CENTER FOR PUBLIC SAFETY MANAGEMENT, LLC

Fire & EMS Operational Analysis

Cocoa Beach Fire Department
Cocoa Beach, Florida

Final Report-December 2023

CPSM®

CENTER FOR PUBLIC SAFETY MANAGEMENT, LLC
475 K STREET NW, STE. 702 • WASHINGTON, DC 20001
WWW.CPSM.US • 716-969-1360

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The International City/County Management Association (ICMA) is a 109-year-old, non-profit professional association of local government administrators and managers, with approximately 13,000 members located in 32 countries.

Since its inception in 1914, ICMA has been dedicated to assisting local governments and their managers in providing services to their citizens in an efficient and effective manner. ICMA advances the knowledge of local government best practices with its website, www.icma.org, publications, research, professional development, and membership.

CENTER FOR PUBLIC SAFETY MANAGEMENT (CPSM)

The ICMA Center for Public Safety Management (ICMA/CPSM was launched by ICMA to provide support to local governments in the areas of police, fire, and Emergency Medical Services.

The Center also represents local governments at the federal level and has been involved in numerous projects with the Department of Justice and the Department of Homeland Security. In 2014, as part of a restructuring at ICMA, the Center for Public Safety Management (CPSM) spun out as a separate company and is now the exclusive provider of public safety technical assistance for ICMA. CPSM provides training and research for the Association's members and represents ICMA in its dealings with the federal government and other public safety professional associations such as CALEA, PERF, IACP, IFCA, IPMA-HR, DOJ, BJA, COPS, NFPA, etc.

The Center for Public Safety Management, LLC, maintains the same team of individuals performing the same level of service that it had for ICMA. CPSM's local government technical assistance experience includes workload and deployment analysis using our unique methodology and subject matter experts to examine department organizational structure and culture, identify workload and staffing needs, and identify industry best practices.

We have conducted more than 400 such studies in 46 states and provinces and more than 275 communities ranging in population size 3,300 (Lewes, DE) to 800,000 (Indianapolis, IN).

Thomas Wieczorek is the Director of the Center for Public Safety Management.
Leonard Matarese serves as the Director of Research & Program Development.
Dr. Dov Chelst is the Director of Quantitative Analysis.

CENTER FOR PUBLIC SAFETY MANAGEMENT PROJECT CONTRIBUTORS

Thomas J. Wieczorek, Director
Leonard A. Matarese, Director, Research & Project Development
Dov Chelst, Ph.D. Director of Quantitative Analysis
Joseph E. Pozzo, Senior Manager
Donald S. Collins, Associate
Xianfeng Li, Data Analyst
Monicque Lee, GIS Specialist

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SECTION 1. EXECUTIVE SUMMARY

The Center for Public Safety Management (CPSM) was retained by the City of Cocoa Beach, Florida, to conduct a Fire and EMS operational analysis. This analysis is intended to provide the city with a comprehensive and unbiased review of the Cocoa Beach Fire Department (CBFD) administrative capabilities, training and support programs, deployment effectiveness, current Fire and EMS operations, the emergency management program, strategic and succession planning, and assessment of providing lifeguard services.

To begin the analysis, project staff requested certain documents, data, and information from the CBFD. The project staff used this information/data to familiarize themselves with Fire, EMS, and other CBFD operations. The provided information was supplemented with information collected during an on-site visit in May 2023, during which CPSM interacted with city and CBFD staff, visited each fire facility, reviewed fleet, and equipment, met with the Cocoa Beach Police Department 911-PSAP staff, and completed an extensive tour of the city to capture a profile of building, transportation, and other community risks. Additionally, CPSM staff held virtual and phone stakeholder meetings with CBFD leadership throughout the project. Information gleaned from these stakeholder meetings is included in this assessment.

Our report includes a comprehensive operational workload and response time data analysis. The data analysis performed for this project provided technical support to our recommendations and assessment of deployment strategies based on call demand, call type, department resiliency, and response times. As well, the data analysis links to the GIS mapping which CPSM uses extensively in this report.

The response time and staffing components discussion in this analysis are designed to examine the current level of service provided by the CBFD compared to national best practices. As well, these components provide incident data and relevant information to be utilized for future planning and self-review of service levels, and for continued improvement designed to meet community expectations and for the department to be able to mitigate emergencies effectively and efficiently.

Throughout our analysis, and more specifically when analyzing the operational deployment of resources, CPSM utilized two national benchmarks: the ISO Public Protection Classification (ISO-PPC) rating system, and the National Fire Protection Association's (NFPA) 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Career Fire Departments*. Both are important national benchmarks. Although both are focused on fire protection, it is important to understand they are independent of one another.

The ISO, a subsidiary of Verisk Analytics, is a national, not-for-profit organization that collects and evaluates information from communities across the U.S. regarding their capabilities to combat building fires. The Verisk hazard mitigation team collects and evaluates information from communities across the United States regarding their capabilities to provide municipal fire protection. This information is analyzed utilizing the Fire Suppression Rating System, from which individual section credits and points are tabulated and a Public Protection Classification for the community is assigned. PPC scores range from 1 through 10, with 1 being the highest rating a community can achieve.[1] The City of Cocoa Beach has achieved a Class 2 rating, which is in the upper third of ratings, and is an achievement to be proud of.

1. Verisk's Community Hazard Mitigation Services (isomitigation.com).

It is important also to understand the PPC is not just a fire department classification, but a compilation of community services that include the fire department, the emergency communications systems, and the water supply system. Our review of the current City of Cocoa Beach ISO-PPC report reveals a highly rated emergency communications system; a well-rated water supply system; a well-rated community risk reduction program (fire prevention component of the CBFD); and a well-rated fire suppression component that has room for improvement in credit for company personnel and ladder service. This final component, as outlined herein, can be enhanced over the mid to long term. We make recommendations related to the current ISO-PPC report.

FACT SHEET

KEY REQUIREMENTS FOR EMERGENCY SERVICES IN NFPA 1710

The minimum requirements for provision of emergency services by career fire departments can be found in NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments.*

NFPA 1710 addresses the structure and operation of organizations providing such services, which include fire suppression and other assigned emergency response responsibilities such as EMS and special operations.

The requirements intend to provide effective, efficient, and safe protective services to help prevent fires, reduce risk to lives and property, deal with incidents that occur, and help prepare for anticipated incidents.

The requirements are listed in NFPA 1710 for fire department service deployment based on the type of occupancy, along with the appropriate response staffing levels for each. The minimum staffing level for each occupancy is listed below. For the full breakdown of staffing requirements by position, refer to the subsections specific to each occupancy in 5.2.4.

KEY REQUIREMENTS

Occupancy Type: Single-Family Dwelling
Deployment: Minimum of 16 members or 17 if aerial device is used

The initial full alarm assignment to a structure fire in a typical 2000 ft² (186 m²), two-story, single-family dwelling without a basement and with no exposures must provide for a minimum of 16 members (17 if an aerial device is used).

Occupancy Type: Garden-Style Apartment
Deployment: Minimum of 27 members or 28 if aerial device is used

The initial full alarm assignment to a structure fire in a typical 1200 ft² (111 m²) apartment within a three-story, garden-style apartment building must provide for a minimum of 27 members (28 if an aerial device is used).

Occupancy Type: Open-Air Strip Mall
Deployment: Minimum of 27 members or 28 if aerial device is used

The initial full alarm assignment to a structure fire in a typical open-air strip shopping center ranging from 13,000 ft² to 196,000 ft² (1203 m² to 18,209 m²) in size must provide for a minimum of 27 members (28 if an aerial device is used).

Occupancy Type: High-Rise
Deployment: Minimum of 42 members or 43 if building is equipped with fire pump

The initial full alarm assignment to a fire in a building with the highest floor greater than 75 ft (23 m) above the lowest level of fire department vehicle access must provide for a minimum of 42 members (43 if the building is equipped with a fire pump).

NFPA 1710 outlines the organization and deployment of operations by career fire and rescue organizations.[2] This standard serves as a benchmark to measure staffing and deployment of resources to respond to fires in different categories of structures and categories of emergencies. Specific components of NFPA 1710 that are germane to staffing and deployment of resources include the assembling of an Effective Response Force (ERF), which is the staffing needed to perform critical tasks on the fireground for each category of structure risk; and response times to emergencies (made up of call processing or dispatch time; turnout time; and travel time to the scene).

Our analysis reveals aspects of response in Cocoa Beach that can be improved. These are call processing times by the city's communications center for fire incidents; turnout times by CBFD staff; and assembling an Effective Response Force. These three aspects of response have the potential to be improved over the mid to long term. CPSM makes recommendations in this report to address these deficiencies.

Critical tasks are those activities that must be conducted on time and preferably simultaneously by responders at emergency incidents to control the situation and minimize/stop loss (property and life-safety). Critical tasking for fire operations involves the minimum number of personnel required to perform the tasks needed to effectively control and mitigate a fire or other emergency. To be effective, critical tasking must assign enough personnel so that all identified functions can be performed simultaneously. The specific number of people required to perform

2. NFPA 1710 is a nationally recognized standard, but it has not been adopted as a mandatory regulation by the federal government or the State of Florida. It is a valuable resource for establishing and measuring performance objectives for the CBFD but should not be the only determining factor when making local decisions about the city's Fire and EMS services.

all the critical tasks associated with an identified risk or incident type is referred to as an *Effective Response Force* (ERF) and is outlined in the NFPA 1710 standard.

The goal is to deliver an ERF within a prescribed time period. NFPA 1710 provides the benchmarks for ERFs for single-family dwellings (low risk), open-air strip malls/commercial buildings (moderate risk); and garden-style apartments (moderate risk). CPSM conducted an analysis of how the CBFD benchmarks against this standard and each building risk. Our analysis includes the use of mutual/automatic aid from neighboring jurisdictions, which the CBFD reciprocates to. We make recommendations related to the current CBFD daily operational staffing complement. These recommendations include augmenting specialty company staffing (truck company at Station 51) and resource deployment over the longer term from Station 50. We believe our recommendations will enhance CBFD effectiveness.

A significant component of this report is the completion of an *All-Hazard Risk Assessment of the Community*. The *All-Hazard Risk Assessment of the Community* contemplates many factors that cause, create, facilitate, extend, and enhance risk in and to a community. The service demands in Cocoa Beach are numerous for the CBFD. They include Advanced Life Support (ALS) EMS first response, fire, technical rescue, hazardous materials, density challenges (some vertical), surface water emergencies to include rip currents, and transportation emergencies to include vehicle and pedestrian traffic, and other non-emergency responses typical of urban and suburban city fire departments.

Our fleet analysis revealed the department works collaboratively with the city when determining the replacement of CBFD heavy apparatus, and to the extent possible follows the national standard. Under this partnership a useful life expectancy methodology that considers NFPA 1901, *Standard for Automotive Fire Apparatus*, is used to guide CBFD's apparatus replacement process. CPSM provides recommendations regarding the fleet; these recommendations are designed to help the department maintain safe and operable equipment as benchmarked against industry best standards.

CPSM's facility analysis focused on the location of each of the department's two stations in relation to travel times (benchmarked against NFPA 1710), and distribution (benchmarked against the ISO-PPC standards for engine and ladder deployment). Each of these benchmarks (NFPA 1710; ISO-PPC) focus on proximity of fire protection assets (staffing and apparatus) to building risks. The NFPA standard also looks at proximity of the first arriving fire suppression unit to an EMS incident.

The ISO-PPC evaluation system establishes the distribution of engine and ladder companies within built-upon areas (deployment analysis). For full credit in the Fire Suppression Rating Schedule (FSRS), a jurisdiction's fire protection area with residential and commercial properties should have a first-due engine company within 1.5 road miles of built-upon land and a ladder or service company within 2.5 road miles of built-upon land.[3]

CPSM visited each fire facility for the purpose of evaluating use of space, operational functionality, and if contemporary fire and EMS service best practices are in place (such as carbon monoxide vehicle exhaust capture systems, decontamination areas, gender-separated sleeping areas, ergonomics, and separation of living and employee fitness space from vehicle and storage space).

Fire department facilities are exposed to some of the most intense and demanding uses of any public local government facility, as they are occupied 24 hours a day. Personnel-oriented needs

3. ISO Mitigation, Deployment Analysis.

in fire facilities must enable performance of daily duties in support of response operations. For personnel, fire facilities must have provisions for vehicle maintenance and repair; storage areas for essential equipment and supplies; and space and amenities for administrative work, training, physical fitness, laundering, meal preparation, and personal hygiene/comfort.

CPSM makes a recommendation for the city's consideration to relocate and construct a new Station 50. This recommendation is aimed at improving the current facility, which was constructed in 1962, and to the extent possible, maintaining effective response travel times when benchmarked against the national standards.

Also included in this report are assessments of the training and education and community risk reduction components of the CBFD. CPSM found these components to be fully engaged in their assigned activities. CPSM was impressed with the commitment to training and the resulting ISO-PPC score the CBFD received in this category. The community risk reduction division, like many around the country, wears many hats (fire prevention, fire investigation, life safety public education), but does not have sufficient staffing to keep up with building and occupancy inspections. CPSM provides recommendations for improvements with these two necessary components of a fire and EMS department.

The provision of efficient and effective Emergency Medical Services (EMS) is a vital aspect of any community's public safety infrastructure. As the City of Cocoa Beach experiences evolving healthcare needs, it becomes increasingly important to assess and optimize its EMS service delivery system. The EMS analysis was conducted through a combination of available data analysis, stakeholder interviews, and benchmarking against industry best practices. CPSM also conducted a review of the CBFD Mobile Integrated Health/Community Paramedicine Program. CPSM found this relatively new program to the city to be effective and one that fills a social needs gap in the community. CPSM provides recommendations intended to make this program more effective and efficient as it continues to evolve and grow into an industry best practices program.

As Cocoa Beach is an Atlantic Ocean coastal community and thus is vulnerable to tropical weather systems, CPSM conducted an extensive review of the department's and the city's emergency management program. This included a review of the city's Comprehensive Emergency Management Plan, Hurricane Operations Plan, and Emergency Operations Center area located at CBFD Station 51. CPSM provides recommendations to enhance this and associated programs.

Lastly, CPSM reviewed the current ocean rescue services provided by Brevard County. The city asked CPSM to perform this review because the city is contemplating taking on this service as a city public safety function. Creating a new public safety service such as ocean rescue is a local decision that must be considered carefully. That said, the CBFD is fully capable of providing ocean rescue service. This assessment is based on the capabilities of current management and leadership of Fire and EMS program service delivery; the CBFD's commitment to training and preparation; and the existence of the CBFD's recognized surf rescue program. The department has certified surf rescue technicians and is the first fire department to receive United States Lifeguard Association accreditation without lifeguards.

In summation, CPSM found the CBFD and city administrative staff we interacted with to be fully engaged with this project. The CBFD is a well-functioning, professional, and focused fire, and EMS agency, and exhibits many aspects of a contemporary fire department.

This report contains a series of observations, planning objectives, and recommendations that are intended to assist the CBFD and the city deliver services more efficiently and effectively.

Recommendations and considerations for continuous improvement of services are presented here. CPSM recognizes there may be recommendations and considerations offered that first must be budgeted, bargained, or for which processes must be developed prior to implementation.

RECOMMENDATIONS

City of Cocoa Beach and CBFD Overview

(See pp. 10-13.)

1. CPSM recommends the city consider changing the operational District Officer position title (Captain level) to District Chief, so that this position better aligns with all other fire departments in the county and that of a contemporary fire department. This potentially will require additional funding and updating the IAFF contract. ISO-PPC Community Rating

ISO Report

(See pp. 16-22.)

2. As the current ISO-PPC report is almost seven years old, CPSM recommends the CBFD contact the ISO and schedule and prepare for a community fire protection review.

Training

(See pp. 22-24.)

3. CPSM recommends the CBFD continue to support and budget for external training opportunities on a state and national level (National Fire Academy and Emergency Management Institute). CPSM further recommends the CBFD continue with its robust training program to sustain maximum credit points on future ISO-PPC community rating evaluations.

Community Risk Reduction

(See pp. 24-27.)

4. CPSM recommends the city and CBFD consider including in any future planning a focus on Community Risk Reduction that includes the expansion of public life safety education programs targeting vulnerable residential populations and those residents (permanent, seasonal, and visiting) living in multistory housing units. These programs should be aimed at educating these populations how to prevent and respond to fire incidents, and how to prevent unintentional injury and death. There should also be a commitment to the current fire prevention code enforcement plan that ensures the completion of required annualized inspections, transient rental inspections, and the remaining occupancy types through scheduling bi-annual and tri-annual inspections of these occupancies. This commitment should include the expansion of fire code enforcement staff by adding one full-time fire prevention code inspector so that the demand and critical nature of current and future inspectable properties can be met.

Emergency Management

(See pp. 27-32.)

5. CPSM recommends the city create at a minimum, a part-time Emergency Management Planner position (24-hours/week), reporting to the Fire Chief, who also serves as the city's Emergency Management Coordinator. This action is recommended and necessary as there is a critical need for continuous planning and preparation, project management, and collaboration with city, county, and state officials, and development and sustainment of required and ancillary written plans required in the emergency management discipline.

Cocoa Beach can be subject to environmental and other emergencies that evolve into federally declared emergencies and thus should put more resources into this program.

6. CPSM recommends the city update the current Comprehensive Emergency Operations Plan as it was implemented in 2016 and contains dated data and information.
7. CPSM recommends, as funding for a part-time Emergency Management Planner and allotted staff time permits, the city consider, as it is an Atlantic Ocean coastal community, pursuing and implementing the necessary elements to become a registered and recognized Storm Ready and Tsunami Ready Community.
8. CPSM recommends the Emergency Management function continue the process of maintaining the National Incident Management System (NIMS) training program to include developing and implementing a plan that trains current and all new city officials and staff to the appropriate NIMS levels.
9. CPSM recognizes the city has existing city-wide plans and individual department plans, which should be used as the basis to formulate an overarching and formal Continuity of Operations Plan (COOP) that is all-hazards and not just related to a hurricane, and that has the ability to ensure the effects of any interruption in a city office, system, operation, and staffing before or during an event are successfully managed and the city is able to perform all essential functions.
10. CPSM recommends the City maintain an Emergency Operations Center or Emergency Management Operations area that can quickly become operational, with minimal set-up, and is capable of supporting necessary emergency support functions to handle a multi-agency emergency 24-hours/day if necessary. The EOC should have the ability to be quickly relocated if compromised, and should contain, at a minimum, equipment, materials, and infrastructure as outlined in the Emergency Operations Center section of this report.

Succession Planning

(See pp. 32-33.)

11. CPSM recommends CBFD work with the collective bargaining unit and the city's Human Resources Director to develop a succession plan that is diverse, includes the entire organization, and has a focus on preparing current and future members to take on additional roles and responsibilities, and as well prepares members for advancement and promotion into key roles in the organization.

Strategic Planning

(See pp. 33-35.)

12. CPSM recommends the CBFD continue to work on the city's Public Safety Strategic Plan and ensure that the plan is inclusive of the entire department and the community; that it incorporates measurable and obtainable goals and objectives; that it includes goals and objectives that are focused on a diverse and inclusive organization; and that it provides for an annual review and report to the organization and community that outlines the plan's progress.

Health, Safety, and Wellness

(See pp. 35-37.)

13. CPSM recommends CBFD develop a health, safety, and wellness committee, which should include the city's Human Resources Department, and develop a comprehensive health, safety, and wellness initiative that aligns with NFPA 1500, Standard on Fire Department Occupational Safety and Wellness Programs, 2021 edition. CPSM further recommends the department implement additional Administrative Orders as necessary that address health,

wellness, and safety on a broad level, including non-emergency and station activities, and that address all facets of health, wellness, and safety in the fire and EMS disciplines. These may include carcinogen exposure, mental health, reduction of workplace injuries in emergency and non-emergency situations, awareness of the NIOSH-5, annualized medical physicals and mask fit-testing, and the like.

Fleet

(See pp. 37-39.)

14. CPSM recommends apparatus and major apparatus components such as the motor, fire pump, aerial ladder assembly and hydraulics, chassis, and chassis components such as brakes, wheels, and steering equipment be maintained in accordance with manufacturer and industry specifications and standards. All testing records should be maintained in a common records management system for continuous review and analysis.

    Further, apparatus components requiring annualized testing either fixed or portable such as fire pumps, aerial ladder and aerial ladder assemblies, ground ladders, self-contained breathing apparatus to include personnel fit testing, and fire hose should be tested in accordance with manufacturer and industry specifications and standards. All testing records should be maintained in a common records management system for continuous review and analysis.

    Due to the imporatnce of the day-to-day care and maintenance of heavy fire appratus, and to ensure consistent emergency and non-emergency apparatus operations, CPSM further recommends the city and the CBFD consider, over the mid-term, the implementation of a dedicated driver-engineer position to drive and operate the heavy fire apparatus. This recommendation does not require additional personnel, but rather a reclassification of a minimum of nine firefighter positions (3 for each of the two engines and 3 for the aerial ladder).

Dispatch / Communications Center

(See pp. 39-45.)

The CPSM Fire Team concurs with the CPSM Police Team's CBPD PSAP/Communications Center recommendations as stated in the CPSM Police Analysis Report:

15. Restructure management/supervisory oversight of the Communications Center as follows: Reduce the Communications Center Manager to a one-half time position (the remaining time dedicated to management of the Records & Property and Evidence Section).
16. Move to fill the vacant Communications Supervisor position at the earliest opportunity and add a second Communications Supervisor to the authorized staffing level as soon as practical. This will allow for seven-days-a-week coverage, though not 24 hours per day.
17. As necessary, recruitment of experienced managers and supervisors from outside agencies should be considered. Highly experienced telecommunicators who are looking for advancement opportunities could be recruited and trained as first-line supervisors.
18. Increase authorized staffing of telecommunications officer positions by three for a total of 12 to enable staffing of all shifts as identified in the existing work schedule.
19. Increase the number of part-time telecommunications officers to four positions from two to add to the pool of personnel who can be called upon to fill staffing gaps, as necessary.
20. Consider training other department personnel to work in the limited role of call taker to increase the pool of personnel that can be called upon to fill staffing gaps, as necessary.

21. An additional CPSM recommendation includes the assignment of a fire tactical channel that is monitored by CBPD telecommunicators any time there is a complex/working multi-unit fire or EMS incident, or as requested by the fire incident commander.

Staffing / Effective Response Force

(See pp. 77-91.)

22. The CBFD and city should consider over the near/mid-term a minimum daily staffing of ten, which adds one person per shift and allows for staffing of three on Ladder 51 so that this apparatus can function as designed (ladder company) with a crew of three when responding with engine companies, or when responding as a single unit to engine company call types due to overlapping calls. Over the longer term, and due to the number of buildings over three stories in the city, and the CBFD's inability to assemble an Effective Response Force on building fires, CPSM recommends the CBFD and city consider placing a Quint apparatus at station 50 as a single resource out of this station and staffing this apparatus with a minimum of four, so that it may function as designed with two teams of two for assigned critical tasking either as an engine crew or truck crew, or other configurations deemed appropriate and safe, while working in two teams of two.
23. CPSM recommends the CBFD, to the extent possible and if practical depending on available automatic and mutual aid resources, work with regional Fire Chiefs to increase response resources to single family dwelling fires, strip mall/commercial, apartment, and high-rise fire responses that align more closely with CBFD policies and NFPA 1710 Effective Response Force standards for these building risks.

EMS

(See pp. 91-97.)

24. CPSM recommends the CBFD and the other agencies that are part of the Brevard County PSAP work with the leadership at Brevard County to take full clinical and safety advantage of using the MPDS system for response prioritization, mode, and clinical level of response.

MIH / CP

(See pp. 99-100.)

25. As there are program services made available that certain vulnerable and challenged residents may not otherwise be aware of or able to connect with, and because the Mobile Integrated Health/Community Paramedicine program provides enhanced quality-of-life services for the entire community, CPSM recommends the city continue to fund the MIH/Community Paramedicine. CPSM further recommends the program be expanded to four days/week with part-time staffing, and that the program coordinator work with the Medical Director and establish performance measures for the program that may include: improvement in the coordination of medical, behavioral, and social services for program clients; enhance existing healthcare system resources for program clients; assistance with resource gaps within the City of Cocoa Beach; and imp[roving the quality of care for program clients while reducing avoidable healthcare costs.

Lifeguard Services

(See pp. 100-106.)

26. Based on the current BCOR staffing challenges, and in review of current ocean rescue funding options and service levels as presented in the May 2023 letter from the county to the city, CPSM recommends the city continue to evaluate internal options to create an ocean rescue division within the CBFD. This evaluation should include analysis of viable funding options, ocean rescue workforce availability, service level, and service areas.

Distribution Analysis / Response Times

(See pp. 109-113.)

27. CPSM recommends the CBFD work with the CBPD 911 PSAP and with CBFD fire suppression personnel on improving call processing times (CBPD 911 PSAP) and turnout times (CBFD fire suppression personnel) with the goal of aligning more closely to NFPA 1710 90th percentile standards.

Station Siting

(See pp. 114-121.)

28. CPSM recommends the city and the CBFD continue to plan to relocate Station 50 due to the age, facility conditions, and inadequacies of the current station. The current planning for 5301 N. Atlantic Ave. does create a minor gap in NFPA 1710 travel time criteria and minor gaps in the ISO 1.5 mile engine company benchmark. However, the benefit of a contemporary fire facility on a major north-south throughfare outweighs these minor gaps.

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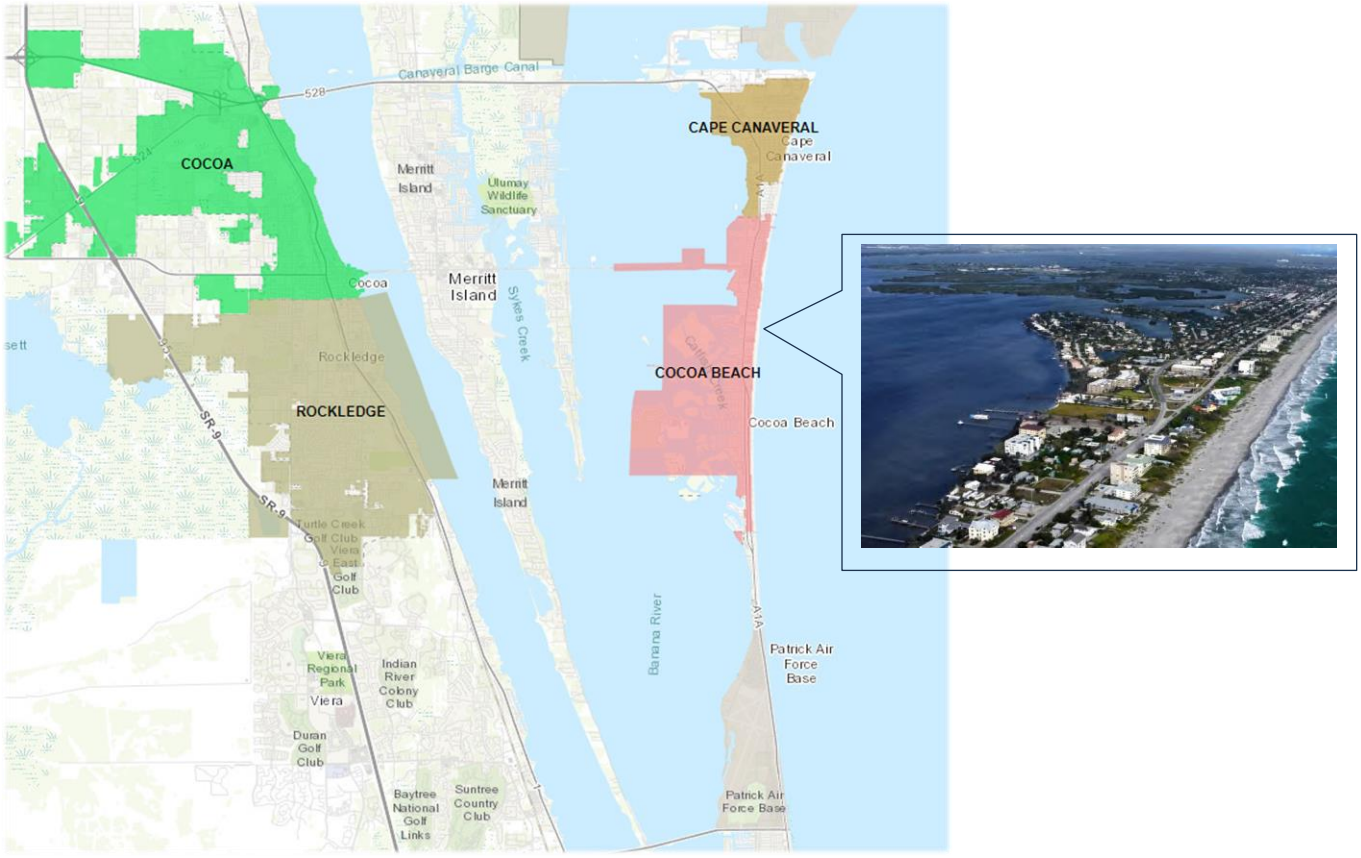
SECTION 2. AGENCY REVIEW, CHARACTERISTICS AND PROGRAMS

CITY OF COCOA BEACH AND CBFD OVERVIEW

Cocoa Beach is located on a barrier island on the Atlantic Coast of east central Florida in Brevard County. Cocoa Beach is contiguous with areas of unincorporated Brevard County to the north and south, as well as the City of Cape Canaveral to the north. The western border of the city is the Banana River, a lagoon which connects to the Intracoastal Waterway (Indian River) on its south end. A series of causeways and bridges along SR 520 directly connects the city with mainland Brevard County from east to west, as well as north through Cape Canaveral to SR 528 where again a series of causeways and bridges connects the barrier islands with mainland Brevard County.

The total area of the city is 15 square miles, and the 2020 Census showed a population of 11,354. The city is an attractive tourist, vacation, special event, and beachgoing destination, which increases the population of the city above the resident population on a daily basis by several thousand visitors. There are also seasonal residents, which increases the daily population during certain times of the year, again by several thousand people.

FIGURE 2-1: City of Cocoa Beach and Surrounding Jurisdictions



The city operates under a City Commission-City Manager form of government. In this form of government, the City Commission serves as the legislative branch of city government and the appointed City Manager administers policy as the executive officer of the city.[4,5] The City Manager is responsible for and manages the day-to-day operations of the city, which is also carried out through department heads and city employees.

Sec. 2-6 of the Cocoa Beach, Florida, City Ordinances establishes the city may have a paid fire department which shall consist of a fire chief and such number of firemen as the city commission may determine. The fire chief shall be the head of the fire department. He shall be appointed and removed by the city manager, subject to the approval of the city commission. The fire chief shall be under the direction and supervision of the city manager.

Sec. 2-6-2 of the Cocoa Beach, Florida, City Ordinances establishes it shall be the duty of the fire chief to aid in the enforcement of all city ordinances relating to the prevention and extinguishment of fires and the protection of life and property within the limits of Cocoa Beach; and to perform such other duties as may be lawfully required of him.

The Cocoa Beach Fire Department (CBFD) is a career fire department that employs full-time administrative, community risk reduction, training, support staff, and operational officers and firefighters. The CBFD deploys two engine companies, one truck company (Quint apparatus), one medium-duty rescue unit (cross-staffed), two surf rescue jet skis with companion all-terrain transport vehicles (cross-staffed), one small boat for canal/river responses (cross-staffed), and one operational District Officer (Captain) from two operational fire stations.

All fire suppression and cross-staffed units are staffed with Advanced Life Support (ALS) staff and life-saving equipment. The operational District Officer (Captain) serves as the city-wide on-duty operational command officer providing day-to-day operational supervision to assigned stations, as well as serving as the incident commander on assigned incident responses.

The Cocoa Beach truck company at Station 51 is a Quint (apparatus that has a fire pump; hose; water tank; engine and truck company equipment; and an elevated aerial device). Although it responds primarily as a ladder truck, it can also respond as an engine company as needed, giving the department versatility in apparatus.

There are 37 total positions budgeted for the CBFD in the FY 2023 budget. Of these positions 32 are full-time. Included in the position count are two part-time fire inspectors, two part-time paramedics, and 1 part-time administrative assistant. Twenty-seven personnel are assigned to shift operations (9 per shift). The city also operates with six fire suppression personnel funded through a Staffing for Adequate Fire and Emergency Response (SAFER) federal grant (2 positions per shift for a total of 6 grant-funded positions). This brings the daily shift staffing level to 11 per shift (33 total). Minimum staffing is nine per shift (current staffing allows for 2 personnel off per shift).

4. City of Cocoa Beach, FL
5. City of Cocoa Beach Charter, Sec. 2.07; Sec 2.08

The department's staffing/deployment model is as follows:

- Engine 50 – full staffing of 3; minimum staffing of 2.
  - (with SAFER – full staffing of 4; minimum staffing of 3.)
- Engine 51 – full staffing of 3 minimum staffing of 2.
  - (with SAFER – full staffing of 3; minimum staffing of 3.)
- Tower 51 – full staffing of 2; minimum staffing of 2.
  - (with SAFER – full staffing of 3; minimum staffing of 2.)
- District Officer (Captain) 50-full staff of 1; minimum staff of 1

Minimum staffing is nine/day and allows for two personnel off per shift on scheduled or unscheduled leave

In Cocoa Beach, CPSM notes that the traditional operational shift District/Battalion Chief role is titled District Captain and filled by a Captain. The more traditional title and role for these positions in Brevard County is District Chief (all departments in Brevard County utilize this title/postion). As there is regular mutual/automatic aid, it is important for all departments to identify these command positions similarly by rank and responsibility to avoid confusion.

Funding for the six SAFER grant positions expires in July 2026. The city plans to fund these positions as full-time employees, increasing the FTE count to 38 full-time.

Administrative, EMS oversight, training and support services, and community risk reduction staff and functions operate from Station 51, which includes administrative office space.

The CBFD is led by a Fire Chief who has overall responsibility for the management and leadership of the department as outlined in the city code of ordinances. The Fire Chief is assisted by a Deputy Fire Chief who is a direct report. Additional support to the Fire Chief includes civilian administrative and technical support staff who have assignments that include logistics and public records custodianship. The Fire Chief's staff also includes a Division Chief of EMS & Community Paramedicine, and a Division Chief–Fire Marshal.

The Deputy Chief manages the three operational shifts as described above. This includes all operational components and staffing. There is one operational District Officer (Captain) on duty each day. Additionally, the Division Chief of EMS & Community Paramedicine, and the Division Chief–Fire Marshal report to the Deputy Chief.

The Division Chief of EMS & Community Paramedicine manages the planning and implementation of assigned programs. This includes planning for and implementing department-wide fire and EMS training and education and liaison with regional and state partners to ensure the department meets and/or exceeds required and contemporary training required of their positions. As the overall department EMS director, the Division Chief of EMS & Community Paramedicine manages all EMS activities to include quality assurance of patient care, liaison with the private EMS provider and the department's Medical Director; planning and implementing protocols, guidelines, and associated training; and associated EMS program work such as the community paramedicine program. The community paramedicine program is coordinated and managed by a part-time community paramedic.

The Division Chief–Fire Marshal manages the department's community risk reduction activities (fire prevention) and fire origin and cause determination program, to include arson investigation. The community risk reduction component is responsible for fire prevention code enforcement, fire protection plans review, and fire and life safety education. This division includes two part-time positions (Fire Inspectors) to assist with the program work as described above.

The key elements of the CBFD include:

- Fire protective services.
- EMS first-tier response (ALS level).
- Fire prevention, fire code enforcement, fire protection plans review.
- Fire cause and origin/arson investigation.
- Technical rescue/surface water response and mitigation.
- Hazardous materials response and mitigation.
- Community outreach and life safety education.
- Employee training and education.
- Fleet, facility, and logistical support and management.
- Special event support.

FIGURE 2-2: CBFD Organizational Chart

Note: Each District Officer (Captain) is assigned to one of the following functions: Fleet, Facilities, Special Events Coordinator.

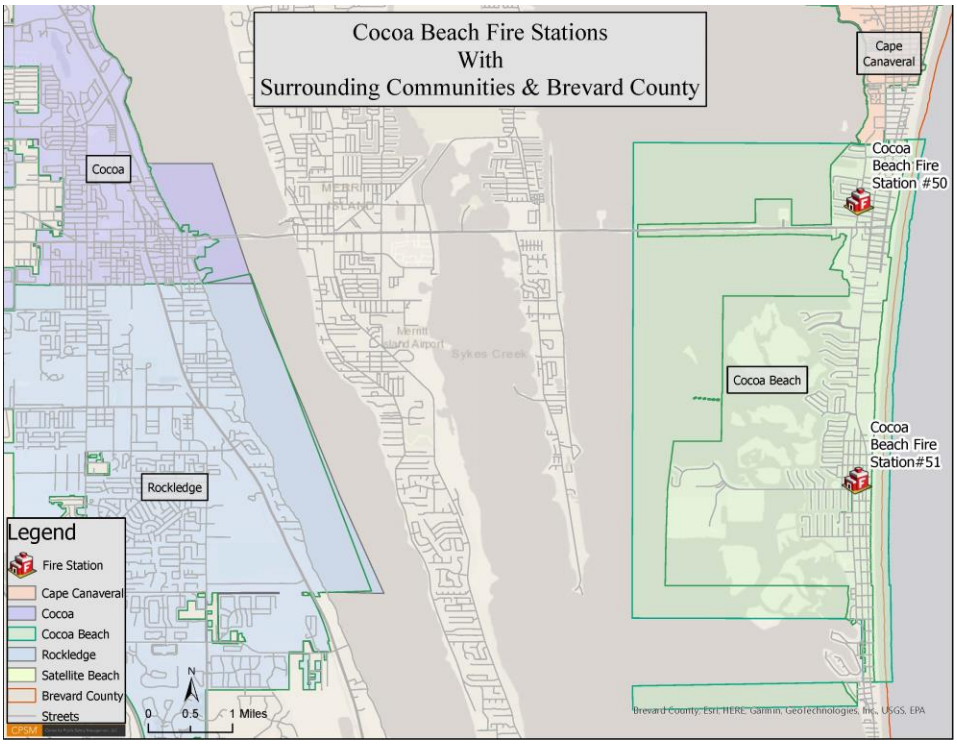
Recommendation:

- CPSM recommends the city consider changing the operational District Officer position title (Captain level) to District Chief, so that this position better aligns with all other fire departments in the county and that of a contemporary fire department. This potentially will require additional funding and updating the IAFF contract. (Recommendation No. 1.)

CBFD SERVICE AREA AND CALL DEMAND

The service area for the CBFD includes 15 square miles of urban and suburban neighborhoods that include single-family and multifamily residential buildings of varying number of floors and heights; commercial buildings; industrial buildings; parks; arterial and collector roads; the Atlantic Ocean, a large lagoon, and many canals; a pier with commercial space; a marina; and a hospital.

FIGURE 2-3: City of Cocoa Beach Boundaries and Fire Station Locations



CBFD Primary Response Resources

Station 50
Engine 50

Station 51
Engine 51
Tower 51
District 50
Squad 51
Ski 1/Beach 50
Ski 2/Beach 51
Island 51 (14' Boat)
Brevard County FD
EMS Transport Unit

Squad 51, Ski 1, Ski 2, and Island 51 are cross staffed with crews from Engine 51 and Tower 51.

The service demands on the department generated from the service area are numerous and include EMS first response; fire suppression; technical rescue; hazardous materials; transportation emergencies; surface water emergencies; and non-emergency responses typical of an urban/suburban fire department.

CPSM analyzed CBFD workload for a one-year period (November 1, 2021, to October 31, 2022). In all, the CBFD responded to 2,876 incidents during this time period as outlined in the following table.

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TABLE 2-1: CBFD Fire Incident Workload by Call Type

Call Type	Total Calls	Calls per Day
False alarm	221	0.61
Good intent	26	0.07
Hazard	78	0.21
Outside fire	16	0.04
Public service	435	1.19
Structure fire	14	0.04
Technical rescue	99	0.27
Fire Subtotal	**889**	**2.44**

31% of all calls

TABLE 2-2: CBFD EMS Workload by Call Type

Call Type	Total Calls	Calls per Day
Medical call	1,758	4.82
MVA	84	0.23
EMS Subtotal	**1,842**	**5.05**

64% of all calls

Included in the overall workload are canceled calls, which are calls the CBFD was dispatched to, but which were canceled while responders were en route or prior to responding (issue resolved and CBFD not needed). There were 105 canceled calls during the study period. Additionally, the CBFD provided 40 automatic/mutual aid responses to neighboring jurisdictions.

Analyzing where the fire and EMS incidents occur, and the demand density of fire and EMS incidents, helps to determine adequate fire management zone resource assignment and deployment. The following figure illustrates all fire and EMS demand in the city for the one-year study period.

As indicated in these demand maps, both fire districts have dense fire and EMS call demand. In terms of overall workload, Station 50 had 1,537 calls for service and Station 51 had 1,299 calls for service. The highest density of calls is concentrated in the proximity of both fire stations.

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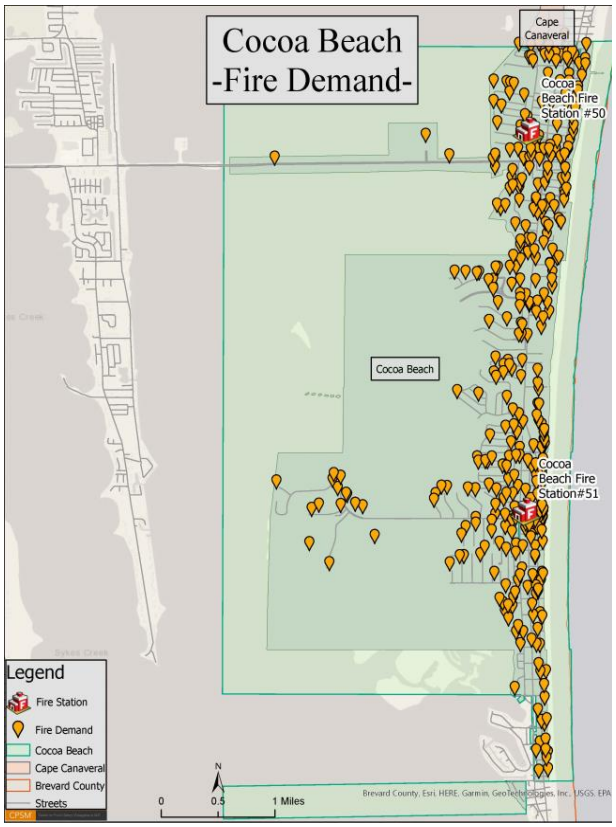
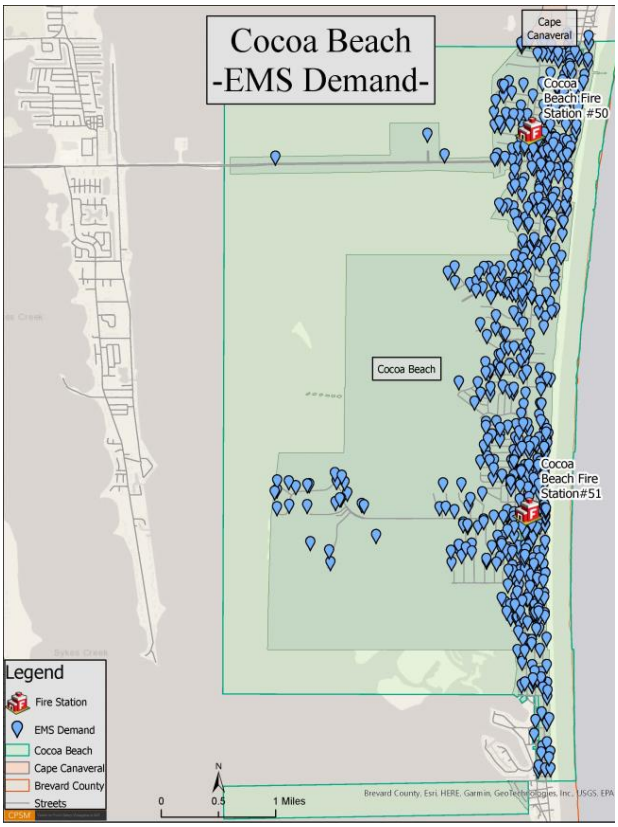
FIGURE 2-4: Fire and EMS/MVA Call Demand

Fire Demand



EMS Demand



ISO-PPC COMMUNITY RATING

In 2016, the City of Cocoa Beach received a Class 2 Public Protection Classification (PPC) rating from ISO, a subsidiary of Verisk Analytics. The Verisk hazard mitigation team collects and evaluates information from communities across the United States regarding their capabilities to provide municipal fire protection. This information is analyzed utilizing the Fire Suppression Rating System from which individual section credits and points are tabulated and a Public Protection Classification for the community is assigned. Classifications range from 1 through 10, with a rating of 1 being the highest rating a community can achieve.[6]

It is important to understand the PPC is not just a fire department classification, but a compilation of community services that include the fire department; the emergency communications system; the water supply system that includes an evaluation of available water matched to the amount needed to suppress fires (referred to as fire flow); and community efforts to reduce the risk of fire, including fire prevention codes and enforcement, public fire safety education, and fire investigation programs.[7]

A high rating does not always guarantee a lower property insurance rating as many factors feed into the formulas that insurance companies utilize to determine rates. However, a PPC rating of

6. Verisk's Community Hazard Mitigation Services (isomitigation.com)
7. Ibid.

1, 2, or 3 alerts the property insurance underwriter that the service area of that fire department is well-equipped, positioned, and staffed to extinguish, mitigate, and prevent fires. Additionally, although insurance companies may use the Verisk / ISO-PPC information when deciding property insurance premiums, Verisk-ISO has nothing to do with insurance premium pricing.

A community's PPC grade depends on:

- **Needed Fire Flows** (building locations used to determine the theoretical amount of water necessary for fire suppression purposes). The needed fire flow in Cocoa Beach is 3,500 gallons per minute. This is based on the fifth-largest needed fire flow in the city.
- **Emergency Communications** (10 percent of the evaluation).
- **Fire Department** (50 percent of the evaluation).
- **Water Supply** (40 percent of the evaluation).

The City of Cocoa Beach's 2016 report included the following credit points by major category:

- **Emergency Communications**: 10.00 earned credit points/10.00 credit points available.
- **Fire Department**: 35.54 earned credit points/50.00 credit points available.
- **Water Supply**: 33.63 earned credit points/40.00 credit points available.
- **Community Risk Reduction** (Fire Prevention/Inspection, Public Education, and Fire Investigation activities): 4.72 earned credit points/5.50 credit points available.

Overall, the community PPC rating yielded 81.29 earned credit points out of 105.50 credit points available. There was a -2.60 point diversion reduction assessed as well, which is automatically calculated based on the relative difference between the fire department and water supply scores.

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The following table outlines the scoring for CBFD's 2016 ISO-FSRS components.

TABLE 2-3: Cocoa Beach ISO Earned Credit Overview, 2016

FSRS Component	Earned Credit	Credit Available
414. Credit for Emergency Reporting	3.00	3
422. Credit for Telecommunicators	4.00	4
432. Credit for Dispatch Circuits	3.00	3
440. Credit for Emergency Communications	**10.00**	**10**
513. Credit for Engine Companies	5.74	6
523. Credit for Reserve Pumpers	0.50	0.50
532. Credit for Pump Capacity	3.00	3
549. Credit for Ladder Service	1.59	4
553. Credit for Reserve Ladder and Service Trucks	0.00	0.50
561. Credit for Deployment Analysis	7.30	10
571. Credit for Company Personnel	6.41	15
581. Credit for Training	9.00	9
730. Credit for Operational Considerations	2.00	2
590. Credit for Fire Department	**35.54**	**50**
616. Credit for Supply System	23.63	30
621. Credit for Fire Hydrants	3.00	3.00
631. Credit for Inspection and Flow Testing	7.00	7
640. Credit for Water Supply	**33.63**	**40**
Divergence	-2.60	-
1050. Community Risk Reduction	4.72	5.50
Total Credit	**81.29**	**105.50**

This ISO-PPC report is seven years old and thus should be renewed in the near term so that the CBFD can adequately assess where improvements have/can be made.

The next figures illustrate ISO-PPC ratings countrywide and in the State of Florida.

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FIGURE 2-5: PPC Ratings in the United States[8]

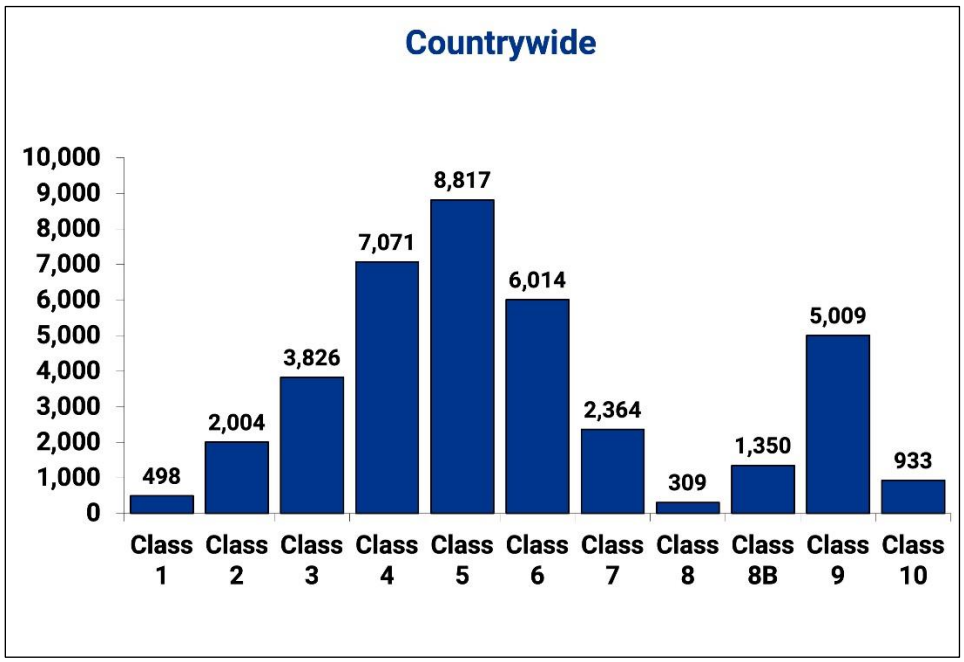
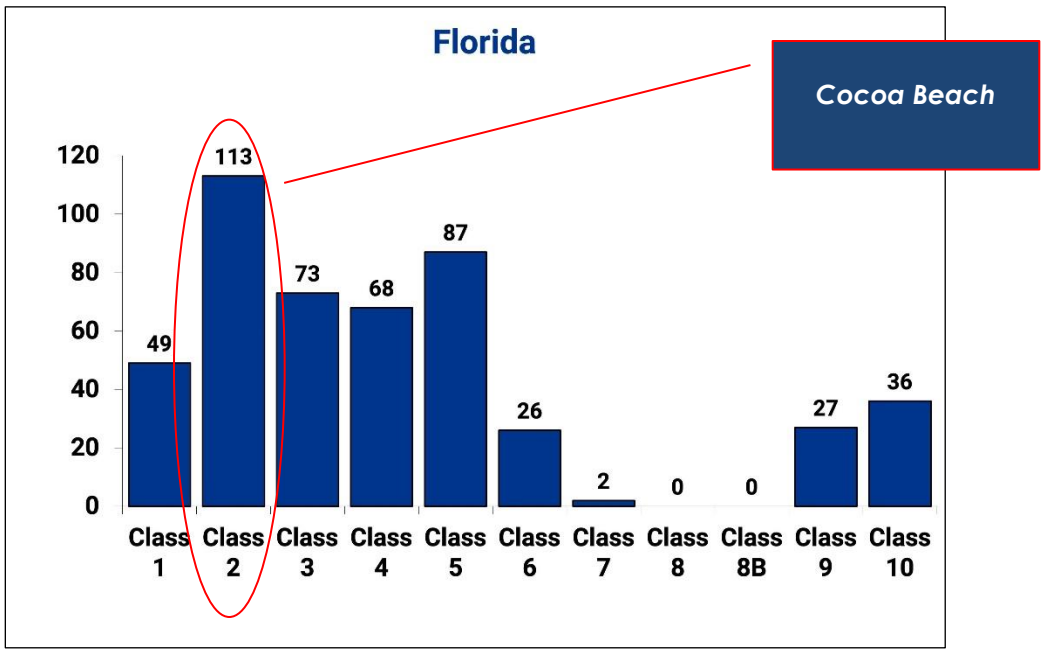


FIGURE 2-6: PPC Ratings in Florida[9]



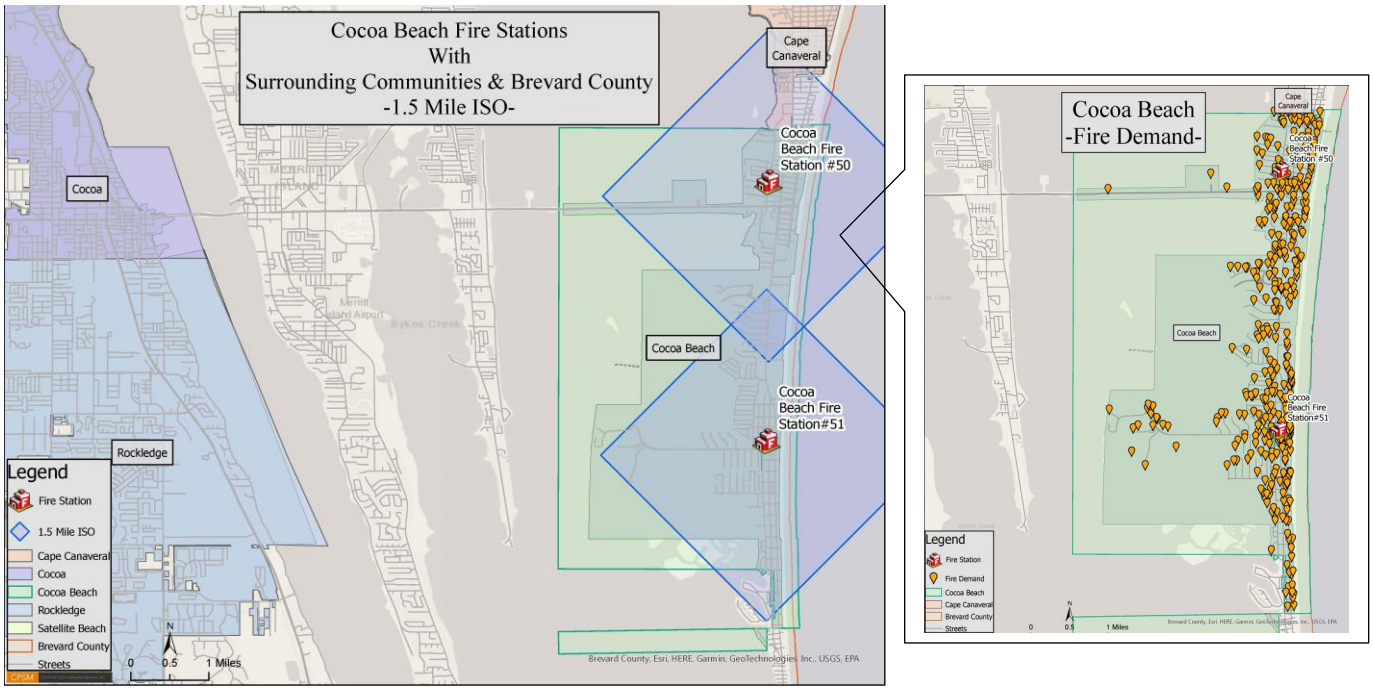
8. https://www.isomitigation.com/ppc/program-works/facts-and-figures-about-ppc-codes-around the country/
9. Ibid.

Under the ISO-PPC grading system, a jurisdiction is graded on the distribution of engine and ladder companies within built-upon areas (deployment analysis). For full credit in the Fire Suppression Rating Schedule (FSRS), a jurisdiction's fire protection area with residential and commercial properties should have a first-due engine company within 1.5 road miles and a ladder service company within 2.5 road miles.[10] As engine and ladder companies both respond from fire facilities, and because engine companies are the more prevalent fire suppression company, fire facilities are predictably sited based on the response needs of engine companies.

The next figures illustrate ISO-PPC engine and ladder company distribution in Cocoa Beach. From these maps we can see there is appropriate coverage in terms of the 1.5-mile engine company station placement. The 2.5-mile coverage for ladder company placement is also appropriate, with only a minor deficiency in the northern-most built-upon area of the city.

FIGURE 2-7: Cocoa Beach Engine Company Coverage per the ISO Benchmark

Cocoa Beach Engine Company
1.5 Mile Benchmark



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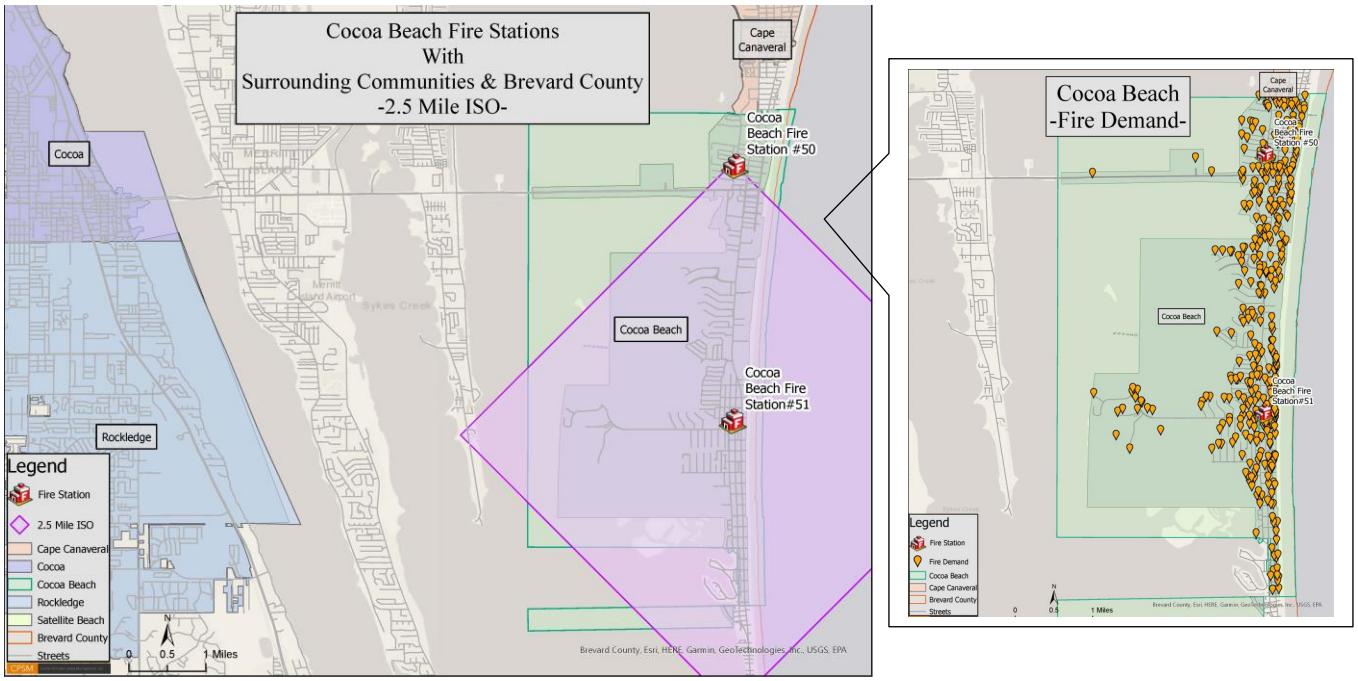
10. Insurance Services Office, ISO Mitigation, Deployment Analysis.

FIGURE 2-8: Cocoa Beach Ladder Company Coverage, ISO Benchmark



The CBFD is to be commended for achieving 9.00 credits/9.00 for training. This is an outstanding score in this category and directly reflects the commitment the department has for preparedness and response to emergencies.

The city is also to be commended for the commitment it takes to maintain a high-performing municipal water supply utility (fire hydrants in the ISO-PPC analysis). The city achieved maximum credit points for hydrant inspection and flow testing. Additionally, the 911 PSAP, which is a division in the Cocoa Beach Police Department, achieved near-maximum credit points for emergency communications. The commitment to ensure contemporary emergency reporting components, dispatch circuits, CAD system, and facility are maintained, and ensuring appropriate telecommunicator staffing, resulted in 10.00/10.00 credit points for this category.

Although the current ISO-PPC is dated, areas of scoring that should be reviewed further internally by the city and the CBFD to ensure improvement has been made, and which can have the most impact on service delivery include:[11]

- Ladder Service: #549 (1.59/4 credits). This item reviews the number of response areas within the city with five buildings that are three or more stories or 35 feet or more in height, or with five buildings that have a needed fire flow greater than 3,500 gpm, or any combination of these criteria. The height of all buildings in the city, including those protected by automatic sprinklers, is considered when determining the number of needed ladder companies. The city is deficient in this category due to the number and type of multistory buildings in the city

11. Public Protection Classification Summary Report, Cocoa Beach, FL, September 2016.

(residential). CBFD does have automatic/mutual aid agreements in place that include additional ladder service for the city. These agreements should be maintained.

- Company Personnel: # 571 (6.41/15). This item reviews the average number of firefighters and company officers available to respond to reported fires alarm structure fires in the city. The ISO report gives credit for 7.4 on-duty personnel and considers any mutual aid companies available to respond as well (as stated above-these agreements should be maintained). On-duty strength and subsequent credit considers the yearly average of total firefighters and company officers on duty after considering scheduled and unscheduled leave. The CBFD is deficient in this category since the department's minimum daily staffing is nine. This is discussed further in the operations section of this report.

ISO-PPC Community Rating Recommendation:

- As the current ISO-PPC report is almost seven years old, CPSM recommends the CBFD contact the ISO and schedule and prepare for a community fire protection review. (Recommendation No. 2.)

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TRAINING AND EDUCATION

[Training is, without question, one of the most essential functions that a fire and EMS department should be performing on a regular basis. One could even make a credible argument that training is, in some ways, more important than emergency responses because a department that is not well-trained, prepared, and operationally ready will be unable to fulfill its emergency response obligations and mission. Education and training are vital at all levels of fire service operations to ensure that necessary functions are completed correctly, safely, and effectively. A comprehensive, diverse, and ongoing training program is critical to the fire department's level of success.

An effective fire and EMS department training program must cover all the essential elements of that department's core missions and responsibilities. The level of training or education required, given a set of tasks, varies with the jobs to be performed. The program must include an appropriate combination of technical/didactic training, manipulative or hands-on/practical evolutions, and training assessment to gauge the effectiveness of these efforts. Most of the training, but particularly the practical, standardized, hands-on training evolutions should be developed based upon the department's own operating procedures and operations while remaining cognizant of widely accepted practices and standards that could be used as a benchmark to judge the department's operations for any number of reasons.

Certain Occupational Safety and Health Administration (OSHA) regulations dictate that minimum training must be completed on an annual basis. The State of Florida does not operate an approved state OSHA program for public employees at the state or political sub-division (e.g., municipal) level. OSHA Regulations and Standards Regulated employers located in the State of Florida are governed by the Federal OSHA health and safety standards found in the 29 Code of Federal Regulations (CFR). As such, the CBFD should ensure the following are included in the training matrix and program requirements for all uniform personnel:

- Annual review of the respiratory protection standard, self-contained breathing apparatus (SCBA) refresher and user competency training, SCBA fit testing (29 CFR 1910.134).
- Annual Blood Borne Pathogens Training (29 CFR 1910.1030).

Other training requirements the CBFD must manage include:

- The ISO-PPC has certain training requirements for which fire departments receive credit during the ISO-PPC review.
- Fire and EMS training requirements governed by the Florida Bureau of Fire Standards and Training, and the Florida Department of Health for initial and maintenance of required position certifications.
  - Fire certifications include but are not limited to Florida Firefighter (Minimum Standards-FF I/II); Fire Inspector (I, II, III); Fire Instructor (I, II, III); Fire Investigator; Fire Officer (I, II, III, IV); Live Fire Training Instructor I, II; Hazardous Materials Technician; Rescue Specialist (various disciplines); Pump Operator; Incident Safety Officer; Health and Safety Officer; and Fire and Life Safety Educator.
  - EMS certifications and licensing includes EMT and Paramedic.
    - CBFD policy EMSO-310.01-2021 addresses EMS certifications for CBFD staff.

Because so much depends upon the ability of the emergency responder to effectively deal with an emergency, education and training must have a prominent position within an emergency responder's schedule of activities when on duty. Education and training programs also help to create the character of a fire service organization. Agencies that place a real emphasis on their training tend to be more proficient in performing day-to-day duties. The prioritization of training also fosters an image of professionalism and instills pride in the organization. Overall, the CBFD has a planned training program and there exists a dedicated effort focused on a wide array of training activities for all three shifts. ***This is noted in the ISO-PPC evaluation as well.***

Training and education in the CBFD are managed by a Division Chief who reports to the Deputy Chief. The Division Chief is supported by a shift Lieutenant who serves as the EMS lead training officer; three firefighter/paramedics who serve as shift EMS training leads; a shift Lieutenant who serves as the Fire/USAR lead training officer; a firefighter/paramedic who serves as the water rescue lead; and three Lieutenants/paramedics who serve as shift fire training leads. Together this group coordinates and implements the various fire and EMS training for the department. The Division Chief works with the Medical Director as well to coordinate and plan for EMS training. The CBFD also invites in external instructors for specialty training as needed/requested.

CBFD training typically takes place on-site at CBFD fire stations and is led by station officers. This is typical in fire departments across the country. Multicompany training and specific building or risk training occurs on-site at the actual building or identified risk, such as surface water rescue. Much of the multicompany live fire company-level practical training is developed and coordinated by station officers and the fire and EMS Lieutenant training leads.

In addition to the above, Station 51 is a recognized training facility by ISO because of the training tower built into the station. CBFD also trains at the Cocoa Beach Public Works Facility, where certain props are located and can be set up for live hands-on training. Also available to the CBFD is the Cape Canaveral Maritime Fire Academy, which is located at the port. CBFD has access to this facility and training, which includes confined space and shipboard firefighting as well as Class A and Class B burn buildings and a training tower.

The CBFD also has a number of technical rescue study guides for new employees, prospective apparatus drivers, and officers. These guides are detailed and thorough and provide performance expectations and general and operational specific procedures and guidelines. The CBFD has also established a series of probationary firefighter exams that test the probationary firefighter in the fundamentals of firefighting and application of certain technical

aspects of the job. These examinations are linked to a final practical-hands on examination of the same.

Professional development occurs outside of the required state certifications. Department staff can participate in training opportunities at the National Fire Academy in Emmitsburg, Maryland, as well as Florida Bureau of Fire Standards and Training, and Florida Department of Emergency Management course offerings. Staff must be approved for these courses and any cost or time off must be approved as well.

As discussed in this report, the CBFD achieved maximum credit points for the training section of the ISO-PPC community evaluation. This is attributed to the commitment of CBFD leadership and personnel to focus on preparedness and effectively mitigating emergencies.

Training Recommendation:

- CPSM recommends the CBFD continue to support and budget for external training opportunities on a state and national level (National Fire Academy and Emergency Management Institute). CPSM further recommends the CBFD continue with its robust training program to sustain maximum credit points on future ISO-PPC community rating evaluations. (Recommendation No. 3.)

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COMMUNITY RISK REDUCTION

Community Risk Reduction activities are important undertakings of a modern-day fire department. A comprehensive fire protection system in every jurisdiction should include, at a minimum, the key functions of fire prevention, code enforcement, inspections, and public education. Preventing fires before they occur, and limiting the impact of those that do, should be priority objectives of every fire department.

Fire investigation is a mission-important function of fire departments, as this function serves to determine how a fire started and why the fire behaved the way it did, providing information that plays a significant role in future fire prevention efforts.

Educating the public about fire safety and teaching them appropriate behaviors on how to react should they be confronted with a fire or other life safety emergency is also an important life-safety program deliverable of the fire department.

Fire suppression and response, although necessary to protect property, have negligible impact on preventing fire. Rather, it is public fire education, fire prevention, and built-in fire protection systems that are essential elements in protecting citizens from death and injury due to fire, smoke inhalation, and carbon monoxide poisoning. The fire prevention mission is of utmost importance, as it is the only area of service delivery that dedicates 100 percent of its effort to the reduction of the incidence of fire.

Fire prevention should be approached in a systematic manner, and many community stakeholders have a personal stake and/or responsibility in these endeavors. It has been estimated that a significant percentage of all the requirements found in building/construction and related codes are related in some way to fire protection and safety. Various activities such as plan reviews, permits, and inspections are often spread among different departments in the municipal government and are often not coordinated nearly as effectively as they should be. Every effort should be made to ensure these activities are managed effectively between departments.

The Fire Marshal (Division Chief), two part-time fire inspectors, and on-duty fire suppression shift inspectors staff the Office of the Fire Marshal (previously the division had a third part-time inspector to assist with the inspection caseload). Together these positions handle cause and origin fire investigations and fire code enforcement, plans review, and related fire code work. There are no positions dedicated to public life safety education and no dedicated position to assist with the administrative functions of the community risk reduction division. In addition to this staff, there are two shift District Officers (Captains) who are certified Fire Investigators and who assist with origin and cause when on duty. The State Fire Marshal's Office is also available to assist the CBFD with origin and cause and fire investigations.

At the time of this analysis the CBFD Fire Marshal's Office was utilizing the following building and fire codes:

- **Fire Code**: NFPA 1 2018 Edition, NFPA 101 2018 Edition, Florida Fire Prevention Code (Seventh Edition), Cocoa Beach City Charter (Chapter 9 Fire Prevention).
- **Building Code**: Florida Building Code 2020 (Seventh Edition).

The CBFD has policies in place that govern and set forth standards for fire code enforcement and fire investigations. These include:

- AO-190.01-2017: Suspicious Fires.
- AO-190.02-2017: Fire Investigations Cost & Recovery.
- AO-190.03-2017: Fire Investigations.
- AO-190.04-2017: Fire Inspections.

At the time of this report, there were 900+ occupancies in Cocoa Beach that require fire code inspections. Additionally, there are transient rental occupancies that require a Business Tax Receipt (BTR) initial inspection, and annual inspections thereafter. Transient rental property inspections create added demand, which in a tourist community such as Cocoa Beach is separate from the regular workload of the fire prevention section. Annual inspections of other occupancies are required pursuant to the adopted fire code and the Florida Fire Prevention Code for certain public assembly, educational, high hazard, institutional occupancies, and other specified occupancies. These may include occupancy inspections and/or inspection of fire protection system inspection/testing documents to ensure compliance with the fire code.

CBFD has established policy through AO-190.04-2017 regarding frequency of fire inspections (***a best practice***) and includes:

- All *High-Hazard* occupancies shall be inspected annually.
- All *Medium-Hazard* occupancies shall be inspected at least every two years.
- Every *Low-Hazard* occupancy shall be inspected at least every three years.

In addition to the staff in the Fire Marshal's Office, CBFD also has implemented an engine company fire inspection program. This is allowable under 633.216(3) of the Florida State Statutes:

A firefighter certified pursuant to s 633.408 may conduct fire safety inspections, under the supervision of a certified fire safety inspector, while on duty as a member of a fire department company conducting in-service fire safety inspections without being certified as a fire safety inspector, if such firefighter has satisfactorily completed an in-service fire department company inspector training program of at least 24 hours' duration as provided by rule of the department.

Under this program, fire suppression personnel conduct fire safety inspections in multi-residential buildings as well as existing business and mercantile occupancies. ***This is a best practice*** as it not only benefits the fire prevention and public education function, but also gets fire suppression personnel into these buildings where they can also conduct pre-fire planning and building familiarization training. Fire suppression level inspections are reviewed by Fire Marshal's Office staff for quality assurance, and to assist with follow-up inspections if required.

The following table provides a snapshot of CBFD fire code inspections over the most recent three-year period.

TABLE 2-4: CBFD Fire Marshal's Office Fire Inspections Completed

2020	2021	2022
357	226	327

The investigation of the cause and origin of fires is also an important part of a comprehensive fire prevention system. Determining the cause of fires can help with future prevention efforts. Officers on scene initiate the fire origin and cause determination process. When needed, particularly when the on-scene officers cannot determine the origin and cause of the fire, or they believe a crime has been committed, the Office of the Fire Marshal is notified and will respond to determine the cause and origin of the fire. The next table provides a historical analysis of CBFD fire investigations.

TABLE 2-5: CBFD Fire Marshal's Office Fire Investigations

2020	2021	2022
5	3	3

The Fire Marshal's Office also conducts building plan reviews to ensure fire protection and fire code elements are met pursuant to the adopted fire and building code. These include:

- Site Plans.
- Automatic Extinguishing Systems/Non-Sprinkler.
- Fire Sprinkler Systems.
- Bi-directional Amplifiers.
- Fire Alarm and Fire Detection Systems.
- Fire Protection Pumps and Related Equipment.
- Standpipe Systems.
- Underground fire lines.

The following table provides the total number of plan reviews conducted by the Fire Marshal's Office over the most recent three-year period.

TABLE 2-6: CBFD Fire Marshal's Office Plan Reviews

2020–2022
1,178

It should be noted that many plan reviews, particularly those involving fire protection systems, site plan review, and fire department ingress and egress require a final fire inspection, which are coordinated and conducted by the Office the Fire Marshal as well.

Neither the Office of the Fire Marshal nor the CBFD has a robust life safety education component. As stated earlier, educating the public about fire safety, and teaching them

appropriate behaviors on how to react should they be confronted with a fire or other life safety emergency is an important program deliverable of the fire department. That said, the CBFD participates in the city's Citizen Academy (5-days scheduled throughout the program), public education in schools during fire prevention week (October each year), and as needed a Juvenile Fire Setter Program.

The Office of the Fire Marshal in Cocoa Beach conducts regular fire code inspections and re-inspections, plans review, and plans review inspections, issues permits as required, and answers fire code complaints. According to the Fire Marshal, not all occupancies in Cocoa Beach are inspected according to AO-190.04-2017 as outlined above, which is reflected in the data provided. It is important that occupancies requiring annualized inspections be completed as a priority; however, the fire code/community risk reduction program cannot end there. Through a realistic and comprehensive fire code inspection plan, those occupancies not included as required in the annual inspection plan should be inspected bi-annually or others tri-annually as allowable though local and state laws. This will ensure these occupancies are inspected on a regular basis.

Community Risk Reduction Recommendation:

- CPSM recommends the city and CBFD consider including in any future planning a focus on Community Risk Reduction that includes the expansion of public life safety education programs targeting vulnerable residential populations and those residents (permanent, sesaonal, and visiting) living in multistory housing units. These programs should be aimed at educating these populations how to prevent and respond to fire incidents, and how to prevent unitentional injury and death. In the short term there should be a commitment to the current fire prevention code enforcement plan that ensures the completion of required annualized inspections, transient rental inspections, and the remaining occupancy types through scheduling bi-annual and tri-annual inspections of these occupancies. This commitment should include the expansion of fire code enforcement staff by adding one full-time fire prevention code inspector so that the demand and critical nature of current and future inspectable properties can be met. (Recommendation No. 4.)

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EMERGENCY MANAGEMENT

Emergency management is the discipline of dealing with and avoiding risks. Its role in the community is to assess and prepare for current risk conditions, to proactively take steps to mitigate those risks, and to respond/recover should an emergency situation occur. Further, through the crucial roles of planning and preparedness and the coordination of response and management of resources, emergency management plays a major role in mitigating the impacts of disasters.

The City Manager serves as the Emergency Manager in Cocoa Beach and the Fire Chief serves as the Emergency Coordinator. This is in line with Section 252.38 of the Florida State Statutes. Sec. 8.5 of the Cocoa Beach Code of Ordinances outlines authority and law regarding emergency management for the city to include designating a state of emergency; authority of a designated official to carry out certain duties and responsibilities required to protect the health, safety, and welfare of the community; authority of the City Commission; and violations or non-compliance of the rules set forth in the Code of Ordinances during a state of emergency.

Pursuant to Sec. 8.5.1 of the Cocoa Beach Code of Ordinances and Chapter 252 of the Floridia, in the event of a state of emergency, when a quorum of the City Commissioners is unable to

meet within a reasonable time in relation to the nature of the emergency, the Mayor or Vice-mayor in their absence, or the City Manager, or his designee, in the absence of the Mayor or Vice-mayor, is empowered to declare a local state of emergency whenever they shall determine that a natural or manmade disaster or emergency has occurred or that the occurrence or threat of one is imminent and requires immediate and expeditious action.

The emergency management community consists of many organizations (local, state, military, nonprofit, federal, and private). Examples of organizations that interact with a local Emergency Management Office include: the Federal Emergency Management Agency (FEMA), local fire and EMS agencies, local public works departments, emergency communications centers (i.e., 911-dispatch), emergency management agencies at the municipal and state level, public health agencies, Coast Guard, National Guard, local and state law enforcement, public works, non-profits, and the American Red Cross.

As a coastal community, Cocoa Beach is vulnerable to Atlantic storm systems and other emergencies requiring a coordinated response. As such, the city has a Comprehensive Emergency Management Plan (CEMP), which was developed and implemented in April 2016. A CEMP outlines the prevention, mitigation, preparedness, response, and recovery phases from potential natural or manufactured disasters or emergencies. A document such as this assigns responsibilities to individuals or groups and determines how actions, internally and externally, will be coordinated.[12] CPSM reviewed the City's CEMP document and found the content valid but in need of updating.

Emergency Operations Center (EOC)

The City Emergency Operations Center (EOC) or City Operations Center is located in the Cocoa Beach Fire Department headquarters area at Station 51. When not used as an EOC, this area is utilized as the CBFD training room. When activated in an emergency, this space serves as the central command and control point for emergency-related operations for the city. The room is used regularly for training and administrative conferences and is not set up for immediate EOC use. According to CBFD officials, this area can be set up quickly to serve as an EOC.

During an emergency, particularly one that involves multiple agencies and where a central command and control in accordance with the CEMP is established and implemented, a functional area (operations room) is required for the assembling of assigned personnel. This area requires enough room so that individuals can plan and direct their specific response, mitigation, and/or recovery sections, and includes communication via telephone and computer software available at each critical function working area, functioning utilities with uninterrupted power supply and emergency generator, and located in a facility that is accessible to staff and with adequate parking. Ideally an EOC is set up and functional at a moment's notice. Additional areas for consideration include planning areas, facilities to include areas to rest for 24-hour operations, and a break area away from the operations room for nourishment.

Staffing, equipment, materials, and infrastructure considerations required in the set-up and continual operation of an EOC are many yet scalable to the size of the EOC, whether it is a permanent facility/area or a shared space, and what may work best for the locality, in this case the City of Cocoa Beach.

FEMA has published a quick reference guide for the location, set-up, operations, suggested staffing, equipment, materials, and infrastructure of an EOC. This manual can be accessed and downloaded as a guide for city officials as they continue to make improvements to their existing

12. Developing and Maintaining Emergency Operations Plans, FEMA, 2010.

EOC, and for use should the city at some point in the future consider relocating the EOC. The link to this document is:

https://www.fema.gov/sites/default/files/documents/fema_eoc-quick-reference-guide.pdf

National Incident Management System (NIMS)

While threat/hazard-based planning is conducted by the county (Hazard Summaries Plan) and the city, Cocoa Beach should be fully compliant with the National Incident Management System (NIMS) training components for employees with response and/or EOC assignments. The primary components are Fundamentals and Concepts, Resource Management, Command and Coordination, and Communications and Information Management. The NIMS training classes listed below are designed to educate response personnel in the fundamentals of incident management, as well as the application of the NIMS components in their home jurisdiction.

NIMS guides all levels of government, nongovernmental organizations, and the private sector to work together to prevent, protect against, mitigate, respond to, and recover from incidents.[13]

NIMS provides stakeholders across the entire community with the shared vocabulary, systems, and processes to successfully deliver the capabilities described in the National Preparedness System. In addition to the benefits of a coordinated response as outlined above, federal preparedness and other federal grants (including state pass-through in some instances) to a local entity is contingent on that entity being NIMS compliant.

The City of Cocoa Beach should be NIMS compliant as follows:

- NIMS ISC-100: Introduction to Incident Command System:
  - All city employees with response and/or EOC assignments, and public safety staff.
  - Independent study program offered through FEMA's Emergency Management Institute. http://training.fema.gov.nims
- NIMS ISC-200: ICS for Single Resources and Initial Action Incidents:
  - All city employees with response and/or EOC assignments, and public safety staff.
  - Independent study program offered through FEMA's Emergency Management Institute. http://training.fema.gov.nims
- NIMS ICS-300: Intermediate Incident Command System for Expanding Incidents:
  - Employees and public safety staff who are decision makers, serve on respective agency unified command, and or may staff state or local emergency operations center.
  - In-class, multiday course. Courses are offered at locations in Florida throughout the year.
- NIMS ICS-400: Advanced Incident Command System for Complex Incidents:
  - Employees and public safety staff who are decision makers, serve on respective agency unified command, and or may staff state or local emergency operations center.
  - In-class, multiday course. Courses are offered at locations in Florida throughout the year.
- NIMS ISC-700: National Incident Management System, An Introduction:

[13]. National Incident Management System | FEMA.gov

- All city employees with response and/or EOC assignments, and public safety staff.
- Independent study program offered through FEMA's Emergency Management Institute. http://training.fema.gov.nims

- NIMS ISC-800: National Response Framework, An Introduction:
  - All city employees with response and/or EOC assignments, and public safety staff.
  - Independent study program offered through FEMA's Emergency Management Institute. http://training.fema.gov.nims

Continuity of Operations Plan (COOP)

Another important document the city should maintain is a separate Continuity of Operations Plan (COOP). A COOP is important to any organization, especially local governments that operate financial and human resources systems, facilities, public operations, and vital community services. A COOP is developed to serve as a roadmap that builds the organization's plan to prepare for, react to, and respond to any event that disrupts one or more operation, facility, service, or line of succession. Current COOP planning is department-oriented and outlined to some degree in the city's Hurricane Operations Plan. COOP planning includes:

- Essential Functions – The critical activities performed by organizations, especially after a disruption of normal activities.
- Orders of Succession – Provisions for the assumption of senior agency offices during an emergency if any of those officials are unavailable to execute their duties.
- Delegations of Authority – Identification, by position, of the authorities for making policy determinations and decisions at the executive, middle management, and operational levels, and all other organizational locations. Generally, pre-determined delegations of authority will take effect when normal channels of direction have been disrupted and will lapse when these channels have been reestablished.
- Continuity of Facilities – Locations, other than the primary facility, used to carry out essential functions, particularly in a continuity event. Continuity facilities, or "Alternate facilities," refers to not only other locations, but also nontraditional options such as working at home, ("teleworking"), telecommuting, and mobile-office concepts.
- Continuity of Communications – Communications that provide the capability to perform essential functions, in conjunction with other agencies, under all conditions.
- Vital Records Management – The identification, protection, and ready availability of electronic and hard-copy documents, references, records, information systems, and data management software and equipment needed to support essential functions during a continuity situation.
- Human Capital – During a continuity event, emergency employees and other special categories of employees are activated by an agency to perform assigned response duties.
- Devolution of Control and Direction – Capability to transfer statutory authority and responsibility for essential functions from an agency's primary operating staff and facilities to other agency employees and facilities.

- Reconstitution – The process by which agency personnel resume normal agency operations from the original or replacement primary operating facility.[14]

Storm Ready and Tsunami Ready Community

Both the Storm Ready and Tsunami Ready Community Programs are National Weather Service initiatives designed to increase a community's server weather and preparedness measures. In Florida, all 67 counties participate in the Storm Ready Community program. Two counties participate in the Tsunami Ready program. Indian Harbour Beach in south/coastal Brevard County participates in both programs.

To become a Storm Ready Community recognized by the National Weather Service, the following components must be met prior to making application:

- Establish a 24-hour warning point and emergency operations center.
- Establish more than one method of receiving severe weather warnings and forecasts and alerting the public of the same.
- Create a system that monitors weather conditions locally.
- Promote the importance of public readiness through community seminars.
- Development of a formal hazardous weather plan, which includes training severe weather spotters in the community and holding emergency exercises.

To become a recognized Tsunami Ready Community, the following activities must be implemented and include:

- Defining tsunami hazard zones, producing evacuation maps, and installing evacuation route signs.
- Supporting on-going, sustained tsunami public education and outreach, including to schools in tsunami hazard ones.
- Establishing a 24-hour warning point and supporting emergency operations center operations.
- Having more than one way to receive tsunami warnings and to alert the public.
- Development of a formal tsunami operations plan and holding annual exercises

The City of Cocoa Beach currently participates in the FEMA Community Rating System (CRS), and has a rating of 8, which affords flood insurance participants a 10 percent discount. The CRS is *a voluntary program incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the National Flood Insurance Program*.[15]

A recognized Tsunami Ready Community is eligible for Community Rating System credit points. There is also the potential to increase credit points as a recognized Storm Ready Community. This includes an increase in credit points in sections #330 (Outreach Projects), #360 (Flood Protection Assistance), and #610 (Flood Warning and Response). Others may be applicable as well for additional credit points.

14. coop_brochure.pdf (fema.gov)
15. FEMA NFIP Community Rating System, Coordinators Manual, 2017 Edition.

Emergency Management Recommendations:

- CPSM recommends the city create at a minimum, a part-time Emergency Management Planner position (24-hours/week), reporting to the Fire Chief, who serves as the city's Emergency Management Coordinator. This action is recommended and necessary as there is a critical need for continuous planning and preparation, project management, and collaboration with city, county, and state officials, and development and sustainment of required and ancillary written plans required in the emergency management discipline. Cocoa Beach can be subject to environmental and other emergencies that evolve into federally declared emergencies and thus should put more resources into this program. (Recommendation No. 5.)
- CPSM recommends the city update the current Comprehensive Emergency Operations Plan as it was implemented in 2016 and contains dated data and information. (Recommendation No. 6.)
- CPSM recommends, as funding for a part-time Emergency Management Planner and allotted staff time permits, the city consider, as it is an Atlantic Ocean coastal community, pursuing and implementing the necessary elements to become a registered and recognized Storm Ready and Tsunami Ready Community. (Recommendation No. 7.)
- CPSM recommends the Emergency Management function continue the process of maintaining the National Incident Management System (NIMS) training program to include developing and implementing a plan that trains current and all new city officials and staff to the appropriate NIMS levels. (Recommendation No. 8.)
- CPSM recognizes the city has existing city plans and individual department plans that should be used as the basis to formulate an overarching and formal Continuity of Operations Plan (COOP) that is all-hazards and not just related to a hurricane, and that has the ability to ensure the effects of any interruption in a city office, system, operation, and staffing before or during an event are successfully managed and the city is able to perform all essential functions. (Recommendation No. 9.)
- CPSM recommends the city maintain an Emergency Operations Center or Emergency Management Operations area that can quickly become operational, with minimal set-up, and is capable of supporting necessary emergency support functions to handle a multi-agency emergency 24-hours/day if necessary. The EOC should have the ability to be quickly relocated if compromised, and should contain, at a minimum, equipment, materials, and infrastructure as outlined in the Emergency Operations Center section of this report. (Recommendation No. 10.)

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SUCCESSION PLANNING

During our analysis, CPSM was advised that the CBFD has a succession plan; however, it is not a formal, developed/implemented plan. One important organizational concept, particularly in a small agency, is proactive organizational preparedness for retirements or other types of separation. Following this theme, it becomes important to implement programs that identify the future leaders of the organization; that is, programs that go beyond the technical courses for career advancement preparation. A key to this is to develop and implement a formal succession plan, focused on developing potential successors to ensure organizational leadership stability, and also serve as a retention plan. This type of planning is typically designed to identify, develop, and nurture potential future leaders.

There are a few examples of succession planning that work well in fire departments:

- Development-Based Processes: A succession planning model that equips an employee or group of employees for future roles and responsibilities through diverse organizational program exposure and assignments. To some degree this occurs in the CBFD, particularly in the training and EMS sections of the organization.
- Replacement Planning: A process of identifying replacement staff for key positions and functions and developing these employees over the short term. This occurs to some degree in the CBFD as the department has established broad task books for identified staff to complete as a Lieutenant (firefighter staff) and as a District Officer/Captain (Lieutenant staff).
- Career Path Training: A program that identifies technical and organizational development courses and/or formal education that must be completed as employees prepare to elevate responsibility or position in the organization. Ideally the officer candidate for any officer level in the department is experienced and has the foundational technical and formal education and training to be successful with each new level promoted to. To ensure this and to ensure CBFD is preparing future officers, a formal program that identifies those foundational technical and organizational courses germane to each level in the organization should be selected and implemented. A growing number of fire departments are employing task books for personnel who aspire to (or in some cases have already been promoted to) higher rank. For CBFD, task books would be appropriate for firefighters, Lieutenants, and Captains. The successful completion of any task book can be considered as a prerequisite for promotion to higher rank including captain, or alternatively, can be a required element of the post-hire/promotional evaluation process.
- Succession Planning: A more future-focused process of categorizing the knowledge, skills, and abilities needed to perform organizational functions. Linked to this is the development of a plan that has the intent of preparing multiple employees to potentially perform those functions and which creates opportunity for advancement in the organization.

Critical to the success of succession planning is the engagement and commitment of the senior leaders to the program, as well as the commitment of other members of the organization to their own personal and professional development. To be a part of the succession plan, one must commit to one's own professional development to be able to compete for and fill critical organizational leadership roles.

Succession Planning Recommendation:

- CPSM recommends CBFD work with the collective bargaining unit and the city's Human Resources Director to develop a succession plan that is diverse, includes the entire organization, and has a focus on preparing current and future members to take on additional roles and responsibilities, and as well prepares members for advancement and promotion into key roles in the organization. (Recommendation No. 11.)

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STRATEGIC PLANNING

Strategic planning is an important process for an organization, as it serves as a clear and concise roadmap for the future. This process can be challenging because strategic planning requires an honest assessment of the department's current state of performance and a realistic understanding of ways to improve. Defining clear goals and objectives for any organization through a formal strategic planning document establishes a resource that any member of the

organization, or those external to the organization, can view and determine in what direction the organization is heading, and as well how the organization is planning to get there.

The CBFD advised it has basic strategic planning goals and objectives. That said, it is important as an organization to take the necessary steps to pursue the strategic planning process as a means toward continuous improvement. The CBFD communicated it is doing this on a broader scale as it is involved in the development of Public Safety Strategic Plan with the city's police department, building department, and code enforcement officer. To that end, and to have a successful and organizationally accepted plan, the development of the department's mission statement, vision and values, and goals and objectives must have input from the entire organization.

Any strategic planning that has a vison for continuous improvement requires an honest assessment of the department's current state of performance and culture. Analysis of the department's mission, vision, and values statements should be performed regularly, followed by a regular update of those statements utilizing department-wide input to ensure alignment with current and anticipated future perspectives, derived from continuous analysis of the department's strengths, weaknesses, opportunities, and threats.

Suggested steps for a successful approach to the strategic planning process include: [16]

Purpose-mission: This is the statement that describes why an organization exists. This statement should describe what customer needs are intended to be met and with what services. The organization should agree on what the mission statement/purpose is, understanding that this will evolve over the years as the organization evolves.

Selection of goals and objectives the organization must meet to accomplish its mission: Goals and objectives are general statements about what an organization needs to accomplish to meet its purpose, or mission, and address major issues it faces. This requires organizational input.

Identify specific approaches or strategies that must be implemented to reach each goal: The strategies are often what change the most as the organization eventually conducts more robust strategic planning, particularly by more closely examining the external and internal organizational environments. This requires organizational input.

Identify specific actions to implement each strategy: Specific activities each division or major function must undertake to ensure it is effectively implementing each goal must be identified. Goals and objectives should be clearly worded to the extent that staff and the community can assess if the goals have been met or not. Ideally, top management develops specific committees that each have a work plan or set of objectives. This requires organizational input.

Monitor and update the plan: Regularly reflect on the extent to which the goals and objectives are being met and whether action plans are being implemented. Perhaps the most important feedback is positive feedback from customers, both internal and external. This requires an annual review and report to the organization and community on each goal and objective and how the strategies to accomplish the goal are progressing.

A Diversity and Inclusion Plan may not be a typical plan found in fire departments across the country, however *those that have contemporary strategic plans will include goals and objectives that focus on a diverse and inclusive workforce.* It is important for any organization to understand that diversity and inclusion initiatives are more than just about racial and gender

16. McNamara, C. (1996-2007), Basic Overview of Various Strategic Planning Models. Adapted from the Field Guide to Nonprofit Strategic Planning and Facilitation. (Minneapolis, MN: Authenticity Consulting LLC.)

breakdown of the department's workforce, or recruiting underrepresented populations, it is about creating an environment whereby each employee feels respected, valued, and appreciated for their own individuality and diverse viewpoints.

To sustain itself as a high-performing organization, the CBFD must continually look inward at how as an organization it develops and retains talent, and then how it can invigorate recruitment efforts that have a focus on attracting the most diverse and brightest firefighter and civilian workforce candidates possible. The CBFD must also prepare the current and future employee base with the skills and opportunities for further professional development so that a diverse workforce can be sustained, with diversity within all ranks that is organic.

Strategic Planning Recommendation:

- CPSM recommends the CBFD continue to work on the city's Public Safety Strategic Plan and ensure that the plan is inclusive of the entire department and the community; that is incorporates measurable and obtainable goals and objectives; that it includes goals and objectives that are focused on a diverse and inclusive organization; and that it provides for an annual review and report to the organization and community that outlines the plan's progress. (Recommendation No. 12.)

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HEALTH, SAFETY, AND WELLNESS

The prevention and reduction of accidents, injuries and occupational illnesses should be established goals of any fire-rescue department and should be primary considerations at all times (emergency and non-emergency activities). This concern for safety and health must apply to all members of the fire-rescue department and should include others who may be involved in fire department activities.

CBFD does strive and should continue to strive to make every reasonable effort to provide a safe and healthy work environment, recognizing the dangers involved in the types of service that fire-rescue departments deliver. Included in this effort should be appropriate and continuous training, supervision, procedures, program support, and review to achieve department health and safety objectives in all department functions and activities.

Firefighting and to some degree EMS service delivery are inherently dangerous activities occurring in environments over which the participants have no engineering control. NFPA 1500, *Standard on Fire Department Occupational Safety and Wellness Programs*, was developed to provide a "consensus standard for an occupational safety and health program for the fire service." NFPA 1500 is intended to be an umbrella document, establishing the basic framework for a comprehensive safety and health program, and providing for its implementation and management.

The health and safety function in the CBFD is handled primarily by the department's health and safety officer (Division Chief of EMS), District Officer (Captain), and company officers (Lieutenants). Operational administrative orders include either direct or indirect guidelines or policy on safe practices and safety while operating on emergency incidents. AO-160.04-2018 establishes the role and duties of the Incident Safety Officer when established by the Incident Commander. There is no umbrella policy/administrative order on health, wellness, and safety of CBFD employees while operating on emergency scenes or non-emergency scenes and in and around the station. AO-110.09-2017 addresses physical fitness and *the need for a proactive,*

department-wide physical fitness training program and how to apply this program within the day-to-day operations of the department.

In 2021, the NFPA produced *The Fifth Needs Assessment of the U.S. Fire Service* and revealed the following:

- 72 percent of departments lack a program to maintain basic firefighting fitness and health.
- 61 percent of departments don't provide medical and physical evaluations for all firefighters that comply with *NFPA 1582: Standard on Comprehensive Occupational Medical Program for Fire Departments.*
- 73 percent of departments lack a behavioral health program (larger departments are much more likely to have such a program).
- 56 percent of fire stations are not equipped for exhaust emissions control; this number rises to 82 percent in the smallest communities.
- Many departments do not engage in cancer prevention best practices.[17]

A successful health, safety, and wellness program requires:

- Senior management buy-in.
- The establishment of a Health & Wellness Committee.
- A department needs assessment.
- The establishment of obtainable goals and objectives.
- The establishment of a budget for health, safety, and wellness.
- Implementation.
- Evaluation.[18]

Primary goals of a comprehensive health, safety, and wellness should include:

- Reducing injury leave and light duty due to on-the-job injuries.
- Potentially lowering workers' compensation and employee health care costs.
- Reduction of injuries.[19]

Firefighter injuries and deaths are devastating to families, fellow responders, local governments, and the community. The National Institute for Occupational Safety and Health (NIOSH) has studied firefighter fatality root causes, and found five key factors, which are commonly referred to as the NIOSH-5:

- Lack of fireground firefighter accountability.
- Lack of fireground communication methods.
- Lack of standard operating procedures related to response and fireground operations.
- Lack of incident management/command.

17. "Creating a Health & Wellness Program for Your Department," *Firehouse Magazine*, October 2022.
18. Ibid.
19. Ibid.

- Lack of appropriate risk assessment of the incident as whole, the building, the emergency scene, and basic fireground knowledge to understand the risk.

These five fireground factors should be etched into every firefighter's brain. A fire department training regimen, equipment, guidelines, and culture should center on these five factors. A lack of understanding of these five factors leads to sloppy, ineffective, and unsafe fireground operations. ***They should be taken seriously.***

Managing the health, safety, and wellness components of a fire-rescue department are as important as any other, as the concepts of health, safety, and wellness apply to both emergency and non-emergency activities. For CBFD this will take dedicated staff hours and oversight from the command and station level.

Health, Safety, and Wellness Recommendation:

- CPSM recommends CBFD develop a health, safety, and wellness committee, which should include the city's Human Resources Department, and develop a comprehensive health, safety, and wellness initiative that aligns with NFPA 1500, *Standard on Fire Department Occupational Safety and Wellness Programs, 2021 edition.* CPSM further recommends the department implement additional Administrative Orders as necessary that address health, wellness, and safety on a broad level to include non-emergency and station activities, and that address all facets of health, wellness, and safety in the fire and EMS disciplines. These may include carcinogen exposure, mental health, reduction of workplace injuries in emergency and non-emergency situations, awareness of the NIOSH-5, annualized medical physicals and mask fit-testing, and the like. (Recommendation No. 13.)

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CBFD FLEET

The procurement, maintenance, and eventual replacement of response vehicles is one of the largest expenses incurred in sustaining a community's fire-rescue department. While it is the personnel of the CBFD who provide emergency services within the community, the department's fleet of response vehicles is essential to operational success. Modern, reliable vehicles are needed to deliver responders and the equipment/materials they employ to the scene of dispatched emergencies within the city.

The CBFD has a modern fleet of frontline heavy fire apparatus and light vehicles (road and water). The fleet includes administrative vehicles and light response vehicles for specialty fire and EMS incidents. The CBFD also has reserve engine apparatus. CBFD apparatus maintenance generally is performed in-house by an Emergency Vehicle Technician (EVT) certified mechanic. More apparatus-specific technical repair/maintenance work is performed by a vendor who specializes in fire and EMS apparatus work. This combination of maintenance and repair work is common practice across the country. The intricacies and scope of fire pumps and fire pump controls, aerial ladder hydraulic systems and controls, and apparatus electrical control systems (the main components outside of the motor, chassis, and drive train) are best left in the hands of specialists for diagnosis, maintenance, and repair.

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TABLE 2-7: CBFD Frontline Fire Apparatus

Unit Number	Year of Purchase
Tower 51	2022
Engine 51	2019
Engine 50	2014
Squad 51	1997
Brush 3	1997
Brush 5	2004

Replacement for E50 is in production with a projected delivery in 2024.

Replacement for Squad 51 is in production with a projected delivery in 2024.

NFPA 1901, *Standard for Automotive Fire Apparatus*, serves as a guide to the manufacturers that build fire apparatus and the fire departments that purchase them. This document is updated every five to eight years (or shorter time periods) using input from the public and industry stakeholders through a formal review process. The committee membership is made up of representatives from the fire service, manufacturers, consultants, and special interest groups. The committee monitors various issues and problems that occur with fire apparatus and attempts to develop standards that address those issues. A primary interest of the committee over the past years has been improving firefighter safety and reducing fire apparatus crashes.

The Annex Material in NFPA 1901 (2016) contains recommendations and work sheets to assist in decision making in vehicle purchasing. With respect to recommended vehicle service life, the following excerpt is noteworthy:

> *"It is recommended that apparatus greater than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status and upgraded in accordance with NFPA 1912, Standard for Fire Apparatus Refurbishing (2016), to incorporate as many features as possible of the current fire apparatus standard. This will ensure that, while the apparatus might not totally comply with the current edition of the automotive fire apparatus standards, many improvements and upgrades required by the recent versions of the standards are available to the firefighters who use the apparatus."*

The impetus for these recommended service life thresholds is the continual industry advances in vehicle and occupant safety. Despite good stewardship and maintenance of emergency vehicles in sound operating condition, there are many advances in occupant and vehicle component safety, such as fully enclosed cabs, enhanced rollover protection and air bags, three-point restraints, antilock brakes, increased visibility, cab noise abatement/hearing protection, a clean cab free from carbon products, and a host of other improvements as reflected in each revision of NFPA 1901. These improvements provide safer response vehicles for those providing emergency services within the community, as well those "sharing the road" with these responders.

Many departments use a 10-5 rule (10 years of frontline service, then 5 years of reserve service) when programming replacement of fire apparatus such as engines, ladders, water tenders, heavy rescues, and heavy squad type haz-mat vehicles. Annex D of the current NFPA 1912 edition states:

> *To maximize firefighter capabilities and minimize risk of injuries, it is important that fire apparatus be equipped with the latest safety features and operating capabilities. In the last 10 to 15 years, much progress has been made in*

upgrading functional capabilities and improving the safety features of fire apparatus. Apparatus more than 15 years old might include only a few of the safety upgrades required by the recent editions of the NFPA fire department apparatus standards or the equivalent Underwriters Laboratories of Canada (ULC) standards. Because the changes, upgrades, and fine tuning to NFPA 1901, Standard for Automotive Fire Apparatus have been truly significant, especially in the area of safety, fire departments should seriously consider the value (or risk) to firefighters of keeping fire apparatus more than 15 years old in first-line service.

It is recommended that apparatus more than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status, be upgraded in accordance with NFPA 1912, and incorporate as many features as possible of the current fire apparatus standard. This will ensure that, while the apparatus might not totally comply with the current editions of the automotive fire apparatus standards, many of the improvements and upgrades required by the current editions of the standards are available for firefighters who use the apparatus.

According to information provided, the CBFD is migrating to a replacement plan for heavy fire apparatus which has a target of 10 years of frontline service and 5 years of reserve service, which is in line with the NFPA standard. This is a best practice. It should be understood, however, that current fire apparatus delivery dates have lengthened from about 18 to 24 months to the current 36 to 42 months, depending on the manufacturer. Early planning, funding, and procurement will maintain the current replacement plan and schedule.

Driver-Engineer Position

Today's fire apparatus are the most sophisticated and complex road machines the fire service has ever operated. These apparatuses operate through multiple complex and integrated systems that are primarily operated electrically and through on-board software. There are but a few mechanical only systems remaining. Understanding these complexities, how the vehicle operates (to include the manufacturers guide and recommendations on operation), how the vehicle drives and functions (motor power, braking, transmission, turning radius, weight), pumps water, hoists the hydraulic aerial device and so on is learned knowledge and skill through many hours of operation and training. As important is the understanding of, and operation and maintenance of all equipment carried on the apparatus.

Localities across the country invest millions in the community's fire apparatus. Engine apparatus has reached the $1-million mark with aerial ladders approaching the 2-million mark. Maintaining this apparatus over a fifteen to twenty year period is critical and requires consistent and regular operation, care, maintenance.

For the reasons stated above, and due to the importance of consistency in operations, care, and daily maintenance at the company level, many fire departments large and small have moved away from the "everybody can/will drive and operate the fire apparatus" to a staffing model that includes dedicated driver-operators for each heavy fire apparatus (engine, aerial ladder, heavy rescue). These positions typically have a specific job description and are assigned a higher rank than firefighter with titles such as engineer, driver-engineer, or driver-operator to name a few of the more common titles. There is also an incremental pay increase over the firefighter position. Additionally, to be placed in a driver-engineer position, candidates typically test (written and practical) to ensure the candidate if selected has the knowledge, skills, and abilities to perform all critical driving, operating, care and maintenance of the vehicle

required of the position. As well this examination includes the operation and maintenance of all equipment carried on the various types of fire apparatus.

In Brevard County the cities of Melbourne, Palm Bay, Titusville, and Cocoa have implemented this position. If Cocoa Beach were to implement this model, it requires no additional personnel, but rather a reclassification of a minimum of nine firefighter positions (3 for each of the two engines and 3 for the aerial ladder).

Fleet Recommendation:

- CPSM recommends apparatus and major apparatus components such as the motor, fire pump, aerial ladder assembly and hydraulics, chassis, and chassis components such as brakes, wheels, and steering equipment be maintained in accordance with manufacturer and industry specifications and standards. All testing records should be maintained in a common records management system for continuous review and analysis. (Recommendation No 14.)
  - Further, apparatus components requiring annualized testing either fixed or portable such as fire pumps, aerial ladder and aerial ladder assemblies, ground ladders, self-contained breathing apparatus to include personnel fit testing, and fire hose should be tested in accordance with manufacturer and industry specifications and standards. All testing records should be maintained in a common records management system for continuous review and analysis.
  - Due to the imporatnce of the day-to-day care and maintenance of heavy fire appratus, and to ensure consistent emergency and non-emergency apparatus operations, CPSM further recommends the city and the CBFD consider, over the mid-term, the implementation of a dedicated driver-engineer position to drive and operate the heavy fire apparatus. This recommendation does not require additional personnel, but rather a reclassification of a minimum of nine firefighter positions (3 for each of the two engines and 3 for the aerial ladder).

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911 PSAP SERVICES

Primary Cocoa Beach 911 PSAP services are handled by the Cocoa Beach Police Department (CBPD). The recent 2023 CPSM *Police Operations and Data Analysis Report* for the CBPD includes a comprehensive analysis of the CBPD Communications Center. The review in this report will focus on fire and EMS 911 services, which are shared between the CBPD PSAP and the Brevard County Fire Rescue (BCFR) PSAP.

From a fire and EMS perspective, the communications center is measured on three critical points in the overall cascade of events linking the event to the incident response force. These are ***how the call is routed through the public safety network and its capabilities*** (wireline phone, wireless phone, E911capabilities, Voice over Internet Protocol (VoIP), mobile satellite services, telematics, and Text Telephone Devices (TTYs)), ***time to answer*** (the time it takes to answer an incoming and call on the emergency phone line), ***and alarm processing time*** (the time it takes to process and create the event and then notify the emergency response unit(s)). As EMS calls are transferred to the BCFR PSAP, the event is received by phone a second time, adding time to the overall incident time measurements, and this runs the risk of a transfer/connection mishap and/or a dropped call.

In the current PSAP system, a 911 or seven-digit phone call for fire or EMS originating in Cocoa Beach is received by the CBPD PSAP. Fire calls are processed and then the appropriate fire response is dispatched by a telecommunicator utilizing run cards established by the CBFD.

EMS calls received by the CBPD PSAP are transferred to the BCFR PSAP where the call is processed, and an ambulance is dispatched, and then the incident is transferred back to CBPD PSAP so that additional information is communicated to a CBFD fire suppression unit. During the initial transfer to BCFR PSAP, the call taker from CBPD PSAP remains on the line to ensure a connection is made and the BCFR PSAP begins the call processing. While transferring the call to Brevard, CBPD dispatches a CBFD fire suppression unit.

National Fire Protection Association (NFPA) Standard 1710, *Standard for Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*, 2020 edition, includes national consensus standards for emergency communication PSAPS and dispatch centers. For the CBFD, this includes a primary PSAP (CBPD) for fire and EMS calls, and secondary PSAP (BCFR) for the dispatch of EMS ground transport units. In the case of EMS, the BCFR PSAP also serves as a communications center. Section 4.1.2.3 of this standard outlines several benchmarks for communications center operations for fire and EMS events. Included in the benchmarks are the following components:

Call answering time: The call arrives at the secondary PSAP and communications center (PFDRDC) by phone and is processed as outlined in the standard as follows:

- Ninety percent of events received on emergency lines shall be answered within 15 seconds, 95 percent of alarms shall be answered in 20 seconds, and no more than 40 seconds 99 percent of the time.

Alarm processing time: Event processing times at the PFDRDC shall be completed in 64 seconds 90 percent of the time and not more than 106 seconds 95 percent of the time.

Alarm processing time for the following call types shall be completed within 90 seconds 90 percent of the time and within 120 seconds 99 percent of the time:

- Calls requiring Emergency Medical Dispatch.
- Calls requiring language translation.
- Calls requiring TTY/TTD receipt of events.
- Calls of criminal activity that require information vital to emergency responder safety prior to dispatching units.
- Haz-Mat incidents.
- Technical rescue incidents.
- Incomplete location.
- Calls received by text message to the communications center.

NFPA 1710 identifies call arrival at the primary PSAP (CBPD) call transfer time as well. **The transfer time standard for the CBPD dispatch center is:**

- NFPA 1710 (4.1.2.3.1) for call answering time is ≤ 15 seconds 95 percent of the time and ≤ 40 seconds 99 percent of the time.

- NFPA 1710 Standard (4.1.2.3.2) for transferring a call from a Primary PSAP (CBPD) to a secondary PSAP (BCFR) is ≤ 30 seconds 95 percent of the time.

The next table highlights CBPD call processing time to dispatch of CBFD unit(s). On average, the CBPD PSAP processes and dispatches the initial EMS call for service in 30 seconds. At the 90th percentile this process takes 78 seconds.

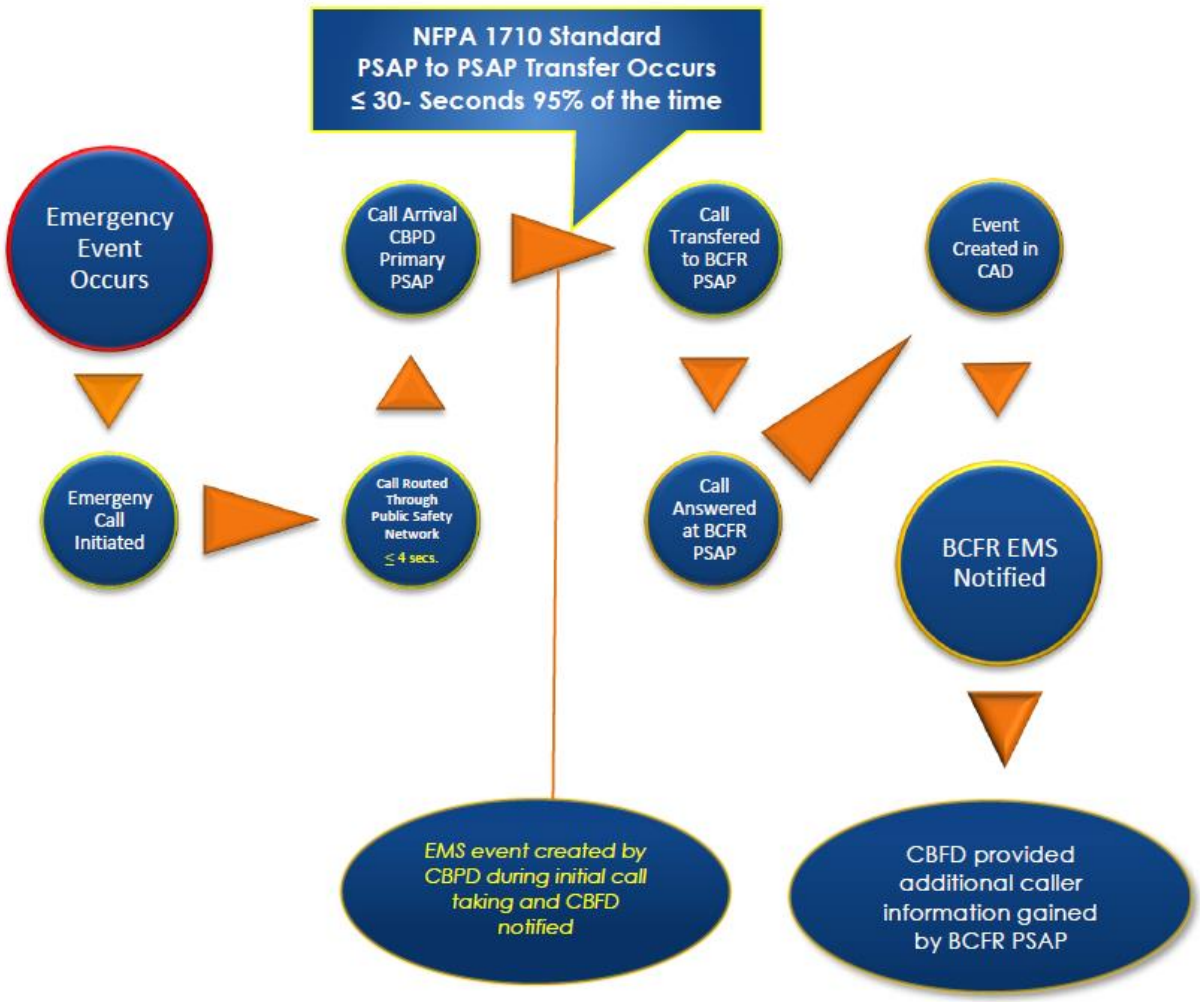
TABLE 2-8: CBPD Response Time: EMS Calls (Dispatch Highlighted)

Call Type	Average Response Time, Min.				90th Percentile Response Time, Min.				Call Count
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
Medical call	0.5	1.6	3.3	5.4	1.3	2.6	5.3	7.6	1,572

Note: Excluded from this table are cancelled calls, mutual aid calls, non-emergency calls, calls where no units recorded a valid on-scene time, and calls where there is missing data.

The next figure illustrates the event timeline when the primary PSAP (CBPD) receives a call and then transfers the call to a secondary PSAP.

FIGURE 2-9: PSAP Cascade of Events for EMS Call



As illustrated above, the dispatch of EMS transport units includes the added step of a PSAP-to-PSAP phone exchange (1,842 times in the one-year study period). Further, additional information regarding the patient(s), emergency scene, or other important factors regarding the incident may not be transmitted to CBFD units prior to arriving on scene, or may not be communicated as received by BCFR PSAP, as the information is passed from PSAP to PSAP via telephone after the BCFR PSAP finishes the caller intake segment. A system such as this is vulnerable to miscommunication between PSAPs and responding units.

The CBPD PSAP staffing complement is designed to include two telecommunicators 24/7, with a third swing-shift telecommunicator scheduled during identified peak times of the day. This staffing complement generally allows for one primary call taker and one primary radio telecommunicator, although in a two-person PSAP, the roles are typically shared. The primary radio telecommunicator is responsible for primary police and fire radio transmissions, as well as other radio communications occurring utilizing the Cocoa Beach radio system. This includes Brevard County Lifeguard services, Cocoa Beach-Beach Rangers, and Brevard County Fire Rescue to name the more frequent push-to-talks. When there is a swing-shift telecommunicator, this position assists with radio and call taking. Assigned PSAP staff do more than this, however. As pointed out in the CPSM *Police Operations and Data Analysis Report*, CBPD PSAP staff handle a litany of tasks that include:

- Handle all incoming administrative and 911 phone lines. Transfer calls to appropriate agencies if misrouted.
- Handle all incoming and outgoing radio traffic for PD, FD, Beach Rangers, Parking Enforcement, as well as outside agency units requesting or providing assistance.
- Investigate open and hang-up 911 cell phone lines including location ping.
- Contact all additional resources as needed. Examples are utilities, helicopters, animal control, tow trucks, emergency management, coroner, Red Cross, social services, and state EOC, etc.
- Contact Judges and Trial Commissioner for Mental Detention Orders for the regional hospital, search warrants, and domestic warrants
- Maintain on-call schedules for all emergency callouts including Cocoa Beach Police Detectives.
- Maintain city street/road directory.
- Enter all stolen property and missing persons into appropriate databases.
- Monitor LINK/NCIC for BOLOs, Golden Alerts, and Amber Alerts and disseminate as needed.
- Interface with additional agencies such as Probation & Parole, Social Services, Jail, Courthouse (judges and clerks), etc.
- Set off emergency notification systems (disaster sirens and phone notifications).
- Monitor bad weather and coordinate with Emergency Management for all the natural disasters affecting Cocoa Beach.
- Utilize the LINK/NCIC system for law enforcement in running driver licenses and license plates, at a minimum.
- Use CJNET, FCIC/NCIC, FINDER, to assist law enforcement for investigation purposes.

- Monitor a total of five radio channels including police (2,) fire (2,) EMS, Public Works (during hurricanes,) and can access a mutual aid channel as needed and bridge channels when needed.
- Holder of the record through the MACH CAD system (computer-aided dispatch).
- Contact surrounding agencies for assistance as needed.
- Enter and maintain all domestic violence-related orders in LINK/NCIC.
- Maintain trespass files for businesses and citizens.
- Maintain mapping and ESNs for Cocoa Beach
- Create and maintain files for the businesses within Cocoa Beach for key-holders and emergency contacts.
- Assist with training for the agency's Citizen Academy.
- Monitor camera system that covers PD exterior and interior. Includes opening doors to secure areas remotely, such as the front door after hours and sally port.
- Monitor panic/emergency alarms within the PD.
- Conduct visual prisoner checks at regular intervals when an arrestee is temporarily in the PD holding cell.
- Public records request responses related to telephone and radio recordings.
- Assist CBFD with run card updates.

It is typical for fire and EMS agencies to be assigned tactical channels when working a multi-unit call, with these channels monitored by a telecommunicator. This does not occur in Cocoa Beach. In fact, fire and EMS units operate all calls from the main fire channel, which is monitored by one dispatcher. Working fire or EMS incidents typically generate emergency radio traffic (unit-to-unit or unit-to-dispatch center) that may be canceled if a call is being dispatched, or another incident is working on the same channel. Maydays or other urgent traffic may be missed by the lone radio telecommunicator as well, if busy operating another talk group or taking a 911 phone call when the primary call-taker is handling another phone call or making one of the many notifications necessary and required by this role. This creates safety issues for personnel operating on the incident.

As noted here, the issue of communication capabilities and/or failures is cited by the National Institute for Occupational Safety and Health (NIOSH) as one of the top five reasons for firefighter fatalities. ***The importance of an assigned telecommunicator for specific incidents is a critical factor in incident scene safety for all public safety disciplines.***

The NFPA standards for 911 PSAPS/Communication Centers staffing originate from the NFPA 1221 standard (*Standard for the Installation, Maintenance, and Use of Emergency Communications Systems*). These are:

- 7.3.1 There shall be a minimum of two telecommunicators on duty and present in the communications center at all times.
- 7.3.1.1 The AHJ shall ensure that there are sufficient telecommunicators available to affect the prompt receipt and processing of alarms needed to meet the requirements of Section 7.4.
  - Emergency lines answered within 15 seconds: 90 percent of the time.

- Emergency lines answered within 20 seconds: 95 percent of the time.

- 7.3.1.3 A communications center shall handle emergency calls for service and dispatching in preference to nonemergency activities.
- 7.3.2* When requested by the incident commander, a telecommunicator shall be dedicated to the incident and relieved of other duties within the communications center.
- 7.3.3 The AHJ shall establish standard operating procedures to identify the circumstances under which a telecommunicator will be assigned to the incident and how that will be accomplished.
- 7.3.4* Supervision shall be provided when more than two telecommunicators are on duty.
  - The supervisor position(s) in the communications center are provided in addition to the telecommunicators positions. Although supervisory personnel are intended to be available for problem solving, the supervisor position is permitted to be a working position (see 7.3.4.2).
- 7.3.4.1 Supervision shall be provided by personnel located within the communications center who are familiar with the operations and procedures of the communications center.
- 7.3.4.2 The supervisor shall be allowed to provide short-term relief coverage for a telecommunicator, provided that the telecommunicator does not leave the communications center and is available for immediate recall as defined in the policies and procedures of the AHJ.

In conclusion, the CBPD 911 PSAP/Communications Center staff the CPSM Fire Team visited with and observed working are dedicated and professional and were engaged in their positions. That said, the CBPD 911 PSAP/Communications Center is understaffed and unable to meet minimum staffing at times, which is typically the loss of the swing-shift/peak time telecommunicator. This creates many issues that range from overlapping 911 and non-emergency incoming calls; several incidents occurring at one time over the police and fire main radio talk groups; critical outgoing phone notifications that must be made; PSAP-to-PSAP EMS call notifications; a working police, fire, or EMS incident that requires close attention to the radio talk group for urgent hailing from personnel operating on the scene; and inability for telecommunicators to take a break.

Dispatch Recommendations:

The CPSM Fire Team concurs with the CPSM Police Team's CBPD PSAP/Communications Center recommendations as stated in the CPSM Police Analysis Report:

- Restructure management/supervisory oversight of the Communications Center as follows: Reduce the Communications Center Manager to a one-half time position (the remaining time dedicated to management of the Records & Property and Evidence Section). (Recommendation No. 15.)
- Move to fill the vacant Communications Supervisor position at the earliest opportunity and add a second Communications Supervisor to the authorized staffing level as soon as practical. (Recommendation No. 16.)
- As necessary, recruitment of experienced managers and supervisors from outside agencies should be considered. Highly experienced telecommunicators who are looking for advancement opportunities could be recruited and trained as first-line supervisors. (Recommendation No. 17.)

- Increase authorized staffing of telecommunications officer positions by three for a total of 12 to enable staffing of all shifts as identified in the existing work schedule. (Recommendation No. 18.
- Increase the number of part-time telecommunications officers to four positions from two at present to add to the pool of personnel who can be called upon to fill staffing gaps, as necessary. (Recommendation No. 19.)
- Consider training other department personnel to work in the limited role of call taker to increase the pool of personnel that can be called upon to fill staffing gaps, as necessary. (Recommendation No. 20.)
- An additional CPSM recommendation includes the assignment of a fire tactical channel that is monitored by CBPD telecommunicators any time there is a complex/working multi-unit fire or EMS incident, or as requested by the fire incident commander. (Recommendation No. 21.)

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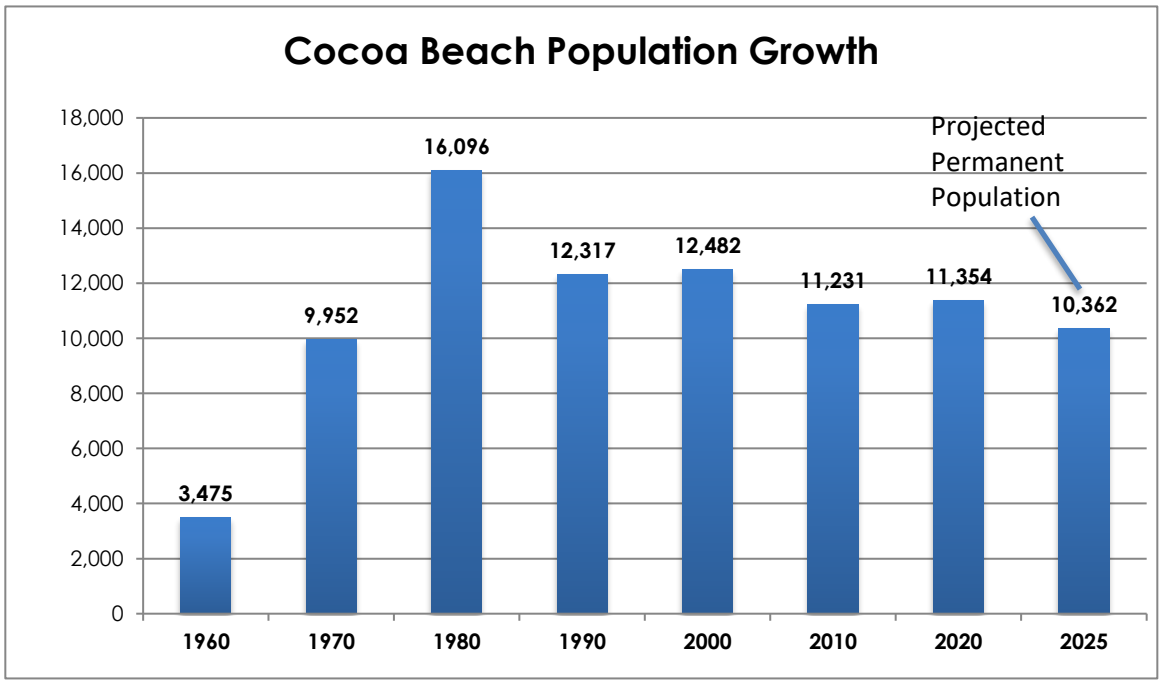
SECTION 3. COMMUNITY RISK PROFILE

POPULATION AND COMMUNITY GROWTH

The U.S. Census Bureau indicates the population of the City of Cocoa Beach in 2020 was 11,354. This is a 1.1 percent increase in population since the 2010 census of 11,231. The city is made up of 4.66 square miles of land mass and 10.53 square miles of water for a total of 15.19 square miles. The population density is 2,437.5 people per square mile. This is an increase of 26 people per square mile over the 2010 census numbers.

The city has a steady influx of seasonal winter visitors as well as tourists visiting this coastal resort community throughout the year. This annual fluctuation of population (about 12,000 seasonal residents and about 3,850 average daily tourists) is the most critical demographic condition affecting demands on public facilities, services, and land uses, and requires that systems be designed to handle recurring seasonal demands in addition to the demands of the city's permanent population.[20]

FIGURE 3-1: City of Cocoa Beach Population Growth: 1960–2025



In terms of fire and EMS risk, the age and socio-economic profiles of the population can have an impact on the number of requests for fire and EMS services. Evaluation of the number of seniors and children by fire management zones can provide insight into trends in service delivery and quantitate the probability of future service requests. In a 2021 National Fire Protection Association (NFPA) report on residential fires, the following key findings were identified for the period 2015–2019:[21]

20. City of Cocoa Beach 2025 Comprehensive Plan, Section I Future Land Use, p. I-6.
21. M. Ahrens, R. Maheshwari "Home Fire Victims by Age and Gender," Quincy, MA: NFPA, 2021.

- Males were more likely to be killed or injured in home fires than females and accounted for larger percentages of victims (57 percent of the deaths and 55 percent of the injuries).
- The largest number of deaths (19 percent) in a single age group was among people ages 55 to 65.
- 59 percent of the victims of fatal home fires were between the ages of 39 and 74, and three of every five (62 percent) of the non-fatally injured were between the ages of 25 and 64.
- Slightly over one-third (36 percent) of the fatalities were aged 65 or older; only 17 percent of the non-fatally injured were in that age group.
- Children under the age of 15 accounted for 11 percent of the home fire fatalities and 10 percent of the injuries. Children under the age of 5 accounted for 5 percent of the deaths and 4 percent of the injuries.
- Adults of all ages had higher rates of non-fatal fire injuries than children.
- Smoking materials were the leading cause of home fire deaths overall (23 percent) with cooking ranking a close second (20 percent).
- The highest percentage of fire fatalities occurred while the person was asleep or physically disabled and not in the area of fire origin, key factors to vulnerable populations.

In Cocoa Beach, the following age and socioeconomic factors are considered herein when assessing and determining risk for fire and EMS preparedness and response:[22]

- Children under the age of five represent 1.9 percent of the population.
- Persons under the age of 18 represent 10.8 percent of the population.
- Persons over the age of 65 represent 33.1 percent of the population.
- Female persons represent 49.6 percent of the population.
- There are 1.90 persons per household in Cocoa Beach.
- The median household income in 2021 dollars was $73,901.
- People living in poverty make up 9.8 percent of the population.

Black or African American alone represents 0.9 percent of the population. The remaining percentage of population by race includes White alone at 93.0 percent, American Indian or Alaska Native alone at 0.1 percent, Asian alone at 0.9 percent, two or more races at 4.0 percent, and Hispanic or Latino at 8.1 percent.

The demographics in Cocoa Beach overall pose a moderate risk in totality. While not a high risk, a single call involving vulnerable population (fire or EMS) poses a higher risk on that particular response. Through pre-fire planning and response district knowledge of residential and other structures housing a vulnerable population as identified above, the CBFD will have the necessary situational awareness and be better prepared on arrival at the incident.

Certain socio-economic characteristics will help to identify those individuals or target populations most likely to use and/or benefit from public sector programs and services, and

22. U.S. Census Bureau QuickFacts: Cocoa Beach, Florida.

community outreach programs (such as the CBFD MIH program). This includes fire and EMS services (more predominately EMS).

The city is generally bounded by the Atlantic Ocean to the east, the low-lying mangrove islands of the Banana River Lagoon to the west, unincorporated Brevard County and the City of Cape Canaveral to the north, and unincorporated Brevard County and Patrick Air Force Base to the south. Low-density residential uses are located adjacent to the Banana River Lagoon and at the northern and southern ends of the city. Moderate and higher density multi-family uses are closer to the main corridors. Hotels and tourist use are concentrated along the ocean. General commercial and retail uses are immediately contiguous to SR A1A and SR 520.[23]

Existing and Future Needs

As described in the Future Land Use Element, of the City of Cocoa Beach 2025 Comprehensive Plan, Cocoa Beach has reached a built-out condition with little vacant land left for new development. The City's barrier island location provides little room to expand existing road rights-of-way. This challenge drives the future development of redeveloped and/or renovated properties. While the permanent population is stabilizing, the seasonal population continues to fuel housing demand. Of the 11,231 permanent residents in Cocoa Beach, 7,974 are homestead homeowners and 3,257 are renters.[24]

There are approximately 74 acres of vacant land in the City (2.8 percent of the City's total area), which can accommodate limited new residential and commercial development. Based on the declines in population for the past several decades, with further projected population declines predicted, paired with maximum allowable densities for single-family and multifamily residential uses, and the amount of vacant land in each of these land use categories, the city has sufficient vacant land to meet the need for single-family and multifamily housing units for the city's permanent and seasonal population through 2025. At this time, the city appears to have sufficient commercial, recreational, and institutional uses to meet the city's needs through 2025.[25]

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23. City of Cocoa Beach 2025 Comprehensive Plan, Section I Future Land Use, p. I-6.
24. City of Cocoa Beach 2025 Comprehensive Plan, Section V Housing Element, p. V-1.
25. City of Cocoa Beach 2025 Comprehensive Plan, Section I Future Land Use, p. I-6.

FIGURE 3-2: 2025 Comprehensive Plan Future

Map Source: Cocoa Beach Comprehensive Plan 2025
Future Land Use Element (FLUE)

Population, demographics, and growth impacts on the CBFD must be included in any strategic master planning the CBFD conducts in the near-, mid-, and long-terms. Increases in development will increase call demand and will impact the deployment analysis in future ISO-PPC community ratings, and the ability of the CBFD to meet NFPA deployment benchmarks.

ENVIRONMENTAL FACTORS

The City of Cocoa Beach is prone to and will continue to be exposed to certain environmental hazards and risks that may impact the community and which will create call demand for the fire deprtment. The most common natural hazards prevalent to the region, according to the Brevard County Emergency Management Hazard Summaries, include:[26]

Hurricane/Storm Effects

Frequency of Occurrence: Once a year or more.

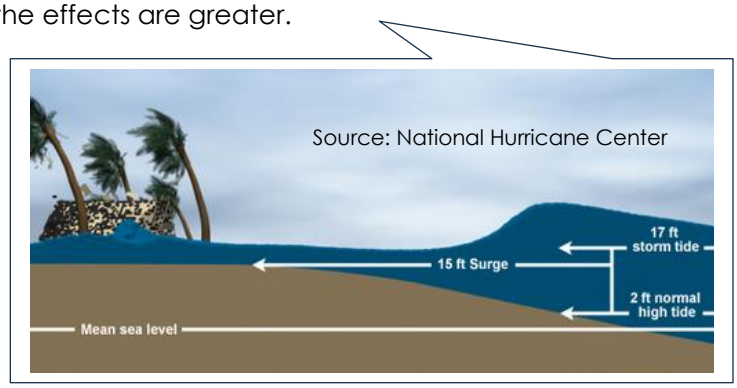
Hurricane. and storms can produce high winds, storm surge, flooding, tornadoes, thunderstorms, and lightning. Some of these hazards have the highest likelihood and largest potential damage impacts of all environmental risks. The probability of more hurricane and storm effects to strike the peninsula of Florida and consequently the Brevard County area must be considered very high, with a possible occurrence of once a year or more. The greatest threats are storm surge along the barrier islands; wind damage to homes, businesses, and coastal lands; inland flooding; and mass casualties.

As a coastal community, Brevard County has had seven FEMA Declared Disasters from 2016 to date:

- FEMA DR-4680 Hurricane Nicole, 2022: Individual and Public Assistance.
- FEMA DR-4673 Hurricane Ian, 2022: Individual and Public Assistance.
- FEMA DR-3533 Hurricane Isaias, 2020: Public Assistance.
- FEMA DR-4486 COVID 19, 2020: Individual and Public Assistance.
- FEMA DR-4468 Hurricane Dorian, 2019: Public Assistance.
- FEMA DR-4337 Hurricane Irma, 2018: Individual and Public Assistance.
- FEMA DR-3377 Hurricane Matthew, 2016: Individual and Public Assistance.

Storm Surge

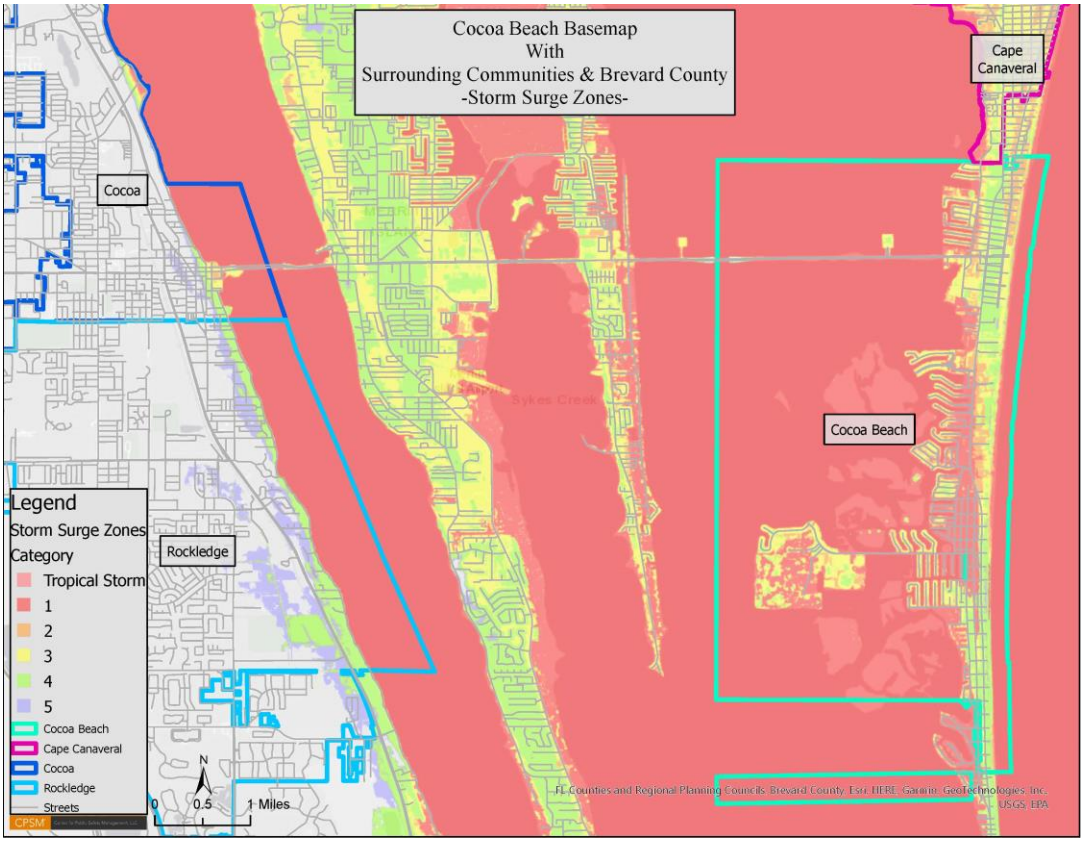
As a coastal community, Cocoa Beach is vulnerable to storm surge from tropical systems/cyclones or other weather events with strong winds that push water onshore. These weather events cause seawater to rise abnormally above the predicted astronomical tide, causing flooding and potential damage to structures and infrastructure. Combined with high tide (storm tide) the effects are greater.



26. Brevard County Emergency Management Hazard Summaries, June 2016.

The next figure illustrates storm surge for Cocoa Beach for tropical systems as indicated (Tropical Storm, Hurricane Category 1-5).

FIGURE 3-3: Storm Surge: Cocoa Beach and Surrounding Communities



Drought

Frequency of occurrence: 25 years or less.

Since 1900, nine drought cycles (typically of two-year periods) have occurred in Florida. Most often, the area of impact was regional rather than statewide. Most summer seasons have micro-heat waves based on the geographic area of Florida.

Extreme Heat

Frequency of Occurrence: 25 years or less.

While extended extreme heat events are not as common, the State of Florida routinely experiences excessive heat outlooks, watches, and warnings/advisories throughout the state. Florida averages 12 heat-related fatalities annually. In 1993 and 1999, 241 and 68 fatalities, respectively, were the result of heat waves affecting the southeast United States.

Prolonged Utility Failure

Frequency of Occurrence: Once a year or more.

Power failure can result from a variety of related causes, including sagging lines due to hot weather, flashovers from transmission lines to nearby trees, and incorrect relay settings.

According to the electric utility industry's trade association, the potential for such disturbances is expected to increase with the profound changes now sweeping the electric utility industry. Power failure can have the following potential impacts on Brevard County: electrical power outage, surface and air transportation disruption, potable water system loss or disruption, sewer system outage, and telecommunication system outage.

BUILDING AND TARGET HAZARD RISK

A community risk and vulnerability assessment will evaluate the community, and regarding buildings, it will review all buildings and the risks associated with each property and then classifying the property as either a high-, medium-, or low-hazard depending on factors such as the life and building content hazard and the potential fire flow and staffing required to mitigate an emergency in the specific property. According to the NFPA *Fire Protection Handbook*, these hazards are defined as:

High-hazard occupancies: Schools, hospitals, nursing homes, explosives plants, refineries, high-rise buildings, and other high life-hazard (vulnerable population) or large fire-potential occupancies.

Medium-hazard occupancies: Apartments, offices, and mercantile and industrial occupancies not normally requiring extensive rescue by firefighting forces.

Low-hazard occupancies: One-, two-, or three-family dwellings and scattered small business and industrial occupancies.[27]

Cocoa Beach has the following building types:

- 2,429 single-family housing units.
- 5,872 multifamily housing units (condos, townhomes, etc.).
- 5 apartment building units, garden style (2 + stories).
- 13 commercial/industrial structures.
- 20 taxpayer structures; 25 under construction (residential over commercial).
- 14 strip malls.
- Educational and day-care facilities.
- Hotel/motel buildings.
- 19 high-rise buildings.
- Fishing pier with mixed occupancy.

In terms of identifying target hazards, consideration must be given to the activities that take place (public assembly, life-safety vulnerability, manufacturing, processing, etc.), the number and types of occupants (elderly, youth, handicapped etc.), and other specific aspects related to the construction of the structure.

27. Cote, Grant, Hall & Solomon, eds., *Fire Protection Handbook* (Quincy, MA: National Fire Protection Association, 2008), 12.

Cocoa Beach has a variety of target hazards that meet an established hazard class that include:

High Hazard

- Hospital and medical facilities that may be occupied 24/7/365.
- Commercial facilities that include assisted living/nursing/development disability.
- Residential facilities for senior/assisted living.
- High-rise hotels/comdominiums.
- Public and private educational and day care facilities.
- Facilities classified as high hazards due to processes/hazardsous materials use.

Medium Hazard

- Multifamily dwelling buildings (multistory townhomes and apartments buildings, multistory condominiums).
- Commercial and industrial facilities and sites.
- Businesses classified as public assembly.
- Shopping centers/retail suites/strip malls.
- Federal, state, and local government buildings/offices.
- Fishing pier with retail and restaurants.

The greatest amount of building risk in Cocoa Beach is of a low hazard (single-family dwellings, predominately wood frame construction). Cocoa Beach does have a number of high risk/vulnerable population risks (nursing/assisted living facilities), educational facilities and multifamily residential structures (apartments/condos). High-rise hotels and condos present the CBFD with significant life-safety concerns. Industrial and mercantile buildingsk and large footprint commercial buildings, while a lower life-safety risk, are generally a higher hazard risk based on processes, storage, and overall occupancy type.

The following figure illustrates CBFD-designated target hazards in Cocoa Beach, e.g., strip malls, hospital, high-rise buildings (over seven stories), pier, and water treatment facility.

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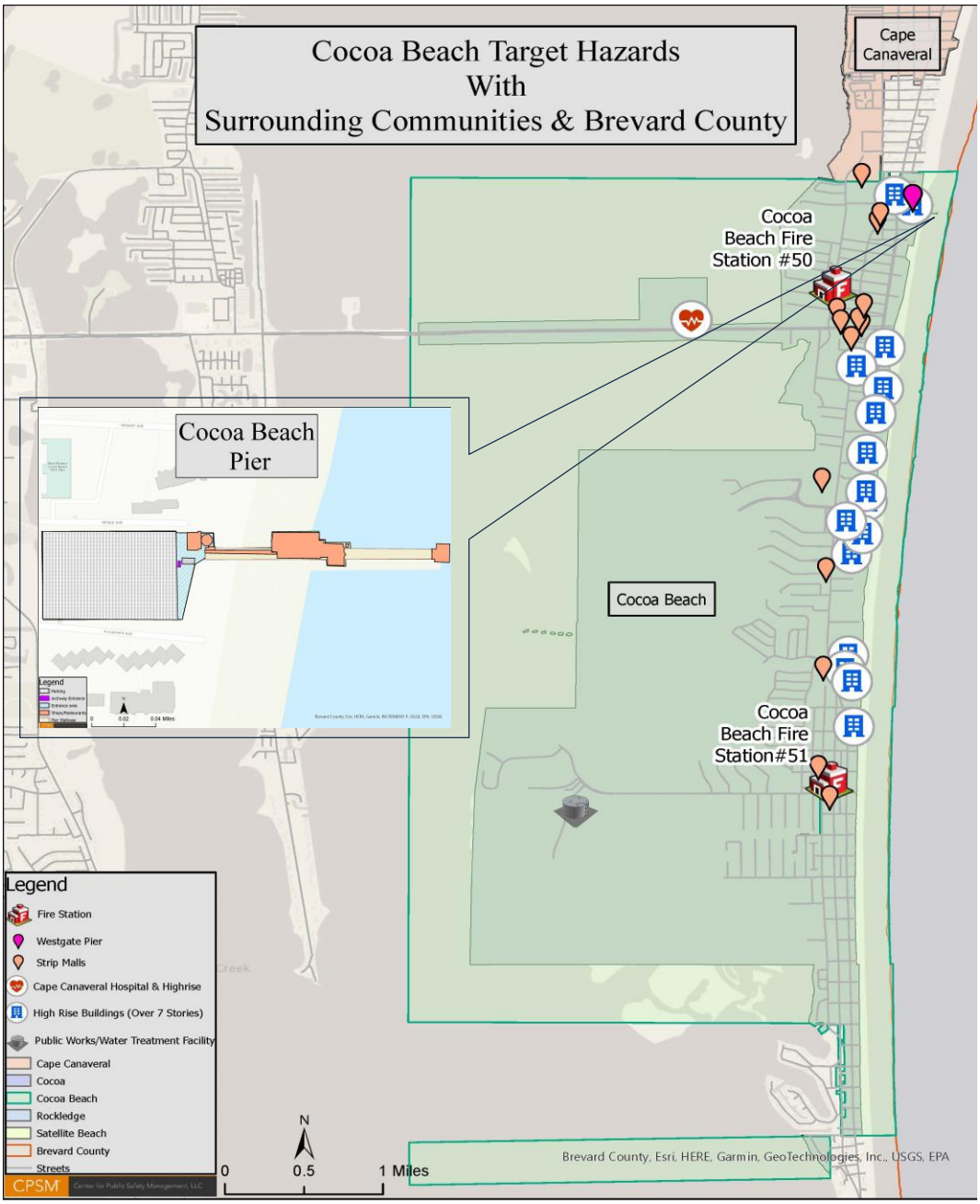
FIGURE 3-4: Cocoa Beach Fire Department Target Hazards



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TRANSPORTATION FACTORS

Within the City of Cocoa Beach, there are two state roads, SR A1A (north-south arterial) and SR 520 (east-west arterial), both of which are owned and maintained by the Florida Department of Transportation (FDOT). Both facilities are designated hurricane evacuation routes. The city works closely with FDOT to ensure that any changes to these state facilities are consistent with Cocoa Beach's priorities and setting. All the other streets within Cocoa Beach are city-owned and maintained. The city's roadway network is depicted in the following figure.[28]

The city's barrier island location provides little room to expand existing road rights-of-way. While the permanent population is stabilizing, the city continues to experience growth in seasonal residents and visitors.

Typically, in a storm situation, the barrier islands will be the first communities under an evacuation notice as they are susceptible to high winds causing downed power lines and storm surges.

Causeways to and from the barrier islands remain open prior to the storm and are generally not safe to travel during a storm. Bridges are closed *after* the storm by the Florida Department of Transportation to perform inspections to make sure the bridges are safe to travel on. Due to these inspections access back to the barrier islands after a storm will be limited until the bridges have cleared inspection and opened back up.[29]

The Cocoa Beach road transportation system is typical of urbanized municipalities and includes:

- Arterials: Connect different areas of the city with moderate volume and moderate speeds; four lanes.
- Major collectors: Provide access to and from neighborhoods and commercial areas with moderate volume and moderate speed; two lanes.
- Minor collectors: Provide access to and from neighborhoods and commercial areas with low volume and low speed; two lanes.
- Local roads: provides access to residential and businesses with low volume and low speed; two lanes.

The next figure illustrates the road network in Cocoa Beach.

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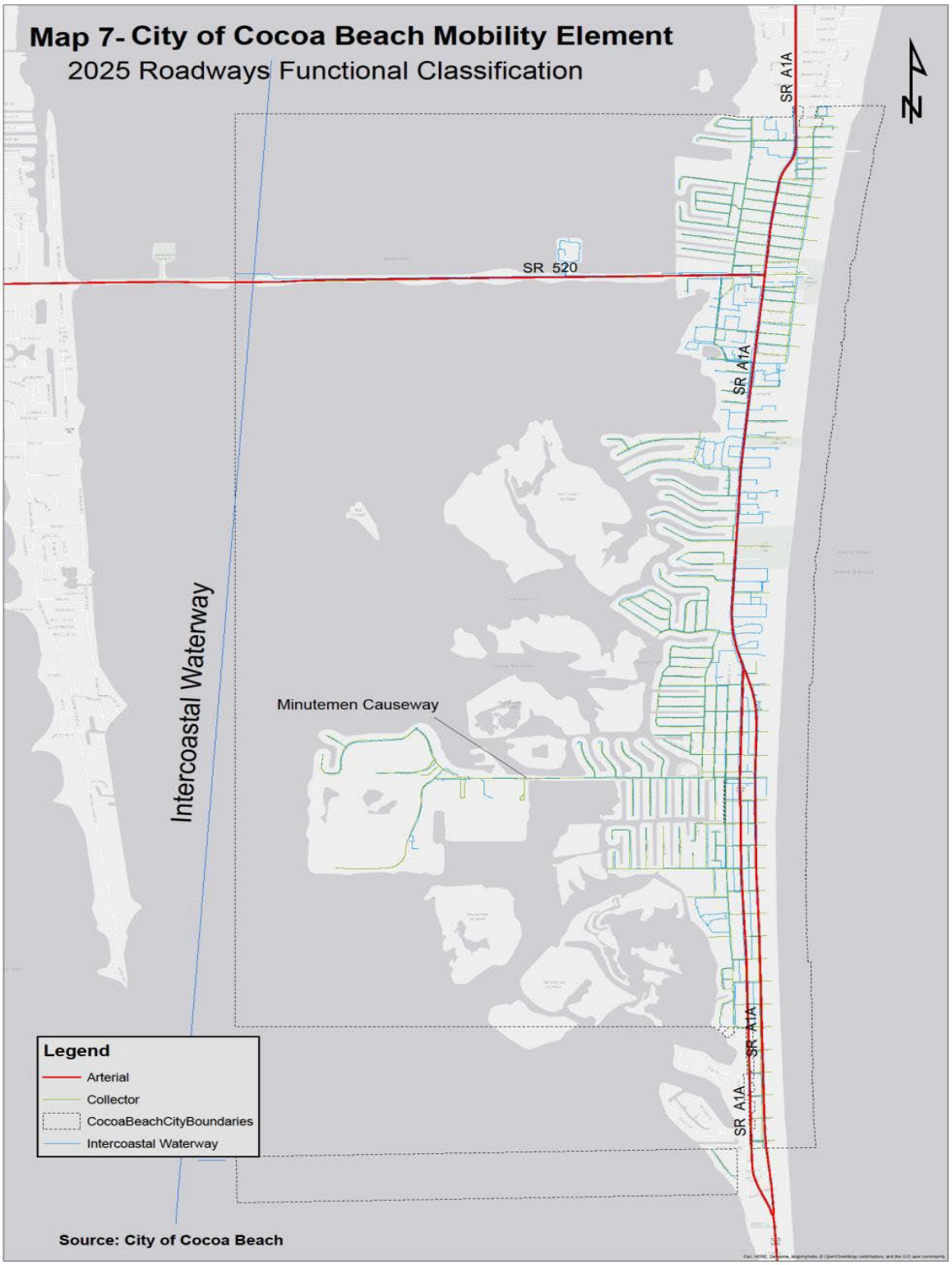
28. City of Cocoa Beach 2025 Comprehensive Plan, Section VIII Mobility Element, p. VIII-1.
29. Cocoa Beach Emergency Preparedness, Barrier Islands and Causeways, n.d., http://www.cityofcocoabeach.com/260/Emergency-Preparedness, accessed 14 May 2023.

FIGURE 3-5: Cocoa Beach Road Network



Cocoa Beach is serviced by the Space Coast Area Transit between the Cocoa Beach Pier and South 13th Street (Route 9).

There is neither mass transit light rail service nor freight rail service within the city.

The next figure illustrates bus transit routes and stops in Cocoa Beach.

FIGURE 3-6: Space Coast Area Transit: Route 9-Cape Canaveral and Cocoa Beach

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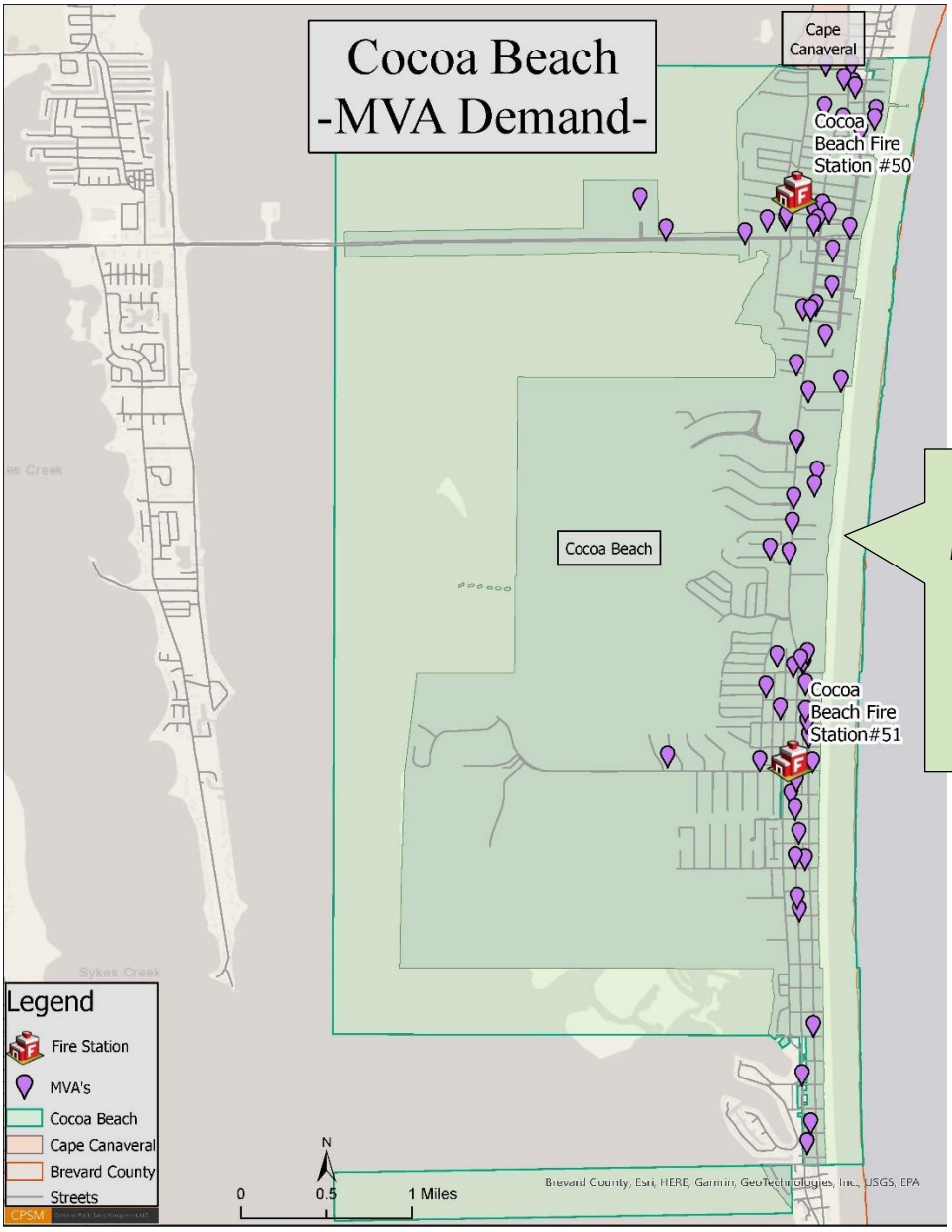
The next figure illustrates the locations of motor vehicle accidents during the period of November 1, 2021, to October 31, 2022, to which the CBFD responded.

FIGURE 3-7: Motor Vehicle Accident Locations



The road and transportation network described herein poses risks for a vehicular accident, some at medium to greater than medium speeds, as well as vehicular-versus-pedestrian risks. There are additional transportation risks since tractor-trailer and other commercial vehicles traverse the roadways of Cocoa Beach to deliver mixed commodities to business locations. Fires involving these products can produce smoke and other products of combustion that may be hazardous to health.

MASS CASUALTY RISK

A mass casualty incident (MCI) is any incident in which emergency medical service resources, such as personnel and equipment, are overwhelmed by the number and severity of casualties.

There is a risk for a mass casualty incident involving high-occupancy vehicles such as mass-transit buses and school buses either on specific bus routes/roads in the city or utilizing the road network in the city for stops outside of Cocoa Beach.

The potential also exists for MCIs occurring in boat marinas as well as open water accidents. Accidents involving multiple vessels on open water, away from land, can be difficult and time-consuming to reach. These type of incidents are covered in more detail in the next section.

Although not transportation related, rip currents can result in an MCI due to the potential for multiple people getting caught up in the currents.

FIRE AND EMS INCIDENT RISK

An indication of the community's overall fire and EMS risk is the type and number of fire and EMS-related incidents the department responds to. CPSM conducted a data analysis for this project that included CBFD incident response types and workload.

The following table details the call types and call type totals for calls between November 1, 2021, and October 31, 2022. During this time period CBFD responded to 2,876 calls. Of these, 14 were structure fire calls and 16 were outside fire calls within the City of Cocoa Beach.

TABLE 3-1: Fire and EMS Incidents by Type

Call Type	Total Calls
Medical call	1,758
MVA	84
EMS Subtotal	**1,842**
False alarm	221
Good intent	26
Hazard	78
Outside fire	16
Public service	435
Structure fire	14
Technical rescue	99
Fire Subtotal	**889**
Canceled	105
Mutual aid	40
Total	**2,876**

- 61 percent of the Fire and EMS calls in Cocoa Beach were EMS-related.
- Motor vehicle accidents made up 3 percent of EMS-related calls.

- 31 percent of the fire and EMS calls in Cocoa Beach were fire related.
- 4 percent of fire and EMS calls in Cocoa Beach were canceled prior to responding or while en route.
- Hazard, Structure and Outside fire calls made up 12 percent of fire calls in Cocoa Beach.
- False alarms made up 25 percent of fire-related calls.
- Public Service and Good Intent calls made up the largest percentage of fire-related calls for service (52 percent).

MARINE AND WATER RISKS

The east side (Atlantic Ocean) and west side (Banana River) areas of the city include marine vessel, marina, and water risks for the fire department. Marine vessel emergencies can occur while docking, fueling, during trailering and launching, and while on the open water. These emergencies can include fire, fuel leaks, medical emergencies, mechanical malfunctions, taking on water, swimmers in distress, and the like.

Fires that occur on boats or in marinas typically spread quickly due to the fuel load and materials some boats are made from and those docked present response challenges, hazardous conditions, and limited access. Fires on the open water have firefighting access issues unless a fireboat is available to respond. Both boat fire incident types and those involving trailering and launching involve life-safety concerns that are of primary importance. Water rescue is a specialized rescue of victims from water or water-related environments where responders utilize various specialized equipment based on the type of situation (surface or underwater) and environmental conditions.

The next figure illustrates the marine and water risks the fire department faces.

FIGURE 3-8: Marine and Water Risks

Rip Currents

Although rip currents are not identified as a specific hazard in the Brevard County Emergency Management Hazard Summaries, rip currents are a significant concern for a local beachfront community. Rip currents are very common on the East Coast of Central Florida. Those who are unaware of the rip current environment can get into trouble quickly, and often without warning. Waves and currents can knock an individual off their feet even in knee-deep water. Sets of waves stacked together can change the water depth by several feet in an instant, overwhelming one's ability to stand or move to safety.

Rip currents have the following characteristics:

- They are channels of water flowing AWAY from shore at surf beaches.
- The speed and strength of these currents can change by the moment and can quickly become dangerous to anyone entering the surf.
- These currents are dangerous because they are strong and will pull a person away from shore.

FIGURE 3-9: Rip Current

Recognizing a Rip Current

- Rip currents are visible as a gap of darker, seemingly calmer water between areas of breaking waves and whitewater.
- A difference in watercolor.
- A line of foam, seaweed, sand, or debris moving AWAY from shore toward the open ocean.
- A channel of churning, choppy water.

Source: "Beach Safety," n.d., https://www.cityofcocoabeach.com/193/Beach-Safety (accessed June 1, 2023).

COMMUNITY FIRE LOSS

Fire loss is an estimation of the total loss from a fire to the structure and contents in terms of replacement. Fire loss includes contents damaged by fire, smoke, water, and overhaul. Fire loss does not include indirect loss, such as business interruption.

In a 2021 report published by the National Fire Protection Association on trends and patterns of U.S. fire losses, it was determined that home fires still cause the majority of all civilian fire deaths, civilian injuries, and property loss due to fire. Key findings from this report include:[30]

- Public fire departments responded to 1,338,500 fires in 2020, a 7.5 percent increase from the previous year.
- 490,500 fires occurred in structures (37 percent). Of these fires, 379,500 occurred in residential structures and 86,000 occurred in apartments or multifamily structures.
- 2,230 civilian fire deaths occurred in residential fires, and 350 deaths occurred in apartments or multifamily structures.
- Home fires were responsible for 11,500 civilian injuries.
- An estimated $21.9 billion in direct property damage occurred as a result of fire in 2020 (includes fires in the California wildland-urban interface and a large loss naval ship fire in California).

The following table shows overall fire loss in Cocoa Beach in terms of dollars for the past five years as assessed and estimated by the CBFD. This information should be reviewed regularly and discussed in accordance with response times to actual fire incidents, company level training, effectiveness on the fire ground, and effectiveness of incident command. Property loss information should also be included in any strategic planning discussions regarding response times, training, incident command, staffing, and deployment of resources.

30. *Fire Loss in the United States During 2020*, National Fire Protection Association.

TABLE 3-2: Historical Property and Content Loss in Cocoa Beach

2018	2019	2020	2021	2022
$160,000.00	$362,770.00	$862,150	$11,600.00	$128,100.00

FIRE- AND EMS-RELATED INCIDENT DEMAND

Analyzing where the fire and EMS/MVA incidents occur, and the demand density of these incidents, helps to determine adequate fire management zone resource assignment and deployment. It is also a prime indicator for sustaining EMS ground transport resources.

The following figures illustrate the fire department's fire and EMS demand by location of calls. The first figure showing fire-related calls includes structural and outside fire incidents; false alarms; other types of fire-related incidents such as good intent and public service calls; and technical rescue calls.

FIGURE 3-10: Fire Incident Demand

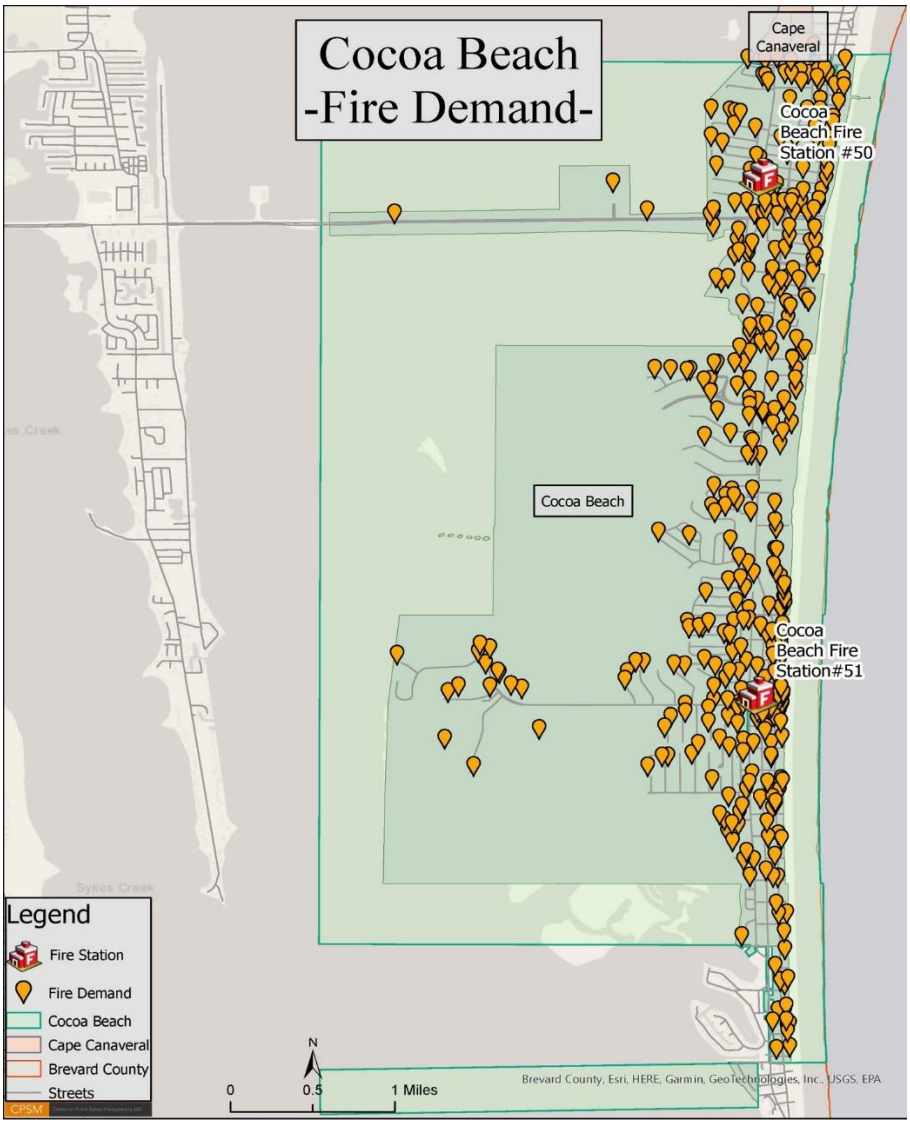
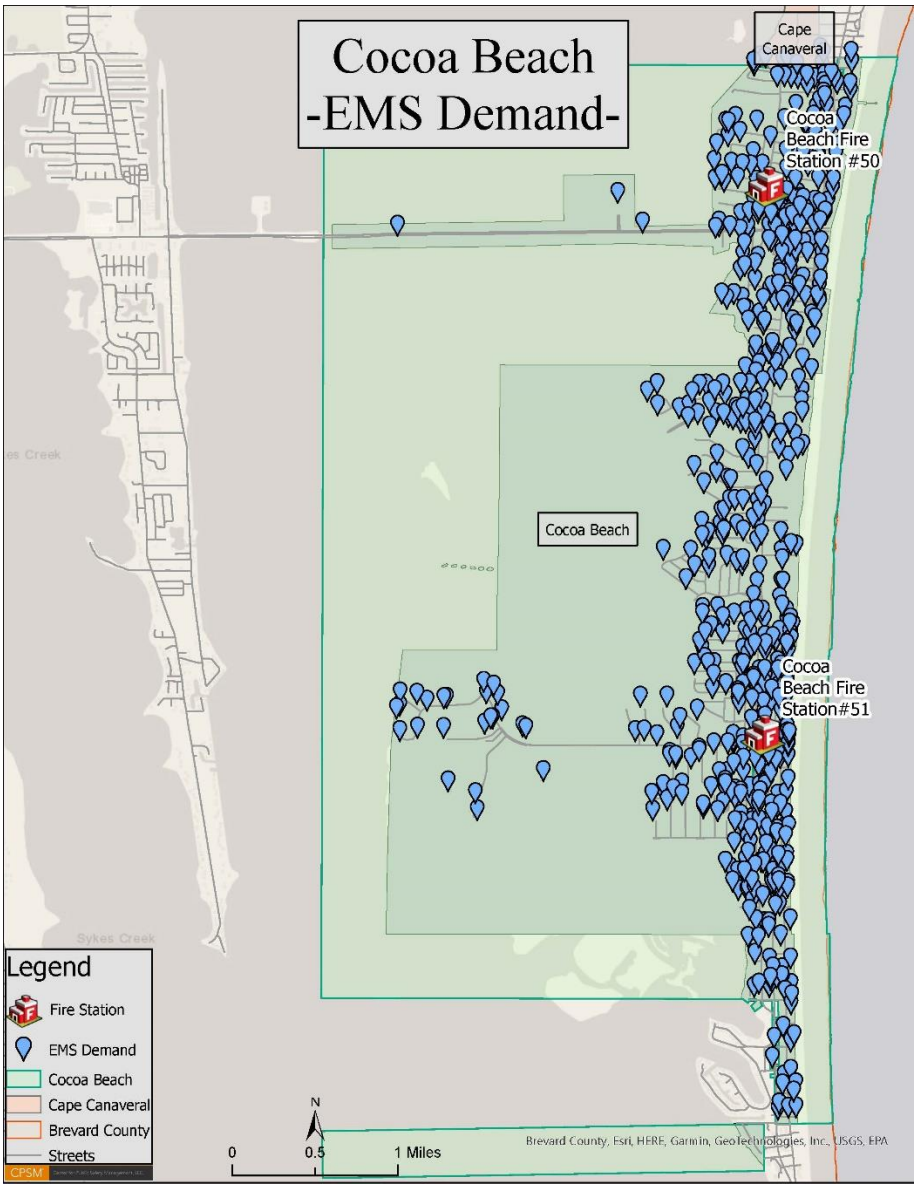


FIGURE 3-11: EMS Incident Demand



CBFD RESILIENCY

Resiliency as defined by the Center for Public Safety Excellence (CPSE) in its *Fire and Emergency Service Self-Assessment Manual* (FESSAM), 9th Edition, is "an organization's ability to quickly recover from an incident or events, or to adjust easily to changing needs or requirements." Greater resiliency can be achieved by constant review and analysis of the response system and focuses on three key components:

- Resistance: The ability to deploy only resources necessary to control an incident and bring it to termination safely and effectively.
- Absorption: The ability of the agency to quickly add or duplicate resources necessary to maintain service levels during heavy call volume or incidents of high resource demand.

- Restoration: The agency's ability to quickly return to a state of normalcy.

Resistance is controlled by the CBFD through available staffing and response protocols, and with CBFD resources dependent on the level of staffing and units available at the time of the alarm.

Absorption is accomplished through availability to respond by CBFD units and through regional auto and mutual aid resources. This is aided through the computer-aided dispatch at the fire dispatch center.

Restoration is managed by CBFD unit availability as simultaneous calls occur, the availability of regional auto and mutual aid resources, recall of personnel to staff fire units during campaign events, and backfilling CBFD stations when needed through mutual aid.

Between November 1, 2021, and October 31, 2022, CBFD fire and EMS units responded to 2,876 calls for service of which 64 percent were EMS calls. The following tables and figure analyze CBFD resiliency. In this analysis, CPSM included all calls that occurred inside and outside Cocoa Beach (to include cancelled calls). We did this because responses outside of the city (although few) and canceled calls impact the resiliency of the department to respond to calls.

The first table examines the workload in terms of runs for each station. Station 50 has the highest workload of the two stations. Each station's availability to respond to calls in their first due area is examined in the second table. The lower the percentage the less resilient the entire station's fire management zone (district) is. Station 51 has the least resiliency. Station 50 is the most resilient.

TABLE 3-3: Annual Workload by Unit

Station	Unit	Unit Type	Total Runs	Runs Per Day
	E50	Engine	1,563	4.3
	Total		**1,563**	**4.3**
51	BCH51	Beach unit	30	0.1
	DIST50	District Officer	620	1.7
	E51	Engine	1,247	3.4
	E251	Reserve engine	5	0.0
	INSP	Inspector	1	0.0
	T51	Tower	664	1.8
	U51	Utility	1	0.0
	Total		**2,568**	**7.0**
Total			**4,131**	**11.3**

TABLE 3-4: Station Availability to Respond to Calls

Zone	Calls in Area	First Due Responded	Percent Responded	First Due Arrived	Percent Arrived	First Due First	Percent First
Station 50	1,503	1,423	94.7	1,416	94.2	1,395	92.8
Station 51	1,258	1,214	96.5	1,197	95.2	1,048	83.3
Total	**2,761**	**2,637**	**95.5**	**2,613**	**94.6**	**2,443**	**88.5**

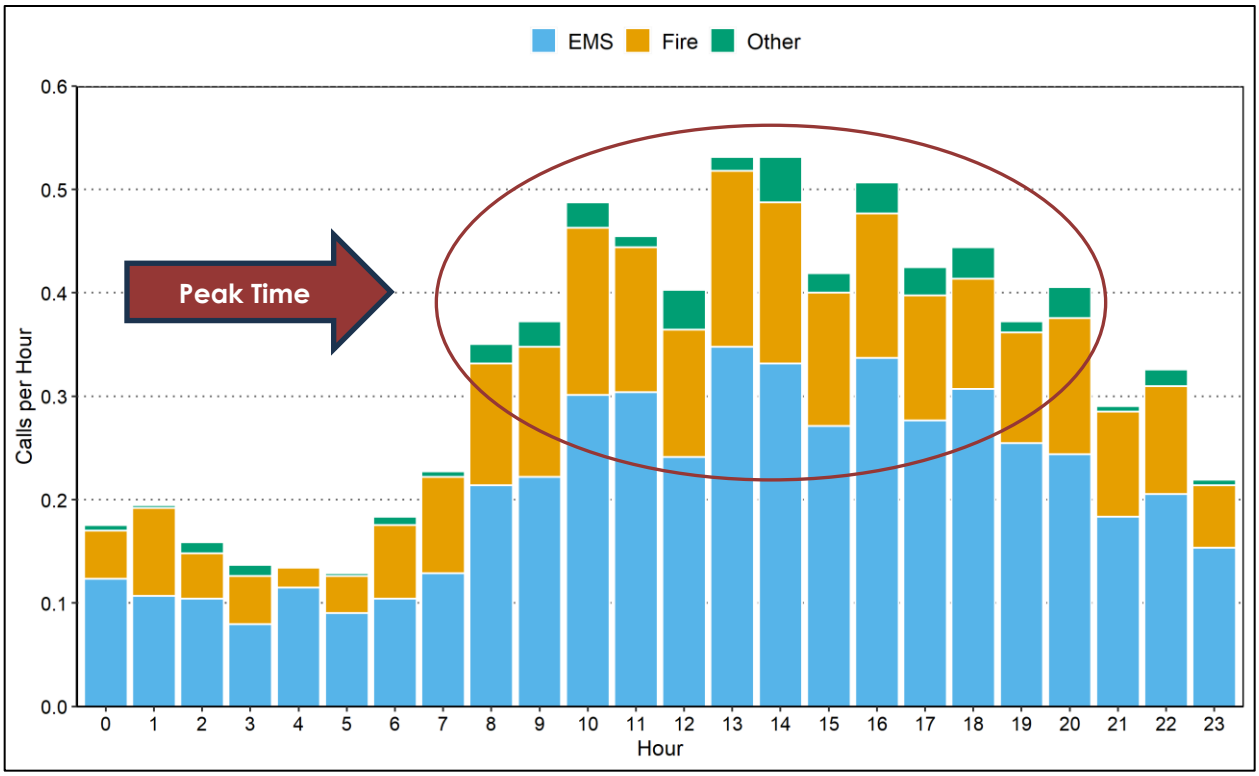
The next resiliency measure is the frequency distribution of calls, or how many calls are occurring in an hour. The next table tells us that citywide, 4.8 percent of the time there are two or more concurrent or overlapping calls.

TABLE 3-5: Frequency Distribution of the Number of Calls

Calls in an Hour	Frequency	Percentage
0	6,376	72.8
1	1,966	22.4
2	352	4.0
3+	66	0.8
Total	**8,760**	**100.0**

The next figure looks at when calls are occurring over a 24-hour period. In Cocoa Beach, the peak time for calls is between the hours of 8:00 a.m. and 8:00 p.m.

FIGURE 3-12: Average Calls by Hour of Day



The next table examines the number of times a call overlapped with another call responded to by CBFD units. The greatest percentage of the time (88 percent) there were no overlapping calls.

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TABLE 3-6: Frequency of Overlapping Calls

Scenario	Number of Calls	Percent of All Calls	Total Hours
No overlapped call	2,538	88.2	921.9
Overlapped with one call	311	10.8	61.2
Overlapped with two calls	23	0.8	3.3
Overlapped with three calls	4	0.1	0.1

The next table looks at the duration of calls, a measure that contributes to overlapping calls, particularly those that last one or more hours. In Cocoa Beach:

- 89 percent of all calls were handled in 30 minutes or less.
- 9 percent of all calls were handled in 30 minutes to one hour.
- 1 percent of all calls were handled in one to two hours.
- 1 percent of all calls were handled in two or more hours.

TABLE 3-7: Calls by Type and Duration

Call Type	Less than 30 Minutes	30 Minutes to One Hour	One to Two Hours	Two or More Hours	Total
Medical call	1,590	150	12	6	1,758
MVA	63	17	4	0	84
EMS Subtotal	**1,653**	**167**	**16**	**6**	**1,842**
False alarm	208	9	2	2	221
Good intent	22	3	1	0	26
Hazard	63	12	2	1	78
Outside fire	10	5	0	1	16
Public service	375	30	12	18	435
Structure fire	8	2	1	3	14
Technical rescue	90	7	0	2	99
Fire Subtotal	**776**	**68**	**18**	**27**	**889**
Canceled	101	1	0	3	105
Mutual aid	35	3	2	0	40
Total	**2,565**	**239**	**36**	**36**	**2,876**

The next table examines the number of arriving units (typically dispatched to a call). In Cocoa Beach:

- 80 percent of calls had one unit assigned.
- 10 percent of calls had two units assigned.
- 7 percent of calls had three units assigned.
- 2 percent of calls had four or more units assigned.

The CBFD does have moderate resistance issues based on the response matrix. Overall, 20 percent of calls where units arrived included two or more CBFD units. Fire calls make up the highest percentage of two or more units responding (33 percent of all fire calls).

TABLE 3-8: Calls by Call Type and Number of Arriving CBFD Units

Call Type	Number of Units				Total Calls
	One	Two	Three	Four or More	
Medical call	1,566	92	82	2	1,742
MVA	19	21	38	4	82
EMS Subtotal	**1,585**	**113**	**120**	**6**	**1,824**
False alarm	90	47	44	37	218
Good intent	12	5	1	7	25
Hazard	33	24	13	8	78
Outside fire	2	11	1	2	16
Public service	374	47	10	1	432
Structure fire	5	3	2	4	14
Technical rescue	76	14	6	1	97
Fire Subtotal	**592**	**151**	**77**	**60**	**880**
Canceled	54	2	1	0	57
Mutual aid	7	14	2	0	23
Total	**2,238**	**280**	**200**	**66**	**2,784**
Total Percentage	**80.4**	**10.1**	**7.2**	**2.4**	**100.0**

Note: Only calls with arriving CBFD units were considered. There were 92 calls where a CBFD unit recorded an en route time but no unit recorded an arrival time.

Overall, the CBFD has moderate resiliency issues at Station 51 in terms of workload of first response fire suppression units.

Station 51 has moderate resiliency issues when analyzing this station's ability to arrive first in its fire management zone as well. The frequency of concurrent calls is relatively low at 12 percent of all calls.

Both stations have concurrent calls that occur. When call concurrency goes beyond two calls in an hour, the fire management zone may not have a resource in the district station, as no station has more than two staffed primary response units.

The workload of all companies in terms of runs (calls where there are more than one unit responding) will have an effect on resiliency, as there are limited resources available with only two primary staffed resources available in station 51 and one primary staffed resource available in station 50.

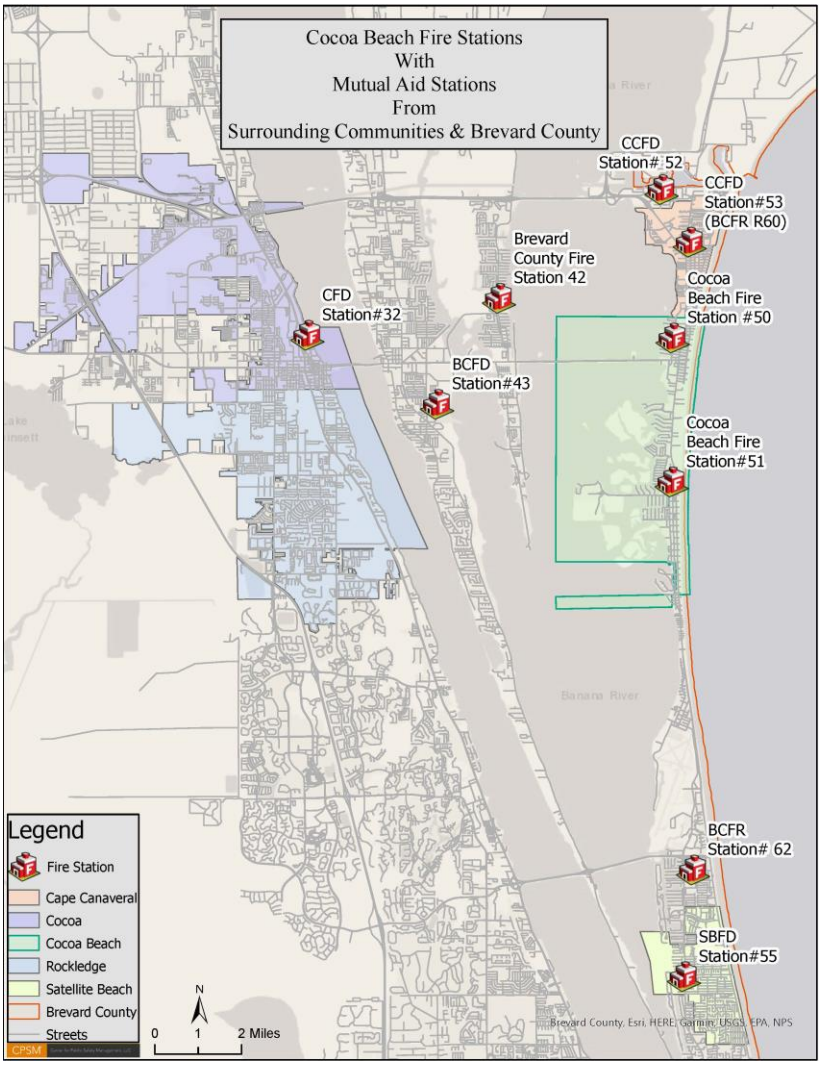
The CBFD's ability to absorb multiple calls and restore response capabilities to a state of normal can be challenging at certain times such as during working structural fires and other multi-company responses (runs). Station 51 should be monitored, as it is below the 90th percentile of arriving first in its fire management zone.

AUTOMATIC AND MUTUAL AID

Automatic aid is a system whereby fire, rescue, and EMS units respond automatically to another community through agreement based on closeness of resources. Mutual aid is a system whereby surrounding communities provide fire, rescue, and EMS resources to another community through agreement and specific request (not automatically). In an automatic aid scenario, resources from neighboring jurisdictions are built into run cards in the home jurisdiction for again, an automatic response; this aid is designed to supplement and bolster the Effective Response Force (ERF) of the home jurisdiction.

As indicated in the next figure, the CBFD has reciprocal automatic aid with Cape Canaveral Fire Department to the north, Brevard County Fire Rescue and Satellite Beach Fire Department to the south, and Brevard County Fire Rescue to the west. Aid given and received can be either emergency response of fire suppression, EMS ground transport, special or technical services, or command staff. Brevard County Fire Rescue also provides a regional hazardous materials response team through mutual aid as needed. Additionally, Space Force Base FD to the north currently provides mutual aid when requested by the city and are considering automatic aid.

FIGURE 3-13: Cocoa Beach Automatic/Mutal Aid Partners



RISK CATEGORIZATION

A comprehensive risk assessment is a critical aspect of assessing and creating a deployment analysis to meet the community's risk and can assist the CBFD in quantifying the risks that it faces. Once those risks are known and understood, the department is better equipped to determine if the current response resources are sufficiently staffed, equipped, trained, and positioned.

In this component, the factors that drive the service needs are examined and then link directly to discussions regarding the assembling of an ERF and when contemplating the response capabilities needed to adequately address the existing risks, which encompasses the component of critical tasking.

The risks that the department faces can be natural or manufactured and may be affected by the changing demographics of the community. With the information available from the CPSM data and operational analysis, the CBFD, the city, and public research, the CBFD can begin to analyze the community's risks, and can begin working towards recommendations and strategies to mitigate and minimize their effects through the proper deployment of resources. This section contains an analysis of the various risks considered within the CBFD service area.

Risk is often categorized in three ways: the probability the event will occur in the community, the impact on the fire department, and the consequence of the event on the community. The following three tables look at the probability of the event occurring, which ranges from unlikely to frequent; consequence to the community, which is categorized as ranging from insignificant to catastrophic; and the impact to the organization, which ranges from insignificant to catastrophic.

TABLE 3-9: Event Probability

Probability	Chance of Occurrence	Description	Risk Score
Unlikely	2%-25%	Event may occur only in exceptional circumstances.	**2**
Possible	26%-50%	Event could occur at some time and/or no recorded incidents. Little opportunity, reason, or means to occur.	**4**
Probable	51%-75%	Event should occur at some time and/or few, infrequent, random recorded incidents, or little anecdotal evidence. Some opportunity, reason, or means to occur; may occur.	**6**
Highly Probable	76%-90%	Event will probably occur and/or regular recorded incidents and strong anecdotal evidence. Considerable opportunity, means, reason to occur.	**8**
Frequent	90%-100%	Event is expected to occur. High level of recorded incidents and/or very strong anecdotal evidence.	**10**

TABLE 3-10: Consequence to Community Matrix

Impact	Consequence Categories	Description	Risk Score
Insignificant	Life Safety	■ 1 or 2 people affected, minor injuries, minor property damage, and no environmental impact.	**2**
Minor	Life Safety Economic and Infrastructure Environmental	■ A small number of people were affected, no fatalities, and a small number of minor injuries with first aid treatment. Minor displacement of people for <6 hours and minor personal support required. ■ Minor localized disruption to community services or infrastructure for <6 hours. Minor impact on environment with no lasting effects.	**4**
Moderate	Life Safety Economic and Infrastructure Environmental	■ Limited number of people affected (11 to 25), no fatalities, but some hospitalization and medical treatment required. Localized displacement of small number of people for 6 to 24 hours. Personal support satisfied through local arrangements. Localized damage is rectified by routine arrangements. ■ Normal community functioning with some inconvenience. Some impact on environment with short-term effects or small impact on environment with long-term effects.	**6**
Significant	Life Safety Economic and Infrastructure Environmental	■ Significant number of people (>25) in affected area impacted with multiple fatalities, multiple serious or extensive injuries, and significant hospitalization. ■ A large number of people were displaced for 6 to 24 hours or possibly beyond. External resources required for personal support. Significant damage that requires external resources. Community only partially functioning, some services unavailable. Significant impact on environment with medium- to long-term effects.	**8**
Catastrophic	Life Safety Economic and Infrastructure Environmental	■ Very large number of people in affected area(s) impacted with significant numbers of fatalities, large number of people requiring hospitalization; serious injuries with long-term effects. General and widespread displacement for prolonged duration; extensive personal support required. Extensive damage to properties in affected area requiring major demolition. ■ Serious damage to infrastructure. Significant disruption to, or loss of, key services for a prolonged period. ■ Community unable to function without significant support. ■ Significant long-term impact on environment and/or permanent damage.	**10**

TABLE 3-11: Impact on CBFD

Impact	Impact Categories	Description	Risk Score
Insignificant	Personnel and Resources	One apparatus out of service for period not to exceed one hour.	**2**
Minor	Personnel and Resources	More than one but not more than two apparatus out of service for a period not to exceed one hour.	**4**
Moderate	Personnel and Resources	More than 50 percent of available resources committed to incident for over 30 minutes.	**6**
Significant	Personnel and Resources	More than 75 percent of available resources committed to an incident for over 30 minutes.	**8**
Catastrophic	Personnel, Resources, and Facilities	More than 90 percent of available resources committed to an incident for more than two hours or event which limits the ability of resources to respond.	**10**

This section also contains an analysis of the various risks considered in the city. In this analysis, information presented and reviewed in this section (All-Hazards Risk Assessment of the Community) have been considered. Risk is categorized as Low, Moderate, High, or Special.

Prior risk analysis has only evaluated two factors of risk: probability and consequence. Contemporary risk analysis considers the impact of each risk to the organization, thus creating a three-axis approach to evaluating risk as depicted in the following figure. A contemporary risk analysis now includes probability, consequences to the community, and impact on the organization, in this case the CBFD.

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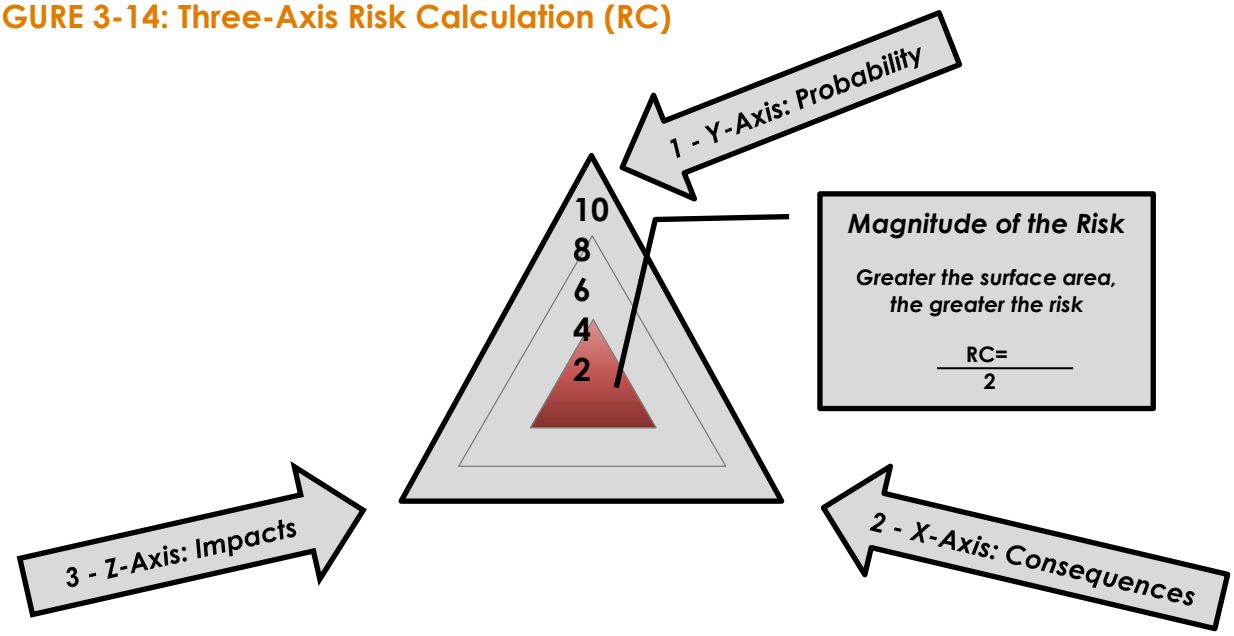
FIGURE 3-14: Three-Axis Risk Calculation (RC)



The following factors/hazards were identified and considered:

- **Demographic factors** such as age, socio-economic, vulnerability.
- **Natural hazards** such as flooding, snow and ice events, wind events, summer storms.
- **Manufactured hazards** such as transportation risks (road and rail) and target hazards.
- Structural/building risks.
- Fire and EMS incident numbers and density.
- Resiliency.

The assessment of each factor and hazard as listed below took into consideration the likelihood of the event, the impact on the city itself, and the impact on CBFD's ability to deliver emergency services, which includes their resiliency and mutual aid capabilities as well. The list is not all-inclusive but includes categories most common or that may present to the city and the CBFD.

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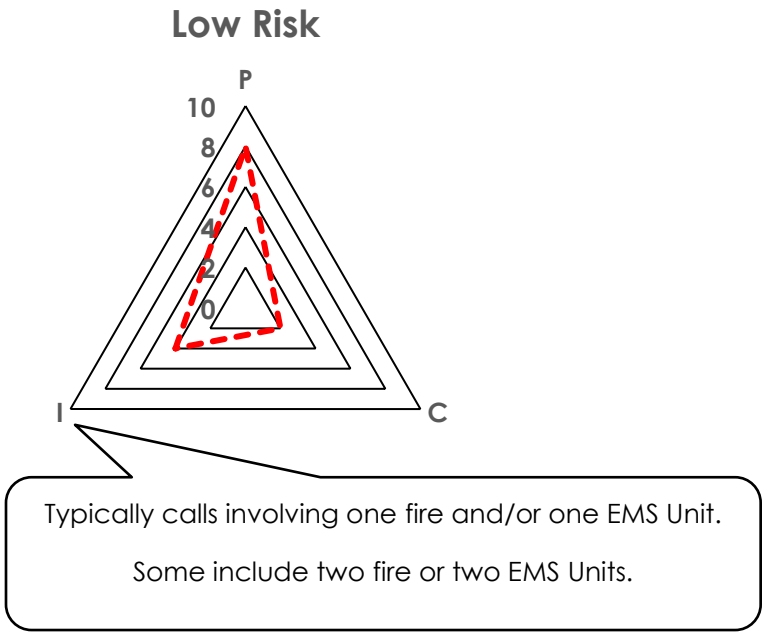
Low Risk

- Automatic fire/false alarms.
- Low-acuity BLS EMS Incidents.
- Low-risk environmental event.
- Motor vehicle accident (MVA)-no entrapment, 1-2 patients, low hazards.
- Good intent/hazard/public service fire incidents with no life-safety exposure.
- Outside fires such as grass, rubbish, dumpster, vehicle with no structural/life-safety exposure.
- Low acuity marine or water incident.

FIGURE 3-15: Low Risk



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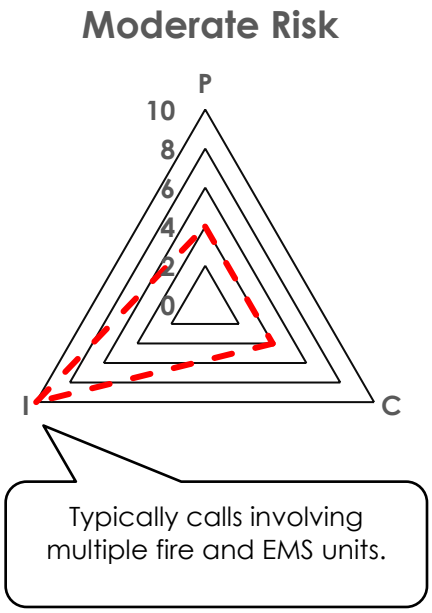
Moderate Risk

- Fire incident in a single-family dwelling where fire and smoke or smoke is visible, indicating a working fire.
- Suspicious substance investigation involving multiple fire companies and law enforcement agencies.
- ALS EMS incident.
- MVA with entrapment of passengers.
- Low-angle rescue involving ropes and rope rescue equipment and resources.
- Surface water rescue.
- Good intent/hazard/public service fire incidents with life-safety exposure.
- Road transportation event with no release of product or fire, and no threat to life safety.

FIGURE 3-16: Moderate Risk



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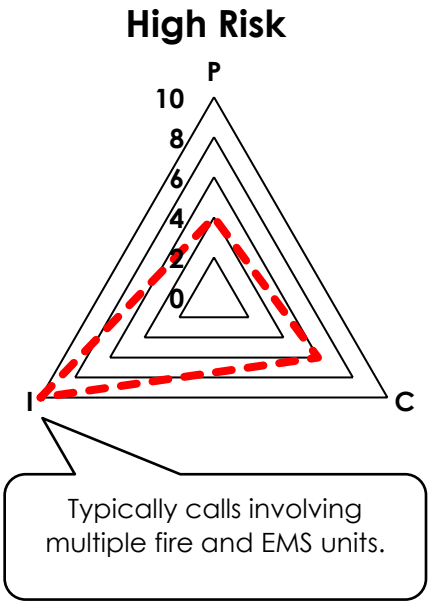
High Risk

- Working fire in a target hazard.
- Mass casualty incident of more than 10 patients but fewer than 25 patients.
- Confined space rescue.
- Structural collapse involving life-safety exposure.
- High-angle rescue involving ropes and rope rescue equipment.
- Trench rescue.
- Suspicious substance incident with multiple injuries.
- Industrial leak of hazardous materials that causes exposure to persons or threatens life safety.
- Surface water rescue involving rip currents.
- Marine incidents involve multiple boats that are docked and fueled.

FIGURE 3-17: High Risk



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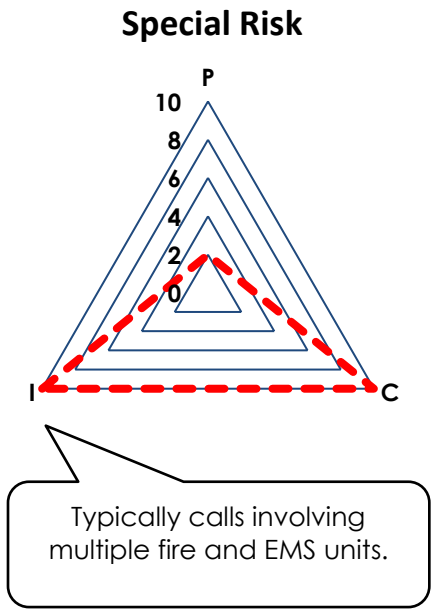
Special Risk

- Working fire in a structure of more than three floors.
- Fire at an industrial building or complex with hazardous materials.
- Fire in an occupied targeted hazard with special life-safety risks such as age, medical condition, or other identified vulnerabilities.
- Mass casualty incident of more than 25 patients.
- Transportation incident that causes life-safety exposure or threatens life safety through the release of hazardous smoke or materials and evacuation of residential and business occupancies.
- Explosion in a building that causes exposure to persons or threatens life safety or outside of a building that creates exposure to occupied buildings or threatens life safety.
- Fire in an occupied public assembly or medical institution, high-impact environmental event, pandemic.
- Mass gathering with threat fire and threat to life safety or other civil unrest, weapons of mass destruction release.
- Weather events (coastal storms) that create widespread flooding, heavy winds, building damage, and/or life-safety exposure.

FIGURE 3-18: Special Risk



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SECTION 4. CBFD OPERATIONS

STAFFING AND DEPLOYING FIRE AND EMS RESOURCES

When exploring staffing and deployment of fire departments it is prudent to design an operational strategy around the actual circumstances that exist in the community and the fire and risk problems that are identified. The strategic and tactical challenges presented by the varied hazards that a department protects against need to be identified and planned for through a community risk analysis planning and management process as completed in this report.

Effectively managing a fire department requires an understanding of and an ability to demonstrate how changes to resources will affect community outcomes. It is imperative that fire department leaders, as well as policy makers, know how fire department resource deployment in their local community affects community outcomes in three important areas: firefighter injury and death; civilian injury and death; and property loss. If fire department resources (both mobile and personnel) are deployed to match the risk levels inherent to hazards in the community, it has been conclusively demonstrated that the community will be far less vulnerable to negative outcomes in all three areas.[31]

Even with a thorough risk evaluation, staffing fire and EMS companies continues to remain a hotly debated topic among firefighters and governmental leadership since risk assessment models include high risk / low frequency situations. While there are situations that may be low frequency, they can and do occur and thus require operational readiness to mitigate.

While NFPA 1710 and OSHA provide guidelines as to the level of staffing and response of personnel, the acceptance of these guidelines varies from state to state and local government to local government. NFPA 1710 addresses recommended staffing in terms of four types of occupancies. The needed staffing to accomplish the critical tasks for each specific occupancy are determined to be the *Effective Response Force* (ERF). The ERF for each of these occupancies is detailed in NFPA 1710 (2020 edition), Section 5.2.4, Deployment. OSHA is specific to operating in immediately dangerous to life or health (IDLH) environments, where there is a requirement of two firefighters outside of the building or entry point to the IDLH, while there are two firefighters operating inside the building or other vessel that has an IDLH.

One of the factors that has helped the fire service in terms of staffing is technology. The fire service continues to incorporate technological advances that help firefighters extinguish fires more effectively. More advanced equipment in terms of nozzles, thermal imaging systems, advancements in self-contained breathing apparatus, incident command strategies, compressed air foam, and devices used to track personnel air supply are some of the advancements of technologies and techniques that help firefighters extinguish fires faster and manage the fireground more effectively. While some of these technologies do not reduce the staffing required, they can have an impact on workload, property loss, and crew fatigue.

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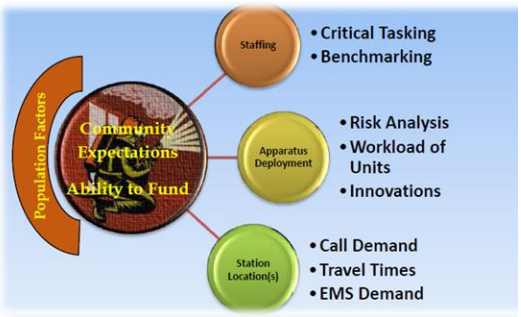
31. Fire Service Deployment, Assessing Community Vulnerability, Metropolitan Chiefs, 2011.



Staffing and deployment of fire services are not exact sciences. While there are many benchmarks that communities and management utilize in justifying certain staffing levels, there are certain considerations that are data driven and reached through national consensus that serve this purpose as well. CPSM has developed metrics it follows and recommends that communities consider when making recommendations regarding staffing and deployment of fire resources.

In addition to metrics, staffing is also linked to station location, what type of apparatus is responding, whether engine, ladder, or specialty piece such as a rescue company. These combined factors help to determine what level of fire and EMS service is going to be delivered in terms of workforce, response time, and resources. Linked to these components of staffing and deployment are 11 critical factors that drive various levels and models from which fire and EMS departments staff and deploy. These factors are:

Fire Risk and Vulnerability of the Community: The community risk and vulnerability assessment are used to evaluate the community. With regard to individual property, the assessment is used to measure all property and the risk associated with that property and then segregate the property as either a high-, medium-, or low-hazard depending on factors such as the life and building content hazard and the potential fire flow and the staffing and apparatus types required to mitigate an emergency in the specific property. Factors such as fire protection systems are considered in each building evaluation. Included in this assessment should be both a structural and nonstructural (weather, wildland-urban interface, transportation routes, etc.) analysis.

Population, Demographics, and Socioeconomics of a Community: Population and population density drive calls for local government service, particularly public safety. The risk from fire is not the same for everyone, with studies telling us age, gender, race, economic factors, and what region in the country one might live all contribute to the risk of death from fire. Studies also tell us these same factors affect demand for EMS, particularly population increase and the use of hospital emergency departments. Many uninsured or underinsured patients rely on emergency departments for their primary and emergency care, utilizing a pre-hospital EMS transport system as their entry point.

Call Demand: Demand is made up of the types of calls to which units are responding and the location of the calls. This drives workload and station staffing considerations. *Higher population centers with increased demand require greater resources.*

Workload of Units: The types of calls to which units are responding and the workload of each unit in the deployment model. This tells us what resources are needed and where; it links to demand and station location, or in a dynamic deployed system, the area(s) in which to post units.

Travel Times from Fire Stations: Looks at the ability to cover the response area in a reasonable and acceptable travel time when measured against national benchmarks. Links to demand and risk assessment.

NFPA Standards, ISO, OSHA Requirements (and other national benchmarking). CPSM considers national benchmarks, standards, and applicable laws when making recommendations or alternatives regarding the staffing and deployment of fire and EMS resources.

EMS Demand: Community demand; demand on available units and crews; demand on non-EMS units responding to calls for service (fire/police units); availability of crews in departments that utilize cross-trained EMS staff to perform fire suppression.

Critical Tasking: The ability of a fire and EMS department to collect an effective response force as benchmarked against national standards when confronted with the need to perform required critical tasks on a fire or EMS incident scene defines its capability to provide adequate resources to mitigate each event. Department-developed and measured against national benchmarks. Links to risk and vulnerability analysis.

Innovations in Staffing and Deployable Apparatus: The fire department's ability and willingness to develop and deploy innovative apparatus. Compressed air foam systems, deploying quick response vehicles (light vehicles equipped with medical equipment and some light fire suppression capabilities) on those calls (typically the largest percentage) that do not require heavy fire apparatus.

Community Expectations: Measuring, understanding, and meeting community expectations.

Ability to Fund: The community's ability and willingness to fund all local government services and understanding how the revenues are divided up to meet the community's expectations.

While each component presents its own metrics of data, consensus opinion, and/or discussion points, aggregately they form the foundation for informed decision-making geared toward the implementation of sustainable, data- and theory-supported, effective fire and EMS staffing and deployment models that fit the community's profile, risk, and expectations.

Deployable Resources

The CBFD service area has a mix of light industrial, commercial, public assembly, professional office buildings, multifamily and single-family residential structures of multiple stories, some mixed use, transportation risks, and healthcare facilities. The service area has a diverse mix of buildings ranging from old to new construction, many with multiple stories and access issues. The built-upon area is largely urban.

As discussed, the CBFD responds with fire suppression apparatus with crews from two fire station locations deploying fire, rescue, and specialty units. The CBFD also utilizes mutual/automatic aid from contiguous jurisdictions to assist in strategic areas of the city and to augment the assembling of an Effective Response Force. The CBFD primary deployable resources include:

Engine Companies, which are primarily designed for firefighting operations, the transport of crew members, hose (fire attack and larger supply), tank water, ground ladders, self-contained breathing apparatus, and storage of an assortment of hand tools used for a broad spectrum of fire operational tasks. As engines are often utilized as first response units on EMS calls, they also carry an assortment of EMS gear to treat patients and provide life-saving measures prior to the arrival of EMS transport units. The CBFD engines are set up for this as well and are staffed with advanced emergency medical technicians. Staffing complements for engine apparatus are discussed below. CBFD currently responds to emergencies with an inventory of two frontline engines.

Quint Companies, which are designed primarily for firefighting operations and offer both engine and ladder capabilities. A quint includes a hydraulically operated aerial ladder, fire pump, water tank, fire hose, and ground ladders. Quint apparatus transport crew members, a broad spectrum of engine company tools and equipment as well as ground ladders, self-contained breathing apparatus, various forcible entry tools, ventilation equipment, and hydraulic rescue

tools, and other equipment to deal with an assortment of fires and technical rescues. As quints are typically the single piece of fire apparatus assigned to a station they are often utilized as first response units on EMS calls, so they carry an assortment of EMS gear to treat patients and provide life-saving measures prior to the arrival of EMS transport units. The CBFD currently responds to emergencies with an inventory of one quint apparatus. The quint in Cocoa Beach is utilized primarily as a ladder company but can function as an engine company when needed. The CBFD ladder is a tower-ladder, meaning the hydraulic aerial device has an enclosed platform (bucket in layman's terms) attached to the tip of the aerial.

Rescue Watercraft Vehicles, which are typically Personal Watercraft (PWC -Jet-Ski) that are trailered and able to be deployed directly into the surf at the specific location of the water emergency. These watercraft typically are equipped with a rescue sled that is coupled to the PWC and towed from behind.

Command Vehicles, which are typically SUV-type vehicles with command centers built into the cargo compartment, are designed to carry a command level officer to the scene and equipped with radio and command boards as well as on-scene personnel-tracking equipment and associated gear. The CBFD has one operations command vehicle assigned to the shift District Officer while on duty. Ther CBFD also has other command capable units assigned to the Fire Chief, Deputy Chief, and Division Chiefs. Operational District Officers respond to fire and EMS incidents and establish command and control of the incident.

Fire, rescue, and emergency medical services (EMS) incidents, and the fire department's ability to respond to, manage, and mitigate them effectively, efficiently, and safely, are mission-critical components of the emergency services delivery system. In fact, fire, rescue, and EMS operations provide the primary, and certainly most important, basis for the very existence of the fire department.

The following table outlines the CBFD's minimum staffing matrix. As a note, there are eleven personnel assigned to each shift at maximum staffing levels. Minimum staffing is nine as outlined in the table, which essentially is three per engine apparatus, two assigned to the ladder company, and one assigned District Officer / shift commander.

TABLE 4-1: CBFD Minimum Staffing Matrix

Station	Apparatus	Minimum Staffing
Station 50	Engine 50	3
Station 51	Engine 51 Truck 51 District Officer-Shift Commander	3 2 1
	Total Minimum Staffing	**9**

CPSM recommends increasing daily staffing to ten so that Truck 51 can be staffed with a minimum of three so the apparatus can function effectively as outlined herein.

EFFECTIVE RESPONSE FORCE AND CRITICAL TASKING

NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Career Fire Departments*, 2020 edition, outlines organization and deployment of operations by career, and primarily career fire and rescue organizations. It serves as a benchmark to measure staffing and deployment of resources to certain structures and emergencies. Questions of legal responsibilities are often discussed in terms of compliance with NFPA standards. NFPA standards are consensus standards and not the law. Many cities and counties strive to achieve these standards to the extent possible while not placing an undue financial burden on the community. Cities and communities must decide on the level of service and compliance they can deliver based on budgetary constraints and operational capabilities.

NFPA 1710 details staffing levels for fire departments in terms of fire, EMS, and special operations incidents. According to NFPA 1710, fire departments should base their capabilities on a formal community risk assessment, as discussed in this report, and taking into consideration:[32]

- Life hazard to the population protected.
- Provisions for safe and effective firefighting performance conditions for the firefighters.
- Potential property loss.
- Nature, configuration, hazards, and internal protection of the properties involved.
- Types of fireground tactics and evolutions employed as standard procedure, type of apparatus used, and results expected to be obtained at the fire scene.

NFPA 1710 addresses standards for an *Effective Response Force* across several types of occupancies. An effective response force (ERF) is defined as the minimum number of firefighters and equipment that must reach a specific emergency incident location within a maximum prescribed travel [driving] time. The maximum prescribed travel time acts as one indicator of resource deployment efficiency.

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32. NFPA 1710, 5.2.1.1, 5.2.2.2

FACT SHEET

KEY REQUIREMENTS FOR EMERGENCY SERVICES IN NFPA 1710

The minimum requirements for provision of emergency services by career fire departments can be found in NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments.*

NFPA 1710 addresses the structure and operation of organizations providing such services, which include fire suppression and other assigned emergency response responsibilities such as EMS and special operations.

The requirements intend to provide effective, efficient, and safe protective services to help prevent fires, reduce risk to lives and property, deal with incidents that occur, and help prepare for anticipated incidents.

The requirements are listed in NFPA 1710 for fire department service deployment based on the type of occupancy, along with the appropriate response staffing levels for each. The minimum staffing level for each occupancy is listed below. For the full breakdown of staffing requirements by position, refer to the subsections specific to each occupancy in 5.2.4.

KEY REQUIREMENTS

Occupancy Type: Single-Family Dwelling
Deployment: Minimum of 16 members or 17 if aerial device is used

The initial full alarm assignment to a structure fire in a typical 2000 ft² (186 m²), two-story, single-family dwelling without a basement and with no exposures must provide for a minimum of 16 members (17 if an aerial device is used).

Occupancy Type: Open-Air Strip Mall
Deployment: Minimum of 27 members or 28 if aerial device is used

The initial full alarm assignment to a structure fire in a typical open-air strip shopping center ranging from 13,000 ft² to 196,000 ft² (1203 m² to 18,209 m²) in size must provide for a minimum of 27 members (28 if an aerial device is used).

Occupancy Type: Garden-Style Apartment
Deployment: Minimum of 27 members or 28 if aerial device is used

The initial full alarm assignment to a structure fire in a typical 1200 ft² (111 m²) apartment within a three-story, garden-style apartment building must provide for a minimum of 27 members (28 if an aerial device is used).

Occupancy Type: High-Rise
Deployment: Minimum of 42 members or 43 if building is equipped with fire pump

The initial full alarm assignment to a fire in a building with the highest floor greater than 75 ft (23 m) above the lowest level of fire department vehicle access must provide for a minimum of 42 members (43 if the building is equipped with a fire pump).

NFPA 1710 provides a staffing deployment model and critical tasking guidelines for four specific occupancies. These occupancies are:

- Single-Family Dwelling.
- Open-Air Strip Mall/Commercial Building.
- Garden Style Apartment.
- High-Rise (there are 19 high structures in Cocoa Beach).

The Center for Public Safety Excellence (CPSE) has also established benchmarks regarding staffing and deployment. CPSE sets standards for agencies desiring accreditation through the Commission on Fire Accreditation International (CFAI). CFAI uses standards set forth in the *Quality Improvement for the Fire and Emergency Services* manual, to provide guidance in staffing and deployment to agencies desiring accreditation through Core Competencies.

Fire Critical Tasking

Both CPSE and the NFPA have defined *critical tasking*. CPSE defines critical tasking as the application of tasks assigned to the human and physical resources that are minimally required to effectively mitigate pain, suffering, and loss of life and/or property. Critical tasking is relevant to risk classifications and risk categories.[33]

Critical tasks as defined by NFPA 1710 are those activities that must be conducted on time by responders at emergency incidents to control the situation and stop loss. Critical tasking for fire operations requires a minimum number of personnel to perform the tasks needed to effectively control and mitigate a fire or other emergency. To be effective, critical tasking must assign enough personnel so that all identified functions can be performed simultaneously. However, it is important to note that initial response personnel may manage secondary support functions once they have completed their primary assignment. Thus, while an incident may end up requiring a greater commitment of resources or a specialized response, a properly executed

33. Center for Public Safety Excellence, Quality Improvement for the Fire and Emergency Services, 2020

critical tasking assignment will provide adequate resources to immediately begin bringing the incident under control.

There are over 90 Core Competencies required for a department to achieve accreditation status as defined by CPSE. Competency 2C.4 is under the heading of Current Deployment and Performance and addresses critical tasking.

Criterion 2C: Current Deployment and Performance

> *The agency identifies and documents the nature and magnitude of the service and deployment demands within its jurisdiction. Based on risk categorization and service impact considerations, the agency's deployment practices are consistent with jurisdictional expectations and with industry research. Efficiency and effectiveness are documented through quality response measurements that consider overall response, consistency, reliability, resiliency, and outcomes throughout all service areas. The agency develops procedures, practices, and programs to appropriately guide its resource deployment.*[34]

Core Competency 2C.4

> *A critical task analysis of each category and risk class is conducted to determine the first due and effective response force capabilities, and a process is in place to validate and document the results. Core competency 2C.4 requires that the agency conduct a critical task analysis of each risk category and risk class to determine the first-due and effective response force capabilities, and to have a process in place to validate and document the results. The process considers the number of personnel needed to perform the necessary emergency scene operations. Completion of the process also helps to identify any gaps in the agency's emergency scene practices.*

The specific number of people required to perform all the critical tasks associated with an identified risk or incident type is referred to as an Effective Response Force (ERF). The goal is to deliver an ERF within a prescribed period.

The CBFD is a signatory to an automatic aid agreement with Brevard County Fire Rescue, Cape Canaveral Fire Department, and Satellite Beach Fire Department, as we previously noted. As such, and as a component of the agreement, CBFD follows Brevard County Fire Rescue Standard Operating Guideline #2603: Standard Apparatus Deployment Model.

Standard Operating Guideline #2603 outlines structural fire responses as low-, medium-, and high-risk. These are defined as and include the following response complement of apparatus/personnel on the initial alarm:

Low Hazard: Single-family residence, 2 to 4 unit apartment buildings, small stand-alone businesses, and small commercial occupancies.

- Closest Fire Apparatus (Engine/Truck Companies): 3.
- Rescue Unit: 1.
- District Chiefs: 2.
- Water Tender (if no fire hydrants): 1.

34. Center for Public Safety Excellence, Quality Improvement for the Fire and Emergency Services, 2020

Medium Hazard: Apartment buildings or complexes, motels/hotels, commercial strip centers, shopping malls, restaurants, large office buildings or complexes, and light industrial.

- Engine Companies: 4.
- Truck Companies: 2.
- Rescue Units: 2.
- District Chiefs: 2.
- Water Tender (if no fire hydrants): 2.

High Hazard: Schools, hospitals, nursing homes, mid-rise or high-rise residential apartments/condominiums, warehouses, lumber yards, large box retail, petroleum storage and other haz-mat facilities, marinas, and boat storage facilities.

- Engine Companies: 5.
- Truck Companies: 2.
- Rescue Units: 2.
- District Chiefs: 2.
- Water Tender (if no fire hydrants): 2.

Cocoa Beach has low-, medium-, and high-hazard buildings/facilities in the city.

Building the Effective Response Force

The following discussion and tables will outline how critical tasking and assembling an effective response force is first measured in NFPA 1710, and how the CBFD is benchmarked against this standard for the building types existing in Cocoa Beach. This discussion will cover single-family dwelling buildings, open-air strip mall buildings, apartment buildings, and high-hazard/high-rise buildings as outlined in the NFPA standard. While not an exact match to Brevard County SOG#2603 in terms of risk classification, there are consistent similarities.

Single-Family Dwelling: NFPA 1710, 5.2.4.1

The initial full alarm assignment (ERF) to a structural fire in a typical 2,000 square-foot, two-story, single-family dwelling without a basement and with no exposures must provide for a minimum of 16 members (17 if an aerial device is used). The next table outlines the critical task matrix. Single family dwellings represent the majority of building risk in Cocoa Beach. These are low hazards under the BCFR SOG #2603.

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TABLE 4-2: Effective Response Force for Single-Family Dwelling Building

Critical Tasks	Personnel
Incident Command	1
Continuous Water Supply	1
Fire Attack via Two Handlines	4
Hydrant Hook Up - Forcible Entry - Utilities	2
Primary Search and Rescue	2
Ground Ladders and Ventilation	2
Aerial Operator if Aerial is Used	1
Establishment of IRIC (Initial Rapid Intervention Crew)	4
Total Effective Response Force	**16 (17 If aerial is used)**

Note: Single-family dwellings in Cocoa Beach greater than 3,000 square feet with a basement should be considered a more moderate risk, particularly if built with lightweight wood-frame construction.

The next table outlines how the CBFD assembles staffing and deployable resources as measured against NFPA 1710 benchmarking for an effective response force for a single-family dwelling fire.

TABLE 4-3: CBFD Effective Response Force for Single-Family Dwelling Building

Apparatus	Personnel
CBFD District Officer	1
Auto Aid District Officer (Cape Canaveral)	1
CBFD Engine	3
CBFD Engine	3
CBFD Truck	2
Auto Aid Truck (Cape Canaveral)	3
BCFR Rescue Unit	2
Total CBFD Effective Response Force	**15**

NFPA 1710 permits fire departments to use established automatic/mutual aid agreements to comply with section 5.2 of this standard as well, and the CBFD utilizes aid when necessary.

The CBFD does not meet the minimum benchmarks of NFPA 1710 for an effective response force for a single-family dwelling; however, the CBFD response can effectively begin the critical task assignments with the initial alarm assignment and does rely on automatic aid to complete the critical tasking assignments on their arrival. Under BCFR SOG #2603 response matrix, the CBFD can meet the intent of the SOG for low hazard occupancy structure fires through automatic aid with Cape Canaveral and Brevard County.

Open-Air Strip Mall/Commercial Building, NFPA 5.4.2

The initial full alarm assignment (ERF) to a structural fire in a typical open-air strip center/commercial building ranging from 13,000 square feet to 196,000 square feet in size must provide for a minimum of 27 members (28 if an aerial device is used). The following table outlines the critical tasking matrix for these building types. These are medium hazards under the BCFR SOG #2603.

TABLE 4-4: Effective Response Force for Open-Air Strip Mall/Commercial Building

Critical Tasks	Personnel
Incident Command	2
Continuous Water Supply	2
Fire Attack via Two Handlines	6
Hydrant Hook Up - Forcible Entry - Utilities	3
Primary Search and Rescue	4
Ground Ladders and Ventilation	4
Aerial Operator if Aerial is Used	1
Establishment of IRIC (Initial Rapid Intervention Crew)	4
Medical Care Team	2
Total Effective Response Force	**27 (28 If aerial is used)**

The next table outlines how the CBFD assembles staffing and deployable resources as measured against NFPA 1710 benchmarking for an effective response force for an open-air strip mall or commercial building fire.

TABLE 4-5: CBFD Effective Response Force for Open-Air Strip Mall/Commercial Building

Apparatus	Personnel
CBFD District Officer	1
Auto Aid District Officer	1
CBFD Engine	3
CBFD Engine	3
Auto Aid Engine	3
Auto Aid Engine	3
CBFD Truck	2
Auto Aid Truck	3
BCFR Rescue Unit x 2	4
Total CBFD Effective Response Force	**23**

NFPA 1710 permits fire departments to use established automatic/mutual aid agreements to comply with section 5.2 of this standard as well, and the CBFD utilizes aid when necessary.

The CBFD does not meet the minimum benchmarks of NFPA 1710 for an effective response force for an open-air strip mall/commercial building; however, the CBFD response can effectively begin the critical task assignments with the initial alarm assignment and does rely on automatic aid to complete the critical tasking assignments on their arrival. Under BCFR SOG #2603 response matrix, the CBFD can meet the intent of the SOG for medium hazard occupancy structure fires through automatic aid with Cape Canaveral and Brevard County.

Apartment Building, NFPA 1710, 5.2.4.3

The initial full alarm assignment (ERF) to a structural fire in a typical 1,200 square-foot apartment within a three-story, garden-style apartment building must provide for a minimum effective response force (ERF) of 27 members (28 if an aerial device is used). These are medium hazards under BCFR SOG #2603.

The next table outlines the critical tasking matrix for this type of building fire.

TABLE 4-6: Effective Response Force for Apartment Building

Critical Tasks	Personnel
Incident Command	2
Continuous Water Supply	2
Fire Attack via Two Handlines	6
Hydrant Hook Up - Forcible Entry - Utilities	3
Primary Search and Rescue	4
Ground Ladders and Ventilation	4
Aerial Operator if Aerial is Used	1
Establishment of IRIC (Initial Rapid Intervention Crew)	4
Medical Care Team	2
Total Effective Response Force	**27 (28 If aerial is used)**

The next table outlines how the CBFD assembles staffing and deployable resources as measured against NFPA 1710 benchmarking for an effective response force for an apartment building or other multi-unit housing type building fire.

TABLE 4-7: CBFD Effective Response Force for Apartment Building Fire

Apparatus	Personnel
CBFD District Officer	1
Auto Aid District Officer	1
CBFD Engine	3
CBFD Engine	3
Auto Aid Engine	3
Auto Aid Engine	3
CBFD Truck	2
Auto Aid Truck	3
BCFR Rescue Unit x 2	4
Total CBFD Effective Response Force	**23**

NFPA 1710 permits fire departments to use established automatic aid and mutual aid agreements to comply with section 5.2 of this standard as well, and the CBFD utilizes aid when necessary.

The CBFD does not meet the minimum benchmarks of NFPA 1710 for an effective response force for an apartment building fire; however, the CBFD response can effectively begin the critical task assignments with the initial alarm assignment and does rely on automatic mutual aid to

complete the critical tasking assignments on their arrival. Under BCFR SOG #2603 response matrix, the CBFD can meet the intent of the SOG for medium-hazard occupancy structure fires through automatic aid with Cape Canaveral and Brevard County.

High-Risk/High-Rise, NFPA 5.2.4.4

The initial full alarm assignment to a fire in a building where the highest floor is greater than 75 feet above the lowest level of fire department vehicle access must provide for a minimum of 42 members (43 if the building is equipped with a fire pump). The following table outlines the critical tasking matrix for this type of building fire.

TABLE 4-8: Effective Response Force for High-Rise Building

Critical Tasks	Personnel
Incident Command	2
Continuous Water Supply	1/1: 1 FF for continuous water. If fire pump exists an additional 1 FF will be required for a total of 2
Fire Attack via Two Handlines	4
One Handline above the Fire Floor	2
Establishment of IRIC (Initial Rapid Intervention Crew	4
Primary Search and Rescue Teams	4
Entry Level Officer with Aide near the Entry Point of Fire Floor	2
Entry Level Officer with Aide near the Entry Point above the Fire Floor	2
Two Evacuation Teams	4
Elevation Operations	1
Safety Officer	1
FF Two floors below Fire to coordinate Staging	1
Rehabilitation Management	2
Officer and FFs to Manage vertical Ventilation	4
Lobby Operations	1
Transportation of Equipment below Fire Floor	2
Officer to Manage Base Operations	1
Two ALS Medical Care Team	4
Total Effective Response Force	**42 (43) If building is Equipped with Pump**

The next table outlines how the CBFD assembles staffing and deployable resources as measured against NFPA 1710 benchmarking for an effective response force for a high-risk/high-rise building fire/facility.

TABLE 4-9: CBFD Effective Response Force for High-Rise/High-Risk Fire

Apparatus	Personnel
CBFD District Officer	1
Auto Aid District Officer	1
CBFD Engine	3
CBFD Engine	3
Auto Aid Engine	3
Auto Aid Engine	3
Auto Aid Engine	3
CBFD Truck	2
Auto Aid Truck	3
BCFR Rescue Unit x 2	4
Total CBFD Effective Response Force	**26**

NFPA 1710 permits fire departments to use established automatic aid and mutual aid agreements to comply with section 5.2 of this standard as well, and the CBFD utilizes aid when necessary.

The CBFD does not meet the minimum benchmarks of NFPA 1710 for an effective response force for a high-rise/high-risk building; however, the CBFD response can effectively begin the critical tasks assignments with the initial alarm assignment and does rely on automatic mutual aid to complete the critical tasking assignments on their arrival. Under BCFR SOG #2603 response matrix, the CBFD can meet the intent of the SOG for high-risk occupancy structure fires through automatic aid with Cape Canaveral and Brevard County.

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CPSM evaluated the CBFD's current deployment of apparatus and staffing as it compares to national standards (NFPA 1710 and ISO-PPC). The ISO-PPC credit for engine companies meets the number required for the city, fire flow, and equipment as the CBFD received 5.74/6.00 credits for engines. Because the engines are positioned in proximity (1.5 miles) of the highest density of built-upon land, credit deficiency was not excessive in the overall deployment analysis.

The ISO-PPC credit for ladder apparatus is 1.59/4.00. The city is deficient in this score, even with additional ladder service through automatic/mutual aid. The ISO-PPC contemplates *the number of response areas within the city with 5 buildings that are 3 or more stories or 35 feet or more in height, or with 5 buildings that have a needed fire flow greater than 3,500 gpm, or any combination of these criteria.*[35] The CBFD deploys one ladder truck out of Station 51.

When a ladder apparatus is deployed with a staffing of minimum of two or three, a choice must be made as to what critical tasks the ladder crew will undertake, which can effectively and safely only be one. With a team of three, the driver/operator can effectively operate the aerial device or fire pump if equipped or needed, but not both safely and effectively as they are separated by distance and apparatus location. The officer and jump seat firefighter deploy as a team of two to complete assigned critical tasks. ***With a staffing of two, the ladder company is***

35. Public Protection Classification Summary Report, Cocoa Beach, FL.

limited to a single crew of two to perform assigned critical tasks either operating the ladder or engaging other critical tasks as assigned if the ladder (or pump if a Quint) is not needed.

BCFR SOG #2603 also contemplates non-structural fire standard deployment of apparatus applicable to CBFD that includes:

- Motor Vehicle Fires.
  - Single vehicle: 1 Engine.
  - Larger vehicles (RVs, Buses, etc.): 1 Engine, 1 District Officer.
  - Cargo Vehicles: 2 Engines, Haz-Mat 48, 1 District Officer.
  - With structural endangerment: First alarm assignment for building risk.
- Miscellaneous Fires (trash fires, dumpsters, transformers, power lines down).
  - Initial response: 1 Engine.
- Automatic Fire Alarm/Smell of Smoke.
  - Commercial: 1 Engine, next closest en route.
  - Residential: 1 Engine, emergency response.
  - Water Flow: Low Hazard, 2 Fire Units respond, remaining en route.
- Transportation Incidents.
  - MVC w/heavy damage/extrication: 1 Engine, 1 Rescue.
  - MVC with commercial vehicles: 2 Engines, 1 Rescue, and 1 District Officer.
- Hazardous Materials Incidents
  - Small fuel spills (< 25 gallons): 1 Engine.
  - Moderate fuel spills (25 -100 gallons): 2 Engines, Haz-Mat, and 1 District Officer.
  - Commercial Carrier (>100 gallons): 2 Engines, Haz-Mat, and 1 District Officer.
  - Gas leaks (Propane, Natural Gas, etc.): 2 Engines, Haz-Mat, and 1 District Officer.
  - Hazardous Materials Incidents: 2 Engines, 2 rescues, SRT (Truck-48, HM-48, R-48), and 2 Districts.
  - Above involving fire: Appropriate structural first alarm & SRT (Truck-48, HM-48, R-48).
- Public Assist.
  - Lift assists, smoke detector, etc.: 1vClosest Unit (Engine, Squad, Truck).

The above are consistent with critical tasking/deployment of resources in fire departments nationally CPSM has reviewed.

Staffing / Effective Response Force Recommendations:

- The CBFD and city should consider over the near/mid-term **a minimum daily staffing of ten, which adds one person per shift and allows for staffing of three on Ladder 51** so that this apparatus can function as designed (ladder company) with a crew of three when responding with engine companies, or when responding as a single unit to engine company call types

due to overlapping calls. Over the longer term, and due to the number of buildings over three stories in the city, and the CBFD's inability to assemble an Effective Response Force on building fires, CPSM recommends the CBFD and city consider placing a Quint apparatus at station 50 as a single resource out of this station and staffing this apparatus with a minimum of four, so that it may function as designed with two teams of two for assigned critical tasking either as an engine crew or truck crew, or other configurations deemed appropriate and safe, while working in two teams of two. (Recommendation No. 22.)

- CPSM recommends the CBFD, to the extent possible and if practical depending on available automatic and mutual aid resources, work with regional Fire Chiefs to increase response resources to single family dwelling fires, strip mall/commercial, apartment, and high-rise fire responses that align more closely with CBFD policies and NFPA 1710 Effective Response Force standards for these building risks. (Recommendation No. 23.)

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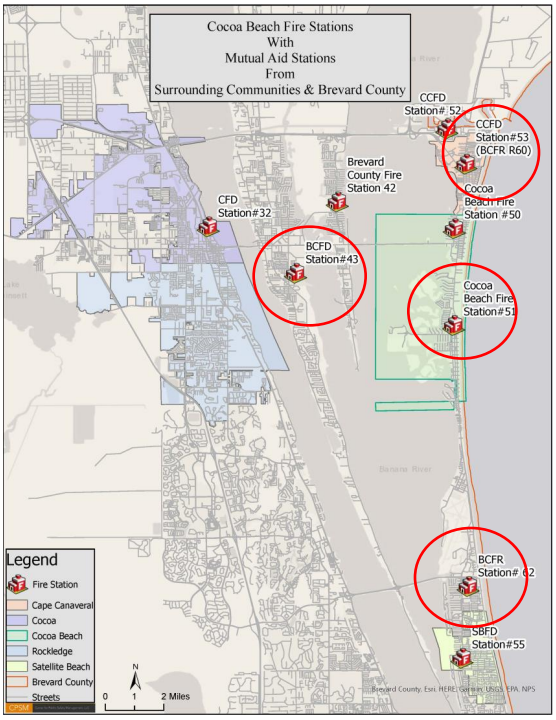
EMERGENCY MEDICAL SERVICES

Emergency medical services (EMS) ground transport in Cocoa Beach is provided by Brevard County Fire Rescue (BCFR). BCFR provides this service county-wide and positions one ALS ambulance at CBFD Station 51 on a 365/24/7 basis. Additional BCFR ambulances are available to respond when available and as needed to Cocoa Beach from Stations 43, 60, and 62 as illustrated in the following figure.

FIGURE 4-1: Brevard County Fire Rescue EMS Transport Unit Locations in Proximity of Cocoa Beach



Red Circle indicates BCFR Ambulance locations.

Each ambulance is Advanced Life Support-capable and is staffed with two dual-certified (EMS and Fire) firefighters.

CBFD provides Advanced Life Support (ALS) medical first response within the City of Cocoa Beach and areas outside of the city as needed through service agreements with contiguous communities. Two engines (50 and 51) and one ladder company (Truck 51) provide this service.

The response configuration to EMS calls for service in Cocoa Beach includes one fire suppression unit and one BCFR ambulance. This response configuration may not be an optimal use of first response resources since it commits crucial first response resources to EMS responses that may not be time critical or may not require ALS care. By committing these resources to low acuity calls in which an ALS first response would likely not be necessary to affect the patient's outcome, it potentially delays a rapid first response to medical calls that may be time sensitive. CPSM understands that the current dispatch agency for CBFD does not fully utilize the benefits of a formal Emergency Medical Dispatch (EMD) program, which may partially be the reason for this current response configuration.

For example, the patient outcome for an EMS response for a twisted ankle will generally not be changed by the presence of a first response unit. However, if the first response resource is committed to the twisted ankle response, and a call for a person not breathing is received in the same response district, a first response resource from out of that response district would normally need to respond. CBFD only has three fire suppression units. Ensuring resiliencies for all responses (fire and EMS) should be a consideration.

ALS first response resources should be preserved for the responses in which the rapid response of an ALS unit may have an impact on patient outcomes.

CPSM was not able to obtain from Brevard County the response data for BCFR ambulance responses in the City of Cocoa Beach. Therefore, an analysis of response times, workload, transport times, and what BCFR station the ambulance responded from could not be completed (as was completed for CBFD). However, as CBFD responds to nearly all EMS calls for service in Cocoa Beach, the CBFD response workload analysis to EMS calls for service should mirror closely the BCFR ambulance responses. This workload is depicted in the next set of tables.

TABLE 4-10: EMS Call Types

Call Type	Total Calls	Calls per Day	Call Percentage
Medical call	1,758	4.82	61.1
MVA	84	0.23	2.9
EMS Subtotal	**1,842**	**5.05**	**64.0**

EMS responses make up 64% of all call types

TABLE 4-11: Calls by Type and Duration

Call Type	Less than 30 Minutes	30 Minutes to One Hour	One to Two Hours	Two or More Hours	Total
Medical call	1,590	150	12	6	1,758
MVA	63	17	4	0	84
EMS Subtotal	**1,653**	**167**	**16**	**6**	**1,842**

The largest percentage of EMS calls last less than 30-minutes, which aids with maintaining an acceptable level of resiliency. Overall, 12% of the time a single call (Fire or EMS) is overlapped with another.

TABLE 4-12: Annual Runs by Unit and Type (EMS Highlighted)

Station	Unit	EMS	False Alarm	Good Intent	Hazard	Out. Fire	Public Service	Struct. Fire	Tech. Rescue	Cancel	Mutual aid	Total
50	DIST50	232	187	15	51	15	53	10	25	7	25	620
	E50	985	181	15	32	8	211	10	53	58	10	1,563
	Total	**1,217**	**368**	**30**	**83**	**23**	**264**	**20**	**78**	**65**	**35**	**2,183**
51	BCH51	3	1	0	0	0	14	0	9	0	3	30
	E51	813	177	15	45	9	107	13	13	37	18	1,247
	E251	2	1	0	0	0	0	0	1	0	1	5
	INSP	0	1	0	0	0	0	0	0	0	0	1
	T51	253	154	15	33	10	133	6	32	15	13	664
	U51	0	0	0	0	0	1	0	0	0	0	1
	Total	**1,071**	**334**	**30**	**78**	**19**	**255**	**19**	**55**	**52**	**35**	**1,948**
Total		**2,288**	**702**	**60**	**161**	**42**	**519**	**39**	**133**	**117**	**70**	**4,131**

The largest percentage of runs (a response of more than one unit to a call) are EMS calls for service (70%)

Fire, rescue, and emergency medical system (EMS) incidents, and the fire department's ability to respond to, manage, and mitigate them effectively, efficiently, and safely, are mission-critical components of the emergency services delivery system. In fact, fire, rescue, and EMS operations provide the primary, and certainly most important, basis for the very existence of today's fire department in many localities.

Nationwide and as stated above, fire departments are responding to more EMS calls and fewer fire calls, particularly fires that result in active firefighting operations by responders. This is well-documented in both national statistical data, as well as CPSM fire studies. These trends and improvements in the overall fire protection system notwithstanding, fires still do occur, occur with greater frequency in older, depressed urban areas, and the largest percentage of those occur in residential occupancies where they place the civilian population at risk. Although they occur with less frequency than they did several decades ago, when they occur today, they grow much quicker and burn more intensely than they did in the past, which leads to an increased ERF as discussed previously.

EMS is a vital component of the comprehensive emergency services delivery system in any community. Together with the delivery of police and fire services, it forms the backbone of the community's overall public safety net.

In terms of overall incidents responded to by the emergency agencies in most communities, it could be argued that EMS incidents constitute the greatest number of "true" emergencies, where intervention by trained personnel makes a difference, sometimes literally between life and death. Heart attack and stroke victims require rapid intervention, care, and transport to a medical facility. The longer the time duration without care, the less likely the patient is to fully recover. Contemporary pre-hospital clinical care deploys many clinical treatments one will receive in the emergency department, truly matching the long-time EMS saying, "we bring the emergency room to you."

Critical tasks by specific call type in EMS-only agencies assisted by fire departments are not as well-defined as those in the fire discipline. Notwithstanding, *Critical Tasking* in EMS is typical of that in the fire service in that there are certain critical tasks that need to be completed either in succession or simultaneously. EMS on-scene service delivery is based primarily on a focused scene assessment, patient assessment, and then followed by the appropriate basic and advanced clinical care through established medical protocols. EMS critical tasking is typically developed (in fire-based EMS Standards of Cover documents) in accord with the U.S. Department of Health and Human Services, Centers for Medicare & Medicaid Services (CMS), as:

- Basic Life Support (BLS), which is an emergency response by a ground transport unit (and crew) and the provision of medically necessary supplies and services.
- Advanced Life Support, Level 1 (ALS1), which is the transportation by ground ambulance vehicle and the provision of medically necessary supplies and services including the provision of an ALS assessment or at least one ALS intervention.
- Advanced Life Support, Level 2 (ALS2), which is the transportation by ground ambulance vehicle and the provision of medically necessary supplies and services including:
  - At least three separate administrations of one or more medications by intravenous push/bolus or by continuous infusion (excluding crystalloid fluids) or
  - (2) ground ambulance transport, medically necessary supplies and services, and the provision of at least one of the ALS2 procedures listed below:

    a. Manual defibrillation/cardioversion.

    b. Endotracheal intubation.

    c. Central venous line.

    d. Cardiac pacing.

    e. Chest decompression.

    f. Surgical airway.

    g. Intraosseous line.

The next set of tables reviews the current critical tasking for the CBFD continuum of care. As indicated above, the critical tasking is based on the current CMS ground transport definition of ambulance services.

TABLE 4-13: BLS Critical Tasking

Critical Task	# Responders
Primary Patient Care Incident Command	1
Secondary Patient Care Vehicle Operations	1
Effective Response Force	**2**

Resource Deployment

1 Transport Ambulance

TABLE 4-14: ALS1 Critical Tasking

Critical Task	# Responders
Incident Command	1
Primary Patient Care	1
Secondary Patient Care Vehicle Operations	2 1
Effective Response Force	**5**

Resource Deployment

1 Transport Ambulance
1 CBFD Fire Unit

TABLE 4-15: ALS2 Critical Tasking

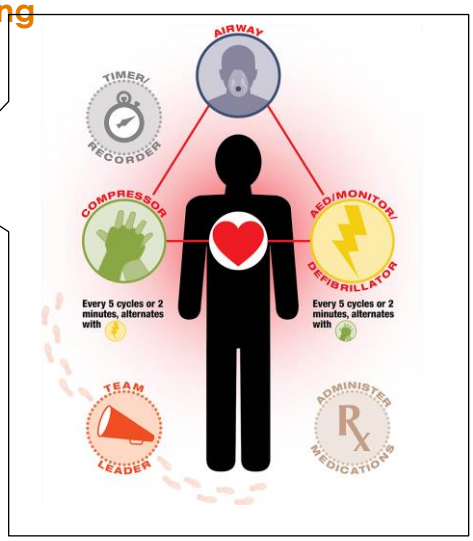
Critical Task	# Responders
Incident Command	1
Primary Patient Care	1
Secondary Patient Care	1
Tertiary Patient Care Provider	2
Vehicle Operations	1
Effective Response Force	**6**

Resource Deployment

1 Transport Ambulance
1 Command Officer
1 CBFD Fire Unit

TABLE 4-16: Pulseless/Non-Breathing Critical Tasking

Critical Task	# Responders
Incident Command	1
Primary Patient Care	1
Secondary Patient Care	1
Tertiary Patient Care Provider	2
Vehicle Operations	1
Effective Response Force	**6**



Resource Deployment

1 Transport Ambulance
1 Command Officer
1 CBFD Fire Unit

CPSM's assessment finds the CBFD has sufficient capabilities to respond to EMS calls in its current non-transport capacity.

As discussed previously, EMS 911 call taking for Cocoa Beach is received by the Cocoa Beach Police Department (CBPD) Primary Safety Answering Point (PSAP) and then transferred to the Brevard County PSAP for call processing and dispatch of a BCFR ambulance. Once the call is processed, the Brevard County PSAP transfers the call back to the CBPD for CBFD first-tier EMS call information for the responding fire suppression unit. During the call processing at the Brevard PSAP, call takers determine the nature of the call, and if needed, provide pre-arrival instructions through an emergency medical dispatch program. This system does not determine if the

incident is low, mid, or high acuity, and does not determine if a fire suppression should also respond (typically high-acuity call determinants), and whether a response to the EMS call should be with or without lights and siren (Hot Response).

One system that is designed to efficiently process incoming PSAP calls for EMS is Priority Solutions® Medical Priority Dispatch System® (MPDS) for Emergency Medical Dispatch (EMD).[36] This system is a highly respected EMD system and is used most by progressive EMS dispatch agencies. The MPDS system is an evidence-based system that uses clinical protocols and call-taking processes to assign a response determinant to the EMS request. These response determinants are alpha-numeric codes that can be used in EMS systems to determine the priority of a response and the appropriate level of care likely necessary to meet the patient's clinical needs. The response determinants also aid in informing the responding units specifically what type of medical call to which they are responding. If approved by local protocol, the MPDS system can also be used to assign response priorities and modes of response, as well as make determinations regarding the response configuration for the EMS response.

The MPDS system also enables the use of an evidence-based process for dispatchers to provide pre-arrival medical instructions during the time EMS units are responding to the call.

Many EMS systems across the country are using EMD, and MPDS in particular, to reduce the incidence of HOT responses so as to make providers and the public safer, as well as preserve crucial first medical response resources for 911 medical calls that are time-sensitive (cardiac arrest, choking, heart attack, etc.). Lights and siren (HOT) responses dramatically increase the risk of crashes and injuries to responding personnel and the public. In February 2022, 14 national EMS associations, including the International Association of Fire Chiefs, and the National Association of EMS Physicians, published a joint position statement ***encouraging EMS systems to reduce HOT responses to less than 30 percent of EMS calls, and less than 5 percent of ambulance transports***.[37]

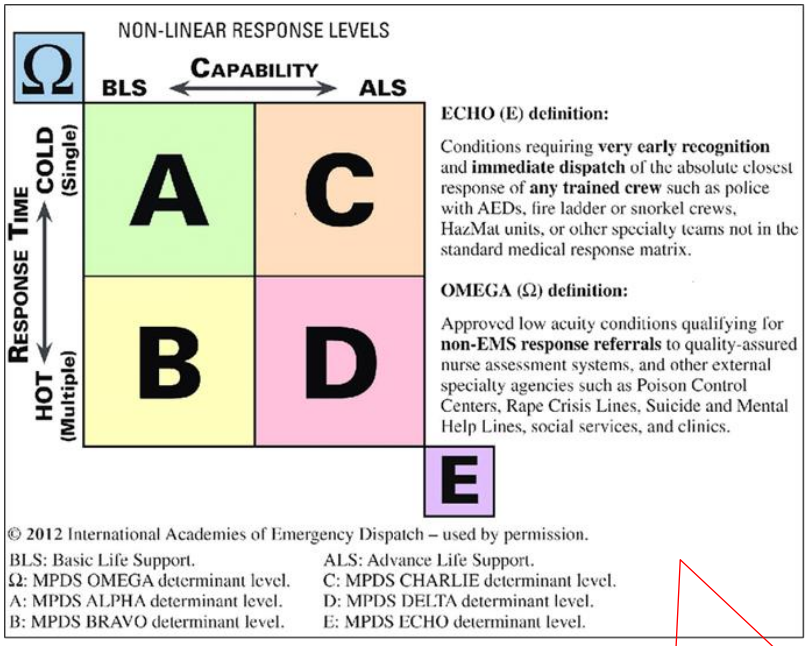
As discussed herein, in Cocoa Beach, a first response fire unit is dispatched to nearly all 911 medical calls within the city. In most communities, time-sensitive medical responses represent a small percentage of EMS responses, typically 10 percent to 30 percent of medical responses. Committing medical first response units to calls in which a timely response will likely not impact the patient's outcome, and not having that resource available for a critical response, could result in a delayed response for a patient with time-sensitive medical emergencies.

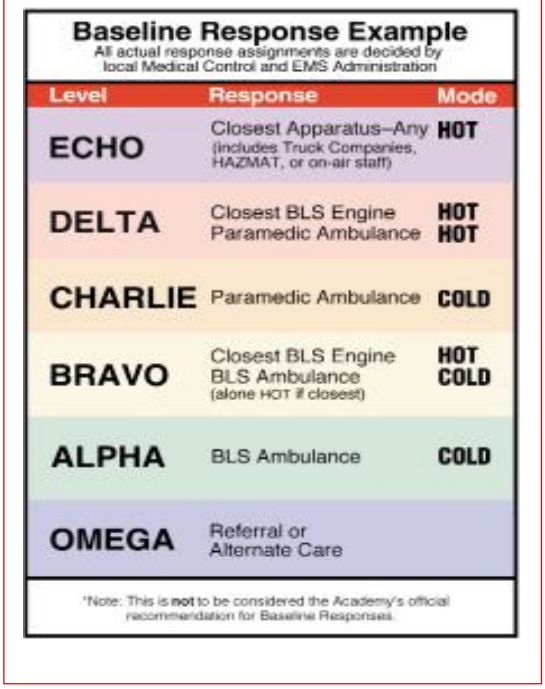
The MPDS system can be used effectively to determine which EMS responses are time-sensitive and if the presence of a medical first response unit could make an impact on patient outcomes. The effective use of this system would preserve crucial first response medical units for those responses that are time-sensitive

An example of a response matrix based on MPDS EMD response determinants is outlined in the next figure.

36. https://www.emergencydispatch.org/what-we-do/emergency-priority-dispatch-system/medical-protocol
37. https://www.hmpgloballearningnetwork.com/site/emsworld/news/top-ems-groups-issue-joint-statement-ls-responses

FIGURE 4-2: Priority Solutions® Medical Priority Dispatch System® Response Matrix





EMS Recommendation:

- CPSM recommends the CBFD and the other agencies that are part of the Brevard County PSAP work with the leadership at Brevard County to take full clinical and safety advantage of using the MPDS system for response prioritization, mode, and clinical level of response. (Recommendation No. 24.)

EMS Medical Direction is the process by which medical oversight and guidance are provided to EMS personnel and agencies. Medical Direction is typically provided by licensed physicians who specialize in emergency medicine or another relevant field and who have experience and training in EMS.

Overall, EMS Medical Direction plays a critical role in ensuring that EMS personnel are well-trained, equipped, and supported to provide high-quality emergency medical care to patients. By providing clinical oversight, developing protocols, ensuring quality assurance, providing continuing education, and collaborating with other healthcare providers, medical directors can help to improve patient outcomes and promote better community health and safety.

The Primary Medical Director at the time of this report is Dr. John McPherson, MD, an experienced EMS Medical Director, and emergency medicine physician in the region.

These intersections provide for a high level of EMS physician involvement in addition to medical direction, clinical oversight, and training. This high level of engagement was evident by a documented and outlined robust training program, QA/QI monitoring, staff/physician engagement, and protocol development.

We assessed that the City of Cocoa Beach Fire Departments' Medical Direction program / practices are consistent with current EMS best practices for EMS physician engagement, clinical oversight, and program development.

Training and quality improvement are essential hallmarks of liability prevention and risk management. For instance, EMS protocol errors are a risk area. Well-run training programs on patient care protocols are essential, as are periodic updates and training refreshers. Further, individual providers can help themselves by doing their "homework"—knowing their system's protocols and avoiding unjustified protocol deviations will sustain a competent and trusted EMS service delivery system.

EMS training QA/QI (Quality Assurance/Quality Improvement) is an essential process that helps to ensure that EMS personnel receive high-quality training and that their skills are maintained and improved over time.

The QA/QI process involves several steps:

- Establishing performance standards: This involves defining the performance standards for EMS personnel, including the skills and knowledge required to provide effective emergency medical care.
- Monitoring performance: EMS agencies should regularly monitor the performance of their personnel to ensure that they are meeting the established performance standards. This may involve reviewing patient care reports, observing personnel in action, and reviewing other performance metrics.
- Identifying areas for improvement: Based on performance monitoring, EMS agencies should identify areas for improvement and develop plans to address any deficiencies in training or skills.
- Implementing improvements: EMS agencies should implement improvements to their training programs and other systems based on their performance monitoring and identification of areas for improvement.

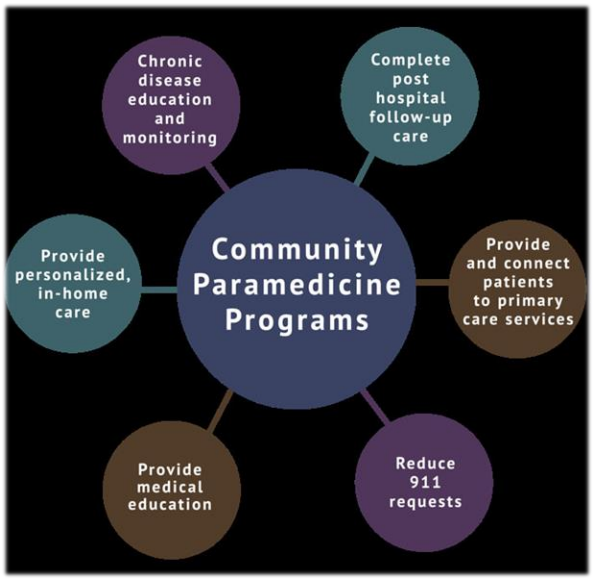
- Evaluating effectiveness: After implementing improvements, EMS agencies should evaluate the effectiveness of their changes and make further adjustments as needed to ensure that EMS personnel are receiving the best possible training and support.

The QA/QI process is critical for ensuring that EMS personnel are well-trained and prepared to provide effective emergency medical care. By regularly monitoring performance and making improvements to training programs and other systems, EMS agencies can ensure that their personnel are providing high-quality care to patients in their communities.

Our review of CBFD EMS reveals a dedicated training hierarchy utilizing staff and shift personnel and an engaged EMS/Training Division Chief and Medical Director who drive education initiatives. For example, the Medical Director provides quarterly skills and protocol training. As well the EMS/Training Division Chief and Lead Paramedic Training Officer (Lieutenant rank) manage the QA/QI program for the department. Current training is provided on a routine basis and addresses both BLS and ALS-specific training opportunities.

CPSM assessed at the time of our review the CBFD EMS training and QA/QI programs ensure regular, routine, and validation-based training and run reviews. The standards from CBFD's QA/QI Review and evaluation-led training are consistent with industry practices.

Mobile Integrated Healthcare/Community Paramedicine (MIH/CP) programs are evolving as some of the fastest growing value-added service enhancements in EMS. An MIH/CP program is comprised of a suite of potential services that EMS could provide to fill gaps in the local healthcare delivery system, particularly to those who frequently use the EMS transport system, and who may have challenges with access to healthcare. In essence, such a service is intended to better manage the increasing EMS call volume and better align the types of care being provided with the needs of the patient. To be effective, an MIH/CP program is commonly accomplished through a collaborative approach with healthcare and social service agencies within the community.



Source: southjeffersonrescue.org

In 2009, there were four such programs in the country, but a recent survey by the National Association of EMTs identified more than 250 active MIH/CP programs operating across the U.S.

The CBFD is currently providing an MIH/CP program that is staffed with one part-time paramedic who works three days/week. This program has been in place for 1.5 years.

Clients for the CBFD MIH/CP program are referred by CBFD EMS first response personnel as well as neighbors helping neighbors, church groups, and other community organizations who are familiar with the program.

All referrals are scheduled for routine and regular visits by the Community Paramedic (CP). The current program CP visits focus on:

- General wellness checks to include vital signs assessment.

- Medication reconciliation (Does the client have prescribed medications?; Is the client taking prescribed medications correctly?; Does the client need a refill of medications?; etc.).
- Are there any trip hazards that need remedy?
- Does the client have adequate nourishment? If not, the CP establishes a connection with local food pantries.
- Does the client require grab bars (bathtub, shower, toilet areas)?
- Arranging rides for medical appointments.
- Assisting with social program assistance.

The above are all best practice MIH/CP program content.

As of late August 2023, the CBFD MIH/CP program has 25 clients. Since its inception in early 2022, the CP has made just over 400 client contacts (in-person visits; spoke to via phone; spoke to family member via phone). While there is no data available yet to suggest this program has reduced 911 EMS calls for service, the services provided by the CP have made an impact on each client's life through program assistance, and moreover the community through enhanced quality-of-life services.

MIH/CP Recommendation:

- As there are program services made available that certain vulnerable and challenged residents may not otherwise be aware of or able to connect with, and because the Mobile Integrated Health/Community Paramedicine program provides enhanced quality-of-life services for the entire community, CPSM recommends the city continue to fund the Mobile Integrated Health/Community Paramedicine program. CPSM further recommends the program be expanded to four days/week with part-time staffing, and that the program coordinator work with the Medical Director and establish performance measures for the program that may include: improvement in the coordination of medical, behavioral, and social services for program clients; enhance existing healthcare system resources for program clients; assistance with resource gaps within the City of Cocoa Beach; and improving the quality of care for program clients while reducing avoidable healthcare costs. (Recommendation No. 25.)

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LIFEGUARD SERVICES

Cocoa Beach has seven miles of Atlantic Ocean beach that serve as a daily attraction for citizens and visitors. As already discussed above, the city has a steady influx of seasonal winter visitors as well as tourists visiting the city throughout the year. This annual fluctuation of population (about 12,000 seasonal residents and about 3,850 average daily tourists), coupled with the city's permanent population, drives the overall beachgoer population.[38]

In Cocoa Beach, Brevard County provides lifeguard service through its Ocean Rescue Division, which is a division within Brevard County Fire Rescue (BCFR). Cocoa Beach supplements funding

38. ibid

for this service through a Memorandum of Agreement (MOA) between the city and the county. The 2023 cost to the city amounts to $83,017.[39]

In total, there are 13 lifeguard towers along the seven miles of beach in Cocoa Beach which are staffed according to season. Four are staffed year round from 10:00 a.m. to 5:00 p.m. as follows:

- Tower 3: Cocoa Beach Pier (South).
- Tower 5: Shephard Park.
- Tower 9-Lori Wilson Park.
- Tower 13: Minuteman Causeway.

There are also seasonal towers that are operated from early March through Labor Day as follows (2023 schedule):

- Weekend only, 10:00 a.m. to 5:00 p.m. (March 11-May 28).
- Spring Break daily. 10:00 a.m. to 5:00 p.m. (March 13-March 17).
- Summer coverage daily. 10:00 a.m. to 5:00 p.m. (May 30 and ending the day before Brevard Public Schools resume).
- Weekend/Holiday coverage daily, 10:00 a.m. to 5:00 p.m. (weekend after Brevard Public Schools resume through September 3 and Labor Day).

Seasonal towers include:

- Tower 2: Cocoa Beach Pier (North).
- Tower 4: Shephard Park.
- Tower 6: Shephard Park.
- Tower 7: Fischer Park.
- Tower 8: Lori Wilson Park.
- Tower 10: Lori Wilson Park.
- Tower 11: Tulip Ave.
- Tower 12: Minuteman Causeway (North).
- Tower 14: 16th Street.

Additionally, there are two mobile lifeguard units (all-terrain vehicles) that have patrol areas (mobile lifeguarding model).

In May 2023, the city received a letter from the county regarding lifeguard services. The letter included an internal assessment of BCOR, and outlined that beginning in FY 23-24, seasonal or full-time towers located within municipal limits at parks or locations maintained by a city should be billed at actual costs. The letter said that the county will fund staff and maintain lifeguard towers in unincorporated areas or parks maintained by the county.[40] There is a mix of these areas (municipal and unincorporated) along the seven miles of beach in Cocoa Beach.

39. February 6, 2023, S. Jurgensen email: Seasonal Lifeguard Contracts, CB 1 & 2.
40. May 26,2023 Brevard County letter to Cocoa beach: Ocean Rescue Assessment.

The BCOR assessment also identified changing beach and coast conditions, growth in post-pandemic tourism, and the resurgence of rip tides along the Brevard County coast after the 2022 hurricanes, which led to an increase in ocean rescues and drownings. Because of this the county approved an increase in staffing by extending the seasonal lifeguard presence.

The assessment also noted recruiting challenges for BCOR, which began in 2020, and which led to a consolidation of seasonal towers when faced with staffing shortages as follows:[41]

- Lori Wilson Park (three to two towers). CBFD staff advises this site commonly operated one tower during the 2023 season.
- Coconuts (Minuteman Causeway) (two to one tower). CBFD staff advises this site commonly operated one tower during the 2023 season.

During the 2022-2023 season and because of continued recruitment and staffing challenges, seasonal towers were closed based on lowest risk, incident type, historical use, and resources utilized. In Cocoa Beach, the following towers would be closed due on a given day due to staffing shortages:

- 16th Street. CBFD staff advises this site was closed for the entire 2023 season.
    - Fischer Park seasonal tower was also closed for the entire 2023 season.

In total, four towers countywide were identified that could be closed based on the criterion outlined above. The 16th street tower is identified as #1 in the priority list.

The May 2023 letter from the county to the city also outlined seasonal lifeguard tower funding options the County is contemplating and discussing with cities which are:

- Option 1: Status Quo. Cocoa Beach contracted cost share is $83,017 (4 seasonal towers)[42].
    - Full time tower costs-County: $1,451,012
    - Total Costs Cocoa Beach: $83,017
    - Total costs City/County: $1,534,029
- Option 2: Expense share with cities for seasonal towers—50 percent county, 50 percent city. Cocoa Beach cost share for four seasonal towers would be $156,771 and $725,506 for four full time towers. This is a substantial increase in city costs.
    - Full time tower costs County: $725,506
    - Full time costs Cocoa Beach: $725,506
    - Total costs Cocoa Beach: $882,277

- Option 3: Contract with cities for <u>total program cost</u>.
    - Full time tower costs County: $0.00
    - Full time costs Cocoa Beach: $1,451,012
    - Seasonal Costs Cocoa Beach: $313,540
    - Total costs Cocoa Beach: $1,764,552

41. Ibid
42. A fourth seasonal tower at Cocoa Beach Pier is funded by the pier.

- Option 4: County absorbs all seasonal tower program costs.
- Option 5: Other as directed by the Board of County Commissioners.

The city is studying the option of creating an ocean rescue service as a city public safety function. Much of the analysis for this service has been completed by CBFD staff, which CPSM has reviewed. Reasons cited for creating a city-run ocean rescue service include:

- Management of recruitment and retention of ocean rescue staff.
- Management of administrative and operational ocean rescue program components.
- Complete integration/interoperability with CBFD surf rescue program, CBPD beach ranger program, and Cocoa Beach emergency radio system.

The CBFD staff analysis has identified lifeguard tower locations as high, medium, and low priority. Each is tied to four staffing plans. The tower locations by priority are:[43]

High Priority (four most populated beaches; high incidents of ocean rescues).

- Cocoa Beach Pier (South Side): Minimum 1 Tower, Maximum 2.
- Shepard Park: Minimum 1 Tower, Maximum 3.
- Lori Wilson Park: Minimum 1 Tower, Maximum 3.
- Minutemen Causeway: Minimum 1 Tower, Maximum 3.

Maximum tower staffing based on season and surf conditions

Medium Priority (lower populated; high incident rate for ocean rescues).

- Tulip Ave: 1 Tower.

Low Priority (lowest populations; lowest incident rates).

- Fischer Park: 1 Tower.
- 16th Street South: 1 Tower.

The CBFD ocean rescue proposal has four staffing options, which are as follows:[44]

Staffing Alternative A (Staffing Costs: $583,290)

- Administrator: 1 FTE.
- Captains: 2 FTEs.
- Lieutenants: 4 FTEs.
- Part-Time Lifeguards: 6 (regularly scheduled).
- Part-Time Lifeguards: 2 minimum, number based on predicted number of towers to be staffed (scheduled as needed).

43. Ocean Rescue proposal, Cocoa beach Fire Department, M. Scales, 2022.
44. Ibid.

Staffing Alternative B (Staffing Costs: $574,352)

- Administrator: 1 FTE.
- Captains: 4 FTEs.
- Lieutenants: 4 part time.
- Part-Time Lifeguards: 8 minimum, number based on predicted number of towers to be staffed (scheduled as needed).

Staffing Alternative C (Staffing Costs: $581,424)

- Administrator: 1 FTE.
- Captains: 2 FTEs.
- Lieutenants: 4 FTEs.
- Part-Time Lifeguards: 9 minimum, number based on predicted number of towers to be staffed (scheduled as needed).

Staffing Alternative D-Minimum Staffing (Staffing Costs: $1,338,512.00)

- Administrator: 1 FTE
- Captains: 2 FTEs
- Lieutenants: 2 FTEs.
- Lifeguards: 19 FTEs.

Recommended Tower Locations, Alternative D

- Cocoa Beach Pier: 2 Towers.
- Alan Shepard Park: 2 Towers.
- Lori Wilson/Tulip Ave.: 2 Towers.
- Minutemen Causeway: 1 Tower.
- "Roamer" UTV Beach Patrol: 1 UTV Patrol

Staffing Alternative D, Maximum Staffing

- Administrator: 1 FTE.
- Captains: 2 FTEs.
- Lieutenants: 4 FTEs.
- Lifeguards: 24 FTEs.

Recommended tower locations:

- Cocoa Beach Pier: 2 Towers.
- Alan Shepard Park: 2 Towers.
- Lori Wilson Park/Tulip Ave.: 2 Towers.

- Minutemen Causeway: 2 Towers.
- "Floater" Tower, location TBD based on ocean conditions and population demand: 1 Tower.
- "Roamer," UTV Beach Patrol: 2 UTV patrols.

Additional considerations in Alternative D include:

- Adjustable hours for summer and winter months.
  - 0800-1800 from March 1 to August 31.
  - 1000-1600 from September 1 to February 29.
- The use of CBFD firefighters Surf Rescue Technicians certified as Lifeguards to fill scheduling deficits or to upstaff on busy holidays/special events.

In addition to personnel costs there will be start-up capital and equipment costs. As proposed in the CBFD plan, this includes:[45]

- 4x4 Truck (1): Pickup truck with 10,000lb winch.
- Patrol UTVs (2): 4x4 capable UTVs with emergency lights and sirens.
- Jet skis (2): Jet skis capable of mounting rescue sled and supporting the weight of 3 adults.
- Enclosed Lifeguard Towers (4): Tower protected from the elements, capable of withstanding hurricane force winds, and light enough to move on the beach with a truck-mounted winch (fiberglass).
- Lifeguard Towers, not enclosed.
- Rescue Boards (2): Soft top, "longboard" style rescue board with grab handles placed around the outside edges.
- Rescue Sleds (2): Hard foam constructed rescue sleds able to mount to the transom of a Jet ski. Grab handles present along the edges of the sled.
- Patrol Rescue Can (15): 28" hard-plastic RFD for rescuing conscious victims in distress.
- Rescue Tubes (20): Soft foam RFD for rescuing unconscious victims, body retrieval or a victim in large surf conditions.
- Binoculars (10): Ease in identifying hazards or victims from the tower.
- Fox 40 Whistles (20): Notifying patrons of a hazard, change in ocean conditions, or "On Duty" and "Off Duty" transitions.
- Uniform Swimming Shorts (40): Easy identification of personnel, and the ability to enter the water rapidly.
- Uniform Shirts (40): Easy identification of personnel, and sun protection.
- Uniform Hats (30): Easy identification of personnel, and sun protection.
- Hip Packs (20): Storage and mobility of BLS supplies.
- DaFin Swim fins (20 pairs): Rapid victim contact in surf conditions.

45. Ibid.

- Beach Flags (5 sets): Quick identification of surf conditions for patrons arriving at the beach
- Marker Buoys (5): Used for last-seen location in the water (datum point) for submerged drowning victim operations.
- Dive Masks (20): Used during underwater search and rescue operations.
- EMS equipment at each beach/tower.
- Radio communication equipment.
- Loose equipment and materials for beach operations.

Depending on the tower and staffing model implemented, there are significant costs in start-up equipment and recurring costs to maintain the equipment.

Creating a new public safety service such as ocean rescue is a local decision. That said, the city and CBFD are fully capable of taking on the ocean rescue service. This is evident by the current management and leadership of Fire and EMS program service delivery, by the CBFD's commitment to training and preparation, and due to the CBFD currently having a recognized surf rescue program. The CBFD has certified surf rescue technicians and is in the final stages of the United States Lifeguard Association (USLA) accreditation process. If awarded accreditation, the CBFD will become the first fire department to receive USLA accreditation without lifeguards. Simply put, the CBFD is already committed and dedicated to the ocean and ocean rescue through its fire suppression response forces.

There are several key aspects the city must consider when contemplating taking on ocean rescue services. These include:

- Identifying a funding source for start-up and recurring personnel and maintenance costs.
- Understanding the workforce availability of potential full- and part-time ocean rescue candidates. If the county is having difficulty recruiting and retaining employees, will the city also have difficulty? Therefore, understanding the workforce availability of potential full- and part-time candidates for employment will first identify if the city can deliver the same or a greater level of service, and will link to which alternative will most favorably serve the city (mix of full and part-time or all full-time employees).
- Will the city only serve city areas or all seven miles of beach along the city's coast?
- Model cost comparisons between proposed county models and proposed CBFD models as presented herein.
- Willingness to create and take on an additional public safety function.

Lifeguard Services Recommendation:

- Based on the current BCOR staffing challenges, and in review of current ocean rescue funding options and service levels as presented in the May 2023 letter from the county to the city, CPSM recommends the city continue to evaluate internal options to create an ocean rescue division within the CBFD. This evaluation should include analysis of viable funding options, ocean rescue workforce availability, service level, and service areas. (Recommendation No. 26.)

SECTION 5. CBFD FACILITY AND RESPONSE TIME ANALYSIS

CBFD FACILITY OVERVIEW

Sound community fire-rescue protection requires the strategic distribution of an adequate number of station facilities to ensure that effective service area coverage is achieved, that predicted response travel times satisfy prevailing community goals and national best practices, and that the facilities are capable of supporting mission-critical personnel and vehicle-oriented requirements and needs.

Fire facilities must be designed and constructed to accommodate both current and forecast trends in fire service vehicle type and manufactured dimensions. A facility must have sufficiently sized bay doors, circulation space between garaged vehicles, and departure and return aprons of adequate length and turn geometry to ensure safe response.

Fire department facilities are exposed to some of the most intense and demanding uses of any public local government facility, as they are occupied 24 hours a day. Personnel-oriented needs in fire facilities must enable performance of daily duties in support of response operations. For personnel, fire facilities must have provisions for vehicle maintenance and repair; storage areas for essential equipment and supplies; and space and amenities for administrative work, training, physical fitness, laundering, meal preparation, and personal hygiene/comfort.

As discussed, the CBFD responds from two fire facilities. Fire administration is located in Station 51 and includes fire administration and operations, the Fire Marshal, associated administrative, training and EMS programs, the city's EOC, and training areas.

The following figure describes each fire facility related to operational use and functionality and includes general comments as observed by CPSM and reported by CBFD staff.

FIGURE 5-1: CBFD Station Facilities

Station 51: 50 S. Orlando Ave. **Year Built: 2015** **Square Feet: Base area 19,114; Sub-area 23,801. Bays: 4.** 	General Comments: ■ Adequate office space for current staff; potentially may outgrow. ■ Gender separation of bunkrooms. ■ No gender separation of bathrooms/ showers for operational staff. ■ Fitness area. ■ Vehicle CO capture system. ■ Living space separated from fleet area. ■ Adequate day room/dining/kitchen areas. ■ Training area.

	■ Generator elevated but below storm surge plane. ■ Electrical panels located on the ground floor and below flood grade. ■ Exterior brick façade issues due to coastal storms. ■ Bi-fold bay doors scheduled for replacement with conventional vertical doors.
Station 50: 151 W. Volusia Ave. **Year Built: 1962** **Square Feet: 2,665 Bays: 2** 	General Comments: ■ No gender separation of bunkrooms. ■ No gender separation of bathrooms. ■ Limited fitness area. ■ No decon area. ■ No vehicle CO capture system. ■ Living space not completely separated from fleet area. ■ Limited day room/office/dining/kitchen area space. ■ Limited apparatus storage in bays due to height and length restrictions. ■ Limited storage. ■ No generator during CPSM visit. The on-site generator is stored in a separate external shed and has no transfer switch. ■ Historical water intrusion (flooding) during inclement coastal storm weather. ■ Condensation in plenum space between drop ceiling and roof.

Decisions on replacing facilities (those not recommended to be re-located) are better made by an engineer who specializes in facility assessments to include mechanical systems and structural components. In general, however, a building goes through a life cycle that includes general maintenance/repair and some mechanical component replacement in the first 16 years of facility life; the next phase in the building life cycle (age 17-29) goes beyond the general maintenance and repair and includes larger replacement items such as roofs and HVAC systems, windows, apparatus aprons, exterior finish upgrades, obsolete electrical components, and major living space renovation due to expansion of services; the next phase (age 30-49) includes replacement of building components that were replaced in earlier years (1-16), interior and exterior renovations, and continuation of replacement of mechanical system components (plumbing, electrical, HVAC).

Facilities that remain active after 50 years of age, while still functional, will continue to need regular maintenance and repair, continued cosmetic updating, and replacement of mechanical and structural components that were replaced in previous life cycle segment years.[46]

The two CBFD fire facilities are about 8 and 61 years of age, respectively, and fall into a building life-cycle range as follows:

- Age 10-16 years: None.
- Age 17-29 years: None.
- Age 30-49 years: None.
- Age 50+: One (Station 50).

Station 50 falls into the 50+ year life cycle and has considerable age and facility challenges for a contemporary fire department. Therefore, the city and CBFD should continue to plan and budget for major renovations (interior and exterior) and maintenance as described above and continue to consider facility replacement.

DISTRIBUTION ANALYSIS

When siting fire stations for the most efficient response, several factors must be considered. These include the road network the assigned apparatus will use to serve the response district the station is built to serve, which directly ties to response travel time. Travel time is key to understanding how fire and EMS station location influences a community's aggregate response time performance. NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Career Fire Departments*, establishes benchmark travel times for first arriving fire units as:

- ≤ 240 seconds for the first arriving engine company to a fire suppression incident 90 percent of the time.
- ≤ 240 seconds for the first arriving engine company to an EMS incident with automated external defibrillator (AED) or higher level capability.

The location of responding units is one key factor in response time; reducing response times, which is typically a key performance measure in determining the efficiency of department operations, often depends on this factor. The goal of placement of a single fire station or creating a network of responding fire stations in a single community is to optimize coverage with short travel distances, when possible, while giving special attention to natural and manufactured barriers, and response routes that can create response-time problems.[47]

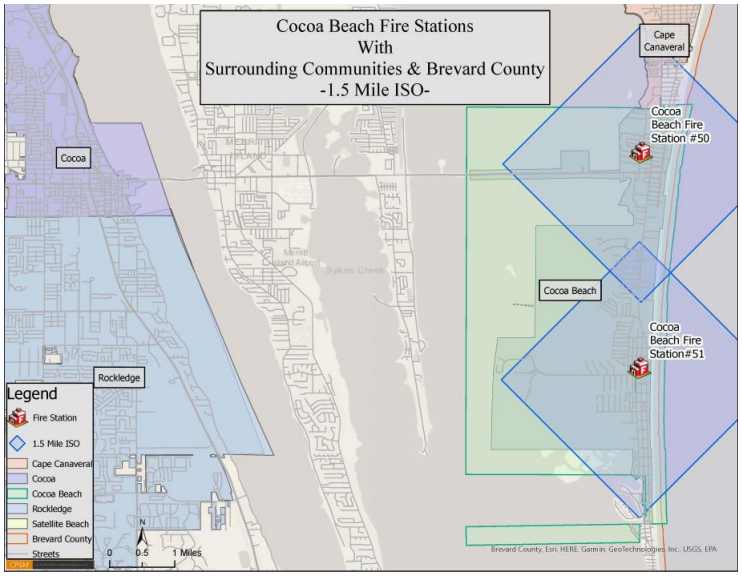
An additional benchmark, and as discussed previously, is the ISO Public Protection Classification rating system. Under this system, one element a jurisdiction is graded on is the distribution within built-upon areas of engine companies and ladder companies (deployment analysis). For full credit in the Fire Suppression Rating Schedule (FSRS), a jurisdiction's fire protection area with

46. What happens over the life of a building, Albrice, 2010.
47. NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments*, 2020 Edition.

residential and commercial properties should have a first-due engine company within 1.5 road miles and a ladder service company within 2.5 road miles.[48]

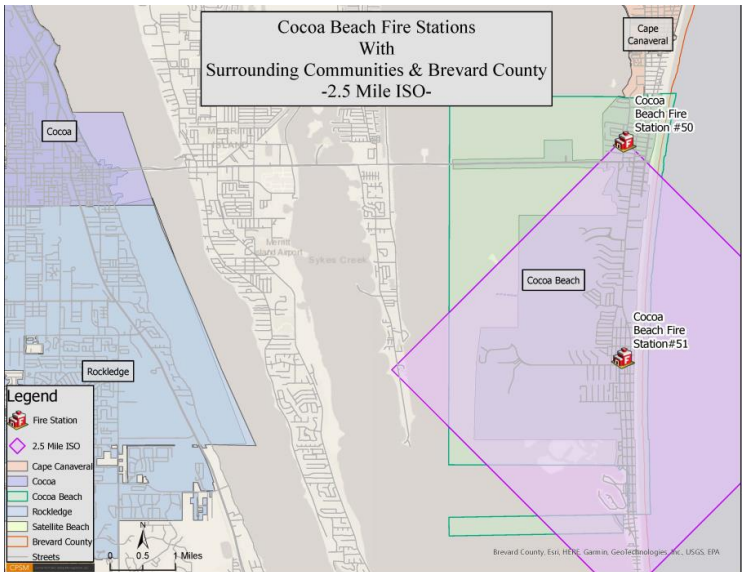
As engine and ladder companies both respond from fire facilities, and because engine companies are the more prevalent fire suppression company, fire facilities are predictably sited based on the response needs of engine companies. CBFD engine and ladder company ISO benchmarks are illustrated in the next figure. As reviewed previously, these two maps tell us the engine company deployment meets ISO benchmarking, and there are only minor deficiencies in the ladder company deployment to built-upon areas.

FIGURE 5-2: ISO Engine and Ladder Benchmark-CBFD



ISO Engine Company Benchmark

Percentage of built-upon area within 1.5 miles of a first due engine company.



ISO Ladder Company Benchmark

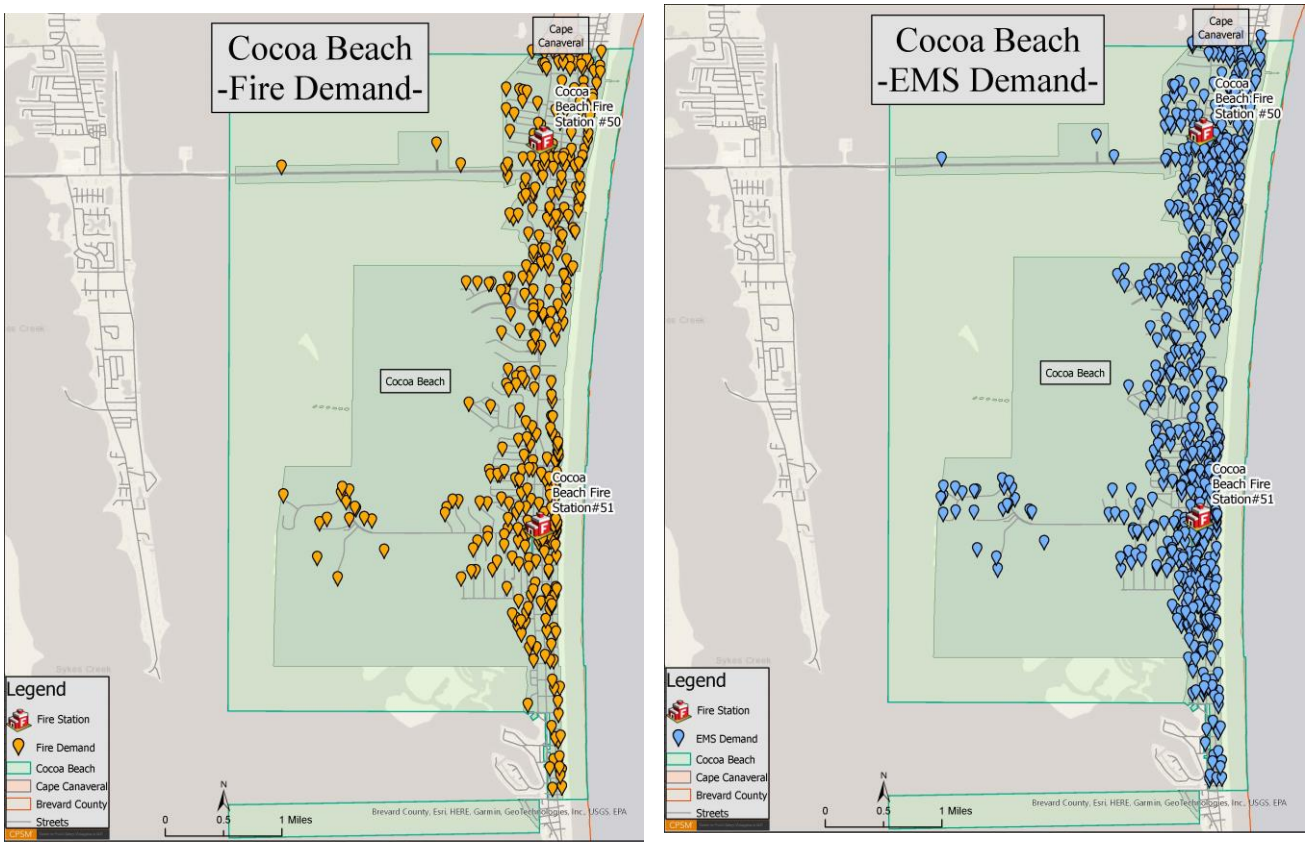
Percentage of built-upon area within 2.5 miles of a first due ladder company and number of response areas in the city with 5 buildings that are 3 or more stories or 35 feet or more in height.

48. ISO Mitigation, Deployment Analysis.

Finally, the current and potential for future demand for service is a consideration for the siting of fire facilities. Demand is the number and types of calls for services provided by the entire fire department. When demand is evaluated, it is important the number of incidents is not confused with the number of unit responses. An emergency call may require the response of more than one unit, but only one incident number is generated. This is a direct accelerator of demand.

To review, the maps in the next figure illustrate fire and EMS demand. In each, demand is most concentrated in the proximity of Stations 50 and 51. Because of the demand and CBFD resiliency, CPSM concentrated analysis of a potential future fire facility for Station 50 in its current core area.

FIGURE 5-3: Fire and EMS Demand



Next, we review the CBFD response times. As the CBFD is a career agency, the benchmarked standard for response times is NFPA 1710. This is a practical application in the suburban and urban areas of service.

The next two tables analyze the average and 90th percentile dispatch, turnout, travel, and total response times for calls, broken out by district (Stations 50 and 51) and then by call type.

At the 90th percentile overall, the CBFD's travel time is 5.2 minutes (all districts-all calls) and 3.6 minutes for structural fires. Further, the CBFD 90th percentile travel times to medical calls is 5.3 minutes.

TABLE 5-1: Average and 90th Percentile Response Time by First Due Area

Zone	Average Response Time, Min.				90th Percentile Response Time, Min.				Call Count
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
Station 50	0.6	1.4	3.5	5.6	1.5	2.5	5.7	8.2	1,136
Station 51	0.7	1.9	2.9	5.5	1.7	2.9	4.8	7.7	907
Total	**0.7**	**1.6**	**3.3**	**5.6**	**1.6**	**2.7**	**5.2**	**7.9**	**2,043**

TABLE 5-2: Average and 90th Percentile Response Time of First Arriving Unit, by Call Type

Call Type	Average Response Time, Min.				90th Percentile Response Time, Min.				Call Count
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
Medical call	0.5	1.6	3.3	5.4	1.3	2.6	5.3	7.6	1,572
MVA	0.9	1.7	2.7	5.3	1.8	2.7	4.5	7.7	57
EMS Subtotal	**0.6**	**1.6**	**3.3**	**5.4**	**1.4**	**2.6**	**5.2**	**7.6**	**1,629**
False alarm	1.2	2.0	3.1	6.3	2.4	3.4	5.1	8.8	195
Good intent	1.7	2.0	3.1	6.9	4.2	2.9	5.4	10.5	15
Hazard	1.4	1.6	2.8	5.8	2.9	2.7	4.8	8.7	54
Outside fire	1.4	1.6	3.2	6.2	2.4	2.8	4.7	8.7	14
Public service	0.6	1.8	3.5	5.8	1.5	3.0	5.9	8.5	116
Structure fire	1.2	1.9	2.4	5.5	2.0	2.4	3.6	7.0	12
Technical rescue	1.4	1.8	2.3	5.6	2.9	2.8	5.6	8.9	8
Fire Subtotal	**1.1**	**1.9**	**3.1**	**6.1**	**2.3**	**3.0**	**5.3**	**8.8**	**414**
Total	**0.7**	**1.6**	**3.3**	**5.6**	**1.6**	**2.7**	**5.2**	**7.9**	**2,043**

Detailed review of the above tables tells us:

- The 90th percentile dispatch time (alarm handling) was 1.6 minutes (**96 seconds**).
  - The NFPA 1710 dispatch time or call processing time standard is 64 seconds, 90 percent of the time, and not more than 106 seconds, 95 percent of the time. For special calls, the dispatch time or call processing is 90 seconds, 90 percent of the time, and not more than 120 seconds, 95 percent of the time. The greatest majority of CBFD calls for service are outside of the special call type.
- The 90th percentile turnout time was 2.7 minutes (**162 seconds**).
  - The NFPA 1710 turnout time is 60 seconds for EMS response and 80 seconds for fire and special call responses.
- The 90th percentile overall travel time was 5.2 minutes.
- The 90th percentile overall EMS travel time was 5.3 minutes.
- The 90th percentile overall structure fire travel time was 3.6 minutes.

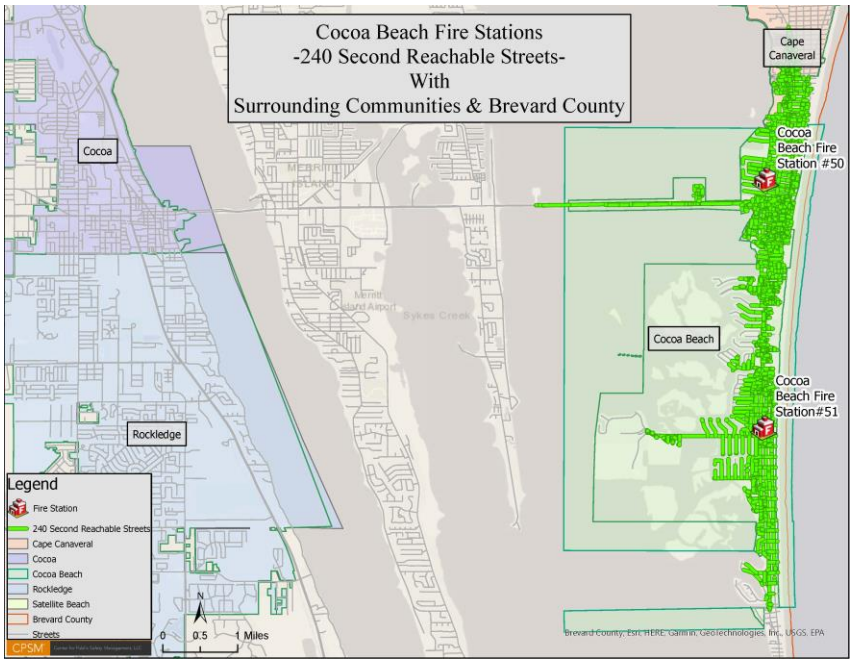
The NFPA 1710 travel time standard is 240 seconds or 4 minutes for the first arriving engine company of structure fires and first arriving fire suppression unit with an AED on EMS calls.

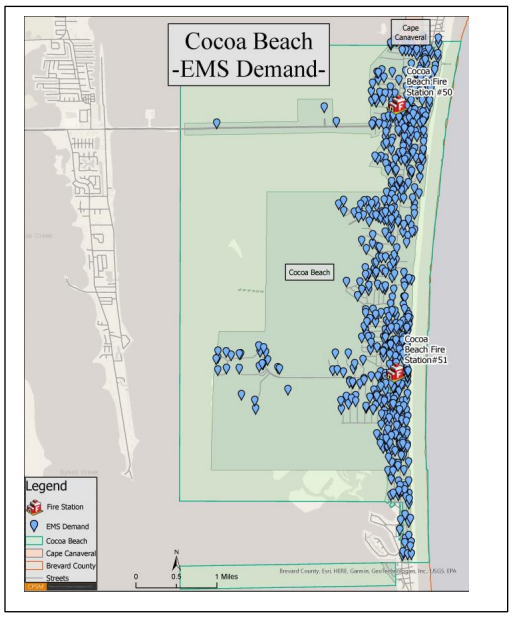
The next figure analyzes the CBFD' s current facility locations and travel time of 240 seconds, as benchmarked against the NFPA 1710 four-minute (240 seconds) travel time standard for structure fires and EMS responses. Collectively there is near 100 percent coverage of the city at the travel time measurement of 240 seconds from the two stations.

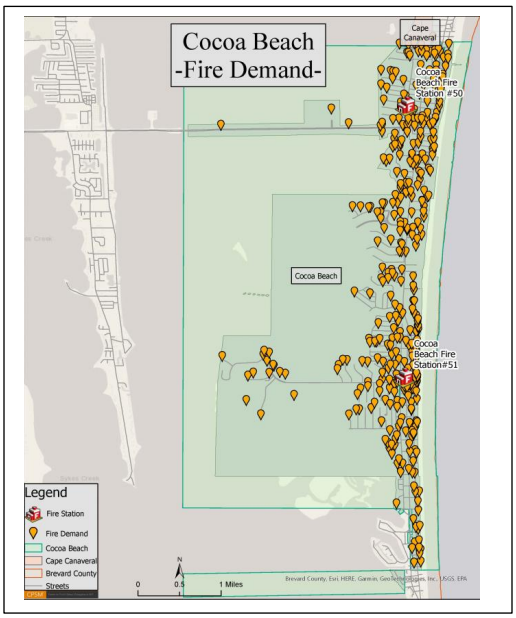
Station Distribution Analysis Recommendation:

- CPSM recommends the CBFD work with the CBPD 911 PSAP and with CBFD fire suppression personnel on improving call processing times (CBPD 911 PSAP) and turnout times (CBFD fire suppression personnel) with the goal of aligning more closely to NFPA 1710 90th percentile standards. (Recommendation No. 27.)

FIGURE 5-4: CBFD Four-Minute Travel Times, with Fire and EMS Demand







FURTHER CONSIDERATIONS FOR FIRE AND EMS RESPONSE TIMES

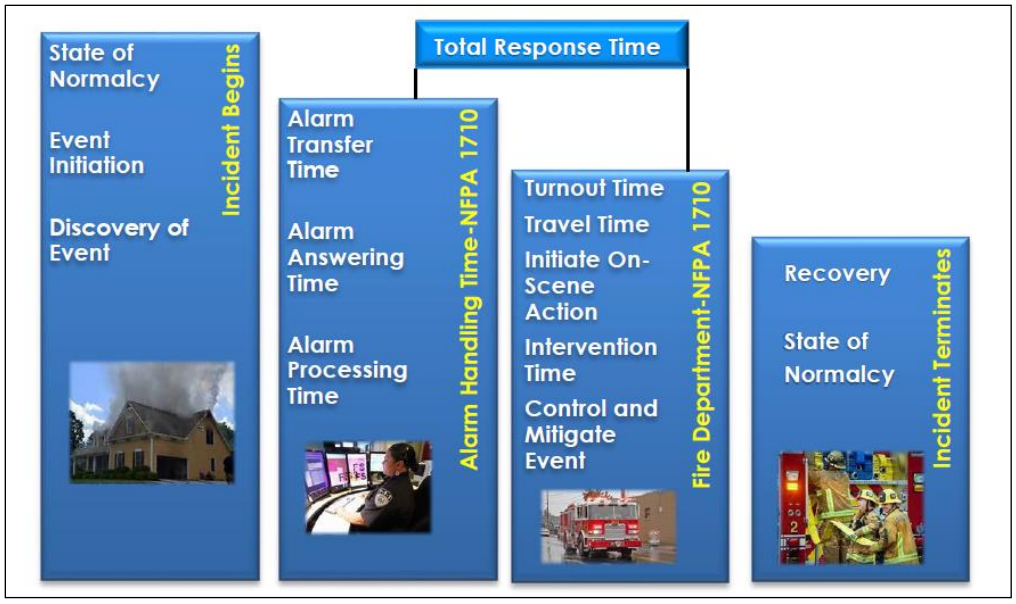
Response times are typically the primary measurement for evaluating fire and EMS services. Response times can be used as a benchmark to determine how well a fire department is currently performing, to help identify response trends, and to predict future operational needs. Achieving the quickest and safest response times possible should be a fundamental goal of every fire department.

However, the actual impact of a speedy response time is limited to very few incidents. For example, in a full cardiac arrest, analysis shows that successful outcomes are rarely achieved if basic life support (CPR) is not initiated within four to six minutes of the onset. However, cardiac arrests occur very infrequently; on average, these incidents make up 1 percent to 1.5 percent of all EMS incidents.[49] There are also other EMS incidents that are truly life-threatening, and the time of response can clearly impact the outcome. These involve cardiac and respiratory emergencies, full drownings, obstetrical emergencies, allergic reactions, electrocutions, and severe trauma (often caused by gunshot wounds, stabbings, and severe motor vehicle accidents, etc.). Again, the frequency of these types of calls is limited.

An important factor in the whole response time question is what we term "**detection time**." This is the time it takes to detect a fire or a medical situation and notify 911 to initiate the response. In many instances, particularly at night or when automatic detection systems (fire sprinklers and smoke detectors) are not present or are inoperable, the detection time can be extended. Fires that go undetected and are allowed to expand in size become more destructive and are difficult to extinguish.

The next figure provides an overview of the fire department incident cascade of events and further describes the complete cascade of events and their relationship to the total response time of a fire incident.

FIGURE 5-5: Incident Cascade of Events



49 Myers, Slovis, Eckstein, Goodloe et al. (2007)." Evidence-based Performance Measures for Emergency Medical Services System: A Model for Expanded EMS Benchmarking." *Pre-hospital Emergency Care*.

Travel time is key to understanding how fire and EMS station location influences a community's aggregate response time performance. Travel time can be mapped when existing and proposed station locations are known. The location of responding units is one key factor in response time; reducing response times, which is typically a key performance measure in determining the efficiency of department operations, often depends on this factor.

The goal of placement of a single fire station or creating a network of responding fire stations in a single community is to optimize coverage with short travel distances, when possible, while giving special attention to natural and manmade barriers, and response routes that could create response-time problems.[50] This goal is generally budget-driven and based on demand intensity of fire and EMS incidents, travel times, and identified risks.

When discussing response times for fire incidents, established criterion is linked to the concept of "flashover." This is the state at which super-heated gases from a fire are released rapidly, causing the fire to burn freely, and become so volatile that the fire reaches an explosive state (simultaneous ignition of all the combustible materials in a room). In this situation, usually after an extended period (often eight to twelve minutes after ignition but times as quickly as five to seven minutes), and a combination of the right conditions (fuel and oxygen), the fire expands rapidly and is much more difficult to contain.

When the fire does reach this extremely hazardous state, initial firefighting forces are often overwhelmed, larger and more destructive fire occurs, the fire escapes the room and possibly even the building of origin, and significantly more resources are required to affect fire control and extinguishment.

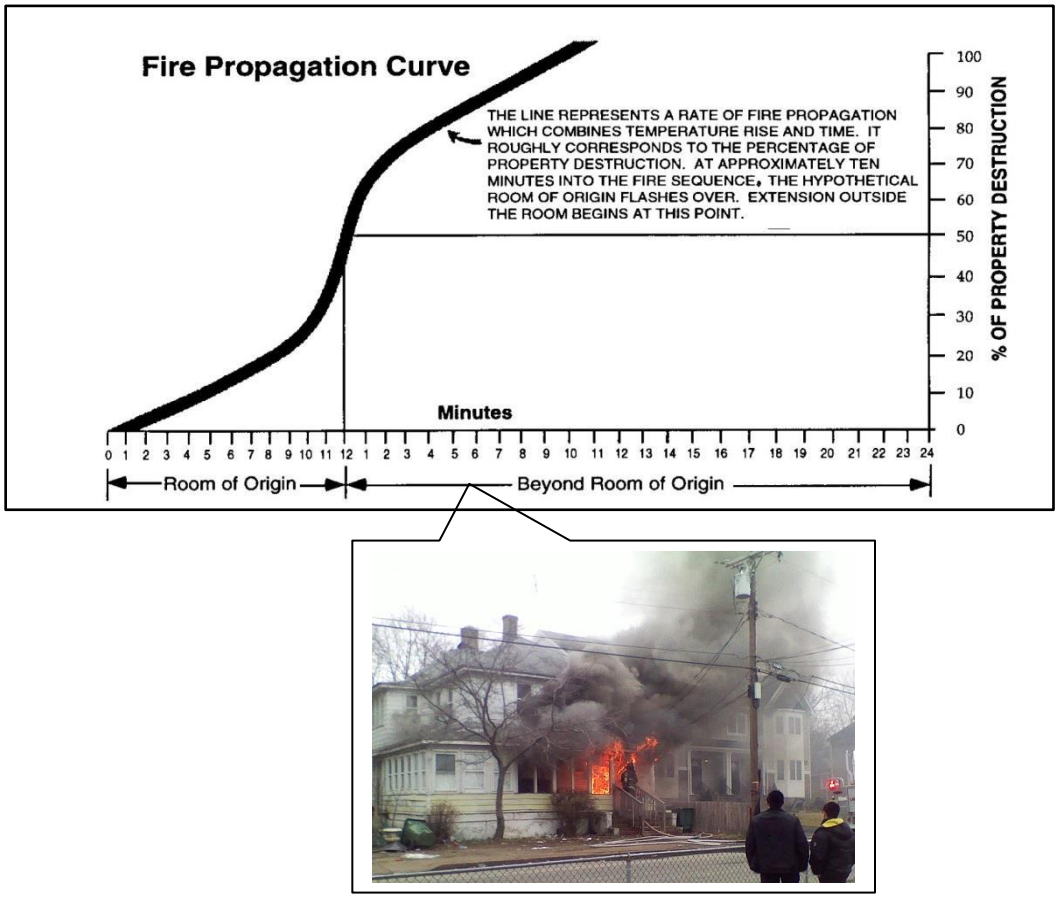
Flashover occurs more quickly and more frequently today and is caused at least in part by the introduction of significant quantities of plastic- and foam-based products into homes and businesses (e.g., furnishings, mattresses, bedding, plumbing and electrical components, home and business electronics, decorative materials, insulation, and structural components). These materials ignite and burn quickly and produce extreme heat and toxic smoke.

The following figure shows the fire propagation curve relative to fire being confined to the room of origin or spreading beyond it and the percentage of destruction of property by the fire. As described in the figure, at approximately the ten-minute mark of fire progression, the fire flashes over (due to superheating of room contents and other combustibles) and extends beyond the room of origin at about the twelve-minute mark, thus increasing proportionately the destruction to property and potential endangerment of life.

The ability to quickly deploy adequate fire staff prior to flashover thus limits the fire's extension beyond the room or area of origin. Fire propagation curve science establishes that temperature rise and time within in a room on fire corresponds with property destruction and potential loss of life, if present.[51]

50. NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments, 2020 Edition*.
51. Clinton Smoke, *Company Officer*, 2nd ed. (Clifton Park, NY: Delmar, 2005).

FIGURE 5-6: Fire Propagation Curve[52]



Regarding the risk of flashover, the authors of an IAFF report conclude:

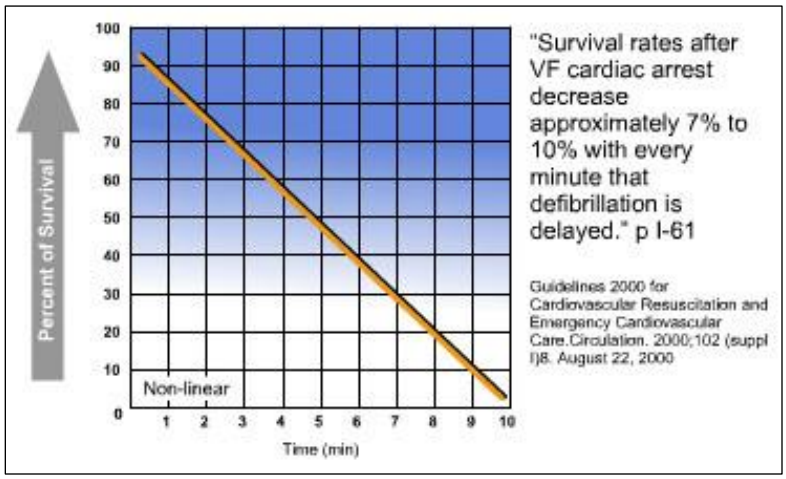
> *Clearly, an early aggressive and offensive initial interior attack on a working structural fire results in greatly reduced loss of life and property damage. Consequently, given that the progression of a structural fire to the point of "flashover" (the very rapid spreading of the fire due to super-heating of room contents and other combustibles) generally occurs in less than 10 minutes, two of the most important elements in limiting fire spread are the quick arrival of sufficient numbers of personnel and equipment to attack and extinguish the fire as close to the point of its origin as possible.*[53]

EMS response times are measured differently than fire service response times. Where the fire service uses NFPA 1710 and 1720 as response time benchmarking documents, the focus with EMS is and should be directed to the evidence-based research relationship between clinical outcomes and response times. Much of the current research suggests response times have little impact on clinical outcomes outside of a small segment of call types. These include cerebrovascular accidents (stroke), injury or illness compromising the respiratory system, injury or illness compromising the cardiovascular system to include S-T segment elevation emergencies, and certain obstetrical emergencies. Each requires rapid response times, rapid on-scene treatment and packaging for transport, and rapid transport to the hospital.

52. John C. Gerard and A. Terry Jacobsen, "Reduced Staffing: At What Cost?" *Fire Service Today* (September 1981), 15–21.
53. *Safe Fire Fighter Staffing: Critical Considerations*, 2nd ed. (Washington, DC: IAFF), 5.

The next figure illustrates the chance of survival from the onset of cardiac arrest, largely due to ventricular fibrillation in terms of minutes without emergency defibrillation delivered by the public or emergency responders. The chance of survival has not changed over time since this graphic was first published by the American Heart Association in 2000.

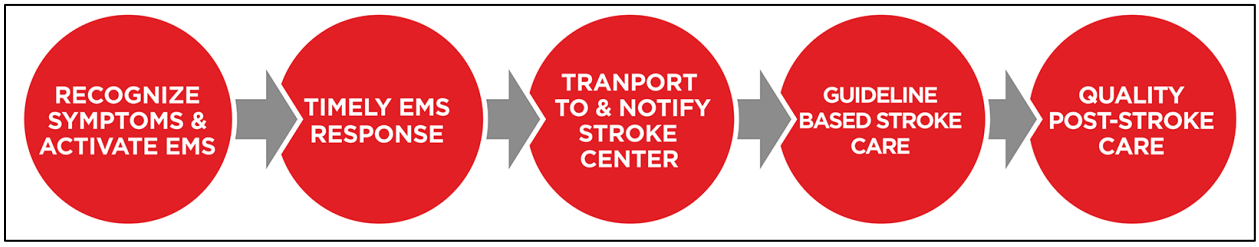
FIGURE 5-7: Cardiac Arrest Survival Probability by Minute



Typically, a low percentage of 911 patients have time-sensitive and advanced life support (ALS) needs. But, for those patients that do, time can be a critical issue of morbidity and mortality. For the remainder of those calling 911 for a medical emergency, though they may not have a medical necessity, they still expect rapid customer service. Response times for patients and their families are often the most important measurement of the EMS department. Regardless of the service delivery model, appropriate response times are more than a clinical issue; they are also a customer service issue and should not be ignored.

In addition, a true emergency is when an illness or injury places a person's health or life in serious jeopardy and treatment cannot be delayed. Examples include severe trauma with cardiovascular system compromise, difficulty breathing, chest pain with S-T segment elevation (STEMI), a head injury, or ingestion of a toxic substance.[54] The next figure illustrates the out-of-hospital chain of survival for a stroke emergency, which is a series of actions that, when put in motion, reduce the mortality of a stroke emergency.

FIGURE 5-8: Cerebrovascular Emergency (Stroke) Chain of Survival



Source: https://nhcps.com/lesson/acls-acute-stroke-care/

If a person is experiencing severe pain, that is also an indicator of an emergency. Again, the frequency of these types of calls is limited as compared to the routine, low-priority EMS incident

54. Mills-Peninsula Health Blog, Bruce Wapen, MD.

responses. In some cases, these emergencies often make up no more than 5 percent of all EMS calls.[55]

Cardiac arrest is one emergency for which EMS response times were initially built around. Science tells us that the brain begins to die without oxygenated blood flow at the four- to six-minute mark. Without immediate cardiopulmonary resuscitation (CPR) and rapid defibrillation, the chances of survival diminish rapidly at the cessation of breathing and heart pumping activity. For every minute without CPR and/or defibrillation, chances of survival decrease 7 to 10 percent. Further, only 10 percent of victims who suffer cardiac arrest outside of the hospital survive.[56]

It is important to understand that measuring and analyzing response times and response time coverage are measurements of performance. When we discussed community risk, we identified that the CBFD, like most other fire departments in the nation, is an all-hazards response agency. While different regions of the country respond to different environmental risks, the majority of hazards that fire departments confront remain the same. Linking response data to community risks lays the foundation for future fire department planning in terms of fire station location, the need for additional fire stations, and staffing levels whether supplied by the fire department or a combination of a jurisdiction's fire department plus automatic aid.

Managing fire department response capabilities to the identified community's risk focuses on three components, which are:

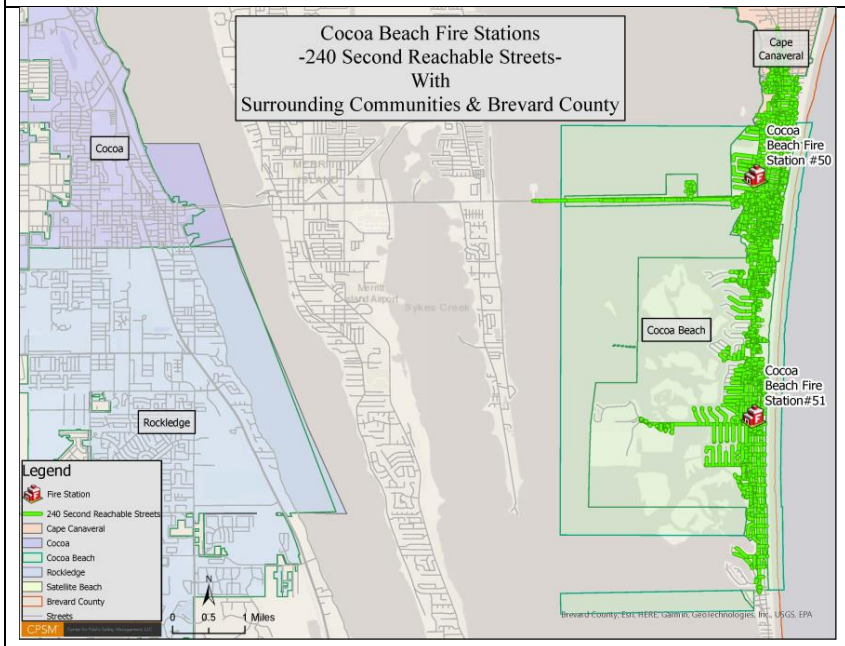
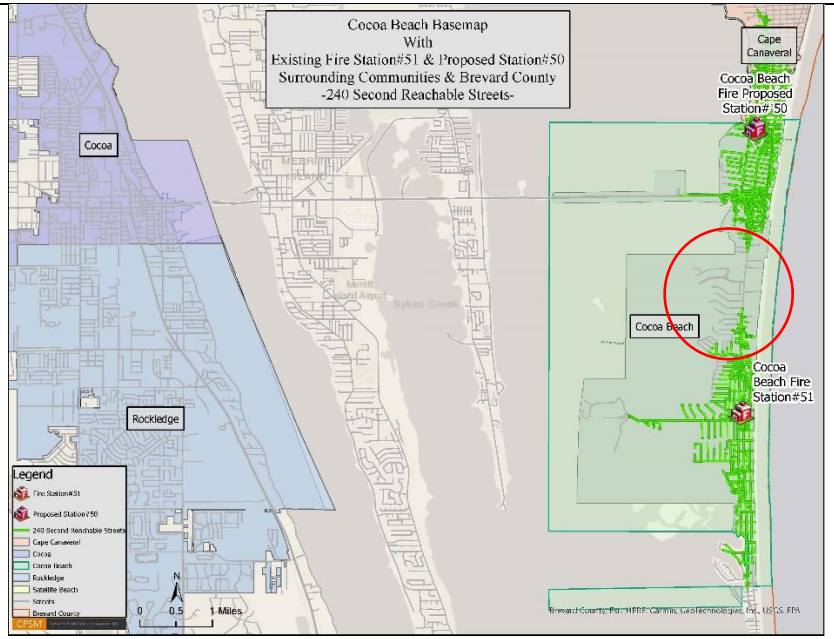
- Having a full understanding of the total risk in the community and how each risk impacts the fire department in terms of resiliency, what the consequences are to the community and fire department should a specific risk or combination of two or more occur, and preparing for and understanding the probability that the risk may occur.
- Linking risk to the deployment of resources to effectively manage every incident. This includes assembling an Effective Response Force for the response risk in measurable times benchmarked against NFPA standards, deploying the appropriate apparatus (engines, ladders, heavy rescues, ambulances), and having a trained response force trained to combat a specific risk.
- Understanding that each element of response times plays a role in the management of community risk. Low response times of the initial arriving engine and low time to assemble an Effective Response Force on fire and other incidents are associated with positive outcomes.

Station Siting Considerations

Due to the age of Station 50 the city and CBFD are considering moving the facility from its current location to a site near 5310 N. Atlantic Ave. Due to the age, restrictions, and facility incompatibilities with a contemporary fire department, CPSM recommended the planning for a new Station 50 facility continue. As such, CPSM has analyzed this new location against the ISO and NFPA 1710 benchmarks. This is illustrated in the next figures.

55. www.firehouse.com/apparatus/article/10545016/operations-back-to-basics-true-emergency-and-due-regard
56. American Heart Association. A Race Against the Clock, Out of Hospital Cardiac Arrest. 2014

FIGURE 5-9: Travel Time of 240 Seconds, Comparing Current and Proposed Station Siting

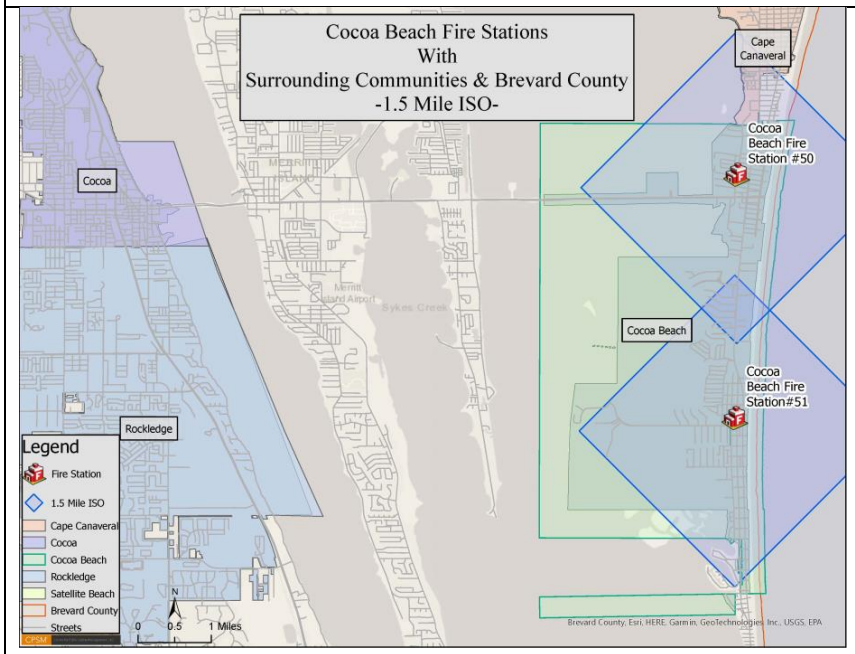
Current Station 50 and 51 4-Minute Response Time	Proposed Station 50 and Current Station 51 4-Minute Response Time
	

In the current station configuration, there are limited gaps at a travel time of four minutes. Relocating Station 50 to the site at 5310 N. Atlantic Ave. does create a coverage gap in terms of travel time of 240 seconds in the middle area of the city from approximately Surf Drive south to Lori Wilson Park.

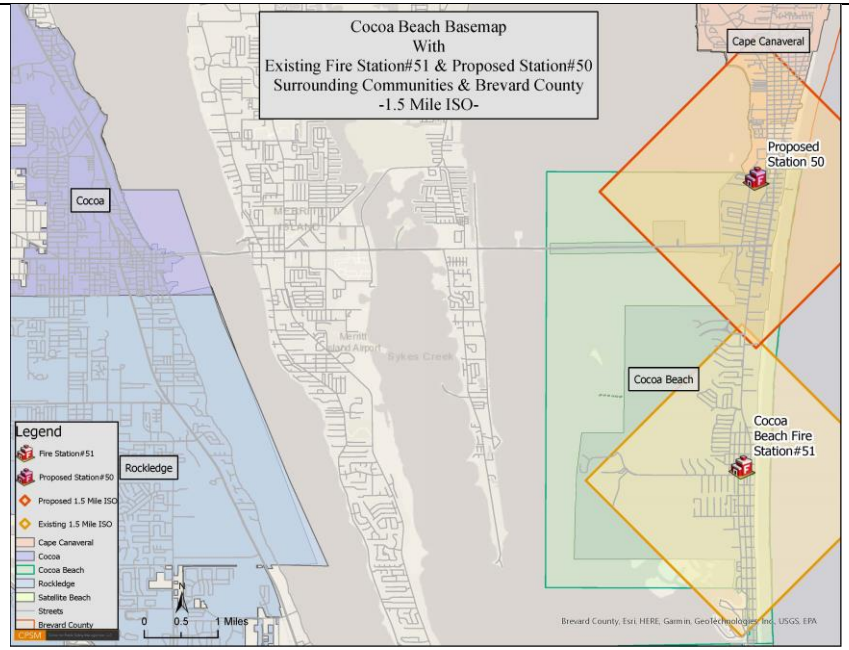
§ § §

FIGURE 5-10: ISO 1.5-Mile Engine Company Benchmark, Comparing Current and Proposed Station Siting

Current Station 50 and 51
ISO 1.5 Mile Engine Company Benchmark



Proposed Station 50 and Current Station 51
ISO 1.5 Mile Engine Company Benchmark



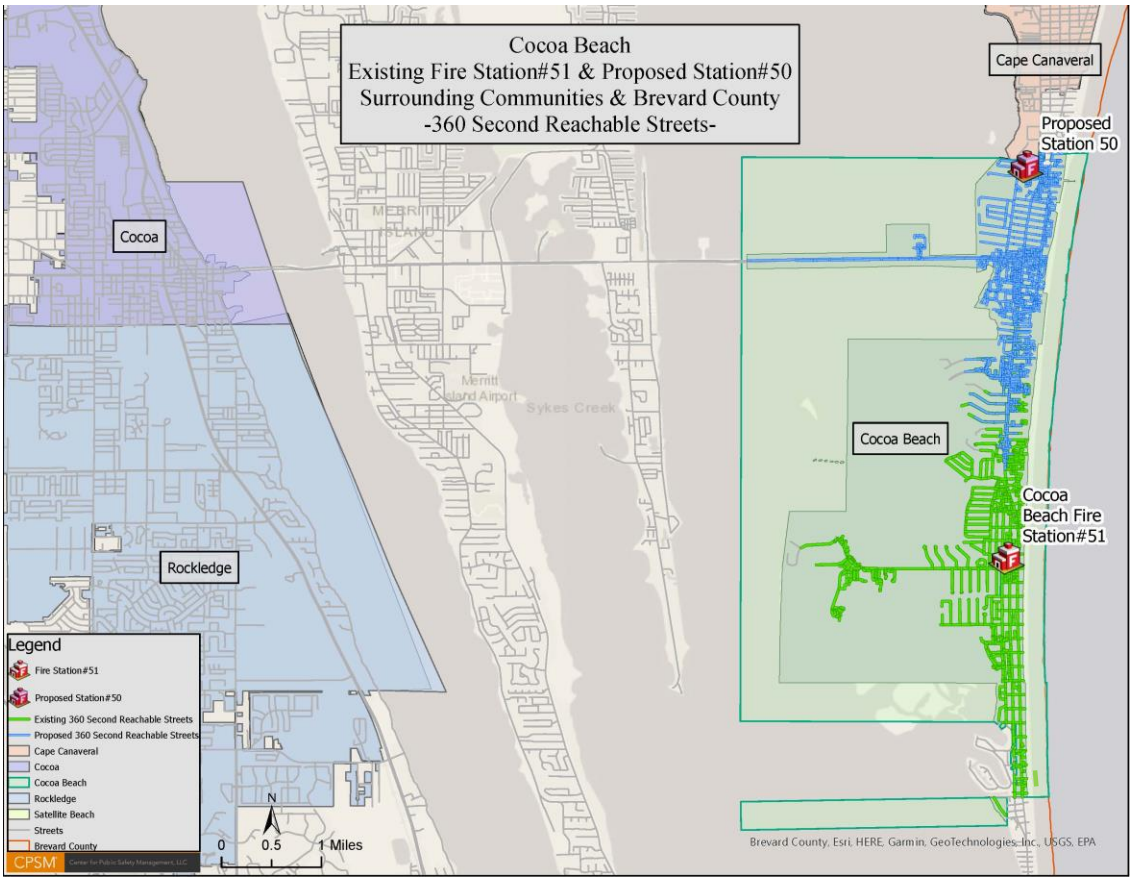
In the current station configuration, there are limited gaps (very southern tip of the city and the western most area of the city in and around the Cocoa Beach Country Club) when benchmarking against the ISO 1.5-mile engine company benchmark. Relocating Station 50 to the site at 5310 N. Atlantic Ave. creates only limited additional gaps just west of A1A. This should have minimal effect overall on the ISO engine company grading.

§ § §

The next map contemplates a 6-minute (360 seconds) response travel time from both CBFD stations. Here we see that using this response metric the city is covered 100 percent aggregately from both stations. Although the 240-second travel time is the national benchmark for a career fire department, understanding the limitations of this is important as well. The street network of a community, speed limits, and traffic control often restrict this measurement. Alternate response travel times for certain areas of a community are often implemented when these factors are understood and accepted.

In analysis of this map, utilizing a 360-seconds travel time benchmark from the proposed Station 50 and current Station 51, we see the gap in the central area of the city is closed and there is some improvement to the far south along S. Orlando Ave. and to the west along Minuteman Causeway.

FIGURE 5-11: Proposed Station 50 and Current Station 51, Travel Time of 360 Seconds



Recommendation:

- CPSM recommends the city and the CBFD continue to plan to relocate Station 50 due to the age, facility conditions, and inadequacies of the current station. The current planning for 5301 N. Atlantic Ave. does create a minor gap in NFPA 1710 travel time criteria and minor gaps in the ISO 1.5-mile engine company benchmark. However, the benefit of siting a contemporary fire facility on a major north-south thoroughfare outweighs the issue of these minor gaps. (Recommendation No. 28.)

SECTION 6. DATA ANALYSIS

This data analysis examines all calls for service between November 1, 2021, and October 31, 2022, as recorded in the Cocoa Beach Police Department's computer-aided dispatch (CAD) system and CBFD's National Fire Incident Reporting System (NFIRS).

This analysis is made up of four parts. The first part focuses on call types and dispatches. The second part explores the time spent and the workload of individual units. The third part presents an analysis of the busiest hours in the year studied. The fourth and final part provides a response time analysis of CBFD units.

The Cocoa Beach Fire Department serves a population of about 11,600 people in a residential and commercial area of approximately 3.5 square miles as well as providing basic fire protection for the "Thousand Islands" area adjacent to Cocoa Beach in the Banana River. CBFD is an all-hazards response fire department, providing service and protection for fire, hazardous material responses, vehicle accidents, emergency medical service (EMS), and other incidents where life and property are threatened. The CBFD staffs 24 shift-based firefighters, a Fire Chief, a Deputy Chief of Operations, a Fire Marshal, an EMS Division Chief, and a Fire Support Administrator. It operates out of two fire stations, utilizing two frontline engines, two reserve engines, a tower truck, a heavy-duty rescue vehicle, a jet ski surf rescue unit, and a utility unit.

Between November 1, 2021, and October 31, 2022, the Cocoa Beach Fire Department responded to 2,876 9-1-1 calls, of which 64 percent were EMS calls. The total combined workload (deployed time) for CBFD units was 1,384.2 hours. The average dispatch time was 0.7 minutes, and the average total response time was 5.6 minutes. The 90th percentile dispatch time was 1.6 minutes and the 90th percentile total response time was 7.9 minutes.

METHODOLOGY

In this report, CPSM analyzes calls and runs. A call is an emergency service request or incident. A run is a dispatch of a unit (i.e., a unit responding to a call). Thus, a call may include multiple runs.

We encountered a few issues while collecting dispatch data for our study:

- The dispatch center switched systems in November 2022. During the transition, data was incomplete. In addition, the new system's recording methods were not fully compatible with the earlier system. For this reason, we chose to focus our analysis on the last twelve months fully recorded within the old system, namely, November 2021 through October 2022.
- We requested detailed ambulance data from Brevard County Fire Rescue to complement the data provided by BCPD and BCFD. The provided information lacked sufficient detail despite repeated requests for enhanced information. For this reason, the study of EMS calls will focus on the BCFD's workload; thus, we cannot provide our usual analysis of ambulance transport.

We received CAD data and NFIRS data for the Cocoa Beach Fire Department. We first matched the NFIRS and CAD data based on the incident numbers provided. Then, we used the NFIRS incident type to identify canceled calls and to assign emergency medical service (EMS), motor vehicle accident (MVA), and fire category call types. For calls without NFIRS incident types, we instead categorized them based on the call nature field in the CAD data. The method of call type categorization is shown in Attachment IV. Calls that occurred outside CBFD's fire district were identified as aid given (including both automatic aid and mutual aid).

We received records for a total of 3,115 calls that occurred between November 1, 2021, and October 31, 2022. We removed 176 calls to which a unit was dispatched but did not go en route or arrive on scene. 63 calls that only involved administrative units were not included in the main analysis. The work associated with these calls is included in the analysis of additional personnel in Attachment I.

AGGREGATE CALL TOTALS

Between November 1, 2021, and October 31, 2022, CBFD responded to 2,876 calls, of which 14 were structure fire calls and 16 were outside fire calls.

Calls by Type

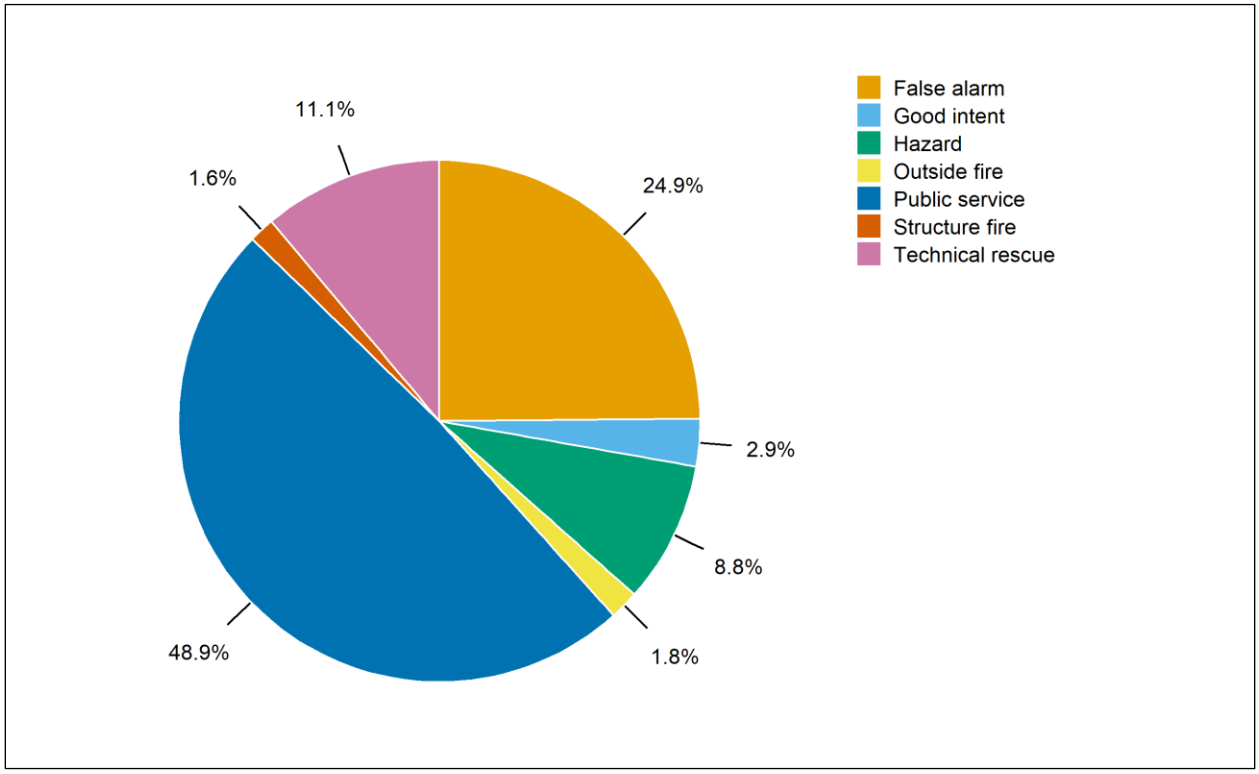
Table 6-1 shows the number of calls by call type, average calls per day, and the percentage of calls that fall into each call type category for the 12 months studied. Figure 6-1 shows the percentage of each category of fire calls.

TABLE 6-1: Call Types

Call Type	Total Calls	Calls per Day	Call Percentage
Medical call	1,758	4.82	61.1
MVA	84	0.23	2.9
EMS Subtotal	**1,842**	**5.05**	**64.0**
False alarm	221	0.61	7.7
Good intent	26	0.07	0.9
Hazard	78	0.21	2.7
Outside fire	16	0.04	0.6
Public service	435	1.19	15.1
Structure fire	14	0.04	0.5
Technical rescue	99	0.27	3.4
Fire Subtotal	**889**	**2.44**	**30.9**
Canceled	105	0.29	3.7
Mutual aid	40	0.11	1.4
Total	**2,876**	**7.88**	**100.0**

Note: *Calls that occurred outside CBFD's fire district were labeled as mutual aid. Out of 40 mutual aid calls, 17 were canceled.

FIGURE 6-1: Fire Calls by Type



Observations:

Overall

- The department received an average of 7.9 calls, including 0.3 canceled and 0.1 mutual aid calls, per day.

EMS

- EMS calls for the year totaled 1,842 (64 percent of all calls), an average of 5.0 per day.

Fire

- Fire calls for the year totaled 889 (31 percent of all calls), an average of 2.4 per day.
- False alarm calls were the largest category of fire calls at 44 percent of fire calls, an average of 0.8 calls per day.
- False alarm calls made up 25 percent of fire calls, an average of 0.6 calls per day.
- Structure and outside fire calls combined made up three percent of fire calls, an average of 0.1 calls per day, or one call every 12 days.

Calls by Type and Duration

The following table shows the duration of calls by type using four duration categories: less than 30 minutes, 30 minutes to one hour, one to two hours, and more than two hours.

TABLE 6-2: Calls by Type and Duration

Call Type	Less than 30 Minutes	30 Minutes to One Hour	One to Two Hours	Two or More Hours	Total
Medical call	1,590	150	12	6	1,758
MVA	63	17	4	0	84
EMS Subtotal	**1,653**	**167**	**16**	**6**	**1,842**
False alarm	208	9	2	2	221
Good intent	22	3	1	0	26
Hazard	63	12	2	1	78
Outside fire	10	5	0	1	16
Public service	375	30	12	18	435
Structure fire	8	2	1	3	14
Technical rescue	90	7	0	2	99
Fire Subtotal	**776**	**68**	**18**	**27**	**889**
Canceled	101	1	0	3	105
Mutual aid	35	3	2	0	40
Total	**2,565**	**239**	**36**	**36**	**2,876**

Observations:

EMS

- A total of 1,820 EMS calls (99 percent) lasted less than one hour, and 18 EMS calls (one percent) lasted one or more hours.

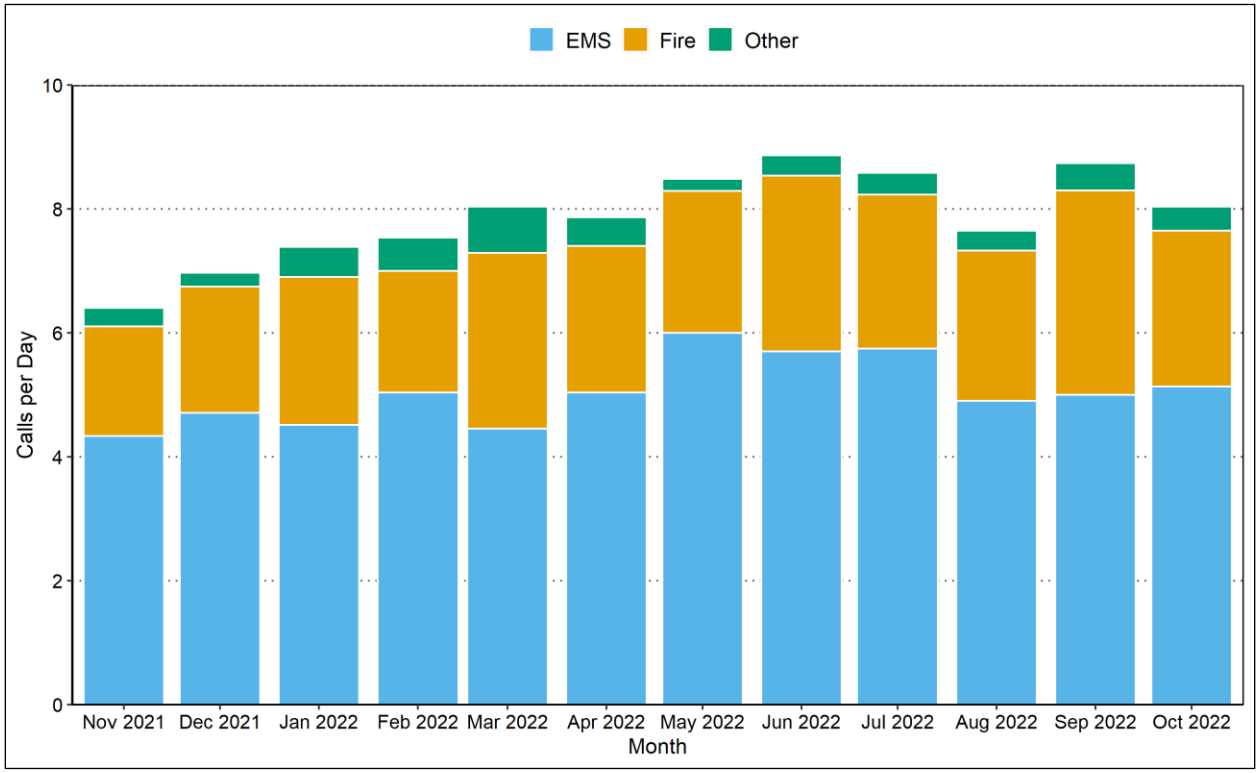
Fire

- A total of 844 fire calls (95 percent) lasted less than one hour, 18 fire calls (two percent) lasted one to two hours, and 27 fire calls (three percent) lasted two or more hours.
- A total of 15 outside fire calls (94 percent) lasted less than one hour and one outside fire call (six percent) lasted more than two hours.
- A total of 10 structure fire calls (71 percent) lasted less than one hour, one structure fire call (seven percent) lasted one to two hours, and three structure fire calls (21 percent) lasted two or more hours.

Calls by Month and Hour of Day

Figure 6-2 shows the monthly variation in the average daily number of calls handled by CBFD between November 1, 2021, and October 31, 2022. Similarly, Figure 6-3 illustrates the average number of calls received each hour of the day over the year.

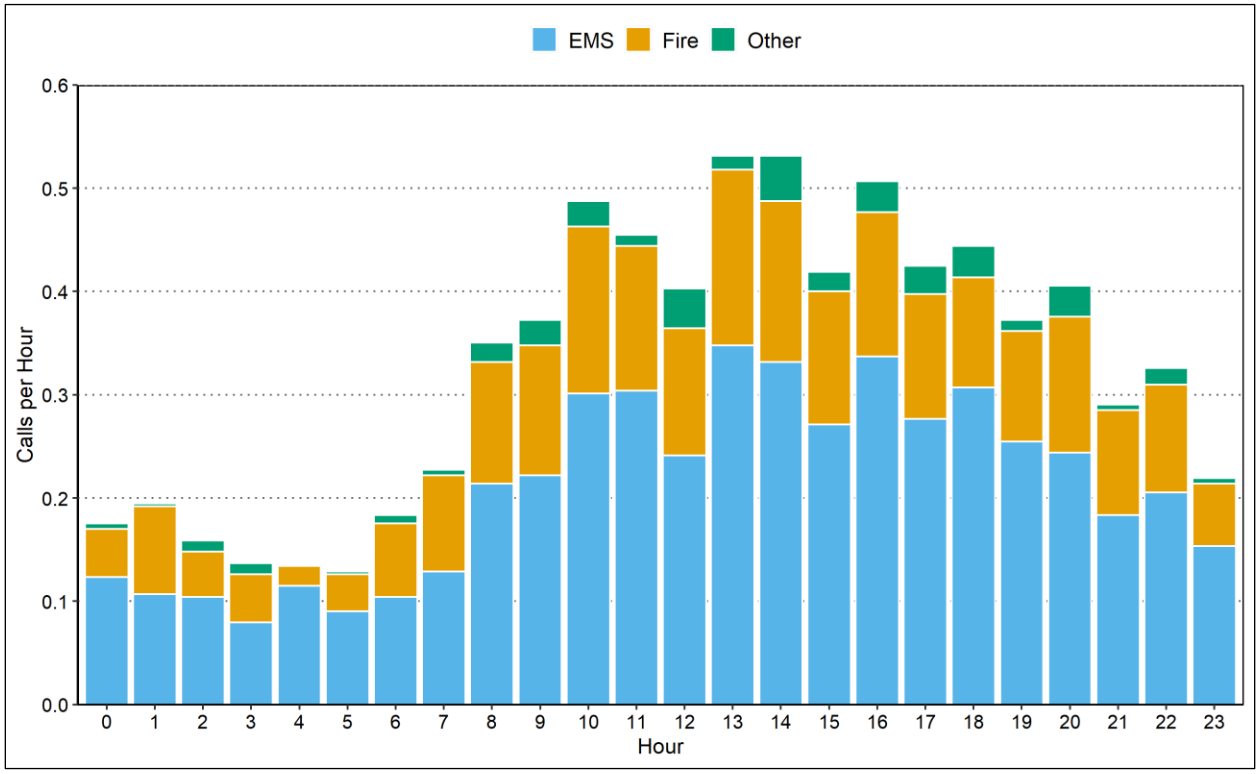
FIGURE 6-2: Average Daily Calls by Month



Observations:

- Average EMS calls per day ranged from 4.3 in November 2021 to 6.0 in May 2022.
- Average fire calls per day ranged from 1.8 in November 2021 to 3.3 in September 2022.
- Average calls per day overall ranged from 6.4 in November 2021 to 8.9 in June 2022.

FIGURE 6-3: Average Calls by Hour of Day



Observations:

- Average EMS calls per hour ranged from 0.08 between 3:00 a.m. and 4:00 a.m. to 0.35 between 1:00 p.m. and 2:00 p.m.
- Average fire calls per hour ranged from 0.02 between 4:00 a.m. and 5:00 a.m. to 0.17 between 1:00 p.m. and 2:00 p.m.
- Average calls per hour overall ranged from 0.13 between 5:00 a.m. and 6:00 a.m. to 0.53 between 1:00 p.m. and 3:00 p.m.

Units Arrived at Calls

Table 6-3, along with Figures 6-4 and 6-5, details the number of calls with one, two, and three or more CBFD units arriving at a call, broken down by call type. In this section, we limit ourselves to calls where a CBFD unit arrived.

TABLE 6-3: Calls by Call Type and Number of Arriving Units

Call Type	Number of Units				Total Calls
	One	Two	Three	Four or More	
Medical call	1,566	92	82	2	1,742
MVA	19	21	38	4	82
EMS Subtotal	**1,585**	**113**	**120**	**6**	**1,824**
False alarm	90	47	44	37	218
Good intent	12	5	1	7	25
Hazard	33	24	13	8	78
Outside fire	2	11	1	2	16
Public service	374	47	10	1	432
Structure fire	5	3	2	4	14
Technical rescue	76	14	6	1	97
Fire Subtotal	**592**	**151**	**77**	**60**	**880**
Canceled	54	2	1	0	57
Mutual aid	7	14	2	0	23
Total	**2,238**	**280**	**200**	**66**	**2,784**
Total Percentage	**80.4**	**10.1**	**7.2**	**2.4**	**100.0**

Note: Only calls with arriving CBFD units were considered. There were 92 calls where a CBFD unit recorded an en route time but no unit recorded an arrival time.

FIGURE 6-4: Calls by Number of Units Arriving, EMS

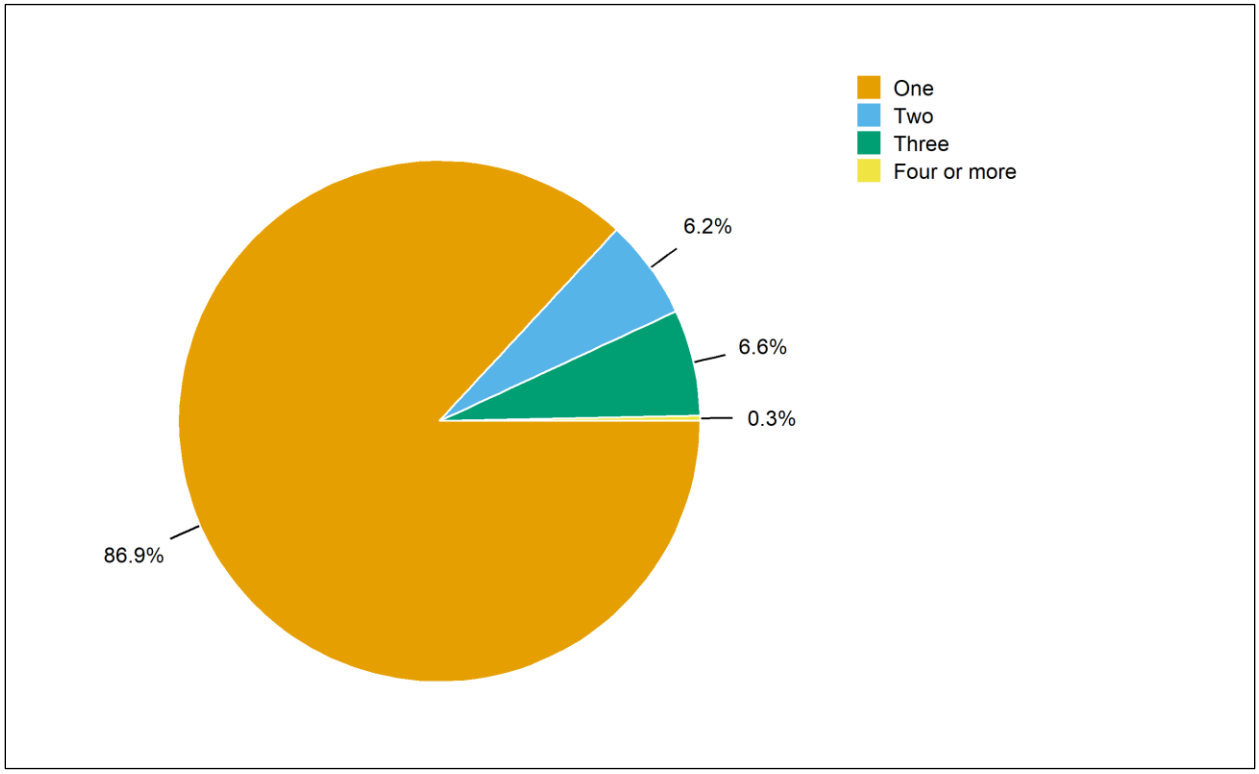
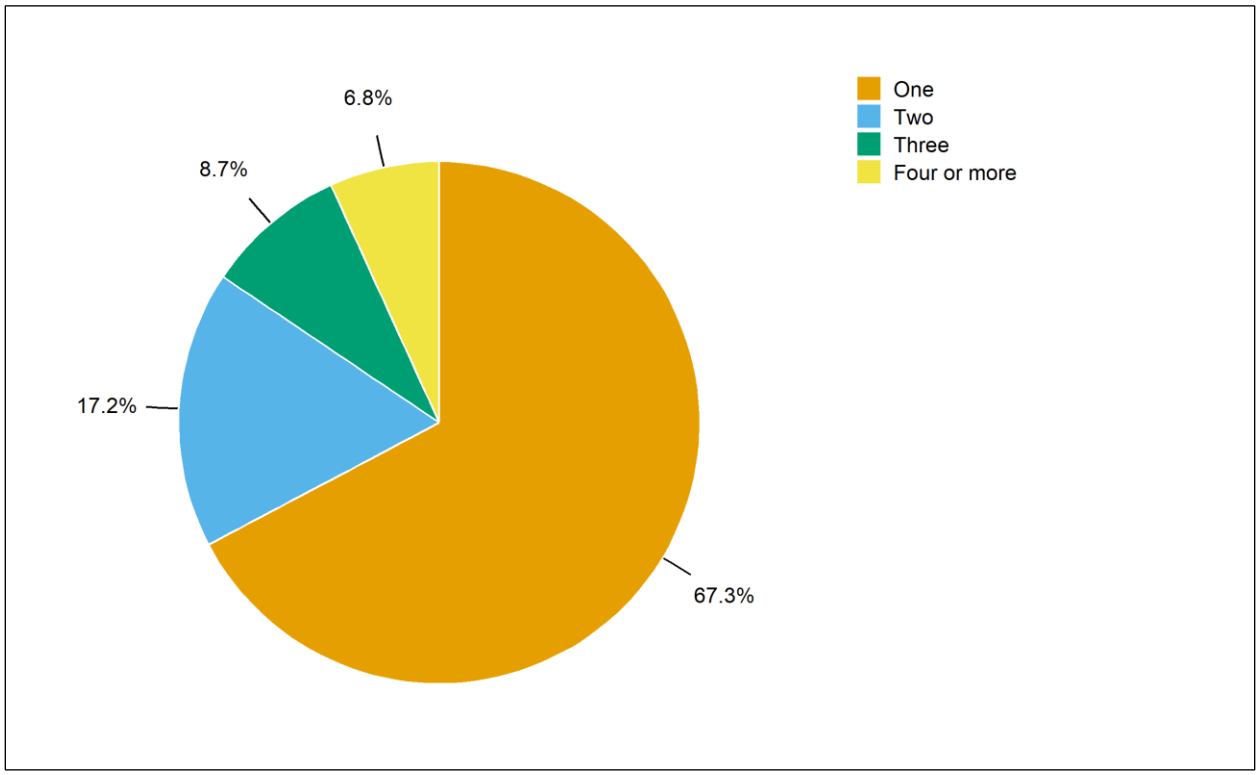


FIGURE 6-5: Calls by Number of Units Arriving, Fire



Observations:

Overall

- CBFD units arrived at 2,784 calls (97 percent of total calls).
- On average, 1.3 CBFD units arrived at all calls; for 80 percent of calls, only one unit arrived.
- There were 92 calls where a CBFD unit recorded an en route time but no unit recorded an arrival time. This included 48 canceled calls, 17 mutual aid calls, 18 EMS calls, and 9 fire calls.

EMS

- On average, 1.2 units arrived per EMS call.
- For EMS calls, one unit arrived 87 percent of the time, two units arrived six percent of the time, and three or more units arrived 7 percent of the time.

Fire

- On average, 1.6 units arrived per fire call.
- For fire calls, one unit arrived 67 percent of the time, two units arrived 17 percent of the time, three units arrived nine percent of the time, and four or more units arrived seven percent of the time.
- For outside fire calls, three or more units arrived 19 percent of the time.
- For structure fire calls, three or more units arrived 43 percent of the time.

WORKLOAD: RUNS AND TOTAL TIME SPENT

The workload of each CBFD unit is measured in two ways: runs and deployed time. The deployed time of a run is measured from the time a unit is dispatched through the time the unit is cleared. Because multiple units respond to some calls, there are more runs (4,131) than calls (2,876) and the average deployed time per run varies from the total duration of calls.

Runs and Deployed Time – All Units

Deployed time, also referred to as deployed hours, is the total deployment time of all units deployed on all runs. Table 6-4 shows the total deployed time, both overall and broken down by type of run, for CBFD units between November 1, 2021, and October 31, 2022. Table 6-5 and Figure 6-6 present the average deployed minutes by hour of day.

TABLE 6-4: Annual Runs and Deployed Time by Run Type

Run Type	Minutes per Run	Annual Hours	Percent of Hours	Minutes per Day	Annual Runs	Runs per Day
Medical call	20.0	688.3	49.7	113.1	2,062	5.6
MVA	21.1	79.3	5.7	13.0	226	0.6
EMS Subtotal	**20.1**	**767.6**	**55.5**	**126.2**	**2,288**	**6.3**
False alarm	12.0	140.6	10.2	23.1	702	1.9
Good intent	19.0	19.0	1.4	3.1	60	0.2
Hazard	20.2	54.1	3.9	8.9	161	0.4
Outside fire	25.1	17.5	1.3	2.9	42	0.1
Public service	29.3	253.5	18.3	41.7	519	1.4
Structure fire	47.6	30.9	2.2	5.1	39	0.1
Technical rescue	20.8	46.0	3.3	7.6	133	0.4
Fire Subtotal	**20.4**	**561.7**	**40.6**	**92.3**	**1,656**	**4.5**
Canceled	16.3	31.9	2.3	5.2	117	0.3
Mutual aid	19.7	23.0	1.7	3.8	70	0.2
Other Subtotal	**17.6**	**54.8**	**4.0**	**9.0**	**187**	**0.5**
Total	**20.1**	**1,384.2**	**100.0**	**227.5**	**4,131**	**11.3**

Observations:

Overall

- The total deployed time for the year was 1,384.2 hours. The daily average was 227.5 minutes for all units combined.
- There were 4,131 runs, including 117 runs dispatched for canceled calls and 70 runs dispatched for mutual aid calls. The daily average was 11.3 runs.

EMS

- EMS runs accounted for 55 percent of the total workload.
- The average deployed time for EMS runs was 20.1 minutes. The deployed time for all EMS runs averaged 126.2 minutes per day.

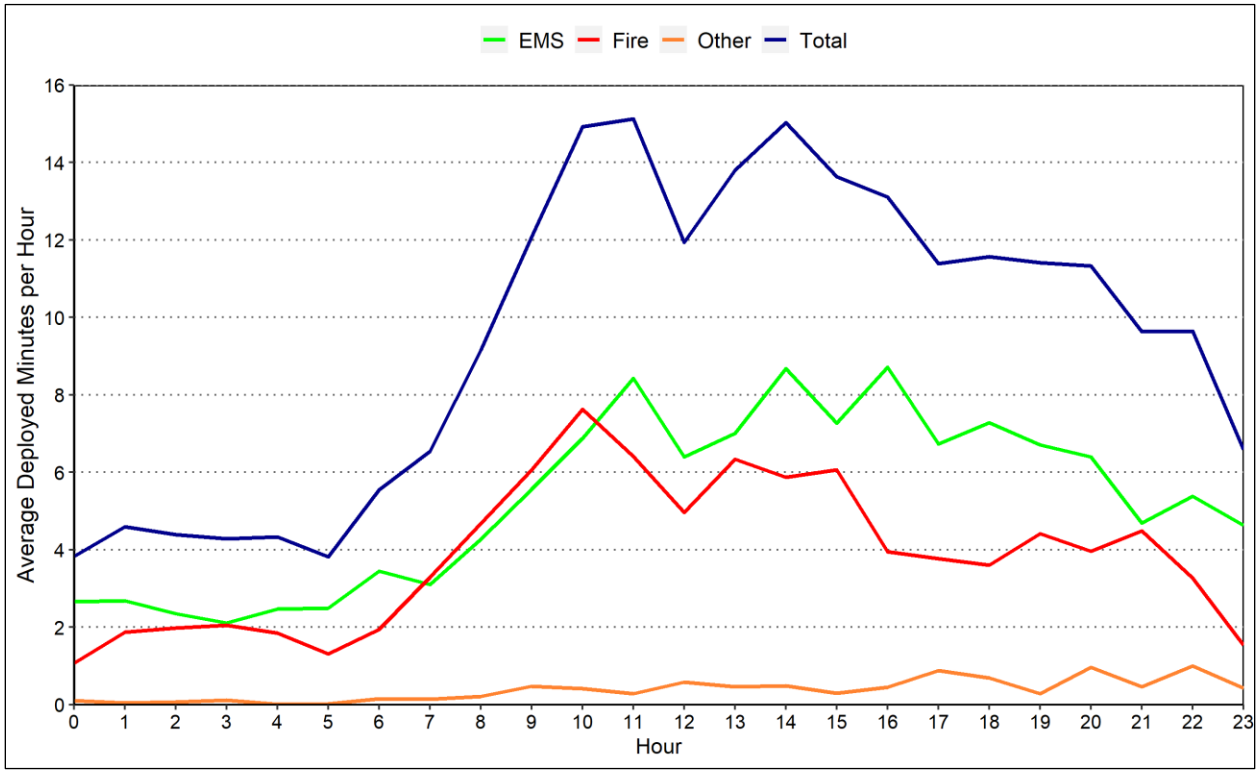
Fire

- Fire runs accounted for 41 percent of the total workload.
- The average deployed time for fire runs was 20.4 minutes. The deployed time for all fire runs averaged 92.3 minutes per day.
- There were 81 runs for structure and outside fire calls combined, with a total workload of 48.5 hours. This accounted for four percent of the total workload.
- The average deployed time for outside fire runs was 25.1 minutes per run, and the average deployed time for structure fire runs was 47.6 minutes per run.

TABLE 6-5: Average Deployed Minutes by Hour of Day

Hour	EMS	Fire	Other	Total
0	2.7	1.1	0.1	3.8
1	2.7	1.9	0.0	4.6
2	2.3	2.0	0.1	4.4
3	2.1	2.1	0.1	4.3
4	2.5	1.8	0.0	4.3
5	2.5	1.3	0.0	3.8
6	3.4	1.9	0.1	5.5
7	3.1	3.3	0.1	6.5
8	4.3	4.7	0.2	9.2
9	5.6	6.1	0.5	12.1
10	6.9	7.6	0.4	14.9
11	8.4	6.4	0.3	15.1
12	6.4	5.0	0.6	11.9
13	7.0	6.3	0.5	13.8
14	8.7	5.9	0.5	15.0
15	7.3	6.1	0.3	13.6
16	8.7	4.0	0.4	13.1
17	6.7	3.8	0.9	11.4
18	7.3	3.6	0.7	11.6
19	6.7	4.4	0.3	11.4
20	6.4	4.0	1.0	11.3
21	4.7	4.5	0.5	9.6
22	5.4	3.3	1.0	9.6
23	4.6	1.5	0.4	6.6
Daily Avg.	**126.2**	**92.3**	**9.0**	**227.5**

FIGURE 6-6: Average Deployed Minutes by Hour of Day



Observations:

- Hourly deployed time was highest during the day from 9:00 a.m. to 5:00 p.m., averaging about 13.7 minutes.
- Average deployed time peaked between 11:00 a.m. and noon, averaging 15.1 minutes.
- Average deployed time was the lowest between 5:00 a.m. and 6:00 a.m., averaging 3.8 minutes.

Workload by Unit

Table 6-6 summarizes the annual workload of CBFD units. Tables 6-7 and 6-8 provide a more detailed view of the workload for each unit, showing each unit's runs (Table 6-7) and the resulting daily average deployed time (Table 6-8) by run type.

TABLE 6-6: Annual Workload by Unit

Station	Unit	Unit Type	Minutes per Run	Total Hours	Total Percent	Minutes per Day	Total Runs	Runs per Day
50	DIST50	Battalion chief	19.3	199.7	14.4	32.8	620	1.7
	E50	Engine	19.3	502.3	36.3	82.6	1,563	4.3
	Total		**19.3**	**701.9**	**50.7**	**115.4**	**2,183**	**6.0**
51	BCH51	Beach unit	166.1	83.0	6.0	13.7	30	0.1
	E51	Engine	18.7	388.4	28.1	63.9	1,247	3.4
	E251	Reserve engine	11.5	1.0	0.1	0.2	5	0.0
	INSP	Inspector	13.8	0.2	0.0	0.0	1	0.0
	T51	Tower	18.4	204.1	14.7	33.6	664	1.8
	U51	Utility	330.4	5.5	0.4	0.9	1	0.0
	Total		**21.0**	**682.3**	**49.3**	**112.2**	**1,948**	**5.3**
Total			**20.1**	**1,384.2**	**100.0**	**227.5**	**4,131**	**11.3**

TABLE 6-7: Annual Runs by Unit and Type

Station	Unit	EMS	False Alarm	Good Intent	Hazard	Out. Fire	Public Service	Struct. Fire	Tech. Rescue	Cancel	Mutual aid	Total
50	DIST50	232	187	15	51	15	53	10	25	7	25	620
	E50	985	181	15	32	8	211	10	53	58	10	1,563
	Total	**1,217**	**368**	**30**	**83**	**23**	**264**	**20**	**78**	**65**	**35**	**2,183**
51	BCH51	3	1	0	0	0	14	0	9	0	3	30
	E51	813	177	15	45	9	107	13	13	37	18	1,247
	E251	2	1	0	0	0	0	0	1	0	1	5
	INSP	0	1	0	0	0	0	0	0	0	0	1
	T51	253	154	15	33	10	133	6	32	15	13	664
	U51	0	0	0	0	0	1	0	0	0	0	1
	Total	**1,071**	**334**	**30**	**78**	**19**	**255**	**19**	**55**	**52**	**35**	**1,948**
Total		**2,288**	**702**	**60**	**161**	**42**	**519**	**39**	**133**	**117**	**70**	**4,131**

TABLE 6-8: Deployed Minutes per Day by Unit and Run Type

Station	Unit	EMS	False Alarm	Good Intent	Hazard	Out. Fire	Public Service	Struct. Fire	Tech. Rescue	Cancel	Mutual aid	Total
50	DIST50	12.4	7.0	0.8	3.4	0.9	4.2	1.4	1.1	0.1	1.5	32.8
	E50	55.8	6.4	0.7	1.3	0.5	11.5	1.9	2.6	1.3	0.5	82.6
	Total	**68.2**	**13.4**	**1.5**	**4.7**	**1.5**	**15.7**	**3.3**	**3.7**	**1.4**	**2.0**	**115.4**
51	BCH51	0.2	0.0	0.0	0.0	0.0	11.4	0.0	1.9	0.0	0.2	13.7
	E51	44.6	5.2	0.8	2.2	0.6	6.0	1.1	0.6	1.9	0.8	63.9
	E251	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
	INSP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	T51	13.1	4.4	0.8	2.0	0.8	7.7	0.7	1.4	1.9	0.8	33.6
	U51	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.9
	Total	**58.0**	**9.7**	**1.6**	**4.2**	**1.4**	**26.0**	**1.8**	**3.9**	**3.8**	**1.7**	**112.2**
Total		**126.2**	**23.1**	**3.1**	**8.9**	**2.9**	**41.7**	**5.1**	**7.6**	**5.2**	**3.8**	**227.5**

Observations:

- Engine E50 made the most runs (1,563 or an average of 4.3 runs per day) and had the highest total annual deployed time (502.3 hours or an average of 82.6 minutes per day).
  - EMS calls accounted for 63 percent of runs and 68 percent of the total deployed time.
  - Structure and outside fire calls accounted for one percent of runs and three percent of the total deployed time.
- Engine E51 made the second most runs (1,247 or an average of 3.4 runs per day) and had the second-highest total annual deployed time (388.4 or an average of 63.9 minutes per day).
  - EMS calls accounted for 65 percent of runs and 70 percent of the total deployed time.
  - Structure and outside fire calls accounted for two percent of runs and three percent of the total deployed time.

Workload by Fire Zone

Table 6-9 provides a breakdown of the workload of CBFD by the fire zone where the calls occurred. Table 6-10 provides further detail on the workload associated with structure and outside fire calls, also broken down by fire zone.

TABLE 6-9: Annual Workload by Zone

Zone	Calls	Percent Calls	Runs	Runs Per Day	Minutes Per Run	Work Hours	Percent Work	Minutes Per Day
Station 50	1,537	53.4	2,124	5.8	20.6	729.3	52.7	119.9
Station 51	1,299	45.2	1,937	5.3	19.6	631.9	45.7	103.9
Internal Subtotal	**2,836**	**98.6**	**4,061**	**11.1**	**20.1**	**1,361.2**	**98.3**	**223.8**
External	40	1.4	70	0.2	19.7	23.0	1.7	3.8
Total	**2,876**	**100.0**	**4,131**	**11.3**	**20.1**	**1,384.2**	**100.0**	**227.5**

TABLE 6-10: Runs for Structure and Outside Fires by Zone

Zone	Structure Fires		Outside Fires		Combined	
	Runs	Minutes per Run	Runs	Minutes per Run	Annual Hours	Percent Work
Station 50	14	42.4	29	21.5	20.3	35.4
Station 51	25	50.5	13	32.9	28.2	49.2
Internal Subtotal	**39**	**47.6**	**42**	**25.1**	**48.5**	**84.6**
External	11	48.1	0	NA	8.8	15.4
Total	**50**	**47.7**	**42**	**25.1**	**57.3**	**100.0**

Observations:

Station 50

- There were 1,537 calls or 53 percent of the total calls.
- There were 2,124 runs, including 62 runs dispatched for canceled calls. The daily average was 5.8 runs.
- The total deployed time for the year was 729.3 hours or 53 percent of the total annual workload. The daily average was 119.9 minutes for all units combined.

Station 51

- There were 1,299 calls or 45 percent of the total calls.
- There were 1,937 runs, including 55 runs dispatched for canceled calls. The daily average was 5.3 runs.
- The total deployed time for the year was 631.9 hours or 46 percent of the total annual workload. The daily average was 103.9 minutes for all units combined.

Outside CBFD's Zones

- There were 40 mutual aid calls (of which 17 were canceled) or one percent of the total calls.
- There were 70 runs, including 24 runs dispatched for canceled calls. The daily average was 0.2 runs.
- The total deployed time for the year was 23.0 hours or two percent of the total annual workload. The daily average was 4.4 minutes for all units combined.

ANALYSIS OF BUSIEST HOURS

For the 2,055 calls that were responded to by CBFD between November 1, 2021, and October 31, 2022, there is significant variability in the number of calls from hour to hour. One special concern relates to the resources available for hours with the heaviest workload. We tabulated the data for each of the 8,760 hours in the year. Table 6-11 shows the number of hours in the year in which there were zero to three or more calls during the hour. Table 6-12 shows the 10 one-hour intervals which had the most calls during the year.

TABLE 6-11: Frequency Distribution of the Number of Calls

Calls in an Hour	Frequency	Percentage
0	6,376	72.8
1	1,966	22.4
2	352	4.0
3+	66	0.8
Total	**8,760**	**100.0**

TABLE 6-12: Top 10 Hours with the Most Calls Received

Hour	Number of Calls	Number of Runs	Deployed Hours
5/22/2022, 2:00 p.m. to 3:00 p.m.	5	5	1.4
5/4/2022, 2:00 p.m. to 3:00 p.m.	5	5	1.0
9/9/2022, 10:00 a.m. to 11:00 a.m.	4	8	3.7
5/18/2022, 5:00 p.m. to 6:00 p.m.	4	6	7.9
8/24/2022, 4:00 p.m. to 5:00 p.m.	4	5	1.3
9/27/2022, 11:00 a.m. to noon	4	4	1.1
3/11/2022, noon to 1:00 p.m.	3	10	1.2
6/6/2022, 10:00 a.m. to 11:00 a.m.	3	9	4.2
12/11/2021, 3:00 p.m. to 4:00 p.m.	3	9	1.6
12/21/2021, midnight to 1:00 a.m.	3	8	3.7

Note: Total deployed hours are a measure of the total time spent responding to calls received in the hour and may extend into the next hour or hours. The number of runs and deployed hours were calculated based on all response units.

Observations:

- During 66 hours (0.8 percent of all hours), three or more calls occurred; in other words, the department responded to three or more calls in an hour roughly once every six days.
- The highest number of calls to occur in an hour was five, which happened twice.
- One hour with the most calls was 2:00 p.m. to 3:00 p.m. on May 22, 2022. The hour's five calls involved five individual dispatches resulting in 1.4 hours of deployed time. They were all medical calls.
- Another hour with the most calls was 2:00 p.m. to 3:00 p.m. on May 4, 2022. The hour's five calls involved five individual dispatches resulting in 1.0 hours of deployed time. These 5 calls included four medical calls and one motor vehicle accident call.

Table 6-13 examines the number of times a call overlapped with another call responded to by CBFD units.

TABLE 6-13: Frequency of Overlapping Calls

Scenario	Number of Calls	Percent of All Calls	Total Hours
No overlapped call	2,538	88.2	921.9
Overlapped with one call	311	10.8	61.2
Overlapped with two calls	23	0.8	3.3
Overlapped with three calls	4	0.1	0.1

Table 6-14 focuses on each CBFD station's availability to respond to calls within its fire district. At the same time, it focuses on calls where a unit eventually arrived and ignores calls where no unit arrived. Out of 2,836 total calls that are not mutual aid (Table 6-1), 2,761 calls had an arriving unit (Table 6-3).

TABLE 6-14: Station Availability to Respond to Calls

Zone	Calls in Area	First Due Responded	Percent Responded	First Due Arrived	Percent Arrived	First Due First	Percent First
Station 50	1,503	1,423	94.7	1,416	94.2	1,395	92.8
Station 51	1,258	1,214	96.5	1,197	95.2	1,048	83.3
Total	**2,761**	**2,637**	**95.5**	**2,613**	**94.6**	**2,443**	**88.5**

Note: For each station, we count the number of calls within its zone where at least one unit arrived. Next, we focus on units from the first due station to see if any unit responded, arrived, or arrived first.

RESPONSE TIME

In this part of the analysis, we present response time statistics for different call types. We separate response time into its identifiable components. Dispatch time is the difference between the time a call is received and the time the fire station is assigned. Dispatch time includes call processing time, which is the time required to determine the nature of the emergency and the types of resources to dispatch. Turnout time is the difference between dispatch time and the time a unit is assigned en route to a call's location. Travel time is the difference between the time en route and arrival on scene. Response time is the total time elapsed between receiving a call to arriving on scene.

In this analysis, we included all calls responded to by non-administrative CBFD units while excluding canceled and mutual aid calls. In addition, calls with a total response time of more than 30 minutes were excluded. In addition, we focused on units that had complete time stamps, that is, units with all components recorded, so that we could calculate each segment of response time. Finally, calls described in the CAD system as "elevator entrapment" or "public assist" were considered non-emergencies and not included in this analysis.

Based on the methodology above, for 2,876 calls (Table 6-1), we excluded 105 canceled calls, 40 mutual aid calls, 415 nonemergency calls, 23 calls where no units recorded a valid on-scene time, two calls with a total response time exceeding 30 minutes, and 248 calls where one or more segments of the first arriving unit's response time could not be calculated due to missing data. As a result, in this section, a total of 2,043 calls are included in the analysis.

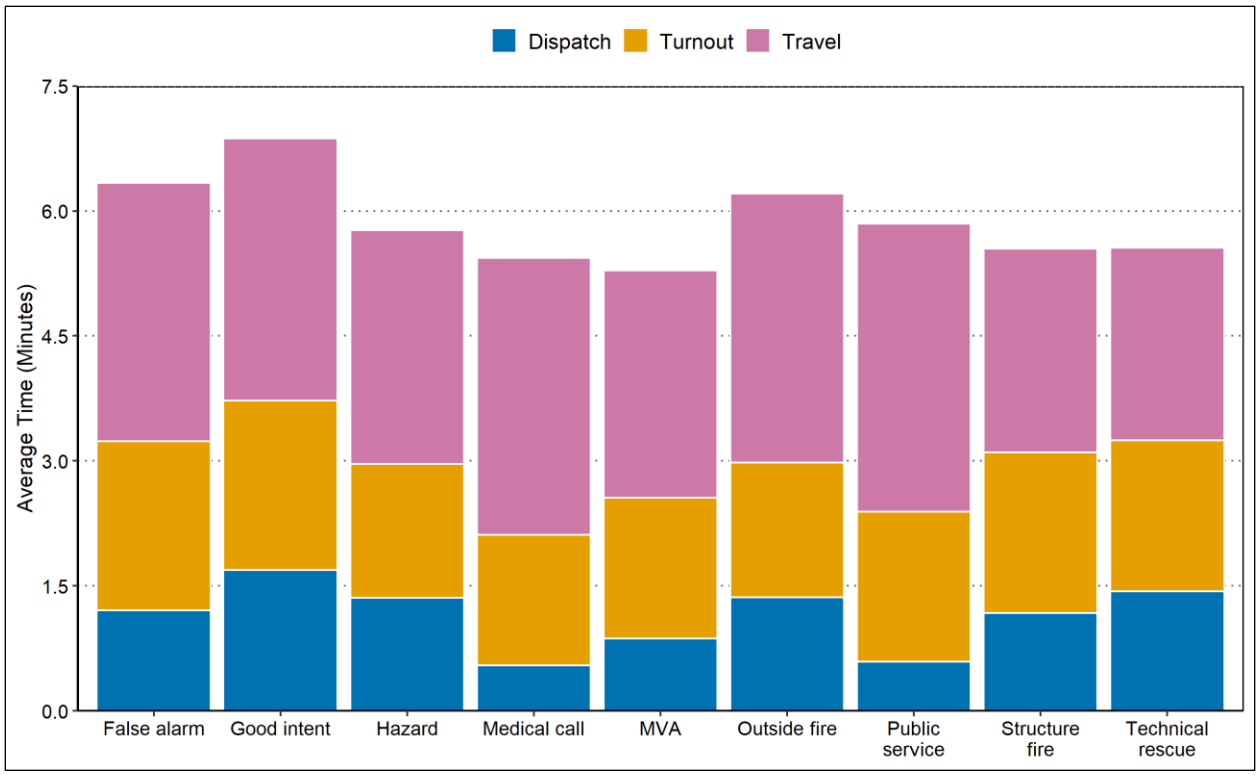
Response Time by Type of Call

Table 6-15 breaks down the average and 90th percentile dispatch, turnout, travel, and total response times by call type. A 90th percentile means that 90 percent of calls had response times at or below that number. For example, Table 6-15 shows an overall 90th percentile response time of 7.9 minutes, which means that 90 percent of the time, a call had a response time of no more than 7.9 minutes. Figure 6-7 illustrates the average response time for each type of fire call.

TABLE 6-15: Average and 90th Percentile Response Time of First Arriving Unit, by Call Type

Call Type	Average Response Time, Min.				90th Percentile Response Time, Min				Call Count
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
Medical call	0.5	1.6	3.3	5.4	1.3	2.6	5.3	7.6	1,572
MVA	0.9	1.7	2.7	5.3	1.8	2.7	4.5	7.7	57
EMS Subtotal	**0.6**	**1.6**	**3.3**	**5.4**	**1.4**	**2.6**	**5.2**	**7.6**	**1,629**
False alarm	1.2	2.0	3.1	6.3	2.4	3.4	5.1	8.8	195
Good intent	1.7	2.0	3.1	6.9	4.2	2.9	5.4	10.5	15
Hazard	1.4	1.6	2.8	5.8	2.9	2.7	4.8	8.7	54
Outside fire	1.4	1.6	3.2	6.2	2.4	2.8	4.7	8.7	14
Public service	0.6	1.8	3.5	5.8	1.5	3.0	5.9	8.5	116
Structure fire	1.2	1.9	2.4	5.5	2.0	2.4	3.6	7.0	12
Technical rescue	1.4	1.8	2.3	5.6	2.9	2.8	5.6	8.9	8
Fire Subtotal	**1.1**	**1.9**	**3.1**	**6.1**	**2.3**	**3.0**	**5.3**	**8.8**	**414**
Total	**0.7**	**1.6**	**3.3**	**5.6**	**1.6**	**2.7**	**5.2**	**7.9**	**2,043**

FIGURE 6-7: Average Response Time of First Arriving Unit, by Fire Call Type



Observations:

- The average dispatch time was 0.7 minutes.
- The average turnout time was 1.6 minutes.
- The average travel time was 3.3 minutes.
- The average total response time was 5.6 minutes.
- The average response time was 5.4 minutes for EMS calls and 6.1 minutes for fire calls.
- The average response time was 6.2 minutes for outside fires and 5.5 minutes for structure fires.
- The 90th percentile dispatch time was 1.6 minutes.
- The 90th percentile turnout time was 2.7 minutes.
- The 90th percentile travel time was 5.2 minutes.
- The 90th percentile total response time was 7.9 minutes.
- The 90th percentile response time was 7.6 minutes for EMS calls and 8.8 minutes for fire calls.
- The 90th percentile response time was 8.7 minutes for outside fires and 7.0 minutes for structure fires.

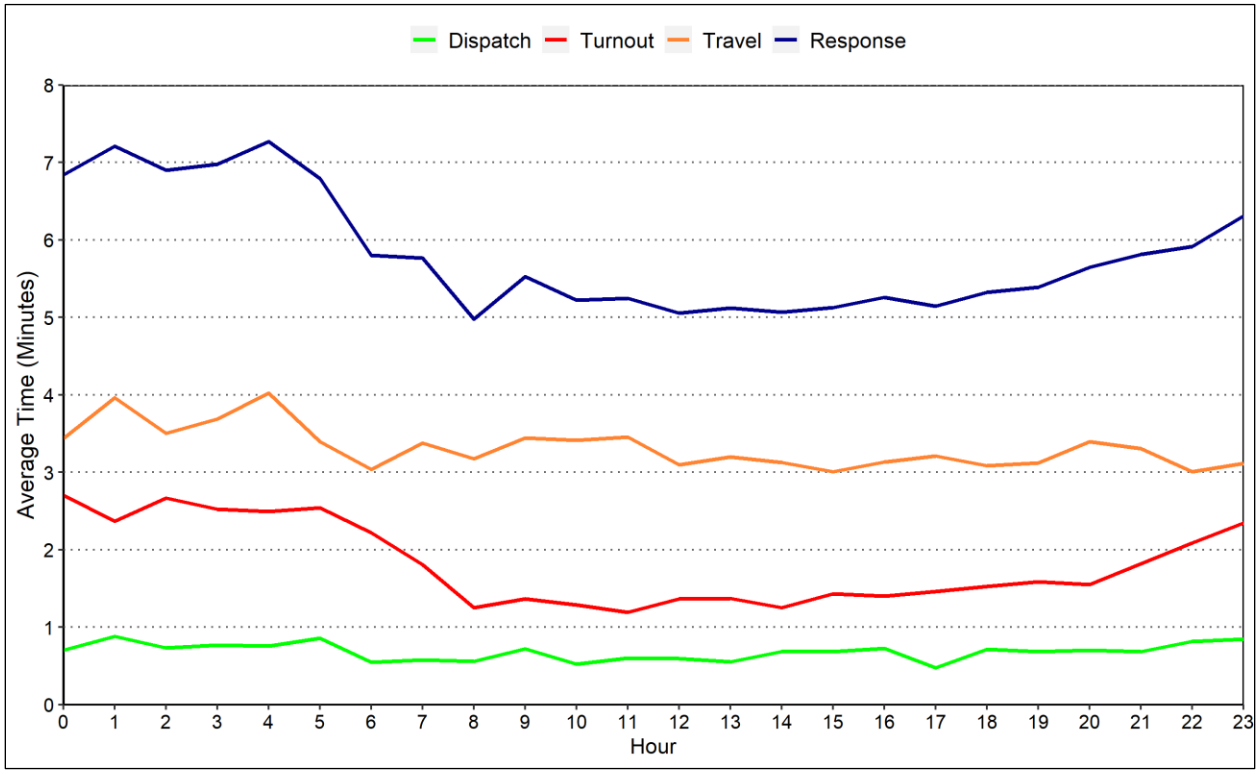
Response Time by Hour

Table 6-16 shows the average response time by the time of day. The table also shows 90th percentile response times. Figure 6-8 shows the average response time by the time of day.

TABLE 6-16: Average and 90th Percentile Response Time of First Arriving Unit, by Hour of Day

Hour	Minutes					Number of Calls
	Dispatch	Turnout	Travel	Response Time	90th Percentile Response Time	
0	0.7	2.7	3.4	6.8	9.3	39
1	0.9	2.4	4.0	7.2	9.4	54
2	0.7	2.7	3.5	6.9	9.3	42
3	0.8	2.5	3.7	7.0	9.1	30
4	0.8	2.5	4.0	7.3	9.5	44
5	0.9	2.5	3.4	6.8	7.7	41
6	0.5	2.2	3.0	5.8	7.6	44
7	0.6	1.8	3.4	5.8	7.8	63
8	0.6	1.2	3.2	5.0	6.9	83
9	0.7	1.4	3.4	5.5	7.9	95
10	0.5	1.3	3.4	5.2	7.6	118
11	0.6	1.2	3.5	5.2	7.9	114
12	0.6	1.4	3.1	5.1	6.9	103
13	0.6	1.4	3.2	5.1	7.4	146
14	0.7	1.3	3.1	5.1	7.7	122
15	0.7	1.4	3.0	5.1	7.3	111
16	0.7	1.4	3.1	5.3	8.0	127
17	0.5	1.5	3.2	5.1	7.1	108
18	0.7	1.5	3.1	5.3	7.3	116
19	0.7	1.6	3.1	5.4	7.8	102
20	0.7	1.5	3.4	5.6	8.2	105
21	0.7	1.8	3.3	5.8	7.8	86
22	0.8	2.1	3.0	5.9	7.9	93
23	0.8	2.3	3.1	6.3	8.2	57
Total	**0.7**	**1.6**	**3.3**	**5.6**	**7.9**	**2,043**

FIGURE 6-8: Average Response Time of First Arriving Unit, by Hour of Day



Observations:

- The average dispatch time varied between 0.5 minutes (5:00 p.m. to 6:00 p.m.) and 0.9 minutes (1:00 a.m. to 2:00 a.m.).
- The average turnout time varied between 1.2 minutes (11:00 a.m. to noon) and 2.7 minutes (midnight to 1:00 a.m.).
- The average travel time varied between 3.0 minutes (10:00 p.m. to 11:00 p.m.) and 4.0 minutes (4:00 a.m. to 5:00 a.m.).
- The average response time varied between 5.0 minutes (8:00 a.m. to 9:00 a.m.) and 7.3 minutes (4:00 a.m. to 5:00 a.m.).
- The 90th percentile response time varied between 6.9 minutes (8:00 a.m. to 9:00 a.m. and noon to 1:00 p.m.) and 9.5 minutes (4:00 a.m. to 5:00 a.m.).

Response Time Distribution

Here, we present a more detailed look at how response times to calls are distributed. The cumulative distribution of total response time for the first arriving unit to EMS calls is shown in Figure 6-9 and Table 6-17. Figure 6-9 shows response times for the first arriving unit to EMS calls as a frequency distribution in whole-minute increments, and Figure 6-10 shows the same for the first arriving unit to outside and structure fire calls.

The cumulative percentages here are read in the same way as a percentile. In Figure 6-9, the 90th percentile of 7.6 minutes means that 90 percent of EMS calls had a response time of 7.6 minutes or less. In Table 6-17, the cumulative percentages of 92.4 and 92.3 mean that 92.4 percent of EMS calls and 92.3 percent of outside and structure fire calls had a response time under 8 minutes.

FIGURE 6-9: Cumulative Distribution of Response Time – First Arriving Unit – EMS

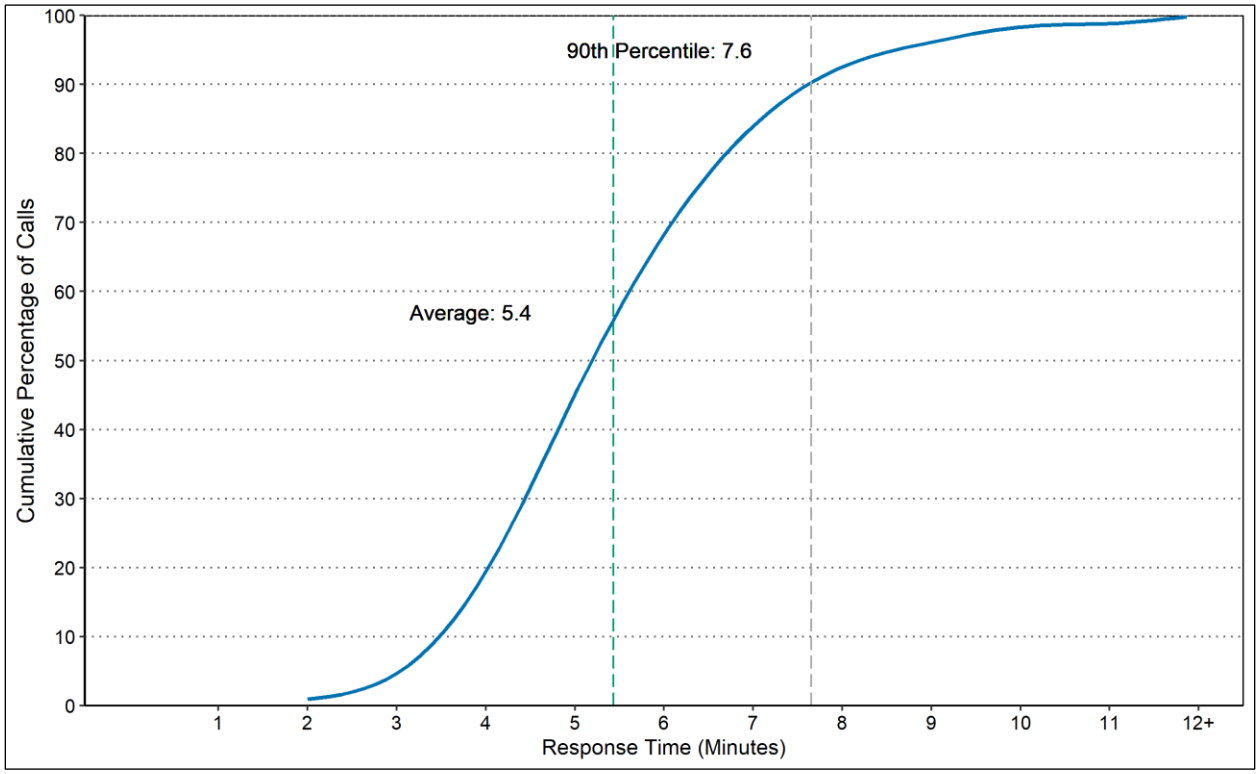


FIGURE 6-10: Cumulative Distribution of Response Time, First Arriving Unit for Outside and Structure Fires

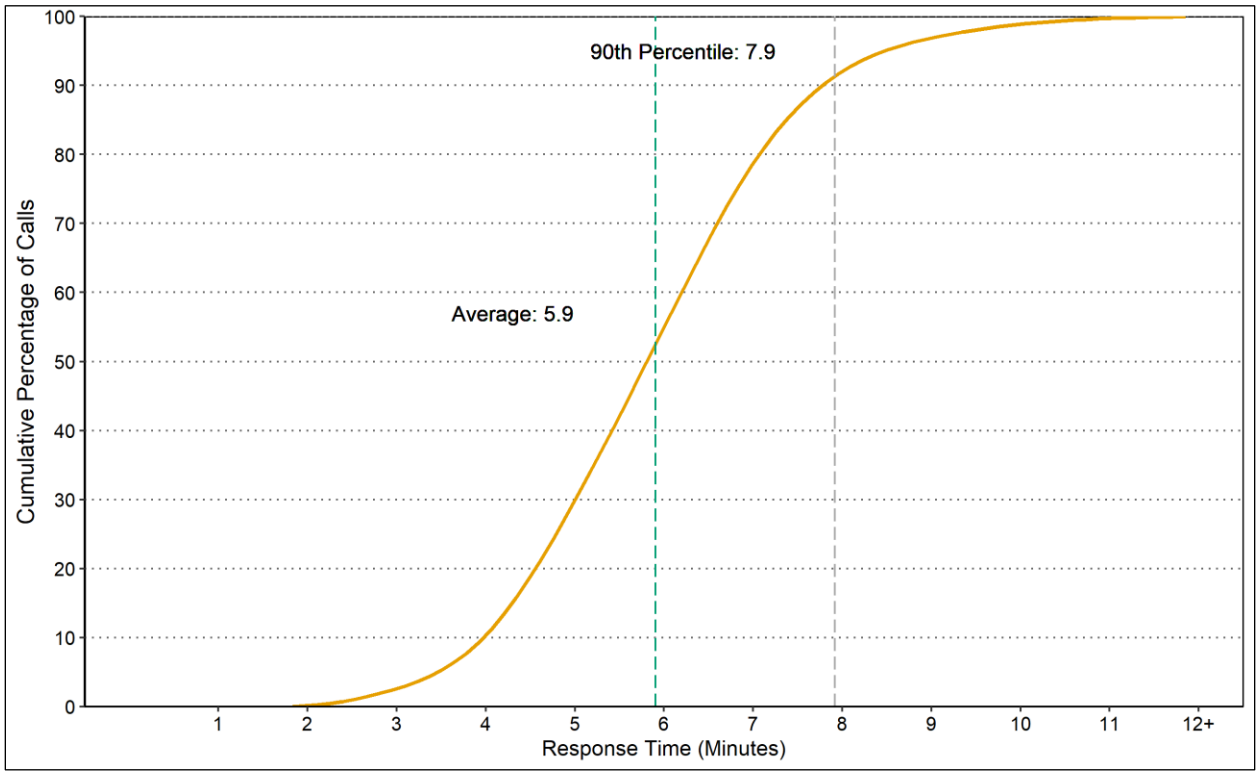


TABLE 6-17: Cumulative Distribution of Response Time – First Arriving Unit

Response Time (minute)	EMS		Outside and Structure Fires	
	Frequency	Cumulative Percentage	Frequency	Cumulative Percentage
1	0	0.0	0	0.0
2	15	0.9	0	0.0
3	61	4.7	1	3.8
4	237	19.2	1	7.7
5	425	45.3	6	30.8
6	371	68.1	6	53.8
7	262	84.2	7	80.8
8	134	92.4	3	92.3
9	63	96.3	1	96.2
10	32	98.2	1	100.0
11	11	98.9	0	100.0
12+	18	100.0	0	100.0

Response Time by Fire Zone

Here, we detail the average and 90th percentile response times to calls that occurred in Station 50 and 51 fire zones. The result is summarized in the following table.

TABLE 6-18: Average and 90th Percentile Response Time of First Arriving Unit, by Zone

Zone	Average Response Time, Min.				90th Percentile Response Time, Min.				Call Count
	Dispatch	Turnout	Travel	Total	Dispatch	Turnout	Travel	Total	
Station 50	0.6	1.4	3.5	5.6	1.5	2.5	5.7	8.2	1,136
Station 51	0.7	1.9	2.9	5.5	1.7	2.9	4.8	7.7	907
Total	**0.7**	**1.6**	**3.3**	**5.6**	**1.6**	**2.7**	**5.2**	**7.9**	**2,043**

TABLE 6-19: Workload of Administrative Units

Unit ID	Unit Type	Annual Hours	Annual Runs
FIRE1	Fire Chief	6.2	5
FIRE2	Deputy Chief	4.5	19
FIRE3	Fire Marshal	10.5	8
FIRE4	EMS Chief	62.6	65
Total		**83.9**	**97**

ATTACHMENT II: ACTIONS TAKEN

TABLE 6-20: Actions Taken for Structure and Outside Fire Calls

Action Taken	Number of Calls	
	Outside Fire	Structure Fire
Contain fire (wildland)	2	0
Control fire (wildland)	0	1
Extinguishment by fire service personnel	6	6
Fire control or extinguishment, other	4	3
Investigate	1	1
Investigate fire out on arrival	1	2
Refer to proper authority	0	1
Remove hazard	0	1
Salvage & overhaul	2	0

Note: Totals are higher than the total number of structure and outside fire calls because some calls recorded multiple actions taken.

Observations:

- Out of 16 outside fires, six were extinguished by fire service personnel, which accounted for 38 percent of outside fires.
- Out of 14 structure fires, six were extinguished by fire service personnel, which accounted for 43 percent of structure fires.

ATTACHMENT III: FIRE LOSS

TABLE 6-21: Total Fire Loss Above and Below $25,000

Call Type	No Loss	Under $25,000	$25,000 plus	Total
Outside fire	13	1	2	16
Structure fire	9	4	1	14
Total	**22**	**5**	**3**	**30**

TABLE 6-22: Content and Property Loss, Structure and Outside Fires

Call Type	Property Loss		Content Loss	
	Loss Value	Number of Calls	Loss Value	Number of Calls
Outside fire	$60,000	3	$1,100	2
Structure fire	$46,500	4	$25,575	5
Total	**$106,500**	**7**	**$26,675**	**7**

Note: The table includes only fire calls with a recorded loss greater than 0.

Observations:

- 13 outside fires and nine structure fires had no recorded losses.
- Two outside fires and one structure fire had $25,000 or more in recorded losses.
- Outside fires:
  - The highest total loss for an outside fire was $30,100.
  - The average total loss for all outside fires was $3,819.
  - Two outside fires recorded content loss with a combined $1,100 in losses.
  - Out of 16 outside fires, three had recorded property losses, with a combined $60,000 in losses.
- Structure fires:
  - The highest total loss for a structure fire was $50,000.
  - The average total loss for all structure fires was $5,148.
  - Five structure fires recorded content losses with a combined $25,575 in losses.
  - Out of 14 structure fires, four had recorded property losses, with a combined $46,500 in losses.

ATTACHMENT IV: CALL TYPE IDENTIFICATION

When available, NFIRS data serves as our primary source for assigning call categories. For the 2,827 non-mutual aid calls, NFIRS incident type codes were used to assign call types for canceled, EMS, fire, and motor vehicle accident (MVA) calls. Table 6-23 summarizes the method used to identify call types. The 40 mutual aid calls were not included. For 9 additional calls without NFIRS incident types, the CAD data's nature description was used as described in Table 6-24.

TABLE 6-23: Call Type by NFIRS Incident Type Code and Description

Call Type	Code	Description	Call Count
Canceled	611	Dispatched and canceled en route	71
	621	Wrong location	2
	622	No incident found on arrival at dispatch address	32
False Alarm	700	False alarm or false call, other	18
	710	Malicious, mischievous false alarm, other	4
	711	Municipal alarm system, malicious false alarm	8
	715	Local alarm system, malicious false alarm	9
	730	System or detector malfunction, other	5
	733	Smoke detector activation due to malfunction	18
	734	Heat detector activation due to malfunction	7
	735	Alarm system sounded due to malfunction	48
	740	Unintentional transmission of alarm, other	5
	743	Smoke detector activation, no fire - unintentional	45
	744	Detector activation, no fire - unintentional	12
	745	Alarm system activation (no fire) - unintentional	35
	746	Carbon monoxide detector activation (no CO)	3
Good Intent	600	Good intent call, other	10
	641	Vicinity alarm (incident in other location)	2
	651	Smoke scare, odor of smoke, not steam	10
	652	Steam, vapor, fog, or dust thought to be smoke	1
	661	EMS call where injured party has been transported by a non-fire service agency	2
Hazard	200	Overpressure rupture, explosion, overheat, other	1
	251	Excessive heat, overheat scorch burns with no ignition	3
	400	Hazardous condition (no fire), other	1
	411	Gasoline or other flammable liquid spill	2
	412	Gas leak (natural gas or LPG)	12
	420	Toxic chemical condition, other	1
	440	Electrical wiring/equipment problem, other	4
	441	Heat from short circuit, defective or worn insulation	2
	442	Overheated motor or wiring	2
	444	Power line down	40

Call Type	Code	Description	Call Count
	445	Arcing, shorted electrical equipment	7
	451	Biological hazard, confirmed or suspected	2
	460	Accident, potential accident, other	1
Medical Call	300	Rescue and EMS incident, other	1
	311	Medical assist	13
	320	Emergency medical service incident, other	24
	321	EMS call	1,718
Motor Vehicle Accident	322	Motor vehicle accident with injuries	72
	323	Motor vehicle/pedestrian accident	1
	324	Motor vehicle accident with no injuries	11
Outside Fire	131	Passenger vehicle fire	3
	140	Natural vegetation fire, other	3
	141	Forest, woods, or wildland fire	1
	142	Brush or brush-and-grass mixture fire	6
	143	Grass fire	1
	151	Outside rubbish, trash, or waste fire	1
	160	Special outside fire, other	1
Public Service	500	Service call, other	6
	510	Person in distress, other	6
	511	Lock-out	4
	512	Ring or jewelry removal, without transport to hospital	1
	520	Water problem, other	3
	522	Water or steam leak	17
	542	Animal rescue	4
	550	Public service assistance, other	23
	551	Assist police or other governmental agency	14
	552	Police matter	52
	553	Removal of victim(s) from stalled elevator	95
	554	Assist invalid	189
	571	Cover assignment, assist other fire agency such as standby at a fire station or move-up	11
	812	Flood assessment	2
	813	Windstorm	1
	900	Special type of incident, other	5
	911	Citizen's complaint	1
Structure Fire	111	Building fire	2
	113	Cooking fire	3
	115	Incinerator overload or malfunction	1
	118	Trash or rubbish fire in a structure	8
Technical Rescue	331	Lock-in	1
	341	Search for person on land	1

Call Type	Code	Description	Call Count
	342	Search for person in water	4
	352	Extrication of victim(s) from vehicle	1
	353	Removal of victim(s) from stalled elevator	81
	364	Surf rescue	8
	365	Watercraft rescue	1
	381	Rescue or EMS standby for hazardous conditions	1
Total			**2,827**

TABLE 6-24: Call Type by CAD Nature

Call Type	Nature	Calls
False Alarm	Fire Alarm	4
Good Intent	Fire Investigation	1
Medical Call	Medical Call	2
Public Service	Public Assist	1
Technical Rescue	Elevator Entrapment	1
Total		**9**

- END -