36	0:01:22	0:04:43	0:06:46	0:26:46
60%	0:00:32	0:01:16	0:04:10	0:06:11	0:24:06
50%	0:00:29	0:01:10	0:03:42	0:05:41	0:21:59
Average	0:00:36	0:01:06	0:04:01	0:06:02	0:24:50
Dataset	12,935	12,937	12,953	12,958	12,958

Figure 44: HFD Rural Response Performance - EMS, 2010

HFD Rural Response Performance					
Fractile Measure	Call Processing Interval	Enroute Interval	Travel Interval	Response Interval	Total Unit Interval
90%	0:01:03	0:02:19	0:07:04	0:09:34	0:40:03
80%	0:00:44	0:02:02	0:05:39	0:07:56	0:31:37
70%	0:00:37	0:01:49	0:04:52	0:07:06	0:27:13
60%	0:00:32	0:01:39	0:04:19	0:06:26	0:24:22
50%	0:00:29	0:01:30	0:03:45	0:05:52	0:21:46
Average	0:00:40	0:01:31	0:04:07	0:06:18	0:25:42
Dataset	4,319	4,318	4,335	4,338	4,335

HESD reports its response time quarterly to the State of Hawaii. ESCI has evaluated the response performance of the ambulance service based on data provided by the dispatch agency. The response requirements for the ambulance service—as required by the state contract—are 60 seconds for the call taking interval; 2 minutes for the enroute interval; and 10, 15, and 20 minutes for the total response interval for urban, urban/rural, and rural zones, respectively. The 2010 performance (for emergency responses) is listed in the following tables.[21]

Figure 45: HESD Urban Performance, 2010

HESD Urban Response Performance							
Fractile	Call Taking Interval	Enroute Interval	Travel Interval	Unit Response Interval	Response Interval	On-Scene Interval	Total Unit Interval
90%	0:04:16	0:02:32	0:10:51	0:12:15	0:15:55	0:26:35	1:12:15
80%	0:03:05	0:01:54	0:08:38	0:09:55	0:12:49	0:22:29	1:04:41
70%	0:02:31	0:01:27	0:07:24	0:08:36	0:11:12	0:19:54	0:59:35
60%	0:02:09	0:01:04	0:06:28	0:07:38	0:10:05	0:17:55	0:55:26
50%	0:01:52	0:00:44	0:05:41	0:06:49	0:09:06	0:16:06	0:51:49
Average	0:02:44	0:01:06	0:06:28	0:07:35	0:10:13	0:16:47	0:53:17
Dataset	29,387	27,408	24,875	24,892	24,880	18,907	21,469

Figure 46: HESD Urban/Rural Performance, 2010

HESD Urban/Rural[22] Response Performance							
Fractile	Call Taking Interval	Enroute Interval	Travel Interval	Unit Response Interval	Response Interval	On-Scene Interval	Total Unit Interval
90%	0:04:32	0:02:44	0:14:00	0:15:46	0:19:37	0:25:18	1:14:40
80%	0:03:03	0:02:10	0:10:58	0:12:37	0:15:38	0:21:03	1:05:34
70%	0:02:27	0:01:50	0:09:15	0:10:50	0:13:28	0:18:33	0:59:51
60%	0:02:04	0:01:33	0:07:57	0:09:29	0:11:58	0:16:33	0:55:19
50%	0:01:47	0:01:17	0:06:52	0:08:19	0:10:39	0:14:53	0:51:35
Average	0:02:29	0:01:27	0:07:50	0:09:18	0:11:59	0:15:42	0:53:43
Dataset	41,582	38,992	34,831	34,838	34,796	25,781	29,591

[21] ESCI recognizes that there are minor differences in the way that it calculates response performance versus the process used by HESD. This process creates small differences in the performance data—some of which is slightly longer, some is shorter. We believe that these differences are insubstantial for the purposes of this report.

[22] HESD uses the term "urban/rural" instead of "suburban". ESCI uses "suburban" to refer to the "urban/rural" response area, to establish a standardized vernacular with the way that HFD reports, and to be more consistent with industry-standard terminology.

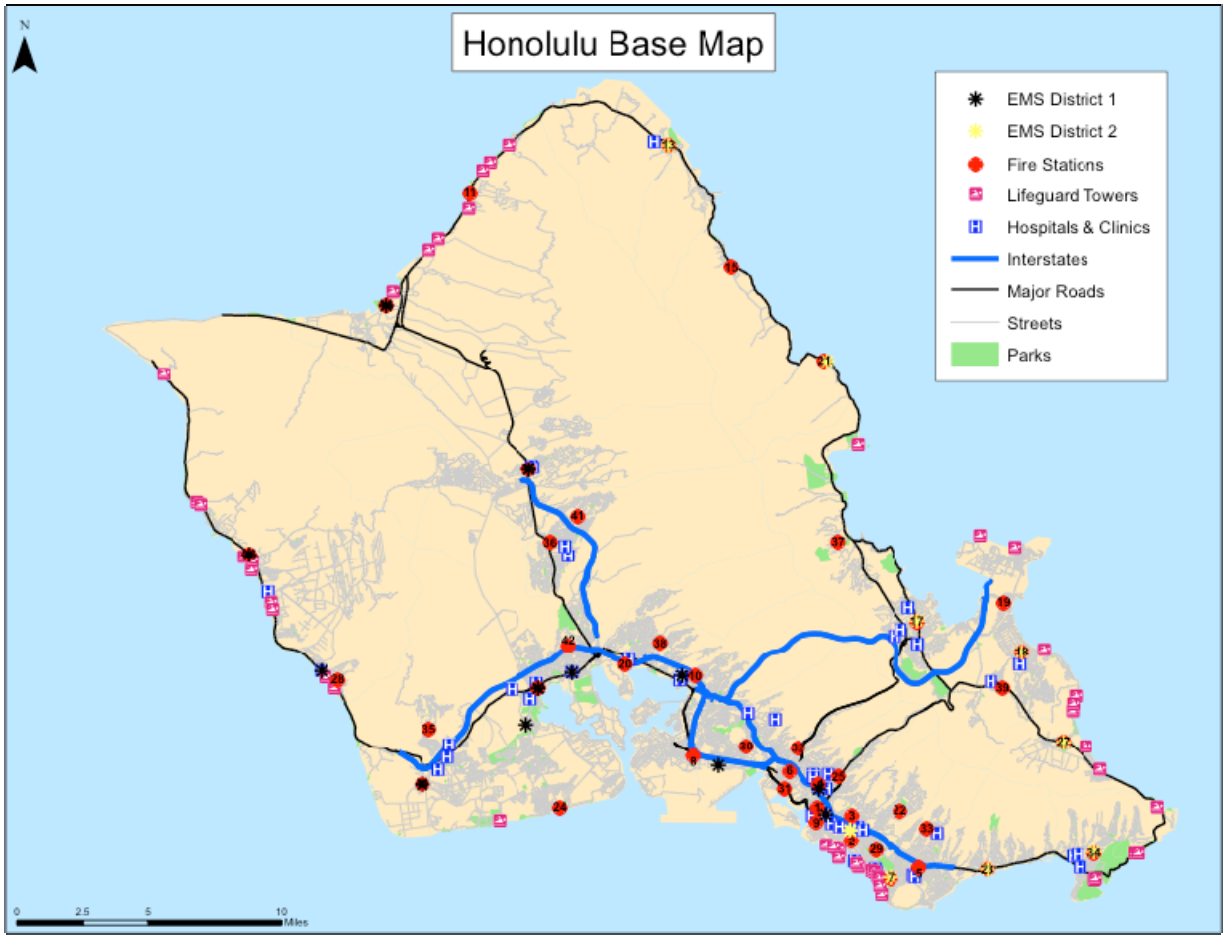
Figure 47: HESD Rural Performance, 2010

HESD Rural Response Performance							
Fractile	Call Taking Interval	Enroute Interval	Travel Interval	Unit Response Interval	Response Interval	On-Scene Interval	Total Unit Interval
90%	0:04:04	0:02:39	0:16:51	0:18:41	0:21:56	0:28:33	1:28:54
80%	0:02:54	0:02:07	0:13:43	0:15:17	0:18:04	0:23:07	1:19:42
70%	0:02:22	0:01:48	0:11:57	0:13:27	0:15:54	0:20:22	1:13:37
60%	0:02:03	0:01:32	0:10:28	0:12:04	0:14:21	0:17:33	1:07:36
50%	0:01:46	0:01:20	0:09:17	0:10:52	0:12:57	0:15:07	1:02:07
Average	0:02:28	0:01:27	0:09:48	0:11:14	0:13:42	0:16:50	1:03:00
Dataset	1,598	1,535	1,350	1,350	1,339	929	1,072

Calls by Response Area

Both the ambulance service and the fire department deploy resources in fixed locations. These locations are scattered throughout the island, generally more concentrated in urban areas (to cover demand) and more sparsely distributed in rural areas (to meet response time and cover geography). The following map shows the locations of all of the ambulance stations, fire stations and lifeguard towers on the island.

Figure 48: Deployment of Ambulance Stations, Fire Stations, and Lifeguard Towers



Units that are deployed in and around Honolulu are busiest. ESCI has evaluated response demand for the fire department and the ambulance service for the last three years. The table that follows shows the EMS system demand, by station and zone, for the fire department for 2008 through 2010.

Figure 49: HFD EMS Calls, 2008 - 2010

HFD EMS Calls by Station and Zone					
Station	Name	Zone	2010	2009	2008
ST01	Central	Urban	1,031	1,015	1,075
ST02	Pawaa	Urban	1,826	1,880	1,799
ST03	Makiki	Urban	743	793	834
ST04	Kuakini	Urban	748	794	721
ST05	Kaimuki	Urban	882	906	766
ST06	Kalihi	Urban	617	552	585
ST07	Waikiki	Urban	1,272	1,172	1,163
ST08	Mokulele	Suburban	463	370	416
ST09	Kaakako	Urban	668	508	537

HFD EMS Calls by Station and Zone					
Station	Name	Zone	2010	2009	2008
ST10	Aiea	Suburban	786	717	729
ST11	Sunset Beach	Rural	240	226	228
ST12	Waipahu	Suburban	1,083	1,070	1,102
ST13	Kahuku	Rural	113	117	138
ST14	Waialua	Rural	375	390	338
ST15	Hauula	Rural	227	230	179
ST16	Wahiawa	Rural	658	620	696
ST17	Kaneohe	Suburban	931	1,028	972
ST18	Kailua	Suburban	472	533	501
ST19	Aikahi	Suburban	142	188	169
ST20	Pearl City	Urban	541	531	488
ST21	Kaaawa	Rural	101	101	90
ST22	Manoa	Suburban	334	345	313
ST23	Wailupe	Suburban	490	430	419
ST24	Ewa Beach	Suburban	921	923	915
ST25	Nuuanu	Suburban	456	456	411
ST26	Waianae	Rural	1,342	1,197	1,024
ST27	Waimanalo	Rural	367	377	353
ST28	Nanakuli	Rural	562	559	498
ST29	McCully-Moilili	Urban	848	749	670
ST30	Moanalua	Suburban	781	689	640
ST31	Kalihi Kai	Suburban	547	440	415
ST32	Kalihi Uka	Suburban	883	817	865
ST33	Palolo	Suburban	301	308	307
ST34	Hawaii Kai	Suburban	660	639	747
ST35	Makakilo	Suburban	279	265	272
ST36	Mililani	Suburban	635	586	600
ST37	Kahaluu	Rural	355	337	338
ST38	Waiau/Newtown	Suburban	751	726	668
ST39	Olomana	Suburban	288	255	288
ST40	Kapolei	Suburban	559	534	464
ST41	Mililani Mauka	Suburban	297	220	245
ST42	Waikele	Suburban	900	894	859

HESD deploys ambulance resources in 19 different areas throughout the island. Calls are distributed by the dispatch center to a specific unit that is assigned to a specific area.[23] However, as no "zones" are assigned by the dispatch center we are unable to determine from the data precisely how units are assigned if the primary unit is not available.

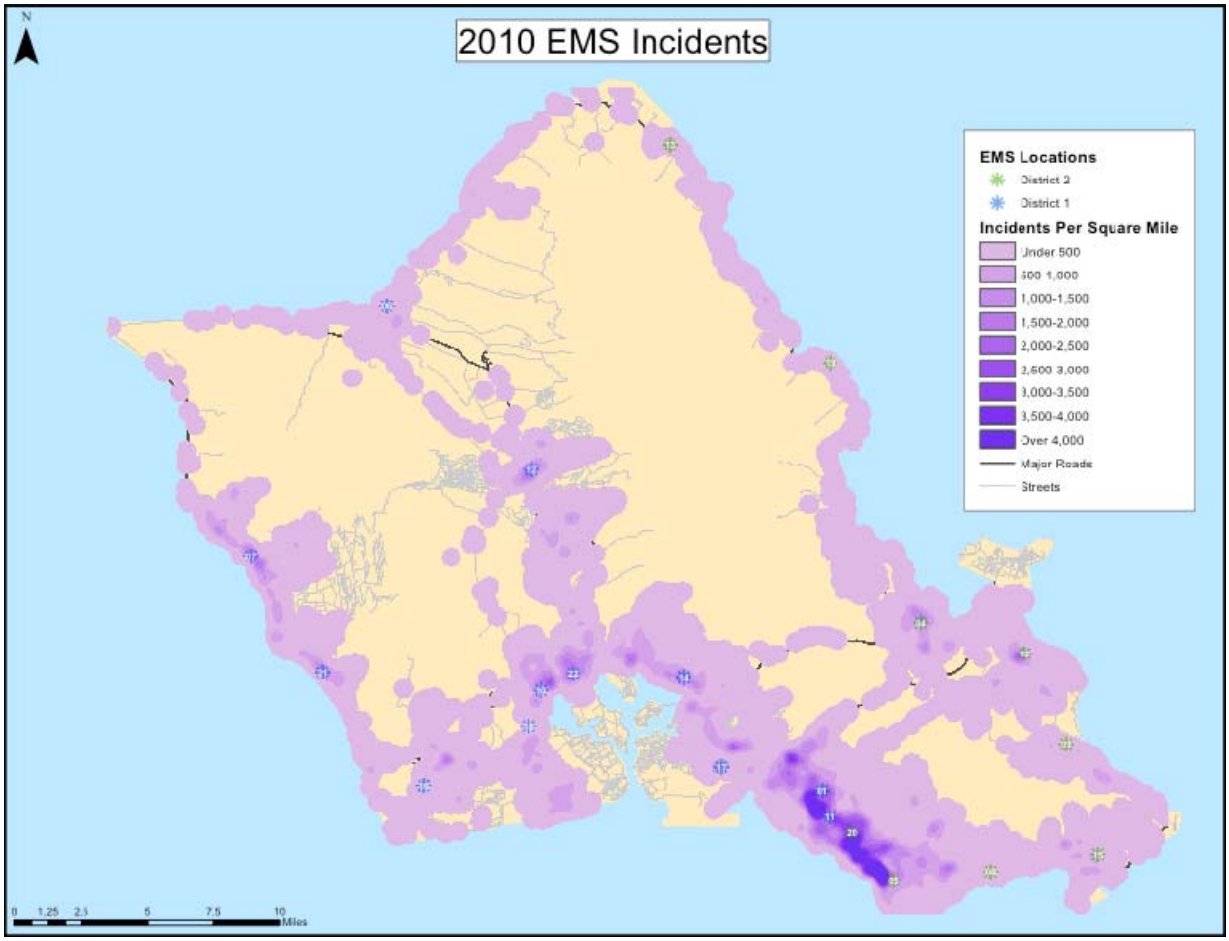
[23] However, as no "zones" are assigned by the dispatch center we are unable to determine from the data precisely how units are assigned if the primary unit is not available.

Figure 50: HESD Calls, 2008 - 2010

HESD Calls by Station and Zone				
Unit	Zones	2010	2009	2008
01 C1	Urban	6,271	5,687	5,657
02 M1	Urban	6,217	5,827	5,725
03 KL	Urban/Rural	2,510	2,495	2,339
04 KN	Urban/Rural	2,753	2,731	2,613
05 P1	Urban	6,180	5,817	5,417
06 WLA	Urban/Rural	1,564	1,480	1,345
07 WN	Urban/Rural	2,742	2,648	2,506
08 WLP	Urban/Rural	3,867	3,596	3,443
09 WAI	Urban/Rural	1,330	1,370	1,302
10 WHU	Urban/Rural	4,213	4,081	3,901
11 B1	Urban	6,403	5,985	5,735
12 WAH	Urban/Rural	3,672	3,425	3,309
13 KKU	Rural	1,102	1,031	916
14 AIEA	Urban/Rural	4,566	4,175	4,148
15 HK	Urban/Rural	2,081	1,965	1,954
16 MAK	Urban/Rural	3,456	3,401	3,000
18 RESP1	Urban/Rural	1,655	1,554	1,501
19 RESP2	Rural	527	485	426
20 Makiki	Urban	4,609	4,286	4,083
21 Nanakuli	Urban/Rural	2,000	1,847	1,666
	Total	67,718	63,886	60,986

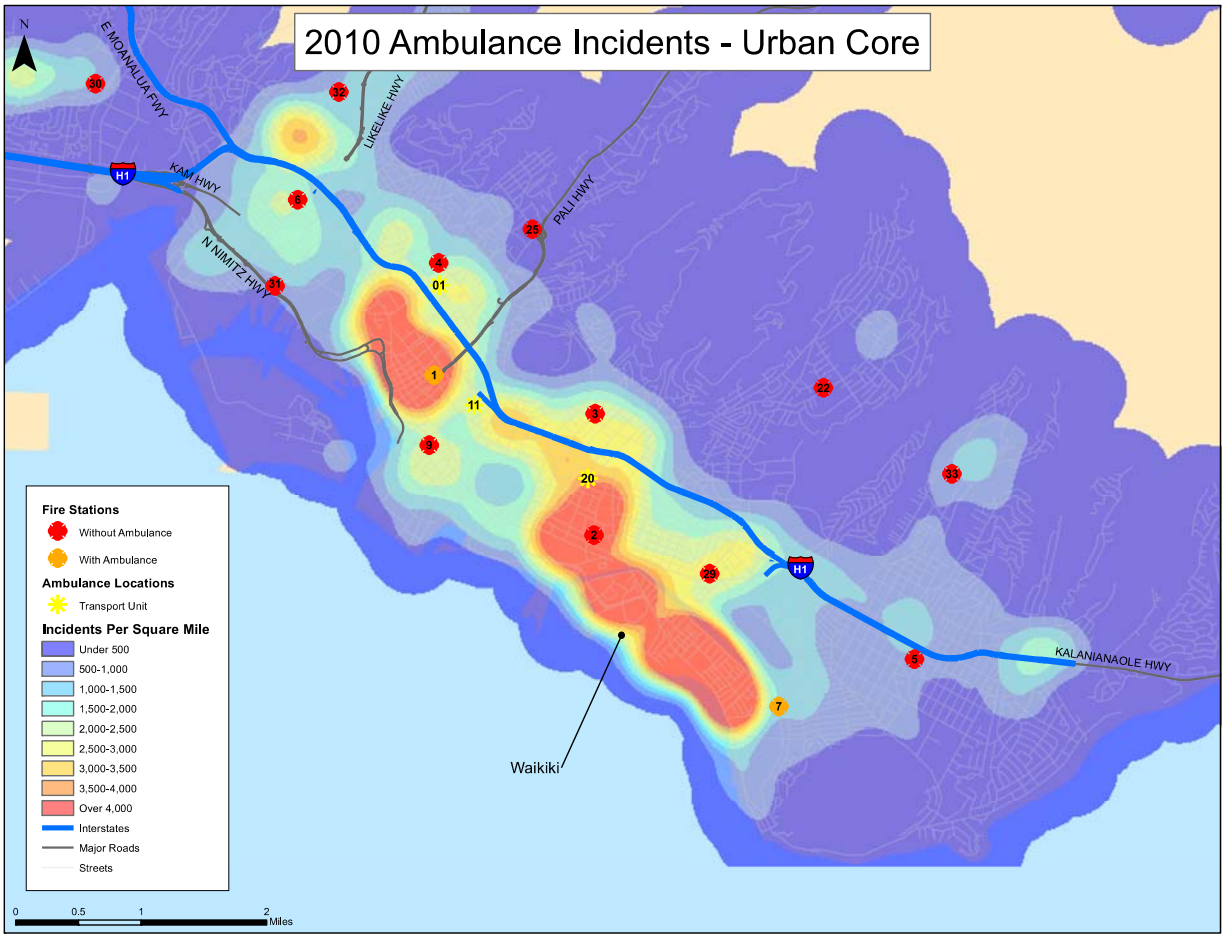
There is a significant amount of variation in the number of calls in the ambulance deployment system. That variation can be more clearly seen in the following demand map for 2010.

Figure 51: EMS Incidents, 2010



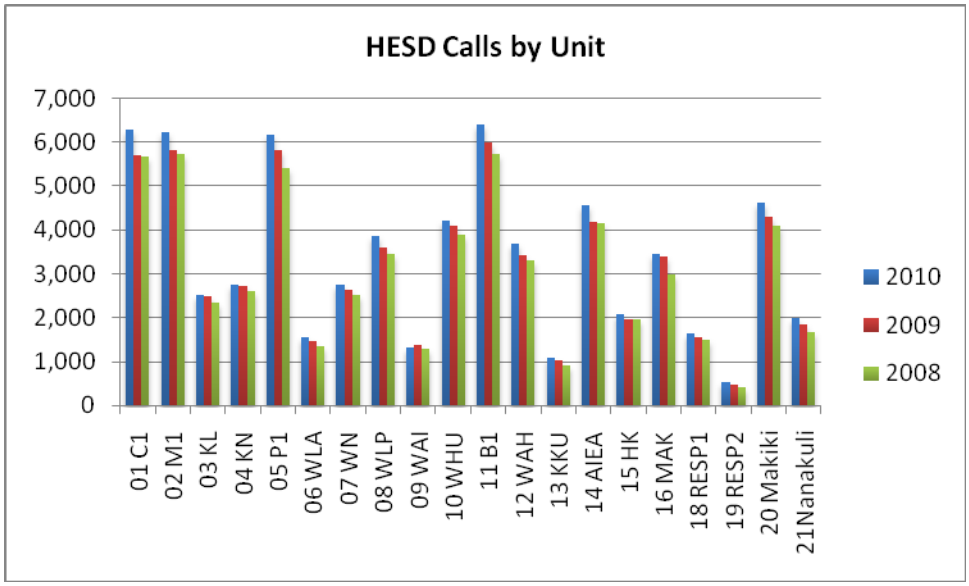
As can be more clearly seen in the inset map below, the density of calls in the urban core is more significant than the events in other areas of the island. The following map shows the detailed density of calls in the urban area of the island, as well as the concentration of resources available to service the density of events.

Figure 52: Density of Calls in the Urban Core Area and Available of Resources



The ambulance units assigned to the more urban areas are much busier than units assigned in other areas. The following figure describes the call volume by unit for the last three years.

Figure 53: HESD Calls by Unit, 2008 - 2010



Importantly, not all units are assigned for the same number of hours per day—some are assigned for 24 hours per day while others are assigned for 16 hours. As such, the workload for each unit is different based on the number of hours the unit is deployed. The table below shows the unit hours deployed per year for each of the units in the HESD ambulance deployment system.[24]

Figure 54: Annual Unit Hours Deployed

HESD Annual Unit Hours Deployed					
Unit District	Zone	Unit Type	District	Hours/Day	Hours/Year
01 C1	Urban	Ambulance	1	24	8,736
02 M1	Urban	Ambulance	2	24	8,736
03 KL	Urban/Rural	Ambulance	2	24	8,736
04 KN	Urban/Rural	Ambulance	2	24	8,736
05 P1	Urban	Ambulance	2	24	8,736
06 WLA	Urban/Rural	Ambulance	1	24	8,736
07 WN	Urban/Rural	Ambulance	1	24	8,736
08 WLP	Urban/Rural	Ambulance	2	24	8,736
09 WAI	Urban/Rural	Ambulance	2	24	8,736
10 WHU	Urban/Rural	Ambulance	1	24	8,736
11 B1	Urban	Ambulance	1	24	8,736
12 WAH	Urban/Rural	Ambulance	1	24	8,736
13 KKU	Rural	Ambulance	2	24	8,736
14 AIEA	Urban/Rural	Ambulance	1	24	8,736

[24] A unit working 24 hours per day works 8,736 hours in one year (24*7*52) while a unit working 16 hours per day is deployed for 5,824 hours.

HESD Annual Unit Hours Deployed					
Unit District	Zone	Unit Type	District	Hours/Day	Hours/Year
15 HK	Urban/Rural	Ambulance	2	24	8,736
16 MAK	Urban/Rural	Ambulance	1	24	8,736
18 RESP1	Urban/Rural	Quick Resp.	1	16	5,824
19 RESP2	Rural	Quick Resp.	1	16	5,824
20 Makiki	Urban	Ambulance	2	16	5,824
21 Nanakuli	Urban/Rural	Ambulance	1	16	5,824
				Total	163,072

One of the more frequently utilized metrics in the industry is the unit-hour utilization ratio (UHU).[25] UHU is a measure of efficiency in the system and is calculated by dividing outputs (hours working on medical calls) by inputs (total hours on duty). Essentially, a unit that is "working" on medical calls for one hour in a ten-hour shift would have a unit-hour-utilization ratio of 0.1.

Based on the calls by unit, the number of unit hours deployed, and the time required to complete a call, we can calculate the "utilization rate" for each unit.[26] Though utilization rates are measured differently by different organizations, the measurement here is based on the total amount of time that the unit is out of service on an emergency response, irrespective of whether the call resulted in a transport. The utilizations rates for the HESD ambulances are described below. The figure shows the UHU rates for all units in the system for the last three years.

Figure 55: HESD Unit Hour Utilization, 2008 - 2010

HESD Unit Hour Utilization (Based on Actual Time)				
Unit	Zone	2010	2009	2008
01 C1	Urban	0.64	0.58	0.58
02 M1	Urban	0.63	0.59	0.58
03 KL	Urban/Rural	0.26	0.26	0.24
04 KN	Urban/Rural	0.28	0.28	0.27
05 P1	Urban	0.63	0.59	0.55
06 WLA	Urban/Rural	0.16	0.15	0.14
07 WN	Urban/Rural	0.28	0.27	0.26
08 WLP	Urban/Rural	0.40	0.37	0.35
09 WAI	Urban/Rural	0.14	0.14	0.13
10 WHU	Urban/Rural	0.43	0.42	0.40
11 B1	Urban	0.65	0.61	0.58
12 WAH	Urban/Rural	0.38	0.35	0.34
13 KKU	Rural	0.13	0.12	0.11
14 AIEA	Urban/Rural	0.47	0.43	0.43
15 HK	Urban/Rural	0.21	0.20	0.20

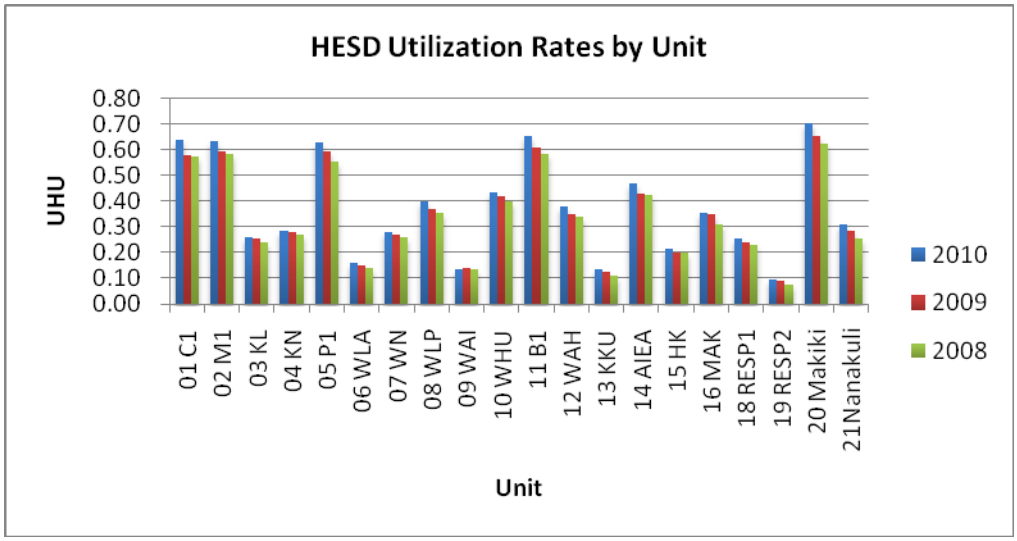
[25] Unit hour is defined as one hour of service by a fully-equipped staffed ambulance.
[26] The terms "utilization rate" and "utilization ratio" have the same meaning in this discussion.

HESD Unit Hour Utilization (Based on Actual Time)				
Unit	Zone	2010	2009	2008
16 MAK	Urban/Rural	0.35	0.35	0.31
18 RESP1	Urban/Rural	0.25	0.24	0.23
19 RESP2	Rural	0.10	0.09	0.08
20 Makiki	Urban	0.70	0.65	0.62
21 Nanakuli	Urban/Rural	0.31	0.28	0.26

In this analysis, we note that the utilization rates for the urban areas are much higher than those in the other areas, leading to concerns about burnout of employees and the opportunity for deployment changes.

In other areas of the country it is typical to see utilization rates for "high performance" private EMS systems approach 0.5 UHU rates. Fire department UHU rates approach 0.25 to 0.30, and municipal utilization rates range from between 0.25 and 0.35. Higher rates tend to lead to higher turnover and higher fatigue among participants. Lower rates may lead to higher skill degradation. Five of the ambulance units have utilization rates above 0.5 as shown in the table below.

Figure 56: HESD Utilization Rates by Unit, 2008 - 2010



Critical Issue:

The current EMS system is unable to meet system wide response time performance requirements as reflected in the high unit utilization rates especially in the urban core.

Impact:

The merger has the capability to utilize existing fire service assets and resources to ensure that paramedic-level intervention can be accomplished within established performance expectations. In addition utilization of these resources will result in providing additional system capacity lowering individual unit utilization rates.

EMS Delivery System

EMS System Service Delivery

The primary responders to emergency medical incidents, including the HFD, OSLD, and HESD EMS, utilize the Incident Command system for on-scene operational activities. In addition, personnel within both agencies are required to complete courses applicable to the National Incident Management System. Through policies adopted by the responding agencies, patient care responsibilities reside with personnel from HESD EMS.

Mutual aid is limited given the geographic limitations of the island. Primary mutual aid is available from several military installations on the Island of Oahu which maintain their own fire suppression and EMS personnel.

There does not appear to be a coordinated program of cross training. Each agency conducts its own training program predicated on the department's primary mission.

Major events such as the Asia Pacific Conference are planned for utilizing a multi-agency process.

Planning for Large Events

Major events are planned for jointly such as Presidential visits and other events which have the potential to stress current emergency services system resources. Joint post incident analyses provide for system improvements. There does not appear to be a coordinated program of post-incident analysis conducted among the various departments resulting with a focus on system improvements. Retrospective analysis of individual incidents does occur within the respective departments in order to improve individual agency performance.

Research and Development

There does not appear to be a coordinated program of research and development within the current system as related to EMS.

Joint Quality Assurance Processes

The medical committee is a joint quality assurance process that meets every other month. Representatives from HESD, HPD, HFD, and AMR attend the meetings. The committee has been successful in making system improvements such as access improvements for ambulances at medical incidents and clarifying supply distribution, management, and cleaning issues.

Critical Issue:

Within the context of service delivery, the current system does not provide a coordinated process for analyzing the impact of major events on the system.

Impact:

The merger will create the capacity to measure the system's performance for unique events that can have a major impact on the local government.

Facilities and Equipment

First Response and Ambulance Transportation Equipment

The State Department of Health regulates the requirements for licensed ambulances and defines the required equipment in several documents including *Essential Equipment for Basic Life Support Ambulance Service Standards* promulgated on 07-15-1985 and *Essential Equipment for Advanced Life Support Ambulance Service Standards* promulgated on 07-15-1985. The state does not regulate the type of equipment carried by first responder agencies—such as OSLD and HFD. No standardization of equipment exists between the various agencies (e.g., backboards, suction, AEDs and monitors, and other equipment). No rotor transport is available.

Replacement Plans

There does not appear to be documented plan for the replacement of equipment or vehicles other than overall wear and functionality within the HESD EMS. Units are generally replaced when they reach a maximum number of miles (approximately 200,000). Recent improvements within the overall fleet have provided an adequate number of frontline units. In addition to 19 frontline units, the HESD EMS maintains a backup fleet of approximately 18 units, which approximates a 1:1 ratio. Typical replacement ratios found in other systems are a minimum of 3:1 and a maximum of 5:1. Part of the rationale for maintaining a 1:1 ratio is the inability of the island to acquire mutual aid in a timely manner, resulting in the need for a certain degree of self-sustainability in the event of a major disaster.

A documented system of vehicle and equipment replacement is evident within the Capital Improvement Plan of the HFD. The Vehicle Maintenance Facility, collocated with the department's storeroom, repairs and maintains the HFD's fleet of firefighting apparatus: 75 firefighting pumpers, 10 aerial ladder trucks, 6 quints, 21 specialty apparatus, 4 rescue apparatus, 2 hazardous materials response vehicles, 11 tankers, 2 aerial tower apparatus, a 110-foot fire boat, watercrafts, and approximately 78 auxiliary vehicles.

The HFD has developed an Apparatus Replacement Program which details the expected life cycles of apparatuses. Annually the department submits replacement requests for three engines and one aerial. Every third year there is a request for an additional engine or support vehicle.

All ambulances utilized by the HESD EMS are appropriately licensed through the State Department of Health. The state does not certify or license first responder apparatus.

No formal plan for the routine inspection of equipment was found within the HESD EMS although policies are in existence requiring ambulance personnel to check their equipment before a unit is placed into service. Standardized equipment inspection plans are in place within the HFD. It is the responsibility of field staff and supervisors to ensure that all equipment is in functional order.

Maintenance plans for all HFD vehicles and equipment is predicated on a preventive maintenance program that is based on the type of unit to determine frequency and complexity of the maintenance performed. Complex repairs are outsourced to external contractors. HESD did not produce a comprehensive maintenance plan for its fleet. The agency maintains one on-site vehicle maintenance person to conduct minor repairs and coordinate repairs outside the scope of the employee's capabilities. All other repair to the fleet is contracted for through the City/County Automotive Maintenance Division.

The HFD Fleet Maintenance Facility provides maintenance on HFD equipment. Routine maintenance is provided by certified personnel; however, these personnel are not certified as Emergency Vehicle Technicians (EVT). The Emergency Services Department utilizes certified personnel through the corporate automotive maintenance facility; no information is available as to the EVT certification for these personnel. OSLD outsources the majority of work related to jet skis to private contractors.

Health Care Facilities

Health care facilities have been categorized by capability, including trauma care, obstetrical specialty, pediatric facility, burn facility, and hospital facilities with cardiac catheterization labs.

Figure 57: Health Care Facility Classification

Functional Classification of Healthcare Facilities						
Facility	Trauma	Peds	Burn	OB	Cath	Cath w/Surgical
Queen's Medical Center	X			X		X
Kaiser Medical Center		X		X		X
Hawaii Medical Center East						X
Hawaii Medical Center West						
Straub Clinic and Hospital			X			X
Kuakini Medical Center*						X
Kapiolani Medical Center		X		X		
Pali Momi Medical Center					X	
Castle Medical Center					X	
Wahiawa General Hospital						
Tripler Army Medical Center		X		X		X
Kaiser Honolulu Clinic						
Kahuku Hospital						
Waianae Cost Health Center						

** Kuakini Medical Center also has hyperbaric treatment capabilities.*

Emergency personnel are cognizant of tertiary care facilities and generally will transport to the most appropriate facility based upon patient condition and facility capability.

The pre-hospital triage program is appropriate for ensuring that patients are transported to facilities capable of managing varied acute conditions. Some exemptions from this program are considered appropriate for remote units in order to limit out-of-service times and coverage requirements.

Ambulances are co-located at 13 of the HFD fire stations on the Island of Oahu. However, the deployment is not predicated on demand analysis or risk/hazard evaluation. Due to the varied terrain and remote access, some ambulance response units are located based on minimizing a prolonged response time. Other rationale for location of units is predicated on historic practice and some units have been deployed as a result of legislative action.

Resource Deployment

Deployment of ambulance resources is based on historical practice and, to some extent, available space. The ambulance deployment plan is not predicated on system design or collaborative use of resources of the agencies. HFD has established a Standards of Cover Document consistent with the requirements for accreditation through the Center for Public Safety Excellence. The document serves as the basis for location and deployment of resources based on a systematic risk analysis and employment of service demand models. The HFD is currently in the process of constructing one new station (the East Kapolei Fire Station) to serve an area of projected high growth. Several projects are in the planning stage for the relocation of existing facilities, including the Hauula Station and the Waialua Station, to improve response times.

Critical Issue:

Multiple facilities are maintained by the respective organizations resulting in duplication of expenditures to maintain and staff these programs.

Impact:

The merger has the capability significantly lower the cost of support services and programs.

Impact of the Merger on the EMS System

ESCI was engaged to help determine how a merger may potentially affect the delivery of emergency medical services. There is concern that a growing and aging population will place additional demands on the EMS system; both the method and model for integrating emergency medical operations can impact the delivery of emergency medical services to the citizens and visitors of Oahu. Further, because the current system providers have multiple autonomous goals and missions, any proposed change will necessarily affect values and goals of the organizations involved. ESCI has reviewed how the merger will affect multiple components of the EMS system, including EMS governance and administration, system planning, human resources, equipment and facilities, communications, medical direction, system financing, EMS system delivery, and quality assurance. In the context of this analysis, ESCI determined that to be successful an EMS system merger must resolve a number of critical issues that will impact the system.

Critical Issues Related to the Merger of the Fire and EMS Departments

EMS in the State of Hawaii is unique. The state provides virtually all of the funding for ambulance service, and the state contract with the Oahu service provider allows the state to have substantial control over the delivery of ambulance services. No other state is as closely involved in ambulance service as Hawaii is, and no other state provides funding to ambulance services in the same way as Hawaii does. However, while the state is involved in the oversight of the service, the delivery of the service is consistent with what can be found elsewhere—callers dial 9-1-1 for services, ambulances and first responders respond and deliver medical care, and patients are delivered to medical facilities at which they receive definitive care. With these differences and similarities, the system has the opportunity to make improvements in the context of the proposed merger between the Honolulu Fire Department and the Honolulu Emergency Services Department. If that merger is to be consummated by the departments, the system participants will have to address a number of critical issues related to the existing system and related to the complexities of the merger. Importantly, a merger should be able to show that it can improve medical quality, is more operationally reliable in the context of response times, or provides financial efficiencies. The following are critical issues related to the merger of the agencies.

System Fragmentation. The EMS system on Oahu is fragmented. Multiple communications centers dispatch resources following a 9-1-1 call, yet there is no real ability to track a single event through the communications process. The system is designed around a historical ambulance model that doesn't consider other resources; in fact, the system can't universally track when the first arriving responder arrives on the scene. Commonly-applied quality assurance measures are not available throughout the system. A more integrated EMS system should be designed to resolve some or all of these issues.

Enhanced Service Delivery. A merger creates opportunities for the agencies to make use of expertise contained within other participants in the merger. For example, Ocean Safety is recognized as the expert agency in ocean rescue, but its services are generally limited to the near-shore areas while the

fire department is considered the primary responder in offshore rescues. Similarly, the ambulance service has a refined quality assurance program that could be distributed throughout a larger organization; and the fire department is the recognized expert in rescue and in its ability to manage large complex incidents. In a merger, these synergies should be maximized within the other participating departments to ensure the service delivery is enhanced.

Contract Compliance. ESCI believes that the state contract for ambulance service is a level-of-effort contract rather than a performance contract. The contract is level of effort in that it requires the number of ambulances to be deployed, the hours that they will be deployed, and the locations at which they will be deployed. While the contract also establishes performance requirements, it is difficult for the state to hold the ambulance service responsible for response performance when the provider has very little control over its resources. ESCI believes that a merger should and could improve contractual compliance by ensuring that the system can quickly deliver appropriate emergency medical resources to the patient's side. This may mean that paramedics arrive on the scene within appropriate timeframes irrespective of whether they arrive on an ambulance, a quick response vehicle, or a fire apparatus.

Yet the wisdom behind the contract is reasonable. The contract should and does specify the number of personnel and their certifications per ambulance; response times for urban, suburban, and rural areas; a quality assurance process; and other appropriate performance measures.

Advancement Opportunity. Civilian paramedics currently employed in the EMS system have committed to a career of providing emergency medical services. In the current system design there are limited opportunities for advancement of personnel. The career ladder is limited to a fixed (and relatively small) number of supervisory and management personnel. A merger should consider the careers of existing personnel and provide opportunities for advancement. A merger should also ensure that the civilian staff members have job security with the HFD in the long term.

The UPW Contract. UPW members have served the island for several decades and have substantial knowledge of EMS service delivery. Yet the UPW has multiple and significant economic incentives to maintain the status quo in the system. After a merger, some paramedics will elect to follow a paramedic/firefighter career and will presumably be represented by another bargaining unit. Others may change assignments and it is possible that ambulances that would otherwise be staffed by overtime personnel will be replaced with straight time fire department ambulances when personnel shortages occur. A merger between the agencies will cause UPW leaders, fire department leaders, and ambulance leaders to consider changes to the UPW contract. Contract changes will be forced not by the merger but rather by challenging financial conditions, personnel shortages, and operational considerations. These changes will require participative negotiations with the UPW leadership, beginning with the 2013 contract.

Quality Assurance. The existing quality assurance process is well structured as a component of the ambulance service. However, there are opportunities to ensure that the quality model is deployed more

effectively system wide. There is currently no contemporary, professional in-house quality model for the fire department or the OSLD. Further, the dispatch system lacks the quality infrastructure that is needed for the delivery of the highest quality medical priority dispatch services. A merger between the agencies should therefore ensure that the ambulance quality assurance process can be deployed effectively throughout the organization—including dispatch, fire services, and ocean safety.

Continuity of Care. The continuity of care is not currently considered in the structure of the system. Because of the multiple handoffs of medical care between dispatch agencies, service providers, and others, opportunity exists for significant discontinuities in the medical care of patients. Does this degrade medical outcomes? No one is sure, because neither this nor many other aspects of EMS have been studied. ESCI believes that the more handoffs that are made in a system without a structured way to ensure continuity, the more risk for patients. In a merger, the system participants must ensure a high level of continuity in the delivery of medical care.

Leadership Stability. The upcoming retirements of the baby boom generation will place pressure on all of the local agencies. There must be a leadership development infrastructure to ensure that there are pools of competent personnel available to take the reins when the existing management teams retire. HFD has somewhat prepared for the pending retirements and has encoded that preparation into its strategic plan. HESD's strategic plan is based on those items that are included in the annual contract for ambulance service. Planning for a new generation of leaders and leadership competence is not a component of the annual contract and therefore not an area of focus for the ambulance service. A merger must ensure that there are adequate numbers of leaders available not only at HFD but also within the ambulance service.

Deployment Schedules. In a merged environment, deployment schedules will change. Some firefighter paramedics will staff ambulances and quick response units according to the needs of the community at that time. Units will be scheduled (potentially) for different shifts and at different locations or using different methods than are currently employed. This will be a change to the system, a change to the dispatch process, and a change in the way that scheduling and resource usage takes place. In a merger, both HFD and HESD employees will have a more hands-on approach to the design and structure of deployment methods and will have the opportunity to determine how deployment schedules and staffing will change (or stay the same).

Employee Turnover. Employee turnover (as well as the nature of the training pipeline) in the ambulance system has caused significant demands on personnel and on the system. Currently overtime costs represent roughly 60 percent of the straight time costs in the system. This cost structure is simply not sustainable in the long term. Overtime costs are driven primarily by three factors: the contract with the State of Hawaii, the nature of the contract with UPW, and the lack of sufficient paramedics in the system. The lack of sufficient paramedics in the system is largely a function of the state's stringent training requirements, the competition for paramedics from other services in the state, and the staffing model employed by HESD. A merger in the EMS system must protect itself from employee turnover and

must take steps to make sure that the optimal numbers of paramedics and EMTs are available in the system at all times.

Financial Efficiency. Even if a merger between the agencies makes significant improvements to response times and to quality, if there are no financial benefits to the merger then there is little likelihood that the merger will be successful. If there are only modest financial benefits, then those benefits may not be sufficient enough to engage in the process of the merger.

Medical Oversight. The current fragmentation of medical oversight will change in the event of a merger. Multiple physicians from multiple agencies currently provide some level of oversight in the system. The island has a medical director with responsibilities to the city and county as well as the federal fire service. HESD employees a physician to oversee the medical care provided by the ambulance service and HFD employs a medical director, primarily for the purposes of the department's AED program. A single medical authority will have the ability oversee all components of medical care from dispatch, through first response care, and finally through the ambulance transport system. One concern in the system is whether the fire department has the ability to provide advanced medical care, and ESCI believes that only through a single medical authority will a medical program with the fire service be successful.

Employee Involvement in Change Processes. Multiple nuances of the merger will require detailed, functional, street-level input to make the merger process successful. As such, any merger proposal that does not include fire department personnel, ambulance personnel, dispatchers, and physicians to work out the multiple details of the process will be very difficult to execute. A critical issue in the implementation of the merger process must include opportunities for input by multiple employee groups.

System Design/Redesign Considerations

ESCI has considered the effect of a merger on the EMS system design. Of primary importance, we considered whether a merger between ambulance and fire service would 1) reduce total system costs, 2) improve system quality, and 3) improve response performance. To do so, we have evaluated the critical issues and the potential changes that could be accomplished through a merger and identified how those changes could resolve some of the critical issues in the system. We also evaluated some of the potential implementation options, including even whether status quo (not making any changes to the existing system) is an option. The system as it currently exists can opt to remain with the status quo or can execute a number of integration options. For the purposes of this report, the integration opportunities will be described under the most common or likely scenarios; however, with each scenario, a number of potential permutations may impact operations of the system. For that reason, ESCI has described a structured, facilitated planning process that allows system stakeholders to participate in the detailed development of the system.

Integration Opportunities

Based in part on the critical issues described above, the HFD and HESD will have multiple opportunities to make improvements to the system and to reduce costs as a result of the merger. Detailed below, ESCI describes a number of benefits to integration and opportunities to make the integration a success by improving response performance, improving quality, or making financial improvements.

Merger of Administrative Space. HESD leases a facility near the airport that houses administrative staff, dispatchers, and some maintenance and supply personnel. Because space is available, or could be made available at the HFD headquarters, there is an opportunity to consolidate the facilities at fire administration thereby improving communications, lowering expenses, and reducing fragmentation.

Merger of Administrative Personnel. Currently, the HFD and HESD operate separate organizational structures that provide significantly parallel functions. The agencies can merge their administrative staffs to reduce management fragmentation, lower cost, improve advancement opportunities, and provide for leadership stability.

Integration of Public Education and Prevention Efforts. HFD, HESD, and OSLD each operate public education, awareness, and prevention activities. Each has expertise in various disciplines and each has the opportunity to make use of the expertise of others to make improvements to internal operations and outcomes. Further, the state contract requires public education and prevention activities on the part of HESD.

Merger of Supply/Logistics. HFD and HESD each employ a specialized supply and logistics function to distribute supplies and other goods to the fire stations and ambulance quarters. The supply functions are duplicative in that there are multiple delivery vehicles and personnel doing essentially the same function (although the supplies are different between fire and EMS). A merger of supply and logistics will reduce any fragmentation that exists between agencies, will enhance the ability of the agencies to provide an integrated service, and will improve financial efficiency.

Merger of Vehicle Maintenance Services. Each of the divisions—fire, ambulance, and ocean safety—employ vehicles that require regular preventative maintenance services as well as occasional repair. With some changes to its existing fleet maintenance facility, HFD has the ability to take over all vehicle maintenance functions. The vehicle maintenance functions will require significant integration efforts by the maintenance personnel for all agencies, but ESCI believes that there are opportunities for financial savings with redistribution of personnel from automotive services.

Merger of Dispatch Communications Services. HFD, HESD, and OSLD operate independent dispatch centers. These multiple dispatch agencies fragment the distribution of 9-1-1 calls and create difficulties when emergency events require responses from multiple agencies. A merger of communications agencies will provide multiple benefits to the system. First, it will improve service and reduce fragmentation through a single dispatch computer system tracking calls from call entry to arrival of all

units. Next, it will ensure that the ambulance agency can make contractual improvements because data will be greatly improved. Further, a merger of dispatch agencies will ensure a broader pool of leadership personnel and a more stable leadership platform. In conjunction with a standardized medical oversight process, there are more opportunities to ensure medical oversight of the dispatch agencies including structured development of medical protocols. Finally, the merger of dispatch agencies will provide significant financial efficiencies for the organization.

Integration of HFD Ocean Rescue Functions into OSLD. The Ocean Safety Lifeguard Services Division provides ocean rescue in near shore waters and the HFD provides similar services in the deep water. Yet, as specialists, the Ocean Safety lifeguards are seen as some of the most expert in the world. A merger between the departments would bring together highly qualified ocean rescue personnel from both agencies and as such could improve service delivery, reduce potential discontinuities in rescue events that involve both agencies, and provide opportunities for advancement for current OSLD personnel.

Deployment of Dual-Role Ambulances. Making fire department ambulances available at appropriate locations on the island is one important method to improve quality in the system. Under the dual-role fire-based ambulance deployment model, the fire department would retain the current deployment of ambulances within the system while improving the response capability of the department to include ALS engine companies and eventually implementation of fire-staffed transport ambulances. The expansion of the role of the fire department to this level of service ensures that response time performance improves and that the EMS system complies with the state contract, expands the career path available to members of HESD EMS that wish to become cross-trained, and allows individuals to retain their current position without fear of losing their jobs or having to certify as firefighters. This option captures the ability of the HFD to institute transport units at peripheral facilities where multi-role job responsibilities are capable of managing the workload with existing staff and resources. The addition of these resources enables redeployment of other units to higher demand areas at marginal cost rather than the full cost of adding ambulance capacity. In addition, instituting firefighter-staffed ambulances results in improvements to staff productivity recognizing that firefighters work a 53-hour workweek as permitted under the FLSA 7K Exemption. This work schedule essentially results in a 20 percent productivity improvement over the standard 40-hour workweek currently used by the EMS Division.

Elimination of Outside Ambulance Service for Surge Capacity. Making use of fire department ambulance resources can make other improvements in the system, most notably eliminating the use of back-up ambulance resources from the private sector. When called up for response, the private ambulance bills for services (which are ultimately paid by the State of Hawaii) irrespective of whether the ambulance transports. After a merger, HESD and the fire department will make use of the same medical director and the same quality assurance process—monitoring the continuum of care throughout the medical event. The merger will bring a reduction in the payments made to the private ambulance provider and will therefore save the EMS system as much as $200,000 per year.

Deployment of QRVs in Fire Stations. Quick response vehicles, staffed by a single paramedic, are used by HESD in two areas on the island to provide coverage during times when ambulances are out of position or when additional resources are needed in the system. The HFD can, with appropriate staffing, provide QRVs in fire stations. After a merger, the fire department can deploy QRVs in specific stations in the system to increase the availability of paramedics, to cover significantly more territory in the rural areas, and to free up the civilian QRVs for duty in other areas.

Deployment of Split Ladder Companies. Some of the more urban fire stations deploy, among other resources, ladder companies staffed with five personnel. Splitting the ladder companies means to deploy the ladder companies on two units: the ladder and an ambulance or quick response vehicle. The ladder company would still respond to fires as a company; the company would respond to the event on two pieces of apparatus rather than one. For medical calls, the QRV or ambulance would respond rather than the ladder truck. This saves multiple responses on the nearly $1 million vehicle and therefore preserves the vehicle (including metal fatigue) by reducing the number of calls to which it responds. Use of split ladder companies this way enhances services, assists the city with ambulance contract compliance issues and saves costs in the system.

Integration of Medical Oversight Services. Currently, multiple physicians provide some level of oversight in the emergency medical system and multiple processes to review the quality of medical care. A merger of the services will provide the opportunity to merge medical oversight into a centralized, focused process. This will improve the potential for quality management, reduce medical fragmentation, and consolidate medicine.

Negotiation of State Contract for Ambulance Service. Currently the ambulance provider negotiates the contract with the State Department of Health on an annual basis. While that won't change in a merged environment, the savings attributable to the merger of the entities will have the effect of pitting the state's desire for lower payments with the City/County of Honolulu's desire to benefit from reducing the costs. As such, in the context of negotiating the contract with the state, the City will have to ensure that there are adequate benefits for the state as well as appropriate incentives for the merged department to lower costs.

Deployment of Quality Assurance Functions. Currently HESD has a highly functional quality assurance process that is focused on the issues related to performing according to the state contract and is also important in measuring appropriate procedures, treatments, protocol violations and medical outcomes. The HFD does not have the same level of quality oversight. A significant benefit for the system in the context of the merger is the ability of the ambulance provider to deploy its high level of quality oversight to the fire department. The fire department will benefit greatly from a contemporary, professional quality assurance process and for the first time a single agency will be able to measure performance of personnel and the system by making use of HESD's quality management program.

Evaluation of Merger Opportunities

The City and County of Honolulu is faced with the unique opportunity to make substantive improvements in the design of its emergency services operations. We have noted that there continues to be strong internal pressure by some system participants to maintain the status quo, while others seek significant changes. The initial design of the opportunities considers both possibilities. ESCI has made the following recommendations based on a reasoned approach to evaluating the current emergency services system design. We have evaluated the system based on contemporary professional standards and have considered the local operating, governance, cultural, and financial environments as the basis for our recommendations.

In evaluating the potential changes to the system, EMS participants should consider how each of the possible changes will impact the current system and how those changes will affect patient care. As we have previously noted, any changes to the system in the absence of establishing performance criteria will limit the ability of the system participants to make substantive improvements. In the absence of establishing performance criteria, implementing any option will have roughly the same impact on the community. Irrespective of the integration opportunity, ESCI believes that financial, response time, and medical performance must be carefully monitored. Each of the opportunities we have identified has both advantages and disadvantages; however, there may be additional derivations of options and considerations other than those articulated in this report.

In making our recommendations, we have taken into account the critical issues related to the Oahu EMS system and have analyzed those based on critical issues. The following table describes which integration opportunities can achieve improvements in the critical issues. A notation of “Y” in the matrix indicates improvements can be made in those critical issues based on the opportunity noted.

Figure 58: Opportunities for Resolving Critical Issues

Benefits of a Merger between HFD and HESD												
Integration Opportunity	System Fragmentation	Enhanced Service Delivery	Contract Compliance	Advancement Opportunity	The UPW Contract	Quality Assurance	Continuity of Care	Leadership Stability	Deployment Schedules	Employee Turnover	Financial Efficiency	Medical Oversight
Administrative space.	Y	Y									Y	
Administrative personnel.	Y	Y		Y				Y			Y	
Public education/prevention.	Y	Y	Y							Y	Y	
Supply/logistics.	Y	Y									Y	
Vehicle maintenance services.											Y	
Dispatch communications services	Y	Y	Y			Y	Y	Y			Y	Y
HFD ocean rescue into OSLD.	Y	Y		Y								
Dual-role fire based ambulances.	Y	Y	Y	Y	Y		Y		Y	Y	Y	
Eliminate outside ambulance service for surge capacity.	Y	Y	Y			Y	Y		Y		Y	Y
FD QRVs	Y	Y	Y		Y		Y		Y	Y	Y	Y
Split ladder companies.		Y	Y						Y		Y	
Medical oversight services.	Y					Y						Y
Negotiation of state contract for ambulance service.	Y										Y	
Quality assurance functions.						Y						Y

Financial Analysis of the Proposed Merger

ESCI has identified a number of benefits resulting from the proposed merger. Included are significant cost savings, continuity of medical care from initial response to hospital destination, a single unified command structure, compliance with state required ALS response times, utilization of fire service resources to augment the delivery of EMS, and other benefits. However, a critical aspect of determining the feasibility of the merger is the financial impact the merger will have for the City/County of Honolulu as well as the State of Hawaii in its role as the principal payor for the delivery of Advanced Life Support patient care and transport services. In analyzing the financial impact of the proposed merger, ESCI evaluated the following elements:

- State of Hawaii Department of Health EMS Contract
- HFD Budget and Revenues
- HESD Budget and Revenues
  - Emergency Medical Services Budget and Revenues
  - Ocean Life Safety Budget and Revenues
- Opportunities for Short and Long-Term Cost Savings
- Projected Savings under a Merged Environment

It is clear from our observations as well as interviews conducted with senior officials that funding for emergency services will face constraints as all levels of government have been impacted by the recession. In addition, concerns about tax increases and changes to how the nation's healthcare system will be funded, in particular the Centers for Medicare Services as the principal federal payor for health care, is expected to limit increases at a minimum and will more likely reduce payments for ambulance services. Regardless of these financial constraints, demand for emergency medical services will continue to grow as the population expands, and will grow even further as the full effect of the "baby boomer" generation will be realized with a graying population requiring additional medical services.

Any discussion of potential savings through a merger of the organizations must be tempered with the realization that the revenues to support the delivery for emergency medical services are derived from a contractual agreement with the State Department of Health. Within the context of the contract the state has identified the required level of effort for contract compliance. This level-of-effort contract includes compliance with a specified number of ambulances, unit locations and hours of operations; number of primary and back-up units to be maintained, a limitation on the use utilization of personnel for other functions or responsibilities; response time requirements, procedures for completion of billing forms, and other requirements. The contract is renegotiated on annual basis and funding for the last two fiscal years has been held constant at $32,273,154. The contract provides funding for personnel, equipment, communications, overhead, support services and capital expenditures.

As the primary payer for the delivery of emergency medical services, the State of Hawaii through the Department of Health has a fiduciary responsibility to ensure that the agency charged with operating the emergency medical services program meets the contractual requirements in an efficient and cost effective manner while ensuring that all citizens have equal access to the provision of advanced life support services. The state, in an effort meet its fiduciary obligation under a performance-based contract, could require an annual audit of contract expenditures similar to the requirements of federal grant programs.

ESCI's analysis concludes that the cost of providing emergency medical services will continue to be faced with mounting fiscal pressures. The proposed merger of the organizations provides both the State of Hawaii and the City/County of Honolulu the opportunity to develop a new contractual relationship that is predicated on performance rather than level of effort. A performance-based contract would not dilute the State's statutory role in managing the provision of ALS care and patient transport; rather we believe it would enhance the delivery of EMS services by providing an opportunity for creativity and innovation.

In using a performance-based approach to contracting for this service, the state would establish performance standards such as ALS response time criteria for urban, suburban, and rural areas; dispatch criteria including pre-arrival instructions; utilization of state-established patient care protocols; personnel performance such as continuing education; quality assurance; and other reporting requirements. Subsequently it would be the responsibility of the City/County of Honolulu under a performance-based contract to determine the resource requirements, how to deploy those resources, and other services necessary to meet the contractually established performance standards. Through a performance-based contract the organization responsible for the delivery of the service is provided the opportunity to be flexible and innovative in the provision of services including the institution of cost controls and other efficiencies currently not available to the system.

The State and the City/County of Honolulu should develop a multi-year budget that provides stability for both agencies in terms of financial resources required to meet contractual obligations. The contract amount should be negotiated and the State and the City/County should benefit from efficiencies and productivity improvements gained through a merger of the organizations.

The financial impact of the merger can be measured both in terms of reductions in the cost of services provided and through productivity gains realized from utilizing current fire service assets in the delivery of emergency services. Some reductions in cost can be recognized early in the integration process; however, the full impact of financial savings will be highly dependent upon the degree of integration desired and achieved by the agencies. ESCI has identified cost savings for each of the component elements of the integration process, including merging administrative functions, communications and other support services, utilization of cross-trained firefighters in the delivery of ALS first response, and implementation of patient transport units staffed with dual-role firefighters. In our opinion, cost savings that can be initially achieved through a merger of the organizations are specifically within the administrative, communications, and support services functions. Long-term savings can be achieved by

using fire service personnel in a cross-trained dual-role function both from a first-responder perspective providing ALS services as well as strategically located ambulances staffed with firefighter/paramedics and firefighter/EMTs. Two of the advantages of using firefighters as medical responders are the shift scheduling of 24 hours per day and the FLSA exemption that limits the amount of overtime for these shift schedules.

HFD Budget and Revenues

The HFD operates under a consolidated budget segregated by department function. The total budget for the department is approximately $101,551,055. Revenues to support the HFD are derived from the City/County of Honolulu General Fund. Some financial assistance is provided under a contract with the state for the operations of the fireboat, and HFD receives approximately $60,000 from HESD EMS for housing ambulances within certain fire stations. The department also generates revenues from plan reviews and inspections performed by the Fire Prevention Bureau, which are deposited to the City/County of Honolulu General Fund. The fire department's current role in EMS first responder services is funded entirely through the fire operations budget.

Figure 59: HFD Department Budget

Honolulu Fire Department Budget			
	2009	2010	2011
Total Fire Administration Budget	$2,676,413	$2,953,919	$2,771,533
Total Fire Operations Budget	71,358,385	79,504,204	80,452,729
Total Fire Prevention Budget	3,242,136	3,658,485	3,392,310
Total Fire Communications Budget	1,899,142	2,242,033	2,222,575
Total Fleet Maintenance Budget	1,980,776	2,043,168	1,946,149
Total Training and Research Budget	1,895,827	2,299,601	1,988,573
Total Radio Shop Budget	294,929	282,450	270,653
Total Fireboat Budget	1,565,984	3,216,515	1,951,185
Total Radio City Budget	195,388	241,065	156,362
Total APEC Budget	--	--	4,765,285
Total Vacant Position Budget	--	--	1,618,844
Total	$85,111,680	$96,449,159	$101,551,055

HESD Budget and Revenues

The Honolulu Emergency Services Department Budget reflects expenditures associated with the provision of administrative services for the department's two divisions consisting of the Emergency Medical Services Division and the Ocean Life Safety Division. Revenues to operate the HESD function are provided from the City/County of Honolulu General Fund.

Figure 60: HESD Administration Budget, 2011

HESD Administrative Budget	
Function	2011 Budget
HESD Administration	$354,552

Emergency Medical Services Budget and Revenues

The HESD Emergency Medical Services budget is funded by the State consistent with the annual contract negotiated with the City/County of Honolulu. Expenditure reports are provided by the HESD EMS to the State for purposes of reimbursement. In addition to funding the operational expenses associated with the delivery of emergency medical services, the State also reimburses the City/County of Honolulu for specific expenditures including overhead, employee benefits, and capital expenses.

One frequently cited concern by both the state and the City/County of Honolulu is the level of overtime expense being incurred by the HESD EMS. In the current fiscal year (FY-2011) total salary expense (regular and overtime) is budgeted at $17,026,847. Of this amount approximately $4,172,524 is budgeted for overtime expense. In FY-2010 the same overtime expense was budgeted but year-end actual numbers reflected an expense of $4,910,736, equivalent to 43 percent of the regular salary budgeted. ESCI has identified opportunities to lower the overtime expense currently being incurred. However, elements responsible for some of the growth in this expense category are directly attributable to provisions within the labor contract in effect between the City/County of Honolulu and the United Public Workers Union, the collective bargaining agency representing emergency medical services personnel. Any cost reductions in overtime expense from this category would require renegotiations of the overtime provisions of the labor contract.

Figure 61: HESD EMS Budget

HESD EMS Budget		
	Revenues	Expenditures
State EMS Contract	$32,273,154	
Direct Payments to City		$7,909,738
Authorized City EMS Budget FY 2011		$22,156,752
Total	$32,273,154	$32,273,154*

**Total 'Expenditures' does not include $2,206,654 in non-expended funds; ESCI was unable to determine if these funds were returned to the state or retained by City/County of Honolulu.*

Ocean Safety Lifeguard Services Division Budget and Revenues

The Ocean Safety Lifeguard Division derives its funding from the General Fund of the City/County of Honolulu. Expenditures reflect the provision of lifeguard services throughout the Island of Oahu. The OSLD does not generate revenue in its provision of services.

Figure 62: OSLD Budget

HESD Ocean Safety Lifeguard Services Division Budget	
Department	2011
Ocean Safety Lifeguard	$7,874,049
Total Budget	$7,874,049

Opportunities for Cost Savings

Administrative Space

Integrating administrative functions of the current organizations creates economies of scale and direct savings through the relocation of the Emergency Services Department from commercial space currently being leased. The organization leases space at 3375 Koapaka Street, an office and warehousing facility located adjacent to the Honolulu International Airport. The annual facility lease payment is approximately $325,000. Based on conversations with senior emergency services staff, the current lease has a single year buyout provision equal to one annual lease payment.

The Honolulu Fire Department has adequate administrative space at its headquarters facility to accommodate the administrative functions of the Department of Emergency Services. HFD has indicated that a relocation of the current space occupied by the department's Bureau of Prevention to available space in an adjacent facility would enable the relocation of HESD administrative functions. In the absence of a performance contract it is unclear whether the HFD would be able to recoup administrative lease costs from the state through the EMS contract. If the state does not permit payment for HFD administrative space, the City/County should negotiate use of the current lease funding of $325,000 for improvements to other elements of the EMS delivery system such as training some fire personnel to the ALS level. In addition, the fire department currently receives approximately $60,000 annually for space provided at various fire stations that house HESD EMS units. Under a merged environment it is plausible that the organization would not receive this payment from the state. ESCI recommends that the City/County of Honolulu should discuss the application of cost savings from facility lease payments to system improvements. At a minimum, the merger has the potential to save approximately $385,000 on an annual basis in facility lease payments subsequent to the buyout provision in year 1.

Administrative Services

The proposed merger will integrate administrative functions and staff. The HESD EMS Division currently employs five office staff and one administrative assistant for the clerical needs of the organization. ESCI recommends that some of the functions currently being performed be integrated into the HFD Administrative Services Bureau, which has 23 positions dedicated to clerical and administrative functions. Based upon our analysis of the functions performed by the HFD AS Bureau and current staffing within the Bureau as well as the HESD EMS Division, ESCI is confident that within the first two years of consolidation, three clerical positions could be eliminated without an adverse impact on the clerical and administrative responsibilities of the integrated organization. It is recommended that these

positions be eliminated through attrition or reassignment to other clerical functions vacated within the City/County of Honolulu. Annual savings in personnel costs, salary, and benefits, are estimated at approximately $150,000.

Figure 63: Annual Administrative Facility and Personnel Savings

Administrative Facilities and Services Savings	
Administration	Annual Savings
Facility Lease Payments	$385,000
Personnel Costs	$150,000
Projected Savings	$535,000

Communications

The City/County of Honolulu expends an estimated $4.3 million in combined annual operating cost for HFD, EMS, and OSLD Dispatch services.

Figure 64: Communications Budgets, 2011

2011 Communication Budgets				
	HFD	HESD EMS	HESD OSLD	Combined
Salaries	$1,997,438	$1,378,225	$225,000	$3,600,663
Expenses	225,137	443,687	25,000	693,824
Total	$2,222,575	$1,821,912	$250,000	$4,294,487

By integrating the separate dispatch centers, the City/County of Honolulu can meet nationally accepted benchmarks for staffing, including the addition of positions for QA and training, and supervisory personnel that are not in place today. Based upon our analysis an integrated communications center meeting national benchmarks for staffing would require 46 FTEs thereby decreasing current staffing by five FTEs. This recommended staffing level provides sufficient staff for supervisory, training and quality assurance positions. The reduction of FTE positions and operating costs for a combined center provides a yearly savings of approximately $600,000.

An in-depth analysis of the Communications Centers for each agency was conducted by ESCI. Based upon the analysis, ESCI believes that the EMS Communications Center is operating with less than adequate personnel for the call volume being processed. *In the absence of a consolidated environment*, ESCI recommends an additional 12.5 FTE positions will be required to meet nationally accepted benchmarks for workload and call processing functions, supervisory, training and quality assurance (QA), within the EMS dispatch center. ESCI's analysis concludes that the cost of the recommended positions for EMS would result in additional expenditures of approximately $1.3 million.

The EMS Communications Division is required to complete scheduling for operations personnel; however, currently five (5) positions are allocated to this function, however all positions are not filled and communications staff is performing the staffing functions. ESCI recommends that a merged environment should explore the use of available software and technology to automate the staffing function. While there would be initial acquisition costs associated with the technology the return on investment could be accomplished within two years recognizing the elimination of at least four positions or reassignment to current vacancies within the organization. Annual savings projected after first year start-up costs are approximately $200,000 per year.

Combining the communication centers results in a reduction of staffing and will lower expenses currently duplicated with the three locations—facility operating costs, insurance, telephone line charges (multiple drops), and maintenance costs. Preliminary estimates indicate an approximate annual cost savings in operating costs is between $100,000 and $150,000.

The EMS Communications Division is required to complete scheduling for operations personnel; however, currently 5 positions are allocated to this function, however all positions are not filled and communications staff is performing the staffing functions. ESCI recommends that a merged environment should explore the use of available software and technology to automate the staffing function. While there would be initial acquisition costs associated with the technology the return on investment could be accomplished within two years recognizing the elimination of at least four positions or reassignment to current vacancies within the organization. Annual savings projected after first year start-up costs are approximately $200,000 per year.

Currently the individual centers either have budgeted capital improvements or are in various planning stages. A review of current infrastructure requirements and potential capital improvements for each agency indicates the individual agencies require an estimated combined expenditure of $3.4 million.

An integrated center indicates the estimated infrastructure requirements range from $2 million - $2.6 million. Integration requirements indicate potential cost avoidance for infrastructure of an estimated $780,000. The HFD Communications Center has the potential to accommodate the combined communication center requirements; however, additional space configuration, design, and remodeling may be necessary.

Figure 65: Current vs. Merged Infrastructure Requirements

Current Infrastructure Requirements					Integration Infrastructure Requirements	
Description	**Fire (upgrading to 6)**	**EMS (5 positions)**	**Ocean Safety (2 positions)**	**Total**	**Integrated Center**	**Cost Difference**
Facility	$150,000			$150,000	$200,000	$(50,000)
Workstns*					$70,000	$(70,000)
CAD	$1,000,000	$1,000,000	$250,000	$2,250,000	$1,625,000	$625,000
Radio Consoles		$700,000	$100,000	$800,000	$600,000	$200,000
Technical Support	$75,000	$75,000	$75,000	$225,000	$150,000	$75,000
Total	$1,225,000	$1,775,000	$425,000	$3,425,000	$2,645,000	$780,000

*Integration costs assume utilization of the new FCC workstations and purchase of five additional workstations.

The estimated savings by combining the various communication centers is estimated at approximately $2,680,000. This figure reflects a reduction in anticipated future costs associated with capital projects currently planned for the various centers and ESCI's recommendation regarding the need for additional EMS dispatch positions to meet national benchmarks. An in-depth analysis of the communication functions is provided as a separate document.

Figure 66: Potential Communications Savings

Financial Analysis of Integration - Communications	
Personnel & Operating Costs	$600,000
EMS Dispatch Positions Needed	1,300,000
Future Capital Project Savings	780,000
Total Potential Savings	$2,680,000

Support Services

HESD's current lease includes space for various support functions, including communications, supply inventory, and a classroom in addition to administrative space. Also included is a vehicle bay for minor repair and maintenance on ambulances and staff vehicles. The HFD operates a combined fleet maintenance facility with a warehousing function for supplies and equipment. Sufficient space exists within the current warehouse to stock and distribute EMS supplies and equipment. HFD is also in the process of constructing a new facility on Kapolei Parkway (Kapolei Fire Station 43). The new facility will also include additional space for warehousing supplies and equipment, including the ability to store controlled substances thereby further expanding the capability of the fire department to accommodate spatial requirements for inventory and supply purposes under a merger. In addition, sufficient classroom space is available at the Thurston Fire Training Center to accommodate EMS training requirements. Future plans for the training center have incorporated additional EMS training needs. Staffing for

support services within the EMS Division does not include staff dedicated to EMS fleet maintenance services provided by the City/County of Honolulu Automotive Services Division.

Transfer of the responsibility for maintaining the HESD fleet of vehicles would require an expansion of existing space at the HFD Fleet Maintenance facility estimated at a cost of $100,000. In addition to the HESD EMS fleet coordinator position, two additional vehicle maintenance personnel would be required, possibly through a transfer from the Automotive Services Division.

Figure 67: Support Services Staffing for HESD EMS

HESD EMS Support Services Staffing	
Position	Personnel (FTEs)
Injury Prevention	1
Equipment Coordinator	1
Fleet Coordinator	1
Supply Coordinator	1
Utility Clerks	3
IT Specialists	3
Safety & Health	1
Total	11

Based upon current staffing for inventory and equipment supply between the respective organizations, HESD EMS positions of supply coordinator and equipment coordinator should be combined into single position. In addition, at least one utility clerk position can be eliminated. Cost savings for the elimination of two support services positions is estimated at $100,000 annually. It is further recommended that the requirement for the three IT (information technology) positions be evaluated after the merger to determine long-term organizational IT needs. It is anticipated that the positions will initially be required to integrate various electronic reporting systems.

Operations

While significant savings can be achieved in the short term through the integration of administrative space and support services functions, in the long term the greatest cost savings are within the realm of field operations. Cross training firefighters to perform emergency medical services is cost effective from several perspectives. First, additional firefighting staff trained as EMTs and paramedics expands the level of ALS care provided by engine companies and aerial companies, ensuring that ALS personnel arrive on all calls requiring ALS intervention. The strategic location of fire stations ensures that state-mandated response time criteria can be met without penalties imposed for non-compliance.

The HESD EMS currently staffs two Quick Response Vehicles that are not transport capable. Utilizing fire service engine companies staffed with a firefighter/paramedic will allow for the elimination of the QRV units in their current locations. ESCI estimates that fire department paramedic first response in the

areas currently served by the EMS QRVs will save the system approximately $518,000 in personnel expenditures annually. In addition the QRVs are currently staffed only 16 hours per day whereas paramedic engine companies are scheduled for 24-hour coverage. We further recommend that the QRV units be relocated to Fire Station 2 and Fire Station 7. Rather than depending on a ladder or quint response to EMS calls, the QRVs or equivalent units should be staffed with two personnel from the aerial apparatus and be the primary first responder to EMS calls. The urban stations with high EMS call volumes are ideal candidates for this type of response system; the net effect will be to lower the wear and tear on high value apparatus such as ladders and quints.

Figure 68: Savings Resulting from Replacing QRVs with ALS Fire First Response

Financial Analysis of Integration		
Savings from Eliminating QRV Staffing		
MICT I	Average Salary	Annual Savings
7	$73,905	$517,335
FF/Paramedic	Salary Differential	Annual Cost
7	$15,000	$105,000
	Net Annual Savings	$412,335

Figure 69: EMS Budget and Cost Per Ambulance for HESD

EMS Budget		
Personnel Cost		$23,634,960
Current Expenses		3,511,802
Other Expenses		5,126,392
Annual Budget		$32,273,154
Personnel Cost per Ambulance	19	$1,243,945
Current Expense Cost per Ambulance	19	184,832
Other Expense Cost per Ambulance	19	269,810
Total Annual Cost per Ambulance		$1,698,587

The staffing model employed by the HFD yields an average workweek consisting of 53 hours as opposed to the traditional 40-hour workweek of EMS personnel. Personnel that are cross-trained as firefighters who provide EMS services are exempt from overtime[27] until they work greater than 212 hours in a 28-day period. The additional work hours not subject to overtime payment significantly reduce personnel costs associated with staffing an ambulance with cross-trained dual-role personnel.

Personnel expenditures for a single staffed ambulance are estimated at $1,243,945. For every unit staffed with cross-trained EMS personnel the savings is approximately 20 percent of the staffing cost for each ambulance or approximately $248,789 per unit (primarily because of the increased number of

[27] Based on federal Fair Labor Standards Act (FLSA) Section 7K rules.

hours worked by firefighters). However, because the fire department staffing model is based on a 24-hour shift schedule, only those ambulances with acceptable call volumes should be considered for cross staffing; busy urban units would cause unsafe fatigue for those working 24-hour shifts. Those units, which are located in fire stations, include Medic 6, Medic 9 and Medic 12. The aggregate savings is approximately $750,000 per year.

Figure 70: Current Staffed Ambulances at Fire Stations and Deployment Potential

Unit	Zone	Potential Ambulance Deployment at Fire Station?	Calls per Year
Medic 1	Urban		6,271
Medic 2	Urban		6,217
Medic 3	Urban/Rural	Ambulance staffed with cross-trained firefighters split from ladder company	2,510
Medic 4	Urban/Rural	Ambulance staffed with cross-trained firefighters split from ladder company	2,753
Medic 5	Urban		6,180
Medic 6	Urban/Rural	Ambulance staffed with former HESD personnel cross-trained as firefighters	1,564
Medic 7	Urban/Rural	Ambulance staffed with cross-trained firefighters split from ladder company	2,742
Medic 8	Urban/Rural		3,867
Medic 9	Urban/Rural	Ambulance staffed with former HESD personnel cross-trained as firefighters	1,330
Medic 10	Urban/Rural		4,213
Medic 11	Urban		6,403
Medic 12	Urban/Rural		3,672
Medic 13	Rural	Ambulance staffed with former HESD personnel cross-trained as firefighters	1,102
Medic 14	Urban/Rural		4,566
Medic 15	Urban/Rural	Ambulance staffed with cross-trained firefighters split from ladder company	2,081
Medic 16	Urban/Rural		3,456
Medic 20	Urban		4,609
Medic 21	Urban/Rural		2,000

Based on our interviews, we project that approximately 15-20 percent of the current HESD EMS workforce will request to be cross-trained as firefighters. HFD should provide preferential employment to fill current and future vacancies for EMS employees desiring cross-training.

Facilities and ambulances that should be considered for staffing with EMS personnel cross-trained as firefighters working a 24-hour fire department schedule include the following:

Figure 71: Proposed HFD Ambulance Locations

HFD Proposed Ambulance Staffing - EMS Personnel Cross-Trained				
Station 16	Wahiawa Fire Station	640 California Highway	Kahuku	Medic 12
Station 14	Waialua Fire Station	66-420 Haleiwa Road	Haleiwa	Medic 6
Station 27	Waimanalo Fire Station	5046 Kalanianaole Highway	Honolulu	Medic 9

In addition to achieving higher cost savings as a result of the 53-hour workweek, the HFD has the capability to significantly lower the cost of EMS services by utilizing existing fire personnel to staff an ambulance in certain locations where overall call volume for both fire and EMS calls are within acceptable staff workloads. Specifically, the HFD could utilize a split-staffing model for aerial companies in which two of the five personnel assigned to the aerial unit would be transferred to the ambulance housed at the same station. The ambulance would co-respond to all fire calls requiring its presence, such as structure fires, explosions, gas leaks, etc.

Based upon ESCI's analysis of service demand and location of aerial apparatus the following locations would be optimum candidates for this staffing model:

Figure 72: HFD Split Staffing Locations

HFD Ambulance Staffing - FD Split Staffing				
Station 17	Kaneohe Fire Station	45-910 Kamehameha Highway	Kaneohe	Medic 4
Station 18	Kailua Fire Station	211 Kuulei Road	Kailua	Medic 3
Station 26	Waianae Fire Station	85-645 Farrington Highway	Waianae	Medic 7
Station 34	Hawaii Kai Fire Station	515 Lunalilo Home Road	Honolulu	Medic 15

Should this model be adopted there would be substantial cost savings recognizing the only cost incurred would be the marginal cost for the salary differential of cross-trained personnel and routine operating expenses associated with the transport unit. With the acquisition of seven new ambulances for the Asia Pacific Economic Conference for the EMS Division, no capital costs should be incurred to locate these units at the recommended fire stations. The HESD EMS ambulance currently located at these facilities could be transferred to the urban core where call volumes require additional transport units.

Figure 73: Cost Savings for Ambulances Staffed With FF/PM

Cost Savings for Ambulance Staffed with FF/PM		
Cost per Unit		$1,698,587
FF Salary Differential	5 FF/Paramedics	(75,000)
Operating Expense		(454,641)
	Net Savings	$1,168,946

By relocating four ambulances to high demand areas, it is our projections that overtime expenditures would substantially decrease as a result of adding additional transport capacity to the system. ESCI estimates that overtime costs would be reduced by at least $1,250,000. In addition to the reduction in overtime costs will be a reliance on the contract with AMR for surge capacity and backfilling areas due to high call demand. It is not unreasonable with the reassignment of staff from the QRVs as well as the stations employing a split-staffing model to reduce the annual contract expenditures by $200,000.

Aggregate Cost Savings

It is clear that opportunities for cost savings by combining the HFD and HESD are significant. As previously stated, however, achieving optimum savings will require time and commitment of the agencies with respect to the degree of integration desired. Costs will be incurred to integrate the workforce; additional training for fire personnel will entail additional expenditures. ESCI believes that conducting training classes on duty can mitigate some of these costs. In conversations with Kapiolani Community College, it is our understanding that on-duty training classes can be accommodated by shift schedule and located at the fire-training center.

In the absence of conducting training on-duty, which will be difficult to accomplish with currently assigned EMS personnel, ESCI recommends an accelerated fire academy class. Based on conversations with the staff at the Thurston Training Center, ESCI estimates approximately 30 positions can be adequately trained in a single class consisting of 20 weeks. The estimated cost associated with backfilling positions with overtime during the training program is estimated at $120,975.

Figure 74: Costs Required for Cross Training HESD Personnel

Cross-Train EMS Personnel Costs			
Personnel	Shifts	OT Rate	Total
15 MICT I	100	$44.41	$66,615
15 EMT	100	$36.24	$54,360
Total Training Cost - EMS Personnel			$120,975

ESCI recognizes that integration of the various duties and responsibilities of the respective organizations will take time to accomplish. We have therefore projected a realistic timeline during which cost savings can be fully realized based upon the amount of time necessary to train personnel and integrate the operational components.

Figure 75: Projected Annual Cost Savings

Projected Cost Savings Timeline					
Component	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
Support Services	$100,000	$100,000	$100,000	$100,000	$100,000
Administrative Facilities		$372,500	$535,000	$535,000	$535,000
Communications		$2,680,000	$1,900,000	$1,900,000	$1,900,000
HFD Paramedic Engine Companies	$206,168	$206,168	$412,335	$412,335	$412,335
EMS Personnel Cross-Trained Savings	$750,000	$750,000	$750,000	$750,000	$750,000
HFD Staffed Ambulances		$1,168,946	$2,337,892	$3,506,838	$4,675,784
Estimated Overtime Savings		$250,000	$500,000	$1,000,000	$2,000,000
AMR Contract Savings		$50,000	$100,000	$150,000	$200,000
Accumulated Annual Savings	**$1,056,168**	**$5,740,114**	**$6,635,227**	**$8,354,173**	**$10,573,119**
Less One-Time Integration Costs					
Fleet Maintenance Expansion	$100,000				
EMS Personnel Training Costs	$120,975				
Communication Center Integration	$250,000				
Projected One Time Expenditures	$470,975				
Estimated Annual Savings	**$585,193**				

Integration Components and Implementation Timelines

Executing Implementation Components

ESCI has analyzed the system using contemporary professional standards and has described some timelines for executing the components. The success of the merger will ultimately be determined by the ability of the participants to execute the implementation. Some of these components are relatively complex and will push the boundaries of some participants who have not known any system design other than what exists today. As such, the success of the implementation will be based on the complexity of the component, the experience of the personnel, the beliefs of the participants, and the cognitive complexity required for implementation.

In that regard ESCI recommends a process that uses cross-functional teams empowered and authorized to establish the details of each component of the merger. The implementation process would include the following:

1. Establishment of clearly articulated team goals and outcomes.
2. Appointment of team members by appropriate leadership officials. Team participants must be balanced and from both agencies (and others as appropriate).
3. Appointment of an oversight team, including at least one elected official.
4. Establishment of clear timelines.
5. Involvement of senior leaders (but not necessarily as a committee leader).

Throughout the phased process of the merger, HFD should establish a "Merger Oversight Committee" staffed with organizational leaders to develop a strategic plan for the merger and to monitor the integration process. ESCI recommends the following organizational leaders for the Merger Oversight committee:

- City/County of Honolulu Chief Operating Officer
- Chief Financial Officer
- Human Resources Director
- Fire Chief
- Emergency Services Director
- Labor Representatives
- Office of the General Counsel

<u>Duties and Responsibilities for the Merger Oversight Committee:</u>

- Develop and adopt strategic plan for the integration of the organizations.
- Appoint sub-committees and chair and co-chairs of the sub-committees.
- Provide annual report to the City/County of Honolulu on integration milestones.

- Approve sub-committee reports and recommendations.
- Resolve conflicts.

The Merger Oversight Committee should establish realistic goals and objectives through the strategic plan for the merger process and authorize the appointment of sub-committees for functional areas of the organization. At a minimum the following sub-committees should be established:

- Communications
- Operations
- Administrative Services
- Support Services
- Education and Training
- Human Resources
- Medical Control

The sub-committees should be populated with members of the affected organizations, including sub-committee leadership positions. In addition, it is recommended that the Merger Oversight Committee's representative from the Office of General Counsel be appointed to each of the subcommittees to provide assistance and ensure equity in the sub-committee process. The subcommittees should meet on a regularly scheduled basis.

<u>Duties and Responsibilities of the Merger Sub-Committees:</u>

- Merger of administrative space.
- Merger of administrative personnel.
- Integration of public education and prevention efforts.
- Merger of supply/logistics.
- Merger of vehicle maintenance services.
- Merger of dispatch communications services.
- Integration of fire department ocean rescue functions into OSLD.
- Integration of medical oversight services.
- Negotiation of state contract for ambulance service.
- Deployment of quality assurance functions throughout the larger organization.
- Establishment the process for implementation of:
    - Deployment of dual-role fire based ambulances.
    - Deployment of fire department QRVs in fire stations.
    - Deployment of split ladder companies.

Integrating Strategic Goals

ESCI anticipates that upon the adoption of the recommended integration strategy, the Merger Oversight Committee will identify additional strategic objectives based upon the level of integration and timeline associated with the integration process. Each sub-committee would be responsible for developing goals to achieve each of the adopted strategic objectives and a timeline for the accomplishment of the recommended goals. ESCI recommends the following minimum strategic objectives for the individual sub-committees.

Communications

- Operate emergency dispatch and communications from a single facility.
- Operate from a single set of communications technologies, including Computer Aided Dispatch (CAD).
- Establish a single point of contact for communications equipment maintenance, repair, and support.
- Develop a uniform dispatch and communications model, including policies, procedures, and performance standards.
- Establish a uniform formal system for recruitment, retention, and training of communications personnel.
- Evaluate all functions of call-taking and communications functions as they relate to system missions.

Operations

- Develop a deployment plan that utilizes suitable fixed facilities for all employees.
- Develop staffing plans based a variety of schedules.
- Ensure that workload will be balanced to consider employee wellness and economic efficiency.
- Ensure that appropriate personnel and equipment arrive at the patient within established response parameters.
- Maintain or exceed the current level of clinical performance.
- Explore feasible options for future deployment to achieve best practices in effectiveness and efficiency.

Administrative Services

- Develop a plan that identifies suitable fixed facilities for administrative personnel.
- Terminate lease at the airport facility within timelines appropriate to contract.
- Establish phased approach to moving administrative personnel, dispatch personnel, supply, and maintenance.
- Integrate payroll functions into the HFD administration process.
- Integrate HR functions into the HFD administration process.

Support Services

- Develop a fully integrated logistics system.
- Integrate fleet services programs.
- Integrate Information Technologies programs.
- Integrate facilities services programs.

Education and Training

- Established processes and/or relationships to ensure consistent availability of qualified medical personnel.

Human Resources

- Ensure current supervision and rank scheme of each organization is integrated into a clear and unified organizational structure.
- Integrate the internal communications processes of the two organizations.

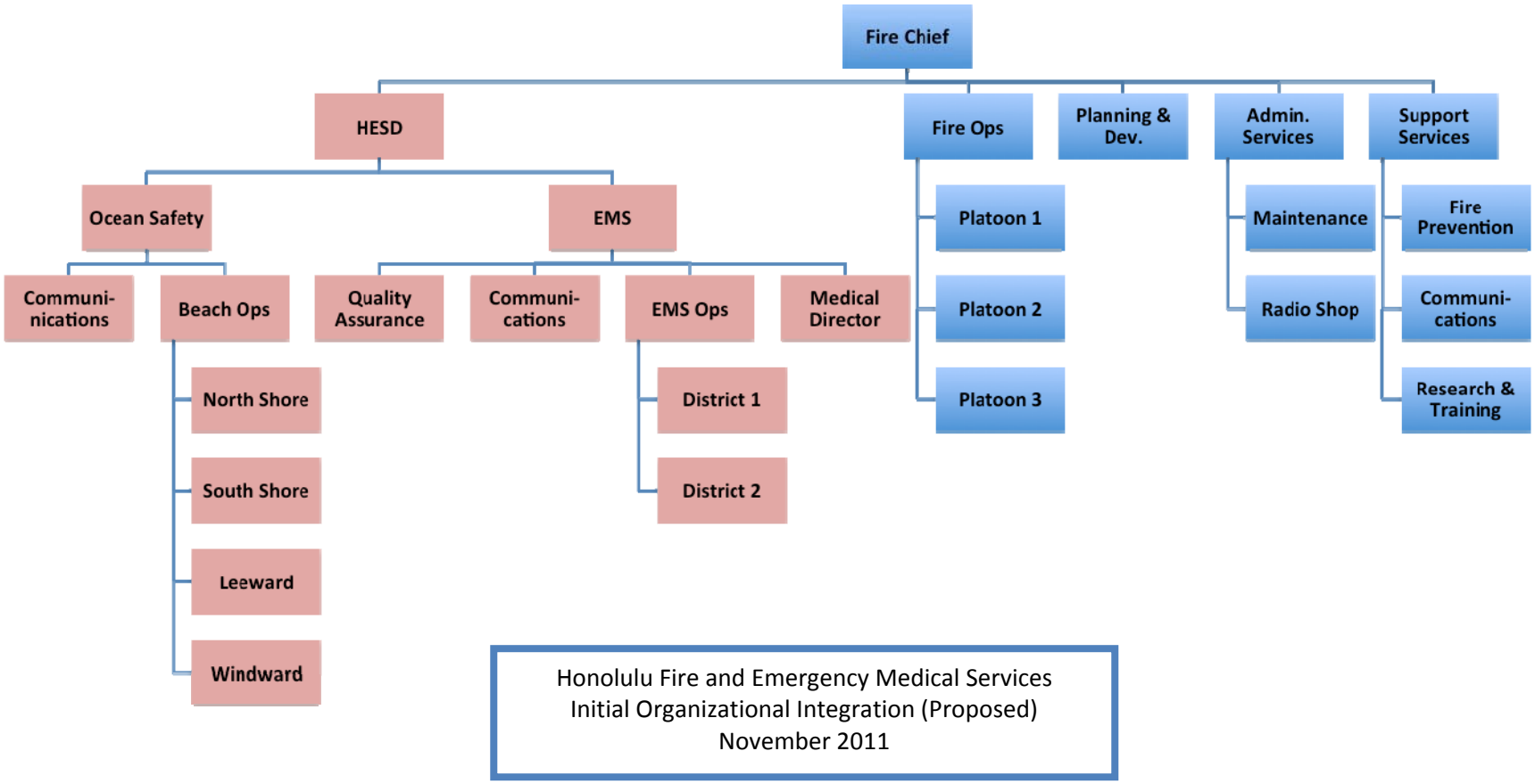
Medical Control

- Implement an integrated patient care reporting system.
- Foster a unified culture of process improvement.
- Implement uniform patient care protocols and standards.

Organizational Structure

ESCI recommends the adoption of the following initial organization chart to facilitate the merger process. ESCI recognizes that the organizational chart will be modified as various phases of the integration process are accomplished. The chart reflects an operating environment in which the current HESD organizational structure will remain intact with no fundamental change in reporting relationships other than the director of emergency services who would report directly to the fire chief. This reporting relationship may require modifications to the City/County of Honolulu Charter.

Figure 76: Honolulu Proposed Initial Organization Chart



ESCI recommends a phased-in approach to organizational integration while transitioning over time to full integration. It is our opinion that a phased approach would:

- Minimize the impact of the merger on the EMS workforce.
- Allow an orderly transition to an integrated environment.
- Enable the organization to develop a strategic plan for long-term service delivery.
- Capture cost savings in the short term by eliminating duplicate support services functions.
- Allow the organization to respond to system changes cost effectively.
- Enable the organization to properly prepare the workforce for the multi-role requirements.

System Merger Recommendations

ESCI has evaluated the system in the context of just that—as a system. We believe that the most successful systems of medical care have both highly integrated activities and the ability to measure performance from the system perspective. It is in that regard we have analyzed the components of the system.

Each of these components has the ability to make improvements—financial, operational, performance, or administrative—in the context of a system. These improvements are not mutually exclusive nor are they completely independent. In fact, some of the integration components are highly related to others. For example, reducing the use of alternate ambulance services for surge capacity may not be possible without first integrating fire department ambulances. As a result, ESCI has described specific timeframes for implementation. . These timelines and recommendations for implementation are based on the 1) the capabilities of current system participants to integrate these components within a reasonable timeframe, 2) the level of effort required to implement, and 3) specific external factors (such as the Asia Pacific Economic Conference) that will delay or divert management attention from implementation.

Figure 77: Integration Timeline

Components of Integration and Estimated Timelines			
Merger Component	Function	Timeline	Description
Merger of administrative space. .	Administrative & Financial	Can be started immediately. Complete in 6 months.	Eliminate the lease payments in the airport facility and merge the facilities with the HFD facilities in Honolulu.
Merger of administrative personnel.	Administrative & Financial	Can be started immediately.	0 to 6 months. Phase-in starting immediately.
Integration of public education and prevention efforts.	Operational	Can be started immediately. Ongoing integration.	Make use of fire department, ambulance, and Ocean Safety public education efforts and merge the units.

Components of Integration and Estimated Timelines			
Merger Component	Function	Timeline	Description
Merger of supply/logistics.	Operational	Begin now and complete in 6 months.	Joint ordering, supply, and delivery.
Merger of vehicle maintenance services.	Operational	Now through 12 months.	Begin facility improvements now and merge services over 12 months.
Merger of dispatch communications services	Performance and Financial	12 months to 24 months.	Begin facility improvements now and merge over the next 24 months.
Integration of fire department ocean rescue functions into OSLD.	Operational	12 months to 24 months	Can begin now, but merge over the next 2 years.
Deployment of dual-role fire based ambulances.	Operational	12 months to 35 months	Begin merge over the next 36 months.
Elimination of AMR or other outside ambulance service for surge capacity.	Operational and Administrative	Begin in 36 months and phase in.	Begin merge over the next 36 months.
Deployment of fire department QRVs in fire stations.	Operational	Begin now, complete in 12 to 24 months.	Depending on staffing, begin in 12 months.
Deployment of split ladder companies.	Operational	Begin in 24 to 36 months.	Depending on staffing, begin in 36 months
Integration of medical oversight services.	Functional	Begin now, complete in 6 months.	Can begin with integration of administrative services.
Negotiation of state contract for ambulance service.	Financial	Begin with 2012 contract—12 months.	Begin with 2012 contract negotiations.
Deployment of quality assurance functions throughout the larger organization.	Operational	Can begin now, phase in over next 24 months.	Starting with reporting, begin now and phase in as fire staffing upgrades.

Timeframes for Implementation

Phase 1, Time Frame: 6 months.

Administrative Services Implementation. HFD would merge the HESD into the organizational structure of the HFD, essentially retaining the current organizational structure of HESD and reporting relationships - with the exception of the director of HESD who would report to the fire chief[28]. Activities to be undertaken include:

- Merge the fleet maintenance operations into the fire fleet maintenance facility for routine vehicle repair services.
- Merge equipment and supply functions and relocate to the fire storeroom facility.
- Relocate the administrative offices to fire headquarters.
- Employ a full-time medical director.
- Change fire deployment model for EMS response in urban core from Ladder Companies to QRVs (quick response vehicles such as pick-up or SUV).

Phase 2, Time Frame: 1-2 years

- Merge the three communication centers into a single center.
- Expand fire recruit training program to include Basic EMT state certification.

Phase 3, Time Frame: 1-3 years

- Establish paramedic engine companies.

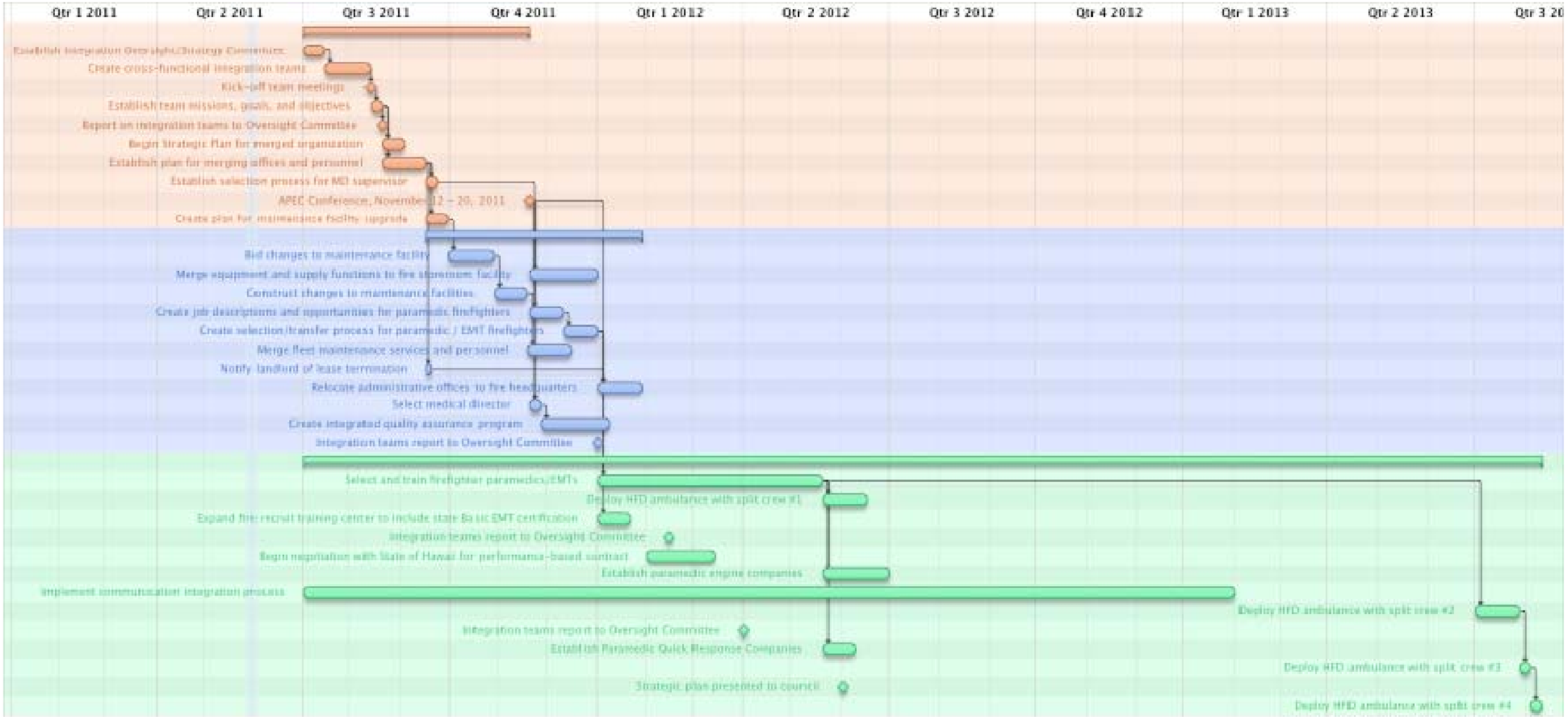
Phase 4, Time Frame: 3-5 years

- Institute fire-based transport units.

The GANTT chart timeline and the outline that follows describe in graphical detail the recommended timelines for the integration of the Honolulu Fire Department and the Honolulu Emergency Services Department.

[28] ESCI anticipates that this recommendation will require legal review to ensure that the implementation of this recommendation complies with the city charter; however, we believe that the recommendation is feasible.

Figure 78: Integration Timeline (Effective July 1, 2011)



Honolulu Fire and Emergency Medical Services Integration Timeline, beginning July 1, 2011

Figure 79: Outline of Honolulu Integration Plan

	Task	Effort
Phase 1 – Planning		4 mo
1.1)	Establish Integration Oversight/Strategy Committee	2 wk
1.2)	Create cross-functional integration teams	1 mo
1.3)	Kick-off team meetings	
1.4)	Establish team missions, goals, and objectives	1 wk
1.5)	Report on integration teams to Oversight/Strategy Committee	
1.6)	Begin Strategic Plan for merged organization	2 wk
1.7)	Establish plan for merging offices and personnel	1 mo
1.8)	Establish selection process for MD supervisor	1 wk
1.9)	APEC Conference, November 12-20, 2011	
1.10)	Create plan for maintenance facility upgrade	2 wk
Phase 2 – Support Service Integration		< 8 mo
2.1)	Bid changes to maintenance facility	1 mo
2.2)	Merge equipment and supply functions to fire storeroom facility	1 mo 2 wk
2.3)	Construct changes to maintenance facilities	3 wk
2.4)	Create job descriptions and opportunities for paramedic firefighters	3 wk
2.5)	Create selection/transfer process for paramedic/EMT firefighters	3 wk
2.6)	Merge fleet maintenance services and personnel	1 mo
2.7)	Notify landlord of lease termination	< 0.5 wk
2.8)	Relocate administrative offices to fire headquarters	1 mo
2.9)	Select medical director	1 wk
2.10)	Create integrated quality assurance program	1 mo 2 wk
2.11)	Integration teams report to Oversight Committee	
Phase 3 – Operational Integration		2 yr 8 mo 3 wk
3.1)	Select and train firefighter paramedics/EMTs	5 mo
3.2)	Deploy HFD ambulance with split crew #1	1 mo
3.3)	Expand fire recruit training center to include state Basic EMT certification	3 wk
3.4)	Integration teams report to Oversight Committee	
3.5)	Begin negotiation with State of Hawaii for performance-based contract	1 mo 2 wk
3.6)	Establish paramedic engine companies	1 mo 2 wk
3.7)	Implement communication integration process	1 yr 8 mo 3 wk
3.8)	Deploy HFD ambulance with split crew #2	1 mo
3.9)	Integration teams report to Oversight Committee	
3.10)	Establish Paramedic Quick Response Companies	3 wk
3.11)	Deploy HFD ambulance with split crew #3	1wk
3.12)	Strategic plan presented to council	
3.13)	Deploy HFD ambulance with split crew #4	1 wk

Appendix A: EMS Data Analysis Methods

ESCI Data Analysis and Selection Method		
Number	Calls Removed	Justification
1	Multiple units assigned to the same event	For this analysis, the system should be interested in how the performance is applied to each event, rather than how each individual unit performs.
2	Priority P3 (Minor), P4 (Special Event) and P7 (Delayed patient contact)	Only "emergency" events were evaluated.
3	Calls in which no units were assigned	Occasionally multiple calls arrive (usually via cellular telephone) for the same event. On these duplicate calls, the dispatcher may not assign a unit.
4	Calls in which the time stamps to start or stop the clock were missing	ESCI could not evaluate performance when certain time stamps were missing. As such, these events were excluded from evaluation.
5	Call-taking interval = "0"	It's unreasonable to consider that a dispatcher could take a call, gather the information and dispatch a unit in "zero" time.[29]
6	Call-taking interval > 20 minutes	A call-taking interval of more than 20 minutes is significantly outside the norm for call taking intervals and as such is considered unreasonable and therefore an outlier in the data.
7	Enroute interval = "0"	As in the call-taking interval analysis, we consider that an enroute interval of "zero" seconds to be unreasonable and as such was removed from the analysis.
8	Enroute interval > 20 minutes	Enroute intervals exceeding 20 minutes is unreasonable because virtually all modern dispatch centers will take steps to re-page or otherwise take steps to alert crews when exceedingly long enroute intervals are encountered.
9	Travel interval = "0"	As in the call-taking interval analysis, we consider that an travel interval of "zero" seconds to be an outlier and as such was removed from the analysis.

[29] We understand that on occasion, a unit may actually initiate a call, for example when they come across an incident, are flagged down by a bystander, or encounter a "walk-in" first aid; these incidents are very infrequent and are not independently verifiable in the data. As such, all "zero" time calls have been removed.

ESCI Data Analysis and Selection Method		
Number	Calls Removed	Justification
10	Travel interval > 40 minutes	Some calls may reasonably exceed 40 minutes in other systems, but ESCI's analysis of travel on the island leads us to believe that 40 minutes is excessive and evidence of data errors. Occasionally, during periods of high demand, travel times could be exceedingly long but we selected 40 minutes as the cut off for reasonability.
11	Unit response interval > 40 minutes	Similarly, we selected 40 minutes as the reasonable cutoff for unit response intervals—the period between enroute time and arrival time.
12	Response interval > 1 hour	As with cut-off points for other intervals, we selected one hour as the cutoff for reasonable response intervals—the interval between phone pickup and arrival at the scene.

Appendix B: Communications (EMS/Fire/Ocean Safety) Baseline System Assessments

Executive Summary

The feasibility and integration analysis component for dispatch operations consists of an operational review evaluating nine infrastructure core areas for Honolulu Fire, Honolulu EMS, and Ocean Safety Lifeguard Services. This provides the starting point for identifying operational and infrastructure similarities, differences, and core areas not meeting industry standard Best Practice and completing the analysis for integration of dispatch services.

Core Criteria Findings

The comparison of Fire Communications (FCC), EMS Communications, and Lifeguard Dispatch reveals similar conditions and requirements specific to Public Safety Communications; however, there are disparate organizational differences specific to labor organizations, pay structure, shifts, supervision, hiring, and testing practices.

The comparative assessment reveals capabilities of the dispatch agencies to meet industry standards and Best Practices by identifying areas either meeting or requiring improvement in core assessment criteria. ESCI findings indicate the following:

- Honolulu 9-1-1 workflow requires multiple handling processes creating processing delays.
- Honolulu Fire Communications (FCC) achieves the uppermost ratings in the core areas either meeting or partially meeting criteria in a majority of critical core areas.
- EMS requires improvements in significant critical areas.
- Ocean Safety requires significant improvement.

<u>Significant Findings:</u>

- There is a lack of public safety coordination and oversight among the three dispatch agencies. Additionally, a lack of operational direction manifests itself resulting in the need for development and implementation of Quality Assurance and Training Programs, Risk Management, and formalized Disaster Recovery Plans.
- Multiple centers (fire/EMS/Ocean Safety) create a delay in response as telephone relays increase notification, coordination, and processing times, with risk exposure for unintentional information distortion.
- Separate CAD platforms and lack of CAD at Ocean Safety prevents interoperability increasing processing and service delivery response times.
- There is a significant duplication of Infrastructure Requirements (Facility and Technologies create higher costs for Emergency Services).

Integration Analysis

The comparison of similar conditions and requirements provides key information for integration analysis of FCC, EMS Dispatch, and Lifeguard Dispatch. These areas include Workload, Staffing, Performance Measures, Workflow, Infrastructure Requirements, and Costs.

Workload and Workflow - The analysis indicates Integration streamlines workflow and workload processes. Currently, the three dispatch centers duplicate workload and efforts for call processing and dispatch. Workload analysis of a fully integrated center for fire, EMS, and Ocean Safety reveals a reduction in the number of duplicate dispatch incidents and administrative phone calls between the separate agencies, thus reducing workload requirements. Current 9-1-1 workflow has multiple areas where delays occur due to relay processes, creating risk for call mishandling and/or failure to dispatch resources and increasing call processing and dispatch time.

Staffing - The analysis indicates Integration of fire, EMS, and Ocean Safety dispatch reduces FTE staffing requirements. The staffing review and analysis indicates FCC and Ocean Safety provide sufficient staffing for dispatch operations. EMS currently has a significant staffing shortfall: 12.5 FTE. EMS requires additional operational personnel, supervisory positions, and support staff to meet workload and Best Practices if integration does not occur. The current number of authorized FTE's for FCC, EMS, and Ocean Safety is 51 positions. If the agencies remain separate, the required staffing is 63.5 FTE.

Figure 80: Communication Center Staffing Requirements (Recommended vs. Current)

Communications Center FTE Requirements Staffing Analysis	Separate Agencies			Combined Total
	Fire (FCC)	EMS	Ocean Safety	
Recommended Staffing: *Current Workload/Meet Best Practices*	27	33.5	3	63.5
Current Staffing (2011)	27	21	3	51
Difference/(Staffing Shortfall)	***0***	***(12.5)***	***0***	***(12.5)***

The staffing analysis for an integrated center indicates a requirement of 46 FTE. When compared to current staffing levels, this is a reduction of five FTE with an integrated center, but most importantly, the recommended integrated staffing of 46 FTE provides operational, supervisory, quality assurance, training, and support staff.

Performance - The analysis indicates call processing performance measures require improvement. Primary PSAP: The 9-1-1 Primary PSAP performance measures and data for ring time or duration of a call were not provided. The Honolulu PSAP call interval has a potential for negative impact during periods of high workload. This may occur when calls are queued and there is significant wait time prior to call answer. During this scenario, the call, electronically answered with a recording, receives a 'live' answer upon call screener availability. The queuing wait time data for the Honolulu PSAP was not provided.

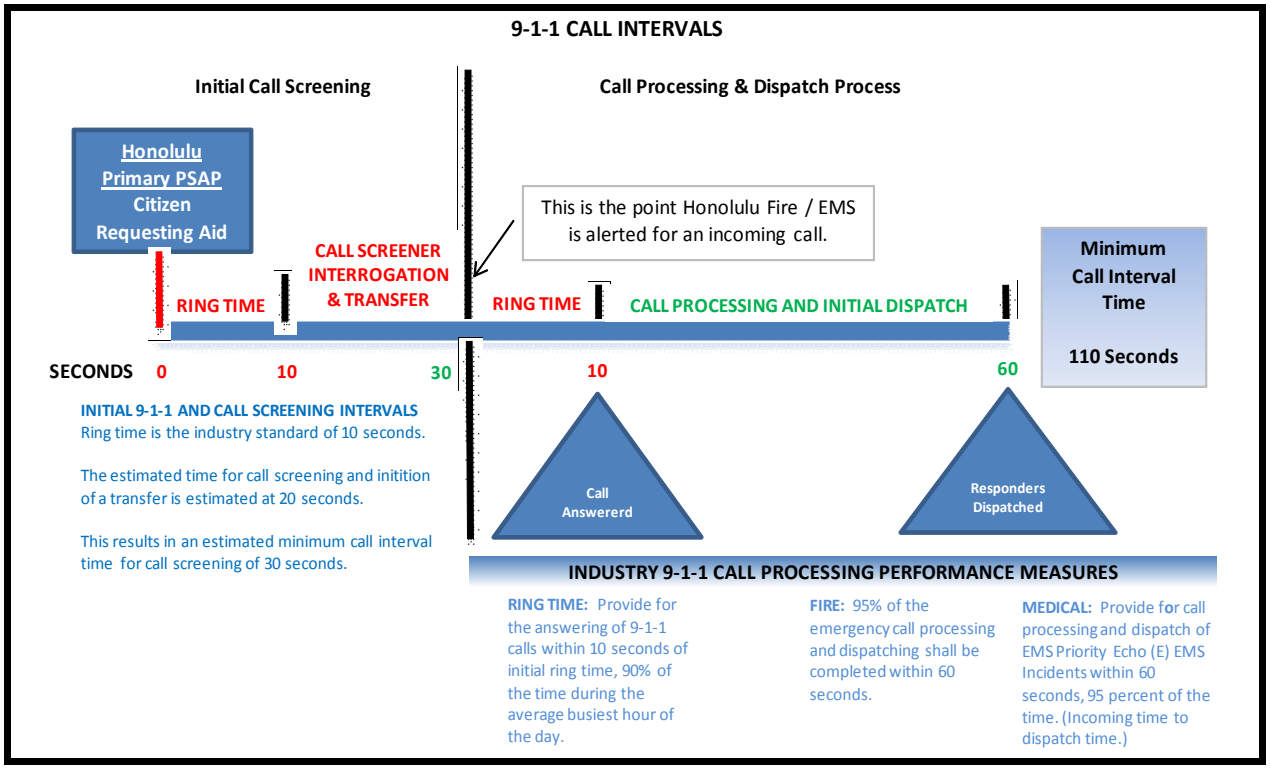
Fire (FCC): Data presented for fire indicates agency performance targets are met; however, it is unknown the call time interval at the Primary PSAP.

EMS: Data presented for EMS indicates an inability to meet agency performance targets. Additionally, time intervals at the Primary PSAP extend processing times, thereby slowing response.

Ocean Safety: Ocean Safety does not measure call taking or dispatch processing times.

The 9-1-1 Call Interval Diagram illustrates time intervals and industry performance targets.

Figure 81: 9-1-1 Call Intervals



Fire and EMS agencies provide performance targets. The agency targets, however, while similar to industry standards, are not as inclusive and comprehensive as industry 9-1-1 call processing standards.

The agencies must aggressively pursue development of agency performance standards and verify adherence establishing a high level of 9-1-1 call processing for the citizens on Honolulu.

Operating Costs – The analysis indicates operational cost savings for dispatch are possible with Integration. Integration results in a reduction of annual operating costs. The estimated savings based on current operations is $600,000 per year (salaries and expenses).

Figure 82: Operating Costs (Current vs. Integrated)

Current vs. Integrated	Current Costs (Existing Staff)				Estimated Integrated Costs
	Fire	*EMS*	*OS*	**Total**	
FTE	*27*	*21*	*3*	**51**	**46**
Salaries	*$ 1,997,438*	*$ 1,378,225*	*$ 225,000*	**$ 3,600,663**	***$ 3,150,663***
Expenses	*$ 225,137*	*$ 443,687*	*$ 25,000*	**$ 693,824**	**$ 543,824**
Total	*$ 2,222,575*	*$ 1,821,912*	*$ 250,000*	**$ 4,294,487**	**$ 3,694,487**

For EMS to achieve the recommended staffing level in the absence of integration, requires an annual operating cost increase of $1.3 million for EMS Communications. Utilizing the estimated costs for additional EMS staff ($1.3 million operating cost increase), the combined operational savings achieved with integration is $1.9 million per year.

Integration Cost Requirements – The analysis indicates a requirement for an Integrated Communications Center of $2 million - $2.65 million for technological infrastructure. However, the integration cost requirements offset the estimated individual center upgrade costs. Integration 'up front' costs are necessary for the establishment of required technological infrastructure. The capital requirement addresses facility, CAD, workstations, radio consoles, and technical support costs (outlined below). Long-term operational costs and ongoing savings for infrastructure support costs are minimized in an integrated environment, as there is no duplication of services and infrastructure, as experienced in today's environment.

Under the current operational separation of three centers, each of the agencies currently requires upgrades or improvements in key infrastructure areas (CAD, workstations, radio consoles, and technical support costs). Estimates for each individual center to complete necessary upgrades require an estimated $3.2 million.

The following comparison table illustrates the comparative costs of current infrastructure capital requirements versus integrated capital requirements.

Figure 83: Current vs. Merged Infrastructure Requirements

Current Infrastructure Requirements					Integration Infrastructure Requirements	
Description	**Fire (upgrading to 6)**	**EMS (5 positions)**	**Ocean Safety (2 positions)**	**Total**	**Integrated Center**	**Cost Difference**
Facility	$150,000			$150,000	$200,000	$(50,000)
Workstations[30]					$70,000	$(70,000)
CAD	$1,000,000	$1,000,000	$250,000	$2,250,000	$1,625,000	$625,000
Radio Consoles		$700,000	$100,000	$800,000	$600,000	$200,000
Technical Support	$75,000	$75,000	$75,000	$225,000	$150,000	$75,000
Total	$1,225,000	$1,775,000	$425,000	$3,425,000	$2,645,000	$780,000

A onetime savings of approximately $780,000 can result with integration and implementation of a single CAD platform including additional infrastructure support requirements as opposed to individual center upgrades.

Recommendation

The analysis of workload, performance, cost, and the similarities of the current operational and technical core components supports integration of dispatch operations for the Honolulu Fire Department, EMS, and Ocean Safety. The assessment of current conditions indicates integration is not only feasible, but also imperative for efficient and cost effective delivery of emergency services. Additionally, the analysis indicates potential long-term cost savings are achievable in comparison to the duplication of operations and infrastructure in today's environment.

- Integration provides optimum efficiency, performance, and effectiveness, while reducing duplication of work efforts, separate technologies, and staffing shortfalls.
- Integration enhances overall capabilities and provides opportunities for the agencies to achieve industry standards of Best Practice.

ESCI recommends the City and County of Honolulu immediately begin a planning and implementation process for an integrated communications center, mitigating critical deficiencies and risks identified in the existing dispatch core areas.

[30] FCC is currently in the procurement phase for six workstations. Integration costs assume utilization of the new FCC workstations and purchase of five additional workstations.

Next Step/Planning and Implementation

The feasibility study efforts and subsequent analysis creates a momentum, which City and County of Honolulu may build upon to initiate the planning phases for integrated services, specifically dispatch functions for fire, EMS, and Ocean Safety. A successful Public Safety Communications Center influences all elements of emergency response delivery. On the other side, failure results in a lack of confidence, reduced standards of care, and failure to meet the needs of citizens and emergency responders alike. 9-1-1 and public safety communications are essential and time critical functions within the specialty of emergency response services.

The magnitude of undertaking integration of the dispatch centers requires consideration for using experienced, professional assistance to facilitate the planning and implementation phases. The facilitation of planning efforts assists in moving the integration project in a positive direction. There are significant planning and start up responsibilities that cease to exist once the integration is functional.

Outsourcing coordination, planning, and implementation processes frees the agencies' management to concentrate on personnel, policy development, and other operational support structures recognized as critical to the success of integration.

Timeline

ESCI has estimated timeframes for implementation requiring approximately 24 months for completion of the communications integration of the three dispatch centers. The timelines and recommendations for implementation are based on capabilities of current system participants to integrate the components within a reasonable timeframe and the level of time and effort required to implement. Additionally, identification of external factors that may delay or divert management focus from implementation requires consideration.

Appendix B: Communications (EMS/Fire/Ocean Safety) Baseline System Assessments

Methods Used in Conducting the Assessment

ESCI utilizes baseline infrastructure criteria for determining the overall efficiency and effectiveness of current dispatch operations for Honolulu Fire, Honolulu EMS, and Ocean Safety Lifeguard Services Division. The ESCI matrix consists of nine critical core criteria.

Figure 84: Communications Matrix – Baseline Infrastructure Criteria

Communications Assessment	
Core Criteria	
1. Governance	**7. Facilities**
2. Organizational	**8. Technology**
a. Financial	a. Telephone
3. Personnel Processes	b. Computer Systems (CAD)
4. Performance	c. Mobile Data/AVL
5. Operational	d. Paging/Alerting
a. Workload	e. Workstations
b. Staffing	f. Radio Systems
c. Protocols/Procedures	g. Logging Equipment
d. Training	h. Time Synchronization
6. Quality Assurance	**9. Disaster Recovery**

This project requires two distinct components. The first is the assessment of current conditions, which includes the dispatch agencies' environment and ESCI's assessment and findings. The assessment of current conditions requires direct onsite observation of each dispatch center, collection of information and data relating to operational requirements, and identification of functionalities and capabilities within each center by the ESCI Project Team. A description of current conditions and operational practices for each dispatch center is in the following Appendices:

- Appendix B(1): Honolulu Fire Communications Center - Current Conditions
- Appendix B(2): EMS Communications Center – Current Conditions
- Appendix B(3): Ocean Safety Lifeguard Services/Communications – Current Conditions

ESCI compares the baseline description of existing conditions to current industry standards and Best Practices for each center.

ESCI further completes findings relative to each center based on the nine critical core criteria. The findings reveal issues influencing integration efforts.

The second component of the project report contains analysis of the core areas for integration of the communication agencies.

Current Conditions/Comparisons/Findings

The Communications Centers Operational Assessment for Honolulu Fire Communications (FCC), EMS Communications, and Ocean Safety/Lifeguard Dispatch provides current conditions through dispatch observations and information provided to the ESCI team.

- The first step in the Operational Assessment is the overview of the Honolulu 9-1-1 emergency response processes and workflow. The workflow illustrates processing of an initial 9-1-1 citizen request and notification to the emergency responders.
- The second part of the Operational Assessment presents the dispatch agency reviews for three major categories: Organizational, Operational, and Support Structures.

The feasibility study requires a side-by-side comparison and analysis of existing systems, equipment, staffing, and operational readiness. The analysis measures existing conditions of each agency against Best Practices, accreditation criteria, operating standards, and guidelines.

ESCI summarizes key criteria utilized in describing 'current conditions' for each dispatch center. (Current conditions for each center are contained in the appendices.) The comparative sections utilize the same criteria for each agency, providing a balanced overview.

ESCI presents key Best Practice statements and criteria specifically for City/County Honolulu assuring industry standards of Best Practice. Statements are compiled through direct experience in public safety communications, observations during consulting assignments, and review of published practices, guidelines, and standards. These emanate from a variety of sources, including:

- National Emergency Number Association (NENA)
- Associated Public Safety Communications Officials (APCO)
- National Fire Protection Association (NFPA)
- Commission on Fire Accreditation International (CFAI)
- Commission on Accreditation for Law Enforcement Agencies (CALEA)[31]
- Professional Articles and Documents

Criteria developed by these organizations provide measures and standards indicating 'what' agencies should be doing, not 'how' they should be doing it. While the above organizations have published practices, guidelines, and standards, they carry no regulatory authority.

Best Practice statements provide mechanisms for comparisons of the agencies and their ability to meet Best Practices and standards criteria within the core components. Each category has core public safety communications components listing criteria for center assessment supported by 27 Best Practices and standards. The statement values identify whether the agency 'Meets', 'Partially Meets', or 'Does Not Meet' the industry standard or Best Practice criteria.

[31] CALEA is the parent organization providing accreditation for Public Safety Communications Centers.

The resulting operational assessment assists in the analysis of merging communications services for both Divisions of the Emergency Services Department and Honolulu Fire Communications Center (FCC).

Current Environment – 9-1-1 System

9-1-1 and Public Safety Communications are essential and time critical functions. The Honolulu 9-1-1 Public Safety Answering Point (PSAP) is the main entry point for services delivered by Honolulu Fire, EMS, and Ocean Safety/Lifeguard Services on the Island of Oahu.

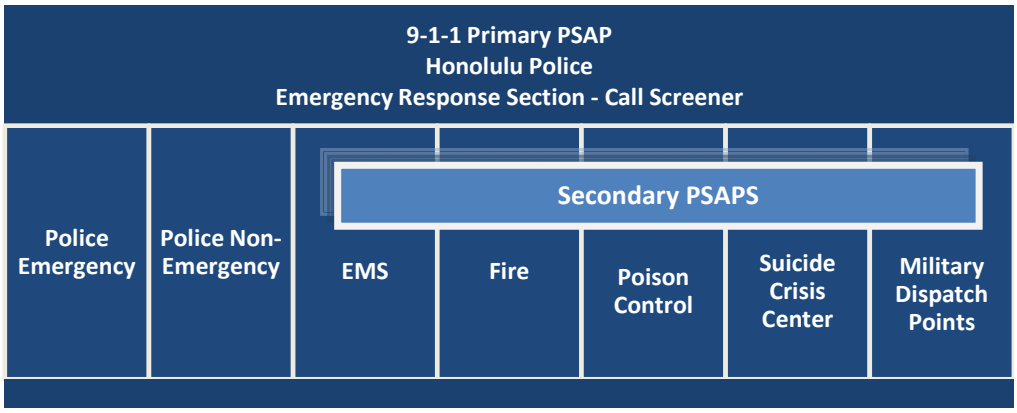
All three entities operate separate dispatch centers and receive calls for service transferred either directly or indirectly from the Primary Public Safety Answering Point (PSAP) located at Honolulu Police Department. The dispatch centers are the entry point for services delivered by fire, EMS, and Ocean Safety.

- Primary PSAP - The Honolulu Police Department (HPD) serves as the Primary PSAP for the City and County of Honolulu on the Island of Oahu.
- The PSAP serves a resident population of 953,000, an estimated 5 million tourists per year, an area of 604 sq. miles, with 227 miles of shoreline.

The City/County of Honolulu 9-1-1 Communication System consists of the following elements:

- Call Screener (Primary PSAP) - Call screener for the initial entry of 9-1-1 calls into the system. The call screener ascertains the type of services needed and routes the call to the appropriate secondary PSAP agency. The call screener's responsibility is to transfer calls to the appropriate agency, upon determination of the nature of the call, for further information gathering and dispatch.
- Secondary PSAP - The agencies receiving call transfers are secondary PSAPS. The Honolulu Fire Communications Center (FCC) and Emergency Medical Services Dispatch (EMS) operate as secondary PSAPs. Ocean Safety has PSAP equipment; however, is not formally recognized as a secondary PSAP, therefore does not receive direct transfer from the Honolulu 9-1-1 Primary PSAP.

Figure 85: City and County of Honolulu 9-1-1 Configuration



Hawaiian Telcom provides PSAPs and secondary PSAPs in the State of Hawaii 9-1-1 CML Answering Equipment. FCC and EMS receive ANI/ALI data (Automatic Number Identification and Automatic Location Identification). Ocean Safety Services has the capability to receive ANI/ALI information, but rarely receives a direct CML 9-1-1 transfer call.

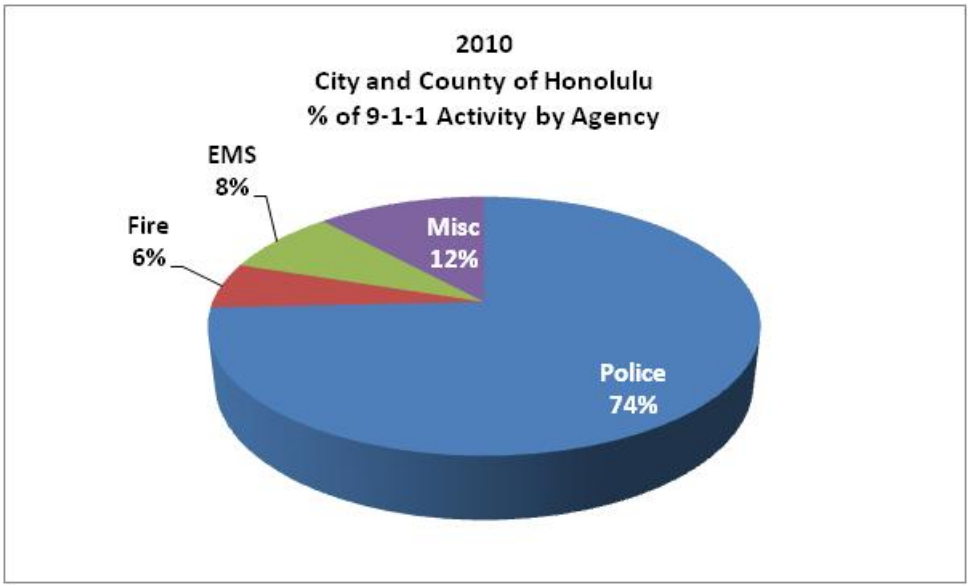
In 2009, the HPD 9-1-1/dispatch center received 896,940 calls for service. Incoming 9-1-1 call activity data for 2010 indicates 900,345 calls for service, an increase of 3,405 calls in 2010.

- 9-1-1 statistics indicate 6 percent of the total received calls were transferred to Fire Communications in 2010 (51,724 fire 9-1-1 calls).
- 8 percent of 9-1-1 calls were transferred to EMS (72,932 EMS 9-1-1 calls).
- 12 percent of 9-1-1 calls were categorized as miscellaneous, were transferred to the military dispatch center, poison control, or other required services (105,875 miscellaneous).

Ocean Safety typically does not receive direct transfer of 9-1-1 calls from the Honolulu Emergency Response Section. Ocean Safety generally receives emergency call notification via administrative telephone landline from FCC creating a third relay, transfer, or conference call. (Additionally, notification of emergencies for Ocean Safety may be initiated 'on view' from lifeguard tower locations, via radio to Lifeguard dispatch.)

The following graph illustrates the percentage of 9-1-1 workload for each public safety agency.

Figure 86: Honolulu 9-1-1 Activity



9-1-1 Workflow

The Fire Communications Center (FCC) and the EMS Dispatch Center typically receive emergency calls for service as an initial transfer from the Honolulu 9-1-1 PSAP. OSLD is not considered a secondary PSAP and receives 9-1-1 calls for service as a second layer 9-1-1 transfer, normally from the Fire Communications Center.

Note: Ocean Safety dispatch does not track or maintain records on the originating source for emergency calls for service; e.g., FCC transfer, EMS transfer, lifeguard tower 'On View', etc. As there is no tracking of the call source, ESCI assumes Ocean Safety receives a majority of emergency calls for service by the 'On View' method through the staffed lifeguard towers.

The 9-1-1 system on Oahu is a 'layered' workflow process, requiring call transfers of each 9-1-1 call from the Honolulu Primary PSAP (call screening position), to EMS, FCC, or the HPD call taker. Call screeners do not perform detailed call interrogation. All three agencies, police, fire and medical, operate with call takers, responsible for call interrogation, and radio dispatchers, with each position providing distinct operational functions.

The workflow process initiates with the 9-1-1 PSAP call screener transferring the call for service to the appropriate or lead emergency response dispatch center. Under the layered process, the respective call takers, in this case fire or EMS, obtain caller and incident information. The call taker at fire or EMS initiates a CAD incident and forwards the call information via the CAD system, to the radio dispatcher for unit assignment and notification (dispatch) of the primary response units. In the event of a required co-response, the call taker initiates a verbal relay of information to the appropriate co-response agency. Call entry and dispatch at the co-response agency subsequently occurs.

If the call for service pertains to Ocean Safety, such as a life threatening water incident, FCC receives the initial transfer from the HPD PSAP. Upon call entry by FCC, the FCC call taker may conference the caller to Ocean Safety, or may elect to complete the call, and then notify Ocean Safety Dispatch. Additionally, notification of EMS dispatch occurs for a co-response via telephone landline call relay.

An additional scenario example involves a motor vehicle crash (MVC). If the MVC is a non-injury, the call screener transfers the call to the police call taker as the primary responder. If the caller indicates injuries, the call screener transfers the call to EMS. EMS moves through the call process and notifies fire and police respectively via landline, for fire and police unit secondary response.

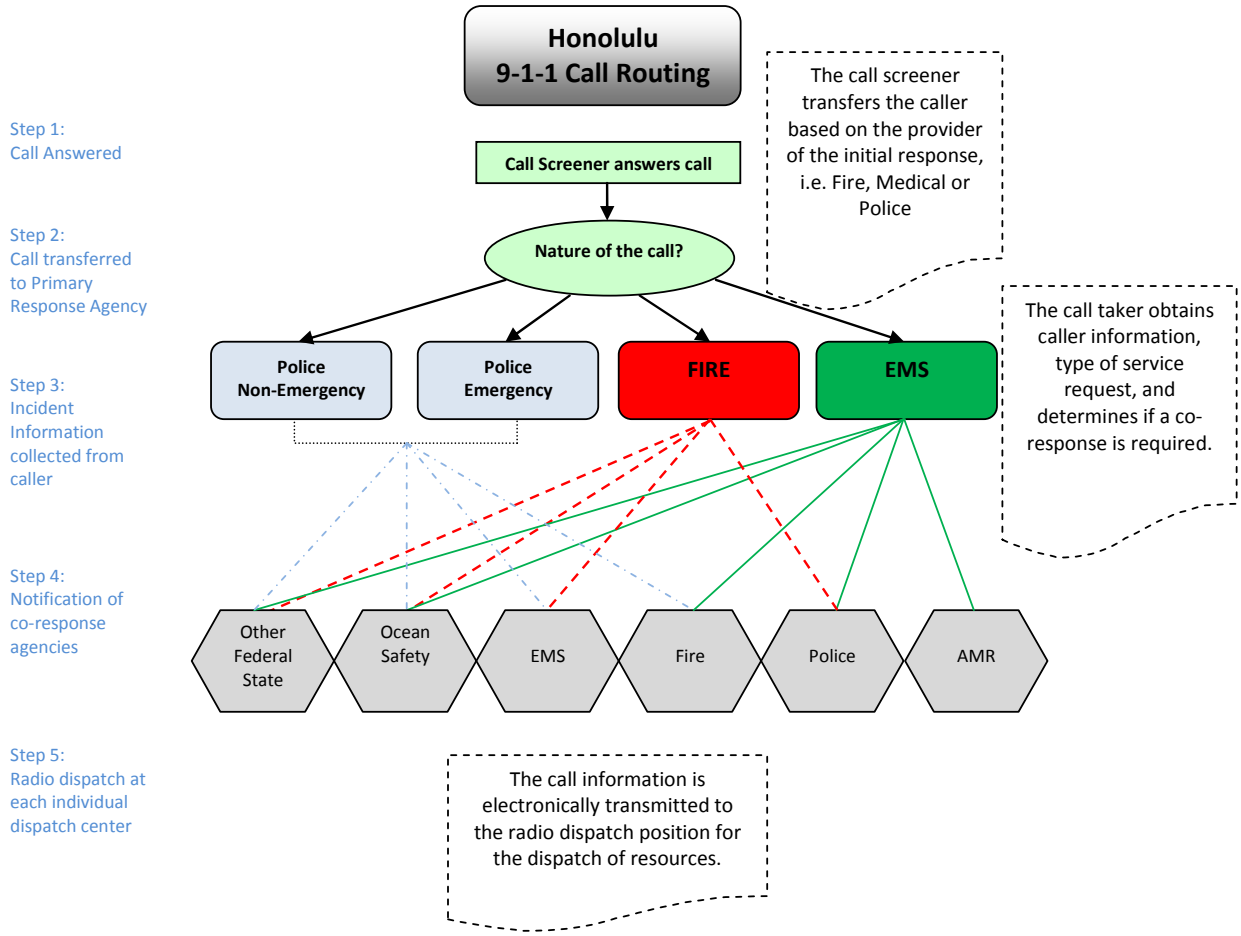
Life threatening or potential life threatening water safety calls originating from the lifeguard towers are relayed via radio to Ocean Safety Dispatch. Lifeguard dispatch initiates water safety resource(s) response based on the type of call, and notifies EMS Dispatch and/or FCC for unit standby or response via telephone landline.

Under all of the above scenarios, additional 9-1-1 calls to the Primary PSAP providing further information, route through the same process, although in a normally shorter time expenditure.

Upon cancellation of a call for response, agencies reverse the process for notifications. Additionally, other resources, such as US Coast Guard, Federal/military or other auxiliary response agencies, depending on the location or type of call, require initial and/or reverse notification.

A notable exception to the workflow process is AMR (American Medical Response). Within the City and County of Honolulu, AMR handles non-emergency transport calls, i.e. inter-hospital transfers, or transfers to other care facilities. Per agreement and upon request by EMS, AMR provides emergency transport if all City/County EMS units are busy and cannot respond. Incident notification to AMR requesting back-up response is typically by verbal relay from the EMS dispatch center.

Figure 87: Honolulu Call Routing Diagram



Current Honolulu 9-1-1 Call Routing is complex with a requirement of multiple steps and numerous administrative calls between responding agencies.

- Additional 9-1-1 calls with updated information on a specific incident requires the duplication of steps providing verbal updates to each co-response dispatch center.
- Updated information from response units, additional coordination, or requests for other agencies, requires verbal relay from the initial Secondary PSAP to the dispatch centers of the co-responders.
- Cancellation of a response works in reverse requiring the initiating dispatch center to notify all responders dispatch point by telephone.
- A significant event with police, fire, medical, and Ocean Safety response, requiring 2 updates of information between the agencies during the incident, creates a minimum of 8 verbal relays (telephone calls) to adequately coordinate the update of information.

Organizational Services Comparisons

The Organizational Services comparison section focuses on governance and organizational structure, operating costs, and personnel processes. Additionally, the Organizational Services section contains the sub-criteria addressing types of services provided, mission statements, planning considerations, and financial processes

Figure 88: Summary of Governance and Organizational Conditions

CRITERIA 1: GOVERNANCE CRITERIA 2: ORGANIZATIONAL	
SERVICES PROVIDED/MISSION/ORGANIZATION	**FCC** • **Services Provided**: The Honolulu Fire Department provides dispatch and communications services to the Honolulu Fire Department. • **Organizational:** Fire Communications is a division of the Planning and Development Section of Honolulu Fire (chart provided). • **Mission Statement**: FCC does not present a mission statement specific for communications. • **Strategic Plan:** Honolulu Fire Strategic Plan addresses specific communications related issues. • **Written Agreements:** Agreements affecting FCC Operational requirements are in place with City/County Services, State of Hawaii, and Federal agencies. Additionally, two MOUs are in place specifically for FCC operations with Hawaii Fire Fighters Association (HFFA).
	EMS COMMUNICATIONS • **Services Provided:** EMS provides communications services and dispatch to City and County of Honolulu EMS. • **Organizational:** EMS Communications is a unit within the EMS Division of the Honolulu Emergency Services Department (HESD). EMS did not present an organizational structure for review. • **Mission Statement:** The EMS Communications Center does not present a mission statement specific for communications. • **Strategic Plan:** EMS did not present any type of strategic planning documents relating to communications. • **Written Agreements:** Not provided for review.
	OCEAN SAFETY • **Services Provided**: Ocean Safety Lifeguard Services Division provides dispatch support functions for Oahu Beaches and Ocean Safety. • **Organizational:** Dispatch/Communications function for Lifeguard services is not a recognized unit on the Organizational Chart representing the Ocean Safety Division. • **Mission Statement:** None specific for communications • **Strategic Planning:** No planning documents provided. • **Written Agreements:** Not provided for review.
BEST PRACTICE(S)	
1. Appropriate written agreements, policy, and governance documents (if applicable) are in place clearly defining the legal authority, roles, and responsibilities of the Public Safety Communications Agency, including services provided, and organizational policy (governance, administrative, and fiscal).	
2. The Communications Agency provides a Mission Statement, outlining goals, objectives, and strategies.	
3. The Agency provides a clearly defined Organizational Structure. The structure provides the appropriate lines of authority and direction for the agency with, levels of supervision, and accountability in achieving the stated mission, goals, and objectives of the agency.	
4. The Agency provides a Strategic Planning process and document.	

FINDINGS
✓ **FCC partially meets the Best Practice for the Governance and Organizational Core Criteria, providing written agreements, Mission Statement (not specific to communications), Organizational Structure, and Strategic Planning Processes.**
✓ **EMS Communications did not provide an organizational chart, mission statement, strategic plan, or written agreements specific to communications, thereby not meeting the identified Best Practices.**
✓ **Ocean Safety Dispatch does not meet Best Practices addressing Governance and Organizational conditions as these core components are not in place.**

Figure 89: Summary of Financial Conditions (Costs) by Agency

CRITERIA 2a: FINANCIAL	
OPERATING COSTS	**FCC** • FY 2011 FCC Communications Budget: $2,222,575
	EMS COMMUNICATIONS • 2011 Estimated Operating Costs – EMS Communications: $1,821,912
	OCEAN SAFETY • 2011 Estimated Operating Costs – Lifeguard Dispatch: $250,000
BEST PRACTICE(S)	
5. Financial policies are in place for the communications center addressing acceptable budgeting and expenditure practices. The Policy addresses critical infrastructure programs, technologies, and replacement (infrastructure) funding, reflecting the Strategic Plan, Mission Statement, Goals, and Objectives.	
FINDINGS	
✓ **FCC presented a communications section budget meeting Best Practice.**	
✓ **EMS did not provide a communications section budget; therefore, EMS does not meet Best Practice.** (Note: Estimated costs were extracted from the EMS department budget by ESCI for comparative purposes. FTE scheduling positions are not included in the Communications Costs. There are five positions allocated for scheduling.)	
✓ **Ocean Safety does not maintain a communications section budget and does not meet Best Practice.**	

Figure 90: Summary of Personnel Processes/Resources

CRITERIA 3: PERSONNEL PROCESSES	
PERSONNEL RESOURCES	**FCC** • **Labor:** The Hawaiian Fire Fighters Association, IAFF, Local 1463, represents FCC dispatchers. • **Personnel Processes:** Job Descriptions are available (FF II, FF III and Captain). Hiring for FCC dispatcher is not an initial entry position, but through a lateral transfer internally within Honolulu Fire Department. There is no testing requirement for transfer into FCC. • **Turnover:** Turnover is not applicable to FCC personnel in the traditional sense due to internal transfers, promotions, and retirement. **EMS COMMUNICATIONS** • **Labor:** Dispatch personnel and the EMS Communications Supervisor are represented by the United Public Worker's Union. • **Personnel Processes:** Job Descriptions specific to EMS are available for dispatch personnel and the Unit Dispatch Supervisor. Initial dispatch entry position requires two (2) years field experience as an EMT. CritiCall Test assessment and interview process is required prior to hire. • **Turnover:** Turnover rate for dispatch personnel for the immediate past three years ranged from a 2008 rate of 17% to a 2010 turnover rate of 5%. **OCEAN SAFETY** • **Labor:** Hawaiian Government Employees Association, Unit 3, represents Water Safety personnel. There is no specific recognition of personnel assigned to dispatch/communications functions. • **Personnel Processes:** Position descriptions are developed for Water Safety Officer; however, no descriptions are in place specific to communications. No hiring or testing procedures specific for dispatchers were provided. It is assumed initial hiring requirements are the same for all entry personnel. • **Turnover:** Turnover data for Ocean Safety Lifeguard dispatchers is not provided.
BEST PRACTICE(S)	
6. There are written policies specifically addressing Position Requirements (i.e. Job Descriptions, Testing, and Selection Methodology). The center must monitor and predict vacancies, assuring pro-active hiring processes and continued maintenance of authorized positions.	
FINDINGS	
✓ **FCC <u>partially meets</u> Best Practice. Position descriptions are available but not specific to communications. FCC maintains internal formalized procedures listing the duties and responsibilities for each position assigned to the center. Management of vacancies occurs through lateral transfers and promotions. There is no specific testing for skills related to emergency call taking and fire dispatch communications.**	
✓ **EMS Communications <u>partially meets</u> Best Practice. There is no policy denoting hiring processes and required testing for prospective employees. Management of turnover is on an as needed basis rather than a planned pro-active approach.**	
✓ **Ocean Safety <u>does not meet</u> Best Practice for formalized position descriptions, formalized hiring processes, and required skills for Ocean Safety Dispatch.**	

Operational Comparisons

Operational conditions address performance requirements, workload, staffing, policies, training, and quality assurance programs.

Figure 91: Summary of Current Performance Requirements

CRITERIA 4: PERFORMANCE	
PERFORMANCE REQUIREMENTS	**FCC** • **Performance Requirements:** FCC policy targets all emergency calls for immediate pickup, or within 2 to 3 rings maximum (per policy). There is no tracking of ring time. FCC provides a formally developed performance requirement comprising the combined time from call receipt at FCC to the time of initial dispatch notification. The performance benchmark is 60 seconds at a 90% fractile. **EMS COMMUNICATIONS** • **Performance Requirements:** EMS Communications provides a policy requiring the EMD "will answer the call promptly, answering in three rings or less" in processing a call for EMS. EMS policy outlines an EMS ambulance crew "shall be dispatched within one minute after the receipt of an emergency ambulance request". **OCEAN SAFETY** • **Performance Requirements:** Ocean Safety does not present performance standards or measures for call answering or dispatch.
BEST PRACTICE(S)	
7. Established performance requirements are in place specific to communications reflecting answer time, call processing time, dispatch time, and combined call answer, call processing, and dispatch notification times.	
8. Management Information System Reports provide data for measurement of established Performance Requirements. **- The Agency assigns personnel and delineates the reporting program responsibilities.** **- Data indicating adherence to performance requirements is maintained on a monthly basis, and reviewed annually assuring applicability and relevance.**	
FINDINGS	
✓ **FCC partially meets Best Practices, addressing performance requirements, data collection and reporting requirements. While the performance benchmark of 60 seconds at 90% fractile is achieved, additional data measurement and review on a monthly basis is optimal.**	
✓ **EMS partially meets Best Practices addressing performance requirements with a policy statement on answer and dispatch time. EMS does not meet Best Practice for data collection assignment and responsibilities or reporting requirements as it relates to communications. EMS does not meet dispatch processing performance requirements.**	
✓ **Ocean Safety Dispatch does not meet Best Practice Performance Requirements.**	

Figure 92: Workload Summary by Agency

CRITERIA 5a: OPERATIONAL WORKLOAD		
WORKLOAD	**FCC (FIRE COMMUNICATIONS)** **CML 9-1-1 Incoming Calls** Monthly Average: 4292 calls per month Daily Average: 141 calls per day Hourly Average: 6 calls per hour	**Dispatch Incidents** Monthly Average: 3392 incidents per month Daily Average: 112 incidents per day Hourly Average: 5 incidents per hour
	Non-Emergency Administrative Calls (Estimates) Daily Average: 165 calls per day Hourly Average: 7 calls per hour	
	EMS COMMUNICATIONS **CML 9-1-1 Incoming Calls** Monthly Average: 6319 calls per month Daily Average: 208 calls per day Hourly Average: 9 calls per hour	**Dispatch Incidents** Monthly Average: 5,504 incidents per month Daily Average: 181 incidents per day Hourly Average: 8 incidents per hour
	Non-Emergency Administrative Calls (Estimates) Daily Average: 197 calls per day Hourly Average: 8 calls per hour	
	OCEAN SAFETY Lifeguard Dispatch does not maintain telephone or dispatch workloads.	

BEST PRACTICE(S)

9. **The Communications Center collects, maintains, and periodically/routinely reviews workload data to determine staffing levels, allocation of personnel, and position requirements.**

FINDINGS

Minimal workload information is collected, reviewed, and subsequently analyzed by the agencies for determination of staffing levels, allocation of personnel, and position requirements.

- ✓ **FCC does not meet Best Practice for utilizing collected data for purposes of workload staffing allocation. FCC presented incoming 9-1-1 activity, and comprehensive dispatch activity reports.**

- ✓ **EMS Communications does not meet Best Practice for utilizing collected data for purposes of workload staffing allocation. EMS provided comprehensive data for incoming telephone calls, answering times, and hourly workload; however, no information was provided indicating any type of review of performance and workload data.**

- ✓ **Ocean Safety Dispatch does not meet Best Practice for utilizing collected data for purposes of workload staffing allocation. Lifeguard Services Dispatch has no data available for dispatch activities. Any tracking or notation of information is completed on a manual basis. This promotes 'under reporting' of activities and workloads.**

Figure 93: Staffing by Agency

CRITERIA 5b: STAFFING	
STAFFING	**FCC** • Authorized Staffing: 27 FTE (1 Chief, 4.0 Captains, 4.0 FF III Positions, 17.0 FF II positions – 1.0 FF II is vacant). • Minimum Staffing: 4.0 personnel per shift – includes 3 operators and an officer.
	EMS COMMUNICATIONS • Authorized Staffing: 21 FTE (1 unit supervisor, 20 call taker/dispatch positions – 1 is vacant). • Minimum Staffing: 4.0 personnel 0700-2300 hours - 3.0 personnel 2300 – 0700 hours (1.0 Supervisor for all three shifts).
	OCEAN SAFETY • Authorized Staffing: 3.0 FTE; however, dispatch is not a recognized unit within Ocean Safety (2 Water Safety Officers and 1 Captain). Three FTE are assigned from authorized Water Safety Officer positions. • Minimum Staffing: 1.0 position 0645 – 1800 hours, Captain (supervisor) is available as needed.

BEST PRACTICE(S)

10. There is sufficient staffing to meet the mission, goals, and objectives of the Agency including sufficient personnel on duty to meet established performance standards for emergency call answering and dispatch of alarms.
- **Supervision is available for minimum staffing of three telecommunications personnel or assigned to the center when more than three telecommunicators are on duty.**
- **Centers providing medical dispatch protocols ensure two staffed positions are on duty at all times.**

FINDINGS

✓ **Analysis indicates an operational staffing requirement of 20 FTE. FCC authorized staffing is 21 operational positions (FF II & FF III). FCC meets minimum staffing requirements. There are 4 Captains per shift, with back up provided by the FF III positions assuring appropriate supervision. FCC meets Best Practice for sufficient staffing and supervision assignment.**

✓ **EMS Communications does not meet Best Practice for sufficient staffing, minimum staffing requirements, and does not provide supervision assignment 24/7. Analysis indicates an operational staffing requirement (Call Taking/Dispatch Positions) of 25 FTE. EMS is authorized 20, which is a shortfall of 5 FTE; however, 1 position is vacant, creating a shortfall of 6 FTE. EMS Communications does require a minimum of two positions at the console position at all times meeting best practice per medical dispatch protocols. FTE scheduling positions are not included in the staffing requirements. There are five additional positions allocated for scheduling, with several positions that are vacant.**

✓ **Ocean Safety Dispatch does not meet Staffing Best Practices. Note: Supervision and medical dispatch protocols do not apply with a singular staffed position.**

Figure 94: Protocols, Training, Quality Assurance by Agency

CRITERIA 5c: PROTOCOLS/PROCEDURES **CRITERIA 5d: TRAINING** **CRITERIA 6: QUALITY ASSURANCE**	
PROTOCOLS/TRAINING QUALITY ASSURANCE	**FCC** • **Policies:** Policy and Procedures document addresses responsibilities, operations, and performance requirements of the Communications Center. • **Training:** Certified APCO Trainers; maintains a new dispatcher Training Program with a stated goal for development of a formalized program. Continuing education training is conducted monthly as personnel needs dictate; but not currently tracked specific to communications. • **Quality Assurance:** Does not have a formalized quality assurance program. Management of quality issues are on a case-by-case basis by the supervisor or the Battalion Chief. A formalized quality assurance plan is a goal and objective for FCC. FCC does not track any type of compliance or reporting processes.
	EMS COMMUNICATIONS • **Policies:** Policies and procedures are in place for personnel, operations, and equipment/technologies specific to EMS Communications. • **Training:** Formalized new dispatcher Training Program in place; EMS dispatch requires 24 hours CME (continuing medical education) which includes maintenance of EMD certification and attendance at an annual departmental Base Station meeting. • **Quality Assurance:** EMS Communications does not adhere to or have a medical dispatch Quality Assurance program.
	OCEAN SAFETY • **Policies:** No protocols/policy specific to the dispatch function. • **Training:** Dispatch provides new hire training and /or newly assigned dispatch staff 120 hours of instruction. Information regarding any type of formalized continuing education program with the exception of certification maintenance was not provided for review. • **Quality Assurance:** Does not have a Quality Assurance program.
BEST PRACTICE(S)	
11. Policy documents and procedural guidance are available specifically addressing Public Safety Communications. At a minimum these documents address: **- Services Provided and Responsibilities** **- Operations – Performance Standards (Call Processing/Dispatch)** **- Procedures (SOPs) Development Process, Training Program Standards, Quality Assurance, Risk Management and Mitigation, Technical Systems, and Disaster Recovery/Alternate Site**	
12. The documented training program is performance based and meets local, state, or national requirements. *(Training curriculum complies with or is comparable to the APCO ANS Minimum Training Standards for Public Safety Telecommunicators.)* There are established minimum requirements, standards, and training for: **- Public Safety Communications Training Officer (CTO)** **- First level supervisors complying with or comparable to APCO Minimum Training Standards for First Line Supervisors, 2006** **- Continuing Education Program providing ongoing professional development of communications staff**	
13. The Agency provides an approved Quality Assurance Program for evaluation of program guidelines, agency procedures, and performance. The Quality Assurance Program specifically provides for review and sampling of incoming calls for emergency service, assessing level of performance based on operating procedures.	

FINDINGS
✓ **FCC <u>partially meets</u> Best Practice for policy document. There is no policy document regarding risk management nor policy/procedure for Disaster/Recovery Alternate site. FCC <u>partially meets</u> Best Practice for Training with certified trainers and a training process for new employees. A formalized performance based training program is not fully developed. Continuing education is available but not tracked specific to communications training. FCC <u>does not meet</u> criteria for Quality Assurance, as no formalized review process is in place.**
✓ **EMS Communications <u>partially meets</u> Best Practice for policy documents. There is no policy document for risk management/mitigation or Disaster Recovery/Alternate site. EMS Communications <u>partially meets</u> Best Practice with a formalized training program and a minimum of 24 hours annually for continuing education requirements. Certification of Trainers is not to the APCO CTO Trainer level. EMS dispatch <u>does not meet</u> criteria for Quality Assurance.**
✓ **Ocean Safety Dispatch <u>does not meet</u> Best Practices for policy documents, training, or quality assurance.**

Support Structures Comparisons

Support Structures outlines the facilities and technologies of each communication center. Communication Centers must provide infrastructure equipment and technology to meet critical workload demand during emergency operations and maintain the ability to meet the needs of the organization. Public Safety agencies must use technology platforms and applications built on a standards-based technology, enabling interoperability.

Figure 95: Facility Descriptions by Agency

CRITERIA 7: FACILITIES	
FACILITY	**<u>FCC</u>** • **Location:** Basement of the Frank F. Fasi Municipal Building (Type I construction with a Class A roof.) • **Access:** Secure Facility, key lock access to communications. • **Power:** There is redundant power with UPS and generator support. The facility is not on a separate heating and ventilation system.
	<u>EMS COMMUNICATIONS</u> • **Location:** 2nd floor of EMS Administrative offices, in the industrial area near Honolulu International Airport. Facility is a metal building utilized for industrial applications. • **Access:** Secure area, electronic card key entry system. • **Power:** The facility has redundant power through UPS and generator support.
	<u>OCEAN SAFETY</u> • **Location:** Ocean Safety Facility, Leahi Avenue. (Facility is an older wood building previously used as a residence.) • **Access:** Secure area, electronic keypad entry for dispatch only. • **Power:** Redundant power is available through UPS and generator.

BEST PRACTICE(S)
14. Facilities and resources are designed, maintained, managed to meet building Essential Services design and functions and meet agency mission, goals, and objectives.
15. Emergency communications centers are designed to manage peak and critical workloads established by the jurisdictional Agency including support staff; emergency communications centers and associated buildings housing essential equipment for the center operations are protected from vandalism, terrorism, and other disturbances.
16. Entries to communication areas are restricted to non-authorized personnel.
17. Effective redundancy plans call for UPS devices and generators to provide power to critical systems until restoration of primary power supply. Generator sets must provide backup power to Critical Operations Power Systems (COPS) for a minimum of 72 hours at full load.
FINDINGS
✓ **FCC <u>meets</u> Best Practices; communications facility is housed in a municipal building originally designed to meet Essential Services.**
✓ **EMS communications <u>partially meets</u> Best Practices; industrial facility design does not meet Essential Services requirements.**
✓ **Ocean Safety Dispatch <u>does not meet</u> Best Practices.**

Figure 96: Agency Technologies (Telephone, CAD, Paging, MDTs, Workstations)

CRITERIA 8a: TELEPHONE CRITERIA 8b: CAD CRITERIA 8c: MOBILE DATA CRITERIA 8d: PAGING CRITERIA 8e: WORKSTATIONS	
TELEPHONE/CAD PAGING/MDTs/WORKSTATIONS	**<u>FCC</u>** • **Telephone:** 9-1-1 CML Equipment - 3 answering positions, and Meridian telephones (non-emergency/administrative calls) – 5 answering positions. • **CAD:** TriTech VisiNet CAD system, version 4.5.6; • **Mobile Data/AVL:** MDCs in frontline response equipment with AVL/GPS capabilities identifying location of apparatus. • **Paging:** Paging interfaced with CAD; pages initiated from CAD dispatch positions; text paging and group paging capabilities. • **Workstations:** Five Infra-Structure "Star" workstations (Planning for upgrade).
	<u>EMS COMMUNICATIONS</u> • **Telephone:** 9-1-1 CML Equipment - 4 answering positions, and Meridian telephones (non-emergency/administrative calls) – 5 answering positions. • **CAD:** TriTech VisiNet CAD version 4.4.4. • **Mobile Data/AVL:** MDCs in frontline response equipment with AVL/GPS capabilities identifying location of responders. • **Paging:** Paging interfaced with CAD; pages initiated from CAD dispatch positions; group paging capabilities. • **Workstations:** 5 Watson "Fusion" workstations, (sit/stand capabilities).
	<u>OCEAN SAFETY</u> • **Telephone:** 9-1-1 CML Equipment - 1 answering position, and Meridian telephones (non-emergency/administrative calls) – 2 answering positions. • **CAD:** None. • **Mobile Data/AVL:** None. • **Paging:** No information provided. • **Workstations:** Two Computer/Desk Workstations.

BEST PRACTICE(S)
18. The telephone network, equipment, and policies supporting the Public Safety Communication Center meets the needs and capacity requirements of the agency. **- The telephone network provides a minimum grade of service for incoming emergency calls, and appropriate lines to manage non-emergency call loading** **- The telephone network is a design providing route diversity for the incoming network** **- The telephone system supports the ability to separate emergency versus non-emergency calls, providing ability for prioritization of incoming calls**
19. The Agency provides policy, training, and testing processes directly related to the agency telephone systems. **- Wireless Phase I and Phase II calls** **- TDD/TTY requirements** **- Language translation services** **- System components, reroute, make busy, disaster/failure planning**
20. The CAD system hardware is of the grade, quality, and reliability to meet the requirements of the Agency; provides interoperability with other emergency service agencies; developed manual back up or secondary dispatch method in the event of a failure of the CAD system.
21. Mobile Data Computers (MDCs) provide operational efficiencies for public safety responders and communications center personnel. **- MDC capabilities require ability to provide CAD dispatch to units, messaging between units, status updates of the public safety responders, and ability to prioritize emergency messages** **- MDC System data is not lost in the event of a system failure**
22. The paging system is managed by the communications agency; paging/CAD interface is functional providing automated tone notification, paging, and texting capabilities directly from the CAD dispatch function.
23. Workstations are functional meeting agency requirements and ergonomic standards; workstations allow 'universal' capabilities for call taking and/or dispatch functions.
FINDINGS
✓ **FCC, EMS, and Ocean Safety <u>meets</u> telephone Best Practices for telephone equipment systems. ESCI did not specifically observe training components within the three centers for the telephone systems (Best Practice #19). Although Ocean Safety telephone equipment meets Best Practices, the use of the CML 9-1-1 equipment is not as intended, but rather a 'stop gap' solution to offset an operational problem concerning information relay.**
✓ **FCC <u>partially meets</u> CAD, MDC, and Paging Best Practices.**
✓ **EMS Communications <u>partially meets</u> CAD, MDC, and Paging Best Practices.**
✓ **FCC and EMS CAD systems, while the same vendor are not interoperable with one another, software versions are not the same, data is not updated at the same time, and there is no formalized manual back-up processes.**
✓ **Ocean Safety Dispatch <u>does not meet</u> Best Practices as there is no CAD, MDC, or Paging systems available.**
✓ **FCC, EMS, and Ocean Safety <u>partially meet</u> Best Practice relating to workstations; however workstations are not universal in communications applications.**

Figure 97: Radio System Utilization by Agency

CRITERIA 8f: RADIO SYSTEMS	
RADIO SYSTEMS	**FCC** • **Radio System:** City and County of Honolulu 800 MHz Radio System (Trunked and Conventional) Talk Groups for dispatch, tactical, island wide groups, special ops and InterOp for communications with other public safety agencies. A conventional system provides talk around channels, mutual aid and repeater channels. • **Radio Workstations:** Radio controls are through a MaCom C3 Maestro.
	EMS COMMUNICATIONS • **Radio System:** MEDICOM UHF Radio Channels for dispatch and day-to-day radio activities. Hospital communications between field units and the Hospitals are conducted on the City and County of Honolulu 800 MHz trunked radio system. • **Radio Workstations:** Radio controls for the MEDICOM UHF System are Motorola radio consoles. MaCom C3 Maestro is utilized for the 800 trunked system functionalities (hospital communications).
	OCEAN SAFETY • **Radio System:** Ocean Safety/Lifeguard Services utilize the Honolulu 800 MHZ radio system. • **Radio Workstations:** Radio control is through a single Zetron radio control console position.
BEST PRACTICE(S)	
24. Radio systems must fulfill the agency mission and meet the needs of community expectations; interoperability with other jurisdictions/agencies is optimal.	
FINDINGS	
✓ **FCC <u>meets</u> Best Practice, operating on the City and County of Honolulu System, assuring interoperability.**	
✓ **EMS Communications <u>does not meet</u> Best Practice with use of two separate radio systems and control stations. This configuration is not operationally efficient or effective for meeting the needs of the emergency dispatch responders. The separate radio systems create an operating vacuum limiting interoperability for EMS and are disparate to the overall City and County of Honolulu emergency response system.**	
✓ **Ocean Safety Dispatch <u>meets</u> Best Practice.**	

Figure 98: Logging Equipment and Time Synchronization by Agency

CRITERIA 8g: LOGGING EQUIPMENT **CRITERIA 8h: TIME SYNCHRONIZATION**	
LOGGING EQUIPMENT TIME SYNCHRONIZATION	**FCC** • **Logging Equipment:** Voice logging equipment Instant Recall Recorders on each workstation (Exacom EARS 2000IR). Exacom, Hindsight-Net, Version 6, Digital Recording System for Telephone Traffic. Telephone data is stored on the HFD FCC recorder hard drive. Radio traffic recordings are stored on the Honolulu Police Department recorders, and FCC accesses data from the HPD storage data house. • **Time Synchronization:** Network Time Protocol through the City and County of Honolulu. **EMS COMMUNICATIONS** • **Logging Equipment:** Stancil, Ten-4 System, V2.4.11 and an Exacom (Hindsight-Net Recorder), Version 6.1.26.18. • **Time Synchronization:** Network Time Protocol through the City and County of Honolulu. **OCEAN SAFETY** • **Logging Equipment:** Information not provided • **Time Synchronization:** Information not provided
BEST PRACTICE(S)	
25. Communications centers ensure a logging voice recorder channel is available for each radio channel or talk-group, dispatch circuit, and telephone position; each position allows instant replay of voice or radio recordings.	
26. Communications agencies provide the ability to synchronize internal clocks of equipment/systems to an accepted time standard (i.e. CAD, Radio Consoles, Telephone, and Voice Logging Equipment).	
FINDINGS	
✓ **FCC and EMS meet Best Practices.**	
✓ **Ocean Safety Dispatch does not meet Best Practices; no information was provided. It is assumed the radio traffic is recorded through the City/County of Honolulu recording system utilized for the trunked radio system; however, Ocean Safety does not utilize the radio logging data.**	

Figure 99: Disaster Recovery by Agency

CRITERIA 9: DISASTER RECOVERY	
BACK UP/DISASTER RECOVERY	**FCC** • **Backup:** FCC maintains an alternate site for communications and tests the facility once a month. • **Plan:** FCC currently does not have a Disaster Recovery Plan, but a Continuity of Operations Plan (COOP) is a high priority issue for FY 2011. **EMS COMMUNICATIONS** • **Backup:** EMS currently does not maintain a viable back-up site for communications but is developing a new site on Young Street. • **Plan:** A COOP or Disaster Plan is not currently developed for the new location. **OCEAN SAFETY** • **Backup:** Ocean Safety maintains a fifth wheel trailer on the site of the existing administrative facility (reportedly movable) for back-up disaster communications. • **Plan:** A COOP/Disaster Plan is not available.
BEST PRACTICE(S)	
1. The jurisdictional agency has documented a vulnerability assessment and operations plan for communications. **- Essential Services provided are identified for operational inclusion in the plan;** **- The plan identifies the maintenance and operations of an alternate communications system;** **- The alternate communications system is capable of duplicating and performing Essential Services provided at the primary communications center;** **- The plan includes back-up and redundant power for the facility;** **- The agency develops a drill and exercise program on a regular basis to evaluate the contingency/continuity plan.**	
FINDINGS	
✓ **FCC <u>partially meets</u> Best Practice; planning is underway for the development of a Continuity of Operational Plan.**	
✓ **EMS Communications <u>does not meet</u> Best Practice. A back-up site is under development; however, it is not operational and a Disaster Plan is not developed.**	
✓ **Ocean Safety <u>does not meet</u> Best Practice. A Disaster Plan is not developed and exercised.**	

Key Observations

The review, assessment, and comparisons identify areas affecting service delivery for Honolulu Fire and Honolulu Emergency Services Department (EMS and Ocean Safety). Additionally, the assessment serves to measure similarities and differences, and identifies areas requiring improvement, and considerations for integration planning of the Honolulu Fire Department and Honolulu Emergency Services Department

Figure 100: Summary of Observations - Communications

FCC/EMS COMMUNICATIONS/LIFEGUARD DISPATCH OBSERVATIONS	
AGENCY OPERATIONAL AND INFRASTRUCTURE SIMILARITIES	**Honolulu Fire Communications (FCC), EMS Communications, and Lifeguard Dispatch have specific similarities relating to operational and infrastructure conditions for Public Safety Communications as follows:** 1. The three centers provide call taking, resource assignment, and tracking of those resources. All three centers operate under time constraints for call taking, dispatching, and tracking of units. 2. Each Center is responsible to receive emergency calls relating to immediate threat to life and/or property and dispatch emergency responders. Both FCC and EMS receive 9-1-1 calls transferred from the Honolulu 9-1-1 center and calls for service via other telephone lines. Ocean Safety Dispatch typically receives a call relay from FCC, or receives an 'on view' report or request from Lifeguard stations. All centers generally receive or give secondary notification (mutual aid requests) verbally by call relay to and from other centers or agencies. 3. Personnel in all three centers require specialized training and certifications. Recertification in specialized areas is a requirement for the maintenance of specific certifications. 4. All three centers utilize CML 9-1-1 call taking equipment, 'J' lines, and other non-emergency telephone equipment. FCC and EMS dispatch have the ability for immediate playback of emergency telephone calls and have recording capability of radio and telephone traffic relating to call taking, dispatch, and tracking of resources. Ocean Safety did not provide or verify this capability. 5. All three centers, whether formalized by procedure or not, elicit information from callers based on expertise and requirements specific to their discipline (fire/medical/ocean safety). The information required contains basic tenants of where, what, when, and who. Each agency has questions specific to their discipline and type of call for service for the appropriate response level and assignment of resources. Each communications center records incidents whether manually or via entry into CAD. 6. Both FCC and EMS utilize TriTech CAD Systems, however operating on differing versions of software, and geo database files. 7. Each center utilizes a system of location identification for appropriate/ closest assignment of response resources. Resources are assigned or dispatched by each center based on pre-determined operating protocols. 8. Each communication center may request outside resources or additional assistance depending on the location and type of call for service. These requests are via call relay (telephone) to other agencies. 9. Each center tracks response of resources and monitors radio traffic and/or receives updated on-scene information. Resources are tracked either manually or via CAD. 10. Each center tracks and records radio transmissions either manually or electronically via CAD.

FCC/EMS COMMUNICATIONS/LIFEGUARD DISPATCH OBSERVATIONS		
ORGANIZATIONAL DIFFERENCES		**The comparison of Fire Communications (FCC), EMS Communications, and Lifeguard Dispatch reveals disparate Organizational requirements specific to each employee group. The Organizational core areas require planning and coordination prior to initiation of an Integration Plan for communications. Specific areas include:** 11. Different Labor Organizations 12. Dissimilar pay and benefit structure 13. Unrelated Position Descriptions not specific to communications 14. Disparate shifts, work hours, shift assignment practices, and working conditions 15. Shift supervision 16. Differing testing and hiring practices
NEEDED IMPROVEMENTS	OPERATIONAL	**Operational components partially meeting Best Practice, or are not in place, require improvement by each agency, assuring improved service delivery, and assisting in coordination and planning of required operational upgrades.** 17. Minimal Performance Standards 18. Workload Measurements - inability to measure work activities due to lack of management reporting systems, use of existing data, and lack of consistent operational review 19. Shortage of sufficient staffing levels, adequate supervision, QA, and training staff (EMS) 20. Varying levels of protocol development 21. Lack of protocols specifically addressing and defining operational interoperability, call relay, multiple agency response, mutual aid, and cancellation procedures a. Initial or first notification priority to water safety (ocean) calls for service b. Cancellation of responders c. Co-response responsibilities of dispatch 22. Varying levels of training, curriculum, training expertise, certifications, and requirements a. Lack of continuing education requirements 23. Lack of standardized and consistent Quality Assurance and Performance Review mechanisms
	INFRASTUCTURE	**Infrastructure components partially meeting best practice, or are not in place, require improvement by each agency, assuring the infrastructure is in place supporting operational and organizational requirements.** 24. Disparate facility requirements and inability to assure facilities meet Essential Service requirements 25. Disparate technical equipment and capabilities 26. CAD systems – separate platforms, varying software and GIS versions, lack of coordination between agencies, and lack of interoperability between public safety agencies 27. Varying types of Workstations 28. Radio – Lack of consistent radio capabilities/interoperability/disparate radio systems at EMS 29. Lack of developed, standardized, and coordinated Back-up and Continuity of Operation Plans (Disaster Planning)

Core Criteria Findings

The baseline infrastructure criteria for fire, EMS, and Ocean Safety dispatch provide the information to assess individual agency ability to meet Best Practices. The following dispatch center table summarizes each agency's capability in the nine critical core areas for achieving Best Practices.

- Honolulu Fire Communications achieves the uppermost ratings in the core areas either meeting or partially meeting criteria in a majority of critical core areas. While not all core areas at FCC are complete, formalized key planning documents outline and address requirements for these areas. The planning documents provide a set direction of meeting the agency goals and objectives.
- EMS requires improvements in significant critical areas addressing direction of the agency as it relates to infrastructure support for staffing allocations, meeting performance measures, Quality Assurance, shift supervision, and technologies.
- Ocean Safety requires significant improvement to meet industry standard public safety communications Best Practices.
- Honolulu 9-1-1 workflow requires multiple handling processes and verbal relay of information for notification and communication with co-responder dispatch centers. This prevents simultaneous notifications creating significant time delays and high risk for errors in information transfer.

Figure 101: Communications Core Criteria Findings

Communication Center Findings			
Core Criteria	**Fire (FCC)**	**EMS**	**Ocean Safety**
1. Governance/Organizational	Partially Meets	***Does Not Meet***	***Does Not Meet***
2. Financial	Meets	***Does Not Meet***	***Does Not Meet***
3. Personnel Processes	Partially Meets	Partially Meets	***Does Not Meet***
4. Performance	Partially Meets	Partially Meets	***Does Not Meet***
5. Operational			
Workload	***Does Not Meet***	***Does Not Meet***	***Does Not Meet***
Staffing	Meets	***Does Not Meet***	***Does Not Meet***
Protocols	Partially Meets	Partially Meets	***Does Not Meet***
Training	Partially Meets	Partially Meets	***Does Not Meet***
6. Quality Assurance	***Does Not Meet***	***Does Not Meet***	***Does Not Meet***
7. Facilities	Meets	Partially Meets	***Does Not Meet***
8. Technology			
Telephone	Meets	Meets	Meets
CAD, MDC, Paging	Partially Meets	Partially Meets	***Does Not Meet***
Workstations	Partially Meets	Partially Meets	Partially Meets
Radio Systems	Meets	***Does Not Meet***	Meets
Logging Equipment	Meets	Meets	Unknown
Time Synchronization	Meets	Meets	Unknown
9. Disaster Recovery	Partially Meets	***Does Not Meet***	***Does Not Meet***

Significant Findings and Critical Areas

The review, assessment, and comparison classify critical areas impacting service delivery for Honolulu Fire and Honolulu Emergency Services Department (EMS and Ocean Safety). Areas needing improvement are found in each of the nine core areas.

Significant Findings:

- Lack of public safety coordination and oversight for the three dispatch agencies;
- Redundancies (Organizational, Personnel Processes, Operational, Facilities, and Technology);

- Multiple centers (fire/EMS/Ocean Safety) create a delay in response as telephone relay increases notification, coordination, processing times, with risk exposure for unintentional information distortion;
- Separate CAD platforms prevent interoperability and increases processing and service delivery response times;
- Lack of a CAD system for Ocean Safety creates a vacuum in the overall public safety requirements;
- Lack of required and standardized CAD interfaces (data collection/data base);
- Lack of Operational Direction, i.e., Quality Assurance Program, formalized Training Program, policies addressing operational risk management, and formalized Disaster Recovery plans;
- Facilities and technologies do not meet agency needs and public safety requirements;
- Duplication of Infrastructure Requirements (Facility and Technologies create higher costs for Emergency Services).

The lack of coordination and duplications between the communication centers is directly related to differing organizations and multiple centers at multiple locations. A lack of centralized and directed oversight is the key critical area resulting in disparate processes and redundancies effecting emergency communications service delivery.

Fire (FCC) and EMS utilize Tri-Tech CAD systems, but are unable to communicate electronically to reduce system response and mitigate risks associated with information processing. Disparate processes include redundancies in technologies (CAD systems) compounded by lack of electronic interoperability between those technologies.

A lack of interoperability has a profound negative effect in the delivery of emergency services, specifically

- Excessive information relay between the agencies;
- Restricting capabilities and increasing processing times;
- Delay of information;
- Risk exposure of 'dropping' calls and unintentional distortion of information during relay processes.

Additionally, disparate databases for CAD systems lengthen processing time as confirmation or comparison of diverse address information occurs during the call relay process.

While there are critical operational areas relating to performance, there is a direct correlation between identified operational issues and a lack of a well-developed Quality Assurance process and programs. This concern is specifically identified for EMS dispatch. Medical protocol, industry standard Best Practice, and accreditation criteria all require QA processes for the review of emergency medical

dispatch calls. The failure to complete QA processes is a critical risk factor for the City and County of Honolulu.

Ocean Safety although not a secondary PSAP, utilizes expensive 9-1-1 CML call taking equipment, allowing capabilities to contact Honolulu Police and 9-1-1 services. Additionally, Ocean Safety does not have any type of CAD system supporting dispatch and field operations.

Integration Impact

The comparison of similar conditions and requirements provides key information for consideration and analysis of the integration of FCC, EMS Dispatch, and Lifeguard Dispatch. Comparison areas include Workload, Staffing, Performance Measures, Workflow, Infrastructure Requirements, and Costs.

Workload

Workload of the agencies defines the staffing and infrastructure requirements. It is estimated the agencies process an average of 769 calls per day (9-1-1, administrative, and non-emergency calls). ESCI estimates each agency has a significant number of administrative telephone call counts for the same incident due to multiple agency responses to a single incident, and three separate dispatch operations (not including HPD dispatch) for the City and County of Honolulu. This requires additional calls back and forth between responding agencies. The lack of an integrated CAD with messaging capabilities to 'other agency' radio dispatch positions creates the additional telephonic workload.

Integration Analysis:

Integration of dispatch agencies, depending on the configuration, influences workflow processes. Estimates indicate integration in a single facility, with an integrated CAD platform reduces telephone workload significantly. Caller information in an integrated center, captured electronically and sent to the required dispatch position, provides an efficient and effective workflow process. Call information is captured only one time, rather than requiring a verbal relay two or three times during multiple response incidents. This provides faster and significant improvement of response data.

Estimated Telephone Workload Calculations – Integration

The telephone workload estimates for integration are determined through review of interagency activity of medical incidents processed by FCC requiring relay of telephone information.

- Current FCC telephone workload indicates 300 calls daily.
- In order to estimate the telephone workload impact for integration, the number of duplicate dispatch activities between Fire and EMS, provides the telephone work estimates.
- Each medical call generates a telephone notification from EMS to fire providing incident information.
- Medical calls are 63% of the total FCC dispatch workload. FCC processes approximately 41,000 incidents for dispatch each year (fire and EMS Rescue). EMS Rescue (medical) is approximately 26,000 incidents (co-response with Honolulu EMS).

- Ocean Safety incidents processed by Lifeguard dispatch are incorporated into the fire and EMS workload.
- FCC fire dispatch workload without medical incident count indicates a 63% workload reduction.
- It is estimated daily telephone workload is reduced the same 63% resulting in an estimate of 111 calls per day (average hour 4.8 calls), applying the 63% reduction of dispatch activity.

It is important to note EMS and Ocean Safety call workload experience the same level of reduction due to a decrease of telephone notifications in an integrated operation. Telephone workload data other than EMS call relay to FCC is not available; thus, no further workload adjustments occur to integrated center estimates.

The following table provides a snapshot view of the telephone workload for each agency, combined, and the estimated telephone workload for an integrated center based on the integration analysis explained above.

Figure 102: Estimated Annual Telephone Workload

Annual Workload	FCC	EMS	Ocean Safety	Total 3 Agencies	Integrated Center[32] Estimated
Estimated Telephone Workload	111,756	147,831	21,000	**280,587**	**210,181**
Monthly average	9,313	12,319	1,750	**23,382**	**17,515**
Daily average	306	405	58	**769**	**577**
Average per hour	**12.8**	**16.9**	**2.4**	**32.1**	**24.1**

Estimated Dispatch Workload Calculations – Integration Analysis:

Telephone workload generates a dispatch incident. Currently, a single dispatch incident typically has multiple associated emergency and administrative telephone calls. The following table provides the estimated annual workload for dispatch incidents for each of the agencies. Ocean Safety does not track, nor collect reportable activity data for their dispatch center; therefore, their workload estimate is from 2009 Lifeguard Log Sheet Data.

Figure 103: Summary of Estimated Annual Dispatch Incidents

Dispatch Incidents	FCC	EMS	Ocean Safety	Combined
Estimated Dispatch Incidents	41,374	66,048	1,773	**109,195**
Monthly average	3,448	5,504	148	**9,100**
Daily average	113	181	5	**299**
Average per hour	**4.7**	**7.5**	**0.4**	**12.6**

[32] Integrated Center totals indicate a 63 percent reduction in FCC telephone workload, as described in the workload calculations.

The three dispatch centers process a daily average of 299 calls for service. ESCI notes in 2010, FCC dispatch incidents were 41,374; of which 25,968 were EMS co-response calls. Ocean Safety incidents are inclusive in these numbers as a co-responder. The resulting incident totals are multiple response counts for a single event: one response count at fire, one at EMS, and one for Ocean Safety.

ESCI bases estimates of dispatch workload for integration on the actual number of dispatch activities for medical incidents processed by FCC.

- FCC processes approximately 41,000 incidents for dispatch each year (fire and EMS rescue). EMS rescue (medical) is approximately 26,000 incidents (co-response with Honolulu EMS).
- Medical calls are 63 percent of the total FCC dispatch workload.
- FCC fire dispatch workload without the medical incidents indicates a 63% workload reduction.
- Ocean Safety dispatch workload is incorporated into the workload adjustments for fire and medical incidents.

The following table indicates the workload estimates for each agency, combined total workload, and projected dispatch incidents for an integrated center based on the analysis explained above.

Figure 104: Comparison Estimated Annual Dispatch Workload (Integrated Center)

Annual Dispatch Workload	FCC	EMS	Ocean Safety	Total (3 agencies)	Integrated Center[33] (Estimated)
Estimated Dispatch Incidents	41,374	66,048	1,773	**109,195**	**81,454**
Monthly average	3,448	5,504	148	**9,100**	**6,788**
Daily average	113	181	5	**299**	**223**
Average per hour	**4.7**	**7.5**	**0.4**	**12.6**	**9.3**

Observations

Currently, the three dispatch centers duplicate workload and efforts for call processing and dispatch. The analysis indicates Integration streamlines workflow and workload processes. Workload of a fully integrated center for fire, EMS, and Ocean Safety, based on cross training, position assignments, and equipment infrastructure, minimizes the number of duplicate dispatch incidents and administrative phone calls between the separate agencies, thus reducing workload requirements.

Staffing

Fire, EMS, and Ocean Safety have a combined operational staff of 43 call taking/dispatch positions. The following table indicates the current number of FY 2011 authorized FTE positions for each agency. FCC is

[33] Integrated Center totals indicate a 63 percent reduction, as described in the workload calculations.

the only agency providing shift supervision 24/7. Each of the agencies has a unit chief, supervisor, or captain. FCC has a support staff position. None of the agencies staff positions for Training or Quality Assurance. The current authorized staffing of the three agencies is 51 FTE.

Figure 105: Current FTE Staffing

Total Staffing	FCC	EMS	Ocean Safety	Combined
Call Taking/Dispatch Positions	21	20	2	**43**
Supervisor/Captain	4	-	-	**4**
Unit Supervisor/Chief	1	1	1	**3**
Support Staff	1	-	-	**1**
Total Staff	**27**	**21**	**3**	**51**

Currently each agency maintains separate labor contracts, positions descriptions, and pay rates for personnel assigned to the communications function.

Integration Analysis:

An analysis of staffing is completed based on current workload, and estimates of dispatch workload for integration.

- Call Taking analysis requires calculations utilizing ring times, average duration of calls, and average hour workload.
- Radio position analysis requires average hour dispatch activity, through comparative data collected from other fire/EMS agencies indicating the estimated number of radio transactions per incident, and average duration of the radio transactions.
- Calculations result in the average hour position staffing requirements for call taking and dispatch radio positions.
- The full-time equivalent (FTE) factor is determined based on employee availability and represents the required staff level for coverage of a single position 24 hours per day, seven days per week. The basis of the calculation recognizes time off as unavailable work hours. These factors provide the average availability for each employee.
- The average hour position staffing analysis, based on workload and utilization of leave time, yields the FTE requirement for each agency, and provides the capability to determine staffing configuration for integration.

The analysis utilizes the position staffing requirements and the FTE equivalency calculation, calculating the staffing requirements for each agency based on workload and the agency's ability to meet Best Practices. The following chart includes staffing projections based on estimated workload for an Integrated Communications Center. Additionally, supervisory positions, quality assurance, training, and support staff is taken into consideration as requirements for existing conditions and for an integrated

center. These are positions required to achieve industry standard of Best Practice in the critical core areas whether integrated or remaining as separate agencies.

Figure 106: Communications Staffing Analysis – FTE Requirements (Current vs. Integrated)

Communications Center FTE Requirements Staffing Analysis	Separate Agencies Recommended Staffing			Integrated
	Fire (FCC)	EMS	Ocean Safety	
Position Staffing Requirement[34] Average Hour	3.4	4.3	1.0	6.0
Full-Time Equivalent (FTE) factor	5.8	5.8	2.9	5.8
Call Taker/Dispatch FTE	**20.0**	**25.0**	**3.0**	**35.0**
Supervisory/Captain Positions	**4.0**	**5.0**	**1.0**	**6.0**
Quality Assurance Positions	**0.5**	**2.0**	**-**	**2.0**
Training Positions	**0.5**	**0.5**	**-**	**1.0**
Chief/Unit Supervisor Position	**1.0**	**1.0**	**-**	**1.0**
Support Staff Positions	**1.0**	**-**	**-**	**1.0**
Recommended Staffing Current Workload/Meet Best Practices	**27.0**	**33.5**	**3.0**	**46.0**
Current Authorized Staffing (2011)	27.0	21.0.0	3.0	n/a
Difference	-	-12.5	-	

Observations:

The staffing review and analysis indicates FCC and Ocean Safety provide sufficient staffing for dispatch operations. EMS currently has a significant staffing shortfall: 12.5 FTE. EMS requires additional operational personnel, supervisory positions, and support staff to meet workload and Best Practices if integration does not occur. The current number of authorized FTEs for FCC, EMS, and Ocean Safety is 51 positions. If integration does not occur, EMS requires additional staffing (12.5) to meet workload and Best Practices, which is a combined staffing requirement for the three agencies of 63.5 FTE. In contrast, the analysis for integration indicates a staffing requirement of 46 FTE. When compared to current staffing levels, there is a reduction of five FTE with an integrated center, but most importantly, the recommended integrated staffing of 46 FTE includes operational, supervisory, quality assurance, training, and support staff.

Performance

FCC and EMS Dispatch currently have minimal performance requirements. Ocean Safety does not utilize any type of performance measurement. Performance measurements focus attention and align employees with organizational goals and the expectations of service delivery requirements as it relates

[34] 'Position Staffing Requirement' is the result of the analysis resulting in the number of positions requiring staffing during an average hour. The average hour staffing requirement changes during peak periods as well as slower work periods. It does however, provide the baseline to determine total FTE required to staff operations, thus allowing for workload adjustments.

to emergency communications. Performance targets require continual evaluation, monitoring, and tracking to assure they are realistic, applicable to current operations, and not utilized in a punitive or negative manner. Attainment of a performance target allows an agency to recognize and celebrate a sense of organizational accomplishment, assuring quality service delivery to the citizens of the City and County of Honolulu.

Ocean Safety

Ocean Safety does not measure call taking or dispatch processing times.

Honolulu Fire (FCC)

FCC does not provide ring time measurements; however, FCC does maintain processing times from the receipt of call to the initiation of dispatch. Over the last 3-years, FCC call processing times continue to indicate a reduction in time, thus meeting Honolulu Fire Performance Measures.

- 2010 FCC Report (Jan – June): Performance at 90 percent Fractile - Indicates call processing times ranging from 56 seconds to 59 seconds.

EMS

EMS provided ring time measurements. ESCI review and calculations for combined performance verifies a performance average indicating EMS Dispatch answers 97 percent of 9-1-1 calls within 10 seconds.

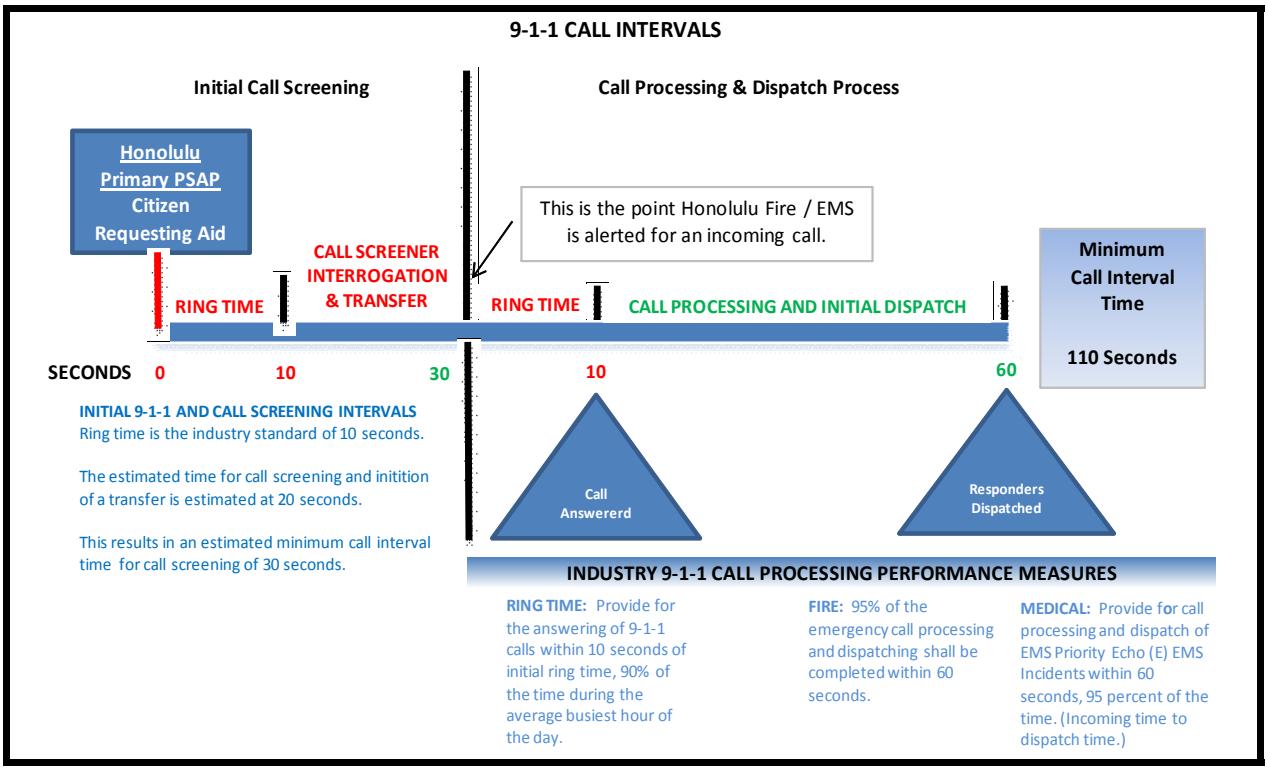
EMS provided response performance times with measures from the receipt of call (call pick-up) to the initiation of dispatch. Over the last 3-years, EMS call processing times have remained static; neither showing improvement, nor meeting industry accepted standards for call processing.

- 2010 Performance at 90 percent Reliability - Indicates call processing times ranging from 4:04 minutes to 4:32 minutes. Combined Reliability (50-90 percent) indicates average call processing times from 2:29 minutes to 2:44 minutes.

In addition to call processing and dispatch interval times addressed in agency performance measures, the initial 9-1-1 ring time and screening interval times at the Primary PSAP has a direct impact on call processing and notification times.

The following diagram illustrates 9-1-1 call intervals and industry performance targets for ring time and call processing targets.

Figure 107: 9-1-1 Call Intervals



The illustration is an estimate based on operational knowledge and industry standards for ring time. It is important to recognize the best-case scenario before initial dispatch of responders for the City and County of Honolulu is estimated at 110 seconds, or almost 2 minutes. Potentially, it takes approximately 40 seconds before the caller requesting assistance talks to a fire or medical call taker.

The Primary PSAP agency performance measures and data were not provided for ring time or duration of call for interrogation and transfer.

Data presented for fire indicates agency performance measure are being met; however, it is unknown what time interval occurs at the Primary PSAP.

Data presented for EMS indicates an inability to meet agency performance measures. Additionally, time intervals at the Primary PSAP compound excessive call processing times, thereby slowing response.

The Honolulu PSAP call interval has greater potential for negative impact during periods of high workload. This occurs when calls are queued and there is a significant wait time prior to call answer. During this scenario, the call is electronically answered with a recording, and receives a 'live' answer upon call screener availability. The queuing wait time data for the Honolulu PSAP was not provided for review.

Observations:

Fire and EMS agencies currently provide specific agency performance targets. The agency targets however, while similar to industry standards, are not inclusive and as comprehensive as the public safety industry standards presented by National Fire Protection Association or the National Academy of Emergency Medical Dispatch.

The agencies must aggressively pursue development of agency performance standards and verify adherence. In addition, coordination must occur with the Primary PSAP, assuring performance measures are in place, with a consistent ongoing review process. This establishes a high level of 9-1-1 call processing for the citizens on Honolulu.

EMS dispatch call processing times potentially include a 'wait time' factor. That is, the EMS call is ready for dispatch (holding in Queue and ready for assignment), but the dispatcher is unable to assign the call immediately; therefore, the call waits in the CAD dispatch queue. The reasons for an extended queue time may include lack of available units for assignment and/or dispatch position overload created by insufficient staffing levels in the communications center. Both of these types of situations can delay immediate call assignment and extend overall call processing time. The EMS staffing shortfall has a direct impact on the agency's call processing times; however, the requirement for EMS communications personnel to complete operational scheduling tasks compounds the staffing shortfall. Scheduling tasks assigned to communications requires a significant time commitment and reduces the number of personnel available for call taking and dispatch functions; thus, affecting performance.

Additionally, wait time may occur if it is determined there are no EMS units available and AMR is notified for back-up response. This situation incurs wait time verifying the need for AMR and verbally relaying the information for AMR dispatch. This adds an additional call relay and call processing time thereby extending the combined call processing time for the center. In turn, the added time affects overall center performance time, and extends wait time to the citizen's call for service. Although both AMR and EMS dispatch utilize a TriTech CAD, the software versions are different and there is no interoperability between the two systems for an electronic transfer of call information.

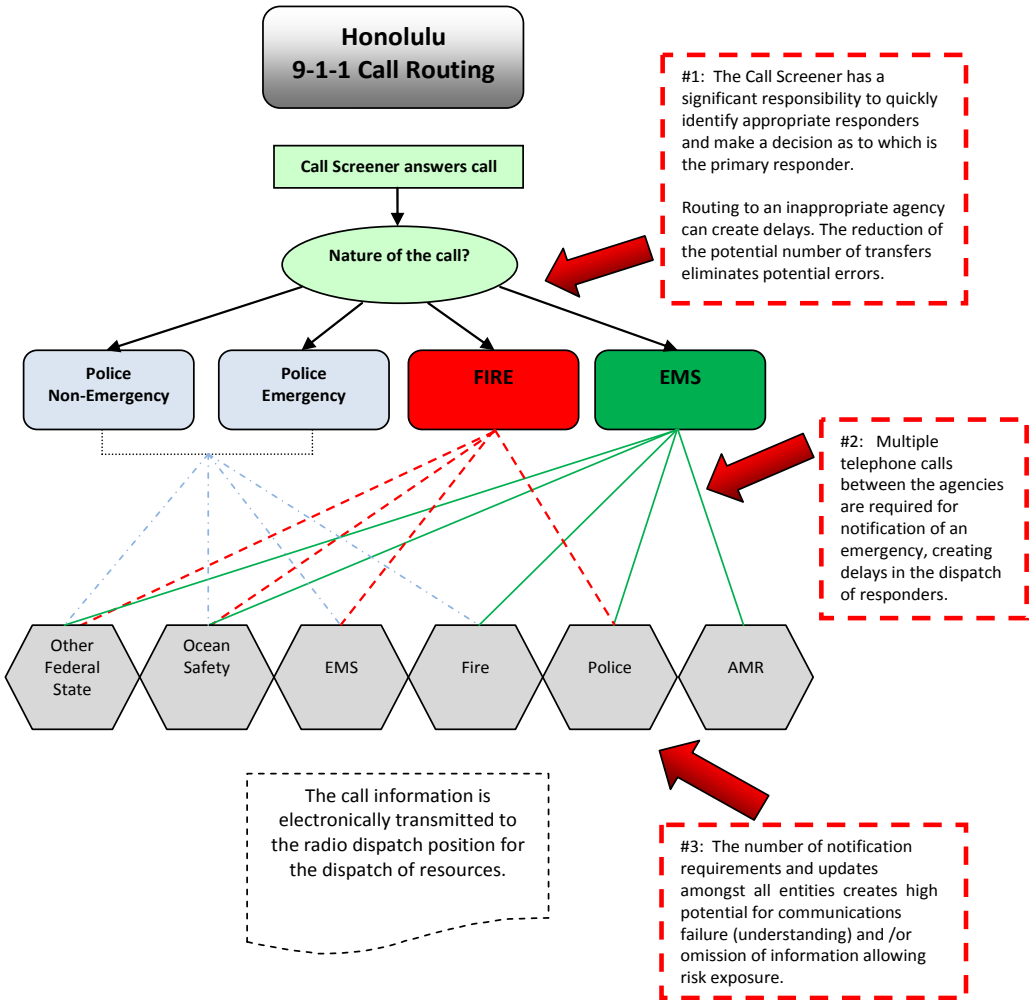
Workflow

Honolulu 9-1-1 system is a component of the State of Hawaii 9-1-1 System and meets State requirements. Due to multiple dispatch points however, the Honolulu 9-1-1 workflow requires numerous steps, lacks reporting of performance measures, and creates numerous calls between responding agencies to coordinate or relay information. This process creates inherent delays in emergency response systems. The actual type of call greatly influences workflow and overall processing and response times. Under current technical and operational conditions, this often incurs delays prior to dispatch of resources. This results in delays for help arriving at the location of the incident.

Observation:

The 9-1-1 workflow diagram illustrates multiple areas where delays occur due to relay processes and creates risk for call mishandling and /or failure to dispatch resources.

Figure 108: Workflow Diagram/Potential Risk Areas



Integration Infrastructure Requirements

The review of current conditions and integration analysis identifies core area infrastructure required for implementation of an Integrated Communication Center (ICC). These requirements have a direct impact on operating and capital expenditures as a direct result of Integration.

1. The ICC for fire, EMS, and Ocean Safety requires a single facility meeting Essential Service requirements.

   The current FCC location has potential to meet ICC requirements; however, additional space configuration, design, and remodeling must occur. If the existing FCC cannot manage required console and personnel expansion, assessment of an alternate location is required.

2. The ICC requires a single CAD platform, providing capabilities, and functional requirements for fire, EMS, and Ocean Safety.

   Options include Integration and upgrade of the current CAD systems (Tri-Tech) or a full replacement of the Tri-Tech CAD to a new system.

   It is imperative the agencies are supported by a single CAD platform specifically designed for multi-discipline operations. The required CAD functions, features, and performance requirements for ICC functionality must be defined. Once requirements are documented, a comparative assessment of the TriTech System versus a new system upgrade is made.

3. Universal workstation positions with capabilities to provide telephone and radio support.

   Workload and projected staffing is used to determine the number of workstations (consoles) for the ICC. A minimum of 11 workstations are required: 4 Call Taking, 6 Radio, and 1 Supervisory. This provides ability to meet average hour staffing requirements of 6 positions, with the ability to increase staffing based on peak periods and critical events 24 hours a day.

4. The ICC requires utilization of structured radio channels to effectively manage fire, EMS, and Ocean Safety responders.

   EMS requires transition to the City and County of Honolulu 800 radio system providing full interoperability.

5. Staffing, position allocation (number of positions), and responsibilities assigned based on a workload assessment and distribution, including supervisory, QA, training, support staff, and management positions.

   The positions in the ICC require cross-trained personnel providing greater flexibility in personnel assignment, depth for day-to-day operations, and greater efficiency during significant or disaster incidents.

Financial - Operating and Infrastructure Costs

The City and County of Honolulu supports an estimated combined annual operating budget for FCC, EMS Dispatch, and Ocean Safety Dispatch of $4.3 million.

Figure 109: Estimated Annual Operating Costs

Communication Center Operating Costs	FCC	EMS	Ocean Safety	Combined
Salaries	$1,997,438	$1,378,225	$225,000	**$3,600,663**
Expenses	225,137	443,687	25,000	**693,824**
Estimated Fiscal Year Costs	$2,222,575	$1,821,912	$250,000	**$4,294,487**

Integration Analysis:

Financial estimates for integration are completed through review of the existing operating costs.

- Itemized detail was not provided for salary and benefit costs, thus only summarized cost information is presented.
- Utilizing the salaries identified in the operating costs, a 'median' position cost is calculated at $73,979 (includes benefits). This figure is utilized to calculate salaries for the integrated center cost estimate.
- In addition to salary costs, it is estimated integration will yield a reduction in expenses currently duplicated with the three locations, i.e. facility costs, insurances, telephone line charges (multiple drops), and maintenance costs. Without a detailed line item analysis, preliminary estimates indicate an approximate annual cost savings of $100,000 - $150,000.

The EMS staffing shortfall requires strong consideration, thereby increasing current operating costs to meet required staffing levels. Utilizing the median position cost figure, the estimated costs to assure adequate EMS communications staffing (additional 12.5 FTE) requires an increase in annual operating costs ranging from a minimum of $1.2 million - $1.3 million per year. EMS requires the 12.5 FTE increase to maintain current dispatch functions.

<u>Operating Costs</u>

Estimated salary costs for staffing an integrated center with 46 FTE, provides the ability to decrease <u>current</u> staffing requirements by five FTE. The reduction of FTE requirements provides an estimated yearly operating cost decrease for salaries ranging from $350,000 to $500,000. ESCI notes this is a very conservative cost savings estimate. The comparisons are not direct apples to apples comparison, as the current operational staffing of EMS is lacking supervision, training, and QA positions. Staffing of 46 FTE for an integrated center includes additional positions for QA, training, additional supervisory personnel, and adequate operational staffing levels that are not in place today.

Operating costs are compared against the estimated costs for an Integrated Center in the following table. There is no adjustment made in the current staffing levels, thus, EMS dispatch performance would significantly suffer due to existing staffing deficiencies. The ability of the agencies to upgrade operational conditions to meet Best Practice is currently limited due to lack of staff. The annual cost estimate for integration includes operational staff, training, QA, support, supervisory, and management positions assuring the ability to meet Best Practices.

Figure 110: Operating Costs (Current vs. Integrated)

Current vs. Integrated	Current Costs (Existing Staff)				Estimated Integrated Costs
	Fire	EMS	OS	**Total**	
FTE	27	21	3	**51**	**46**
Salaries	$ 1,997,438	$ 1,378,225	$ 225,000	**$ 3,600,663**	**$ 3,150,663**
Expenses	$ 225,137	$ 443,687	$ 25,000	**$ 693,824**	**$ 543,824**
Total	$ 2,222,575	$ 1,821,912	$ 250,000	**$ 4,294,487**	**$ 3,694,487**

Observation:

Integration results in a reduction of annual operating costs. The analysis of dispatch center operating costs, based on current operations, projects an estimated annual cost savings of $600,000 per year (salaries and expenses). The combined cost savings for an integrated center provides a 5-year savings of an estimated $3 million based on existing conditions.

In the absence of integration, for EMS to achieve the recommended staffing level requires an annual increase of $1.3 million for EMS Communications. Utilizing the estimated costs for additional EMS staff ($1.3 million operating cost increase), the combined operational savings achieved with integration is $1.9 million per year, a projected 5-year savings of $9.5 million.

Note: Additional integration 'up front' capital costs are necessary for establishment of the operational and technological infrastructure requirements. Estimated integration capital expenditures (upfront costs) are outlined in the next section. It is important to note each dispatch agency is currently planning, budgeting, or in the process of infrastructure upgrades, including CAD, telephonic, and work environment improvements. ESCI did not receive detailed planning information from the agencies; however, cost estimates were completed for comparison purposes.

Prior to expenditures occurring on technological infrastructure requirements by the individual agencies, a detailed cost analysis to validate the estimated cost savings possible through integration is required.

Delay of the current planned expenditures may assist in reducing the duplication of infrastructure costs providing a positive offset for initial 'up front' costs for integration.

Infrastructure Costs

Cost estimates provide preliminary consideration for establishment of an ICC. The integration of dispatch operations requires capital expenditures for the initial build out, as well as technical support costs for network changes, connectivity, and movement of existing technologies.

Figure 111: ICC Infrastructure Estimated Costs

Infrastructure	Estimated Cost Range
FACILITY Expansion and remodel of FCC Facility[35]	$100,000 - $200,000
CAD Options: Tri-Tech Upgrade or New system Upgrade of the existing Tri-Tech Systems requires involvement from the vendor and is dependent upon ICC requirements for determination of costs. If it is determined a new system is required, a cost estimate is $90,000 to $125,000 per position (dependent upon defined requirements. (11 positions/2 additional).	$1,170,000 - $1,625,000
WORKSTATIONS 11 workstations Cost estimate is approximately $14,000 per position. FCC is currently planning on the installation of 6 workstations; thus, the estimated cost is for 5 additional workstations.	$70,000
RADIO CONSOLES Existing: 6 radio consoles at FCC It is unknown if existing equipment at EMS and Ocean Safety is compatible with FCC equipment or if the back room equipment at FCC is capable of expansion. Depending upon technical configuration, costs variations exist. Cost estimates include back room changes or upgrades of approximately $100,000, with a per console cost of $100,000 per position (Maximum of 5 additional consoles)	$600,000
TECHNICAL COSTS Network, connectivity, changes to existing technologies	$100,000 - $150,000
Total Estimated Costs	**$2,040,000 - $2,645,000**

Under the current operational separation of three centers, each of the individual agencies requires upgrades or improvements in key infrastructure areas (CAD, workstations, radio consoles, and technical support costs). Estimates for each individual center to complete required upgrades are

[35] The existing FCC facility may not be able to accommodate expansion for the required workspace. If this is the case, assessment of an alternate location is required, creating higher costs.

estimated at $3.2 million. The following comparison table illustrates the comparative costs of current infrastructure capital requirements versus integrated capital requirements.

Figure 112: Current vs. Merged Infrastructure Requirements

Current Infrastructure Requirements					Integration Infrastructure Requirements	
Description	**Fire (upgrading to 6)**	**EMS (5 positions)**	**Ocean Safety (2 positions)**	**Total**	**Integrated Center**	**Cost Difference**
Facility	$150,000			$150,000	$200,000	$(50,000)
Workstations[36]					$70,000	$(70,000)
CAD	$1,000,000	$1,000,000	$250,000	$2,250,000	$1,625,000	$625,000
Radio Consoles		$700,000	$100,000	$800,000	$600,000	$200,000
Technical Support	$75,000	$75,000	$75,000	$225,000	$150,000	$75,000
Total	$1,225,000	$1,775,000	$425,000	$3,425,000	$2,645,000	$780,000

Observation:

An initial capital requirement for implementation of an Integrated Communications Center requires an estimated one-time expenditure of $2 million - $2.65 million. The capital requirement addresses facility, CAD, workstations, radio consoles, and technical support costs.

Long-term operational costs and ongoing savings for infrastructure support costs are minimized in an integrated environment, as there is no duplication of services and infrastructure, as experienced in today's environment. A onetime savings of approximately $780,000 is possible with integration and implementation of a single CAD platform, including additional infrastructure support requirements as opposed to individual center upgrades.

[36] FCC is currently in the procurement phase for six workstations. Integration costs assume utilization of the new FCC workstations and purchase of five additional workstations.

Integrated Communication Center (ICC) Components

The analysis of workload, performance, cost, and the similarities of the current operational and technical core components support the feasibility for integration of dispatch operations for the Honolulu Fire Department, EMS, and Ocean Safety. The core areas assessed by ESCI and the resulting findings support a full integration of the three dispatch centers. Assessment of current conditions indicates integration is not only feasible, but also imperative for efficient, cost effective, and risk mitigation in delivery of emergency services. Integration requires optimum efficiency, performance, and effectiveness. Currently, the duplication of work efforts at each center, separate technologies, and staffing shortfalls creates critical risk management issues relating to the delivery of emergency medical services.

The core infrastructure components of the integrated center requires careful planning, consideration, and development to meet the needs of a fully integrated communications center providing communications services to fire, EMS, and Ocean Safety. Development of the ICC core components requires utilization of Best Practices providing a solid foundation to meet the needs of the community in providing emergency communications services specific to the an integrated communications application.

- ✓ The first step for integration of communications is a conceptual design describing infrastructure requirements for the integrated center.
- ✓ Secondly, the operational configuration and workflow processes require coordination during infrastructure planning and design.

<u>Core Planning Requirements</u>

The following summarizes the operational, facility, and technical core requirements necessary for planning an integrated communications center meeting Best Practices.

Figure 113: ICC Core Design Requirements

ICC Requirements – Best Practices	
Personnel Processes	• Position descriptions • Communications based hiring requirements and processes • In-house promotions/lateral transfers • Evaluations – Communications specific/performance standards based
Performance Standards	Call taking/Dispatch QA Process standards
Staffing	Workload Assessment and Distribution
Procedures	New development and revisions of existing procedures for ICC operations
Training	New Hire Training Program Continuing Education Training Program
Quality Assurance	• Quality Assurance Program Standards • Data maintenance/gathering/reporting • Call Taking Fire/EMS/Ocean Safety

ICC Requirements – Best Practices	
	• Dispatch Fire/EMS/Ocean Safety
Facilities	ICC facility meets needs of an emergency communications center providing Essential Public Safety Services. The facility incorporates • External and internal security • Physical and technological design to manage peak workloads • Power redundancy and back-up
Telephone	9-1-1 and Admin telephonic equipment meets ICC needs including • Ability to capture required information/data for performance measures and workload assessment; • 9-1-1 and Admin telephonic systems are at all workstations; • NG911 capability planning occurs.
CAD System	Identify CAD system requirements meeting agency needs: • Singular system/platform; • Integrated w/ capability to interface with ICC required technical systems; • Manage /track multi-disciplines independently and in joint responses;, • Open architecture system design.
CAD Interfaces	Identify required CAD interfaces required by the ICC • 9-1-1/telephone equipment • MDTs • Alerting/Paging • Mapping/GIS • AVL • Medical Dispatch ProQA/AQUA • System Status Management • RMS systems, including patient care reporting
Workstations	Ergonomic with sit/stand capabilities/redundant equipment capabilities
Logging Equipment	Sized to meet all logging/recording requirements for telephones and radios
Time Synchronization	All servers/electronics synchronized to approved time standard
Radio Systems	All ICC agencies have talk groups for dispatch, tactical, island wide groups, special ops and InterOp for communications with other public safety agencies
Disaster Recovery/Continuity of Operations	Essential services defined for the ICC and provided in a documented COOP including a back-up/alternate center to provide identified Essential Services. The alternate center meets requirements to maintain continuity of operations.

Concept of Operations - Integrated Call taking and Dispatch Methodology

Integrated call taking and dispatch increases coordination of resources, speed of dispatch, and accuracy with less confusion during peak traffic loads. Description of assignments and duties for each console position requires development under minimum and maximum shift staffing. Position requirements include call takers, primary radio dispatchers, and secondary radio positions.

Call Taking

The call taker position in the integrated center processes all incoming calls. This includes 9-1-1 calls for EMS, fire, and Ocean Safety transferred from the Honolulu Primary PSAP, as well as administrative and business calls.

1. The call taker processes calls for service, entering data into the CAD incident file providing sufficient information for dispatch (location and type of call).
2. CAD electronically routes the call for service to a pre-determined dispatch position based on incident type code entered by the call taker.

Discussion/Comments

In the instance a call for service requiring multiple discipline response, (fire, EMS, Ocean Safety) CAD programming, based on incident type, electronically routes the call for service to the correct radio dispatch workstation(s) simultaneously. Call information updates from the call taker to the dispatcher(s) utilizes the same simultaneous distribution process.

If call taker positions are busy, call answering functions are typically provided by secondary dispatch positions.

A prime method for decreasing response times for EMS calls for service is the sending of a medical call for service to the medical dispatch position as soon as patient location and a preliminary call type is determined. The call receives a preliminary primary dispatch, and the call taker continues with protocol questioning, updating the medical dispatch position with information or a change in the call type determinant. This provides the ability for a 60-second performance standard from receipt of call to dispatch of EMS responders.

A second requirement for decreasing call-processing times is adequate staffing in dispatch and adequate field unit availability for assignment.

Dispatching

Radio dispatch responsibilities depend on the configuration of dispatch and secondary radio positions. There are several options available for dispatch configuration when the integrated center is in a single facility, utilizing the same CAD platform, accessible common radio channels, universal workstations, and cross-trained personnel.

1. Separate Discipline Primary Dispatch
    a. Fire/Ocean Safety Dispatch (combined)
    b. EMS Dispatch

    Dispatcher determines the appropriate units to dispatch, reviews unit assignments, and initiates a verbal dispatch of the appropriate responders.
2. Call information is electronically transmitted to the responder MDCs simultaneous with the verbal dispatch notification.
3. Radio management and tracking of units occurs by secondary radio dispatch positions, also providing back-up support to the primary position, and call taking functions as necessary.

-or-

1. Singular Primary Dispatch (Multi-discipline Fire/EMS/Ocean Safety)
    Dispatcher determines the appropriate units to dispatch, reviews unit assignments, and initiates a verbal dispatch of all appropriate responders.

2. Call information is electronically transmitted to the responder MDCs simultaneous to the verbal dispatch notification.
3. Radio management and tracking of units occurs by designated secondary radio dispatch positions specific to Fire /Ocean Safety and EMS, also providing back-up support to the primary position, and call taking functions as necessary.

Discussion/Comments

Immediate and simultaneous notification of all response units, whether on a single or co-response incident is optimum operationally. Essentially, there is a primary dispatcher for fire, EMS, and Ocean Safety. Events requiring multi discipline responses are dispatched simultaneously. Upon the initial simultaneous notification and dispatch of responding units, secondary dispatch positions handle radio traffic for the individual specific responders. The subsequent radio management and tracking of unit response at the secondary positions is based on pre-established operational procedures such as geographical location of the incident, least busy console, or by specific discipline.

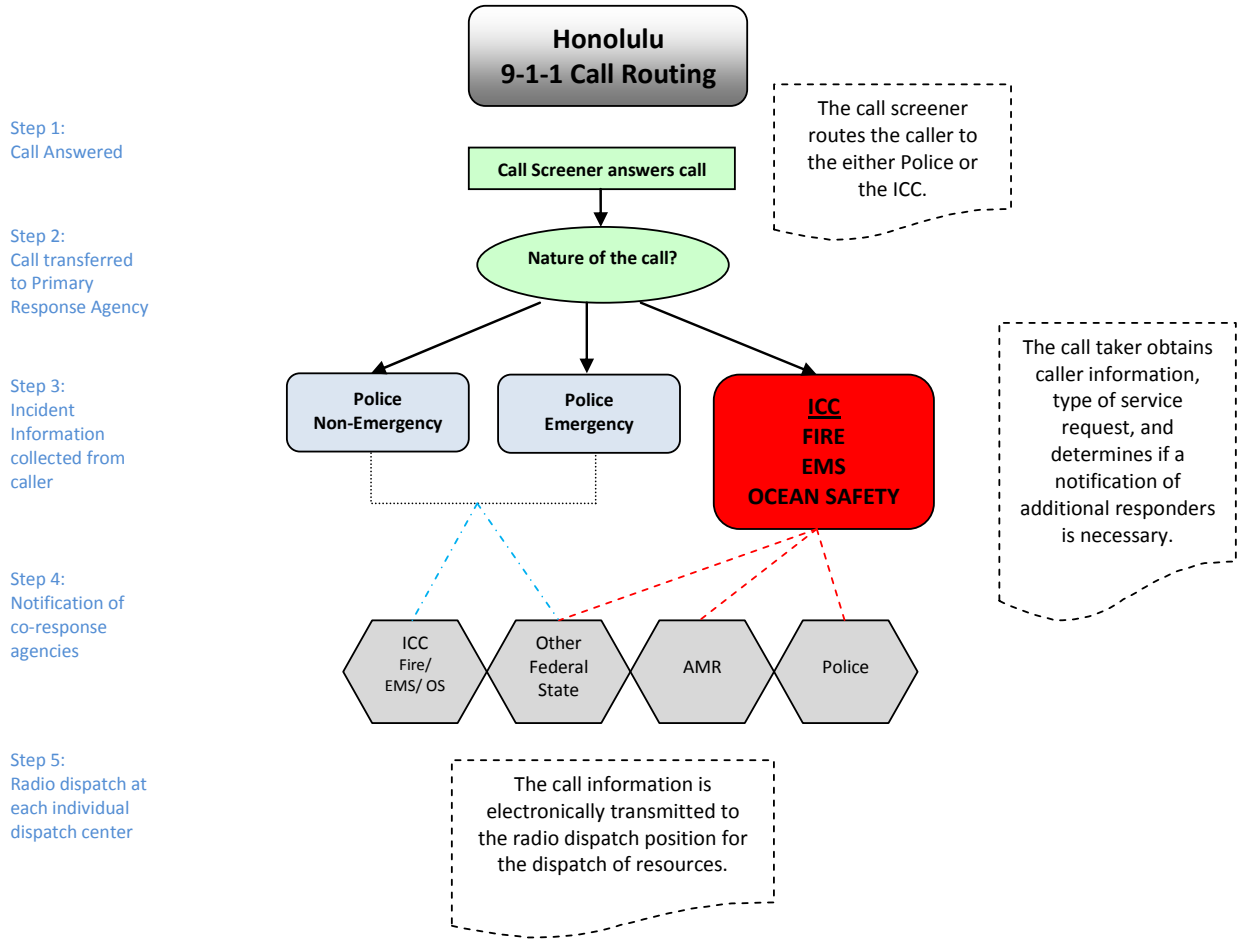
The position assignment of primary and secondary radio dispatch positions provides a reduction in notification times providing optimum use of shift staffing. Additionally, the configuration of primary and secondary dispatch positions depends on availability and functionality of the System Status Management (SSM) program to maintain constant and real-time tracking of all available units. With a SSM program, all responses, whether co-response by fire and EMS or a multi-response level including Ocean Safety, are alerted with the same alert tone and voice announcement from a single primary radio dispatch position.

In situations where an initial single discipline response arrives on the scene and requires a second discipline (fire requests EMS), the secondary fire position is able to send the specific call information to the Primary dispatcher, bypassing the call taking function, via CAD. The Primary dispatcher creates an incident for EMS response and dispatches the incident.

Depending on records management requirements and pre-defined parameters during CAD functionality design, the EMS incident record may automatically 'attach' to the fire RMS incident, as well as stand-alone separately as an EMS response. The same is true for an Ocean Safety incident.

Overall required FTE does not change based on the operational configuration of radio dispatch positions as workload determines the average hour position requirement, based on workload sharing and cross-training of positions. The overall FTE requirement takes into consideration positions that may be affected based on hour of the day (night shift versus day shift), type of CAD system, use of System Status Management, and staffed field response units per shift, allowing increases and decreases of staffing by hour of day. The following diagram illustrates the Honolulu 9-1-1 workflow with implementation of an integrated center.

Figure 114: Honolulu 9-1-1 Workflow w/Integrated Communications Center

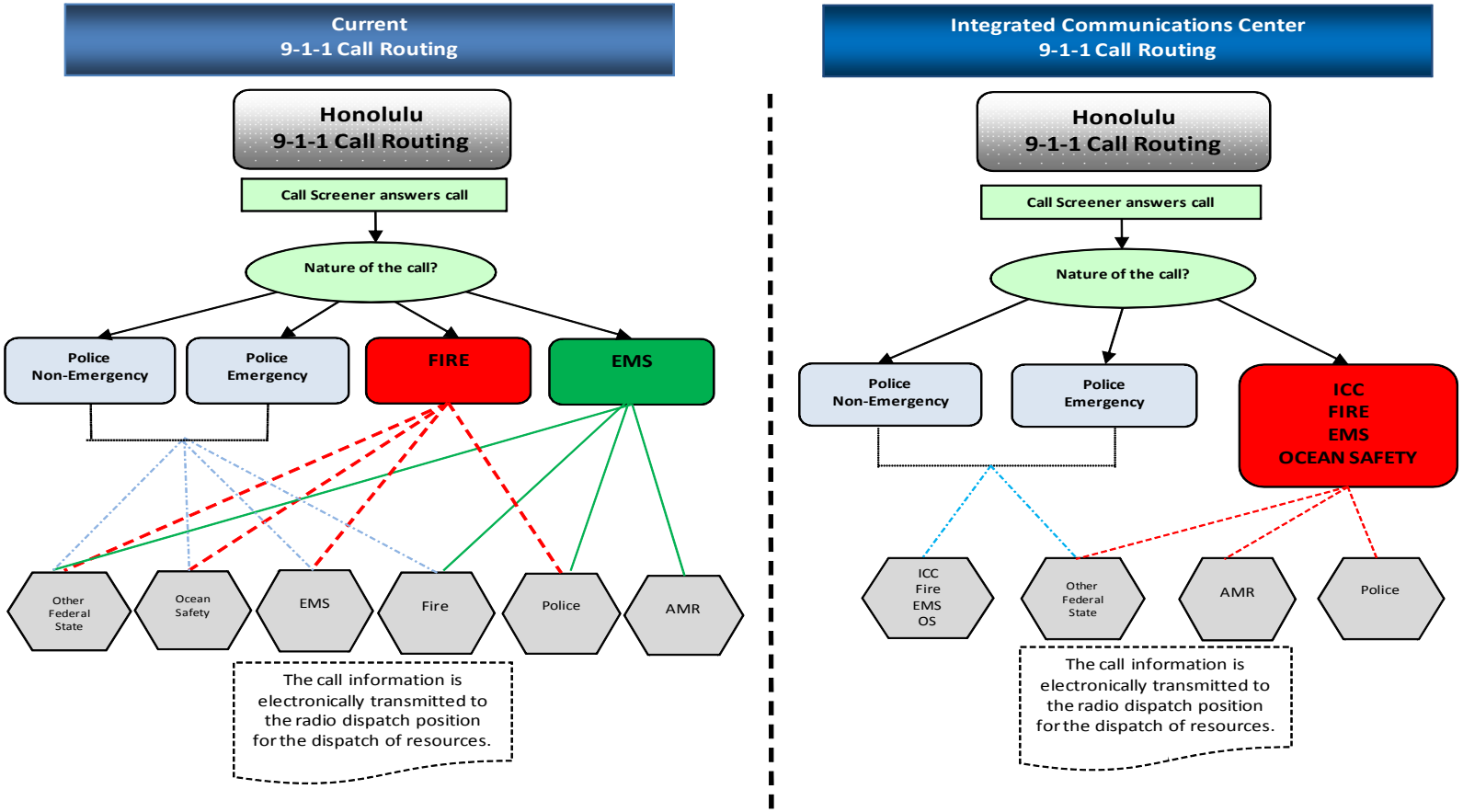


Current Honolulu 9-1-1 Call Routing complexities with multiple steps and numerous administrative calls between responding agencies is significantly reduced with integration of Fire, Medical, and Ocean Safety, thus increasing operational efficiencies.

- Verbal relay of incident information amongst the ICC agencies becomes non-existent thereby reducing risk exposure, time for information distribution, and telephone workload for personnel. A verbal relay with police and the ICC is still required.

The next page illustrates a comparison of call routing based on current conditions vs. Integrated Communications.

Figure 115: Workflow Comparisons (Current vs. Integrated)



- Primary Dispatch points are reduced from 4 to 3 Centers, thus less transfer options for the call screener, reducing transfer errors.
- Current call routing has a potential of 13 various co-response relay requirements, versus 5 with an Integrated center, thus reducing possible omissions and failures to relay information in a timely manner.
- It is noted that the number of relay requirements could be reduced further, if CAD technical interoperability included coordination with AMR and Police.
- All Fire, Medical and Ocean Safety calls and the co-response between these agencies, have the potential, based on operational configuration and technology, to simultaneously be dispatched at the same time, without duplication of information or telephone call relay.

Recommendation

Integration provides optimum efficiency, performance, and effectiveness, while reducing duplication of work efforts, separate technologies, and staffing shortfalls. The analysis results indicate there is a potential for long-term cost savings. Integration enhances overall capabilities and provides opportunities for the agencies to achieve industry standards of Best Practice.

ESCI recommends the City and County of Honolulu immediately begin a planning and implementation process for an integrated communications center, mitigating critical deficiencies and risks identified in the existing dispatch core areas.

A successful Public Safety Communications Center impacts and reflects on all elements of emergency response delivery. On the other side, failure results in a lack of confidence, reduced standards of care, and failure to meet the needs of citizens and emergency responders alike.

9-1-1 and public safety communications are essential and time critical functions within the specialty of emergency response services. Post disaster de-briefings and post consolidation reports indicate the substantial impact, in both successes and failures, accredited to public safety communications. Success within an emergency dispatch center requires careful planning, utilization of Best Practices, and dedicated system monitoring, care, and feeding.

Planning and Implementation

The feasibility efforts and subsequent study creates a momentum, which the City and County of Honolulu may build upon by initiating planning phases for integrated dispatch functions for fire, EMS, and Ocean Safety. The magnitude of undertaking the integration of the three dispatch centers requires consideration in utilizing experienced, professional assistance to facilitate planning and implementation phases. The facilitation of planning efforts assists in moving the integration project in a positive and focused direction. Once integration is functional, the significant planning, milestone tracking, and start up responsibilities cease to exist.

Outsourcing coordination, planning, and implementation processes frees management to concentrate on personnel, policy development, and other operational support structures recognized as critical to the success of integration.

<u>Implementation Components</u>

Communications Integration is one component of the overall phased process for the merger of HFD, EMS, and Ocean Safety. The integration of a communications sub-committee is one of numerous sub-committees necessary for the merger of the organization, meeting on a regularly scheduled basis, and reporting to a Merger Oversight Committee. The success of integration of the communications centers ultimately is measured by the ability of the participants to execute the implementation successfully. The implementation requires assignment of cross-functional teams responsible to establish the details of

each component for integration. Some of the participants may not have known any system design other than what exists today, thus a need to embrace the project.

Integration Strategy

ESCI recommends minimum strategic objectives for the individual communications sub-committee. It is anticipated upon adoption of the recommended integration strategy, the Merger Oversight Committee will identify additional strategic objectives based upon the level of integration and timeline associated with the integration process. Each sub-committee is responsible for developing goals to achieve the adopted strategic objectives and a timeline for the accomplishment of the recommended goals. Strategic objectives for integration of the communication centers are as follows:

Communications Integration Objectives

- Operate emergency dispatch and communications from a single facility.
- Operate from a single set of communications technologies, including Computer Aided Dispatch (CAD).
- Establish a single point of contact for communications equipment maintenance, repair, and support.
- Develop uniform call taking, dispatch and communications models, including policies, procedures, training, and performance standards.
- Evaluate all functions of call-taking, dispatch, and communications as they relate to system missions for Fire, EMS, and Ocean Safety.
- Establish a uniform formal system for recruitment, retention, new hire, and ongoing training of communications personnel.

Integration Timeline

The integration components for the organizational merger and for the communications integration are highly interconnected; thus, the need of all members of the integration team to work together. The communications integration components are not independent.

ESCI has estimated timeframes for implementation. The timelines and recommendations for implementation are based on capabilities of current system participants to integrate the components within a reasonable timeframe and the level of time and effort required to implement. Additionally, identification of external factors that may delay or divert management focus from implementation requires consideration.

Figure 116: Communications Integration Components

Communications Integration Components and Estimated Timelines		
Merger Component	Timeline	Description
Facility	Can be started immediately (18 months)	Determine requirements and initiate a facility upgrade action plan
CAD Analysis / Upgrade	Can be started immediately (18 months)	Complete analysis of requirements, initiate implementation steps, i.e., procurement, installation, training
Technical Upgrades	Can be started immediately (18 months)	Determine needs and initiate required equipment upgrades (workstations, radio consoles, other)
Operational Planning	Can be started immediately Ongoing (24 months)	Development, approval, and implementation of policies, training program, quality assurance program, and staffing plan
Integration Implementation	6 months	Complete system tests (CAD / upgrades), acceptance, and training. Begin cutover (phase-in)

The GANTT chart timeline and the outline that follows describe in graphical detail the estimated timelines specific to the integration of communications for Fire, EMS, and Ocean Safety.

Figure 117: Communications Integration Timeline (Effective July 1, 2011)

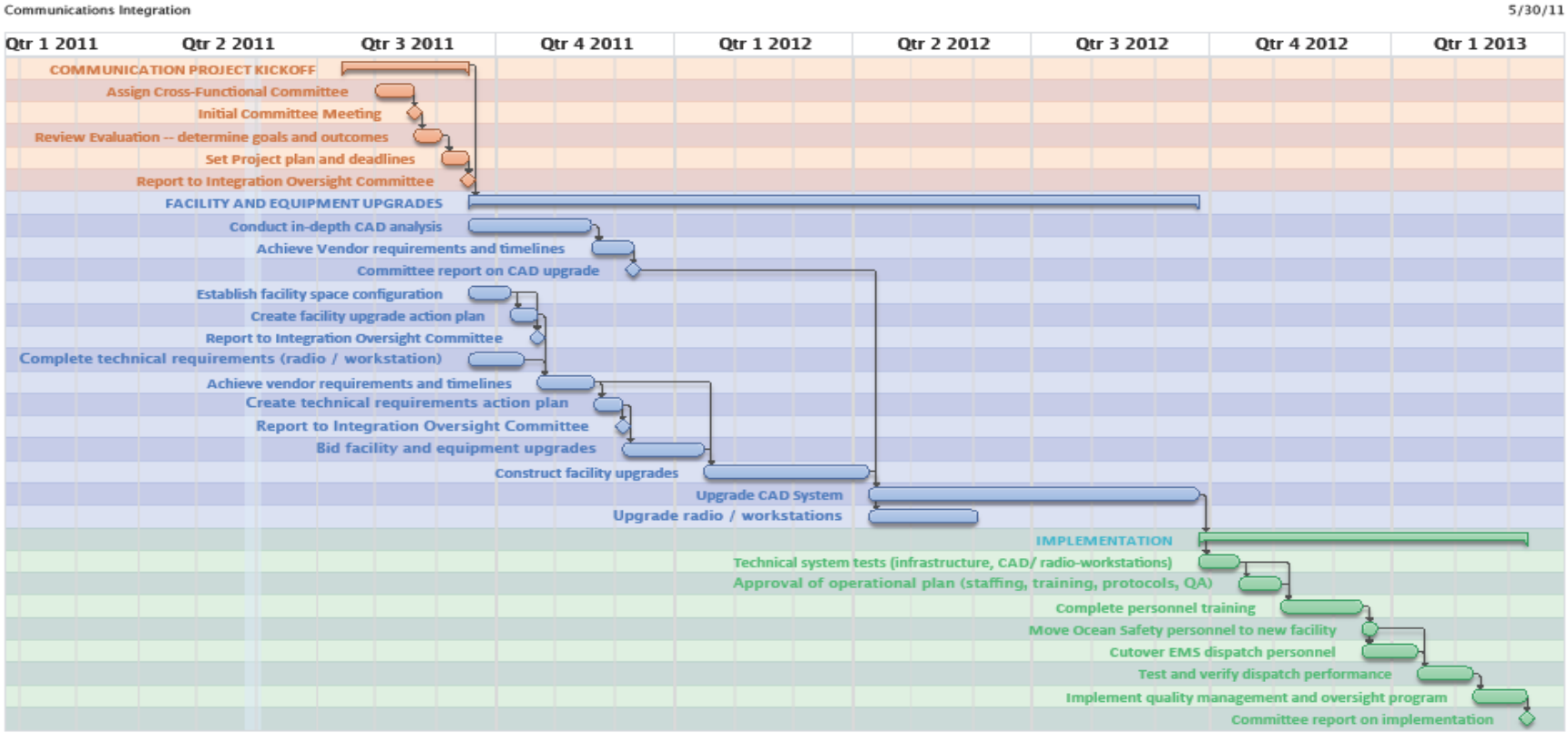


Figure 118: Outline of Communications Integration Plan

	Task	Effort
Phase 1 – Communication Project Kickoff		1 mo 2 wk 4 dy
1.1)	Assign Cross-Functional Committee	2 wk 4 dy
1.2)	Initial Committee Meeting	
1.3)	Review evaluation –- Determine goals and outcomes	2 wk
1.4)	Set project plan and deadlines	2 wk
1.5)	Report to Integration Oversight Committee	
Phase 2 – Facility and Equipment Upgrades		1 yr 7 mo 1 wk
2.1)	Conduct in-depth CAD analysis	2 mo 1 wk
2.2)	Achieve vendor requirements and timelines	3 wk
2.3)	Committee report on CAD upgrade	
2.4)	Establish facility space configuration	3 wk
2.5)	Create facility upgrade action plan	2 wk
2.6)	Report to Integration Oversight Committee	
2.7)	Complete technical requirements (radio/workstation)	1 mo
2.8)	Achieve vendor requirements and timelines	1 mo 1 dy
2.9)	Create technical requirements action plan	2 wk
2.10)	Report to Integration Oversight Committee	
2.11)	Bid facility and equipment upgrades	1 mo 2 wk
2.12)	Construct facility upgrades	3 mo
2.13)	Upgrade CAD system	6 mo
2.14)	Upgrade radio/workstations	2 mo
Phase 3 – Implementation		6 mo 1 wk
3.1)	Technical system texts (infrastructure, CAD/radio/workstations)	3 wk
3.2)	Approval of operational plan (staffing, training, protocols, QA)	3 wk
3.3)	Complete personnel training	1 mo 2 wk
3.4)	Move Ocean Safety personnel to new facility	1 wk
3.5)	Cutover EMS dispatch personnel	1 mo
3.6)	Test and verify dispatch performance	1 mo
3.7)	Implement quality management and oversight program	1 mo
3.8)	Committee report on implementation	

Appendix B(1): Honolulu Fire Communications Center - Current Conditions

Fire Communications Center - FCC (Organizational/Services provided) – FCC is a division of the Planning and Development Section of the Honolulu Fire Department.

FCC is a secondary PSAP receiving direct transfer of 9-1-1 calls for the Honolulu Fire Department within the City/County geographical area. FCC receives and processes incoming emergency response requests, and dispatches proper types, and appropriate number of responders. FCC maintains records of streets, hydrants, and other pertinent information. Secondarily, FCC processes phone inquiries regarding community concerns, scheduled alarm system testing, cooking fire notifications, and school fire drills.

Mission Statement - The Communications Center does not present a mission statement specific for communications; however, it is incorporated into the department's mission statement as a support function of Planning and Development Division.

The mission of the HFD is to respond to fires, emergency medical incidents, hazardous materials (HM) incidents, and rescues on land and sea to save lives, property, and the environments. We accomplish this mission by:

- *Promoting safety and maintaining a well-equipped, highly trained, and motivated force of professional FFs and rescue personnel.*
- *Promoting fire prevention and other public safety education programs.*

Guiding principles adopted by FCC personnel:

"Safety" and "Do the Right Thing".

Agreements - FCC incorporates numerous interagency agreements into operational requirements both directly and indirectly.

- City-State of Hawaii (Emergency Medical Services and Ocean Safety Divisions) - Co-Response
- Department of Information Technology (DIT) Position FC 141
- MOU 9-1-1 calls for service
- Federal – Mutual Aid (Federal Fire & Hickam AFB)
- Federal – US Navy Mutual Aid
- Federal – Federal Building Fires
- Federal – US Coast Guard (USCG) Emergency Response
- Federal – USCG SAR Mutual Aid Amendment
- Federal – Office of Justice TRP – 1000 Com System

Additionally two MOUs are in place specifically for FCC with Hawaii Fire Fighters Association (HFFA)

- Parking for FPB Employees (includes FCC personnel)
- MOU for FCC (Shift) Schedule

Personnel Processes (labor, job descriptions, hiring/testing) – Labor representation of personnel assigned to the Fire Communications Center is through the Hawaii Fire Fighters Association, IAFF, Local 1463.

The Honolulu Fire Department maintains position descriptions for all personnel assigned to the Fire Communications Center, (FF II, FF III, and Captain). There is no hiring or testing process for FCC, as personnel are lateral transfers from other Divisions within the Fire Department to the Fire Communications Center.

There are no additional or specified requirements for transfer/assignment to FCC other than already listed for FF II, III, Captain, and BC levels.

Operating Costs – FY 2011 Section Budget Information for Fire Communications indicates an annual operating cost of $2.2M.

Figure 119: FCC - Fiscal Year Operating Costs

Honolulu Fire Communications	FY 2011
Personnel Salaries	1,997,438
Expenses	225,137
Other/Equipment	0
Total	**$2,222,575**

Performance Requirements – Honolulu Fire Response Benchmarks are established in SOC, Section C, as well as Master Strategic Plan (MSP) Initiative #3.

The singular response benchmark for FCC addresses specific performance measures for times from receipt of call at FCC to time of dispatch (initial notification).

- The performance benchmark is 60 seconds at a 90 percent fractile. (Call receipt at FCC to the time of initial dispatch notification.)
- FCC targets emergency calls for immediate pickup, or within 2 to 3 rings maximum (per policy). FCC did not provide records for speed of answer (i.e. Ring Time) after transfer from the Primary PSAP.

Call Answering Performance

FCC did not provide ring time reports for review.

Dispatch Performance

FCC provided annual Call Processing Performance Reports by Shift for 2008, 2009, and YTD 2010 (June). These reports measure the time from receipt of call to the initiation of dispatch.

- 2008 Report: Performance at 85 percent Fractile - indicates call processing times ranging from 51 seconds to 1:05 minutes.
- 2009 Report: Performance at 90 percent Fractile - Indicates call processing times ranging from 56 seconds to 1:06 minutes. Performance at 85 percent Fractile - Indicates call processing times ranging from 48 seconds to 56 seconds.
- 2010 Report: Performance at 90 percent Fractile - Indicates call processing times ranging from 56 seconds to 59 seconds (Jan – June). Performance at 85 percent Fractile - Indicates call processing times ranging from 48 seconds to 55 seconds (Jan – June).

Workload – Workload of FCC dispatch operations, in conjunction with the standards of performance, establishes agency staffing requirements. The following measurable activities define the types of workload measurements.

- Telephone Call Processing Workload – Incoming (number of 9-1-1, emergency, and non-emergency calls).
- Radio Dispatch Activities (number of fire/medical incidents).

FCC utilizes CML 9-1-1 equipment for processing 9-1-1 calls. Hawaiian Telcom provides call count activity reports to FCC for wireline and wireless 9-1-1 calls, and 'Admin' calls processed on the CML 9-1-1 equipment. The 9-1-1 'Admin' lines are used between 9-1-1 system responders to coordinate emergency response requests.

The City Meridian phone system processes non-emergency calls, general business calls, and direct lines (referred to as 'J' lines) to co-responding emergency service agencies. The Meridian telephone system serves as backup in the event of a CML 9-1-1 equipment failure. No report data is provided for call received on the Meridian System.

9-1-1 Emergency Workload (CML Phone System)

Annual 9-1-1 workload and associated administrative line activity for a three year period appears in the figure below.

Figure 120: FCC 9-1-1 Workload Summary[37]

HFD 911 Telephone Activity	2008			2009			2010		
	Admin	*9-1-1*	**Total**	*Admin*	*9-1-1*	**Total**	*Admin*	*9-1-1*	**Total**
Jan	*178*	*4413*	**4591**	*136*	*4303*	**4439**	*360*	*4360*	**4720**
Feb	*101*	*3721*	**3822**	*126*	*4180*	**4306**	*187*	*3808*	**3995**
Mar	*135*	*3941*	**4076**	*115*	*4019*	**4134**	*333*	*3870*	**4203**
April	*111*	*3944*	**4055**	*151*	*3921*	**4072**	*199*	*4046*	**4245**
May	*153*	*4010*	**4163**	*186*	*4050*	**4236**	*196*	*3930*	**4126**
June	*76*	*3741*	**3817**	*271*	*4014*	**4285**	*No data*	*No data*	***No data***
Jul	*88*	*4611*	**4699**	*240*	*4733*	**4973**	*232*	*5330*	**5562**
Aug	*81*	*3696*	**3777**	*200*	*3846*	**4046**	*No data*	*No data*	***No data***
Sep	*62*	*3680*	**3742**	*No data*	*No data*	***No data***	*No data*	*No data*	***No data***
Oct	*83*	*3830*	**3913**	*251*	*3747*	**3998**	*No data*	*No data*	***No data***
Nov	*66*	*3603*	**3669**	*No data*	*No data*	***No data***	*No data*	*No data*	***No data***
Dec	*125*	*4783*	**4908**	*259*	*4227*	**4486**	*No data*	*No data*	***No data***
Annual 911 Telephone Activity	**1259**	**47973**	**49232**	**1935**	**41040**	**42975**	**1507**	**25344**	**26851**
Average Monthly Activity	**104.9**	**3997.8**	**4102.7**	**193.5**	**4104.0**	**4297.5**	**251.2**	**4224.0**	**4475.2**
Average 911 Activity/per day	**3.4**	**131.4**	**134.9**	**6.3**	**134.6**	**140.9**	**8.3**	**139.3**	**147.5**
Average 911 Activity/per hr	**0.1**	**5.5**	**5.6**	**0.3**	**5.6**	**5.9**	**0.3**	**5.8**	**6.1**

FCC does not capture the average duration of CML 9-1-1 or admin calls (i.e. time on the phone).

Non-emergency Workload (Meridian Phone System)

Types of calls received on the non-emergency system are general business calls, 'Advised Incident' calls, such as agricultural burns, cooking fires, alarm tests, fire drills, etc. The Meridian phone system does not provide call counts for non-emergency workload; therefore, FCC provided the following estimates:

General business calls: 125 calls per day *(Average per hour – 5.21 calls)*

'Advised Incident' calls: 40 per day *(Average per hour – 1.67 calls)*

- Daily Workload: 165 calls per day (Average per hour - 6.88 calls)
- Estimated Annual Workload 60,225 calls

Combined FCC Telephone Workload

Utilizing 2008, 2009, 2010 data, calculations indicate FCC dispatch receives an estimated average of 51,495 9-1-1 calls per year and an estimated annual workload of 60,225 non-emergency calls. The

[37] The average 2009 workload is calculated on 305 days of data. 2010 workload averages are calculated on 182 days of data.

following table provides the estimated FCC Telephone workload (CML 9-1-1 and Meridian non-emergency).

Figure 121: FCC Estimated Telephone Workload (9-1-1 and non-emergency)

FCC Telephone Workload	3 yr average		Estimate non-emergency	Annual Total
	9-1-1	Admin		
Estimated calls per year	49,303	2198	60,255	**111,756**
Monthly average	4,109	183	5,021	**9,313**
Daily average	135.1	6.0	165.1	**306.2**
Average per hour	5.6	0.3	6.9	**12.8**

Call Answering Performance Data – FCC does not capture the average duration of call (i.e. time spent on the phone); or the average speed of answer (ring time) for either emergency or non-emergency calls.

Workload by Hour of Day - FCC does not review workload by hour of day. No reports were presented.

Incident Activity - Fire Communications provided Incident data by call type for 2008, 2009, and YTD 2010. Summary data is included in the following figure.

Figure 122: FCC Incident Workload Summary

Incident Count by Call Type	2008	2009	2010
	Incident Count	Incident Count	Incident Count 1/1/2010 - 12/15/2010
Fire	2,389	2,409	2,261
Rupture/Explosion	15	17	15
EMS Rescue	25,263	25,968	25,428
Hazardous Condition	1,751	1,732	1,651
Service Call	2,027	1,837	1,785
Good Intent	6,927	7,635	5,874
False Call	1,824	1,759	1,747
Severe Weather	41	12	37
Other	7	5	6
Total FCC Incident Count	**40,244**	**41,374**	**38,804**
Average Incident Count/per day	110.3	113.4	111.5
Average Incident Count/per hour	4.6	4.7	4.6

FCC provided data indicating performance factors relating to the measurements of time to answer a call and initiate the dispatch of resources. Dispatch performance is noted in the previous section.

Workflow - Upon receipt of the 9-1-1 call from the PSAP, FCC call takers complete call interrogation, determining type of call, location, and caller information. Upon determination of the call type, call information is sent electronically via the CAD system to the radio dispatcher. Note: The information entered by the call taker determines the response zone or area as identified in the CAD GEO files, and provides the baseline recommendation for unit response. The mapping system based on the Geo/GIS files, automatically plots the location of the call on a map available to the dispatcher.
Once the dispatcher confirms/determines the closest or correct response unit, an alert tone is initiated with a verbal dispatch of the call for service. The CAD information downloads to the field unit MDCs providing a secondary notification to the verbal dispatch. Unit status is updated from the field units, and is monitored by the radio dispatcher. CAD generates a text message to specifically identified personnel mobile devices.

Call takers are able to update call information into the CAD incident/dispatch screen as updates/notifications are received via telephone landline for co-response or further information is relayed from a secondary agency/citizen on the scene.

Staffing - FCC is authorized 27 FTE. This includes one Battalion Chief, responsible for the management of the Communications Center, and one Senior Clerk Typist for Administrative Support. Currently 25 FTE (uniform personnel) are assigned to FCC as follows:

4 – Captains (Officer)

4 – FF III Positions (Officer – relief)

17 - FF II Positions (1-FF II currently remains vacant)

Uniformed personnel assigned to the FCC work a rotating 40-hour workweek consisting of one 24-hour shift and one 16-hour shift. The work schedule is through agreement between Honolulu Fire Department and IAFF Local 1463 (July 1, 2007, to June 30, 2011), provided as a one-year pilot project pending evaluation of the operational and economical effectiveness of the schedule.

The FCC shift scheduling requires four different schedules rotated amongst four platoons. Each platoon is assigned six on-duty staff members: one Captain, one FF III, and four FF II.

- FCC Standard Operating Procedures, Section 01.200 Duties and Responsibilities, Section 01.203 outlines FCC normal staffing level shall be an officer and five operators (total 6).
- Minimum staffing for the Fire Communications Center is an officer and three operators, i.e. four (4) personnel.

Figure 123: FCC Staffing Requirements

FCC Staffing Levels	
Normal Staffing	**Total**
1 Officer 5 Operators	6 Positions
Minimum Staffing	**Total**
1 Officer 3 Operators	4 Positions

Turnover

Turnover is not applicable to the FCC in the traditional sense, as the reasons for turnover in the FCC are transfers, promotions, or retirement.

Leave Usage

Complete leave usage information was not provided by FCC. Comparative data from similar agencies is used in the analysis and staffing projections.

Policies – The FCC has specific policies within the Honolulu Fire Policy and Procedures addressing responsibilities, operations, and performance requirements of the Communications Center. The following are listed under Article 2, Section 1, Organization (functions, duties, & responsibilities of the FCC)

- Section 3, Alarm Notification Procedures
- Section 4, Response Assignments
- Section 5, Response Boundaries
- Section 6, Relocation Assignments
- Section 7, Dispatch Definitions & Protocols
- Section 8 and 9, Radio Communications
- Section 12, MDT and GPS Operations

Training - There are no known local or State requirements for public safety dispatchers.

FCC staff are APCO certified at the Public Safety Telecommunicator 1 level, with two staff, and two additional staff in the process of obtaining APCO instructor certification. Staff assigned to the FCC requires certification to the Firefighter II level. The FCC is in the process of seeking International Fire Service Accreditation Congress (IFSAC) Accreditation and Certification for Telecommunicator 1 and 2

levels. The FCC is also seeking to have all Captains and FF IIIs IFSAC certified to the Fire Instructor 1 and 2 levels.

The FCC training program (newly assigned personnel to communications) is in the process of formalization. FCC established the training program as a high priority, with a short-term goal in 2010 goals and objectives.

- Newly assigned personnel receive an 8-hour orientation class, assigned a training coach, and placed on shift.
- On-the-job training initiates with call taking skills, and eventually moving to radio and dispatch responsibilities.

All FCC personnel are responsible to do both call taking and radio dispatch.

The Battalion Chief of FCC directs the platoons of required/desired continuing education training for the month. FCC currently does not track training in the Fire Department RMS system; however, there is planning for specific software allowing the ability to track the FCC training modules. Training is scheduled by the HFD Training and Research Bureau; however, is not specific to communications. For 2009, total training time (departmental and communications) provided to FCC personnel averaged 77 hours per person.

Quality Assurance Program – FCC does not maintain a Quality Assurance program.

Facility – FCC is housed in the basement of the Frank F. Fasi Municipal Building, constructed in 1974. The Center is considered to be Type I construction with a Class A roof. The facility, when built (in 1974), met the requirements for all applicable building codes as well as requirements for protection against seismic damage.

Entrance to the facility is through an electronic lock system. Servers and back-end equipment are located in a room next to the communications/operations floor area.

FCC provides redundant power supply for essential electronic equipment with a Smart UPS 1500 (Purchased 2009). A single workstation is equipped with a SMART RS 1300 UPS, purchased in 2009. The UPS automatically powers electrical equipment until the two 300-kilowatt diesel backup generators activate. The back-up generators, shared with the balance of the building, are diesel, with the ability to provide up to 14 days of normal operation. Fuel is stored in an underground 12,000-gallon supply tank.

FCC reports that the FCC facility has several areas that do not meet NFPA 1221, Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems (2010 Edition). The

facility is also not up to grade and does not have a dedicated heating and ventilation system. Currently planning is in place for upgrade remodeling of the facility to occur within the next year.

Technology

Telephones – FCC utilizes two primary telephone systems:

- Hawaiian Telcom 9-1-1 CML Equipment
- Meridian Phone Equipment

FCC dispatch center has three (3) 9-1-1 CML answering positions provided by Hawaiian Telcom for the receipt of 9-1-1 calls and coordination of responders via administrative lines.

The CML equipment displays ANI/ALI (Automatic Number Identification/Automatic Location Identification) of the caller for wireline 9-1-1 calls. On wireless 9-1-1 calls, information displays the Lat/Long (latitude and longitude) of the calling part within a plus or minus metric range. The Lat/Long accesses the City/County GIS (Graphic Information System) database, providing an address or closest landmark to the wireless caller. The Lat/Long display capability varies on the type of location solution, either triangulation or hand-set based (GPS identifier). CML interfaces to the mapping system displaying the location of the calling party from ALI or the Lat/Long data.

The Meridian Phone System equipment is used for non-emergency calls and back-up to the CML 9-1-1 telephone equipment. The Meridian system is being replaced with a City VOIP System.

Computer System – The center utilizes TriTech VisiNet CAD system 4.5.6. FCC utilizes an ESRI based GEO/CAD mapping system. Additional system interfaces are as follows:

- ANI/ALI Interface – Link between the 9-1-1 CML and CAD, allowing transfer of number and location data to the CAD system.
- Mapping display.
- Paging Interface allows the initiation of pages from a CAD position to personnel mobile devices and vehicles.
- Mobile Data Computer interface provides seamless communications between FCC CAD and MDCs in the response vehicles.
- Records Management System interface provides a communication link between CAD and the HFD RMS systems allowing incident data transfers from the CAD to the Fire Department RMS system.

Mobile Data - Fire vehicles utilize laptops in all frontline Engine companies, Ladder/Quint/Tower companies, Battalion Chief vehicles, Rescue 1 & 2, and HM 1 & 2. The laptops provide transmission of data communications and GPS location data of response vehicles on in

interactive basis with the TriTech CAD System. Replacement and upgrade of laptop equipment in the response vehicles is currently occurring to the CF31 Panasonic Toughbooks.

Paging - *Radio* alert tones and required paging initiated during dispatch of a call for service are initiated via TriTech CAD positions by the radio dispatcher. Text paging of incident information can be forwarded to individual mobile devices of personnel. A specialty combination of group paging is also available.

Workstations – FCC has five (5) Infra-Structures "Star" workstations installed in March 1999.

Radio Systems - *Control (Console)* – Honolulu Fire Department utilizes both trunked and conventional systems provided by City and County of Honolulu 800 MHz Radio System.

- Trunked talk groups utilized by FCC are as follows:

  Dispatch talk group
  Tactical B1-B5
  Tac 1-5,
  4 - Island wide talk groups
  Special Ops and InterOp Talk Groups

  Incident dispatches occur on the Dispatch talk group with subsequent assignment of response units to a Battalion Tactical talk group based on the geographical location. Each Battalion has availability of five Tactical talk groups and one Fleet talk group.
- InterOp talk groups allow interagency communication between emergency responders.
- The conventional radio system provides talk around channels, mutual aid, and repeater channels.
- Radio Control (Console) Equipment is MaCom C3 Maestro radio consoles (5 workstations).

Logging Equipment – FCC provides voice logging equipment Instant Recall Recorders on each workstation (Exacom EARS 2000IR) and Exacom Hindsight-Net Version 6 Digital Recording System for Telephone traffic. Telephone data is stored on the HFD FCC recorder hard drive. Radio traffic recordings are stored on the Honolulu Police Department recorders, and FCC accesses data from the HPD storage data house.

Time Synchronization – FCC equipment receives time synchronization capabilities through the City and County of Honolulu IP network utilizing WWVB Atomic Clock.

Back-up/Disaster Recovery – FCC provides an alternate site approximately ¾ of a mile from the Communications Center at the Central Fire Station and equipped as follows:

- 2-CAD workstations
- 3-back up 9-1-1 phone (no ANI/ALI data)

- 2-Geo-Comm Wireless Mapping systems
- 2-Radio Consoles (Maestro 800 MHZ)
- 3-Catalyst ROIP back-up radio workstations

The alternate site is tested on a monthly basis. FCC does not currently have a Disaster Recovery Plan; however, a Continuity of Operations Plan is a short term, high priority issue for the FCC, with a completion date by the end of FY2011.

Appendix B(2): EMS Communications Center – Current Conditions

EMS Communications Center (Organizational/Services provided) **- EMS dispatch is** a unit within the division of Emergency Medical Services, under the umbrella of the Honolulu Emergency Services Department.

EMS communications receives and dispatches calls for service for emergency ambulance response and transport within the City/County of Honolulu geographical response area. The dispatch center is a secondary PSAP (Public Safety Answering Point) receiving direct transfer of 9-1-1 calls from the Primary PSAP located at the Honolulu Police Department. Typically, EMS dispatch personnel perform 9-1-1 EMS call taking and dispatch duties. Dispatchers are responsible for providing medical protocol questioning and assistance to callers and arriving at an appropriate medical determinant based on the caller's answers. Dispatchers coordinate calls for services with other agencies, monitor the 'EMSystem Hospital Resource Program' for field units, assign appropriate field units, and assure safe and effective radio communications.

EMS dispatchers provide a wide variety of clerical functions including coordinating EMS duty assignments, overtime scheduling, scheduling for training, vacations, and attendance rosters.

Mission Statement - The EMS Communications Center does not present a mission statement specific for communications.

Agreements – Agreements directly affecting EMS Communications were not provided for review; however, ECSI did review a Memorandum of Agreement, outlining cooperation and support response for fire, Water Safety, and EMS. This agreement denotes support amongst the three departments for co-response when dealing with specific types of emergencies.

Personnel Processes (labor, job descriptions, hiring/testing) – Labor representation of EMS non-supervisory dispatch personnel and the EMS Communications Supervisor are represented through the United Public Worker's Union.

Position descriptions, specific to EMS dispatch personnel, are available. The dispatch position is classified as an Emergency Medical Technician III (Communications) with a title classification of Emergency Medical Dispatcher (EMD). Listed requirements for this position include:

- Current Hawaii Driver's License
- Current National Academies of Emergency Dispatch, Emergency Medical Dispatcher (EMD) completed by the end of probation

Dispatch personnel must have a minimum requirement of a two years EMT field experience, although this is not listed under the position description as a requirement. Applicants are required to complete a CritiCall Test Assessment and interview prior to employment.

The Communications Center Supervisor is an FSLA exempt position. The position allocation has the same title of Ambulance Communications Center Supervisor. Listed requirements for this position include:

- Current Hawaii Driver's License (Class 3)
- Completion of a Board approved EMT program
- Current American Heart Association Basic Cardiac Life Support certificate (BLS)
- Current National Academies of Emergency medical Dispatch, Emergency Medical Dispatcher (EMD) certification

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Operating Costs – EMS communications costs are extracted from the overall EMS agency budget. Communications function does not have a section budget. Fiscal Year operating costs identified in the following table indicate estimated annual operating costs of approximately $1.8M.

Figure 124: EMS Estimated Annual Operating Costs

EMS	Estimated Annual Costs
Personnel Salaries	1,378,225
Expenses	443,687
Other/Equipment	
Total	**$1,821,912**

Performance Requirements - EMS establishes call answer and dispatch processing times in the EMS Policy and Procedures Manual, "Processing a Request for EMS" as follows:

Call Answering Performance provides the following statement:

"EMS will answer the call promptly, answering in three rings or less."

EMS Dispatch provided Call Answering Performance Reports for the period January 2008 - December 2010. The calculations for combined performance verifies a performance average indicating EMS Communications answers 97percent of 9-1-1 calls within 10 seconds.

The following table provides the lowest and highest percentage of calls answered within in the ring time of 0-10 seconds during the time period, and the overall average percentage.

Figure 125: EMS 9-1-1 Call Answering Performance Summary

EMS Communications 9-1-1 Call Answering Performance			
Data Collection Period Jan 2008 – Dec 2010 *(25 Monthly Reports)*	Lowest % 0-10 Seconds	Highest % 0-10 Seconds	**Overall Average**
	93.5%	99.6%	**97.0%**

Dispatch Performance

Dispatch performance time provides the following statement:

> "An EMS ambulance crew shall be dispatched within one minute after the receipt of an emergency ambulance request."

EMS provided ESCI incident data for review and analysis. ESCI completed an analysis of EMS data for 2008 – 2010 based on urban, suburban, and rural response performance times. The response data measures total call processing time from call (call pick-up) to actual dispatch initiation.

- 2008: Performance at 90 percent Reliability - indicates call processing times ranging from 4:50 minutes to 5:00 minutes. Combined Reliability (50-90 percent) indicates average call processing times from 2:35 minutes to 2:46 minutes.
- 2009: Performance at 90 percent Reliability - Indicates call processing times ranging from 4:16 minutes to 4:22 minutes. Combined Reliability (50-90 percent) indicates average call processing times from 2:27 minutes to 2:38 minutes.
- 2010: Performance at 90 percent Reliability - Indicates call processing times ranging from 4:04 minutes to 4:32 minutes. Combined Reliability (50-90 percent) indicates average call processing times from 2:29 minutes to 2:44 minutes.

Workload – Workload of EMS dispatch operations, in conjunction with standards of performance, establish agency staffing requirements. The following measurable activities define workload measurements:

- Telephone Call Processing Workload – Incoming (number of 9-1-1, emergency, and non-emergency calls).
- Radio Dispatch Activities (number of medical incidents).

EMS utilizes CML 9-1-1 equipment for processing 9-1-1 calls. Hawaiian Telcom provides 9-1-1 call count activity reports to EMS. The reports provide counts for wireline and wireless 9-1-1 calls, and 'Admin' calls processed on the CML. The 9-1-1 'Admin' lines are used between 9-1-1 system responders to coordinate emergency response requests.

Non-emergency calls, business calls, and direct lines (referred to as 'J' lines) to co-responding emergency service agencies are processed on the Meridian phone system. The Meridian telephone system serves as

a backup measure in the event of a CML 9-1-1 equipment failure. No report data is provided for calls received on the Meridian System.

9-1-1 Emergency Workload (CML Phone System)

Annual 9-1-1 workload and associated administrative line activity for a three year period appears in the figure below.

Figure 126: EMS 9-1-1 Workload Summary

EMS 911 Telephone Activity	2008			2009			2010		
	Admin	*9-1-1*	**Total**	*Admin*	*9-1-1*	**Total**	*Admin*	*9-1-1*	**Total**
Jan	*218*	*6603*	**6821**	*214*	*6354*	**6568**	*267*	*6268*	**6268**
Feb	*226*	*6196*	**6422**	*267*	*6029*	**6296**	*246*	*5624*	**5624**
Mar	*220*	*6198*	**6418**	*233*	*6537*	**6770**	*248*	*6228*	**6228**
April	*204*	*6293*	**6497**	*248*	*5942*	**6190**	*253*	*6011*	**6011**
May	*244*	*6465*	**6709**	*242*	*6483*	**6725**	*270*	*6180*	**6180**
June	*235*	*5759*	**5994**	*227*	*6079*	**6306**	*192*	*5751*	**5751**
July	*273*	*6155*	**6428**	*250*	*6464*	**6714**	*267*	*6163*	**6163**
Aug	*212*	*5851*	**6063**	*253*	*5864*	**6117**	*265*	*6207*	**6207**
Sep	*229*	*5918*	**6147**	*274*	*5465*	**5739**	*235*	*5636*	**5636**
Oct	229	6114	**6343**	*288*	*6114*	**6402**	*228*	*6228*	**6228**
Nov	*227*	*5820*	**6047**	*228*	*5544*	**5772**	*256*	*6045*	**6045**
Dec	*230*	*6001*	**6231**	*218*	*5896*	**6114**	*166*	*6425*	**6425**
Annual 911 Telephone Activity	**2747**	**73373**	**76120**	**2942**	**72771**	**75713**	**2893**	**72766**	**72766**
Average Monthly Activity	**228.9**	**6114.4**	**6343.3**	**245.2**	**6064.3**	**6309.4**	**241.1**	**6063.8**	**6063.8**
Average 911 Activity per day	**7.5**	**201.0**	**208.5**	**8.1**	**199.4**	**207.4**	**7.9**	**199.4**	**199.4**
Average 911 Activity per hr	**0.3**	**8.4**	**8.7**	**0.3**	**8.3**	**8.6**	**0.3**	**8.3**	**8.3**

EMS does not capture the average duration of CML 9-1-1 or admin calls (i.e. time on the phone).

Non-Emergency Workload (Meridian Phone System)

The Meridian phone system is used for business and administrative calls. The Meridian phone system does not have the capability to provide call counts for workloads; therefore, EMS provided the following workload estimates:

- Daily Workload: 197 calls per day (Average per hour – 8.2 calls)
- Estimated Annual Workload: 72,000 calls

Combined EMS Telephone Workload

Utilizing 2008, 2009, 2010 data, calculations indicate EMS dispatch receives an estimated average of 75,830 9-1-1 calls per year and an estimated 72,000 non-emergency calls. The following table provides the estimated EMS Telephone Workload (CML 9-1-1 and Meridian non-emergency).

Figure 127: EMS Average Telephone Workload (9-1-1 and non-emergency)

EMS Telephone Workload	3 yr average		Estimate non-emergency	Annual Total
	9-1-1	Admin		
Estimated calls per year	72,970	2861	72,000	**147,831**
Monthly average	6,081	238	6,000	**12,319**
Daily average	199.9	7.8	197.3	**405**
Average per hour	8.3	0.3	8.2	**16.9**

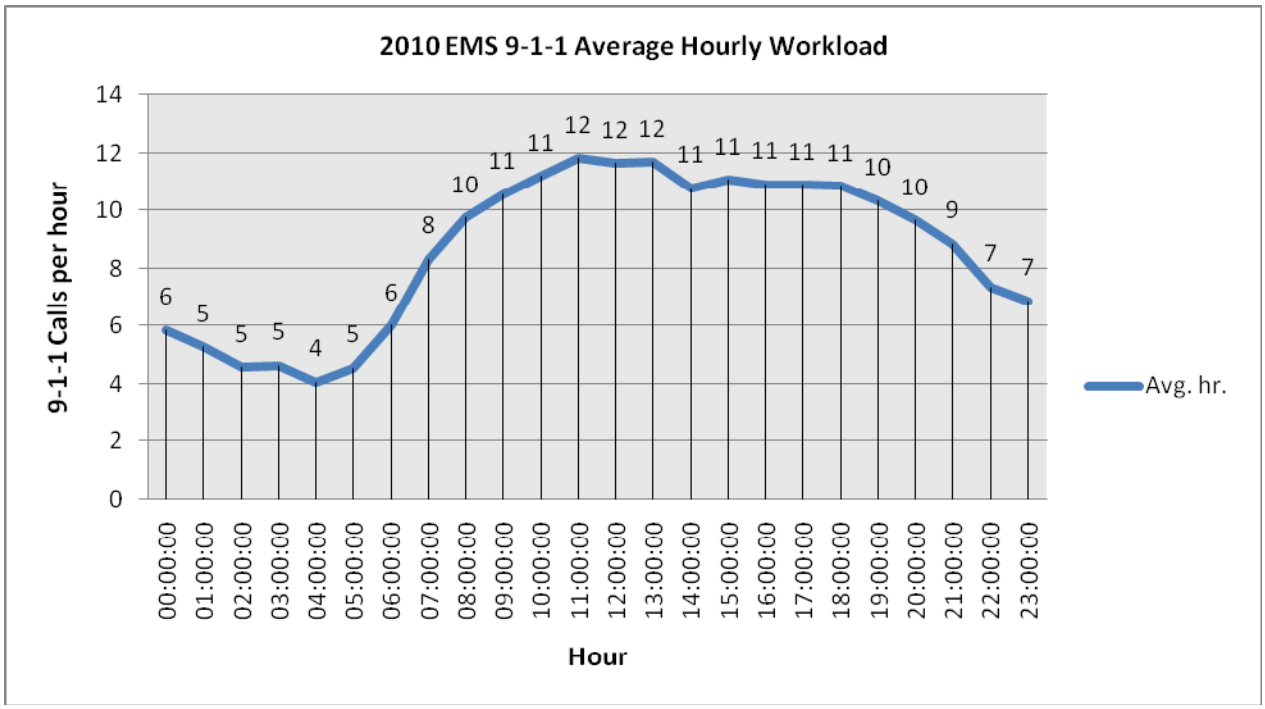
Call Answering Performance Data – Hawaiian Telcom provides a monthly report template to EMS, titled "Monthly Ringing Time Ranges". The reports indicate the percentage of calls answered within specified ring times, i.e. seconds the phone rings before the 9-1-1 call is answered. Performance data outlined in the performance section indicates the total 9-1-1 calls answered and the percentage of calls answered within designated time ranges as follows:

- 0-10 seconds
- 11-20 seconds
- 21-30 seconds
- 41-50 seconds
- + 51 seconds (max 80 seconds)

A calculation for combined 9-1-1 Ring Time Performance indicates EMS Communications answers 97% of 9-1-1 calls within the 10 seconds time range.

Workload by Hour of Day – Hawaiian Telcom provides monthly reports detailing daily 9-1-1 calls received by hour. ESCI compiled 12 months of data, detailing the total calls received each month, by hour. The following is a 12-month average of the 9-1-1 workload by hour for 2010.

Figure 128: EMS Communications 9-1-1 Workload by Hour of Day



Incident Activity

EMS Communications dispatched 66,048 responses in 2009 for emergency ambulance service. A further breakdown of EMS average hour workload activity is found in the following table.

Figure 129: EMS Communications Incident Workload Summary (2009)

2009	Dispatch Incidents
Annual Dispatch Incidents	66,048
Average Monthly	5,504
Average Daily	181
Average Hour	7.5

EMS does not provide dispatch performance data, nor a report for workload by hour of day based on dispatch activity.

Workflow - Upon receipt of the 9-1-1 call from the PSAP, EMS call takers complete medical protocol questioning, i.e. location and medical information as outlined in Medical Priority Dispatch System (MPDS) protocols. This includes the provision of pre-arrival instructions, if applicable, to the reporting party.

After completing protocol questioning and obtaining appropriate medical determinant, the call information is sent electronically via the CAD system to the radio dispatcher. Note: The information entered by the call taker is predicated on MPDS system protocols, the response zone or area is identified in CAD, providing baseline recommendations for unit response. The mapping system, based on the GIS files, automatically plots the location of the call on a map available to the dispatcher.

Once the dispatcher confirms/determines the closest or correct response unit, an alert tone is initiated with a verbal dispatch of the call for service. The CAD information downloads to the field unit MDCs providing a secondary notification to the verbal dispatch. Unit status is updated from the field units via the MDC, and is monitored by the radio dispatcher.

Call takers are able to update the call for service information into the CAD incident/dispatch screen as notifications/updates are made via the telephone landline for co-response or further information is relayed from a secondary agency on the scene, e.g., Honolulu PD, or a reporting party.

Staffing – The EMS Communications unit is authorized 21 FTE positions. This includes 20-call taker/dispatch positions and one unit supervisor. Currently one call taker/dispatch position remains vacant. The dispatch supervisor fills in on the console as necessary to meet required staffing levels. Dispatch personnel work a 40-hour workweek consisting of eight-hour shifts. EMS maintains a minimum staffing requirement as outlined in the table.

Figure 130: EMS Staffing Requirements/Communications

EMS COMMUNICATIONS STAFFING		
Shift Schedule	**Minimum Staffing**	**Positions Staffed**
Day Shift 0700 – 1500	4 positions	2 - Call Taking 1 - Dispatch 1 - Back up Call Taking/Dispatch
Mid Shift 1500 - 2300	4 positions	2 - Call Taking 1 - Dispatch 1 - Back up Call Taking/Dispatch
Night Shift 2300 - 0700	3 positions	1 - Call Taking 1 - Dispatch 1 - Back up Call Taking/Dispatch

The EMS Policies and Procedures Manual, “General Comms Center Operations”, requires a minimum of two EMD personnel positioned at the consoles at any given time.

Note: EMS Division allocates five (5) FTE for scheduling; however, several positions are currently vacant. Communications staff is required to complete scheduling functions in addition to call taking, dispatch, and supervisory responsibilities utilizing the current staffing level of 20 positions. (One (1) call taker/dispatch position is vacant.

Turnover

Turnover rate (attrition) is the ratio of the number of workers replaced in a given time period, to the average number of workers. The retention of employees and the vacancy rate influences the number of staff required for position staffing. ESCI utilized annual data (2008-2010) for purposes of calculating EMS Communications turnover rate. Statistical information (as illustrated in the following graph) provides turnover and retention rates for the last three-year period.

Figure 131: EMS Annual Turnover Rates, 2008 – 2010

Turnover Rate (Attrition)	2008	2009	2010
Total number of employees at the highest staffing level for the year	12	14	20
Number of employees who left for any reason	2	1	1
Turnover Rate	**17%**	**8%**	**5%**
Retention Rate	**83%**	**92%**	**95%**

Leave Usage

Leave data was not provided by EMS. Comparative data from similar agencies is used in the analysis and staffing projections.

Policies - The EMS dispatch center maintains Standard Operating Policies/Procedures in an EMD Manual specifically for communications. The EMD Manual is not grouped by sections, but contains policies/procedures generally relating to the following categories:

- Personnel Guidelines/Job Description/Uniform Policy
- Communication Center Guidelines/Staffing Guidelines
- Call Processing
- EMS Ambulance Radio Operations
- Performance Requirements
- Worksheets (Mass Casualty, Hospital Tracking, Unit Tracking, Special Event Tactical)
- Equipment Utilization/Maintenance/Repair

Training – There are no known local or State requirements for public safety dispatchers.

Staff assigned to EMS require two years field EMS experience. Additionally, EMS staff require certification as an Emergency Medical Dispatcher through the MPDS (Medical Dispatch Priority System). Along with EMD certification, all personnel are trained in Incident Command System (ICS) 100 and 700. The Communications Supervisor additionally maintains certification for ICS 200, 300, IS 700, IS 800-b and All Hazards Type III Communications Unit Leader (COML course).

The EMS dispatch center maintains a Training Program for employees new to dispatch. The dispatch center requires 24 hours CME (continuing medical education) which includes maintenance of EMD certification and attendance at an annual departmental Base Station meeting.

Quality Assurance Program – The EMS Dispatch center does not currently maintain a Quality Assurance program for medical call taking or dispatching.

Facility - The EMS Dispatch Center is located in a metal building, similar to a Soule' building utilized for industrial applications.

There is no information available as to the age or rating of the facility as an Essential Services structure or the ability to sustain hurricane force winds. There is no information as to compliance with NFPA 1221, Standard for the Installation, Maintenance, and Use of Emergency Communications Systems (2010 Edition).

Entrance to the Dispatch center is an electronic card key entry system. Square footage of the center is approximately 450 square feet providing space for five call taking/dispatch consoles and small shelving area. A small office for the unit supervisor is adjacent to the dispatch area. The Dispatch center with associated equipment (servers/radio equipment/UPS) is on the second floor. Support services, such as Information Technology, are located on the fourth floor.

The EMS dispatch center provides redundant power supply for essential electronic equipment with a Powerware UPS (uninterruptible power supply) to maintain selected equipment until the diesel generator, located on the roof, reaches acceptable power output level. There is an automatic transfer switch sensing the power drop to initiate generator start. Building management maintains and exercises the power equipment for the center. The generator is shared with the balance of the building.

Technology

Telephones – EMS dispatch utilizes two primary telephone systems:

- 9-1-1 CML Equipment
- Meridian Phone Equipment

EMS dispatch has four (4) 9-1-1 CML answering positions provided by Hawaiian Telcom for the receipt of 9-1-1 calls and coordination of responders through administrative lines.

The CML equipment displays ANI/ALI (Automatic Number Identification/Automatic Location Identification) of the caller for wireline 9-1-1 calls. On wireless 9-1-1 calls, information displays the Lat/Long (latitude and longitude) of the calling part within a plus or minus metric range. The Lat/Long accesses the City/County GIS (Graphic Information System) database, providing an address or closest landmark to the wireless caller. The Lat/Long display capability varies on the type of location solution, either triangulation or hand-set based (GPS identifier). The CML interfaces to the mapping system displaying the location of the calling party from the ALI or the Lat/Long data.

The Meridian Phone System equipment is used for non-emergency calls, general business, coordination with other agencies ('J' lines), and back-up to the CML 9-1-1 telephone equipment. The Meridian System is being phased out and replaced with a City VOIP System.

Computer Aided Dispatch **-** The center utilizes a TriTech VisiNet CAD system, version 4.4.4 (service pack 2) to dispatch calls for service. The CAD system is not interoperable with other emergency service agencies. The Tri-Tech CAD has interfaces to the following equipment/technology:

- ANI/ALI Interface – Link between the 9-1-1 CML and CAD, allowing transfer of number and location data to the CAD system.
- ProQA (medical protocol software)
- Paging Interface allows the initiation of pages from a CAD position to personnel mobile devices and vehicles.
- Mobile Data Computer interface provides seamless communications between EMS CAD and MDCs in the response vehicles.
- Mapping – AVL (location display) - Geocomm
- RMS Interface to State EMS Patient Reporting System (ePCR)

The IT staff extracts and downloads CAD information (response times) to the State Department of Health. Reportedly, the software program to capture dispatch information (call processing times, etc.) for the dispatch center was not purchased.

Mobile Data/Automatic Vehicle Locator (AVL) – EMS response vehicles are equipped with MDCs. The equipment allows transmission of data communications and GPS location data of response vehicles interfaced to TriTech CAD.

Automatic Vehicle Location is provided by the TriTech Visine Mobile System. Tracking is through the AirLink modem equipped with GPS providing Lat/Long of each vehicle. Information displays on the mapping system enabling dispatchers to visualize ambulance location.

Paging – Radio alert tones and required paging initiated during dispatch of a call for service are initiated via TriTech CAD positions through the radio dispatcher. A specialty combination of group paging is also available.

Workstations - The EMS dispatch center has five Watson Fusion workstations ergonomic in design with sit-stand capabilities through adjustable desk heights.

Radio System/Control (Console) - The EMS dispatch center utilizes UHF MEDICOM radio frequencies for day-to-day radio communications supporting EMS operations. A trunked 800-radio system operated by the City/County Honolulu is utilized for communications with the hospitals and as a back-up in the event of failure of the primary UHF system.

InterOp talk groups on the 800 system are available for interagency radio communications if necessary.

The UHF and 800 Systems require two types of radio control consoles at the EMS dispatch positions:

- Motorola for MEDICOM system
- Maestro for the 800-trunked system

Logging Equipment - The center provides recording of voice and radio communications through a Ten-4 System by Stancil, version 2.4.11, and an Exacom Recording (Hindsight-Net Recorder), version 6.1.26.18.

Time Synchronization - Time synchronization of all electronic equipment and servers is by NTP (Network Time Protocol) through the City /County Honolulu.

Back-up/Disaster Recovery - The current back-up center for EMS Communications is located in an equipment room adjacent to the Honolulu Fire Communications Center; however, is reported to be inoperable. EMS is currently in the process of establishing a back-up communications site on Young Street near South King in Honolulu. This is the site of a new station. Back-up capabilities at the new site includes:

2 radio positions
2 call-taking positions

EMS Communications currently has procedures for evacuation of the communications center and for "Primary EMS Radio Failure". Reportedly, a new plan, pertaining to Disaster Recovery for communications requires development for the new back-up location. It is unknown if EMS has a Disaster Recovery Plan specific for communications functionality.

Appendix B(3): Ocean Safety Communications – Current Conditions

Ocean Safety and Lifeguard Services Dispatch (Organizational/Services Provided) **-** Ocean Safety is a non-formalized unit within the Division of Ocean Safety and Lifeguard Services under the umbrella of the City and County of Honolulu Emergency Services Department. Lifeguard dispatch receives and dispatches requests for water rescue/lifeguard services and mobile water rescue response within four geographical beach districts on the island of Oahu. The four areas include:

- South - Pearl Harbor to Ala Wai (District 1)
- Windward - Hawaii Kai to Makapuu (District 2)
- North - Kaneohe to Waimea (District 3)
- Leeward - Kaena Point to Pokai Bay (District 4)

The geographical response area for each District extends out 1.0 miles into the ocean from the each beach area. The dispatch center monitors surf and wind conditions, and may post information of hazardous conditions for other agencies and as a public information announcement. The dispatch center produces a manual daily log for dispatch activities and radio contacts with the 38 lifeguard towers. Lifeguard dispatch also performs a variety of administrative, clerical and maintenance duties for the Division.

Mission Statement - There is no mission statement for Lifeguard dispatch.

Agreements – Agreements directly affecting Lifeguard dispatch were not provided; however, ECSI did review a Memorandum of Agreement, outlining Co-Response for fire, Water Safety, and EMS. This agreement outlines support among the three departments for co-response when dealing with specific types of emergencies. Ocean Safety submitted an expired agreement for review pertaining to co-response.

Personnel Processes (labor, job descriptions, hiring/testing) - Labor representation of Ocean Safety dispatch personnel is through the Hawaiian Government Employees Association Unit 3.

There are no position descriptions for Lifeguard dispatch personnel. A list of duties and responsibilities for Lifeguard dispatch personnel is available. As personnel assigned to dispatch are Water Safety Officers, all potential candidates for Ocean Safety Services must possess the following base level certifications and requirements:

- Current Driver's License
- Possess a High School Diploma or Equivalent

- Proof of previous completion of American Red Cross Lifeguard Training Class
- Proof of previous completion of Basic First Aid Class
- Proof of previous completion American Red Cross CPR for the Professional Rescuer Class or American Heart Association BLS Healthcare Provider Class

Prospective applicants who meet the above requirements must pass a secondary phase, which includes the following physical performance exam:

- 1000 Yards Run and 1000 Yard Swim - Under 25:00 Minutes
- 400 Yards Rescue Board Paddle - Under 4:00 Minutes
- Run-Swim-Run 100 Yards each length – Under 3:00 Minutes

Other than the above, there were no specific requirements provided or entry level testing given for personnel considered for the dispatch function.

Operating Costs – Ocean Safety dispatch does not have a section budget specifically for communications. Based on salary costs of three personnel, and other operational costs, it is estimated (by ESCI) the annual fiscal year operating costs are approximately $250,000.

Performance Requirements - There are no performance requirements for Ocean Safety dispatch operations.

Workload - There is no formal method of tracking workload managed by Lifeguard dispatch other than a dispatch daily log, a manual notation system. There is no computerization of dispatch events whether self-initiated or from external sources.

A large majority of Ocean Safety Lifeguard incidents are generated 'on view' by lifeguards from the beaches or specific tower locations. There are 38 lifeguard towers within the four beach districts. The initiation of lifeguard incidents is similar in method to a law enforcement patrol officer walking a neighborhood beat. Much of the work ranges from public information, assistance, requests, and 'on view' emergency occurrences. The remaining balance of calls for service is generated via 9-1-1. The majority of 'on view' contacts made by lifeguards are not reported to dispatch; however, Ocean Safety does complete forms by hand that describe the types of events.

9-1-1 Emergency Workload (CML Phone System)

Lifeguard dispatch has CML 9-1-1 call taking equipment**.** There are no reports provided for Ocean Safety on the number of calls directed to Ocean Safety on the CML equipment.

Non-Emergency Workload (Meridian Phone System)

The Meridian phone system is used for business, administrative calls, and coordination with other agencies on the 'J' lines. There is no method to track the number of calls both inbound and outbound on the Meridian Telephone system. Dispatch personnel estimate there are approximately 60 incoming calls a day (0645 – 1800) received on the Meridian Telephone system.

Daily Workload:	60 calls per day (Average per hour – 5 calls/*12 hour days)*
Estimated Annual Workload:	21,000 calls

Call Answering Performance Data – Lifeguard dispatch does not capture the average duration of the call, or the average speed of answer.

Workload by Hour of the Day – Lifeguard dispatch does not capture workload data.

Incident Activity – Lifeguard dispatch does not capture incident activity. It is noted the lifeguard log sheet data indicates field activity, i.e. public contact and preventative actions. Many of these incidents and log entries are for public information and assistance or minor first aid. These are not reported to dispatch therefore requiring no dispatch activity. Rescues, surfing accidents, and drowning are types of lifeguard activities currently having a direct correlation with the dispatch center, and require multi-discipline responses from fire and EMS. Dispatch incident activity, extracted from the log entries indicates an estimated dispatch workload as follows:

2009 Annual Workload:	1,773 incidents (Rescues, Surfing Accidents, Drowning)
Average Daily Workload:	4.9 activities
Average Hourly Workload:	0.4 activities

Workflow - 9-1-1 calls for Ocean Safety are received at the Honolulu PSAP and transferred to FCC by the call screener. FCC completes the call interrogation and dispatches the appropriate fire units. FCC notifies Lifeguard dispatch center of the incident for dispatch of a co-response. Lifeguard dispatch notifies the closest lifeguard tower, if applicable, and area personnel. Lifeguard dispatch initiates the appropriate response to the call, including required resources (personnel and equipment) based on the type of water safety call. Lifeguard dispatch may backfill tower positions as necessary. Lifeguard dispatch typically utilizes 'Reef Breaks' as location indicators rather than a street address or intersection. Calls for service are initiated from various lifeguard towers through radio notification from one of the 38 manned lifeguard towers or from the beach area. The dispatcher acknowledges the incident and provides/confirms any need for assistance, such as backfill coverage for the tower, or specialized resource equipment. Additionally, in the event of the need for a co-response of police, fire or EMS, the dispatcher initiates a landline telephone request for emergency responders or other ocean responders. Updates received from the 9-1-1 PSAP or co-responder dispatch centers are verbally relayed via telephone to Lifeguard dispatch.

The dispatch center monitors beach video cams located at key areas on the coastline. Based on the various types of circumstances observed on the cam, Lifeguard dispatch makes the appropriate notification of beach conditions or on view safety incidents as necessary.

Staffing - Dispatch is not a recognized unit of Ocean Safety; however, three FTE personnel are informally assigned to staff dispatch operations. This includes two lifeguards (Water Safety Officers), and a Captain for supervisory oversight. Part-time positions also fill in at dispatch; however it is unknown the average number of hours per month. The Captain assigned to the dispatch center may also fill in assuring staffing in dispatch.

Lifeguard dispatch operates from 0645 to 1800 hours, 7 days per week. There are two dispatch shifts during the 12-hour period.

- Early shift starts at 0645 and ends at 1230 hours.
- Late shift starts at 1230 hours and ends at 1800.

The dispatch workday is 8 hours and 45 minutes; two 15-minute breaks, 45 minutes for a non-paid lunch, and 1.0 hours for physical fitness. Maintenance of physical fitness is a requirement for all personnel, for participation in life saving events. Actual dispatch console time is approximately 6.0 hours per shift.

Shift Staffing is one (1) dispatcher per shift.

Turnover

Turnover data is not applicable as positions are lateral transfers from the field.

Leave Usage

Ocean Safety did not provide leave usage data. Comparative data from similar agencies is used in the analysis and staffing projections.

Policies - There are no policies specific to dispatch operations provided by Ocean Safety. Reportedly there are field operational procedures.

Training – There are no known local or State requirements for public safety dispatchers. Staff assigned to Lifeguard dispatch and dispatcher training, require no additional certification other than the requirements as a Water Safety Officer.

Reportedly, new hire training and/or newly assigned staff for a dispatch position includes 120 hours of instruction in the following categories:

- Incident Command System (6 classes)
- Classroom Training
- Field Dispatch Center Training
- Field Ocean Safety District Training
- Ocean Safety Dispatch Training
- Final Practical Scenario
- Final Written/Oral Exam

The training program for the above categories includes a check-off sheet for each subsection under the main categories and requires the Captain and Trainer signature indicating successful completion.

Continuing education is not formalized, however all employees must maintain individual water and life safety certifications and accreditations.

Quality Assurance - There is no Quality Assurance program for the dispatch center.

Facility - The Ocean Safety and Lifeguard Services facility is housed an older stick-built type structure previously used as a residence and day care center.

The structure for the Ocean Safety and Lifeguard Services is not an Essential Service facility. Dispatch occupies a room within the structure estimated at approximately 150 sq. feet. There is an electronic keypad entry to the room. The dispatch area, remodeled three years ago, contains two workstation positions.

An older fifth wheel, also considered part of the facility, is located at the side of the Ocean Safety parking lot. It provides storage for archived files, numerous pieces of radio equipment, boxes, older equipment, and many miscellaneous items.

The back-up power for the center is through a FERRUPS Powerware UPS with a transfer switch to a diesel generator located outside of the building.

There is an attached garage, housing punch blocks, wiring, and back-end equipment for the telephone systems. The garage also contains numerous boxes, supplies, and used equipment. Reportedly, it is the inventory receiving and distribution point for all Ocean Safety and Lifeguard equipment.

Technology

Telephones – Lifeguard dispatch has two primary telephone systems:

- Hawaiian Telcom 9-1-1 CML Equipment – 1 position.
- City Meridian Phone System used for non-emergency calls, coordination with other agencies ('J' lines), and back-up to CML 9-1-1 telephone equipment. The Meridian system is being replaced with a City VOIP System.

Reportedly, there are few 9-1-1 calls transferred to Lifeguard dispatch via the CML 9-1-1 telephone system. Lifeguard dispatch mainly utilizes the CML Admin lines for direct contact with Honolulu Police Department.

There is no GIS mapping system allowing caller location display or CAD system providing a pre-assigned response based on the zone or reef break areas.

Computer System – Lifeguard dispatch does not utilize Computer Aided Dispatch (CAD) for tracking of dispatch activities. Work positions have PC workstations allowing access to internal and external email, intranets, and the internet.

Mobile Data – None

Paging System – Unknown

Workstations – Lifeguard dispatch has two workstations. The primary workstation is equipped with CML 9-1-1 equipment, Meridian telephone equipment, radio control console, Geo Lynx Mapping, and computer PC; the second position provides a Meridian Telephone providing capability for administrative and non-emergency calls, and a computer PC. The dispatch center utilizes a large flat screen between the two workstations, allowing observation of various beach cams for surf conditions and the monitoring of citizen safety and lifeguard activities.

Radio Systems/Control (Console) – Ocean Safety/Lifeguard Services utilized the Honolulu 800 MHz radio system providing basic interoperable communications with public safety responders.

A Zetron radio control station provides communications with the four District beach areas on the C/C Honolulu trunked radio system.

Logging Equipment **–** Information not provided.

Time Synchronization **–** Information not provided.

Back-up/Disaster Recovery – The fifth wheel trailer in the parking lot of Ocean Safety Services provides back-up to the main structure should it become uninhabitable. Reportedly, the fifth wheel may move to another (yet identified) location in the event Ocean Safety property area is threatened or becomes unusable. There is a cache of older radios in the fifth wheel dedicated to the back-up purpose. Radio channel capabilities in the fifth wheel are unknown.

No disaster or back-up plan is available.

Appendix B(4): Public Safety Communications/Core Best Practices

Best Practices provide the ability to assess existing conditions of the public safety communications agency. This listing, compiled by ESCI, provides Best Practice Statements applicable to the nine core areas.

Figure 132: Core Best Practices

PUBLIC SAFETY COMMUNICATIONS CORE BEST PRACTICES
1. Appropriate written agreements, policy, and governance documents (if applicable) are in place clearly defining the legal authority, roles, and responsibilities of the Public Safety Communications Agency, including services provided, and organizational policy (governance, administrative, and fiscal).
2. The Communications Agency provides a Mission Statement, outlining goals, objectives, and strategies.
3. The Agency provides a clearly defined Organizational Structure. The structure provides the appropriate lines of authority and direction for the agency with, levels of supervision, and accountability in achieving the stated mission, goals, and objectives of the agency.
4. The Agency provides a Strategic Planning process and document.
5. Financial policies are in place for the communications center addressing acceptable budgeting and expenditure practices. The Policy addresses critical infrastructure programs, technologies, and replacement (infrastructure) funding, reflecting the Strategic Plan, Mission Statement, Goals, and Objectives.
6. There are written policies specifically addressing Position Requirements (i.e. Job Descriptions, Testing, and Selection Methodology). The center must monitor and predict vacancies, assuring pro-active hiring processes and continued maintenance of authorized positions.
7. Established performance requirements are in place specific to communications reflecting answer time, call processing time, dispatch time, and combined call answer, call processing, and dispatch notification times.
8. Management Information System Reports provide data for measurement of established Performance Requirements. • **The Agency assigns personnel and delineates the reporting program responsibilities.** • **Data indicating adherence to performance requirements is maintained on a monthly basis, and reviewed annually assuring applicability and relevance.**
9. The Communications Center collects, maintains, and periodically/routinely reviews workload data to determine staffing levels, allocation of personnel, and position requirements.
10. There is sufficient staffing to meet the mission, goals, and objectives of the Agency including sufficient personnel on duty to meet established performance standards for emergency call answering and dispatch of alarms. • **Supervision is available for minimum staffing of three telecommunications personnel or assigned to the center when more than three telecommunicators are on duty.** • **Centers providing medical dispatch protocols ensure two staffed positions are on duty at all times.**
11. Policy documents and procedural guidance are available specifically addressing Public Safety Communications. At a minimum these documents address: • **Services Provided and Responsibilities.** • **Operations – Performance Standards (Call Processing/Dispatch).** • **Procedures (SOPs) Development Process, Training Program Standards, Quality Assurance, Risk Management and Mitigation, Technical Systems, and Disaster Recovery/Alternate Site.**

PUBLIC SAFETY COMMUNICATIONS CORE BEST PRACTICES
12. The documented training program is performance based and meets local, state, or national requirements. *(Training curriculum complies with or is comparable to the APCO ANS Minimum Training Standards for Public Safety Telecommunicators.)* There are established minimum requirements, standards, and training for: • **Public Safety Communications Training Officer (CTO).** • **First level supervisors complying with or comparable to APCO Minimum Training Standards for First Line Supervisors, 2006.** • **Continuing Education Program providing ongoing professional development of communications staff**
13. *The Agency provides an approved Quality Assurance Program for evaluation of program guidelines, agency procedures, and performance. The Quality Assurance Program specifically provides for review and sampling of incoming calls for emergency service, assessing level of performance based on operating procedures.*
14. Facilities and resources are designed, maintained, managed to meet building Essential Services design and functions and meet agency mission, goals, and objectives.
15. Emergency communications centers are *designed to manage peak and critical workloads established by the jurisdictional Agency including support staff; emergency communications centers and associated buildings housing essential equipment for the center operations are protected from vandalism, terrorism, and other disturbances.*
16. E*ntries to communication areas are restricted to non-authorized personnel.*
17. *E*ffective redundancy plans call for UPS devices and generators to provide power to critical systems until restoration of primary power supply. Generator sets must provide backup power to Critical Operations Power Systems (COPS) for a minimum of 72 hours at full load.
18. The telephone network, equipment, and policies supporting the Public Safety Communication Center meets the needs and capacity requirements of the agency. • **The telephone network provides a minimum grade of service for incoming emergency calls, and appropriate lines to manage non-emergency call loading.** • **The telephone network is a design providing route diversity for the incoming network.** • **The telephone system supports the ability to separate emergency versus non-emergency calls, providing ability for prioritization of incoming calls.**
19. The Agency provides policy, training, and testing processes directly related to the agency telephone systems. • **Wireless Phase I and Phase II calls** • **TDD/TTY requirements** • **Language translation services** • **System components, reroute, make busy, disaster/failure planning**
20. The CAD system hardware is of the grade, quality, and reliability to meet the requirements of the Agency; provides interoperability with other emergency service agencies; developed manual back up or secondary dispatch method in the event of a failure of the CAD system.
21. Mobile Data Computers (MDCs) provide operational efficiencies for public safety responders and communications center personnel. • **MDC capabilities require ability to provide CAD dispatch to units, messaging between units, status updates of the public safety responders, and ability to prioritize emergency messages** • **MDC System data is not lost in the event of a system failure.**
22. The paging system is managed by the communications agency; paging/CAD interface is functional providing automated tone notification, paging, and texting capabilities directly from the CAD dispatch function.
23. Workstations are functional meeting agency requirements and ergonomic standards; workstations allow 'universal' capabilities for call taking and/or dispatch functions.
24. Radio systems must fulfill the agency mission and meet the needs of community expectations; interoperability with other jurisdictions/agencies is optimal.
25. Communications centers ensure a logging voice recorder channel is available for each radio channel or talk-group, dispatch circuit, and telephone position; each position allows instant replay of voice or radio recordings.

PUBLIC SAFETY COMMUNICATIONS CORE BEST PRACTICES
26. Communications agencies provide the ability to synchronize internal clocks of equipment/systems to an accepted time standard (i.e. CAD, Radio Consoles, Telephone, Voice Logging Equipment).
27. The jurisdictional agency has documented a vulnerability assessment and operations plan for communications. • **Essential Services provided are identified for operational inclusion in the plan;** • **The plan identifies the maintenance and operations of an alternate communications system;** • **The alternate communications system is capable of duplicating and performing Essential Services provided at the primary communications center;** • **The plan includes back-up and redundant power for the facility;** • **The agency develops a drill and exercise program on a regular basis to evaluate the contingency/continuity plan.**

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