COMMUNITY RISK ASSESSMENT

Standards of Cover & Deployment Analysis

January

2023

San Mateo

CONSOLIDATED FIRE DEPARTMENT

AP TRITON

VISION · INNOVATION · SOLUTIONS

Contents

Acknowledgments

AP Triton Consulting wishes to extend its sincere appreciation to each individual whose contributions and assistance made this project possible.

Our sincere appreciation is extended to each of you…

San Mateo Consolidated Fire Department

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Eric Mackintosh
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…and each of the firefighters, officers, and support staff who daily serve the citizens and visitors of the San Mateo Consolidated Fire Department service area and the surrounding communities.

Introduction

The San Mateo Consolidated Fire Department (SMCFD) engaged AP Triton Consulting, LLC (Triton) to conduct what was identified in the Department's Request for Proposals (RFP) as the provision of a Community Risk Assessment (CRA) and Standards of Cover (SOC) analysis.

The study closely follows the Center for Fire Public Safety Excellence (CPSE) Standards of Coverage model, 6th Edition, which develops written procedures to determine the community risk, distribution, and concentration of a fire and emergency service agency's fixed and mobile resources. The purpose of completing the CRA/SOC document is to assist the agency in ensuring a safe and effective response force for fire suppression, emergency medical services, and specialty response situations.

Creating a Community Risk Assessment/Standards of Cover document requires that a number of areas are researched, studied, and evaluated. Therefore, this report will begin with an overview of both the community and the agency. Following the overview, the plan will discuss topics such as community risk assessment, critical task analysis, agency service level objectives, and distribution and concentration measures. Finally, the report will analyze historical performance and conclude with policy and operational recommendations.

AP Triton extends its appreciation to the staff and elected officials of the cities of San Mateo, Foster City, and Belmont, the staff and personnel of the San Mateo Consolidated Fire Department, and all others who contributed to this study.

Section I:
THE FIRE DEPARTMENT & EMERGENCY SERVICES SYSTEM

Overview of the San Mateo Consolidated Fire Department

The San Mateo Consolidated Fire Department (SMCFD) is a relatively new organization, having been formed and begun operations as a Joint Powers Authority (JPA) in January 2019. The organization represents an agreement among three member jurisdictions and is a consolidation of the San Mateo Fire Department, Foster City Fire Department, and Belmont Fire Protection District.

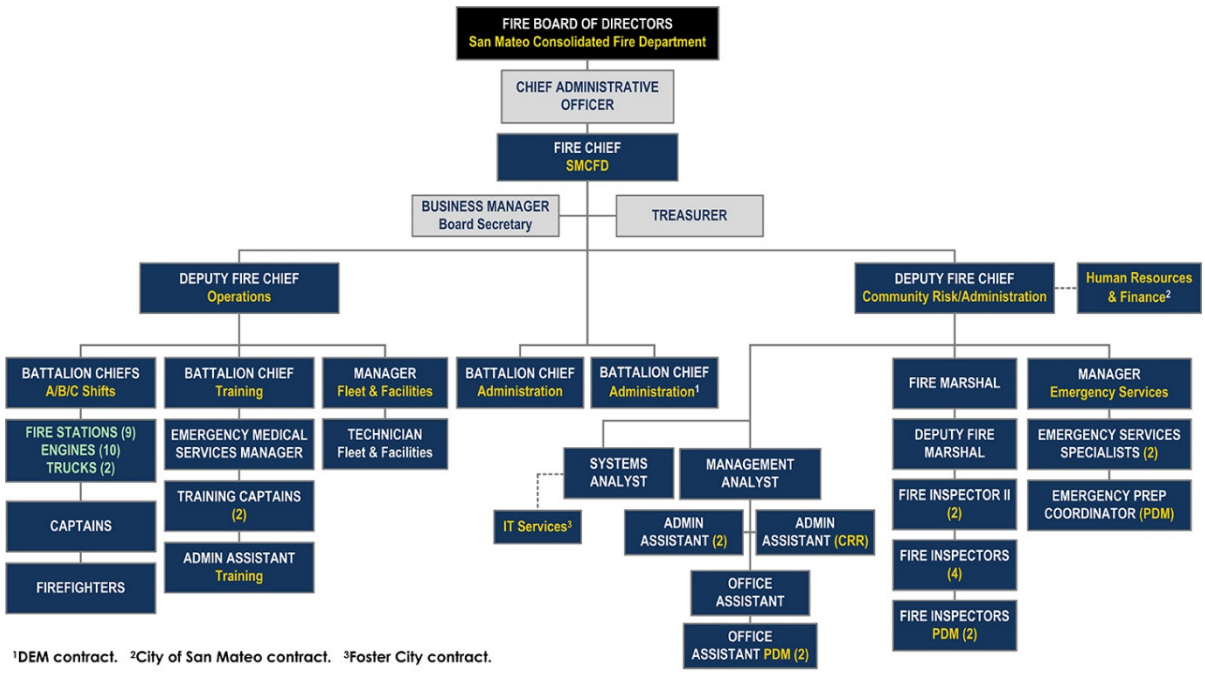
Figure 1: San Mateo FD (1921)

Combined, SMCFD has more than 260 years of fire service history. The San Mateo Volunteer Fire Department was formed in 1889. Next, the Belmont Volunteer Fire Department was formed in 1926, followed by the Belmont Fire Protection District in 1928. Finally, the Foster City Fire Department was created in 1965, which was six years prior to Foster City becoming an incorporated municipality.

Organizational Structure

A three-member JPA Board of Directors oversees SMCFD. The Board is comprised of one elected official from each of the member agencies. One member serves as the Board Chair and another as Vice Chair.

Figure 2: San Mateo Consolidated Fire Department Organizational Chart (2022)



The Fire Chief is responsible to the Board of Directors and oversees two Deputy Chiefs, Two Battalion Chiefs (Administrative & DEM), and a Business Manager. The Deputy Chief of Operations is responsible for the shift Battalion Chiefs, the Battalion Chief of Training, and Manager of Fleet & Facilities. The Battalion Chief of Administration and DEM Battalion Chief report directly to the Fire Chief. The Deputy Chief of Community Risk Reduction supervises the Fire Marshal and the Emergency Services Manager. The Business Manager oversees various Management Analysts and Administrative and Office Assistants.

Services Provided by SMCFD

Emergency Operations

The San Mateo Consolidated Fire Department deploys its apparatus and personnel from nine staffed fire stations. The department provides traditional fire protection and wildland firefighting, medical first-response at the Basic Life Support (BLS) and Advanced Life Support (ALS) levels utilizing cross-trained certified Firefighter/Paramedics and Firefighter/Emergency Medical Technicians (EMT).

In September 2017, the San Mateo Consolidated Fire Department was given a Public Protection Classification (PPC®) score of 2 by the Insurance Services Office (ISO).

In addition, SMCFD also provides technical rescue services, with some department members participating in California Task Force 3-Urban Search & Rescue. SMCFD contract services with San Mateo County for hazardous materials response, providing consulting services and response capability for all fire departments in the county.

Other Services

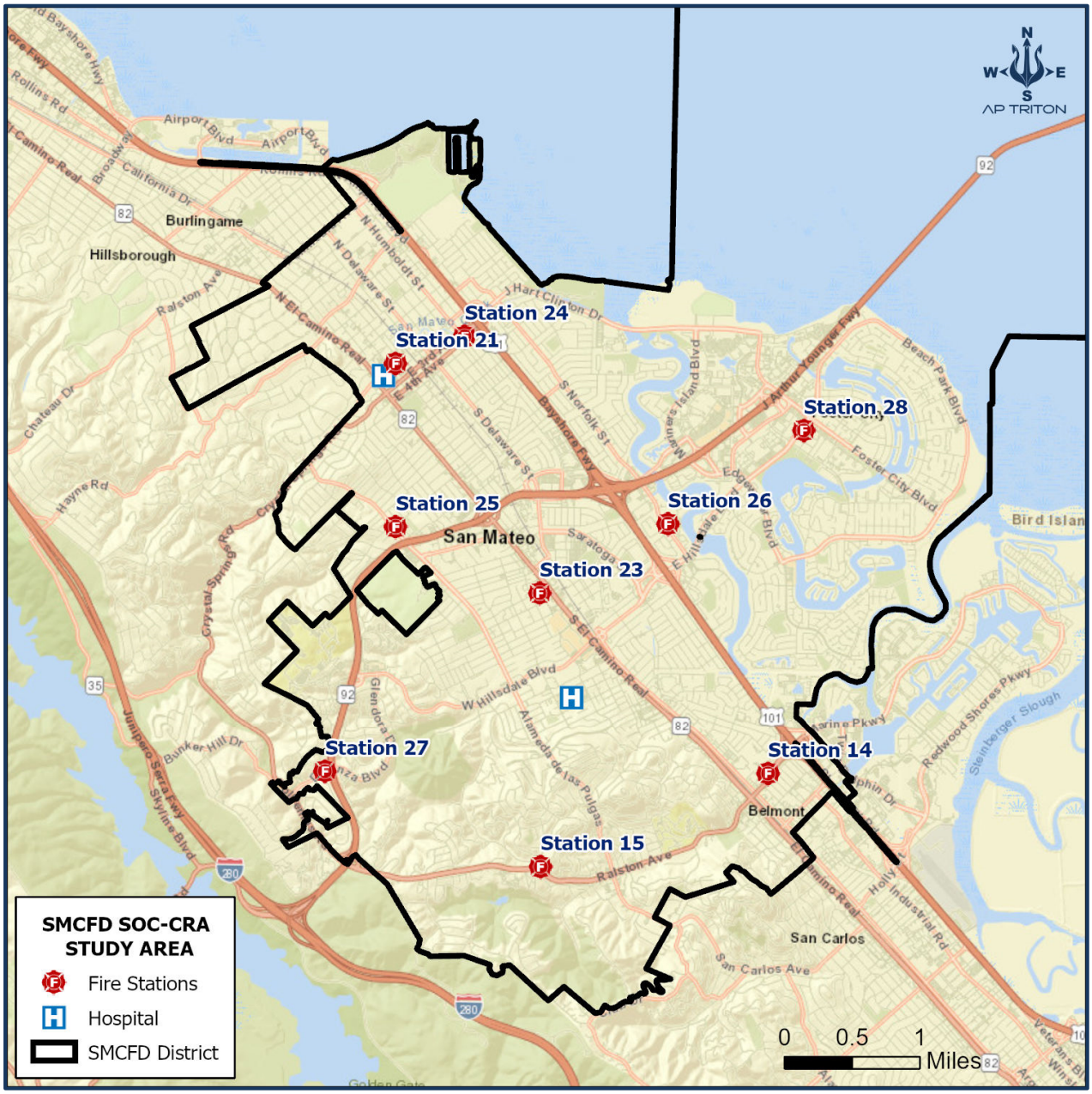
Through its Community Risk Reduction (CRR) Division and Fire Marshal, the San Mateo Consolidated Fire Department conducts fire inspections, plan reviews, fire and arson investigations, and delivers public education and prevention programs. The department also provides Emergency Management planning and services to the three cities it serves.

Service Area

The service area of the San Mateo Consolidated Fire Department consists of just over 40 square miles. Foster City represents nearly 20 square miles, San Mateo nearly 16 square miles, and Belmont nearly five square miles. Of those, about 19 square miles is water within the San Francisco Bay.[1]

The following figure illustrates the San Mateo Consolidated Fire Department's service area.

Figure 3: San Mateo Consolidated Fire Department Service Area



Introduction to the Stakeholder Interviews

Triton interviewed stakeholders representing a wide variety of the San Mateo Consolidated Fire Department's internal and external stakeholders. These interviews aimed to understand the issues, current service levels, concerns, options regarding the emergency service delivery system, opportunities for improvements, and expectations.

It is important to note that the information solicited and provided during this process was in the form of "people inputs" (stakeholders individually responding to Triton's questions), some of which are perceptions reported by stakeholders. All information was accepted at face value without an in-depth investigation of its origination or reliability. The project team reviewed the information for consistency and frequency of comment to identify specific patterns and/or trends. Based on the information reviewed, the team identified a series of observations, recommendations, needs, and general comments that were significant enough to be included in this report.

Stakeholders were identified within the following groups: Elected Officials (San Mateo, Foster City, Belmont), City Management & Department Heads from all three cities, Rank and File line personnel, Chief Officers, Administrative Staff, and Community Leaders.

The complete responses can be found in Appendix B of this report.

Emergency Services in San Mateo County

The following section is a brief overview of other emergency services and mutual aid organizations in San Mateo County.

EMS Transport

Since 1998, American Medical Response (AMR) has served as the primary provider of 911 ground emergency medical transport (GEMT) at the ALS level in San Mateo County. AMR is under contract to the County, who in 2019 renewed its contract with AMR for an additional 10 years. The company employs approximately 250 Paramedics, Emergency Medical Technicians, and support staff. Throughout San Mateo County, AMR transports about 40,000 patients annually.[2] In addition, the South San Francisco Fire Department can deploy ALS transport units from its Stations 61 and 63.

Air Medical Transport

Three organizations are available to SMCFD for rotary-wing scene response: Stanford Life Flight and CALSTAR Air Medical Services. Life Flight is based in Stanford at the hospital, CALSTAR has multiple bases throughout California.

In addition to the preceding services, the Contra Costa County Fire Protection District operates a helicopter fleet staffed with Firefighter/Paramedics and available to SMCFD.

Hospitals & Tertiary Care Facilities in San Mateo County

The primary hospitals in San Mateo County include:

- Stanford Hospital (Palo Alto)—trauma center and catheterization lab equipped to treat strokes and STEMI cases. Majority of SMCFD transported here
- Seton Medical Center (Daly City & Moss Beach)—maintains an ED and has a catheterization lab equipped to treat strokes and STEMI cases.
- San Mateo Medical Center—maintains an emergency department and has interventional radiology capabilities for strokes and STEMI cases.
- Kaiser Permanente (Redwood City & South San Francisco).
- Mills-Peninsula Heath Services (Burlingame & San Mateo).
- Zuckerberg San Francisco General Hospital & Trauma Center (located in San Francisco County)—maintains a fully equipped and staffed emergency department and is a Level 1 Trauma Center with interventional radiology capabilities for strokes and ST-segment elevation myocardial infarctions (STEMI).

Mutual & Automatic Aid Providers

San Mateo County has at least 13 fire departments available for mutual and automatic aid responses. The next image shows the locations of many (but not all) departments.

Figure 4: Mutual & Automatic Aid Fire Stations in San Mateo County

Staffing & Personnel

The greatest asset for any organization is its personnel. Therefore, managing an organization's human capital is essential in ensuring that maximum production is achieved while employees also enjoy a high level of job satisfaction. Job satisfaction is typically a combined result of several factors, including consistent management practices, a safe working environment, recognition of positive workforce practices, inclusion and equitable treatment, and the encouragement of workforce input.

The size and structure of an organization's staffing depend on the organization's specific needs. Organizational priorities should correlate to the community in which they serve. Several national organizations provide staffing guidance and recommendations, including the Occupational Safety & Health Administration (OSHA), the National Fire Protection Association (NFPA), and the Center for Public Safety Excellence (CPSE). This section provides an overview of the San Mateo Consolidated Fire Department's staffing configuration.

Two distinct groups of staff are common in most fire service organizations. The first group is the administrative and support staff that directly services the internal customers by providing the management and support needed to deliver effective and efficient emergency services. The second group is the operational staff, or internal customers, who provide emergency services to external customers and are typically the most recognized group to the citizens. Ensuring a balance between these two groups is essential in providing effective and efficient emergency services and high-quality customer service.

Administrative & Support Staffing

Providing the operational staff with the means and ability to respond to and mitigate emergencies safely, effectively, and efficiently is one of the primary responsibilities of administrative and support staff. Additional responsibilities of this group include planning, organizing, directing, coordinating, and evaluating the various programs utilized within SMCFD. In many cases, the administrative and support staff are concurrently handling a variety of responsibilities, some of which do not fall under the previously mentioned responsibilities. Some of these ongoing responsibilities include records management, payroll, purchasing, travel/per diem, and training documentation requirements.

The following figure illustrates the administrative and support staffing structure for SMCFD.

Figure 5: SMCFD Administrative & Support Staffing

Position Title	No. of FTEs	Hours per Week
Fire Chief	1	40
Deputy Fire Chief	1	40
Administrative Battalion Chiefs	4	40
Deputy Fire Marshal	1	40
Fire Inspectors	6	40
Public Educators	1	40
Management Analyst	1	40
Information Technology Technician	1	40
Administrative Assistant	4	40
Board Secretary	1	40
Office Assistant	1	40
Administrative Technician	1	40
Fleet and Facility Manager	1	40
Emergency Services Manager	1	40
Emergency Services Specialists	2	40
Fleet & Facility Technician	1	40
Total:	**28**	

As with many fire service organizations, administrative and support staff typically serve multiple roles with varying job responsibilities. For SMCFD, the Community Risk Division is an example. The division includes six full-time equivalent (FTE) Fire Inspectors whose duties include fire inspections, plan reviews, fire investigations, and coordinate public education and community engagement. Administrative and support staffing represents 24% of the total SMCFD employees.

Operational Staffing

As previously discussed, the operational staff is typically the face of any fire service organization due to increased interaction with the citizens they serve. This group is involved with nearly every facet of the organization's operations. For SMCFD, this includes fire suppression, emergency medical response, technical rescue, fire investigations, public education, pre-incident planning, and a regional hazardous materials team.

Several national organizations recommend standards to address staffing issues. The Occupational Safety & Health Administration *CFR 1910.134, Section (g)(4) Respiratory Protection Standard,* National Fire Protection Association (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* and the Center for Public Safety Excellence (CPSE) publishes benchmarks on the number of personnel recommended on the emergency scene for various risk levels.

The following figure illustrates the operational staffing structure for SMCFD.

Figure 6: SMCFD Operational Staffing

Position Title	Number of FTEs	Hours Worked per Week	Work Schedule
Deputy Fire Chief	1	40	40
Battalion Chiefs	3	56	48/96
Captains	39	56	48/96
Firefighter/Paramedics	38	56	48/96
Firefighter/EMTs	34	56	48/96
Firefighter Trainees (Probationary)	8	56	48/96
EMS Single Role EMR	1	40	40
EMS Clinical Educational Specialist	1	40	40
Total:	**125**		

A three-platoon system working 48-hour shift rotations that yield an average 56-hour workweek accomplishes shift operations. The minimum staffing goals for SMCFD is 39 personnel responding from nine fire stations on 13 apparatus each 24-hour period. The on-duty Battalion Chief manages flexibility for a limited timeframe.

The following figure illustrates the current minimum staffing model for SMCFD.

Figure 3: SMCFD Current Staffing Model

Apparatus	Minimum Staffing
Engine 14	3 personnel
Engine 15	3 personnel
Engine 21	3 personnel
Engine 23	3 personnel
Engine 24	3 personnel
Engine 25	3 personnel
Engine 26	3 personnel
Engine 27	3 personnel
Engine 28	3 personnel
Engine 29	3 personnel
Truck 21	4 personnel
Truck 23	4 personnel
Battalion 5	1 personnel
Total:	**39 personnel**

Deploying appropriate units with sufficient responders is critical for all emergency incidents but is especially true for fire suppression operations. Staffing methodologies for fire suppression operations are typically derived from numerous national organizations that have been previously mentioned. For example, OSHA safety regulations (CFR 1910.120) require that personnel entering a building involved in a fire must do so in groups of two. Further, before personnel can enter a building, at least two additional firefighters must be on-scene and assigned to conduct search and rescue if the initial crew becomes trapped. This is referred to as the "two-in, two-out rule."

As previously discussed, SMCFD has a minimum staffing requirement of 39 personnel on duty each 24-hour period. Several fire suppression apparatus types are housed at the nine staffed SMCFD fire stations, and cross-staffing is used to respond to emergencies such as wildland fires, regional hazardous materials incidents, and water rescue responses. The SMCFD's actual response to incidents and performance will be analyzed in a separate section of this report.

Industry standards offer guidance for determining the staffing level that will meet service demand. 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) provides specific definitions and operational standards for SMCFD:

- A career fire department is an organization that utilizes full-time or equivalent station-based personnel immediately available to compromise at least 50 percent of an initial full alarm assignment.
- Four Firefighters must be on the scene to proceed with an interior fire attack. This portion of the standard mirrors the OSHA Regulation "two-in, two-out rule" (29 CFR 1910.134 (g)(4)) that states for an atmosphere immediately dangerous to life and health (IDLH) such as a structure fire, two personnel can fight the fire but at least two standby persons must be present before entry should be made into the structure.
- Company staffing (crew size) should be Engine = minimum four on duty, and Truck = minimum four on duty.
- Initial Alarm Deployment (number of Firefighters including officers) is Low Hazard = 15 firefighters, Medium Hazard = 28 firefighters, and High Hazard = 43 firefighters.
- A fire department should identify minimum staffing requirements to ensure the number of members available to operate based on the community's needs.

SMCFD does not currently meet the NFPA 1710 minimum four-person staffing standard for any of its 10 full-time staffed fire engines but does meet the NFPA 1710 minimum 4 person staffing standard on its two full-time staffed aerial trucks. NFPA 1710 minimum staffing standards are the goal for fire departments based on safety standards and fireground critical tasks but can be challenging to attain based on budgetary and other locally driven economic factors for communities.

Financial Overview

Since San Mateo Consolidated Fire Department commenced operations on January 13, 2019, there is not much historical financial information to review. Additionally, the development of both revenue and expenditure forecasts will become better defined as the organization matures.

SMCFD being a JPA makes their financial circumstances different than a traditional Fire District. SMCFD does not receive direct property tax allocation. Therefore, operations must be funded by the member agencies, which are the cities of Belmont, Foster City, and San Mateo. SMCFD utilizes a two-year budget cycle, adopting the revenue and expenditure plan for the first year only. The staff brings recommended amendments for Board consideration for the second or alternate fiscal year.

SMCFD primarily utilizes the General Fund for operating revenue and expenditures and uses special funds as appropriate. Specifically, the Department has a Special Revenue Fund—Fire Protection and Life Safety, and three Internal Service Funds, one for Vehicle and Equipment Replacement, one for Benefits, and one for Workers' Compensation and General Liability. However, this section of the report focuses on the General Fund.

SMCFD's budget process includes phases in each quarter of the year. Ultimately, the Board approves the recommended budget following a public hearing. Each member agency then seeks approval from their respective City Councils for both the recommended budget and their respective contribution. Once all member agencies approve it, the recommended budget becomes final and adopted.

The Chief's FY 2021/22 Budget Transmittal noted an increase in CalPERS' unfunded liability. SMCFD will begin payments on the unfunded liability in FY 2022/23. It is indicated that the fluctuating CalPERS rate of return is driving the liability. This is not unique to SMCFD. Due to the agency's newness, other expenses currently challenging to quantify are workers' compensation and general liability claims. As the agency matures, these factors should become more stable and predictable.

Revenue

The General Fund is the primary funding source, representing over 90% of revenue. The General Fund revenue is principally received as contributions from the JPA members. In accordance with the governance section of the JPA, the contribution breakdown is 20% from Belmont, 20% from Foster City, and 60% from San Mateo.

The following figure illustrates the total General Fund revenue for the three fiscal years since inception, along with the projected upcoming two fiscal years.

Figure 7: SMCFD General Fund Revenue

Description	2019/20 Actuals	2020/21 Adjusted	2021/22 Adopted	2022/23 Forecast	2023/24 Forecast
Member Agency Contributions					
Belmont	$7,487,307	$7,939,627	$8,405,748	$8,521,240	$8,725,177
Foster City	$7,487,307	$7,939,627	$8,405,748	$8,521,240	$8,725,177
San Mateo	$22,461,922	$23,818,879	$25,217,245	$25,563,720	$26,175,531
Member Contributions:	**$37,436,536**	**$39,698,133**	**$42,028,741**	**$42,606,200**	**$43,625,885**
Other Revenue					
Charges for Services	$4,910	$120	$11,000	$11,220	$11,444
Grants & Other IG	$1,333,826	$3,741,348	$933,051	$951,712	$970,746
Interest & Miscellaneous	$526,172	$123,363	$50,000	$51,000	$52,020
Total Other Revenue:	**$1,864,908**	**$3,864,831**	**$994,051**	**$1,013,932**	**$1,034,210**
TOTAL REVENUE:	**$39,301,444**	**$43,562,964**	**$43,022,792**	**$43,620,132**	**$44,660,095**

The department also received nearly $2.3 million in special revenue—Fire Protection and Life Safety. This number is projected to grow to over $3.3 million by FY 2025/26. FY 2019/20 Actual and FY 2020/21Estimated expenditures outpace revenue, drawing the Fund Balance into a deficit position. However, revenue is projected to outpace expenditures in the forecast years.

Notable Grant Funding

SMCFD received $343,030.59 in FEMA Assistance to Firefighters Grant COVID-19 Supplemental (AFG-S) for personal protective equipment and $85,000 in FEMA Fire Prevention & Safety Work Grant Program funds for fire prevention and public education. Additionally, the Gilead Giving Program received $178,709 in training facility funding.

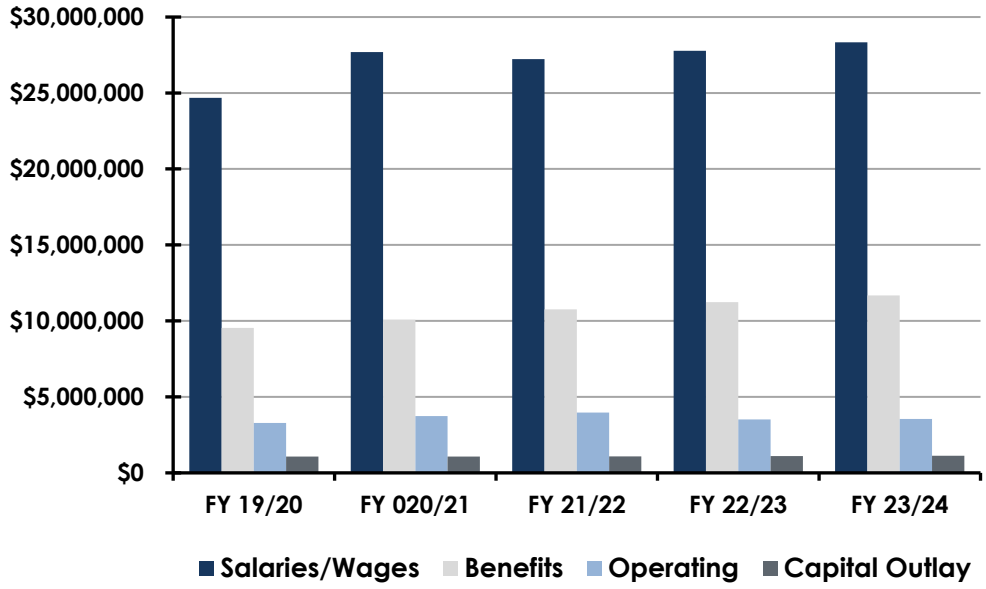
Expenditures

As with many service industries, most expenditures are driven by employee salary and benefit costs. For SMCFD, the FY 2021/22 budget indicates that these costs represent 88% of the expenditures. The next figure is a summary of the General Fund expenditures for the three fiscal years since inception and the projected two fiscal years.

Figure 8: SMCFD General Fund Expenditures

Description	2019/20 Actuals	2020/21 Adjusted	2021/22 Adopted	2022/23 Forecast	2023/24 Forecast
Salaries/Wages	$24,684,539	$27,686,809	$27,233,259	$27,776,213	$28,330,026
Benefits	$9,538,796	$10,077,066	$10,753,041	$11,233,954	$11,671,341
Operating	$3,282,222	$3,735,577	$3,960,792	$3,512,752	$3,539,571
Capital Outlay	$1,071,744	$1,063,512	$1,075,700	$1,097,214	$1,119,158
TOTAL EXPENDITURES:	**$38,577,301**	**$42,562,964**	**$43,022,792**	**$43,620,133**	**$44,660,096**
Surplus/(Deficit)	$724,143	$1,000,000	$0	$0	$0

Figure 9: SMCFD Expenditures by Type



Additional Observations

The department has an estimated $2.35 million General Fund Reserve, representing approximately 5.4% of operating expenditures. A target of at least three months of annual operating expenditures has been set. That equates to a 25% reserve, a healthy number to maintain. These funds are utilized to cover unanticipated economic fluctuations and unforeseen expenditures.

The General Fund portion of the FY 2021/22 budget includes a notation that "the level of fund balance will continue to be monitored to build the reserve and evaluate whether increased contributions from member agencies are necessary to reach the desired level of reserve in a timelier manner." This is a prudent approach to achieving the reserve target.

The Chief's FY 2021/22 Budget Transmittal also notes the fiscal challenges faced by the member agencies due to the COVID-19 pandemic and the impact that has and will have on their ability to fund services, including fire services. He concludes that section of the transmittal by stating, "Our organization stands ready to adjust to this new reality together with our member agencies to ensure long-term sustainability, while also maintaining the high level of fire service our communities expect and deserve."

The Chief notes that the major components of the long-term financial plan include:

- Known salary increases according to the contractual agreements
- Assumed 2% salary increases annually beyond the terms of the contractual agreements
- Increases in CalPERS contribution rates predominantly absorbed by SMCFD
- Assumed increases in medical and other benefit costs

For most governmental agencies, pension-related benefits are a large long-term expense. For SMCFD, the 2020 Comprehensive Annual Financial Report (CAFR) does not indicate any net pension obligation. This is due to the Department being recently established. Each member agency's legacy cost for liabilities remains with the member agency. Therefore, the Department's liability will only be impacted by actual experience moving forward, combined with actuarial assumptions and CalPERS investment returns.

The Department utilizes the CalPERS Health Plan and pays $160 per month for retirees. This flat rate contribution limits the exposure for Other Post-Employment Benefits (OPEB) liability. The 2020 CAFR indicates a net OPEB liability of $618,747. Long-range financial forecasting is a best practice that San Mateo utilizes. Although not represented in this report, the adopted FY 2021/22 budget includes projections through FY 2025/26.

Capital Facilities & Apparatus

Trained personnel, apparatus and vehicles, firefighting and emergency medical equipment, and fire stations are the essential capital resources necessary for a fire department to carry out its mission. No matter how competent or numerous the firefighters, if appropriate capital equipment is not available for operations personnel, it would be impossible for the San Mateo Consolidated Fire Department to perform its responsibilities effectively. The essential capital assets for emergency operations are facilities, apparatus, and other emergency response vehicles. Therefore, this section of the report assessed SMCFD fire stations, vehicles, and apparatus.

Fire Station Features

Fire stations play an integral role in the delivery of emergency services for several reasons. To a large degree, a station's location will dictate response times to emergencies. A poorly located station can mean the difference between confining a fire to a single room and losing the structure or survival or death from sudden cardiac arrest. Fire stations also need to be designed to adequately house equipment and apparatus and meet the needs of the organization and its personnel.

Fire station activities should be closely examined to ensure the structure is adequate in size and function. Examples of these functions can include the following:

- Kitchen facilities, appliances, and storage
- Residential living space and sleeping quarters for on-duty personnel (all genders)
- Bathrooms and showers (all genders)
- Training, classroom, and library areas
- Firefighter fitness area
- The housing and cleaning of apparatus and equipment, including decontamination and disposal of biohazards
- Administrative and management offices, computer stations, and office facilities
- Public meeting space

In gathering information from the San Mateo Consolidated Fire Department, Triton asked the agency to rate the condition of its fire stations using the following figure's criteria. The results will be seen in the figures following that.

Figure 10: Criteria Utilized to Determine Fire Station Condition

Excellent	Like new condition. No visible structural defects. The facility is clean and well-maintained. The Interior layout is conducive to function with no unnecessary impediments to the apparatus bays or offices. No significant defect history. Building design and construction match the building's purposes. Age is typically less than 10 years.
Good	The exterior has a good appearance with minor or no defects. Clean lines, good workflow design, and only minor wear on the building interior. The roof and apparatus apron are in good working order, absent any significant full-thickness cracks, crumbling of the apron surface, or visible roof patches or leaks. Building design and construction match the building's purposes. Age is typically less than 20 years.
Fair	The building appears structurally sound with a weathered appearance and minor to moderate non-structural defects. The interior condition shows normal wear and tear but flows effectively to the apparatus bay or offices. Mechanical systems are in working order. Building design and construction may not match the building's purposes well. Showing increasing age-related maintenance but with no critical defects. Age is typically 30 years or more.
Poor	The building appears to be cosmetically weathered and worn with potentially structural defects, although not imminently dangerous or unsafe. Large, multiple full-thickness cracks and crumbling of concrete on the apron may exist. The roof has evidence of leaking and multiple repairs. The interior is poorly maintained or shows signs of advanced deterioration with moderate to significant non-structural defects. Problematic age-related maintenance and major defects are evident. It may not be well-suited to its intended purpose. Age is typically greater than 40 years.

Facilities & Fire Stations

The following figures list the features of the San Mateo CFD fire stations.

Figure 11: SMCFD Station 14

Address/Physical Location:	911 Granada Street, Belmont, CA 94002						
	**General Description:** This station houses a first-due engine and two Hazmat Units, and a classroom that will accommodate approximately 20 persons. There is an air compressor and generator at the station as well. This fire station has two drive-thru bays, and vehicle storage areas are at maximum, with no room for additional response vehicles.						
Structure							
Date of Original Construction	1999						
Seismic Protection	According to 1998 California Building Code						
Auxiliary Power	Yes						
General Condition	Good						
Number of Apparatus Bays	Drive-through Bays	2		Back-in Bays	2		
ADA Compliant	Lower level only						
Total Square Footage	4,840						
Facilities Available							
Sleeping Quarters	5	Bedrooms	0	Beds	15	Dorm Beds	
Maximum Staffing Capability	15						
Exercise/Workout Facilities	Yes						
Kitchen Facilities	Yes						
Individual Lockers Assigned	Yes						
Bathroom/Shower Facilities	Yes						
Training/Meeting Rooms	Yes						
Washer/Dryer	Yes						
Safety & Security							
Station Sprinklered	Yes						
Smoke Detection	Yes						
Decontamination/Bio. Disposal	Yes						
Security System	No						
Apparatus Exhaust System	Yes						

Figure 12: SMCFD Station 15

Address/Physical Location:	2701 Cipriani Boulevard, Belmont, CA 94003

General Description:
This station houses a first-due engine, a reserve engine, and utility truck. Interior needs renovation. It has a single bathroom and shower and is not configured for different genders. Exercise room is too small, and equipment is moved into the bays. There is a vehicle exhaust system. Turnout gear and exercise equipment are stored in the apparatus bays.

Structure						
Date of Original Construction	1959					
Seismic Protection	Unknown					
Auxiliary Power	Yes					
General Condition	Poor					
Number of Apparatus Bays	Drive-through Bays	0		Back-in Bays	2	
ADA Compliant	No					
Total Square Footage	4100					
Facilities Available						
Sleeping Quarters	3	Bedrooms	0	Beds	9	Dorm Beds
Maximum Staffing Capability	9					
Exercise/Workout Facilities	Yes					
Kitchen Facilities	Yes					
Individual Lockers Assigned	Yes					
Bathroom/Shower Facilities	Yes					
Training/Meeting Rooms	No					
Washer/Dryer	Yes					
Safety & Security						
Station Sprinklered	No					
Smoke Detection	Yes					
Decontamination/Bio. Disposal	Yes					
Security System	No					
Apparatus Exhaust System	Yes					

Figure 13: SMCFD Station 21

Address/Physical Location:	120 S. Ellsworth Avenue, San Mateo, CA 94011

General Description:
This station houses a first-due engine, first-due tiller, hose tender, and an Antique 1921 Seagrave. There is an additional building in the back of the property that has one bay and has been used for fleet maintenance and is being used for storage. The station also has three bays, and vehicle storage areas are at maximum with vehicles with no room for additional response vehicles.

Structure						
Date of Original Construction	1939					
Seismic Protection	1998 Building Code					
Auxiliary Power	Yes					
General Condition	Fair					
Number of Apparatus Bays	Drive-through Bays	0	Back-in Bays	3		
ADA Compliant	No					
Total Square Footage	10,504					
Facilities Available						
Sleeping Quarters	9	Bedrooms	9	Beds	0	Dorm Beds
Maximum Staffing Capability	11					
Exercise/Workout Facilities	Yes					
Kitchen Facilities	Yes					
Individual Lockers Assigned	Yes					
Bathroom/Shower Facilities	Yes					
Training/Meeting Rooms	Yes					
Washer/Dryer	Yes					
Safety & Security						
Station Sprinklered	Yes					
Smoke Detection	Yes					
Decontamination/Bio. Disposal	Yes					
Security System	No					
Apparatus Exhaust System	Yes					

Figure 14: SMCFD Station 23

Address/Physical Location:	31 West 27th Avenue, San Mateo, CA 94403

General Description:
This station houses a first-due engine, first-due tiller, Battalion 5, and reserve Battalion 5. There is an additional training tower at this station used for basic drills. It also has two drive-thru bays and one back-in bay used by the BCs. Apparatus storage areas are at maximum, with no room for additional response vehicles.

Structure						
Date of Original Construction	2011					
Seismic Protection	2007 Building Code					
Auxiliary Power	Yes					
General Condition	Excellent					
Number of Apparatus Bays	Drive-through Bays	2	Back-in Bays	1		
ADA Compliant	Yes					
Total Square Footage	10,325					
Facilities Available						
Sleeping Quarters	9	Bedrooms	9	Beds	9	Dorm Beds
Maximum Staffing Capability	11					
Exercise/Workout Facilities	Yes					
Kitchen Facilities	Yes					
Individual Lockers Assigned	Yes					
Bathroom/Shower Facilities	Yes					
Training/Meeting Rooms	Yes					
Washer/Dryer	Yes					
Safety & Security						
Station Sprinklered	Yes					
Smoke Detection	Yes					
Decontamination/Bio. Disposal	Yes					
Security System	No					
Apparatus Exhaust System	Yes					

Figure 15: SMCFD Station 24

Address/Physical Location:	319 S. Humboldt Street, San Mateo, CA 94401

General Description:
Station houses a first-due engine and a reserve engine. Vehicle storage areas are at maximum with no room for additional response vehicles. The station has a vehicle exhaust system. However, the aerobic workout equipment is in the apparatus area. Personal clothing is being stored in the uniform/bunker lockers.

Structure						
Date of Original Construction	2014					
Seismic Protection	2010 California Building Code					
Auxiliary Power	Yes					
General Condition	Excellent					
Number of Apparatus Bays	Drive-through Bays	1		Back-in Bays	1	
ADA Compliant	Yes					
Total Square Footage	5,500					
Facilities Available						
Sleeping Quarters	4	Bedrooms	0	Beds	4	Dorm Beds
Maximum Staffing Capability	4					
Exercise/Workout Facilities	Yes					
Kitchen Facilities	Yes					
Individual Lockers Assigned	Yes					
Bathroom/Shower Facilities	Yes					
Training/Meeting Rooms	No					
Washer/Dryer	Yes					
Safety & Security						
Station Sprinklered	Yes					
Smoke Detection	Yes					
Decontamination/Bio. Disposal	Yes					
Security System	No					
Apparatus Exhaust System	Yes					

Figure 16: SMCFD Station 25

Address/Physical Location:	545 Shafter St, San Mateo, CA 94402

General Description:
This station houses a first-due engine. The station has a single drive-thru bay, and the vehicle storage areas are at maximum, with no room for additional response vehicles.

Structure						
Date of Original Construction	2021					
Seismic Protection	2019 California Building Code					
Auxiliary Power	Yes					
General Condition	Excellent					
Number of Apparatus Bays	Drive-through Bays	1		Back-in Bays	0	
ADA Compliant	Yes					
Total Square Footage	4,950					
Facilities Available						
Sleeping Quarters	4	Bedrooms	4	Beds	0	Dorm Beds
Maximum Staffing Capability	4					
Exercise/Workout Facilities	Yes					
Kitchen Facilities	Yes					
Individual Lockers Assigned	Yes					
Bathroom/Shower Facilities	Yes					
Training/Meeting Rooms	No					
Washer/Dryer	Yes					
Safety & Security						
Station Sprinklered	Yes					
Smoke Detection	Yes					
Decontamination/Bio. Disposal	Yes					
Security System	No					
Apparatus Exhaust System	Yes					

Figure 17: SMCFD Station 26

Address/Physical Location:	1500 Marina Court, San Mateo, CA 94403

General Description:
This station houses a first-due engine. The station has a single drive-thru bay and a single back-in bay. The drive through bay is not usable as a true drive-through because of turning radius concerns on the back of the station The vehicle storage area has additional space for response vehicles.

Structure						
Date of Original Construction	2002					
Seismic Protection	1998 Building Code					
Auxiliary Power	Yes					
General Condition	Good					
Number of Apparatus Bays	Drive-through Bays	1	Back-in Bays	1		
ADA Compliant	Partial, 1st floor only					
Total Square Footage	6,500					
Facilities Available						
Sleeping Quarters	4	Bedrooms	0	Beds	4	Dorm Beds
Maximum Staffing Capability	4					
Exercise/Workout Facilities	Yes					
Kitchen Facilities	Yes					
Individual Lockers Assigned	Yes					
Bathroom/Shower Facilities	Yes					
Training/Meeting Rooms	No					
Washer/Dryer	Yes					
Safety & Security						
Station Sprinklered	Yes					
Smoke Detection	Yes					
Decontamination/Bio. Disposal	Yes					
Security System	No					
Apparatus Exhaust System	Yes					

Figure 18: SMCFD Station 27

Address/Physical Location:	1801 DeAnza Boulevard, San Mateo, CA 94402

General Description:
This station houses a first-due engine, a brush unit, and utility truck. Interior needs renovation. Station has a vehicle exhaust system; however, doors open between bays, kitchen, main bathroom, and dorm bedrooms. It has a single bathroom and shower and is not configured for multiple genders. Bay areas are at maximum.

Structure						
Date of Original Construction	1973					
Seismic Protection	Unknown					
Auxiliary Power	Yes					
General Condition	Poor					
Number of Apparatus Bays	Drive-through Bays	1	Back-in Bays	1		
ADA Compliant	No					
Total Square Footage	6,524					
Facilities Available						
Sleeping Quarters	2	Bedrooms	5	Beds	1	Dorm Beds
Maximum Staffing Capability	5					
Exercise/Workout Facilities	Yes					
Kitchen Facilities	Yes					
Individual Lockers Assigned	No					
Bathroom/Shower Facilities	Yes					
Training/Meeting Rooms	No					
Washer/Dryer	Yes					
Safety & Security						
Station Sprinklered	No					
Smoke Detection	Yes					
Decontamination/Bio. Disposal	Yes					
Security System	No					
Apparatus Exhaust System	Yes					

Figure 19: SMCFD Station 28

Address/Physical Location:	1040 E. Hillsdale Boulevard, Foster City, CA 94404

General Description:
This station houses two first-due engines, a reserve engine, a reserve tiller, and the water rescue unit with jet skis and reserve jet skis. The station also houses the administration offices and staff for operations and prevention.

Structure						
Date of Original Construction	2002					
Seismic Protection	Yes					
Auxiliary Power	Yes					
General Condition	Good					
Number of Apparatus Bays	Drive-through Bays	5	Back-in Bays	0		
ADA Compliant	No					
Total Square Footage	25,119					
Facilities Available						
Sleeping Quarters	9	Bedrooms	0	Beds	9	Dorm Beds
Maximum Staffing Capability	9					
Exercise/Workout Facilities	No					
Kitchen Facilities	Yes					
Individual Lockers Assigned	Yes					
Bathroom/Shower Facilities	Yes					
Training/Meeting Rooms	Yes					
Washer/Dryer	Yes					
Safety & Security						
Station Sprinklered	Yes					
Smoke Detection	Yes					
Decontamination/Bio. Disposal	Yes					
Security System	No					
Apparatus Exhaust System	Yes					

Summary of the Fire Stations

The following figure summarizes the nine fire stations operated by the San Mateo Consolidated Fire District.

Figure 20: Summary of the SMCFD Fire Station Features (2022)

Station	Square Footage	Apparatus Bays	Maximum Staffing	General Condition	Station Age
Station 14	4,840	4	15	Good	23 years
Station 15	4,100	2	9	Poor	63 years
Station 21	10,504	3	11	Fair	83 years
Station 23	10,325	3	11	Excellent	11 years
Station 24	5,500	2	4	Excellent	8 years
Station 25	4,950	1	4	Excellent	1 year
Station 26	6,500	2	4	Good	20 years
Station 27	6,524	2	5	Poor	49 years
Station 28	25,119	5	9	Good	20 years
Totals:	**78,362**	**24**	**72**		

As shown in the preceding figure, SMCFD fire stations range in age from 1 to 83 years, with a combined average age of just over 34 years. Station 21 and Station 15 are the two oldest fire stations, respectively. The combined fire stations have substantial capacity for housing operational personnel.

Three of the stations were given a rating of "Excellent," three were rated as "Good," and two consider in "Poor" condition. The other facilities had mixed ratings based on the exterior and roof conditions and interior conditions.

Apparatus & Vehicles Inventory

Fire apparatus, command vehicles, and other emergency response units must be sufficiently reliable to transport firefighters and equipment rapidly and safely to an incident scene. In addition, such vehicles must be properly equipped and function appropriately to ensure that the delivery of emergency services is not compromised.

As a part of this study, Triton requested that the San Mateo Consolidated Fire Department provide a complete inventory of its fleet (suppression apparatus, command and support vehicles, specialty units, etc.). For each vehicle listed, SMCFD was asked to rate its condition utilizing the criteria described in the following figure.

Figure 21: Criteria Used to Determine Apparatus & Vehicle Condition

Components	Points Assignment Criteria	
Age:	One point for every year of chronological age, based on the date the unit was originally placed into service.	
Miles/Hours:	One point for every 10,000 miles or 1,000 hours	
Service:	1, 3, or 5 points are assigned based on service type received (e.g., a pumper would be given a 5 since it is classified as severe duty).	
Condition:	This category considers body condition, rust, interior condition, accident history, anticipated repairs, etc. The better the condition, the lower the assignment of points.	
Reliability:	Points are assigned as 1, 3, or 5, depending on the frequency a vehicle is in for repair (e.g., a 5 would be assigned to a vehicle in the shop 2 or more times per month on average; while a 1 would be assigned if in the shop on average once every 3 months or less.	
Point Ranges	**Condition Rating**	**Condition Description**
Under 18 points	Condition I	Excellent
18–22 points	Condition II	Good
23–27 points	Condition III	Fair (consider replacement)
28 points or higher	Condition IV	Poor (immediate replacement)

The San Mateo Consolidated Fire Department operates 13 Type 1 frontline engines and two 100-foot aerial apparatus. In addition, SMCFD maintains six Type 1 engines (one of which is assigned to the Training Division) and three 100-foot aerial apparatus in reserve status.

The following figure list features of the frontline units.

Figure 22: SMCFD Frontline Engines & Aerial Apparatus Inventory (2022)

Unit	Type	Manufacturer	Year	Condition	Features
Engine 14	Type 1	Seagrave	2016	Excellent	1500 gpm/500 gal.
Engine 15	Type 1	Seagrave	2018	Excellent	1500 gpm/500 gal.
Engine 21	Type 1	Pierce	2018	Excellent	1750 gpm/550 gal.
Engine 23	Type 1	Pierce	2007	Fair	1750 gpm/500 gal.
Engine 24	Type 1	Pierce	2018	Excellent	1750 gpm/550 gal.
Engine 25	Type 1	Pierce	2007	Fair	1750 gpm/500 gal.
Engine 26	Type 1	Pierce	2015	Good	1750 gpm/550 gal.
Engine 27	Type 1	Pierce	2015	Good	1750 gpm/550 gal.
Engine 28	Type 1	Pierce	2015	Good	1750 gpm/550 gal.
Engine 29	Type 1	Pierce	2018	Excellent	1750 gpm/550 gal.
Engine 405	Type 1	HME	2018	Excellent	1250 gpm/800 gal.
Engine 2609	Type 6	HME	2020	Excellent	620 gpm/300 gal.
Engine 2610	Type 6	HME	2020	Excellent	620 gpm/300 gal.
Truck 21	Truck	Pierce Arrow	2015	Excellent	100 feet
Truck 23	Truck	Pierce Arrow	2016	Excellent	100 feet

As shown in the preceding figure, 50% of SMCFD's Type 1 engines and 100% of its trucks were rated as in an "Excellent" condition, with the remaining half rated as in "Good" or "Fair" condition. SMCFD is to be commended for the status and condition of the frontline apparatus fleet.

SMCFD listed multiple command vehicles, staff cars, utility vehicles, and specialty vehicles (e.g., Water Rescue, Light Rescue, etc.) assigned to various divisions. In addition, the Fire Chief, Deputy Chief, Fire Marshal, Administration Chief, EMS Manager, and Training Captain have all been assigned vehicles of various manufacturers and configurations (pickup trucks, sport utility vehicles, etc.).

The following figure shows that the San Mateo Consolidated Fire Department has a relatively large fleet of command, staff, and utility vehicles.

Figure 23: SMCFD Frontline Command & Staff Vehicles Inventory (2022)

Unit	Assigned To	Manufacturer	Year	Condition
A22	Administration	Chevy Impala	2013	Fair
BC6	Administration Chief	Ford Interceptor	2017	Fair
BC5	Battalion 5	Ford F-250 4X4	2018	Excellent
CH5A	Deputy Chief	Ford Interceptor	2015	Fair
P52	Deputy Fire Marshal	Toyota RAV 4 Hybrid	2020	Excellent
P49	EMS Manager	Ford Interceptor	2018	Excellent
CH5	Fire Chief	Ford Interceptor	2016	Fair
P51	Fire Marshal	Toyota RAV 4 Hybrid	2020	Excellent
P44	Fire Investigation	Toyota Tacoma	2017	Excellent
P26	Fire Investigation	Ford Fusion Hybrid	2014	Fair
P25	Fire Investigation	Ford Fusion Hybrid	2014	Fair
P24	Fire Investigation	Ford Fusion Hybrid	2014	Fair
P54	Inspector	Toyota RAV 4 Hybrid	2020	Excellent
P45	Fleet & Facilities	Toyota Tacoma	2017	Excellent
MR1	Mail Run	Ford F-250	2001	Poor
CH5B	OES Chief	Ford Interceptor	2015	Fair
OC1	Out of County BC	Chevy 3500 4X4	2005	Fair
P30	Training	Toyota Tacoma	2015	Excellent
T05A	Training Captain	Ford F-250 4X4	2008	Fair
T05	Training Chief	Ford F-350 4X4	2019	Excellent
U15	Utility 15 Light Rescue	Ford F-350 4X4	2007	Fair
U23	Utility 23	Ford F-350 4X4	2007	Fair
U27	Utility 27 light Rescue	Ford F-350 4X4	2006	Fair
WR 28	Water Rescue	Ford F-250 4X4	2011	Excellent
CERT	CERT	Ford F-250	2017	Excellent

As the preceding figure shows, about 44% of the frontline command and staff vehicle inventory is considered to be in an "Excellent" condition

Section II:
ALL HAZARDS
COMMUNITY RISK ASSESSMENT

Description of the Community Served

Overview of San Mateo County

San Mateo County is in the San Francisco Bay area. It is in the San Francisco-Oakland-Berkeley, CA, Metropolitan Statistical Area (MSA), and Redwood City is the county seat. The estimated population of the MSA in 2019 was 4,731,803, an increase of 9.1% since 2010. San Mateo County's population, according to the 2020 Census, is 764,442 and has increased by 6.4% since 2010.[3] The County is considered suburban with interspersed pockets of urban areas. It is the home of San Francisco International Airport, which is in the northeastern section of the County.

The County is 455 square miles of land and bordered by the Pacific Ocean to the west and San Francisco Bay to the east. The southern end of the County borders Silicon Valley. It is the home of many innovative companies such as "bioscience, computer software, green technology, hospitality, financial management, health care, education, and transportation."[4]

According to the U.S. Census 2019 American Community Survey, the median age in San Mateo County is 39.9. At-risk populations under five years old make up 5.7%, and those older than 65 are 15.8% of the population. In addition, the median household income is $122,641, while the percentage in poverty is 6.1%.

Overview of San Mateo Consolidated Fire Department

SMCFD is in San Mateo County, south of San Francisco and north of what is known as Silicon Valley. The department serves San Mateo, Foster City, and Belmont, which total approximately 40.2 square miles, of which 20.5 square miles are on land.

The City of San Mateo's history dates to the 1800s and was incorporated in 1894. The current estimated population in 2020 is estimated to be 105,661 and covers 12.13 square miles of land area. The City of Foster City was incorporated in 1971, and the population in 2020 is 33,803 and comprises 4.62 square miles. In 1926, the City of Belmont was incorporated, and the current estimated population is 28,335 and is 3.61 square miles in area.

In 2019, SMCFD was created when the fire departments in San Mateo, Foster City, and Belmont formed a Joint Powers Authority (JPA) and a consolidated fire department.

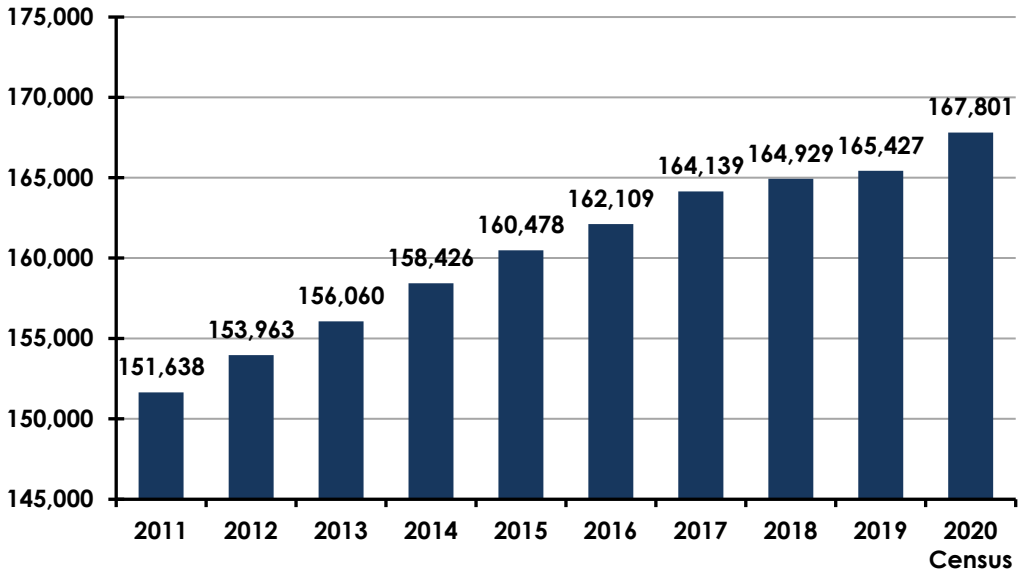
Population & Demographics

The population and demographics dictate the service delivery offered to its citizens. The demographics vary throughout the service area and may require additional response capabilities to meet the demand for fire or EMS. Understanding how demographics play a role in a fire department's incidents allows them to determine the level of service in its response area.

Population

According to the American Community Survey and the 2020 U.S. Census, the population in SMCFD had grown to 167,801 in 2020, which is more than 11% since 2011, when it was 151,638. The following figure shows the population growth from 2011 to 2020.

Figure 24: SMCFD Population (2011–2020)



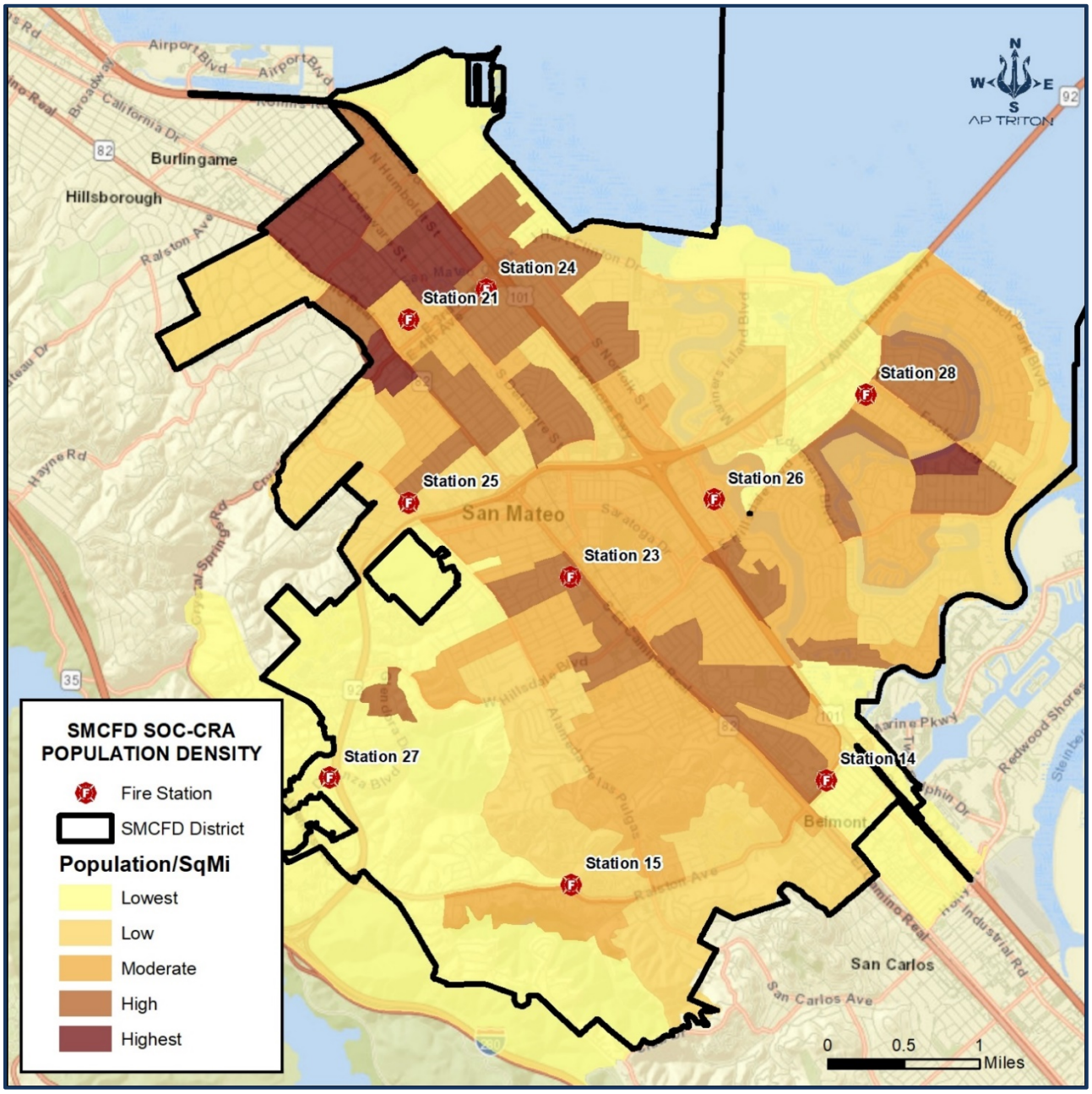
The following figure is the individual populations for San Mateo, Foster City, and Belmont between 2011 to the 2020 U.S. Census.

Figure 25: San Mateo, Forster City, & Belmont Population (2011–2020)

Year	San Mateo	Foster City	Belmont	Total
2011	95,957	30,113	25,568	**151,638**
2012	97,322	30,754	25,887	**153,963**
2013	98,601	31,259	26,200	**156,060**
2014	100,114	31,809	26,503	**158,426**
2015	101,335	32,377	26,766	**160,478**
2016	102,224	32,967	26,918	**162,109**
2017	103,500	33,529	27,110	**164,139**
2018	104,035	33,784	27,110	**164,929**
2019	104,333	33,997	27,097	**165,427**
2020	105,661	33,805	28,335	**167,801**

The next figure shows the population density for the SMCFD.

Figure 26: Population Density



Demographics

At-Risks Populations

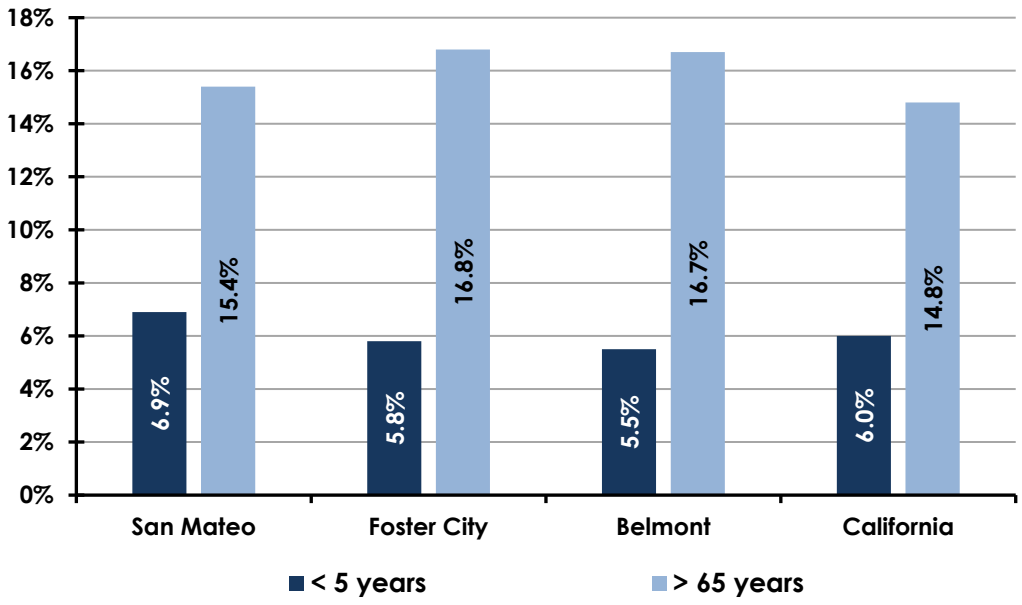
Some people are at higher risk of fires and medical incidents. Understanding these populations and where they reside in the response area provides specific information to prevent or mitigate a response. The following information is from the 2019 American Community Survey 5-Year Estimates.[5]

Age

The age of young children and older adults may directly relate to increased medical responses. In the SMCFD response area, percentages of the population under five range from a low of 5.5% in Belmont, 5.8% in Foster City, and 6.9% in San Mateo. This compares to the state at 6.0%. Young children under five may need additional assistance when evacuating a building during a fire or other event, posing a higher risk to this age group.

As people age, their mobility decreases and places them at a higher risk during a fire, and they are more likely to fall and need assistance from SMCFD for medical-related incidents. The percentage of adults older than 65 is 15.4% in San Mateo, 16.8% in Foster City, and 16.7% in Belmont, higher than California at 14.8%. The following figure shows children under five and adults 65 and older in the three cities and the state.

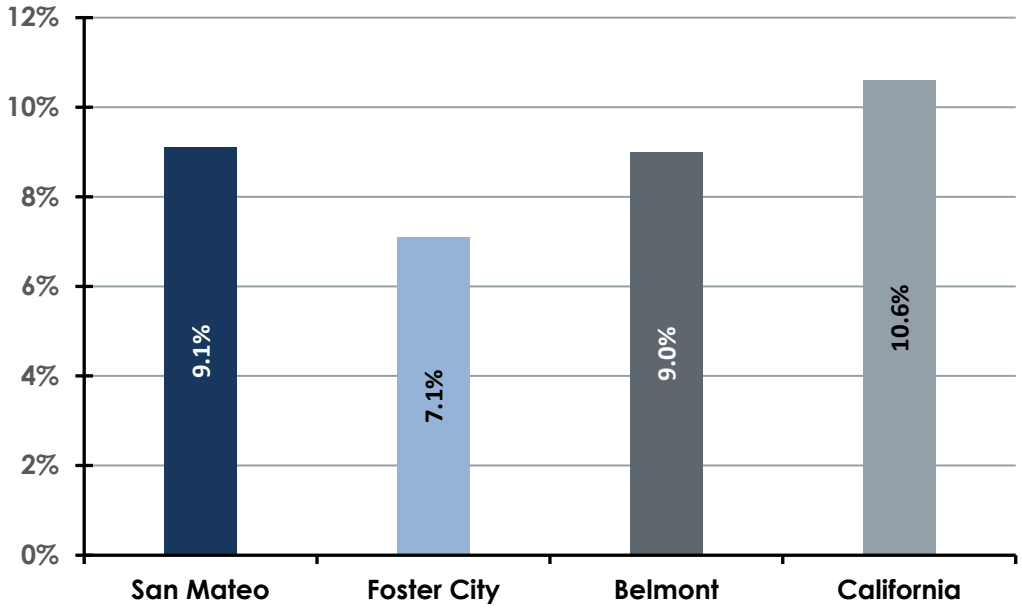
Figure 27: Children Under 5 & Adults 65 & Older



Disabilities

People with disabilities are at a higher risk because they may not self-evacuate a building or home during a fire. In addition, Emergency Medical Services increase for people with disabilities as they age. The percentage of people with a disability is 9.1% in San Mateo, 7.1% in Foster City, and 9.0% in Belmont. Each of these is lower than the state average at 10.6%. The following figure shows the percentage of people with a disability.

Figure 28: Percentage of People with a Disability

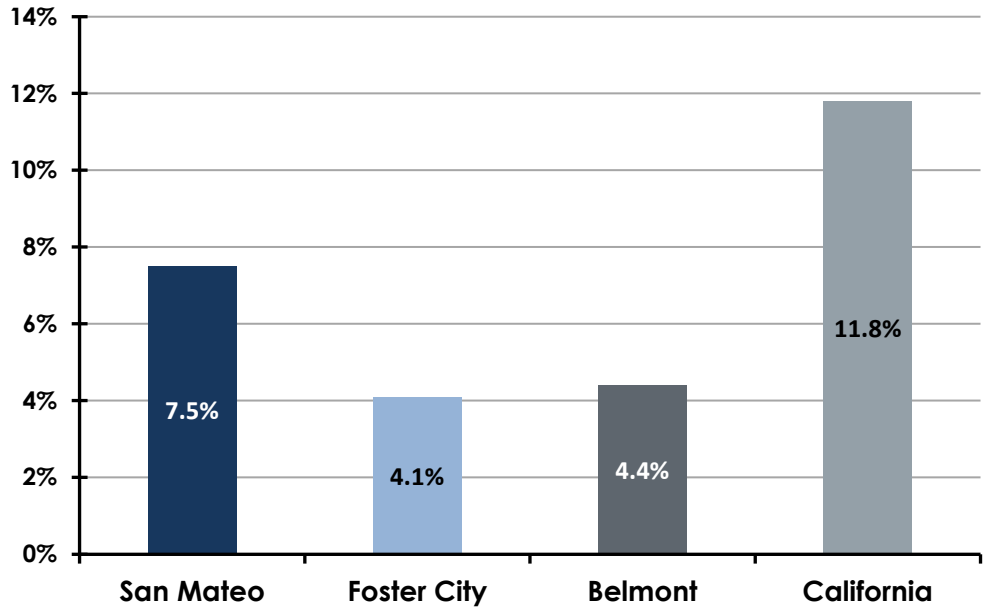


Low-Income Persons

Low incomes can sometimes increase the risk of fires and medical responses in the community. People with lower incomes sometimes experience difficulty properly maintaining their residence, or are incapable of obtaining adequate medical care. People living below the poverty level are considered at the highest risks when combined with other factors such as education levels, disabled, or unable to work. Each city in the SMCFD response area has a lower percentage of the population in poverty than California (11.8%).

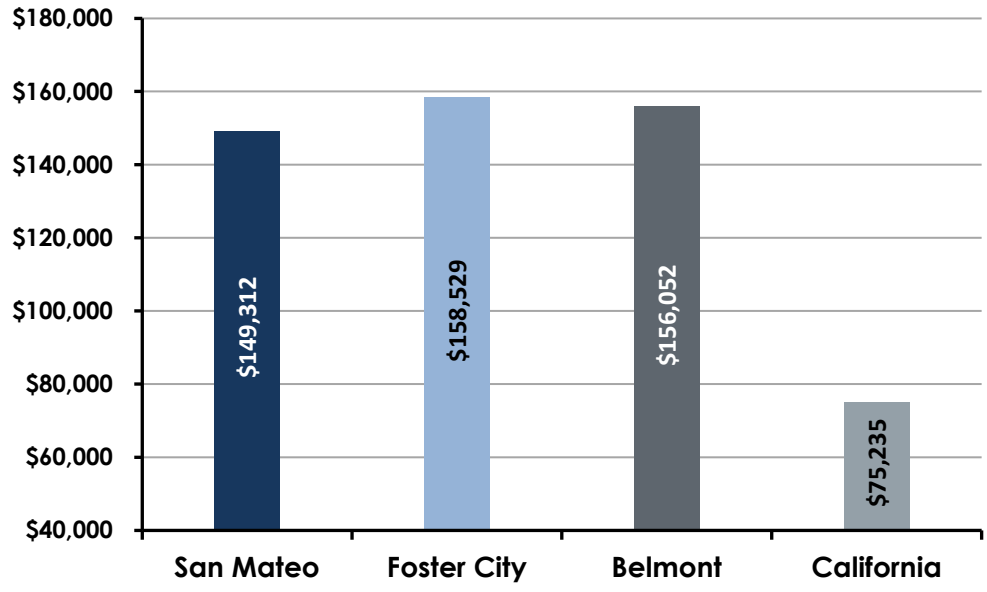
San Mateo is the highest at 7.5%, Foster City is the lowest at 4.1%, and Belmont is 4.4%, as shown in the following figure.

Figure 29: Percentage of People Living in Poverty



The median household income is similar in all three cities, with the highest in Foster City at $158,529, Belmont at $156,052, San Mateo at $149,312, and much higher than the state at $75,235, as shown in the following figure.

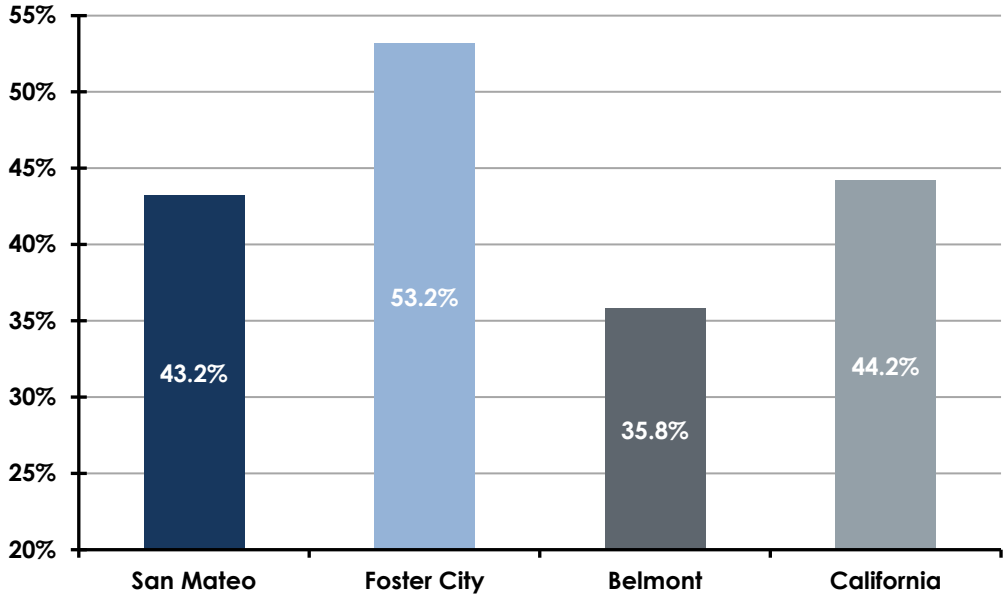
Figure 30: Median Household Income



Language Barriers

Language barriers may create problems when the person does not understand English. The percentage of people who speak a language other than English and are over five years of age is highest in Foster City at 53.2%, San Mateo at 43.2%, and Belmont at the lowest at 35.8%, compared to the state at 44.2%. The following figure is the percentage of people who speak a language other than English at home and older than age five years.

Figure 31: Language Spoken at Home Other Than English—Older Than Age 5

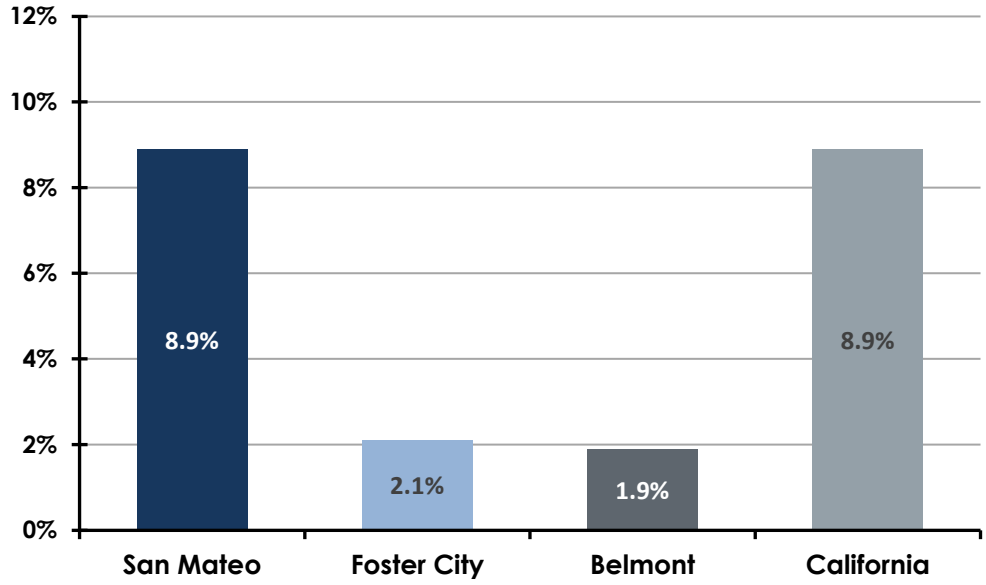


Additional Demographics

Persons without Health Insurance

The lack of health insurance affects lower-income populations since they cannot or have difficulty paying for medical visits because of the lack of insurance. In addition, this group is likely to require additional emergency medical assistance because they did not seek treatment for chronic illnesses. The percentage of people without health insurance under 65 is the highest in San Mateo at 8.9%, which is the same in California. Foster City is 2.1%, and Belmont is 1.9%. The following figure is the percentage of people under age 65 without health insurance.

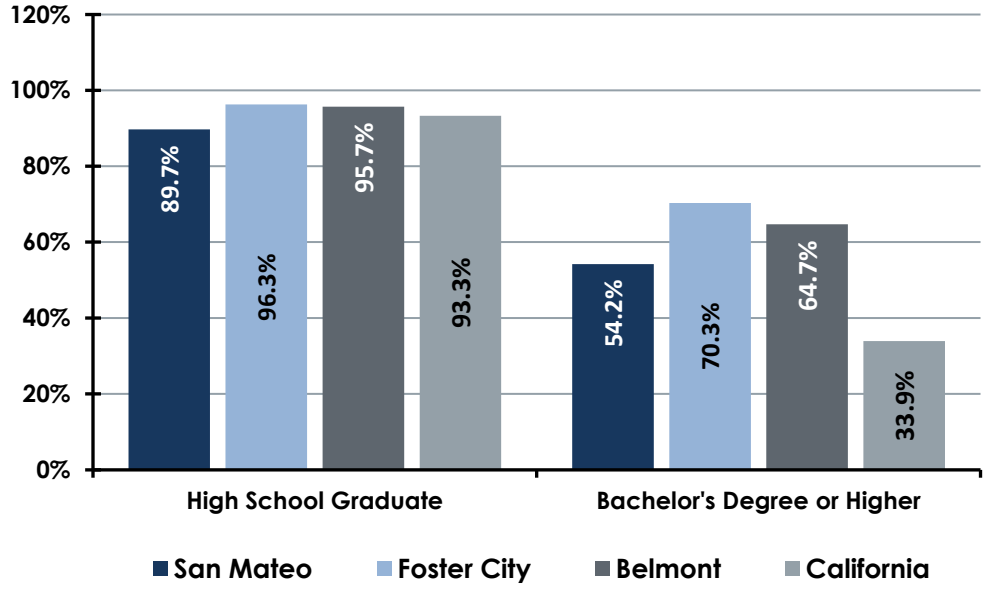
Figure 32: Percentage of People Without Health Insurance Under Age 65



Education Levels

According to the U.S. Bureau of Labor Statistics, higher education levels are directly related to higher wages. For example, in 2019, the median weekly earnings with a high school diploma and no college education were $746, 40% less than someone with at least a bachelor's degree who earned $1,248. The next figure shows the percentage of people with a high school diploma and a bachelor's degree over 25.

Figure 33: Education Level Over the Age 25



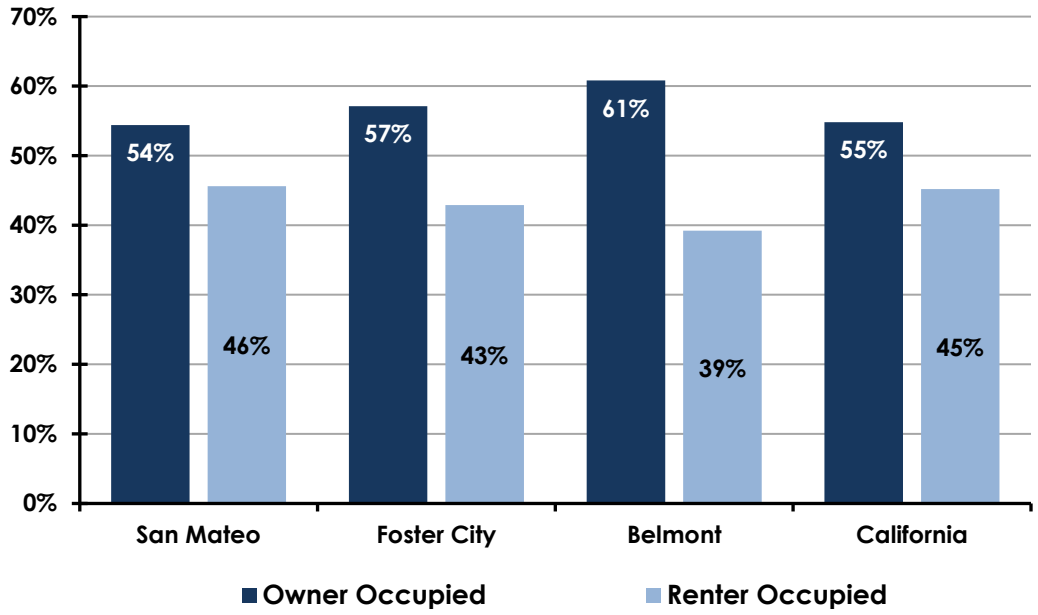
Housing Characteristics

In any community, the housing types vary and provide insights into homeownership, the age of the home, and the number of units in a building. Vacant structures can increase risks to the fire department and the community if the building is not secured to prevent entry. If a building is poorly maintained, its structural integrity can degrade and present strategic and tactical problems during a fire. Vandalism to buildings may create additional challenges for SMCFD and law enforcement.

Housing Ownership

In many circumstances, the ability to own and maintain a home is related to income level. In Belmont, owner-occupied housing is 60.8%, the highest in the SMCFD response area. Foster City is 57.1%, and San Mateo is 54.4%, slightly lower than the state at 54.8%. The following figure shows the percentage of owner or rental-occupied housing.

Figure 34: Owner & Rental-Occupied Housing



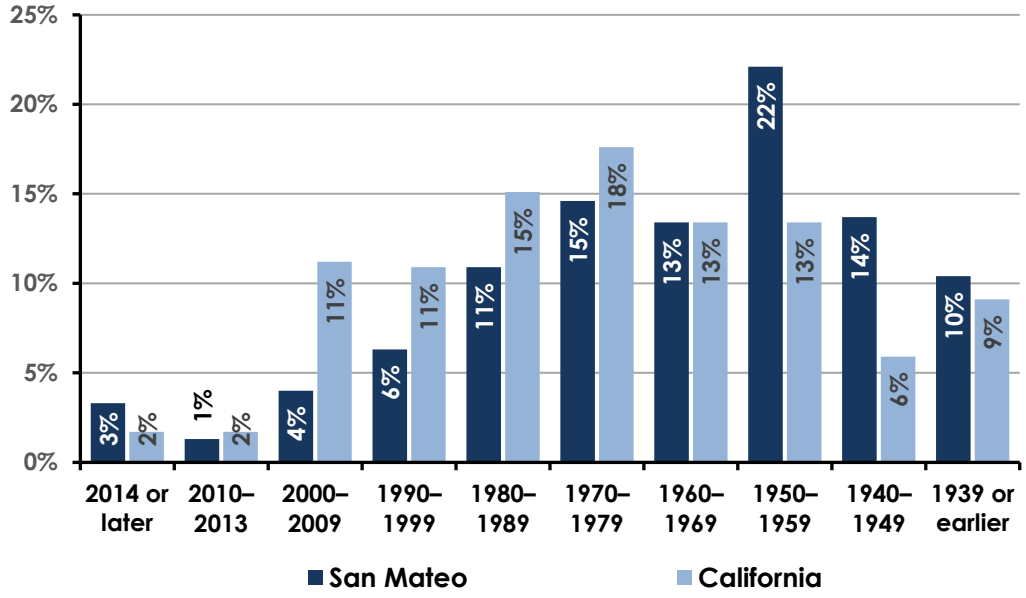
Age of Housing

Understanding the age of housing is essential based on the requirements for smoke alarms in residential occupancies and when building and fire codes were adopted. In addition, older homes tend to need repairs as they age, have older electrical systems which, if neglected, can lead to more fires.

San Mateo

In San Mateo, 40.4% of the housing was built after 1970, which is lower than the state at 58.2%. The highest percentage of housing was built in the 1950s, at 22.1%, as shown in the next figure.

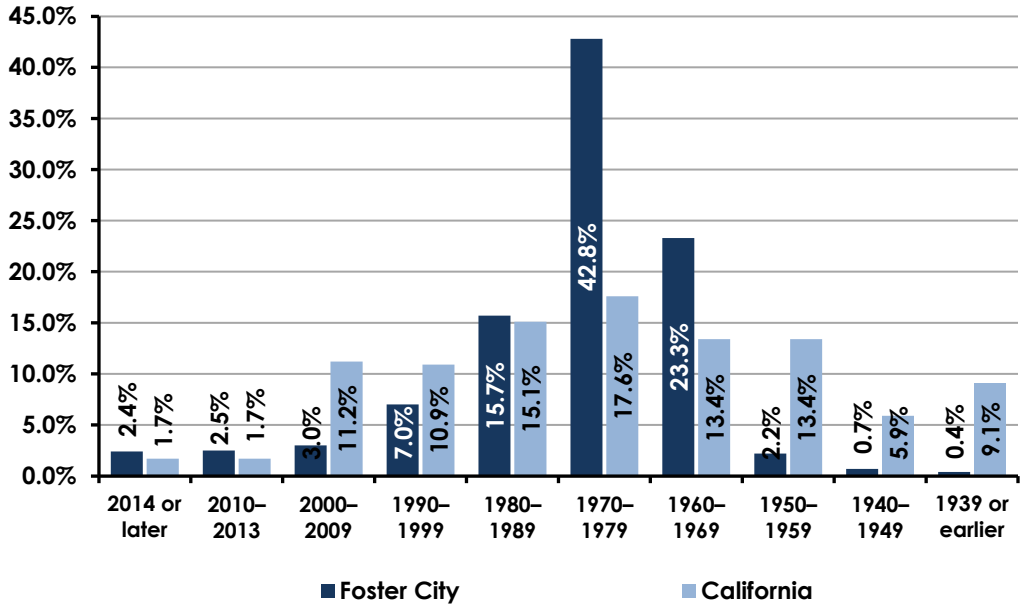
Figure 35: San Mateo Age of Housing



Foster City

Foster City has the highest percentage of housing built after 1970, estimated at 73.4%. The decade with the most housing built was the 1970s. The following figure shows the age of housing in Foster City.

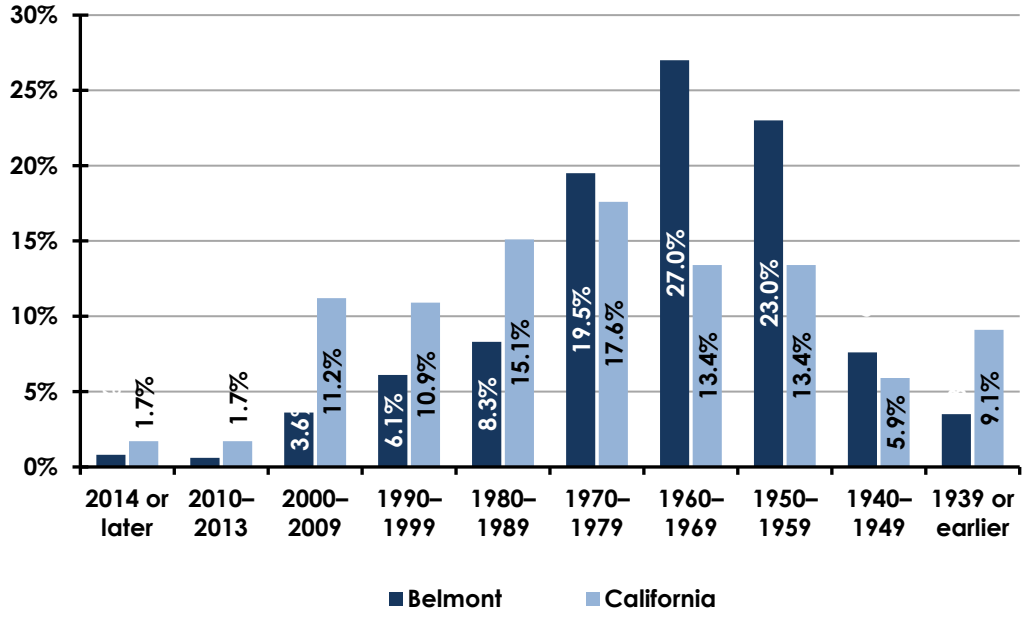
Figure 36: Foster City Age of Housing



Belmont

Belmont's percentage of housing built since 1970 is 38.9%, while more than half occurred in the 1950s and 1960s, as shown in the following figure.

Figure 37: San Mateo Age of Housing

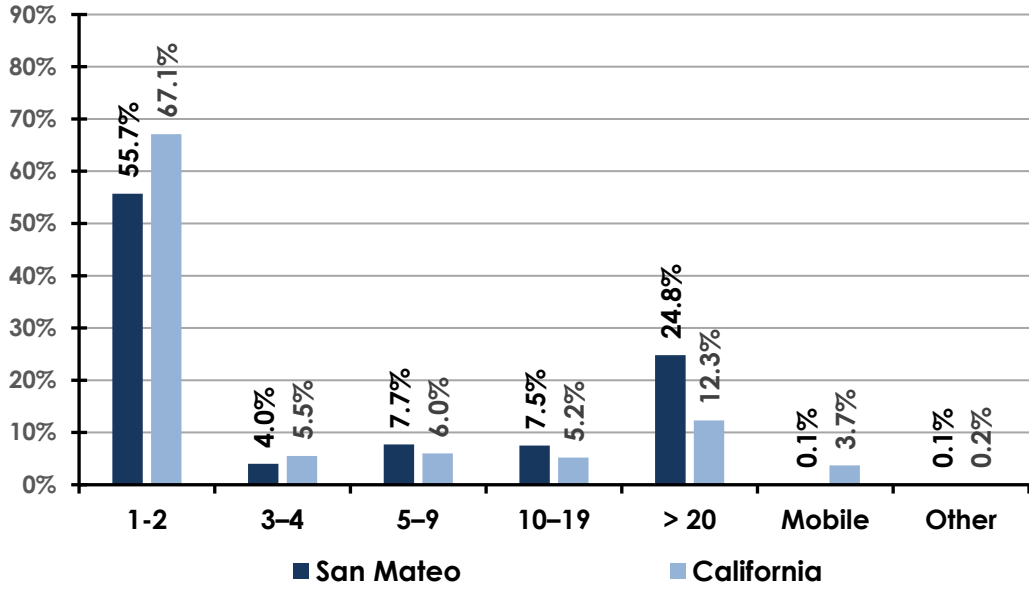


Housing Units

San Mateo

The percentage of people living in one or two-family dwellings in San Mateo is 55.7%, corresponding with a lower number (32.3%) of people living in large multifamily apartment buildings with more than ten units per building. The following figure shows the number of housing units per building in San Mateo.

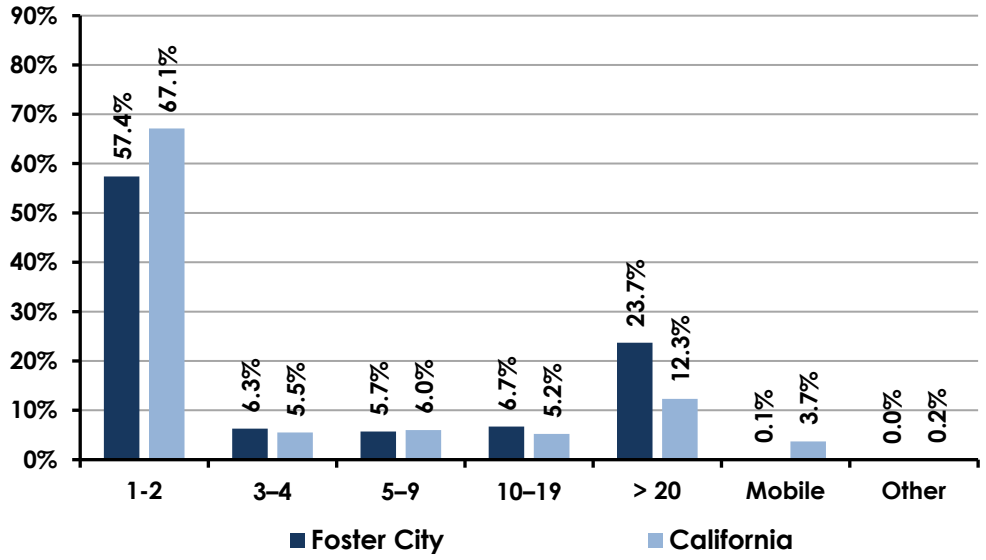
Figure 38: San Mateo Housing Units per Building



Foster City

Foster City has the second-highest number of people living in one or two-family dwellings at 57.4%, lower than California at 67.1%. Nearly 24% live in buildings with greater than 20 units per building. The following figure is the number of housing units per building in Foster City.

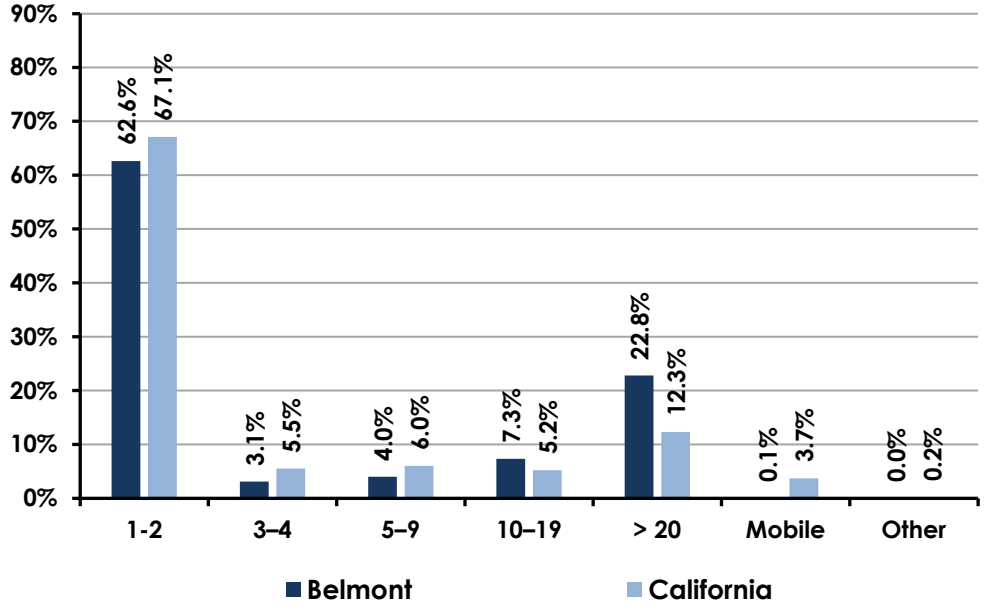
Figure 39: Foster City Housing Units per Building



Belmont

Belmont has the highest percentage of people living in one or two-family dwellings in the SMCFD service area at 62.6%, but still less than the state average at 67.1%. In addition, a high number of people (30.1%) live in buildings with more than ten units. The following figure illustrates the percentage of housing units per building in Belmont.

Figure 40: Belmont Housing Units per Building



Risk Classification

Risk Assessment Methodology

Developing a risk score to determine risks in a community is necessary to provide an organization with a method for creating response protocols for an incident. The Three-Axis Heron model establishes a score by reviewing probability, consequence, and impact factors and assigning a score between 2–8 in each category.[6] A description of the incident types for each risk is in Appendix A.

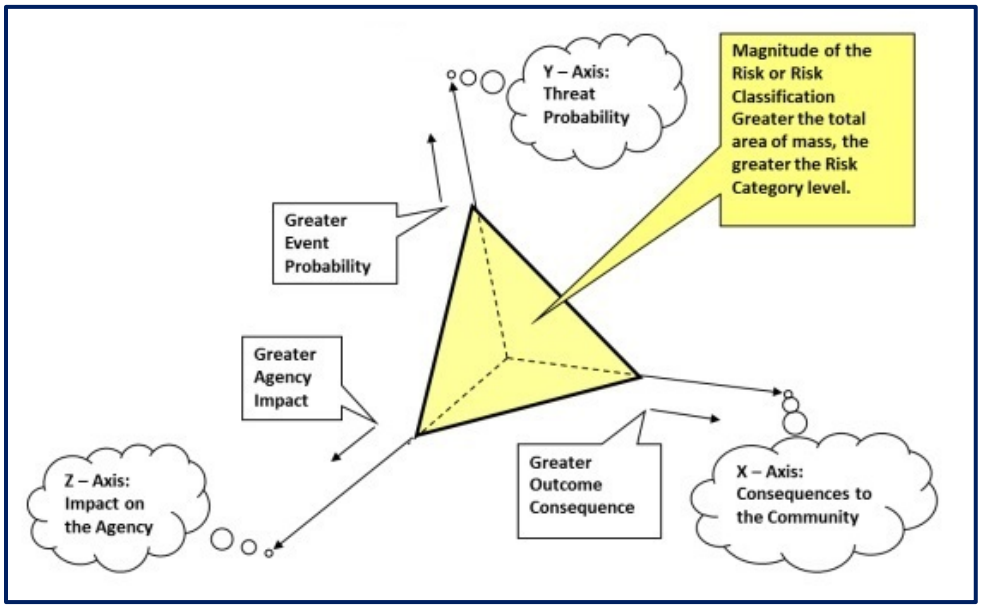
Use of the Three-Axis Heron Formula includes the following equation:

$$\text{Risk} = \sqrt{\frac{(P * C)^2}{2} + \frac{(C * I)^2}{2} + \frac{(I * P)^2}{2}}$$

The risk is graphically illustrated through a three-axis model as follows:

- **P** = Probability (Y-Axis)
- **C** = Consequences (X-Axis)
- **I** = Impact (Z-Axis)

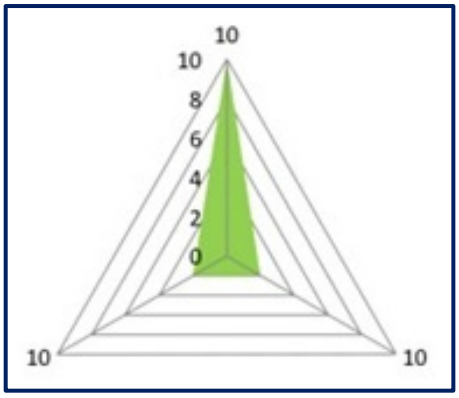
Figure 41: Three-Axis Risk Classification Process



When developing the score, it should be recognized that each of the three scoring components is based on incident data from SMCFD. Although a low risk may have a higher score than a moderate or high risk, the probability is a significant factor in the score. In many instances, the number of low-risk incidents is high, while the consequence and impact on the department are low.

For example, a 31-B call (BLS response low) can be used. The likelihood (probability) of this occurring would be high (occurs multiple times every day) by a factor of 10. The consequence would be minor (affects one person) by a factor of 2. The impact on the Department's ability to respond would be minor (one crew) by a factor of 2. Using the calculator, here is what it looks like: Heron's formula value is 20.2. This equates to a "Low Risk" incident, as shown in the next figure.

Figure 42: Heron's Formula Example



Probability = 10 Consequence = 2 Impact on Department = 2

Probability

Probability is the likelihood of an incident occurring in the community over time. It can range from a rare event to one that occurs often. This axis reflects the probability of a particular type of incident occurring (which contributes to the level of risk). Many factors are considered, such as time of day, location, hazard present, the season of the year, building construction and maintenance, demographic factors, and more. The following figure shows the score, category, and probability of occurrence of an incident.

Figure 43: Probability or Likelihood of Occurrence

Score	Category	Probability or Likelihood
2	Minor	Unlikely–< 0.02% of total call volume. Expected to occur rarely.
4	Low	Possible–0.02%–.07% of total call volume. Expected to occur rarely.
6	Moderate	Probable–0.07&–.3% of total call volume. Expected to occur monthly.
8	High	Likely–0.3%–2% of total call volume. Expected to occur multiple times per week.
10	Extreme	Frequent–> 2% of total call volume. Expected to occur one or more times per day.

Consequence

The consequence of an incident can vary from minor casualties to severe impacts that may destroy historical or major facilities in the community and create a significant loss of employment or life. The following figure lists the community's score, category, and consequence.

Figure 44: Consequence to the Community

Score	Category	Consequence to the Community
2	Minor	1–2 people affected (injuries/deaths). < $10,000 loss
4	Low	3–4 people affected (injuries/deaths). < $500,000 loss
6	Moderate	5–50 people affected (injuries/deaths). $500,000–$1,000,000 loss
8	High	51–100 people affected (injuries/deaths). $1,000,000–$5,000,000 loss
10	Extreme	>100 people affected (injuries/deaths). >$5,000,000 loss

Impact

The third factor in determining the risk is the fire department's impact and the critical tasking needed to control or mitigate an incident. Impact includes the number of emergency responders and apparatus available internally or from external agencies. It measures the department's ability to respond to a given risk or incident while continuing to provide service to the remaining parts of the service area, as shown in the following figure.

Figure 45: Impact on Operational Forces

Score	Category	Impact on Operational Forces
2	Minor	≥ 90% Remaining Apparatus/Crews
4	Low	≥ 75% Remaining Apparatus/Crews
6	Moderate	≥ 50% Remaining Apparatus/Crews
8	High	≥ 25% Remaining Apparatus/Crews
10	Extreme	< 25% Remaining Apparatus/Crews

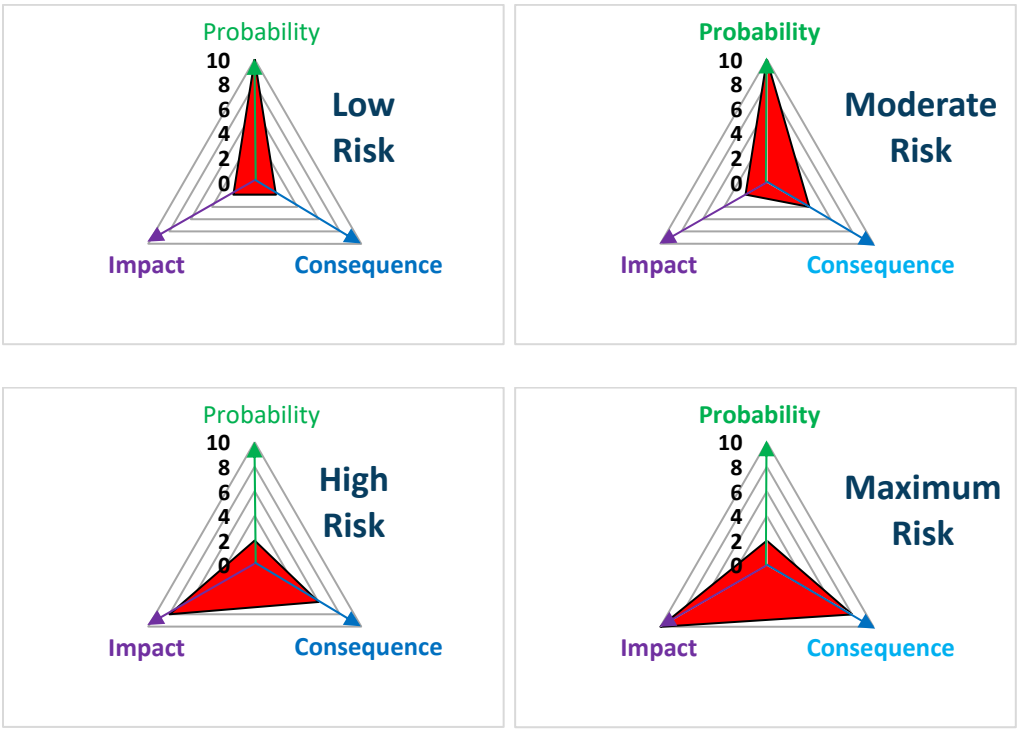
Fire Response

SMCFD is the primary provider of mitigation of fire-related incidents. These range from low-risk incidents such as a vehicle fire to a maximum risk for a fire involving a school. For example, fire risks for a vehicle fire are considered low compared to a maximum risk for a school that houses students. This scoring is applied to four different categories of fire incidents in SMCFD's service area to provide staffing needs to meet critical tasks on the fire ground. The following figures provide the fire response risk assessment scoring and the 3-axis risk classifications.

Figure 46: Fire Response Risk Assessment

Description	Low			Moderate			High			Maximum		
Risk Score	P	C	I	P	C	I	P	C	I	P	C	I
	10	2	2	10	4	2	2	6	8	2	8	10
Score Assigned	20.2			32.1			36.8			59.4		

Figure 47: Fire 3-Axis Risk Classifications



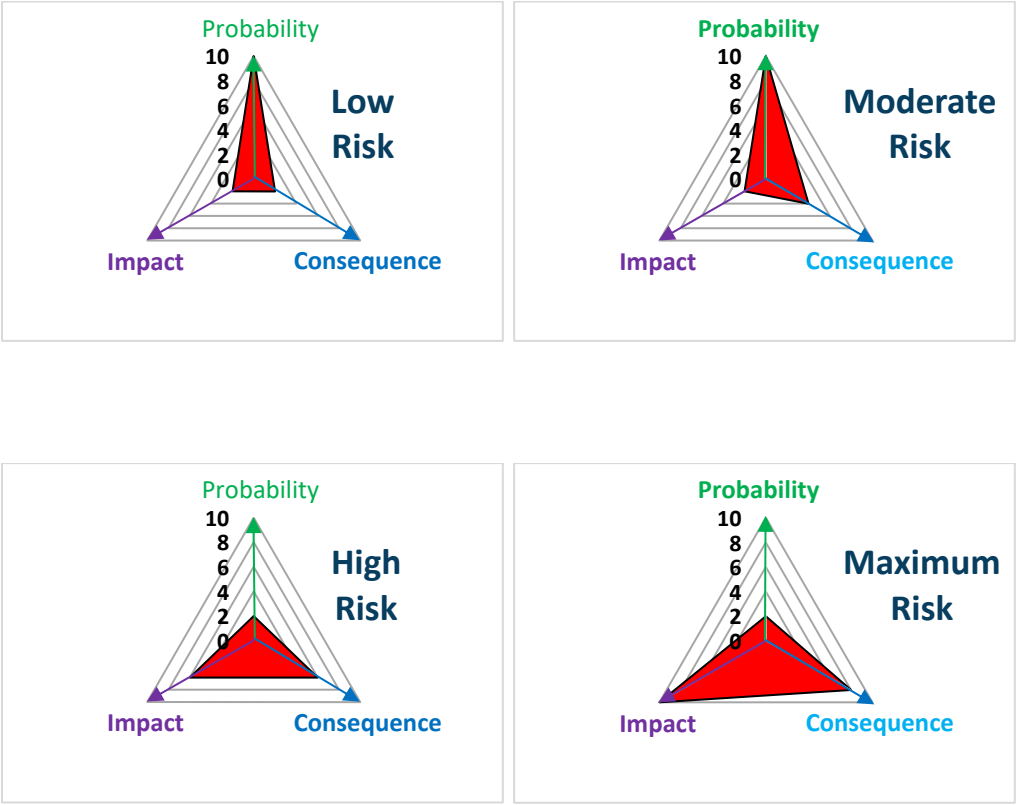
Emergency Medical Services Response

SMCFD provides basic life support emergency medical care in their service area, and AMR provides advanced life support and transport services. Low-risk incidents range from medical assistance to a maximum for an active shooter. The following figures provide the risk score and classifications assigned to each type of EMS risk in SMCFD.

Figure 48: EMS Response Risk Assessment

Description	Low			Moderate			High			Maximum		
Risk Score	P	C	I	P	C	I	P	C	I	P	C	I
	10	2	2	10	4	2	2	6	6	2	8	10
Score Assigned	20.2			23.1			28.1			59.4		

Figure 49: EMS 3-Axis Risk Classifications



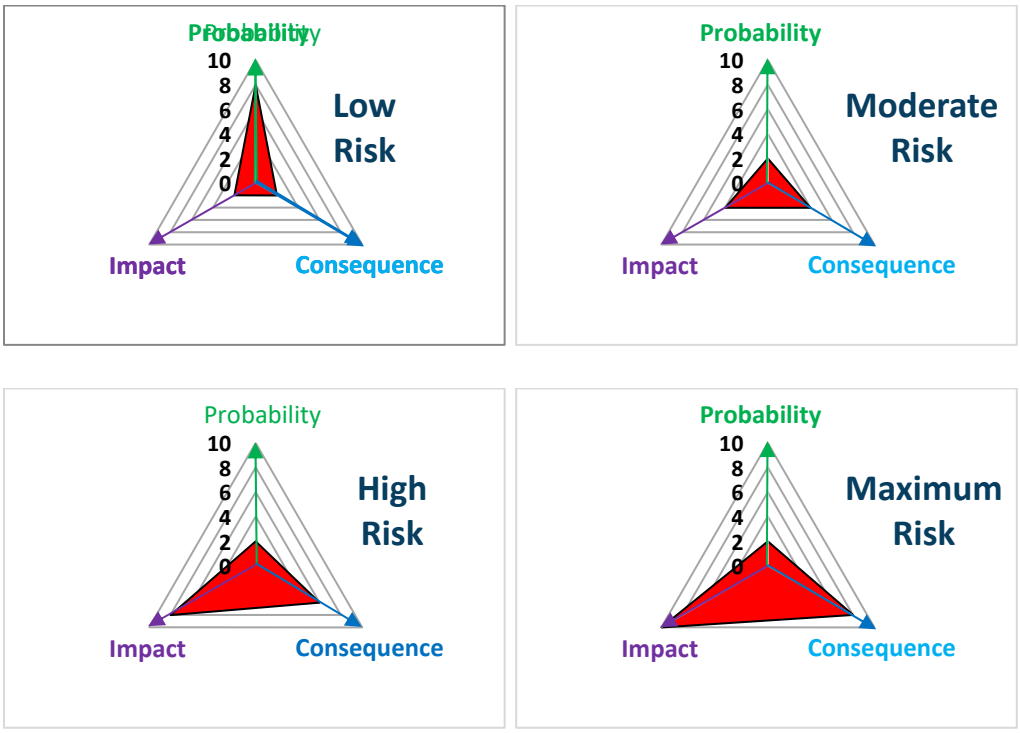
Technical Rescue Response

Rescue services can vary from a low-risk incident, such as accessing a locked vehicle with a child inside, to a confined space incident (maximum) that potentially requires many personnel to mitigate the incident. The following figures provide the risk score and classifications assigned to each type of technical rescue risk in SMCFD's service area.

Figure 50: Technical Rescue Response Risk Assessment

Description	Low			Moderate			High			Maximum		
Risk Score	P	C	I	P	C	I	P	C	I	P	C	I
	8	2	2	2	4	4	2	6	8	2	8	10
Score Assigned	16.2			13.9			36.8			59.4		

Figure 51: Technical Rescue 3-Axis Risk Classification



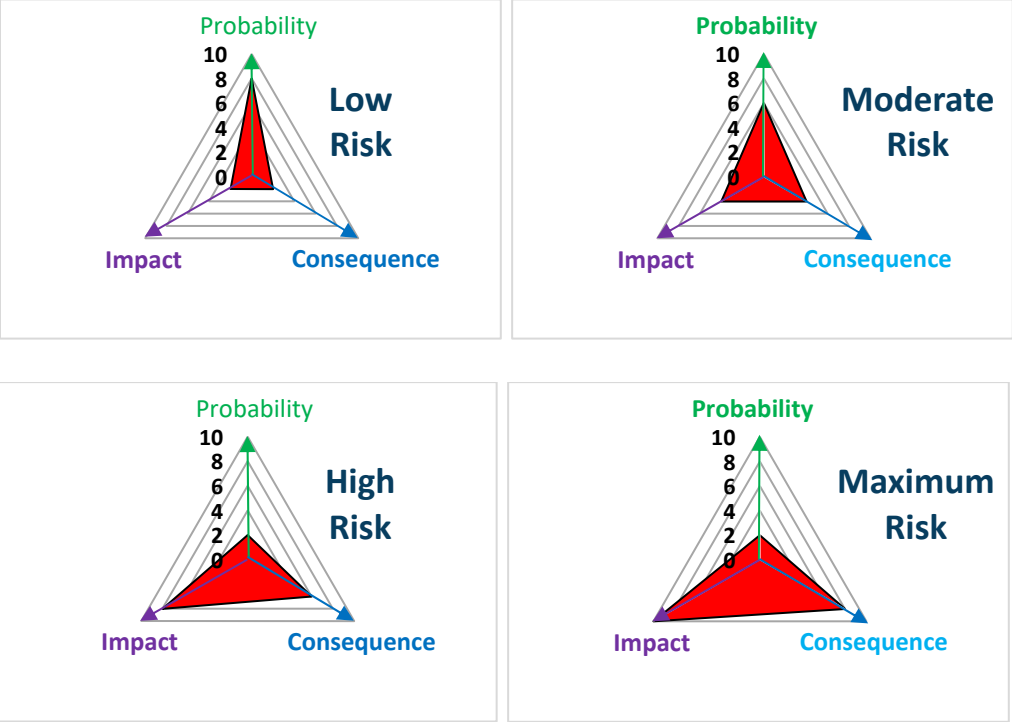
Hazardous Materials Response

Hazardous materials responses can vary from low-risk odor investigations to the maximum risk for a fuel tanker fire in higher populations. Most of these incidents can be managed by SMCFD, but higher risks may need assistance from outside resources. The following figures provide the risk score and classifications assigned to each type of hazardous materials risk in SMCFD.

Figure 52: Hazardous Materials Response Risk Assessment

Description	Low			Moderate			High			Maximum		
Risk Score	P	C	I	P	C	I	P	C	I	P	C	I
	8	2	2	6	4	4	2	6	8	2	8	10
Score Assigned	16.2			26.5			36.8			59.4		

Figure 53: Hazardous Materials 3-Axis Risk Classifications



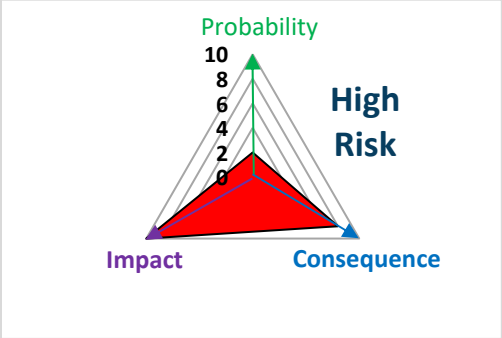
Wildland Fires Response

The types of wildland fire risk vary from small grass fires to large forest fires requiring many internal and external resources. The following figures provide the risk score and classifications assigned to each type of wildland fire risk in SMCFD's district.

Figure 54: Wildland Fires Response Risk Assessment

Description	Low			Moderate			High		
Risk Score	P	C	I	P	C	I	P	C	I
	2	2	2	2	2	6	2	8	10
Score Assigned	4.9			12.3			59.4		

Figure 55: Wildland Fires 3-Axis Risk Classification



Physical Hazards

SMCFD is exposed to various physical or natural hazards daily, such as droughts, flooding, and extreme weather conditions. These hazards may create a situation that threatens a person's physical safety and economically impact the community.

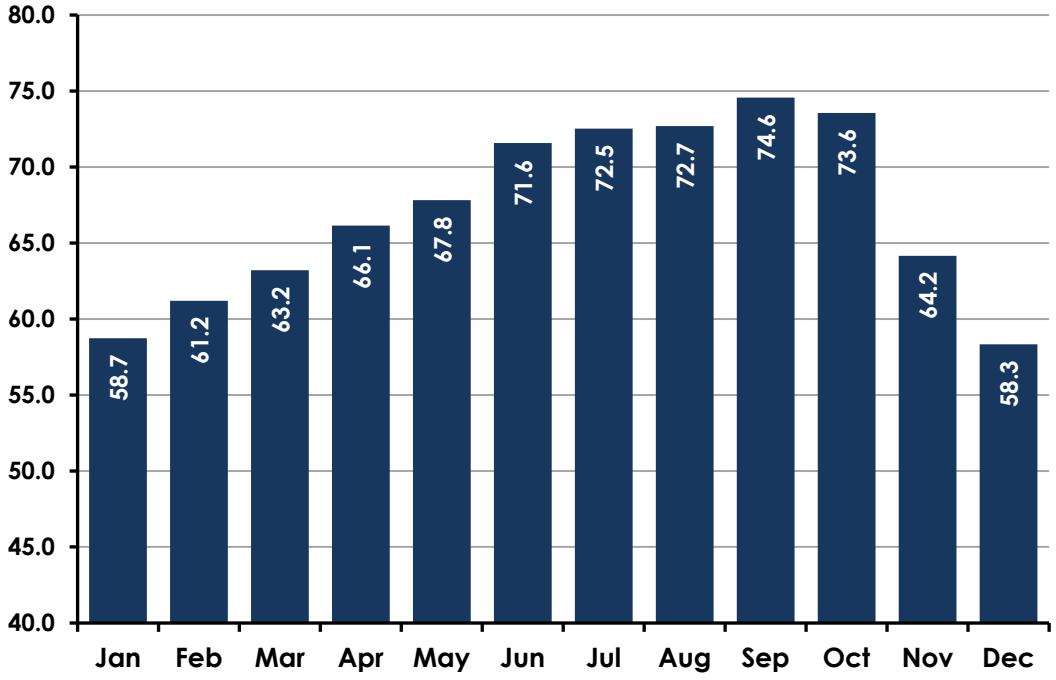
Weather Conditions

How the weather impacts a location varies based on the area's geography. Many factors affect the community, including temperature, precipitation, and wind. San Mateo County climate *"is characterized by dry, mild summers and moist, cool winters."*[7]

Temperature

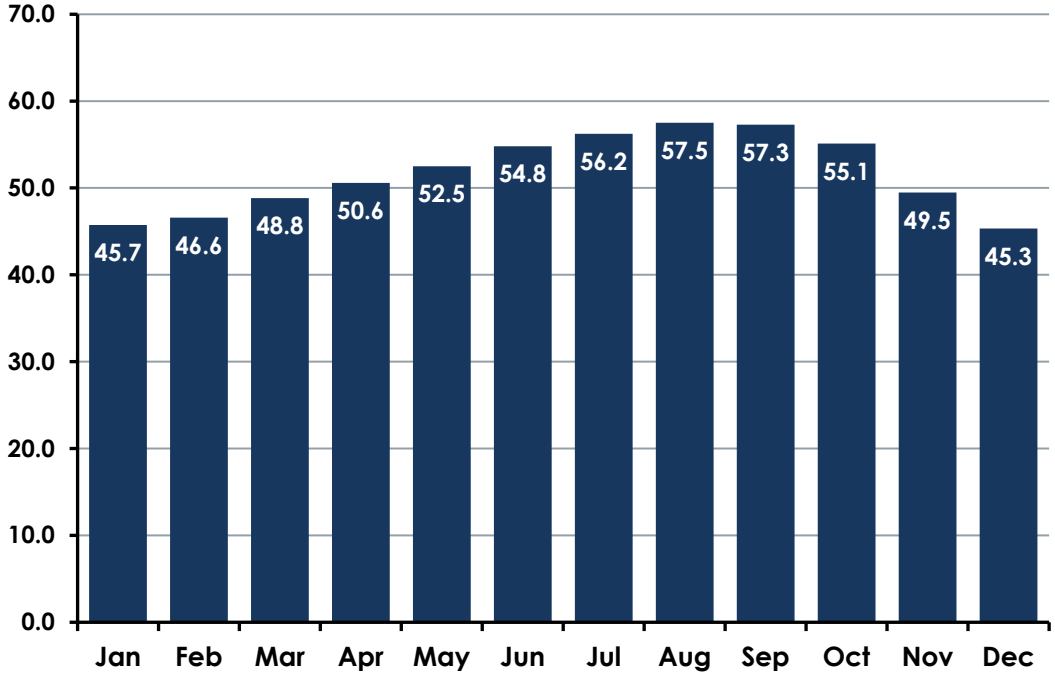
The average daily high temperature in SMCFD is 74.6° F during September, while the low is 45.3 ° F in December. High heat conditions may affect firefighters working an extended incident operation and require outside resources to assist SMCFD. In addition, rehabilitation for operational staff may be necessary to prevent heat exhaustion while conducting fireground operations. The following figure provides the average daily high temperature between 2011 and 2020.

Figure 56: Average Daily High Temperatures (2011–2020)[8]



The following shows the average daily low temperature between 2011 and 2020.

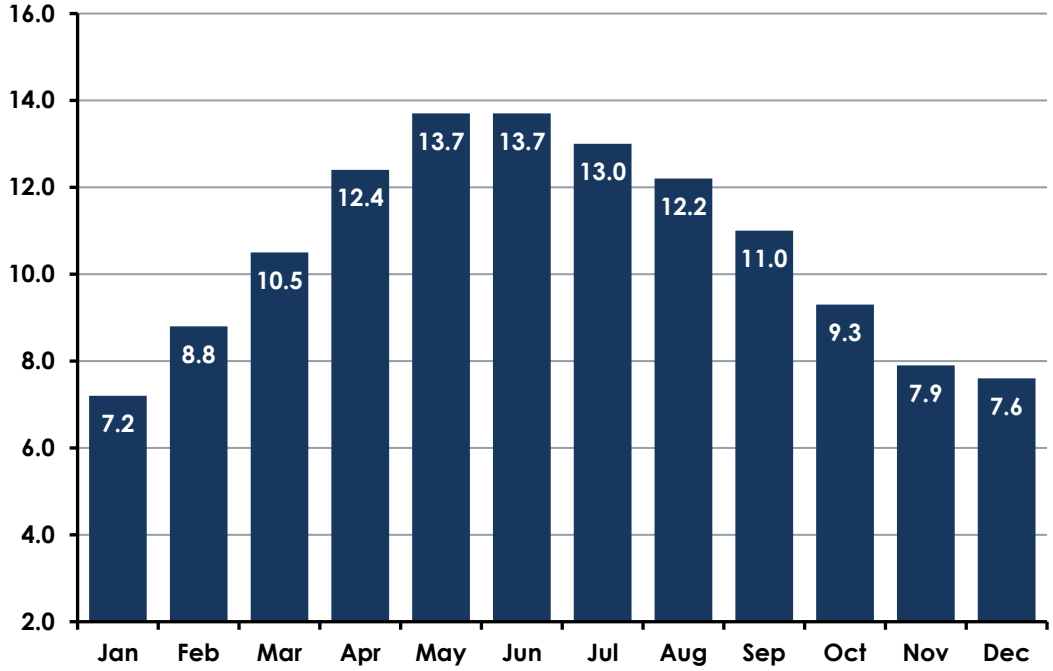
Figure 57: Average Daily Low Temperatures (2011–2020)[9]



Winds

The wind speed and direction may directly impact how SMCFD responds to an incident such as a wildland fire or hazardous materials. The predominant winds are from the west and northwest except in December and January, when the winds vary from all directions. For example, the following figure shows that the highest winds occur during May and June at 13.7 mph, while the lowest is in January at 7.2 mph.

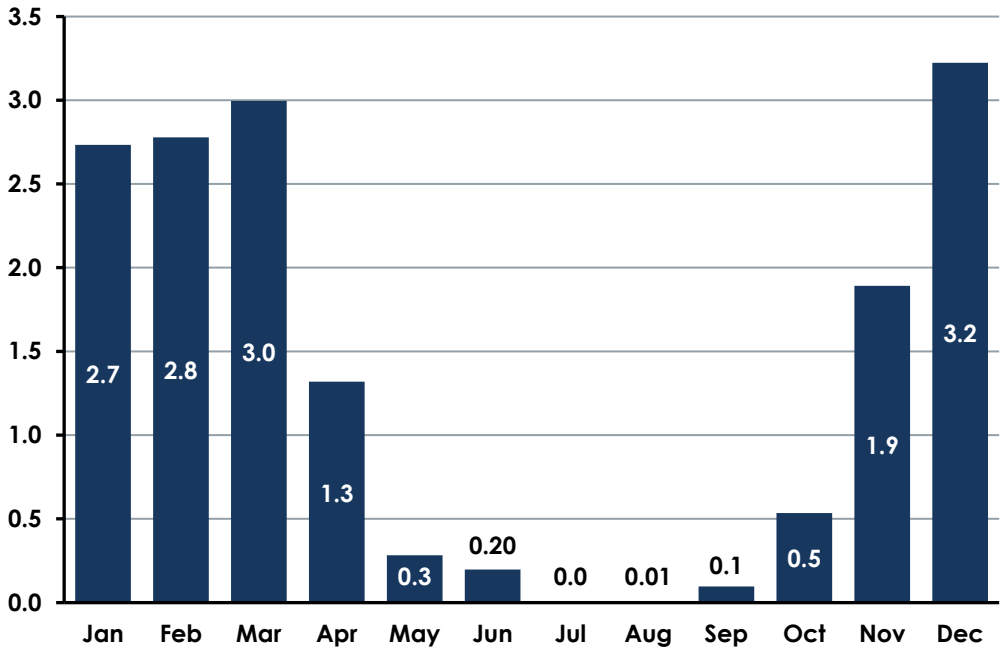
Figure 58: Monthly Average Wind Speeds (2011–2020)[10]



Drought

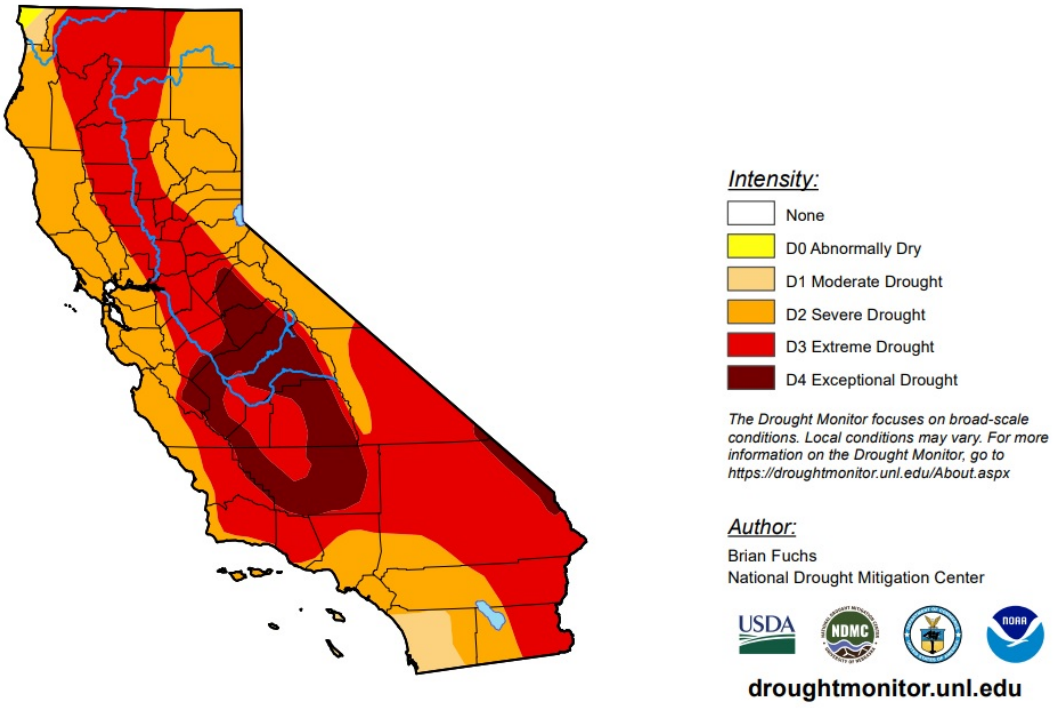
Weather conditions are constantly changing, and the ability to create rain varies during the year. Most rainfall occurs from November through March, with little precipitation during May through August. When a lack of rain occurs, it impacts the ability to grow crops and causes extreme wildfire conditions when vegetative materials dry and their burning rate increases. The following figure is the average precipitation between 2010 and 2020.

Figure 59: Average Precipitation (2010–2020)[11]



The following figure shows the State of California drought condition as of August 2022.

Figure 60: California Drought Conditions (September 2022)



Environmental Hazards

Earthquakes

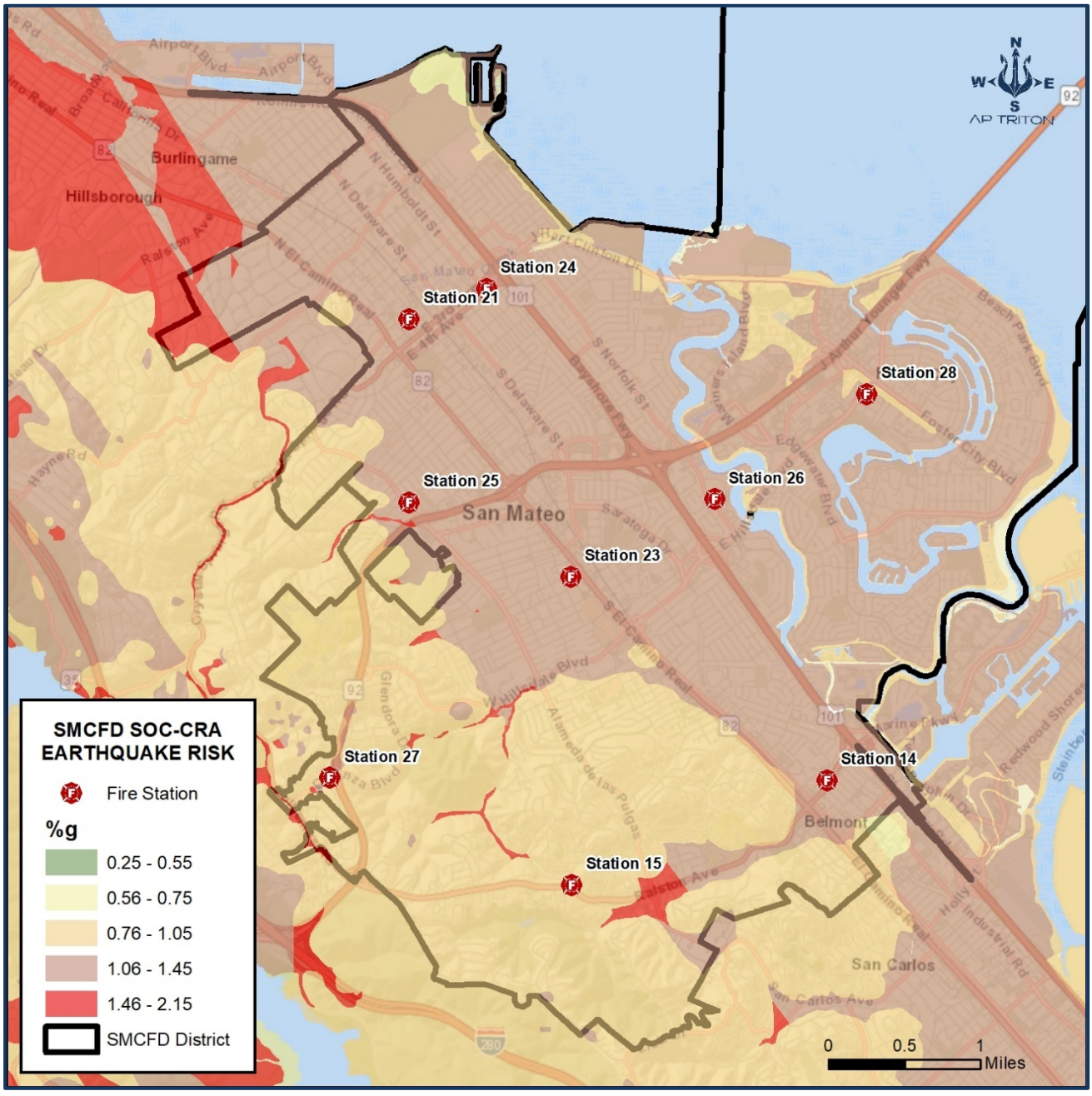
SMCFD is in a high-risk earthquake zone with a four ranking in the 2021 Hazard Mitigation Plan (HMP). The San Andreas Fault travels through the SMCFD service area, stretches more than 800 miles from the Gulf of California to northern California, and has a 21% chance of a 6.7 magnitude or greater earthquake in the next 30 years. The most recent earthquake greater than 5.0 magnitude in San Mateo County occurred in 1957 and was centered near Daly City. The 1906 San Francisco earthquake caused extreme ground shaking, which would occur during a similar event in the community.

Other faults in the area include the Hayward Fault on the east side of San Francisco Bay which has a 31% chance of a 6.7 magnitude earthquake within the next 30 years. In addition, the Haywood Fault is causing more concerns for the region because of its potential impact since it crosses major highways and the Hetch Hetchy Aqueduct. Finally, the San Gregorio Fault is along the western edge of San Mateo County, and there is a 6% chance of a 6.7 magnitude earthquake in the next 30 years.

There is a threat of liquefaction in the SMCFD service area, which occurs when the soil loses its ability to hold its strength, causing damage to buildings if the foundation fails. In addition, if an earthquake's magnitude is high with shaking, it causes more damage to properties. The primary moderate to very high liquefaction areas are along the eastern side of the service area, including all of Foster City.

The following image shows the earthquake risks throughout the SMCFD service area.

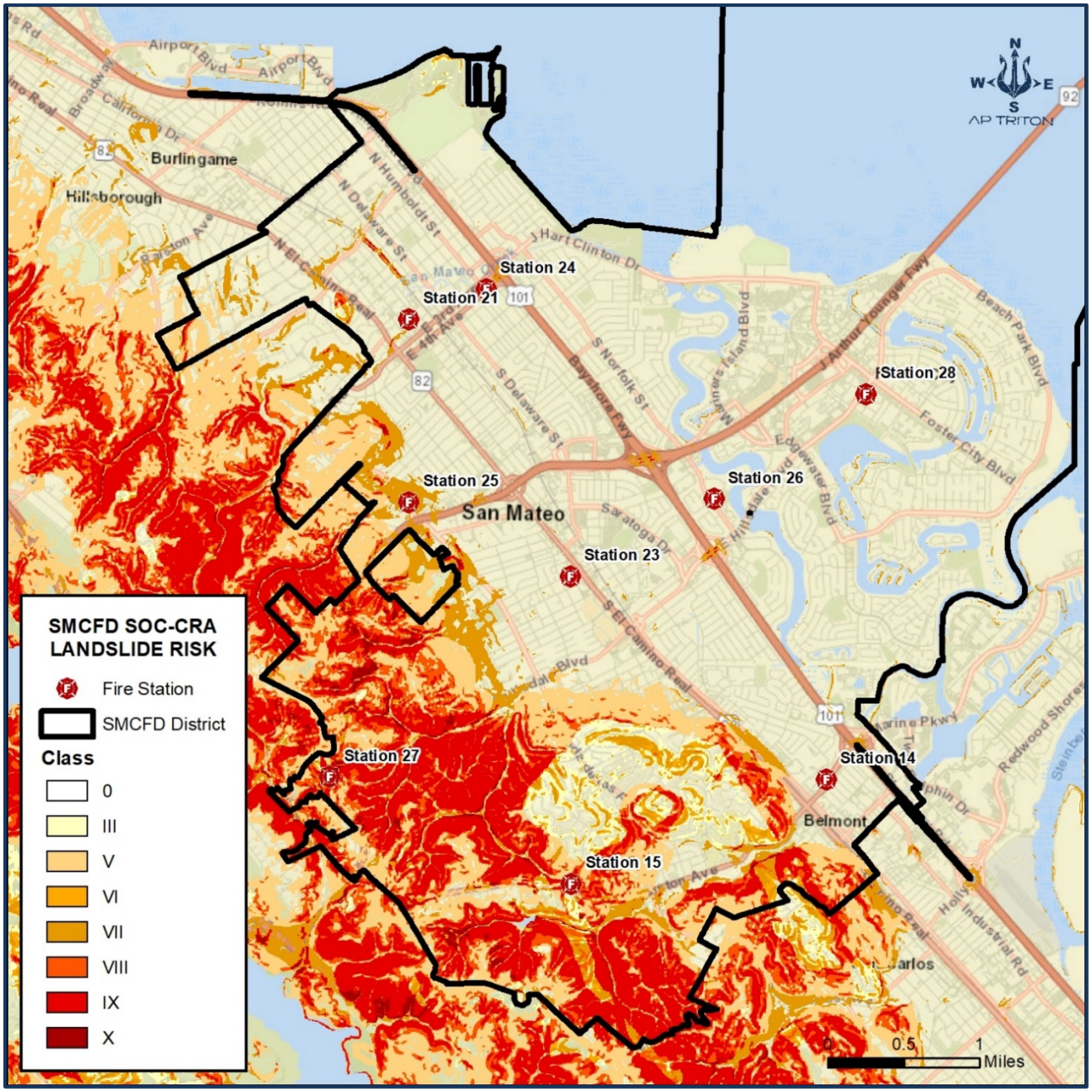
Figure 61: SMCFD Earthquake Risks



Landslides

The risk of a landslide occurring in the SMCFD service area ranks sixth in the HMP. Although the risk is considered high, the primary areas affected are on the western side of the hills. These landslides commonly occur because of a slope failure due to erosion from surface water runoff, mudflows when the water has saturated the ground, debris flows after a wildland fire, or during an earthquake. The following figure shows the landslide risk in the SMCFD.

Figure 62: SMCFD Landslide Risk



Wildland Fires

Wildland fires can create special hazards in a community without proper planning. Reducing the chance of a fire or substantial damage from a wildland fire in the urban interface requires appropriate prevention and mitigation efforts.

Implementing proactive mitigation efforts can reduce the risk of a fire damaging or destroying a building in an urban interface. Removing fuels such as dead trees, plants, grasses, or weeds is a first step for the property owner. This defensible space surrounding the property focuses on vegetated or landscaped areas and how to harden the home or building from fire. The National Fire Protection Association (NFPA) provides information on developing defensible spaces by breaking the property into three zones.[12]

Immediate zone—This area is between 0'–5' from the furthest extent of the building, which is considered non-combustible.

- Clean the roofs and gutters of leaves and pine needles.
- Replace missing or loose shingles to prevent ember penetration.
- Install metal mesh screens around exterior vents to reduce embers from the opening.
- Remove combustible materials from the exterior walls or items stored under decks or porches.

Intermediate zone—This area is from 5'–30' away from the furthest exterior portion of the building.

- Clear vegetation around propane tanks and create fuel breaks using driveways, paths, etc.
- Keep grasses cut to no more than 4" in height.
- Prune trees within 6'–10' from the ground.
- Space trees, so the crowns are separated to prevent a spreading fire.
- Keep trees at least 10' away from a building.
- Maintain shrubs and trees in small clusters on the property.

Extended zone—The area is between 30'–100' from the building.

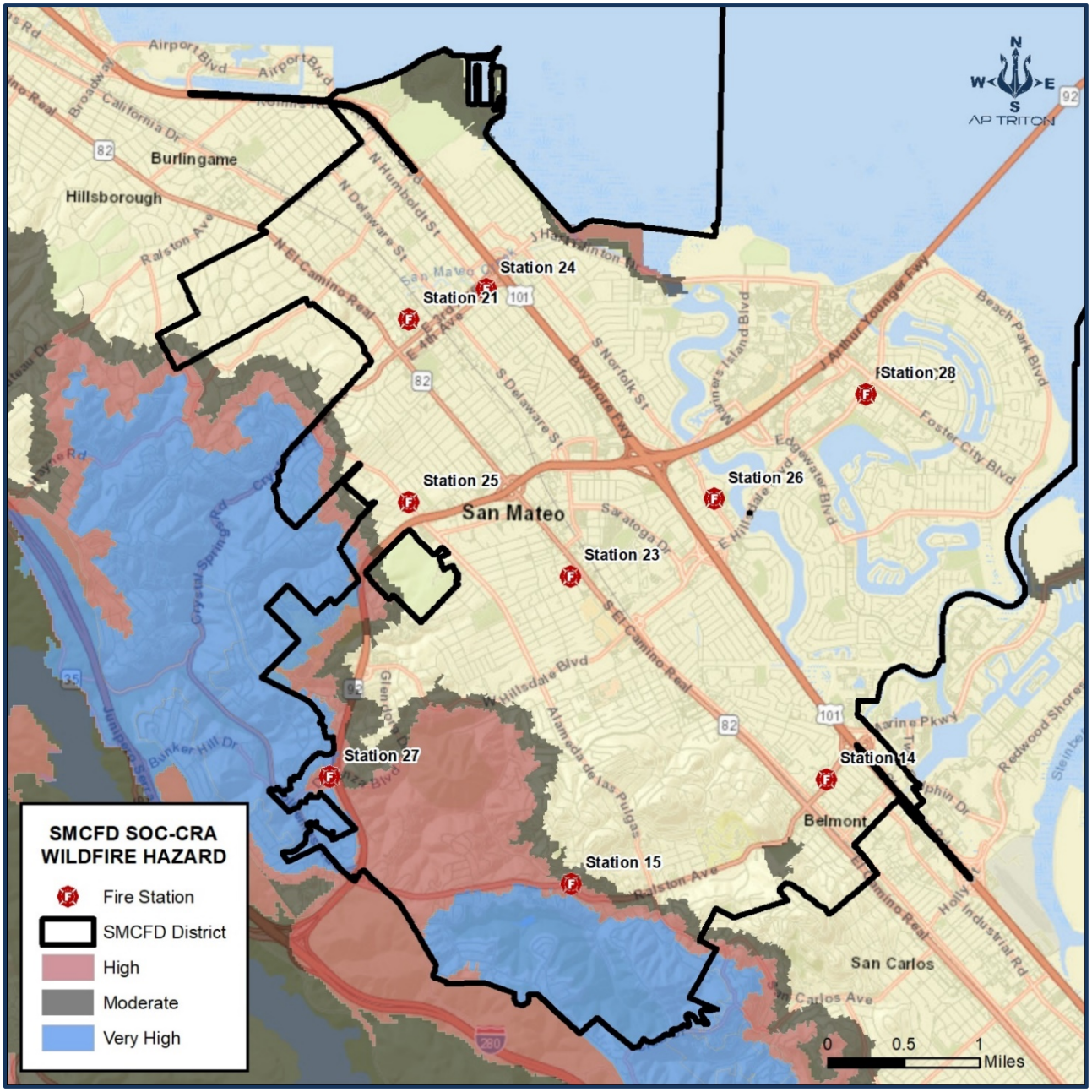
- Remove dense accumulations of dead vegetative material.
- Cut back any small trees growing in developed areas to reduce fuels.
- Remove vegetative material away from storage sheds or other small buildings.

This guidance reduces the impact on a property during a wildfire. Programs have been developed from grant funding to assist homeowners in removing vegetative materials and establishing chipping programs. These programs also reduce risks to firefighters when they respond to a wildfire. Overgrown vegetation can prevent emergency responders from gaining access to the property, thus increasing their risks during the incident.

A leading cause of fire occurs when embers from an advancing wildfire ignite the building even if the surrounding area has taken steps to reduce vegetation around the structure. Hardening the home offers an additional level of protection during a fire. This process reviews how the materials used during construction or when renovating reduce the risk of damage during a wildfire.

Although the overall wildfire threat for the SMCFD is low, there are areas where the urban interface is a higher risk. The 2018 Santa Cruz County San Mateo County Community Wildfire Protection Plan places SMCFD in the "*Bayside*" planning area east of Hwy 280. SMCFD has identified areas of concern bordering Hallmark Drive and Hwy 92. Areas range from high to low risks. SMCFD has created an online map identifying wildland and urban interface risk locations. This map allows residents and business owners to determine if their property is at higher risk. The following figure illustrates the wildland fire risk areas in SMCFD.

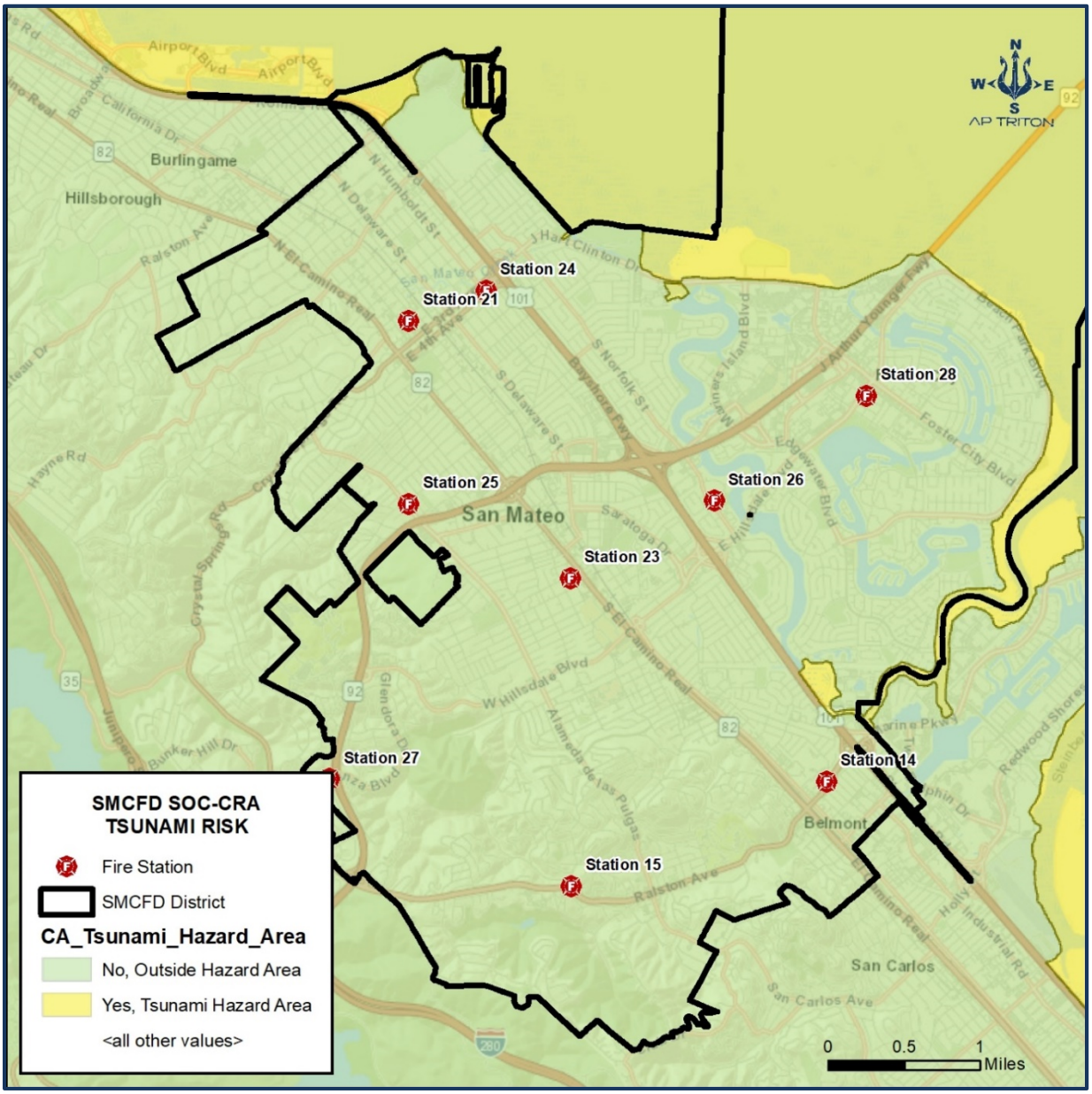
Figure 63: SMCFD Wildland Fire Risks



Tsunami

A tsunami occurs when water shifts by an earthquake, landslides, or volcanic eruptions and creates waves that can impact land areas great distances from the event. The risk of a tsunami in SMCFD is low and ranked the lowest score of three in the 2021 San Mateo County Multijurisdictional Local Hazard Mitigation Plan (HMP). Areas at the highest risks are along the coast and into the Belmont Slough. The following figure provides the tsunami inundation map.

Figure 64: SMCFD Tsunami Inundation Map



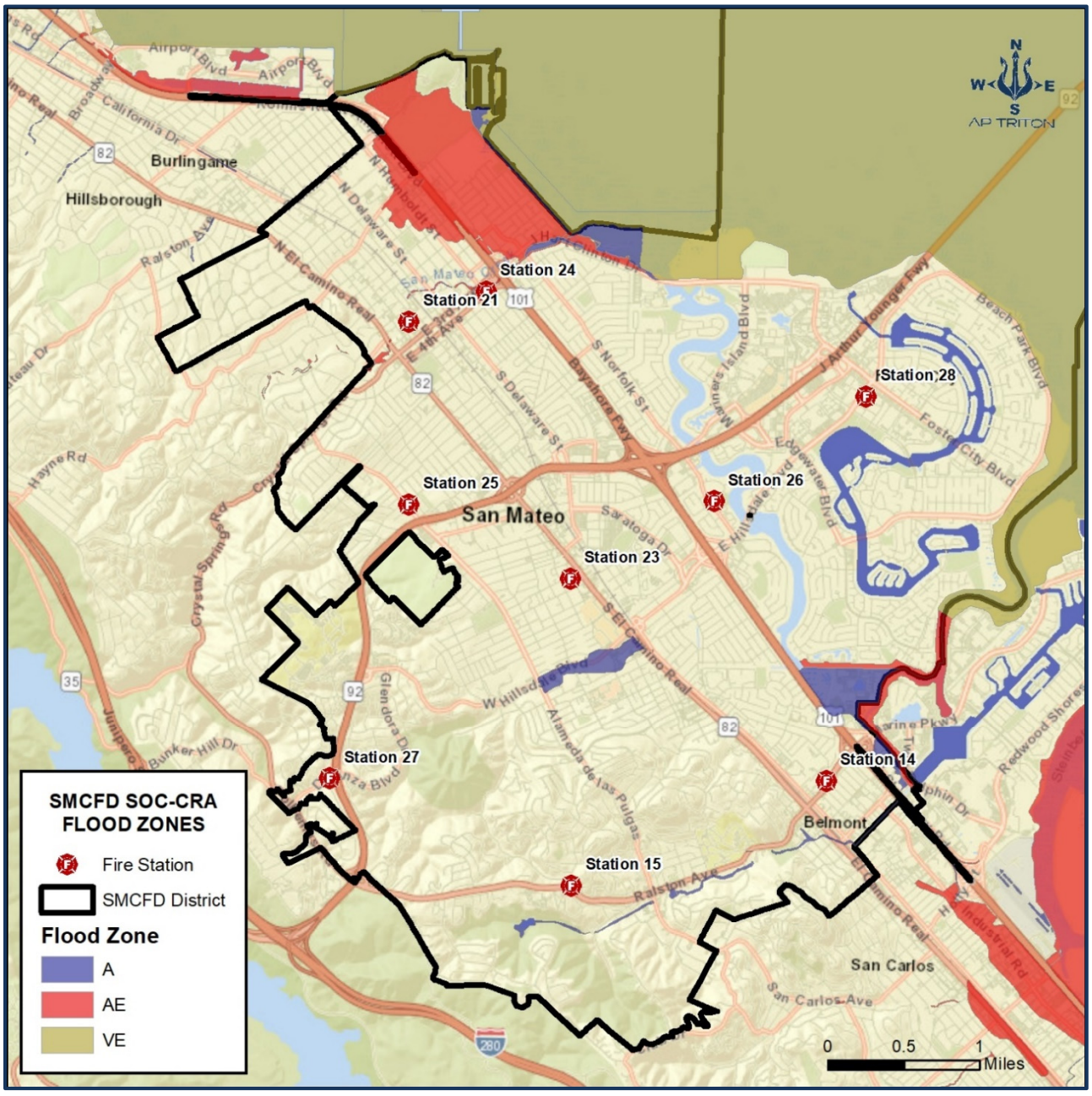
Flooding

Portions of SMCFD are in FEMA flood zones along the coast and small tributaries that flow into the San Francisco Bay. The 2021 HMP classifies flooding as the highest risk, with a score of 117. Flooding from sea level rise and climate change contributes to this risk and is the second-highest hazard for SMCFD.

According to FEMA's website, there are "AE" regulatory floodways in SMCFD. The AE designation is considered "*areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods*." and is further defined as a 26% chance of a flood occurring in 30 years. An area classified as an "A" zone is exposed to a 1% chance of a flood event but does not have a "…*detailed hydraulic analysis*." Zone "AH" is subject to a 1% chance of shallow flooding where ponding may occur with average depths of 1'–3' and base flood elevations resulting from a detailed hydraulic analysis. Zone "VE" areas are along the immediate coast and are "… subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action."

The following figure shows the flood zones in the SMCFD service area.

Figure 65: SMCFD Flood Zones



Technological (Human-Caused) Hazards

Events that occur without warning or are unknown and suddenly appear are considered technological hazards. Examples include industrial accidents or hazardous chemical releases. Each community should create contingency plans for the specific risks in their jurisdiction. These plans may include permitting, periodic fire and life safety inspections, and pre-incident planning. These activities are designed to reduce risks and provide on-site visits for fire department personnel.

If a building or facility has been identified that stores or produces hazardous materials, it may require special personal protective clothing and equipment to control or mitigate the event. Locations with hazardous materials on-site during the year exceeding the limits established by the Environmental Protection Agency are required to file Tier II reports. These reports provide local jurisdictions, local emergency planning committees, and the State's Emergency Response Commission as required by the Emergency Planning and Community Right-to-Know Act of 1986, also known as SARA Title III. These thresholds require submission:

- Ten thousand pounds for hazardous chemicals
- Lesser than 500 pounds or the threshold planning quantity for extremely hazardous chemicals

California requires additional reporting quantities through a five-tier system that authorizes the treatment and storage of hazardous waste.

Land Use

The concept of land use regulation provides attractive social and environmental outcomes to assist in managing development efficiently. Land use for a community is designed to classify properties within a geographical area generally under governmental control. Zoning areas may vary from one portion of the service area with a mixture of low-, moderate-, and high-risk properties.

- Low Risk: Areas zoned for agricultural purposes, open spaces, low-density residential, and other low-intensity use.
- Moderate Risk: Areas zoned for medium-density single-family properties, small commercial and office uses, low-intensity retail sales, and similarly sized business activities.
- High Risk: High-intensity business districts, mixed-use areas, high-density residential, industrial, storage facilities, and large mercantile centers.

Each of the three municipalities has developed a General Plan to assist the cities in developing a balanced approach for future growth. All General Plans must meet state requirements and cover land use, circulation, housing, safety, open space, conservation, and noise.

The most recent General Plan for San Mateo was approved in 2010 and is currently under review for a major update. The city began significant growth in the 1940s, and by 1960 the population was just less than 70,000. Population growth began to slow in the 1970s and 1980s. Still, commercial development expanded faster and changed San Mateo from a bedroom community to a more urban one with important subregional offices and retail centers.

Foster City updated its General Plan in 2016. Initially planned as a residential community, the city has strived to provide more balanced development for its citizens. Commercial and office development allows the citizens who work in the community not to have long commute times, increasing the tax base.

Approximately 46% of existing land use is residential, while commercial and industrial is 16%. The remaining is recreational or open space, streets, and public facilities. Some of the goals for future land use include; preserving the quality of residential neighborhoods, promoting proper site planning, maintaining a variety of land uses, diversifying circulation needs (emergency vehicles, bicycles, public transit, vehicles), providing adequate parking, and reinforcing the Metro Center as a citywide focal point.[13]

In 2017, Belmont updated their General Plan and focused on development as the city built out the remaining vacant land. Most residential areas are west of El Camino Real, and commercial development is east of El Camino Real. Residential land use comprises 46%, while commercial, office, and industrial is 7%. Vacant land is 8%, and the remaining is rights-of-way, parks and open space, and public and community facilities. The primary strategies of the general plan include; preserving existing neighborhoods and maintaining a high quality of life, creating a vibrant downtown village, focusing on economic growth in key areas, enhancing connectivity, improving infrastructure, the commitment to parks, recreation, and open space, and protection of natural hazards.[14]

General Plans promote planned growth in communities based on input from its citizens and business owners. SMCFD should maintain relationships with all three cities to ensure they are familiar with future community growth and its impact on the department.

The following figures show the current zoning for San Mateo, Foster City, and Belmont.

Figure 66: San Mateo Zoning

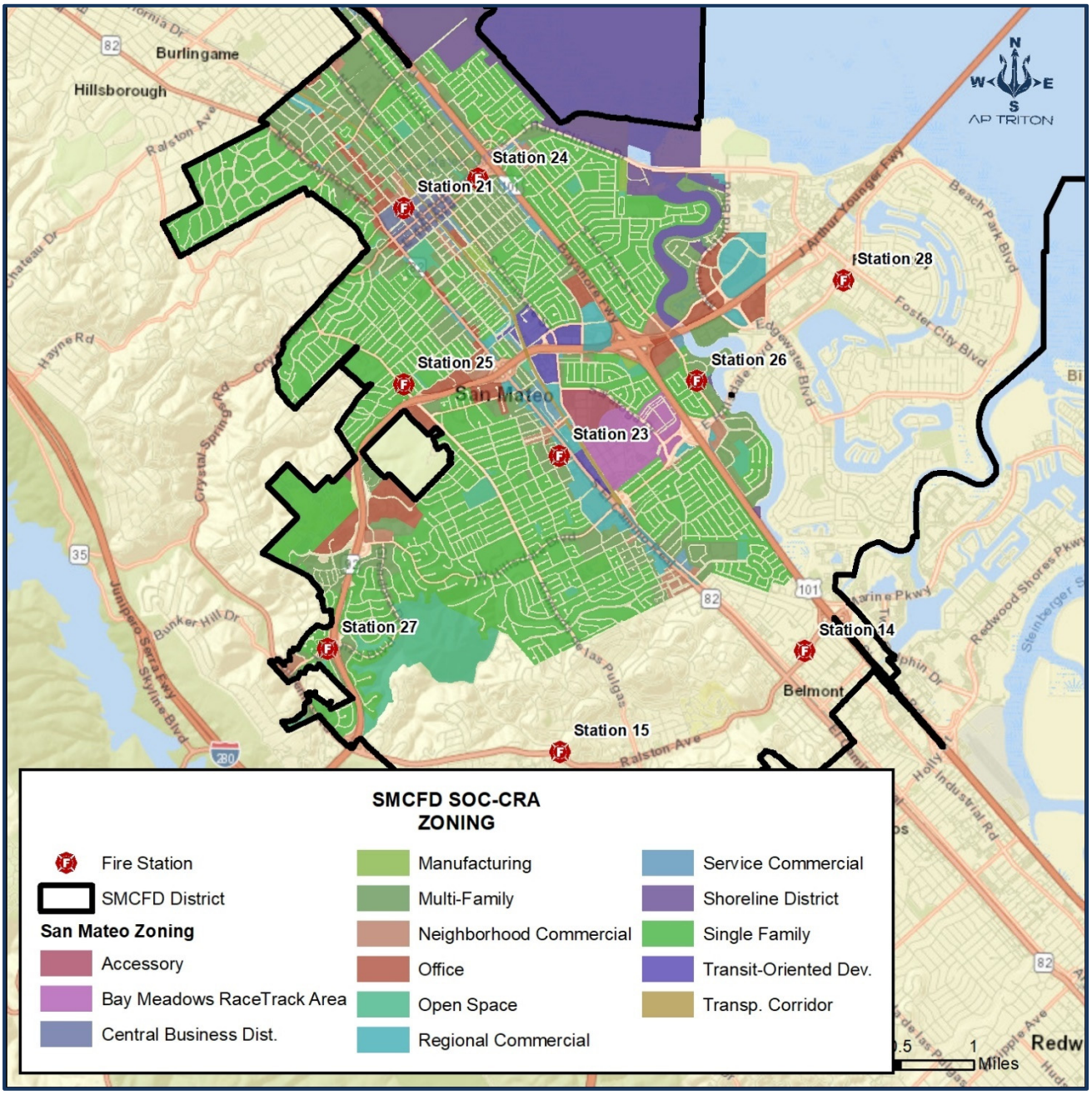


Figure 67: Foster City Zoning

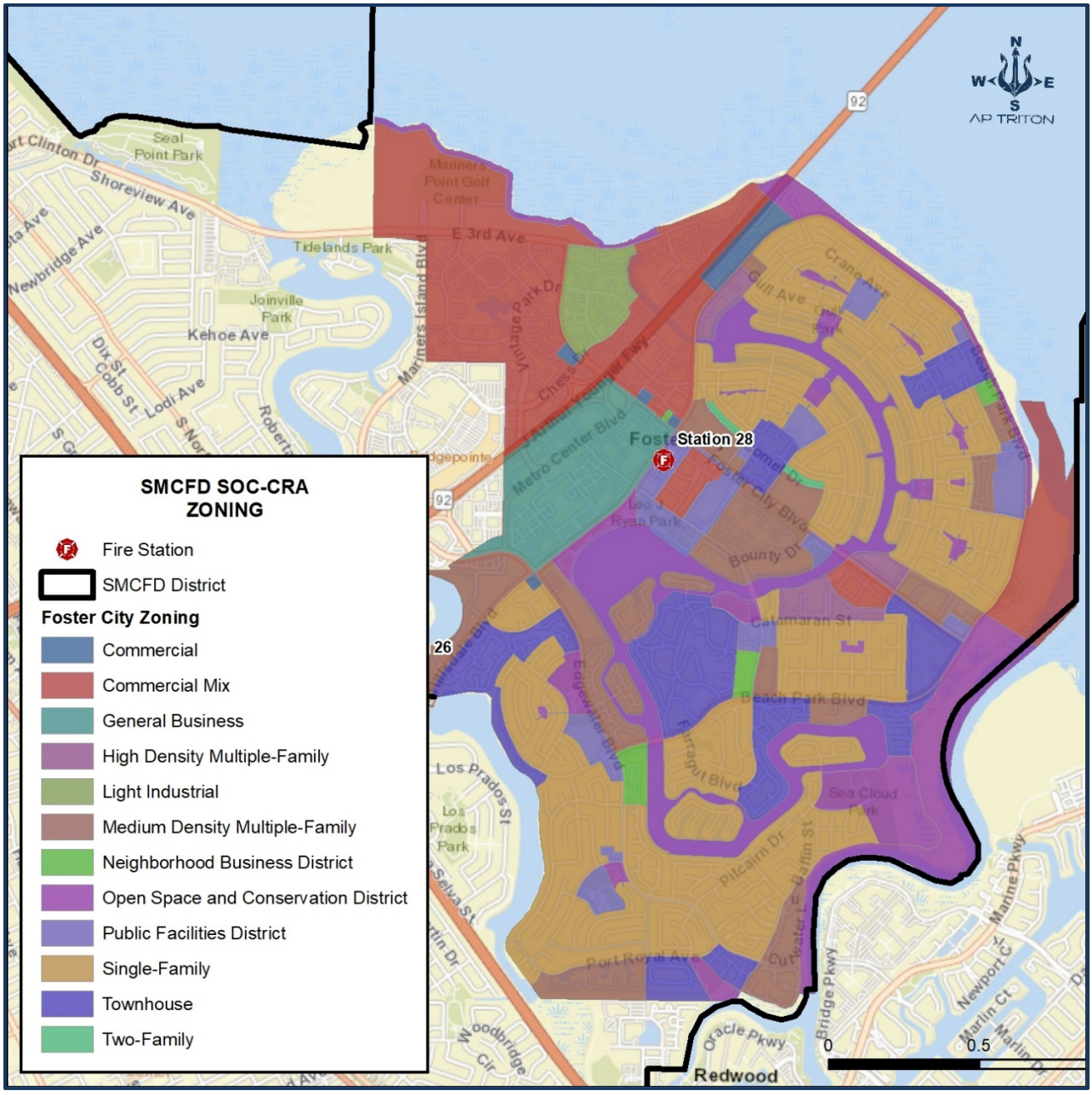
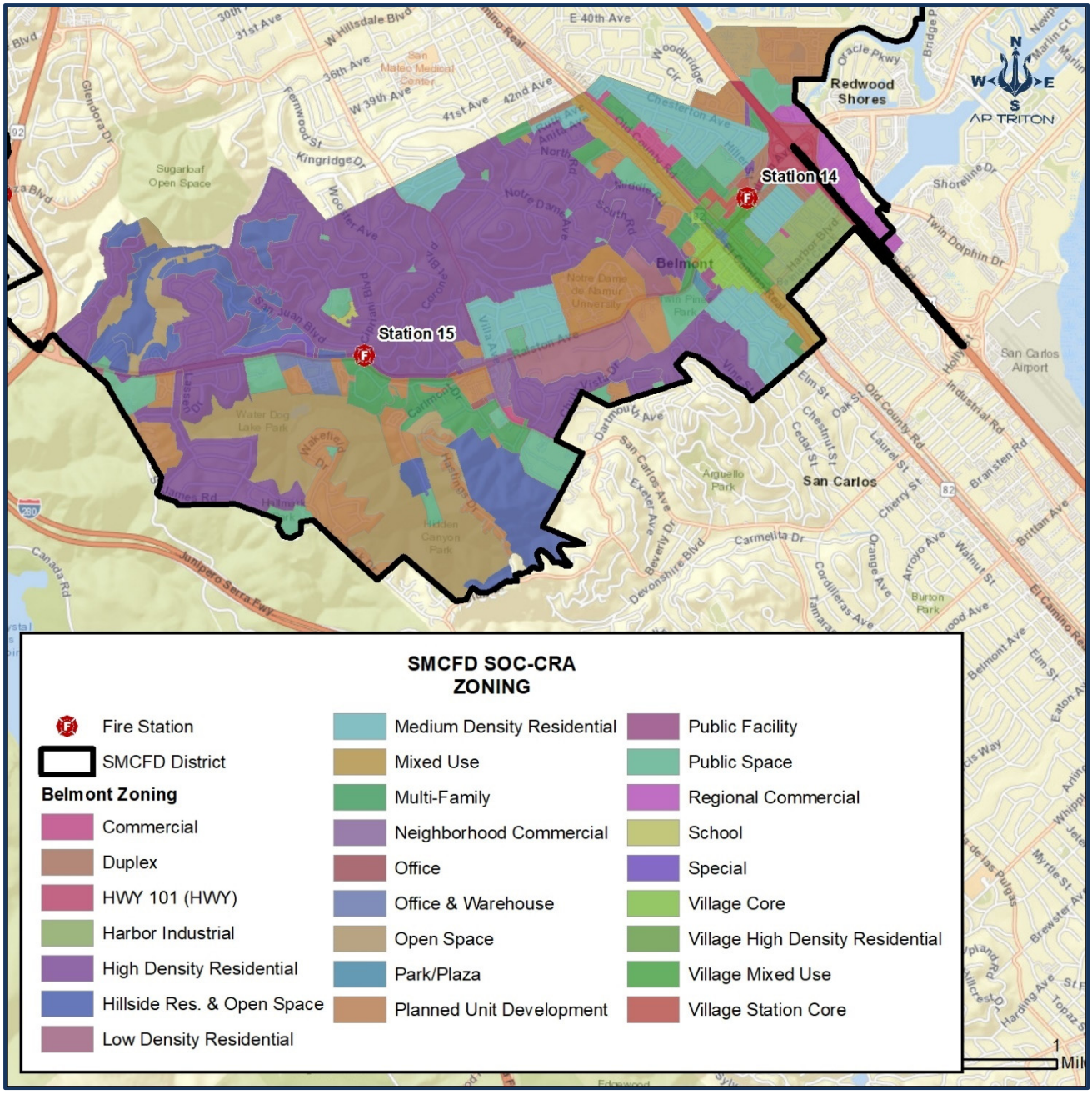


Figure 68: Belmont Zoning



Physical Assets Protected

Structural Risks

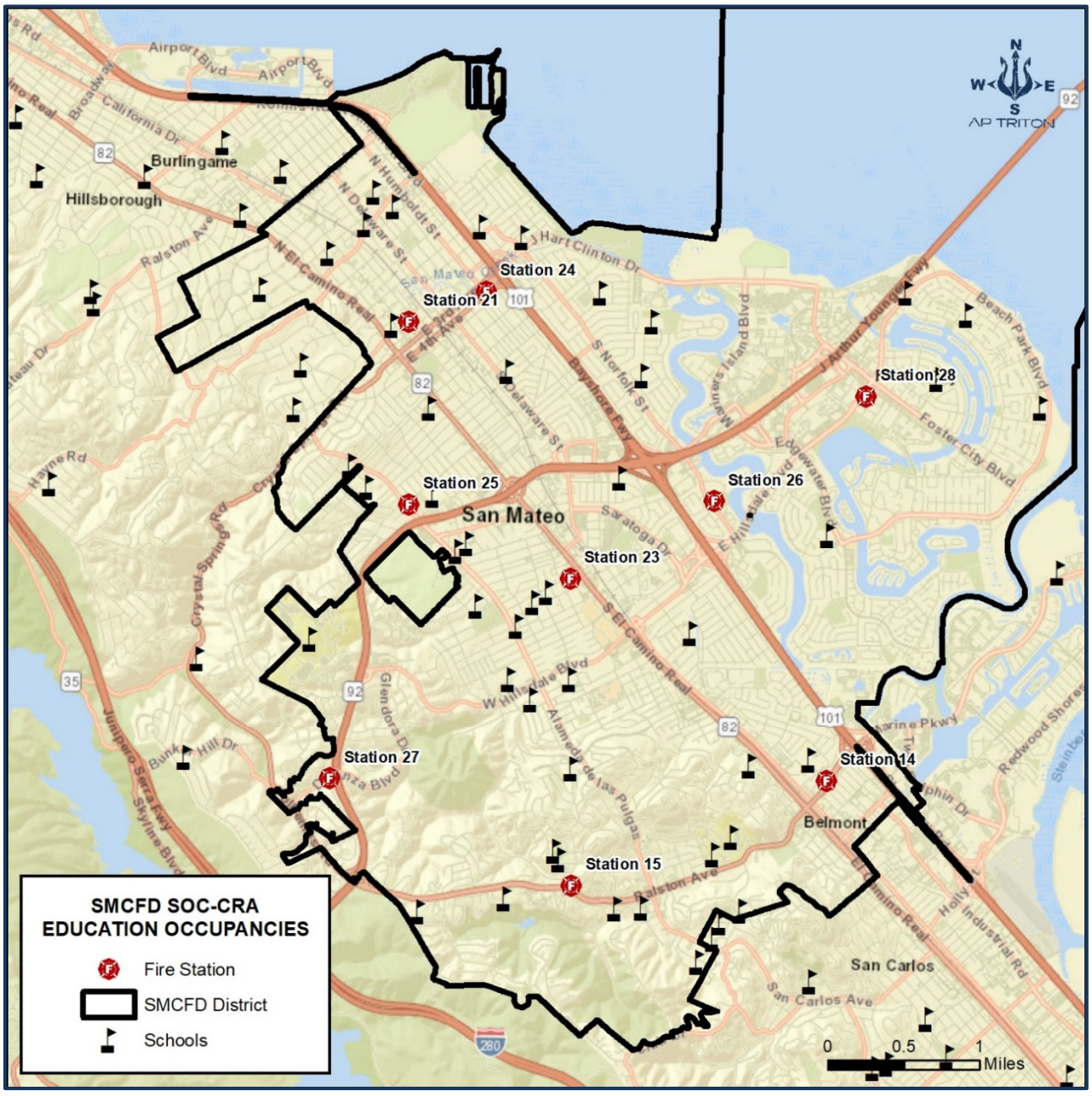
Fires occurring in buildings can present responding personnel with special or unique problems. Many different types of occupancies may exist in a response area, and SMCFD should have a comprehensive pre-incident planning process to develop strategies and tactics during a fire or other emergency.

Educational

Whether public or private, schools pose a threat and should be considered a primary target hazard in the community. These locations may contain many students and school staff during operating hours in a small area. These facilities should be familiar to emergency responders and maintain up-to-date pre-incident plans.

The following figure shows the location of schools in the SMCFD service area.

Figure 69: SMCFD Schools



Childcare Facilities

Childcare facilities create unique risks. Infants and pre-school-age children require additional attention because of their inability to self-evacuate during an emergency. Childcare workers must assist them in leaving the building or physically removing them.

Assembly

Assembly occupancies are at higher risk because of the number of people allowed to gather for worship, entertainment, or special events in a single location. Special events include large sporting venues or outside festivals. In addition, each of these occupancies or locations may require many emergency responders during an incident involving a fire or an active shooter.

Significant outdoor events may require submission of a public safety plan to include emergency vehicle access and egress, fire protection, emergency medical services, public assembly areas, directing of vehicular traffic and attendees, vendor, and food concessions, need for law enforcement, fire, or EMS personnel, and weather monitoring.

Hospitals & Medical Facilities

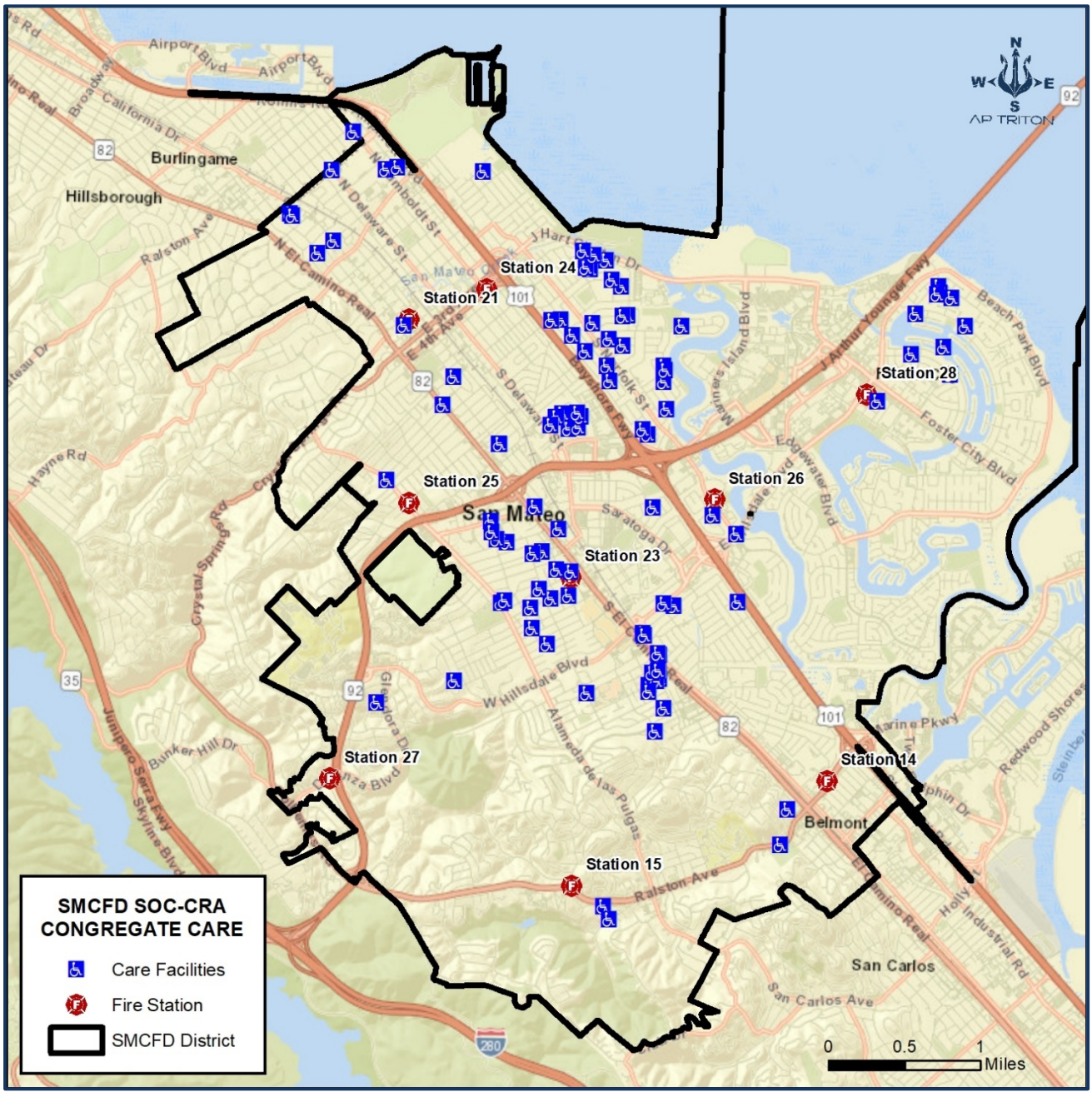
A primary service for any community is providing medical care to its citizens. The inability of patients to self-evacuate during an emergency places hospitals and medical facilities at a higher risk. These buildings require additional built-in fire protection features such as a fire alarm or sprinkler systems to protect the occupants. Medical offices or facilities may not require the same fire protection requirements as a hospital, but the occupants may need similar assistance during an evacuation.

Congregate Care Facilities

The need for a higher level of care may require older adults or those with physical or cognitive conditions a facility to care for their needs. Their level of care may involve staff assisting in an emergency where an evacuation is necessary; thus, proper planning by staff and SMCFD is essential. Special locking arrangements for areas where patients with dementia or Alzheimer's are living are allowed to prevent them from leaving the facility. These locations require additional fire protection systems to protect the occupants, like a hospital.

The following figure show the location of congregate care facilities within the SMCFD service area.

Figure 70: SMCFD Congregate Care Facilities



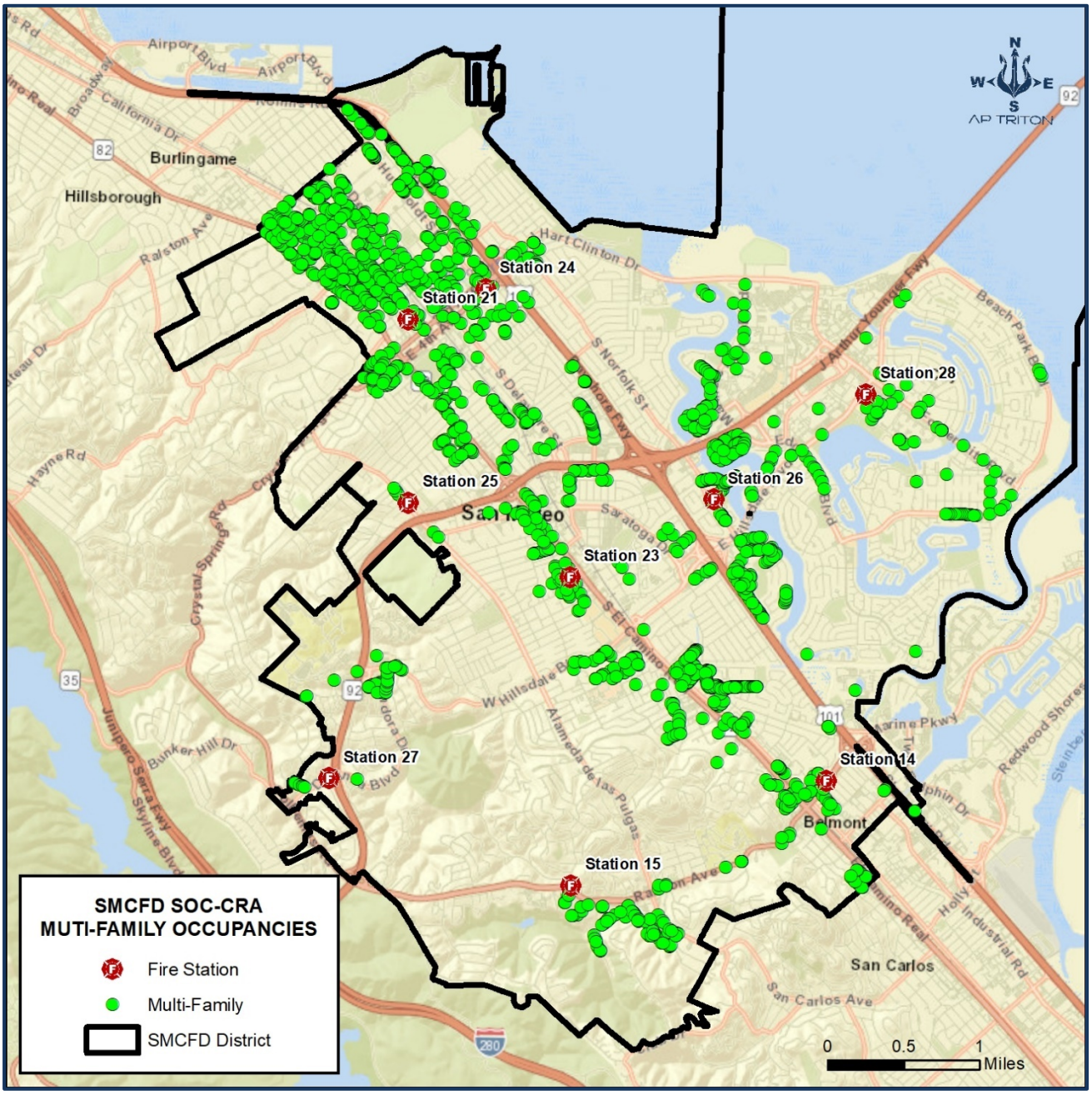
Multifamily Occupancies

Multifamily housing has fewer fires than one-and two-family dwellings, but the number of cooking-related fires is more than twice the rate for other buildings.[15] As a result, current building and fire codes require these buildings to install a residential fire sprinkler system and interconnected smoke alarms in all bedrooms, hallways, and floors.

These fire protection systems are designed to provide sufficient time for the occupants to evacuate the building. The attics in many residential fire sprinkler installations are unprotected and can create problems when a fire reaches this location. Fires can spread from exterior areas, such as when landscaping materials ignite and travel to the roof or attic if the combustible siding is present.

The next figure shows the locations of multi-family occupancies in the SMCFD service area.

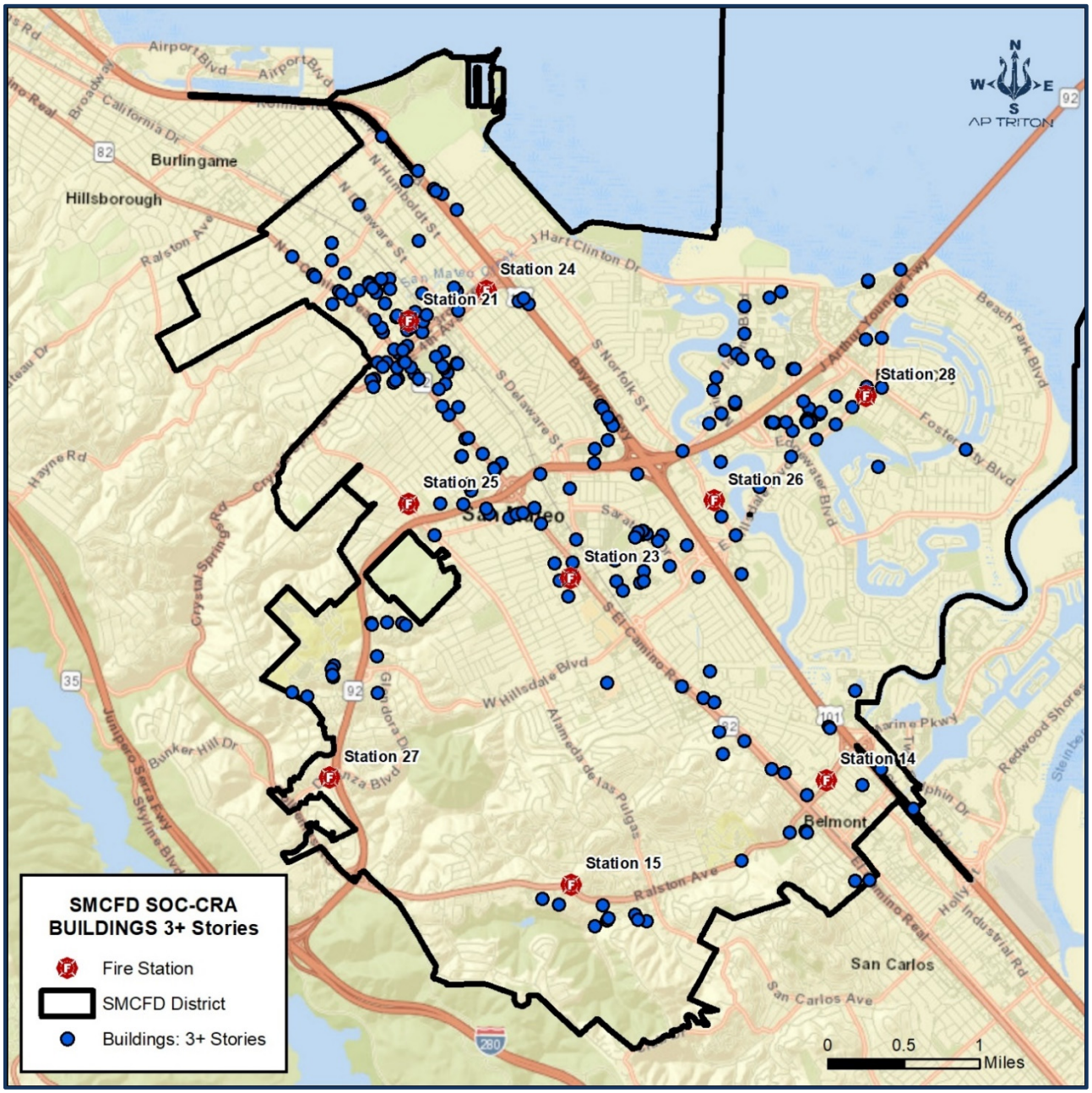
Figure 71: SMCFD Multi-Family Occupancies



Building Three or More Stories in Height

Structures three or more stories in height typically require an aerial apparatus with an elevated master stream. The Insurance Services Office (ISO) reviews the coverage area for a ladder truck for all buildings within 2.5 miles. A ladder truck may be necessary to access these higher buildings' upper floors or roofs since most ground ladders cannot reach these heights.

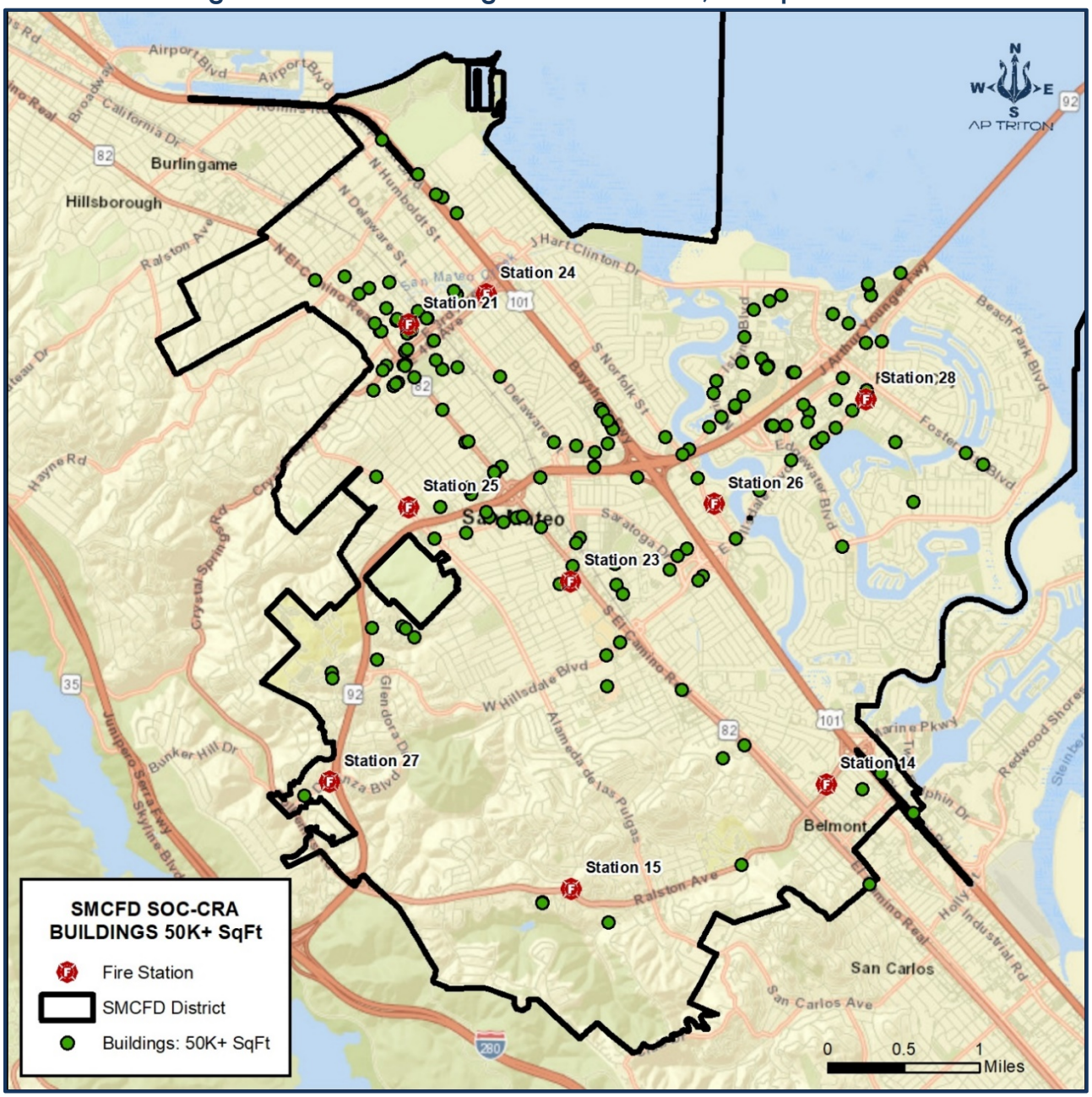
Figure 72: SMCFD Building Three or More Stories in Height



Large Square Footage Buildings

Large buildings, such as warehouses, strip malls, and large mercantile occupancies, require higher fire flow needs and more firefighters to advance hose lines long distances into the building during fireground operations. Conversely, fire flows may be greater for smaller buildings because of construction type, distance to exposures, and lack of built-in fire protection systems such as fire sprinklers.

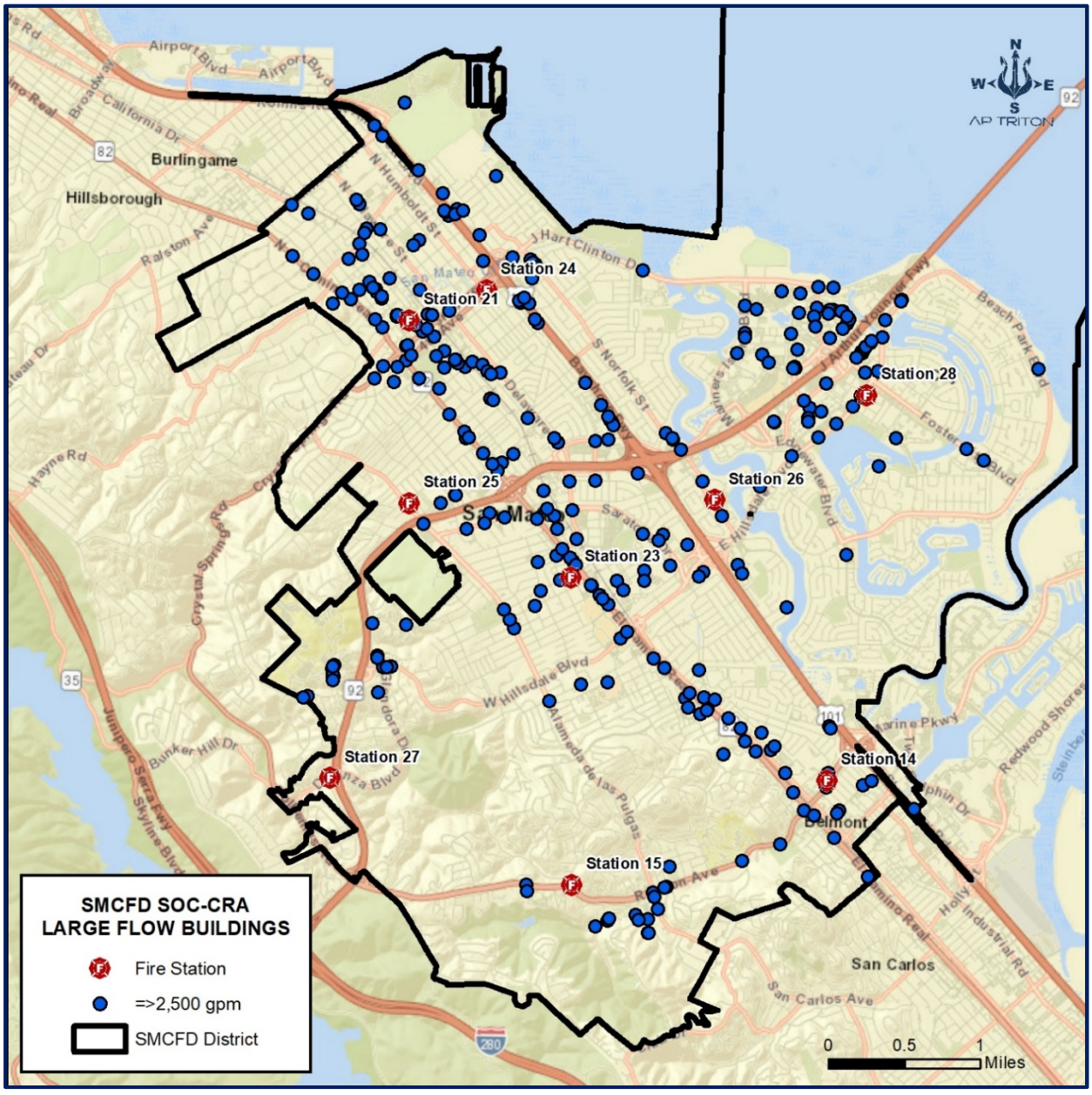
Figure 73: SMCFD Buildings Greater than 50,000 Square Feet



Large Fire-Flow Occupancies

Occupancies are classified according to their risk level. Risk factors that classify occupancies as low, medium, or high include the size of the building(s), construction type, the presence or absence of fire suppression features such as sprinklers and standpipes, the needed fire flow, the risk to life, the presence of chemicals or hazardous processes, and the amount of water available to control or extinguish the fire.

Figure 74: SMCFD Fire Flows Greater Than 2,500 Gallons per Minute



Critical Infrastructure

Critical infrastructure and key resources (CIKR) explain what is crucial for a community to function in a modern economy. Critical infrastructure is defined as a sector "whose assets, systems, and networks, whether physical or virtual, are considered so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof." There are sixteen defined Critical Infrastructure Sectors (CIS):[16]

- Chemical Sector
- Commercial Facilities Sector
- Communications Sector
- Critical Manufacturing Sector
- Dams Sector
- Defense Industrial Base Sector
- Emergency Services Sector
- Water & Wastewater Systems Sector
- Energy Sector
- Financial Services Sector
- Food and Agriculture Sector
- Government Facilities Sector
- Healthcare and Public Health Sector
- Information Technology Sector
- Nuclear Reactors, Materials, & Waste Sector
- Transportation Systems Sector

All these sectors may not be in the SMCFD service area; each community must determine critical infrastructure locations and develop pre-incident plans for responding personnel.

Other buildings to consider as target hazards could include occupancies with a potential for a significant loss of life, such as places of public assembly, schools and childcare centers, medical and residential care facilities, and multifamily dwellings. Other considerations include buildings with substantial value to the community—economic loss, replacement cost, or historical significance—that, if damaged or destroyed, would have a significant negative impact. Responses to target hazards may require significant SMCFD resources and automatic aid during an incident.

Responses to target hazards may require significant SMCFD resources and automatic aid during an incident. The following figure provides the locations of target hazards.

Figure 75: SMCFD Target Hazards

Highways

An adequate road and street system is necessary for emergency responders to travel to an incident quickly and safely. In SMCFD's service area, access to homes and businesses improves when interconnectivity between streets allows more than one approach to the incident location. However, there are locations where cul-de-sacs exist with only one means of accessing the location. For example, in portions of Foster City along Central Lake, one street provides entry into a large group of homes. If this access point is blocked, a delayed response can occur.

U.S. Hwy 101 travels through the center of the service area, and the annual average daily traffic (AADT) count in 2020 was 220,000 for vehicles north of California 92, while truck traffic was 7,469. At the north intersection of California 92 and S El Camino Real, the AADT was 33,500 vehicles per day, and trucks were 455. Traffic signal preemption is available at approximately 95% of the intersections in San Mateo and Foster City. SMCFD is upgrading the existing system to an intelligent system for traffic preemption with route planning.

Rail

Caltrain provides commuter rail service through SMCFD and follows the original San Francisco & San Jose Railroad path. The service area has four commuter stations, with multiple trains traveling north and south daily. These trains carry many passengers daily, and few freight trains travel through the service area with minimal transportation of hazardous materials. There are no at-grade rail crossings in Belmont or Foster City, but four in San Mateo. SMCFD maintains a response plan and participates in an annual drill for rail emergencies.

Dam

The hazard probability of a dam failure in the SMCFD service area is considered the highest in the HMP. For example, the Lower Crystal Springs dam is 149 feet tall and contains 57,910 acre-feet of water. This dam would cause flooding during a failure as water travels along Crystal Springs Road, impacting portions of Hillsborough, San Mateo, and Foster City.

Energy

The ability to provide energy is a necessary component of a thriving community. The need for power includes communications to traffic signals for normal operations, which requires energy use. The community depends on energy sources, whether it is electricity generation and transmission systems, fuel distribution and storage tanks, or natural gas pipelines and regulator stations. Pacific Gas and Electric Company (PGE) provides power and distributes natural gas to San Mateo County.

Electricity

High-voltage electrical transmission lines travel through SMCFD's service area, ranging in size from 60 kV to 230 kV. The 230 kV aboveground electrical lines enter from the east along Hwy 92 and from the south through Foster City, traveling northwest.

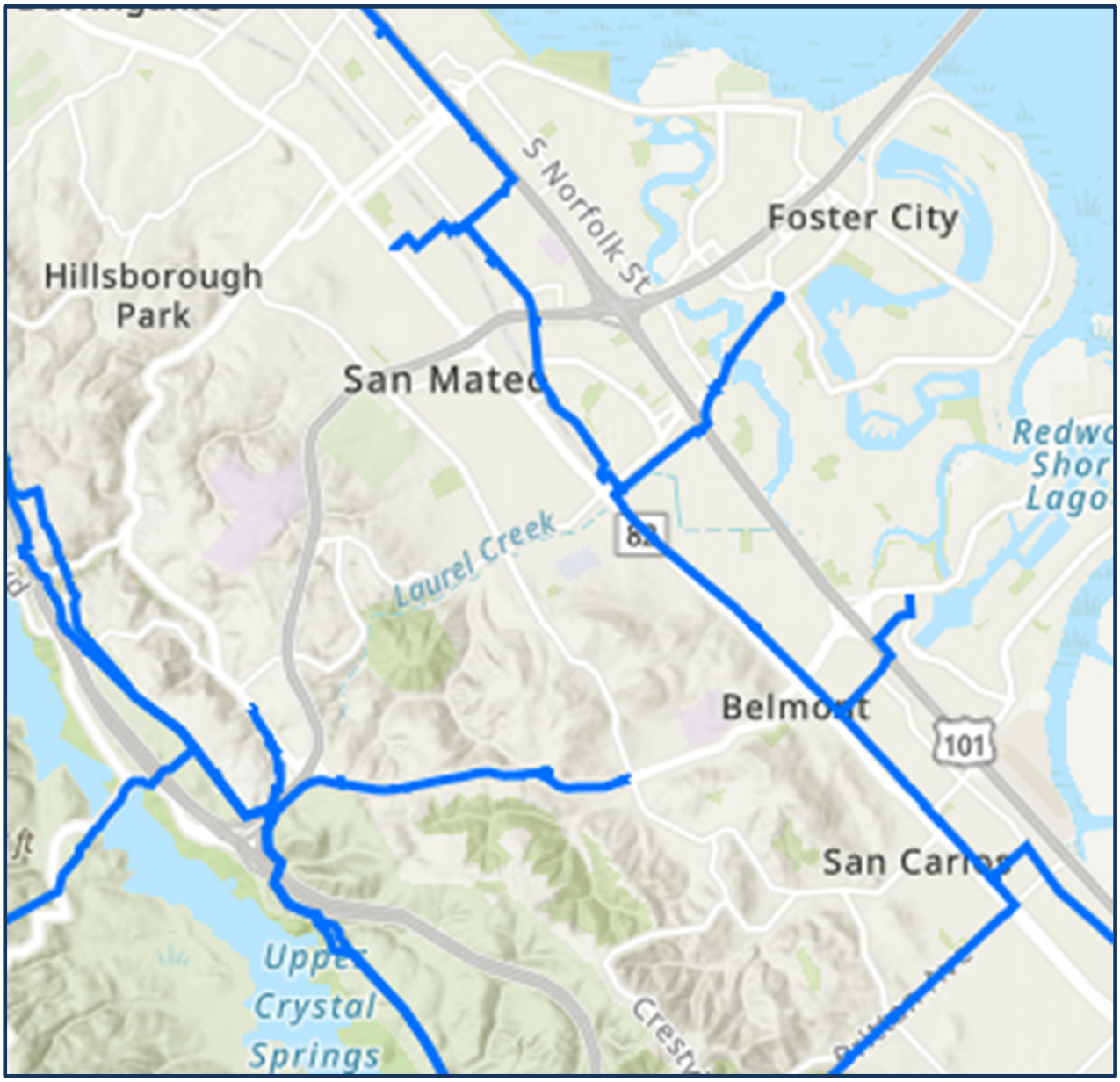
The following figure shows the location of high-voltage electrical transmission lines.

Figure 76: SMCFD High-Voltage Electrical Transmission Lines

Natural Gas

PG&E provides natural gas in the service area through transmission and high-pressure distribution lines that supply service lines for commercial and residential use. Incidents involving natural gas are often caused by contractors who cut or damage lines when excavating during construction. The following image from PG&E shows the *larger* natural gas transmission lines.

Figure 77: Natural Gas Transmission Lines in the SMCFD Service Area



Water

An adequate water supply and distribution consisting of water storage, mains, and a fire hydrant system provide the necessary water for SMCFD to extinguish fires. The system requires well-distributed hydrants and properly sized water mains to provide the water needed for fireground use.

Multiple water purveyors provide service in the SMCFD service area. In the City of San Mateo, California Water Service is the primary provider, and the water is purchased from the City and County of San Francisco. This system serves the City of San Mateo, a portion of the unincorporated County, and San Carlos and provides water to more than 137,000 customers. Eighty-five percent of the water for the system originates from the Hetch Hetchy watershed located in Yosemite National Park, while the remaining 15% is from the Alameda and Peninsula watershed. Residential customers use 72%, while commercial users account for 23%—the system loses five percent to leaks annually.[17]

The Estero Municipal Improvement District (EMID) provides water to Foster City and Mariners Island in San Mateo. The total population served by EMID is approximately 36,500 customers and expects to climb to more than 41,000 by 2045. Residential customers comprise 55%, commercial, institutional, and industrial 13%, dedicated irrigation 24%, and system loss of eight percent. Water enters the EMID system from one 24-inch water main for distribution and utilizes four elevated tanks with a storage capacity of 20 million gallons. Water is purchased from the San Francisco Public Utilities Commission (SFPUC), and the average water demand between 2016 and 2020 averaged 1,596 million gallons annually.[18]

Mid-Peninsula Water District provides water for Belmont and a small portion of San Carlos and serves 27,650 people. SFPUC provided an average of 2.66 million gallons per day in 2020. Ninety-three percent of the customers were residential, and the remaining 7% were commercial, institutional, and industrial. The water district maintains all 820 hydrants in the service area in addition to *20 pumps, 11 water tanks, 13 regulating valves, and 94 miles of water mains*. Water mains range in size from 4" to 24".[19] The respective water companies maintain all hydrants, and SMCFD does not inspect the hydrants.

Figure 78: Hydrant Locations in the SMCFD Response Area

Communications

The ability to receive and transmit incident information requires an emergency communication center. All 911 calls throughout SMCFD are received by the three individual cities' Police Dispatch Public Safety Answering Points (PSAPS) and then transferred to the County of San Mateo Public Safety Communications (SMPSC) for call processing. In addition, the county telecommunicators provide Emergency Medical Dispatch for EMS responses.

SMPSC provides dispatching services utilizing shift personnel specifically assigned as Telecommunicators. Currently, the 911/Communications Center works 12-hour shifts and has a staff of more than 60 employees. SMPSC uses Versaterm computer-aided dispatch to receive incident data and dispatch the appropriate unit.

The Public Safety Center (PSC) is the ninth Emergency Communications Center in California, the 97th globally, to become an Accredited Dispatch Center of Excellence for providing medical priority dispatch services to those who call for emergency medical services. The Center continually meets the call processing standards and rates over 99% in customer satisfaction. Standards include processing high-priority calls for service within established timeframes and customer satisfaction. The Center's performance is closely monitored and reports performance measures to the County Board of Supervisors bi-annually.

In addition to these standards, PSC dispatch staff have job-related performance standards used during the performance evaluation process and compliance standards (95% or above) for Emergency Medical Dispatch. PSC continually exceeds the National Academy standards and Center of Excellence averages for EMD compliance (98%). PSC is the only Communications Center in the County that can manage multi-discipline incidents (police, fire, and medical), resulting in overall efficiency, accuracy, and expedited service. Staff can cross-train on all radios (police, fire, and medical) or remain "specialists" in either Law or Fire/EMS dispatching.

Governmental Facilities

Buildings that provide services for the public from local or other governmental units are considered essential facilities and should receive special attention. These facilities are for the public to receive community services, and fire department personnel should be familiar with the properties during an emergency. Pre-incident plans should be completed and updated annually, including their facilities.

Comparison of Fire Risk in Other Communities

Fire Loss

In 2020, fire departments responded to more than 1.4 million incidents in the United States that caused 3,500 civilian fire fatalities and over 15,200 civilian fire injuries. The property damage was estimated at more than $21.9 billion. The NFPA reported that 64% of the fire deaths occurred in one-or two-family dwellings. In addition, the report stated that $4.2 billion of property fire losses from wildland-urban interface incidents occurred in California.[20] In 2020, the fires per 1,000 population were 0.4, and property loss per capita was $15.97, as shown in the following figure.

Figure 79: SMCFD Fire Loss & Property Loss in 2020

Community Size 100,000 to 249,999	Fires per 1,000 Population	Property Loss per Capita
San Mateo CFD	0.4	$15.97
The U.S.	3.4	$66.62

Intentionally Set Fires

Intentionally set fires, or in many cases considered arson, are defined as "*any willful or malicious burning or attempt to burn, with or without intent to defraud, a dwelling house, public building, motor vehicle or aircraft, personal property of another*."[21] The number of intentionally set fires varies annually, as shown in the following figure.

Figure 80: SMCFD Intentionally Set Fires

Year	Quantity
2018	3
2019	7
2020	0

Insurance Service Office

The Insurance Services Office, Inc. (ISO©) is an independent organization that collects and analyzes data from fire departments in communities throughout the United States to determine rates for fire insurance. According to their report, the ISO's Public Protection Classification program, or PPC, "is a proven and reliable predictor of future fire losses." As a result, commercial property insurance rates are often lower in areas with lower (better) ISO PPC Class ratings.

The ISO Fire Suppression Rating Schedule (FSRS) measures four primary elements of a community's fire protection system: *Emergency Communications* (max 10 points); *Fire Department* (max 50 points); *Water Supply* (max 40 points), and *Community Risk Reduction* (max 5.5 points) for a maximum possible total of 105.5 points. ISO then assigns a grade using a scale of 1 to 10. Class 1 represents the highest degree of fire protection, and Class 10 designates a fire suppression program that does not meet ISO's minimum criteria.

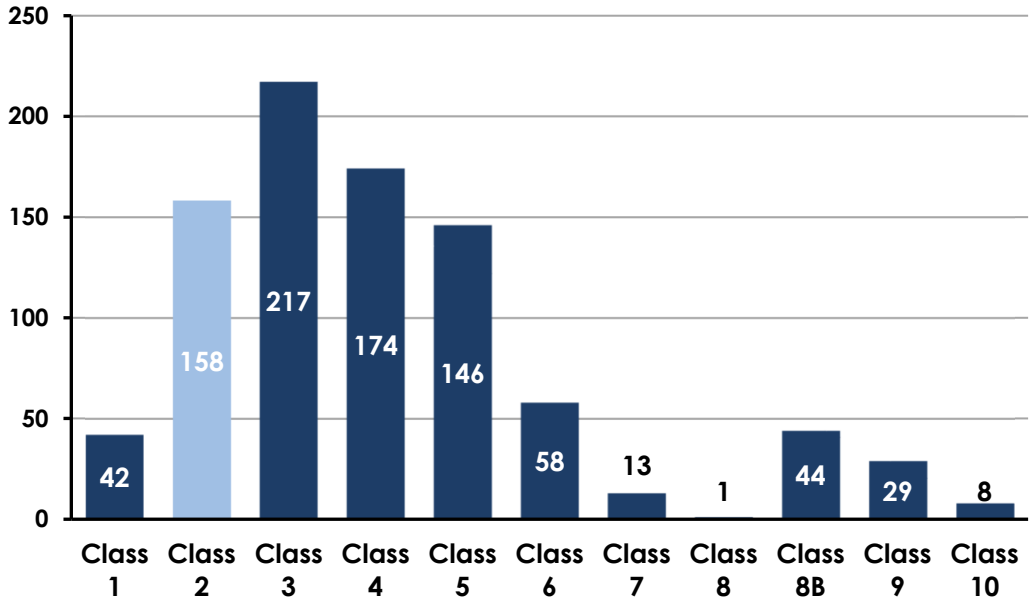
SMCFD has requested ISO to rate the entire district, but this inspection has not been scheduled. The below figure provides a breakdown of the most recent surveys conducted by ISO for each city, as shown in the following figure. Overall, the ISO classification for the three cities is greater than 80 credits, thus providing the areas protected by SMCFD a Class 2 rating. SMCFD does not inspect any fire hydrants but should consider beginning an inspection process for staff familiarization with hydrant locations and increasing the ISO credits. In addition, SMCFD should conduct a more thorough study before ISO grades the entire service area to determine if inspecting hydrants increases credits for water supply.

Figure 81: ISO Earned Credits

City	Credits Available	Emergency Communications	Fire Dept.	Water Supply	Divergent	Earned Credits
San Mateo	105.5	9.2	40.04	36.46	-2.21	88.17
Foster City	105.5	9.2	36.48	35.56	-3.19	82.73
Belmont	105.5	9.2	38.85	37.35	-3.13	86.95

The following figure shows all the fire departments in California and the number of ratings for each classification. For example, 158 departments have a Class 2 rating in the state.

Figure 82:California ISO Classifications



Section III:
STANDARDS OF COVER

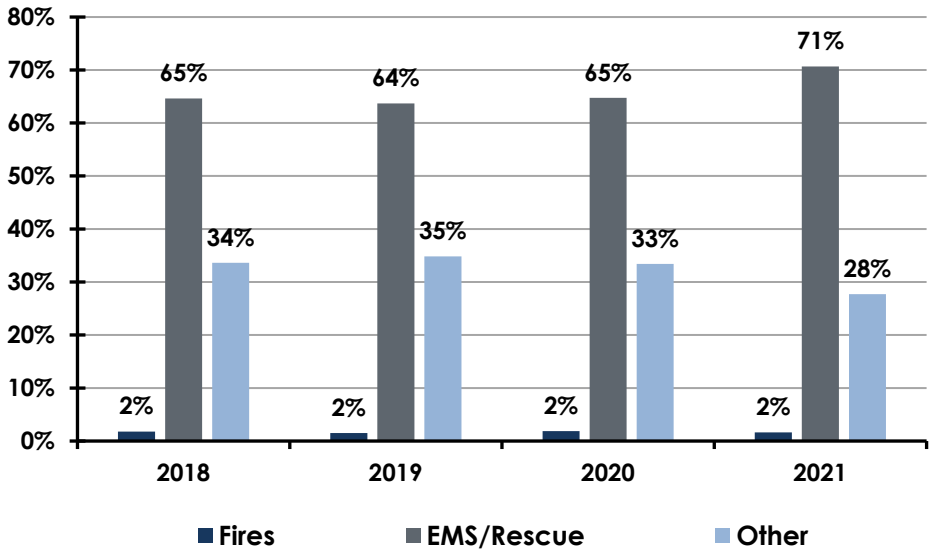
Historical Response Workload

In analyzing the service delivery and performance of SMCFD, the study team requested incident and individual unit response data for the calendar years 2018–2021. The department provided data from its records management system (RMS).

Service Demand

The following figure shows the response workload by general type for the last four years. The total response workload steadily decreased from 2018–2020 but slightly increased back in 2021. Other call types declined 20% over the period, EMS still shared the vast majority of the total volume, and fire types of calls had decreased by 18.5% over the 4-year period.

Figure 83: SMCFD Response Workload History



The percentages shown in the preceding figure represent that incident type's share of that year's total call volume. SMCFD responded to over 55,000 incidents over the four-year period. The following figure shows incidents by type. Emergency medical responses and motor vehicle collisions were the most common incident types, comprising 66% of the total responses.

Figure 84: SMCFD Responses by Incident Type

Incident Type	% of Total*
Medical	66%
Good Intent	12%
Service Call	10%
Alarm	7%
HAZMAT	2%
Fire	2%
Special	1%
Hazard	< 1%
Weather Event	< 1%

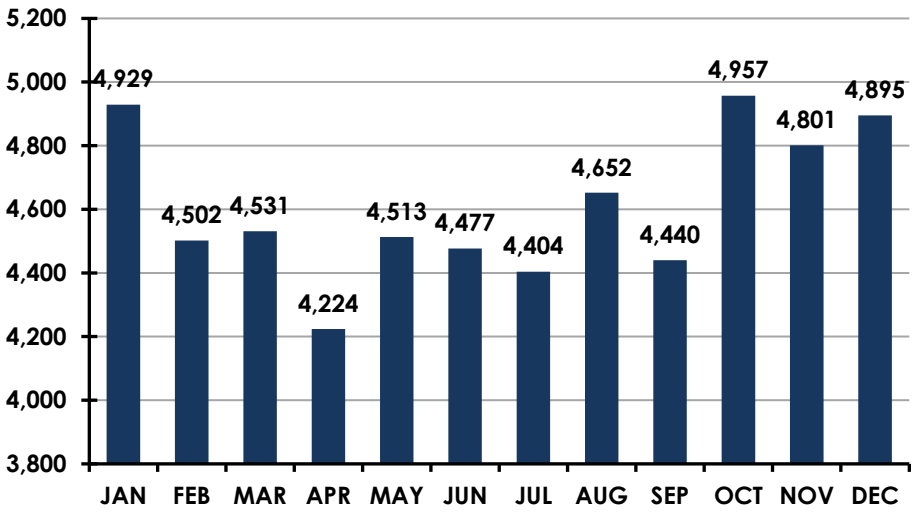
*Percentages rounded to the nearest integer.

Temporal Analysis

This analysis shows how responses change in volume over various measures of time. For example, the following figure shows the change in volume over the months during the study period, indicating seasonality in the response pattern.

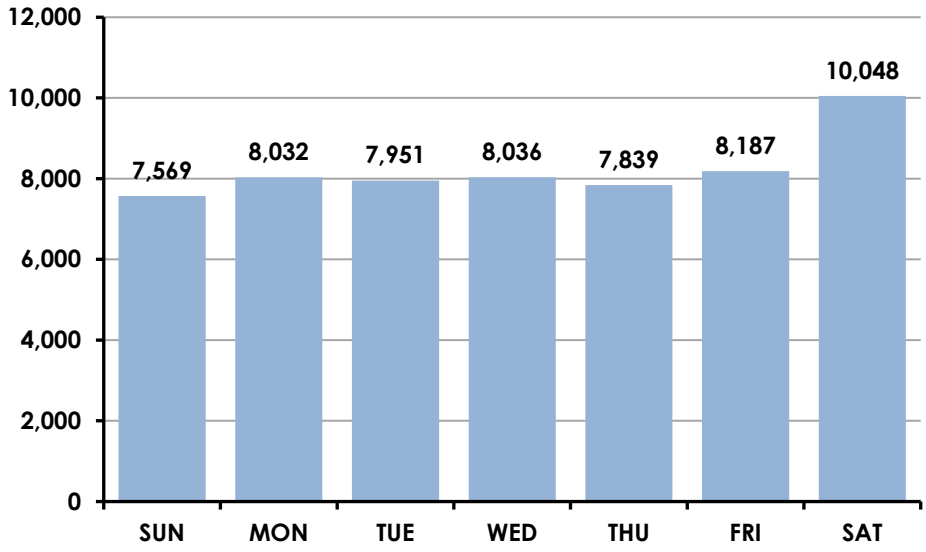
The busiest months for SMCFD has been October–January, after which total monthly volume generally varies through the year.

Figure 85: SMCFD Monthly Response Workload (2018–2021)



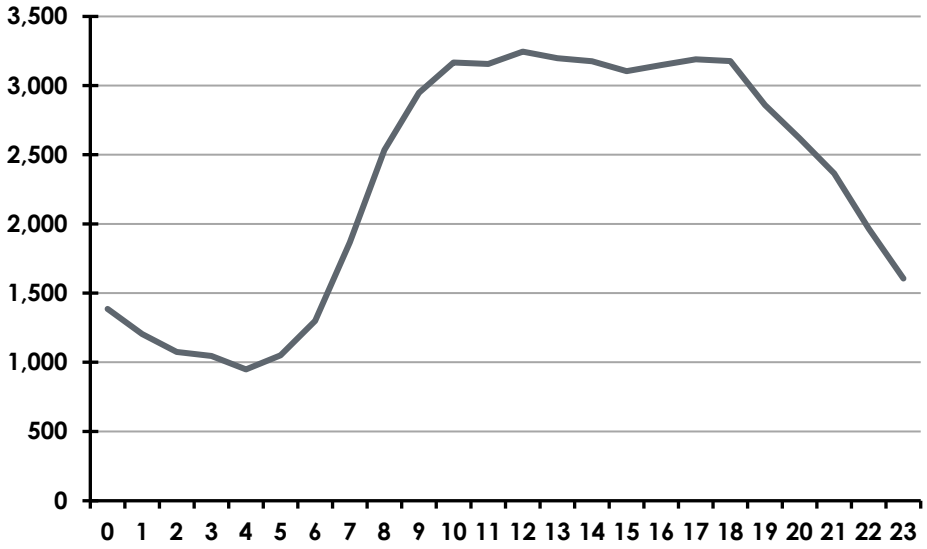
Next, response workload is shown by the day of the week. Fridays and Saturdays tend to have slightly more responses, as shown in the following figure.

Figure 86: SMCFD Daily Response Workload (2018–2021)



Response workload by the hour typically shows fire department activity higher during daytime hours, as in the case of SMCFD. This is because response workload correlates with the time of day in which people are most active. In San Mateo Consolidated, the department's activity begins to increase from 5:00 to 6:00 a.m. until it reaches its first peak at 11 a.m. This level is generally maintained until it gradually decreases at 7:00 p.m. when it begins to decrease more rapidly.

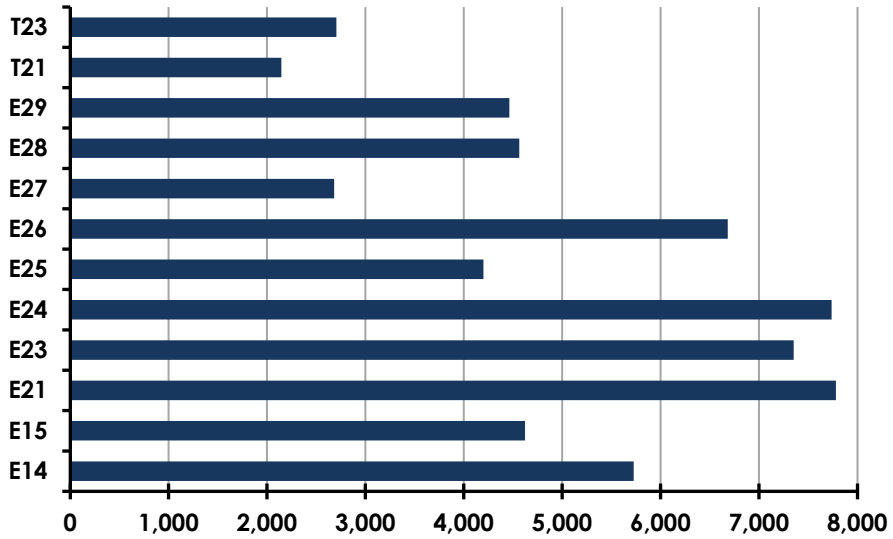
Figure 87: SMCFD Hourly Workload



Response Unit Workload

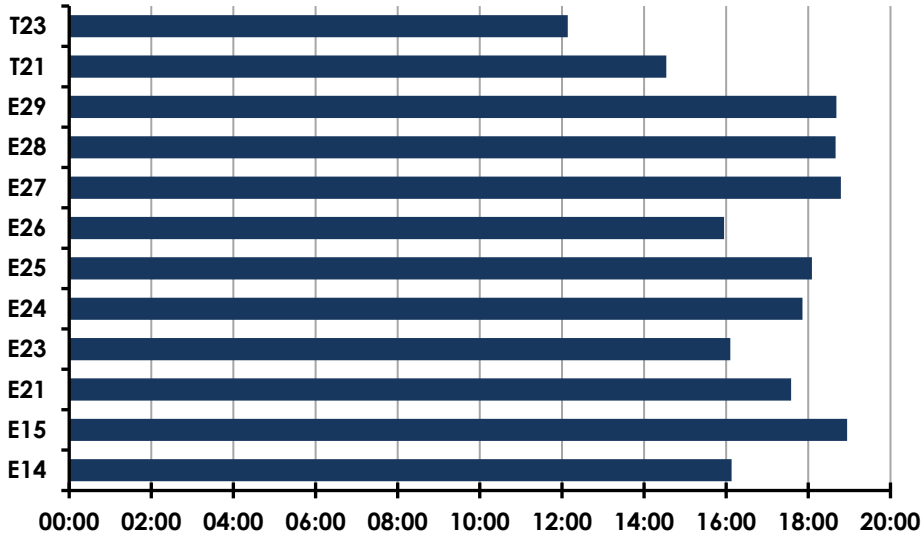
The response workload for each SMCFD apparatus is shown in the following figure. Many incidents, like structure fires and severe motor vehicle collisions, require more than one unit to respond. Engine 21 is the busiest unit, followed by Engine 24. The following figure shows the SMCFD unit workload.

Figure 88: SMCFD Unit Workload



The amount of time spent on the scene can affect firefighters' workload and the availability of resources for the next, or concurrent, incident. The following figure details the average amount of time each unit was committed to a scene type. Understandably for fire incidents, the amount of time committed to the scene by a unit is longer than for the other call types.

Figure 89: SMCFD Average Unit Time on Scene

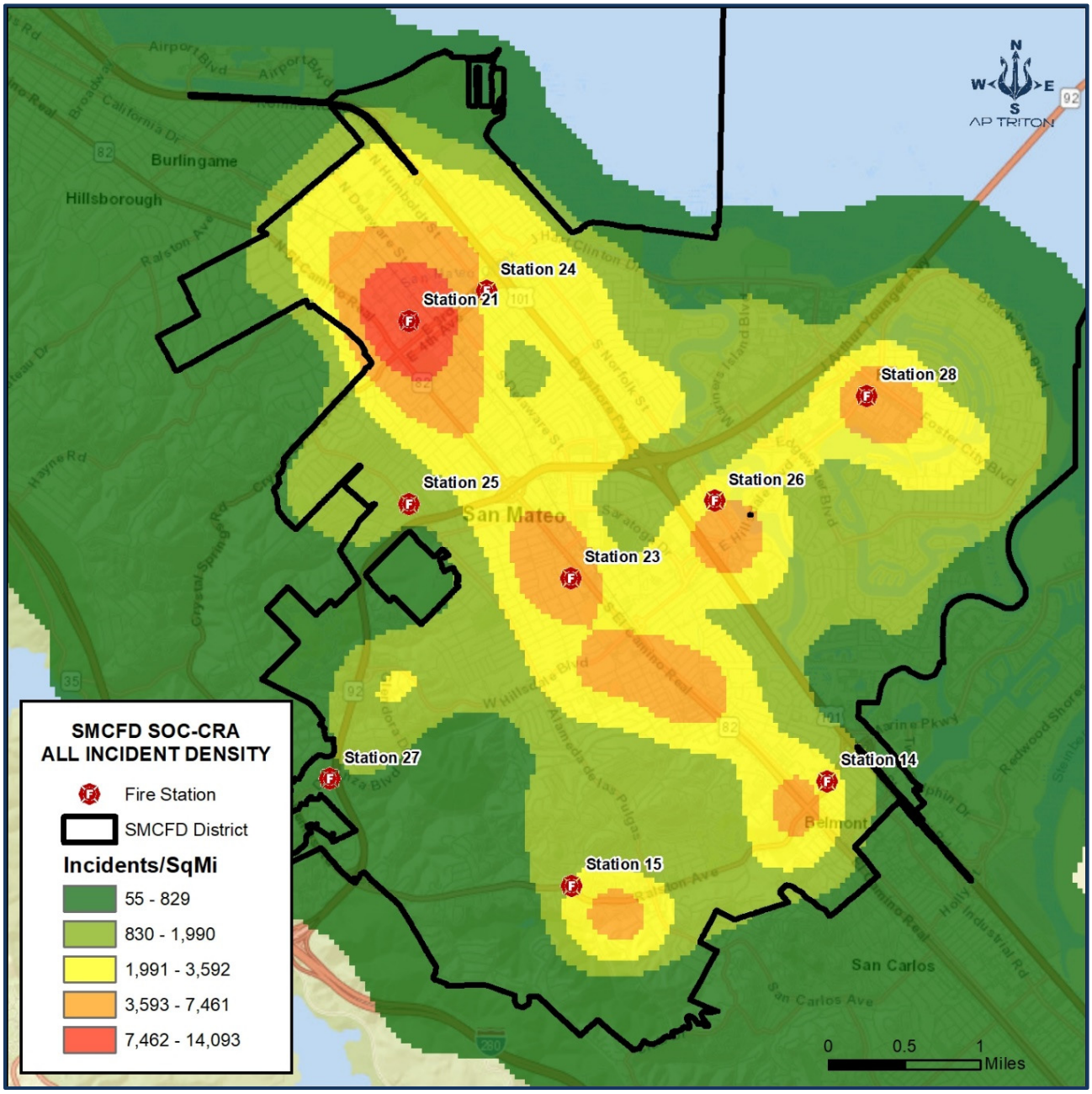


Engine 15 and Engine 27 spend the most amount of time on the scene. The remaining frontline units spend a similar amount of time on the scene.

Spatial Analysis

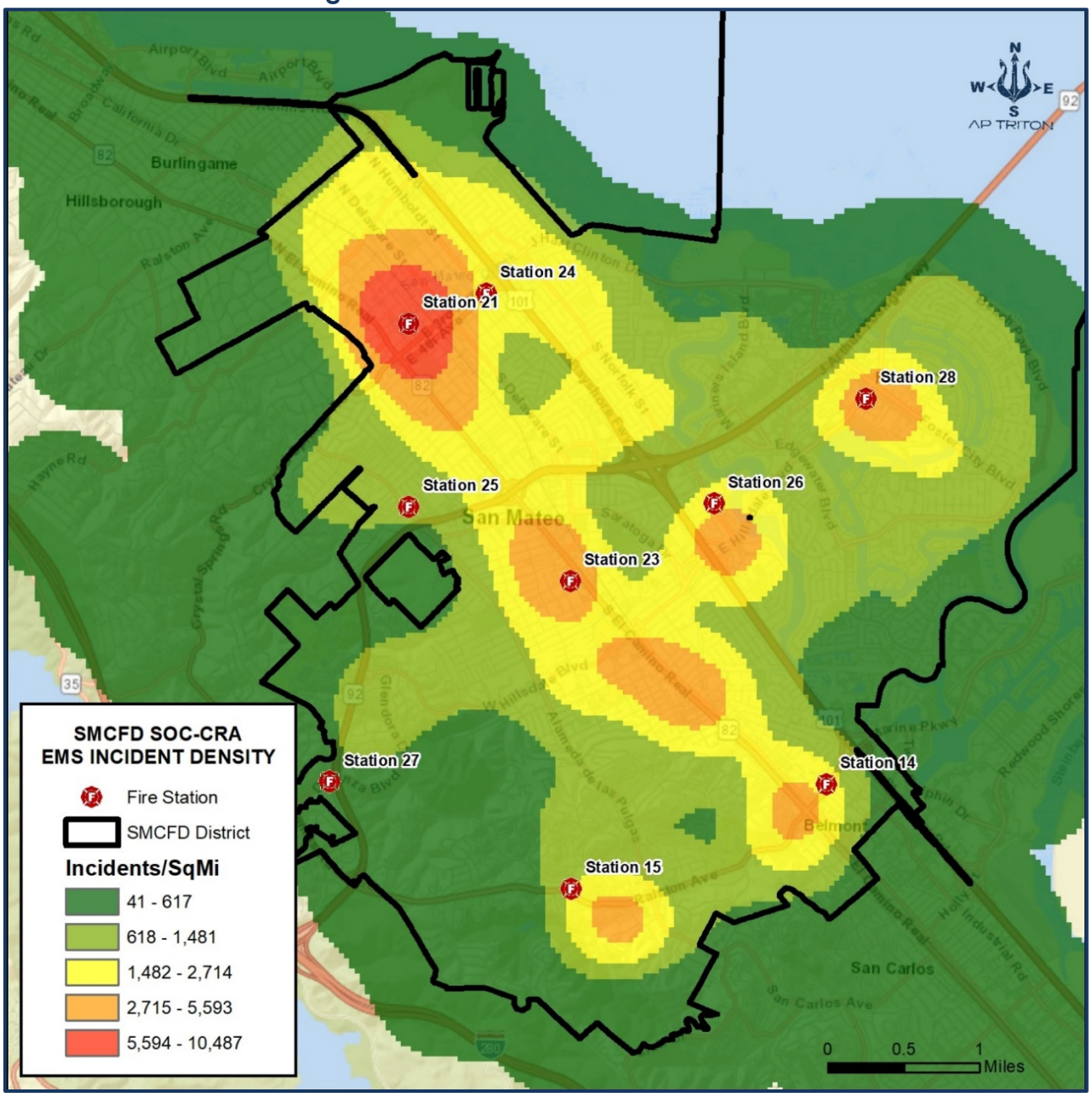
AP Triton also examined response workload geographically. Therefore, the distribution of heavier service demand can be evaluated against the location of the fire station. The following figure shows the density of response workload during the study period.

Figure 90: SMCFD All Incident Demand Density



The previous figure reflected the predominance of emergency medical incidents within the dataset. Note that most demand is located near Station 21. However, there is a moderate level located near other stations as well.

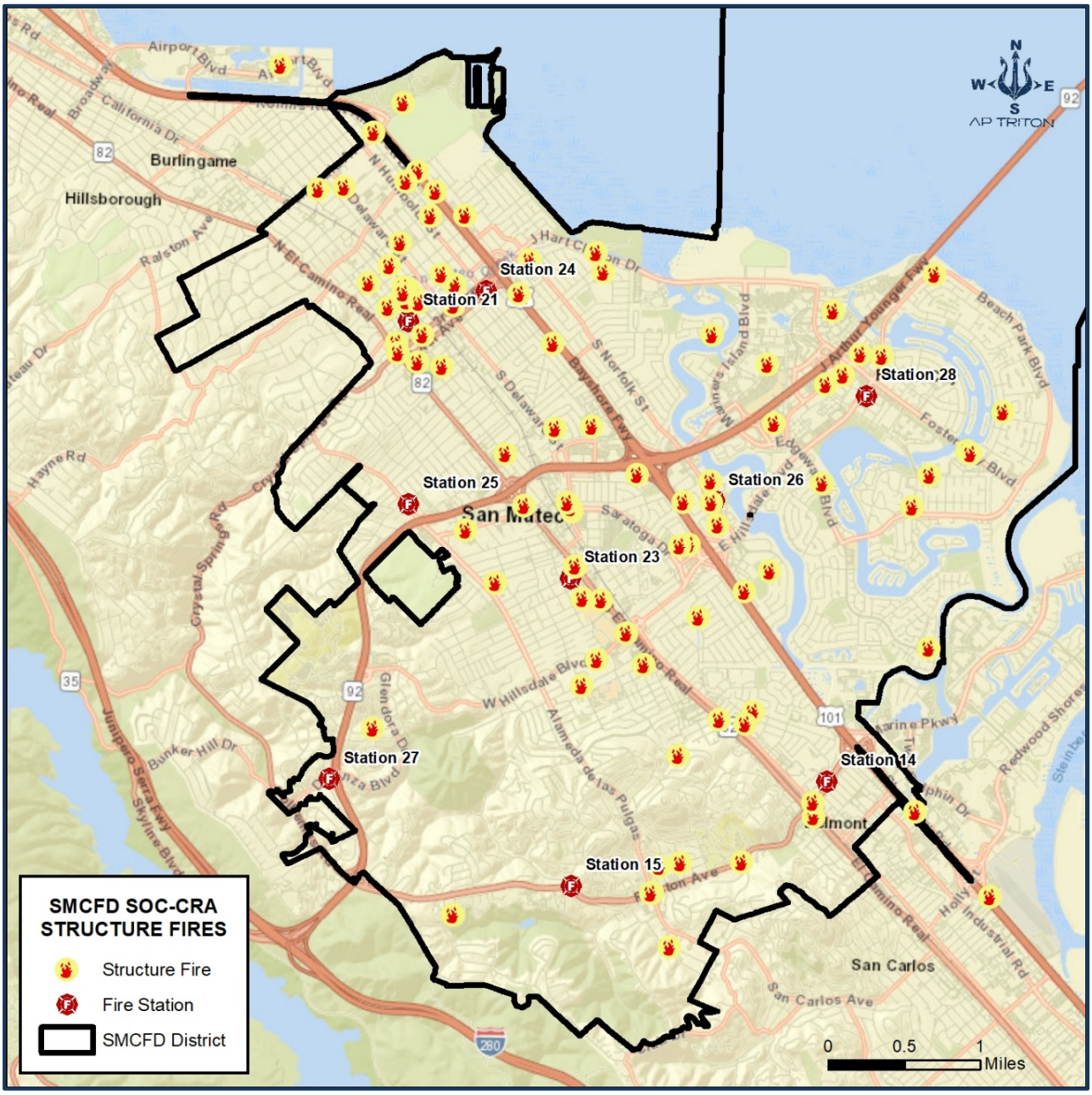
Figure 91: SMCFD EMS Incident Demand



Because of the predominance of EMS-type incidents in the workload data, this preceding image mimics the image of overall service demand density.

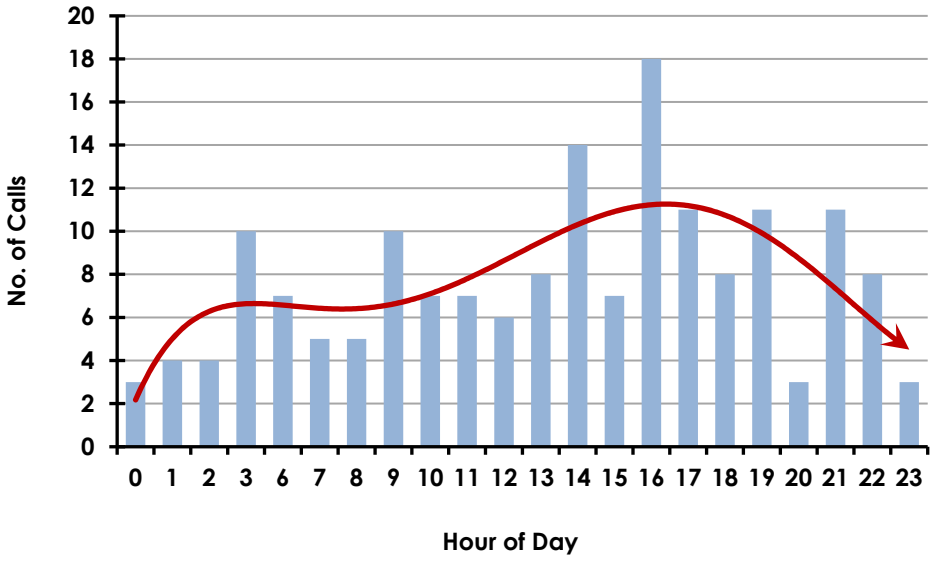
The following figure shows the level of structural fire events within the service area.

Figure 92: SMCFD Structure Fires



The following figure reveals that most of the structure fires shown in the previous figure occur during the afternoon and early evening hours.

Figure 93: SMCFD Structure Fires by Hour of Day



The following figure details the addresses to which the department responded to calls most frequently during the four-year study period.

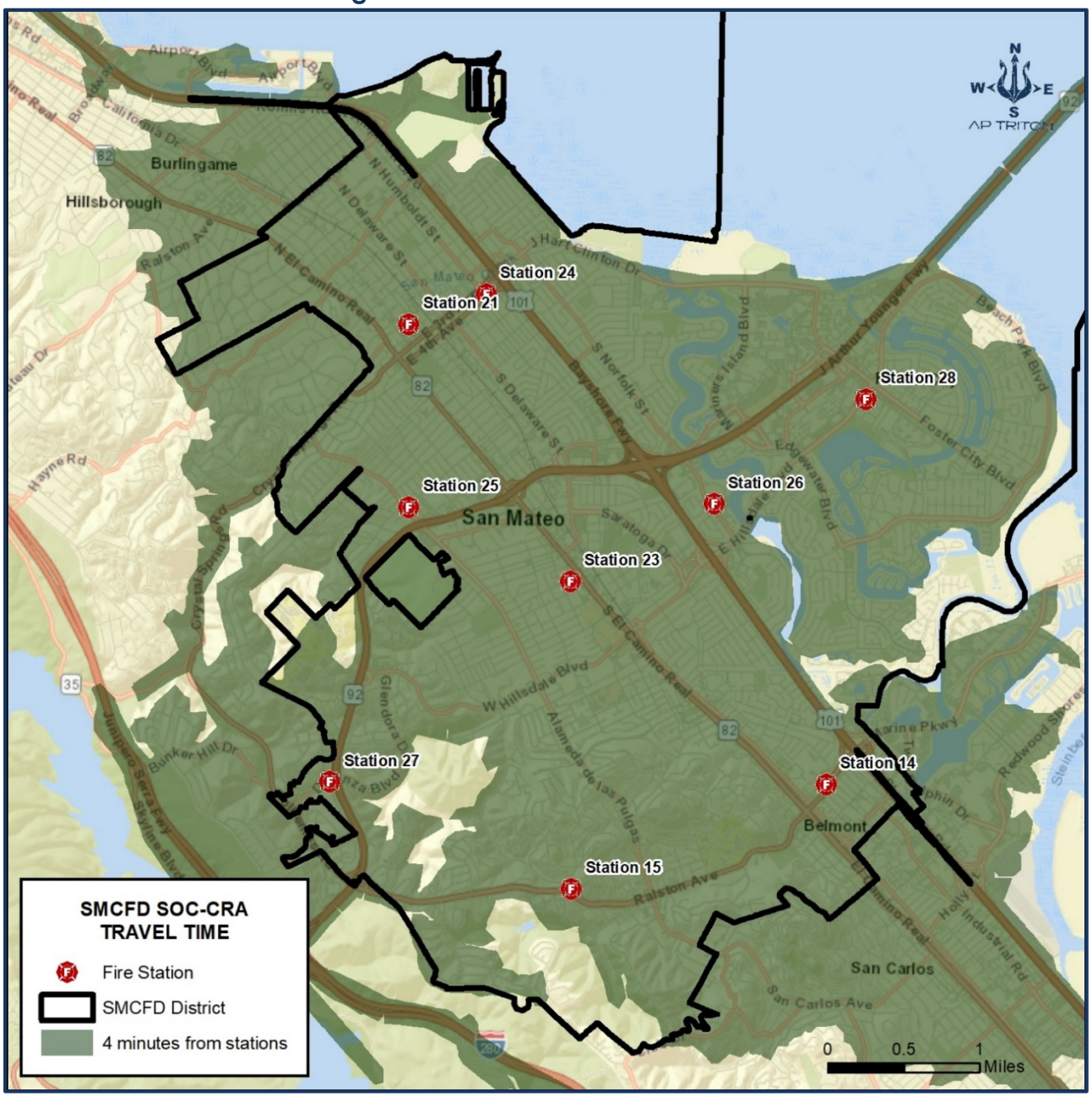
Figure 94: Frequent Response Addresses

Location	Facility	No. of Calls
100 San Mateo Drive, San Mateo	Health Center	720
707 Thayer LA, Foster City	SNF	584
850 N El Camino Real Ave., San Mateo	SNF	573
2400 Carlmont Drive, Belmont	Apartment Complex	514
2883 S Norfolk Street, San Mateo	SNF	416
4000 S El Camino Real Ave., San Mateo	SNF	378
1 Baldwin Avenue San Mateo	SNF	362
955 S El Camino Real Ave., San Mateo	SNF	329

Resource Distribution

SMCFD operates out of nine fire stations. The following figure illustrates the street sections that can be reached from each station within 4 minutes or less of travel time. The data are based on posted road speeds modified to account for turning, stops, and acceleration. They do not consider congestion, construction, weather, darkness, and other non-controllable factors.

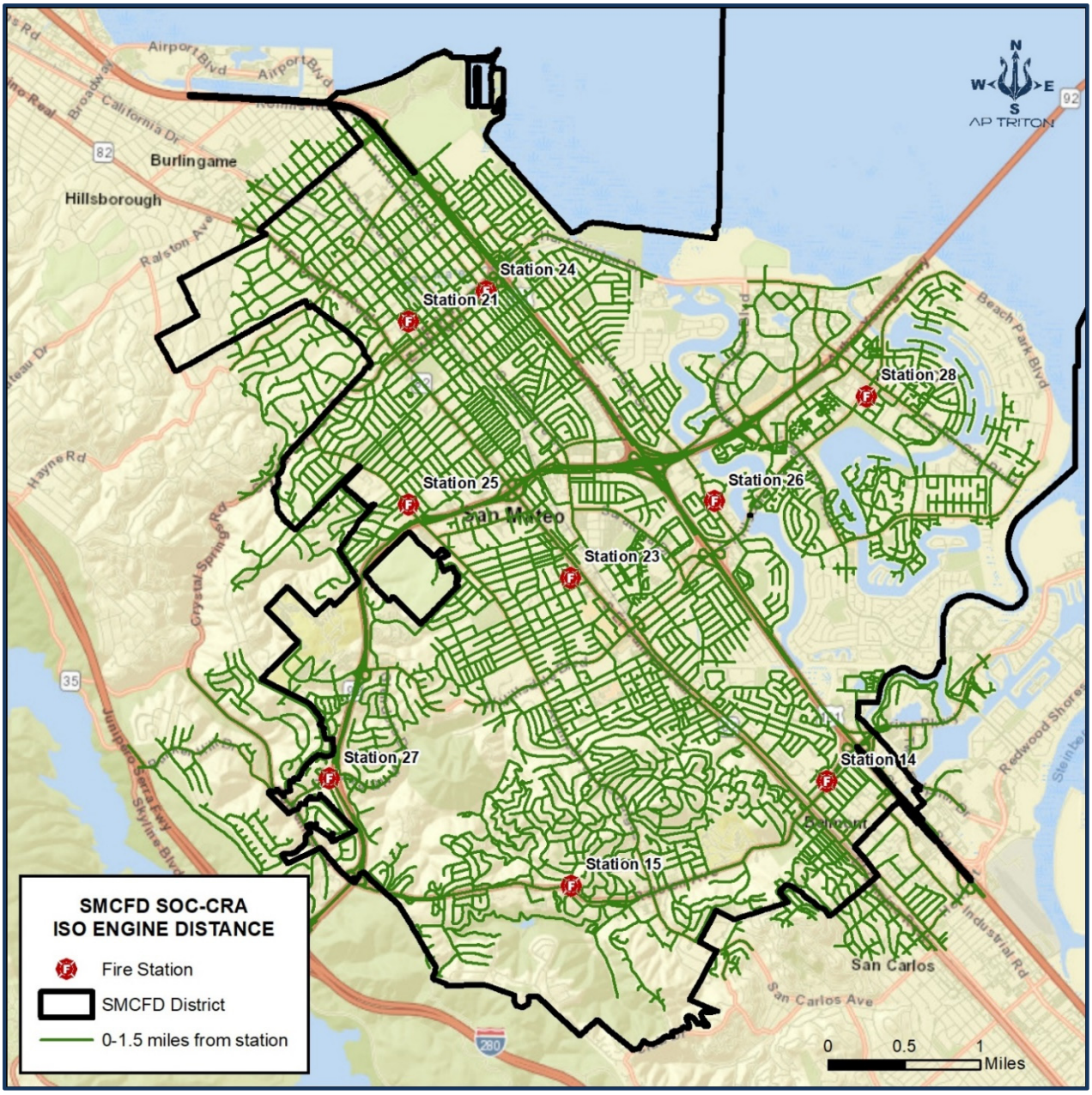
Figure 95: SMCFD Travel Time Extent



The overall coverage of fire incident demand is 99%, presuming engines are available and responding from their assigned stations. The coverage of EMS incidents was also 99%.

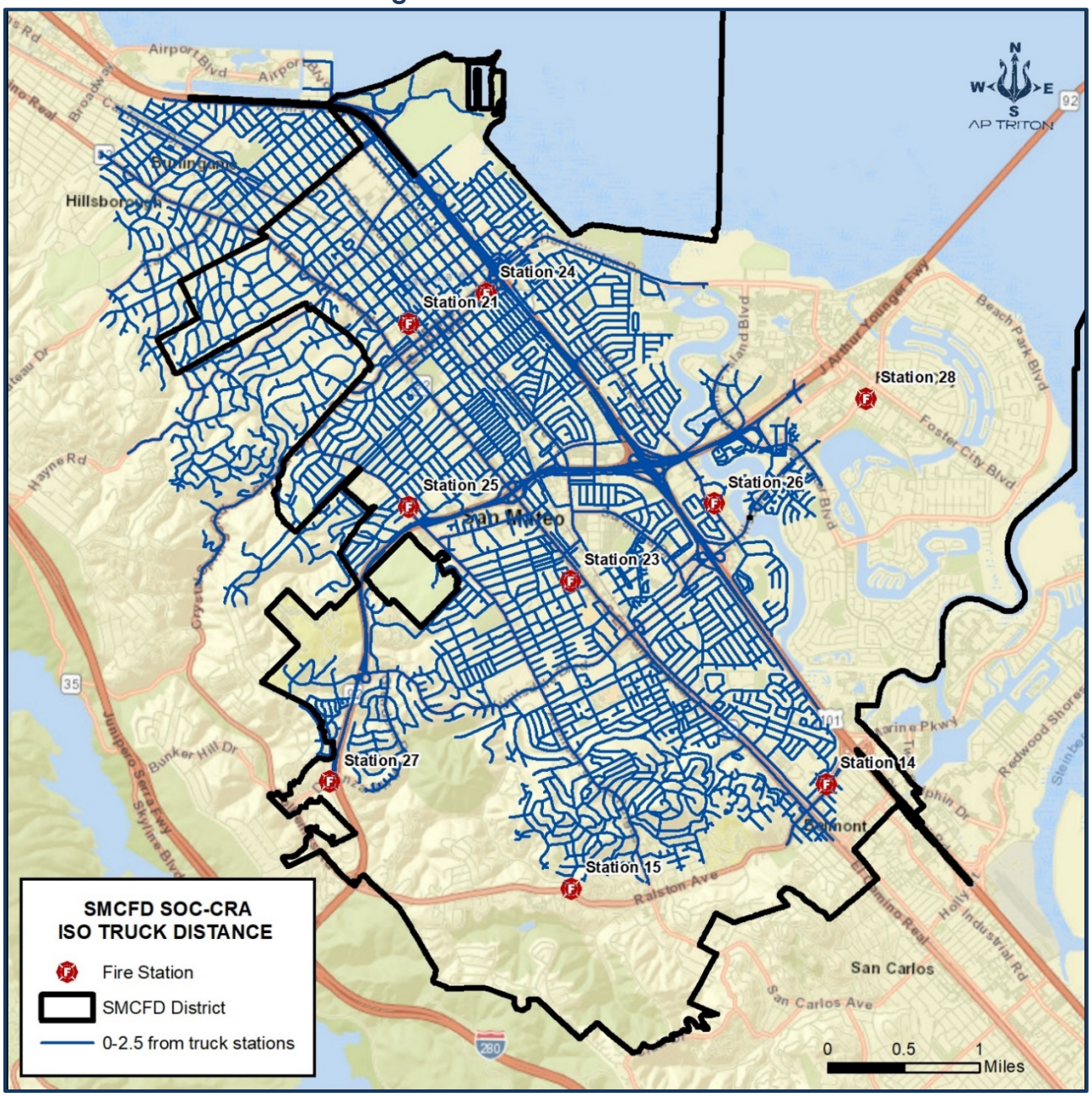
The Insurance Services Office is a major rating bureau that assists insurers in setting insurance prices. Their evaluation of the fire department includes the station location and the distance from which a property is located. For engines, better rates are achieved by being within 1.5 miles of a fire station. The following figure shows this distance for SMCFD.

Figure 96: ISO Engine Distance



For Ladder Truck Apparatus, the requirement is less severe since they are to be positioned near multistory or large square footage buildings primarily within a 2.5-mile distance. The following figure shows the ladder stations and the distance that can be reached.

Figure 97: ISO Truck Distance



The worst rates are reserved for property beyond 5 miles from a fire station which is not an issue for the SMCFD area, as shown in the following figure.

Figure 98: ISO Distance Limit

Effective Response Force Capability Analysis

Effective Response Force (ERF) is the number of personnel and apparatus required to be present on the scene of an emergency incident to perform the critical tasks in such a manner to effectively mitigate the incident without unnecessary loss of life or property. The ERF is specific to each type of incident and is based on the critical tasks to be performed.

The response time goal for delivering the initial full ERF to a building fire is within 8 minutes, 90% of the time for Low and Medium Risk Hazard structures, and 10 minutes, 10 seconds, 90% of the time for High-Risk Hazard and High-Rise structures. SMCFD has defined the minimum full effective response force for low-rise building fires as five fire engines, one Ladder Truck, and two Battalion Chiefs for a total of 22 firefighters, including resources from neighboring fire agencies.

For high-rise and commercial building fires, the defined minimum full ERF for SMCFD is increased to add additional engines, ladders, and Battalion Chiefs to a total of 32 firefighters due to the identified need for more firefighters. While several units are dispatched when a fire is reported, once the first unit arrives, and the scene is assessed, responding units may be canceled while en route.

Impact of Automatic Aid

SMCFD relies upon automatic aid from adjacent agencies during a structure fire and other incidents when needed. These are very important relationships that enable the department to ensure it has sufficient staff and apparatus to fight the fire. The following list catalogs the adjacent automatic aid agencies.

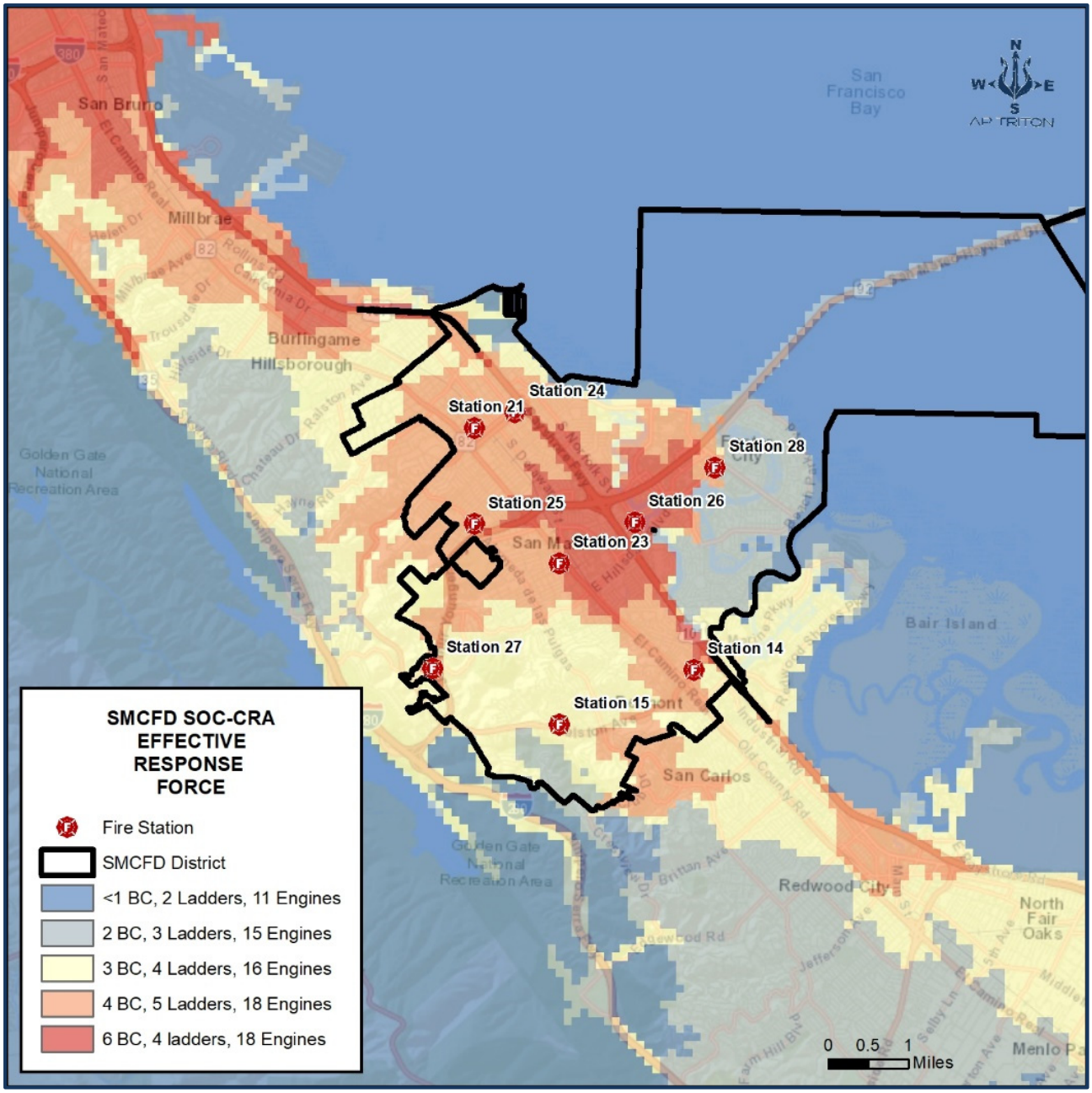
- San Bruno Fire Department
- Menlo Park Fire Protection District
- Woodside Fire Protection District
- Redwood City Fire Department
- San Carlos Fire Department
- Central County Fire Department
- Coastside Fire Protection District
- Kings Mountain Fire Brigade
- South San Francisco Fire Department
- North County Fire Authority
- Colma Fire Protection District
- La Honda Fire Brigade

SMCFD reciprocates by providing auto aid to its adjacent agencies. According to SMCFD data, 11% of the incidents were recorded as providing auto aid.

When a structure fire is reported, the reality may be something else, perhaps less threatening. As a result, an engine often arrives and handles the fire threat, canceling the other units dispatched. According to SMCFD's data from its records management system, no structure fire response achieved the ERF for apparatus and staffing in accordance with the department's alarm assignment protocol.

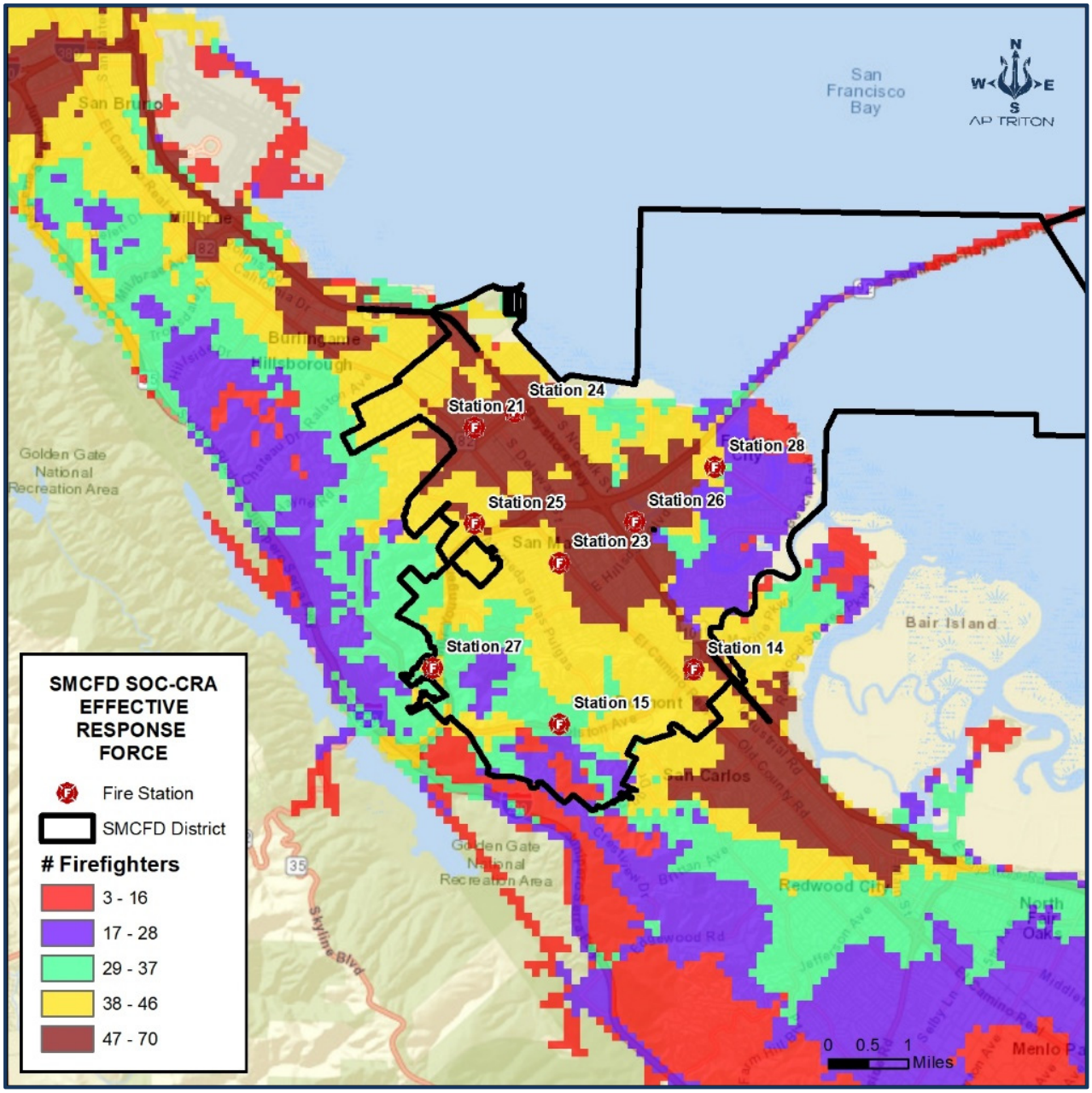
The concentration analysis reviews the physical capability of SMCFD's resources to achieve its target ERF travel time to its service area. The following figures depict the physical capability of SMCFD to assemble apparatus and firefighters by area within an 8-minute travel time. The modeled analysis below assumes that all response units are available. Therefore, the first figure represents the collective apparatus needed to achieve the ERF.

Figure 99: SMCFD Effective Firefighting Force-Apparatus



The following figure shows where the number of firefighters from SMCFD and automatic aid agencies can reach within an eight-minute travel time.

Figure 100: SMCFD Effective Response Force-Firefighters



Resource Reliability

This section analyzes the workload at the unit level rather than at the department level, as previously shown. However, unit-level workload analysis can reveal further insights into the stress level firefighters and apparatus are experiencing. For instance, units are only effective if available within their station. Therefore, if they are already handling an incident when another incident is reported, a unit from further away must respond, increasing the response times.

Unit Hour Utilization (UHU) calculates the percentage of time a unit is not available for a response because it is committed to an incident during a calendar year. This is important because the higher the percentage, the more time the unit is not available to respond to another incident. This is especially important for agencies like SMCFD that measure their performance at the 90th percentile. For example, a unit with greater than 10% utilization cannot provide on-time performance to a 90% target within its response area. This analysis only measures response incidents and does not include other unmeasured activities in the dataset, such as training time and station duties.

The following figure shows UHU between 2018 and 2021.

Figure 101: Unit Hour Utilization

Unit	2018	2019	2020	2021
E14	0.06	0.06	0.05	0.05
E15	0.05	0.06	0.05	0.04
E21	0.09	0.08	0.07	0.07
E23	0.08	0.08	0.07	0.06
E24	0.09	0.09	0.08	0.07
E25	0.05	0.05	0.04	0.04
E26	0.07	0.07	0.07	0.05
E2609	0.00	0.00	0.00	0.00
E2610	0.00	0.00	0.00	0.00
E27	0.03	0.03	0.03	0.03
E28	0.05	0.05	0.05	0.04
E29	0.05	0.05	0.04	0.05
PT21	0.03	0.00	0.00	0.00
PT23	0.03	0.00	0.00	0.00
T21	0.00	0.03	0.02	0.02
T23	0.00	0.03	0.03	0.02

No units exceeded a 10% unit hour utilization rate during the study period.

Concurrency

One way to look at resource workload is to examine the number of times multiple incidents occur within the same time frame. Therefore, incidents during the study period were examined to determine the frequency of concurrent incidents. This is important because concurrent incidents can stretch available resources and delay response to other emergencies. Therefore, this factor significantly impacts the jurisdiction's response times to emergencies.

The following figure shows the number of times that one or more incidents occurred concurrently during the study period.

Figure 102: Concurrent Incident Percentage

No. of Incidents	Percent
Single Incident	52%
2 Incidents	29%
3 Incidents	12%
4 Incidents	4%
5 or More Incidents	3%

The following figure shows the number of times one or more SMCFD response units were committed to incidents. As shown, it is more common for a single unit to be on an incident.

Figure 103: Unit Concurrency

Units/Incident	Percent
Single Unit	79%
2 Units	6%
3 Units	1%
4 Units	1%
5 or More Units	< 1%

Response Reliability

How a station crew responds reliably within its assigned area is important to its ability to handle the incident and its response time performance. Other stations must handle incidents outside their response zones when busier units are on assignment. This is especially true during fire events that require multiple units from several stations. The fire department instituted Automatic Vehicle Locators (AVL) so that the dispatch center can send the closest available unit even if it is not in its response area, which can occur if the zone station is busy on another assignment (concurrency) or on a mutual aid assignment outside of the service area.

Figure 104: Reliability

Station Area	Reliability %
14	85%
15	87%
21	81%
23	80%
24	84%
25	86%
26	83%
27	86%
28	83%

Historical System Performance

Operational Performance Standards

Incident data for the period between January 1, 2018, and December 31, 2021, were evaluated in detail to determine SMCFD's current performance.

Only priority incidents occurring within the SMCFD service area are included in the analysis. Non-emergency public assistance requests were excluded. Performance is reported based on the type of incident as reported. Three categories are used to report performance:

- Fire—Responses to a report of a fire
- Emergency medical—All emergency medical incidents
- Other—Any other incident to which the department responded

Each phase of the incident response sequence was evaluated to determine current performance. This allows an analysis of each phase to determine where opportunities might exist for improvement.

The total incident response time continuum consists of several steps, beginning with the discovery/initiation of the incident and concluding with its appropriate mitigation. Therefore, the time required for each of the components varies. In addition, the policies and practices of the San Mateo Consolidated Fire Department and its dispatch center(s) directly influence some of the steps.

SMCFD's response performance was compared to the national consensus standard for response performance found in the National Fire Protection Association's (NFPA) Standard 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.

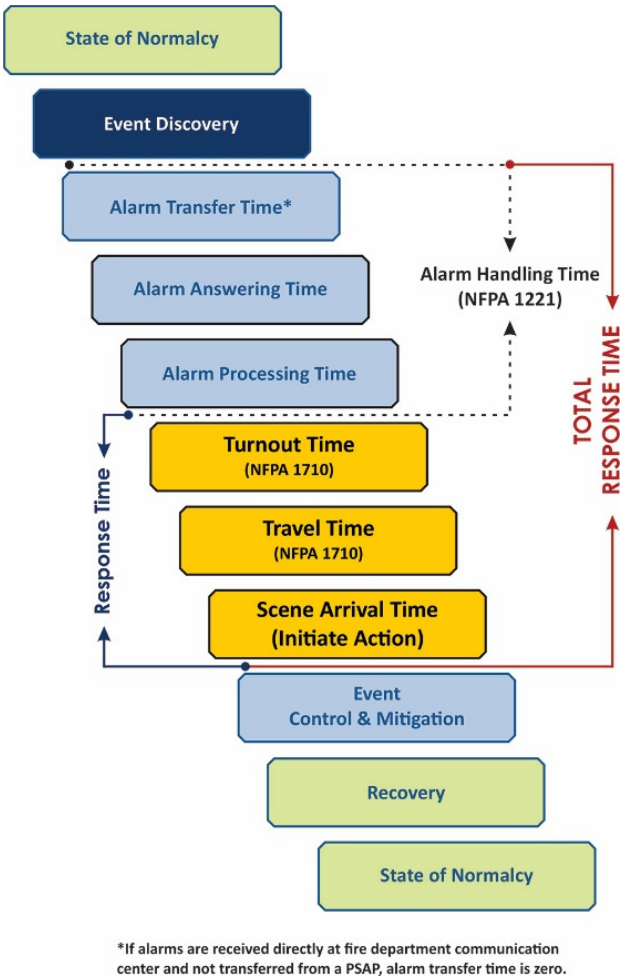
In addition, the dispatch center's performance was compared to standards found in the National Fire Protection Association's Standard 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*, 2019 Edition.

NFPA 1710, Section A.3.3.64.6, breaks down the overall total response time elements of an emergency call in a graph titled the "Cascade of Events" chart. The Cascade of Events chart is provided to assist in understanding the relationship between NFPA 1221, NFPA 1710, and the event discovery/event initiation time, which is currently not addressed by an NFPA standard.

Two phases are included in "Total Response Time." Phase one is the alarm handling time, which includes alarm transfer time, alarm answering time, and alarm processing time (addressed by NFPA 1221). Phase two is the turnout time, and travel time, both addressed in NFPA 1710.

The accompanying figure on the right illustrates the typical "Cascade of Events" described by the National Fire Protection Association.

Figure 105: Cascade of Events



The following figure summarizes the performance standards used in this section to evaluate performance compared to NFPA 1710's standards.

Figure 106: Summary of Performance Goals

Incident Interval	Performance Goal
911 alarm answering time (time from the first ring to answer). NFPA 1221.	Within 15 seconds, 90% of the time
Alarm processing time (time from acceptance at the dispatch center until notification of response units). NFPA 1221.	Within 60 seconds, 90% of the time
Turnout time (time from notification of response personnel until the initiation of movement towards the incident). NFPA 1710.	Within 60 seconds, 90% of the time (EMS) Within 80 Seconds, 90% of the time (Fire)
First unit travel time (time from initiation of response until the arrival of the first unit at the incident). NFPA 1710.	Within 4 minutes, 90% of the time
Total Response Time (time from alarm transfer or answering time until the arrival of the first unit at the incident). Both NFPA 1221 & 1710 combined.	Within 6 minutes, 15 seconds, 90% of the time (EMS) Within 6 minutes, 35 seconds, 90% of the time (Fire)
Full effective response force travel time (time from dispatch until all units initially dispatched arrive at the incident. NFPA 1710.	Within 8 minutes, 90% of the time (low and medium hazard risks) Within 10 minutes, 10 seconds, 90% of the time (high hazard & high-rise risks)

In keeping with NFPA Standards 1710 and 1221 and SMCFD's performance goals, all response time elements are reported at a given percentile. Percentile represents a methodology by which response times are sorted from least to greatest, and a "line" is drawn at a certain percentage of the calls to determine the percentile. The point at which the "line" crosses the 90th percentile, for example, is the percentile time performance. Thus, 90% of the time was at or less than the result. Only 10% were longer.

Percentile differs greatly from average. Averaging calculates response times by adding all response times together and dividing the total number of minutes by the total number of responses (mean average). Measuring and reporting average response times is not recommended because it does not identify the number and extent of events with times beyond the stated performance goal.

A detailed description and review of each phase of the response time continuum follows. Finally, all phases will be compared to SMCFD's performance goals.

Detection

Detecting a fire (or medical incident) may occur immediately if someone is present or an automatic system is functioning. Otherwise, detection may be delayed, sometimes for a considerable period. This phase begins with the inception of the emergency and ends when the emergency is detected. It is largely outside the fire department's control and not a part of the event sequence that is reliably measurable.

Alarm Handling Time

The Alarm Handling Time has two parts, the "alarm answering time" and the "alarm processing time." In addition, for agencies that have an initial Public Safety Answering Point (PSAP) that answers and transfers calls to a secondary dispatch center, there is an additional "alarm transfer time" added.

Most emergency incidents are reported by telephone to the 911 center. Call takers must quickly elicit accurate information about the incident's nature and location from persons apt to be excited. Lay people well-trained in reporting emergencies can reduce the time required for the alarm processing phase. The dispatcher must identify the correct units based on incident type and location, dispatch them to the emergency, and continue to update information about the emergency while the units respond.

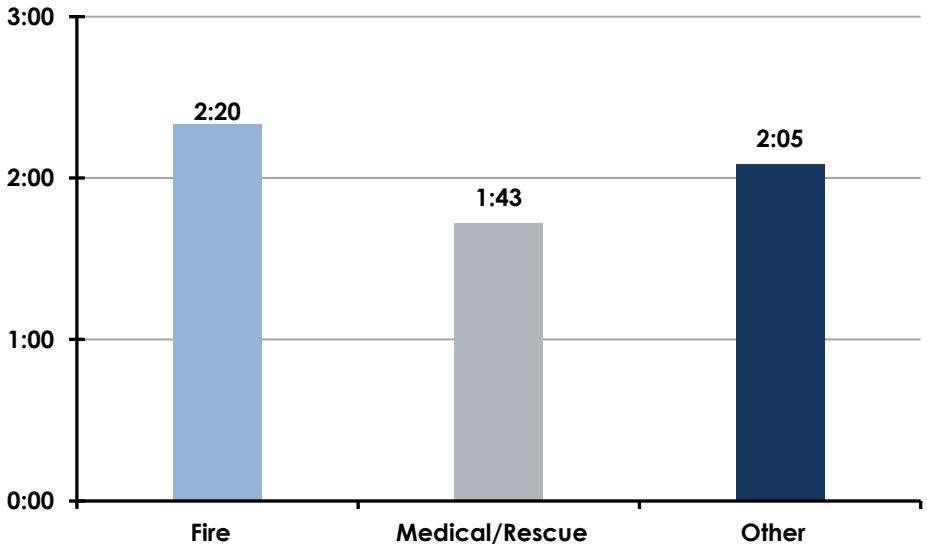
SMCFD has three separate call answering points for the three separate cities that it serves. The cities of San Mateo, Foster City, and Belmont all individually answer their 911 calls, query the caller to determine nature and location, and then transfer the information to the secondary dispatch center at San Mateo County Public Safety Communications Center, which dispatches the SMCFD units. The "alarm transfer" time from PSAP to the secondary dispatch center adds another time element to the sequence.

Triton determined that the actual "alarm answering" and "alarm transfer" times for the San Mateo, Foster City, and Belmont dispatch performance goal data are unavailable as there is no CAD-to-CAD transfer from the initial PSAP to San Mateo County dispatch. Therefore, the "alarm answering" and "alarm transfer" data were not available in this analysis.

The second part of the alarm handing time, called the "alarm processing time" begins when the call is entered into the system at the dispatch center and ends when response units are notified of the incident. NFPA 1221 standards recommend that this phase occurs within 60 seconds, 90% of the time.

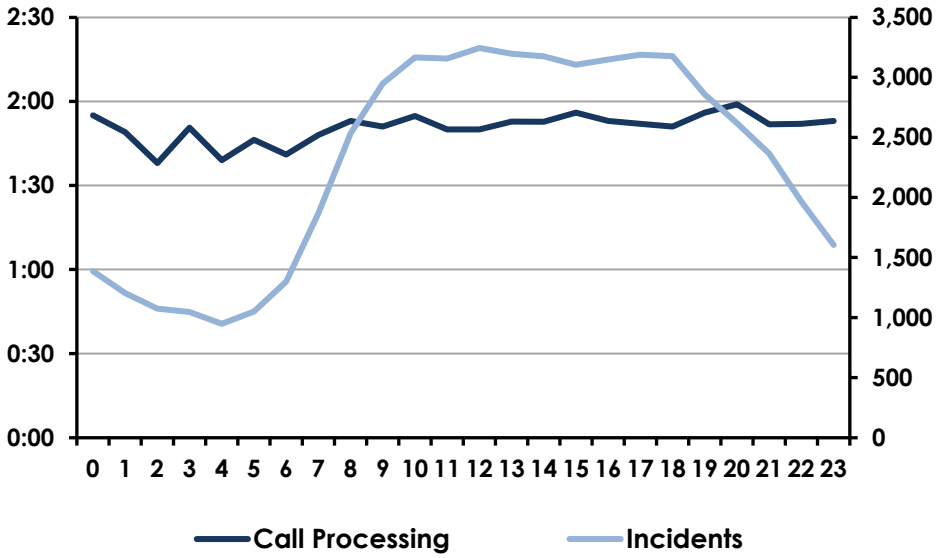
The following figure illustrates the San Mateo County dispatch center's "alarm processing time" performance from the time it receives the call until it notifies response units. Overall performance during the study period was below or near the NFPA 1221 guideline.

Figure 107: Alarm Handling by Type of Incident



The workload at the dispatch center can influence call processing performance. The following figure illustrates performance at different times of the day compared to SMCFD's response workload. Call processing time is below NFPA recommendations despite the variation of being faster in the evening and slightly longer during the day.

Figure 108: Alarm Handling by Hour of Day

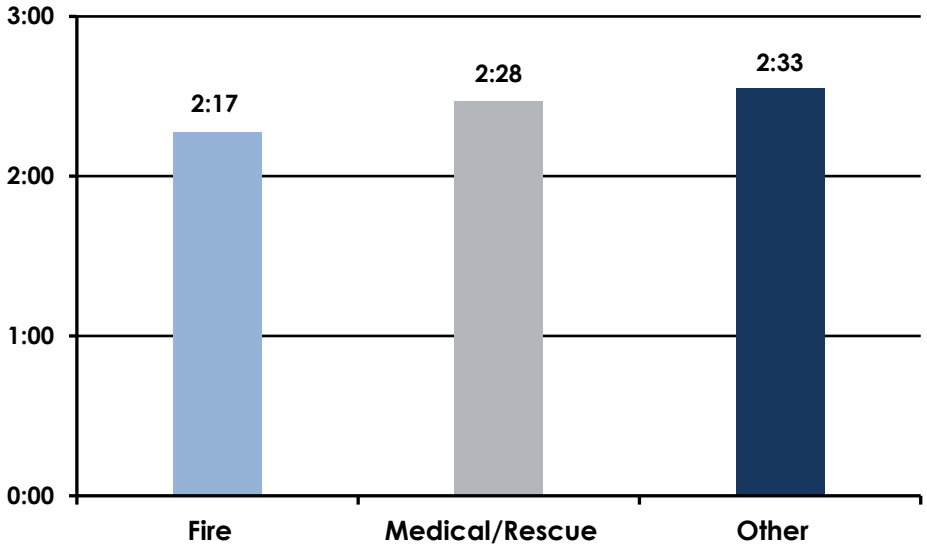


Turnout Time

The turnout time response phase is controllable by SMCFD. This phase begins with the dispatch center's notification of an emergency in progress and ends when personnel and apparatus begin to move toward the incident location. Personnel must don appropriate equipment, assemble on the response vehicle, and begin traveling to the incident. Good training and proper fire station design can minimize the time required for this phase.

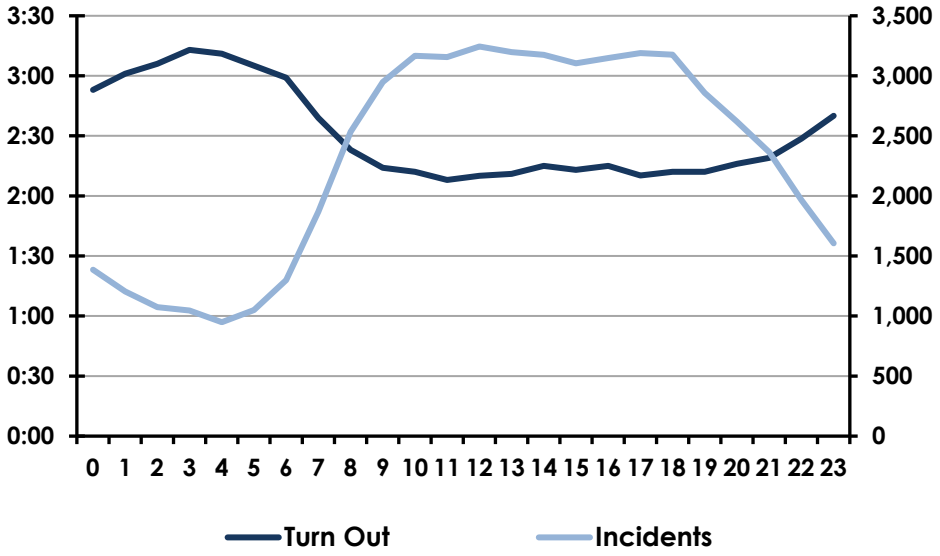
The performance goal for turnout time is within 60 seconds, 90% of the time for EMS, and within 80 Seconds, 90% of the time for fire incidents. The following figure lists turnout time by incident types. Turnout times for all incident types exceed standards. During the study period, turnout time for priority incidents was within 2 minutes, 30 seconds, 90% of the time.

Figure 109: Turnout Time Performance by Call Type



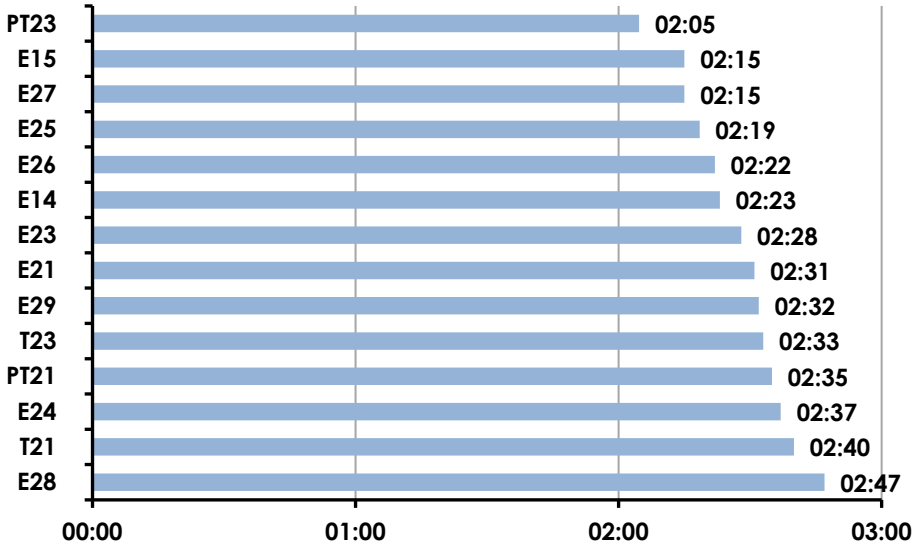
Turnout time can vary by the hour of the day. In this case, turnout time varied by 61 seconds between the early morning hours and daytime hours, as shown in the following.

Figure 110: Turnout Time Performance by Hour of Day



The next figure illustrates turnout time by unit at the 90th percentile performance measure.

Figure 111: Turnout Time by Unit at the 90th Percentile

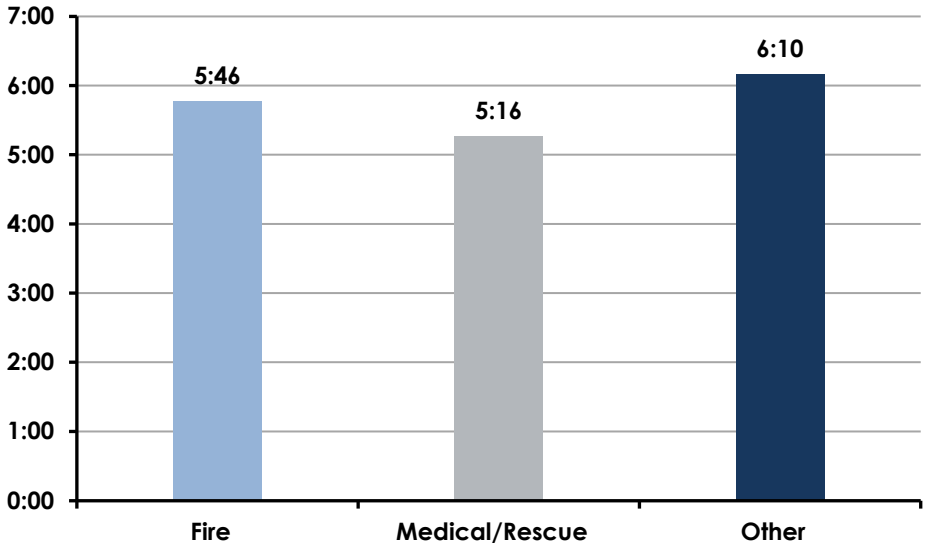


Distribution & Initial Arriving Unit Travel Time

Travel time is potentially the longest of the response phases. The distance between the fire station and the location of the emergency influences response time the most. The quality and connectivity of streets, traffic, driver training, geography, and environmental conditions also are factors. This phase begins with the initial apparatus movement toward the incident location and ends when response personnel and apparatus arrive at the emergency's location. According to NFPA 1710, the performance goal should be four minutes for the first response unit to arrive at an incident.

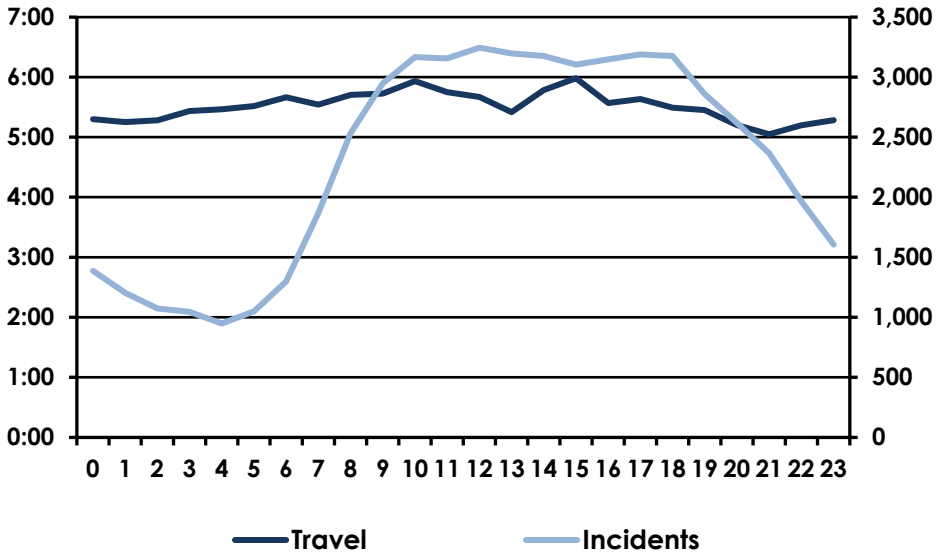
The following figure lists travel times for all priority incidents and incident types. SMCFD's travel times exceeded its goal in all incident types. Travel time for overall average incident types was within 5 minutes, 33 seconds, 90% of the time.

Figure 112: Travel Time Performance by Call Type



Travel time can vary considerably by the time of day. Heavy morning and evening traffic can slow the department's response. Concurrent incidents also can increase travel time since units from more distant stations would need to respond. Morning commuter traffic appears to affect travel time more than evening commuter traffic. The following figure shows the travel time performance and the hourly workload.

Figure 113: Travel Time Performance by Hour of Day



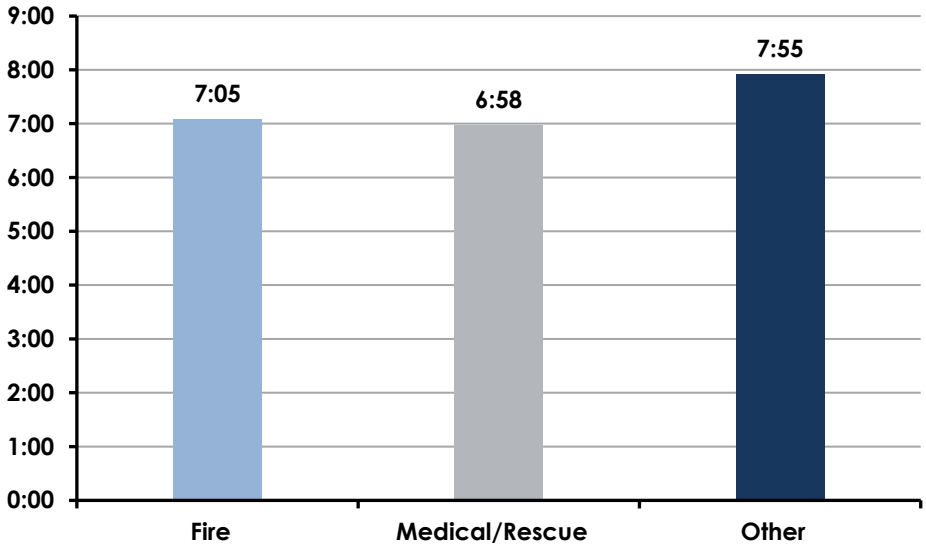
A response unit must be available within four travel minutes of the incident to provide an on-time response.

First Arriving Unit Response Times

First Unit response time is defined as the period between the notifications of response personnel by the dispatch center that an emergency is in progress until the arrival of the first Fire Department response unit at the emergency. When turnout time and travel time are combined, the performance goal for response time is within 5 minutes, 90% of the time for EMS incidents, and within 5 minutes, 20 seconds, 90% of the time for fire incidents.

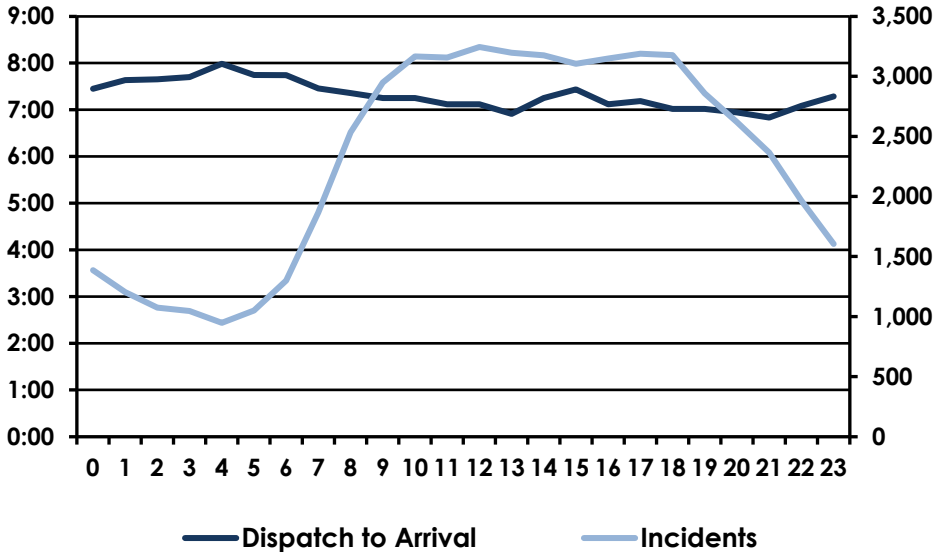
The following figure illustrates the response time for priority incident types. Overall, the response time average for all priority incidents was within 7 minutes, 16 seconds at 90%.

Figure 114: First Unit Arrival Performance



The following figure shows response times and the number of incidents by the hour of the day for all incidents. Response time is slowest during the nighttime hours and slightly faster during the day.

Figure 115: First Unit Arrival Performance by Hour of the Day

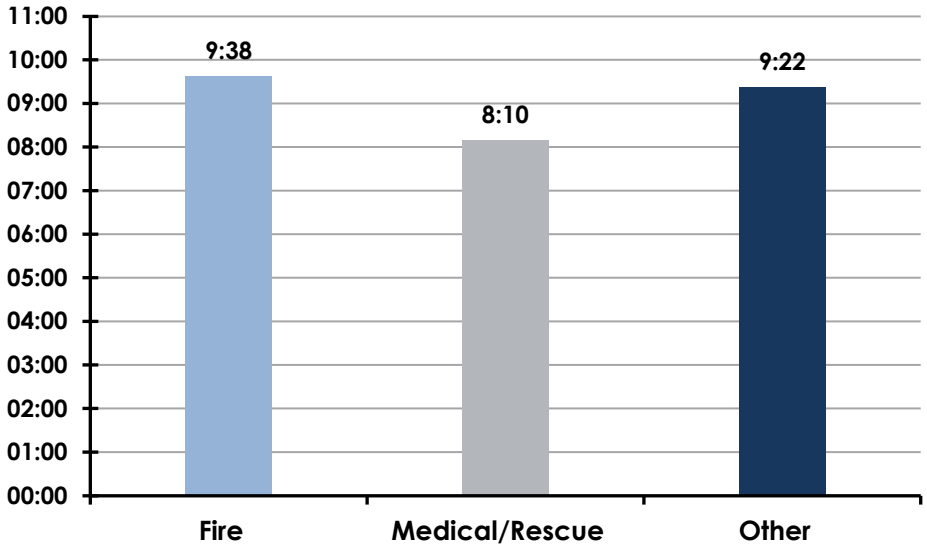


First Arriving Unit Received to Arrival Time

From the customers' standpoint, response time begins when an emergency occurs. Their first contact with emergency services is when they call for help, usually by dialing 911. The alarm received-to-unit arrival time phase combines the alarm answer/transfer, alarm processing, turnout, and travel time phases. When the performance goals are combined, alarm received-to-unit arrival time should be within 6 minutes, 15 seconds, 90% of the time for EMS incidents, and within 6 minutes, 35 seconds, 90% of the time for fire incidents.

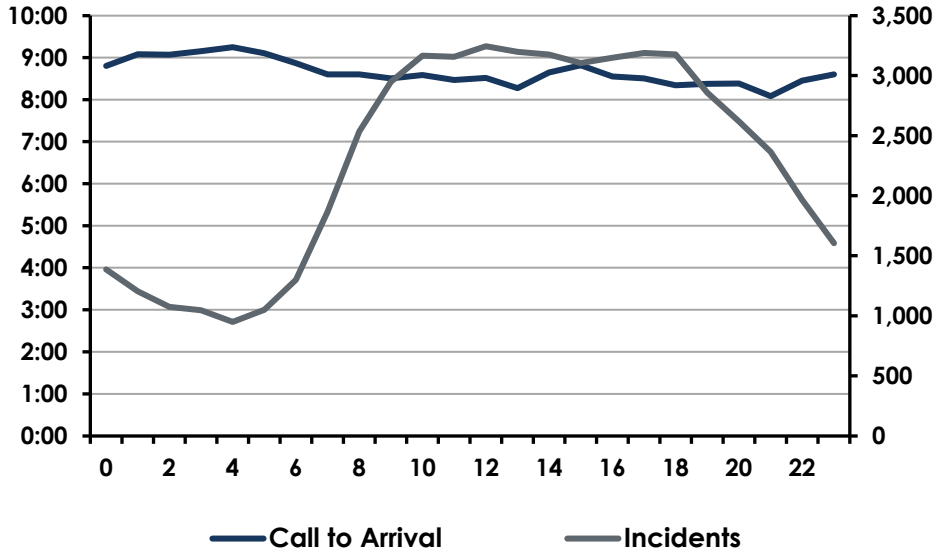
The following figure shows alarm received-to-unit arrival total response times for priority incidents within the SMCFD service area. Overall, the received-to-arrival time was within 8 minutes, 35 seconds, 90% of the time.

Figure 116: Call Received to Arrival by Call Type



The next figure shows received to arrival performance by time of the day compared to incident activity by time of day. From the customers' standpoint, received-to-arrival is consistent during the day.

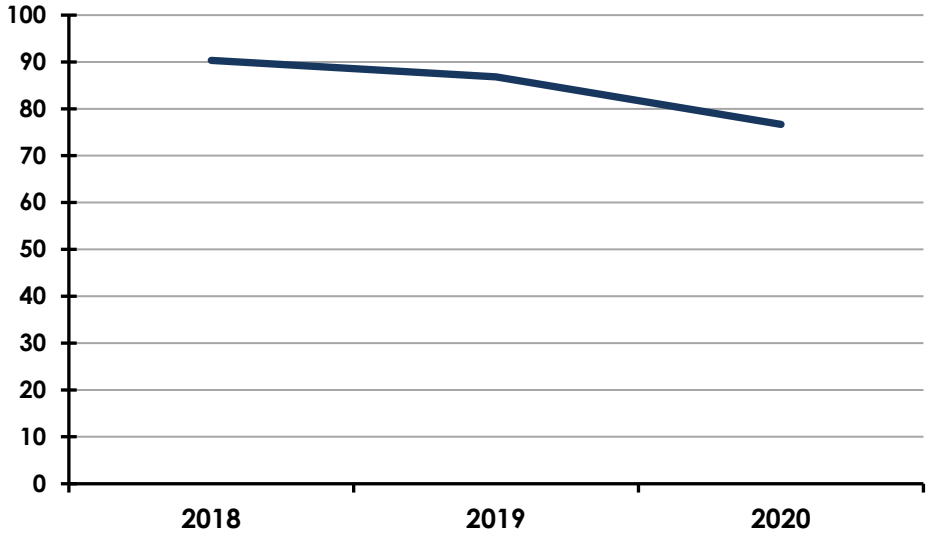
Figure 117: Call Received to Arrival by Hour of Day



Population & Incident Workload Projections

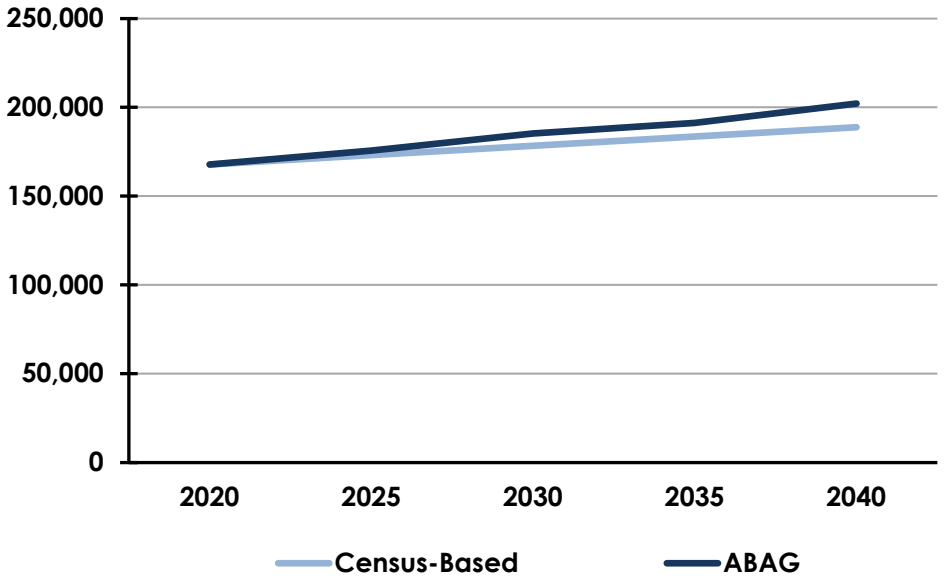
From 2018 through 2020, the utilization rate of the fire department per 1,000 population generally decreased, as shown in the following figure. This was likely due to pandemic concerns, traffic reduction, and fears of healthcare settings. It is projected that utilization will stabilize at 84.6 per 1,000 population through 2040.

Figure 118: Utilization Rate



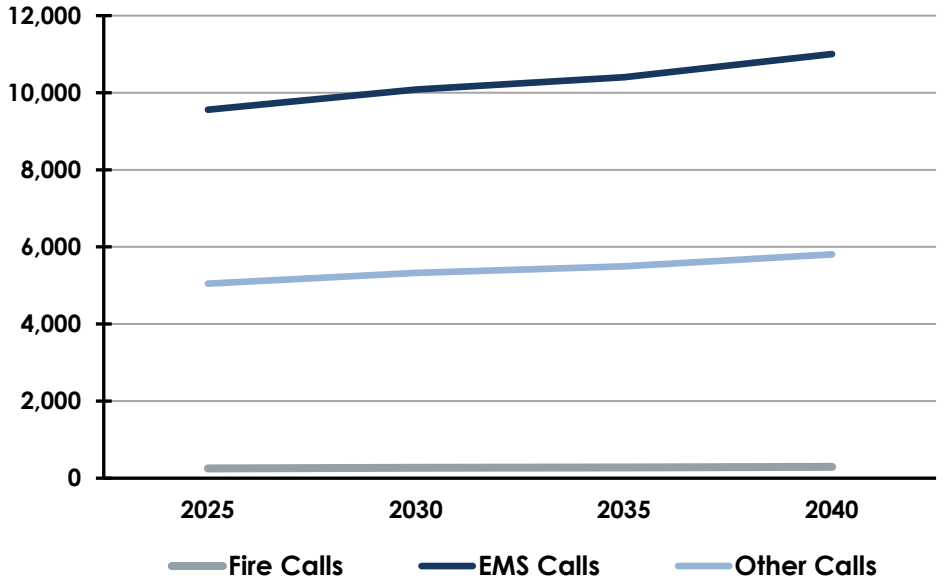
Based on the census population, a forecast for the future population can be calculated using the lasted growth rate data. This forecast was very close to the San Mateo Consolidated Area population projections by the Association of Bay Area Governments (ABAG) report.[22] Census-based forecast calculated a population of 188,751 in 2040, while the ABAG projected 202,160 residents.

Figure 119: Population Projections



The following figure shows that using census-based forecasted population growth will potentially increase SMCFD's workload. However, response workload is expected to remain stable, and requests for emergency medical services are expected to increase.

Figure 120: Workload Projections



Development of Response Standards & Targets

The San Mateo Consolidated Fire Department's service area combines urban and suburban areas with unique risks and response requirements. This can be seen by providing fire protection and EMS coverage to over 40 square miles of land and water that stretch from the San Francisco Bay to the Wildland Urban Interface (WUI) risk areas of Highland and the hills near Interstate 280 and Highway 92. Specific critical tasks must be accomplished with each type of incident and corresponding risk, and certain numbers and types of apparatus should be dispatched.

Tasks that must be performed at a fire can be broken down into two key components: life safety and fire flow. Life safety tasks are based on the number of building occupants, and their location, status, and ability to take self-preservation action. Life safety-related tasks involve the search, rescue, and evacuation of victims. The fire-flow component involves delivering sufficient water to extinguish the fire and create an environment within the building that allows entry by firefighters.

The number and types of tasks needing simultaneous action will dictate the minimum number of firefighters required to combat different types of fires. In the absence of adequate personnel to perform concurrent action, the commanding officer must prioritize the tasks and complete some in chronological order rather than concurrently. These tasks include the following:

- Command
- Scene safety
- Search and rescue
- Fire attack
- Water supply
- Pump operation
- Ventilation
- Backup/rapid intervention

Critical task analyses also apply to non-fire-type emergencies, including medical, technical rescue, and hazardous materials emergencies. Numerous simultaneous tasks must be completed to control an emergency effectively. The department's ability to quickly muster needed numbers of trained personnel to make a difference is critical to successful incident outcomes.

The following figure illustrates the minimum emergency incident staffing recommendations of the Commission on Fire Accreditation International (CFAI). The following definitions apply to the figure:

- **Low Risk**: Minor incidents involving small fires (fire flow less than 250 gallons per minute), single patient non-life-threatening medical incidents, minor rescues, small fuel spills, and small wildland fires without unusual weather or fire behavior.
- **Moderate Risk**: Moderate-risk incidents involving fires in single-family dwellings and equivalently sized commercial office properties (fire flow between 250 gallons per minute to 1,000 gallons per minute), life-threatening medical emergencies, hazardous materials emergencies requiring specialized skills and equipment, rescues involving specialized skills and equipment, and larger wildland fires.
- **High Risk:** High-risk incidents involving fires in more significant commercial properties with a sustained attack (fire flows more than 1,000 gallons per minute), multiple patient medical incidents, significant releases of hazardous materials, high-risk rescues, and wildland fires with extreme weather or fire behavior.

Figure 121: CFAI Staffing Recommendation Based on Risk

Incident Type	High Risk	Moderate Risk	Low Risk
Structure Fire	29	15	6
Emergency Medical Service	12	4	2
Rescue	15	8	3
Hazardous Materials	39	20	3

SMCFD has developed the following Critical Task Analysis using risk matrices for various incident types. AP Triton's review of the Critical Task Analysis concludes that all are generally in keeping with industry standards and provide the minimum number of personnel needed for effective incident operations.

Establishing resource levels needed for various emergencies is a uniquely local decision. Factors influencing local decisions for incident staffing include the type of equipment operated, training levels of responders, operating procedures, geography, traffic, and the nature of buildings and other risks protected.

Critical Tasking

Critical tasks are those activities that must be conducted early on and promptly by firefighters at emergency incidents to control the situation, stop loss, and perform necessary tasks required for a medical emergency. SMCFD is responsible for ensuring those responding companies can perform all described tasks promptly, efficiently, and safely. The following figures show the minimum number of personnel needed by incident type determined by SMCFD. More personnel will be required for complex incidents.

Figure 122: Structure Fire w/Hydrants

Task	Number of Personnel
Command & Safety	2
Pump Operations	1
Attack Line	2
Search and Rescue	2
Ventilation	2
Back-up Line	2
RIC	3
Water Supply/Out Team	2
Ambulance/EMS	0
Other (Utilities, rehab)	2
Total:	**18**

Figure 123: Structure Fire without Hydrants

Task	Number of Personnel
Command & Safety	2
Pump Operations	1
Attack Line	2
Back-up Line	2
Search and Rescue	3
Ventilation	2
RIC	3
Water Supply/Out Team	2
Water Tender Operator	1
Other (Utilities, Rehab)	2
Total:	**20**

Figure 124: Commercial Structure Fire

Task	Number of Personnel
Command & Safety	2
Pump Operations (AO)	1
Attack Line	3
Search and Rescue Team	3
Back-Up Line	3
Ventilation/Ground Ladders	3
Water Supply/Out Team	2
Aerial Operator (if ladder used)	2
RIC	3
Medical Group	0
Total:	**22**

Figure 125: High-Rise Structure Fire

Task	Number of Personnel
Command & Safety	2
Division Supervision	1
Pump Operations/AO	2
Attack Line/Secondary Attack	6
Back-Up Line	3
Vertical Ventilation Crew	3
Victim Search & Rescue Team	3
Interior Staging Manager	1
Staging Supplies	2
Lobby Control Manager	1
Equipment Transport	3
RIC	3
Water Supply/Out Team	2
Medical Group w/Supervisor	3
Total:	**35**

Figure 126: Wildland Fire—Low Risk

Task	Number of Personnel
Command & Safety	2
Pump Operations/Lookout	1
Attack Line (Primary Flank)	2
Attack Line (Secondary Flank)	2
Structure Protection w/MGR	3
Water Supply	1
Other (mop-up, overhaul, line)	3
Total:	**14**

Figure 127: Wildland Fire—High Risk

Task	Number of Personnel
Command & Safety	2
Pump Operations/Lookout	1
Attack Lines (primary, backup, spot fires)	9
Exposure Lines/Structure Protection	3
Structure Protection	3
Water Supply/Out Team	2
Water Tender	2
Other (mop-up, overhaul, line)	3
Total:	**25**

Figure 128: Aircraft Emergency

Task	Number of Personnel
Command & Safety	2
Pump Operations	1
Attack Line	2
Backup Line	3
Rescue	3
Emergency Medical Care	3
Water Supply	—
Total:	**14**

Figure 129: Hazardous Materials—Low-Risk (Investigation)

Task	Number of Personnel
Command & Safety	1
Investigation	2
Total:	**3**

Figure 130: Hazardous Materials—High-Risk (Response)

Task	Number of Personnel
Command & Safety	1
Haz Mat Group Supervisor	1
Haz Mat Safety Officer	1
Entry Supervisor	1
Entry Team	2
Back-Up Team	2
Decontamination	4
Pump Operations	1
Chemist	1
Total:	**14**

Figure 131: Emergency Medical Aid

Task	Number of Personnel
Patient Management	1
Patient Care	2
Total:	**3**

Figure 132: Motor Vehicle Accident

Task	Number of Personnel
Command & Safety	1
Patient Care	3
Extrication	3
Pump Operator/Suppression Line	1
Vehicle Stabilization	2
Total:	**10**

Figure 133: Major Medical Response

Task	Number of Personnel
Command & Safety	2
Medical Group Supervisor	1
Triage Unit with Leader	3
Treatment Manger	1
Patient Care	4
Transportation Manager	1
Medical Communications	1
Landing Zone	2
Extrication Group	3
Total:	**18**

Figure 134: Technical Rescue (Water Bay/Near Shore)

Task	Number of Personnel
Command & Safety	2
Rescue Boat	3
Backup Boat	3
Patient Care	3
Rope Tender (Swift Water)	
Upstream Spotter (Swift H20)	
Downstream Safety (Swift H20)	
Total:	**11**

Figure 135: Technical Rescue (Rope Rescue)

Task	Number of Personnel
Command & Safety	1
Technical Safety Officer	1
Rigging Team	3
Rescue Team Edge Supervisor	3
Backup Team	3
Patient Care	3
Total:	**14**

Figure 136: Technical Rescue (Confined Space Rescue)

Task	Number of Personnel
Command & Safety	1
Technical Safety Officer	1
Support Team (air monitor, air supply, communications)	3
Rigging Team	3
Rescue Team	3
Backup Team	3
Patient Care	3
Total:	**17**

Figure 137: Technical Rescue (Trench Rescue)

Task	Number of Personnel
Command & Safety	2
Support Team (air monitor, air supply, communications)	3
Shoring Team	6
Rescue Team	3
Backup Team	3
Patient Care	3
Total:	**20**

Alarm Assignments

To ensure sufficient personnel and apparatus are dispatched to an emergency event, the following first alarm response assignments have been established by SMCFD to ensure sufficient personnel and apparatus are dispatched to an emergency event. "Total Staffing Needed" is the number identified in the previous Critical Tasking Analysis.

The number of personnel and apparatus required to mitigate an active and complex working incident will require additional resources above and beyond the numbers listed next. With currently available resources, SMCFD is able to staff most incident types in accordance with its Critical Tasking Analysis without relying on mutual and auto-aid with other neighboring departments. With a daily staffing minimum of 39 Firefighters on duty, SMCFD can be nearly self-sufficient in most cases.

Figure 138: Structure Fire w/Hydrants

Unit Type	Number of Units	Total Personnel
Engine	5	15
Ladder	1	4
Battalion Chief	2	2
Total Units/Staffing Provided by SMCF:	**7**	**20**
Total Staffing Needed:		**18**
Mutual-Aid Units/Staffing:	**1**	**1**
Total Staffing Provided:		**21**
Gap/Deficit:		**+3**

Figure 139: Commercial Structure Fire

Unit Type	Number of Units	Total Personnel
Engine	5	15
Ladder	1	4
Battalion Chief	2	2
Total Units/Staffing Provided by SMCF:	**7**	**20**
Total Staffing Needed:		**22**
Mutual-Aid Units/Staffing:	**1**	**1**
Total Staffing Provided:		**21**
Gap/Deficit:		**-1**

Figure 140: High-Rise Structure Fire

Unit Type	Number of Units	Total Personnel
Engine	6	18
Ladder	3	11
Air Supply		
Battalion Chief	3	3
Total Units/Staffing Provided by SMCF:	**8**	**23**
Total Staffing Needed:		**35**
Mutual-Aid Units/Staffing:	**4**	**9**
Total Staffing Provided:		**32**
Gap/Deficit:		**-3**

Figure 141: Wildland Fire—Low Risk

Unit Type	Number of Units	Total Personnel
Engine	3	9
Brush Engine		
Battalion Chief	1	1
Total Units/Staffing Provided by SMCF:	**4**	**10**
Total Staffing Needed:		**14**
Mutual-Aid Units/Staffing:		
Total Staffing Provided:		**10**
Gap/Deficit:		**-4**

Figure 142: Wildland Fire—High Risk

Unit Type	Number of Units	Total Personnel
Engine	6	18
Brush Engine	1	3
Battalion Chief	3	3
Water Tender	1	3
Total Units/Staffing Provided by SMCF:	**7**	**19**
Total Staffing Needed:		**25**
Mutual-Aid Units/Staffing:	**4**	**8**
Total Staffing Provided:		**27**
Gap/Deficit:		**+2**

Figure 143: Hazardous Materials—Low Risk (Investigation)

Unit Type	Number of Units	Total Personnel
Engine	1	3
Ladder	0	0
Battalion Chief	0	0
Total Units/Staffing Provided by SMCF:	**1**	**3**
Total Staffing Needed:		**3**
Mutual-Aid Units/Staffing:	**0**	**0**
Total Staffing Provided:		**3**
Gap/Deficit:		**0**

Figure 144 Hazardous Materials—High Risk (Response)

Unit Type	Number of Units	Total Personnel
Engine	2	6
Ladder	1	4
Battalion Chief	1	1
Hazardous Material Unit	2	6
Total Units/Staffing Provided by SMCF:	**6**	**17**
Total Staffing Needed:		**14**
Mutual-Aid Units/Staffing:	**0**	**0**
Total Staffing Provided:		**17**
Gap/Deficit:		**+3**

Figure 145: Emergency Medical Aid

Unit Type	Number of Units	Total Personnel
Engine or Ladder	1	3
Battalion Chief		
Total Units/Staffing Provided by SMCF:	**1**	**3**
Total Staffing Needed:		**3**
Mutual-Aid Units/Staffing:		**0**
Total Staffing Provided:		**3**
Gap/Deficit:		**0**

Figure 146: Motor Vehicle Accident

Unit Type	Number of Units	Total Personnel
Engine	1	3
Ladder	1	4
Battalion Chief	1	1
Total Units/Staffing Provided by SMCF:	**3**	**8**
Total Staffing Needed:		**10**
Mutual-Aid Units/Staffing:		**0**
Total Staffing Provided:		**8**
Gap/Deficit:		**-2**

Figure 147: Major Medical Response

Unit Type	Number of Units	Total Personnel
Engine	3	9
Ladder	1	4
MCI Trailer		
Battalion Chief	1	1
Total Units/Staffing Provided by SMCF:	**5**	**14**
Total Staffing Needed:		**18**
Mutual-Aid Units/Staffing:		
Total Staffing Provided:		**14**
Gap/Deficit:		**-4**

Figure 148: Technical Rescue Water (Bay/Near Shore)

Unit Type	Number of Units	Total Personnel
Engine	1	3
Boat (Varies on mutual aid)	2	6
Ladder	1	4
Battalion Chief	1	1
Total Units/Staffing Provided by SMCF:	**3**	**8**
Total Staffing Needed:		**11**
Mutual-Aid Units/Staffing:	**2**	**6**
Total Staffing Provided:		**14**
Gap/Deficit:		**+3**

Figure 149: Technical Rescue—Trench Rescue

Unit Type	Number of Units	Total Personnel
Engine	3	9
Ladder	1	4
USAR Heavy Rescue	1	3
Battalion Chief	1	1
Total Units/Staffing Provided by SMCF:	**6**	**17**
Total Staffing Needed:		**20**
Mutual-Aid Units/Staffing:		
Total Staffing Provided:		**17**
Gap/Deficit:		**-3**

Response Time Performance Objectives

Once SMCFD has established response time objectives and identified the critical tasks and number of personnel necessary to achieve those critical tasks (in the preceding section), the department can begin defining emergency response time performance objectives.

The process of setting response time performance objectives will include two primary questions:

- What are the expectations of the community and elected officials regarding the initial response times of SMCFD to an emergency incident? What is the public's perception of quality emergency services concerning response time?
- What response time performance would be reasonable and effective in containing the fire, stopping the loss, and saving lives when considering the common types of incidents and fire risks faced by SMCDF?

With the SMCFD being a career fire department, references to the national consensus standard for career fire departments should be used (NFPA 1710 Standard for Career Fire Departments). Although the NFPA performance recommendations are considered an industry best practice, fire departments working with their governing bodies sometimes implement response performance goals that better suit their communities and are under NFPA best practice standards.

Triton recommends that tiered response performance objectives be developed based on the population density and risks present. This methodology will effectively segregate the service area into response zones reflecting community expectations and fire department capabilities.

The following two figures provide examples of response performance goals based on population and risk response zones. The first example is the "first due" response of a single unit utilizing the industry best practice response time metric, from the time the call is received at 911 to arrival on-scene at the 90th percentile.

Figure 150: Example of a First-Due Single-Unit Response Standard

Density	Description	Response Time Goal
Urban	Greater than 1,000 persons/square mile	7 minutes or less at 90%
Suburban	500–1,000 persons/square mile	9 minutes or less at 90%
Rural	Less than 500 persons/square mile	11 minutes or less at 90%

The following example represents the first-alarm response to a moderate-risk structure fire, utilizing the industry best practice response time metric.

Figure 151: Example of First Alarm Response (3 Engines, 2 Medic Units, & 1 BC)

Density	Description	Response Time Goal
Urban	Greater than 1,000 persons/square mile	8 minutes or less at 90%
Suburban	500–1,000 persons/square mile	11 minutes or less at 90%
Rural	Less than 500 persons/square mile	14 minutes or less at 90%

Fire departments throughout the United States use the practice of establishing risk zones based on risk and population density. Using risk or "demand" zones provides a more accurate picture of service-delivery performance. This is especially relevant for fire departments such as SMCFD, which provide emergency response to substantial and diverse service areas in the nearly 40 square mile fire department serving the communities of San Mateo, Foster City, and Belmont.

The preceding response standards are presented as examples. The previous discussion provides SMCFD with the information necessary to establish response standards and targets. Establishing response standards and performance goals should be viewed as a strategic planning tool for community loss control. Therefore, San Mateo Consolidated Fire Department is encouraged to begin the process as soon as feasible to assist with future planning needs.

Section IV:
FINDINGS & RECOMMENDATIONS

Findings & Observations

The following section outlines some of Triton's more significant findings and observations during this study based on the data received, onsite observations, and stakeholder interviews. In addition, these follow the "critical issues" as listed by the Fire Chief including succession planning, identifying, and implementing appropriate organizational structure, completing the consolidation, and budget sustainability.

Operations & Deployment

- Historical incident records show that the highest service demands occur in SMCFD's Stations 21, 23, & 24 response areas, particularly in the area of station 21.
  - Based on the incident demand density workload data, all of SMCFD fire stations are located in the appropriate areas for very good overall service demand density coverage throughout SMCFD.
  - Based on the SMCFD individual unit workload, the dual companies at stations 21, 23, and 28 are placed in appropriate locations.
  - Coverage gaps are created during busy periods between 8 a.m. to 6 p.m.
  - Current station location configuration meets the overall resource distribution coverage for four-minute travel time throughout SMCFD, and for adequate ISO engine and truck distance requirements.
  - The concentration analysis for SMCFD shows that with the current staffing model combined with station locations, the physical capacity of SMCFD's resources to assemble both apparatus and firefighters by area for an effective response force, is very good and exceeds the capabilities of most agencies.
  - Based on the preceded data, no additional station locations are recommended for SMCFD at this time.
- SMCFD has a current ISO rating of 2. The agency is to be commended for being in one of the top ISO classifications in the state of California.
  - SMCFD has requested ISO to rate the entire district.
- SMCFD maintains Intergovernmental Agreements (IGA) with other departments to initiate a closest forces response model utilizing Automatic Vehicle Location (AVL) technology.
  - SMCFD relies on automatic aid to fill its operational ERF requirements in some areas, just as adjacent agencies reply on SMCFD to fill theirs.

- Operational policies, training, procedures, and activities of the other fire departments are not necessarily consistent with SMCFD's standards. This has sometimes created challenges during incidents that require a multi-agency response.
- SMCFD's current staffing model of 39 firefighters on duty each 24-hour period, allows the agency to be nearly self-sufficient in most cases for ERF assemblies.

Response Performance

- There is an inability to consistently meet response performance goals and NFPA best practice time measurements throughout the SMCFD area.
- The "alarm processing time," overall performance of 60 seconds or less, 90% of the time, based on the data provided, was not within NFPA 1221 standards.
- The Cities of San Mateo, Belmont, and Foster City Police Departments PSAP dispatch centers answer the calls for SMCFD and the "call answer" and "call transfer" times to San Mateo County Public Safety Communications are not well documented.
- NFPA 1221 benchmarks recommending that 911 calls be answered within 15 seconds, 90% of the time (within 20 seconds, 95% of the time), are not able to be determined due to insufficient data by the 3 three city Police PSAP's and with no current CAD to CAD transfer system in place.
- SMCFD's turnout time performance goal is 60 seconds or less at 90% for all call types.
  - Overall turnout times were 2 minutes, 30 seconds at 90% during the study period.
- SMCFD's travel time performance goal is 4 minutes, 0 seconds at 90%.
  - SMCFD's travel time performance was 5 minutes, 33 seconds at 90% for all incidents during the study period.
- SMCFD's first unit response time performance goal is 5 minutes, 0 seconds or less at 90% for all call types.
  - For all incident types during the study period, SMCFD's first-arriving unit response time was 7 minutes, 16 seconds at 90%.
- SMCFD's total call received to first unit arrival response time performance goal is 6 minutes, 30 seconds or less at 90% for all call types.
  - For all incident types during the study period, SMCFD's first-arriving unit response time was 8 minutes, 35 seconds at 90%.
- SMCFD currently does not regularly conduct performance and outcome measurements.

Personnel & Staffing

- NFPA 1710 recommends 4-person staffing on both fire engines and aerial apparatus. SMCFD maintains this minimum on aerial apparatus but does not maintain this minimum standard on fire engines.
  - Current daily minimum staffing for SMCFD is 39 firefighters total in nine stations.
  - Triton estimates that it would require an additional thirty firefighters to maintain 4-person staffing on all ten fire engines.
  - It is well documented that 4-person companies maintain much greater efficiencies and safety factors when operating on fire and emergency scenes.
  - Four-person staffing would improve deficiencies found in total staffing needed for SMCFD critical tasking and alarm assignment totals, and would further increase the ERF assembly capabilities.
- Access to professional career development training for officers, firefighters, and other staff appears to be limited. Succession planning is a priority to many at all levels throughout SMCFD.
- SMCFD does not have a formal succession plan in place.
- Numerous inputs received stated that the current management staff FTEs is inadequate with the numerous program responsibilities currently in place.
- SMCFD currently contracts out HR and Finance services with the City of San Mateo and does not provide those services from within.

Fire Stations & Facilities

- Both Stations 15 and 27 are over the recommended maximum facility age and both are rated in poor condition. Each facility has numerous deficiencies and has likely reached its useful life as a functional modern fire station.
- Both fire stations are currently located in adequate locations based on service coverage but could be slightly relocated following the GIS incident and response time data, if a more suitable nearby property was available.
- SMCFD is currently working on building adequate training grounds and training classroom facilities within the fire department since ending the training IGA with Central County Fire Department.

Miscellaneous Findings & Observations

- It was noted by numerous personnel that the formation of the SMCFD Joint Power Authority (JPA) agreement has been successful after 3 years in place.
- SMCFD currently does not have a Capital Facilities Replacement Plan.
- SMCFD currently has a Strategic Plan in place since 2019 and regularly reviews and updates it, including a current strategic planning event in September, 2022.
- Some of SMCFD's standard operating guidelines, policies, and procedures are outdated and need updating.
- There was universal stakeholder input received at all levels about the high level of regard, support, enthusiasm, spirit, and camaraderie within SMCFD.
- There is a high level of support at all levels for the current fire department management team and Fire Chief. They are to be commended for continuing to lead the agency through the consolidation and as the agency continues to move forward in providing the best service possible to the citizens of SMCFD.
- The Fire Action Consensus Team (FACT) Charter has had high success and it was noted by many throughout SMCFD that it has been an effective participatory management program tool.

Recommendations & Strategies

During the course of this study, a number of issues, concerns, and opportunities were identified. The following section describes proposed strategies and recommendations identified by Triton. They are not presented in any order of priority, and Triton recommends that SMCFD leadership develop timelines for implementation.

The recommendations are described as goals and some should be implemented as funding allows. Each will improve the San Mateo Consolidated Fire Department's ability to provide more effective service to the community.

Response Performance

Recommendation 1: Consider doing further analysis of the call answering times, call processing times, and specifically call transfer times from the City of San Mateo PD, Belmont PD, and Foster City PD PSAP Dispatch Centers to San Mateo County Dispatch Center.

- The City of San Mateo, City of Bellmont, and Foster City Police Department Dispatch Centers answer the emergency calls for SMCFD, then transfer them to San Mateo County Dispatch, and the hand off times are not well documented and the actual "call answer" & "call transfer" times were not available for this study.
- NFPA 1221 standard benchmarks recommend that 911 calls be answered within 15 seconds, 90% of the time (within 20 seconds, 95% of the time). This benchmark was unable to be determined due to insufficient data.
- More detailed analysis should be conducted for data on the actual call answering times, and call transfer times that the three cities are taking to get the calls transferred to San Mateo County.
- Once a call is at San Mateo County dispatch, the data shows the "call processing" time of 60 seconds or less, 90% of the time, was below NFPA 1221 standards.
- Because of questions that arose in the CAD data provided by San Mateo County Dispatch for this study, it is recommended that further analysis on the accuracy of the CAD data is conducted, specifically looking at the time stamp benchmarks provided on all incidents.
- It is further recommended that SMCFD and other regional partner fire departments look into a Computer Aided Dispatch (CAD) CAD to CAD transfer system or network. By creating an interconnected network of CAD systems, public safety agencies can communicate faster and more efficiently and track data appropriately.

Recommendation 2: Consider initiating a regular Response Time Performance time tracking and reporting system.

- SMCFD does not currently regularly analyze and report operational response performance including turnout time, travel time, total response time, and assembly times for an effective response force.
- Software and reporting programs are readily available to assist with this tracking and regular reports should be conducted quarterly or bi annually to assist both the department's management staff and elected officials in oversight and planning.
- Regular response time performance tracking and reporting will allow SMCFD to begin to analyze the reasons for deficiencies under best practices, and methods for improvements.

Recommendation 3: Consider studying turnout time performance measures and possible causes.

- SMCFD's turnout times were found to be well above the performance goal of 60 seconds or less at 90% for all call types.
  - Overall turnout times were 2 minutes, 30 seconds at 90% during the study period.
- Turnout time is the one area over which SMCFD has total control and is not affected by outside influences. Turnout time affects overall response times and reducing this time component reduces total response time.
- Factors that influence turnout time can include station conditions, crew awareness, response procedures, in addition to poor station layouts and inefficient designs.
- New station facilities and better designs can improve turnout performance measures.

Recommendation 4: The department should consider conducting performance and outcome measurements.

- SMCFD should look at ways to provide performance and outcome measurements to share with the community and the elected officials. This could include documenting both property loss and property saved. It is a powerful message to be able to demonstrate every year that SMCFD experienced as an example, a $4.5 million fire loss for the year and was able to save $22.8 billion of property.
- Other measurements could include: How often is the fire contained to the room of origin? How long does it take to get water on the fire? How long does it take to get fire control? How many animals have been saved for the year? How often is an effective firefighting force on-scene within 8 minutes?

- Outcome measures will determine if a program or practice is working. Each year the SMCFD JPA approves a budget to provide funding to operate the agency. Does the funding allow the organization to develop and implement what they believe are the best strategies to improve services? Developing outcome measures permits the fire department to determine if program activities are beneficial.

Recommendation 5: Consider adjusting all incident run card alarm assignments to match critical tasking.

- SMCFD has developed Critical Task Analysis using risk matrices for various incident types. AP Triton's review of the Critical Task Analysis concludes that all are generally in keeping with industry standards and provide the minimum number of personnel needed for effective incident operations.
- To ensure sufficient personnel and apparatus are dispatched to an emergency event, SMCFD has also developed alarm assignments for all incident types.
- SMCFD should adjust some alarm assignments where gap/deficits are present, as noted in Section III of this report, in order to increase the number of dispatched resources to ensure that adequate resources and personnel are available to properly and safely mitigate the incident.

Operations & Deployment

Recommendation 6: Consider hiring enough additional firefighters to ensure a minimum of 4-person staffing daily on Fire Engines.

- Current daily minimum staffing on all ten-engine company's is currently three. The minimum of four meets NFPA 1710 standards, and improves the critical tasking total staffing needed for alarm assignments.
- Based on Triton's risk analysis, increasing engine staffing to a four-person company model will result in an enhanced Effective Response Force for potential fires and other significant events to all occupancies, most notably for high-risk occupancies.
- Four-person staffing meets the "two-in, two-out" OSHA respiratory protection safety standard.
- Four person staffing goals could be implemented based on future available JPA funding, potential grants, or other available funding resources, and should be determined by SMCFD based on planning needs and performance measures.
- Currently, SMCFD has three stations, (station 21, station 23, station 28) with dual companies so the recommended four person staffing priority would be at the stations without the current dual companies.

Fire Stations & Facilities

Recommendation 7: Consider replacing both Station 15 and Station 27 with new facilities.

- Station 15 is 63 years old; Station 27 is 49 years old, and both are rated in poor condition for modern fire station facilities. Numerous deficiencies are cited in the report for each station including interiors needing renovation, lack of adequate gender restroom facilities, inadequate exercise facilities, lack of turnout storage areas, and structural deficiencies.
- Both stations could be slightly re-located to an adjacent location, following the GIS data, that ensures adequate coverage for the incident demand density maps and meets the 4-minute travel time. For each station, a more suitable adjacent location could improve overall time measurements for many portions of their response zones.

Recommendation 8: Consider constructing or relocating the San Mateo Consolidated Fire Department Administrative Facility to a more suitable facility location.

- SMCFD should consider needed administrative facility changes including the possible relocation of the SMCFD administration facilities.
- There is currently limited space and with the SMCFD staff continuing to grow, it would be beneficial to have all of the administration under one roof and not in separate locations.
- Numerous stakeholder interview feedback was received that reported the current cramped office space, inadequate total office space, inadequate office privacy, and lack of easy public access to the headquarters office location.
- SMCFD should work with the JPA and the cities to research and find a suitable location that could be a standalone facility, either owned or leased, that had adequate modern office space, and was more visible and accessible to the public.
- SMCFD could look into the feasibility to have the cities implement a fire impact fee for capital improvement needs to assist with this facility need.

Recommendation 9: Continue to invest in and build training facilities and infrastructure for San Mateo Consolidated Fire Department.

- SMCFD recently ended a joint training intergovernmental agreement with Central County Fire Department and is now providing all training services internally.
- The SMCFD training division will now be supporting and delivering training products and services to all divisions within the department.
- The department has recently received a grant for the training facility and will need to continue to budget for and invest further in developing the training facility.

Recommendation 10: Consider developing a long-term Capital Facilities Replacement Plan.

- SMCFD should plan for facility maintenance, remodel, expansion, and relocation needs to maintain a high degree of safety, efficiency, long-term sustainability, and effectiveness.
- SMCFD operates out of nine fire station facilities, ranging in age from 1-83 years old, with a combined average age of nearly 31 years.
- The fire station facilities are operated by SMCFD but owned by the three separate cities.
- The department does not currently have a long-term Capital Facilities Replacement Plan and needs to develop a plan and work with the JPA and the cities to plan for the current and future facility maintenance and replacement needs, which include some immediate facility needs and concerns.

Organizational Structure

Recommendation 11: Consider conducting a management staffing analysis to analyze the middle management staffing needs of SMCFD and make adjustments to the organizational structure and chart.

- Stakeholder input was received that the SMCFD needs to adjust the middle management structure of the organization.
- A needs assessment should be completed to determine if the organization would be better served by adding an Assistant Fire Chief, Deputy Chief, or other.
- There is a reported need to add some additional support staff, which could be accomplished with the addition of a Deputy Chief or other.
- One of the top critical issues identified by the Fire Chief was "Identifying and Implementing an appropriate Organizational Structure."
- This will result in greater efficiencies, including maintaining and implementing new programs, and the redistribution of the numerous program responsibilities that current personnel at all levels are currently managing.

Recommendation 12: Consider hiring a full time FTE Plans Reviewer for the Fire Prevention Division.

- SMCFD has enough demand for a full time equivalent (FTE) Fire Plan Reviewer, as the demand currently is around 1000 plan reviews per year.
- This addition would allow the department to not use the DFM and others to conduct plan reviews and would allow for expansion into other areas and programs.
- The DFM could also then fully manage the prevention inspectors better, allowing the Fire Marshal to work at a higher level managing the needs of the cities, as well as this creating a better succession plan between the DFM and FM.
- This plan reviewer should do fire permits and building permits, as this would allow for the fire inspectors to focus on other responsibilities and needs.
- SMCFD should review the overall fire prevention staffing needs, as this could be the time to add either another inspector and/or a fire prevention specialist for the WUI.

Recommendation 13: Consider developing a new Pre-Incident Planning Program.

- SMCFD should implement a formalized and continuous pre-incident program for all personnel to assist in identifying potential hazards within the community, as recommended within NFPA 1620; Standard for Pre-Incident planning.
- Based on stakeholder input, the department should move all inspections within the Fire Prevention group and inspectors.
- The department could then refocus the crews and shifts on a pre-incident planning program which would allow crews to gain more knowledge of target hazards, and become more familiar with businesses and facilities since many came from the other previous departments and are still learning new response zones.
- The Pre-Incident Planning program could be managed by the Fire Prevention Division as deemed by the FM.

Recommendation 14: Consider moving the Finance and Human Resources (HR) administrative positions within San Mateo Consolidated Fire Department's Administration.

- SMCFD currently contracts and outsources HR and Finance services to the City of San Mateo and does not provide those services from within.
- Numerous stakeholder input was received from all levels that made the recommendation that SMCFD transition HR and Finance services to within the fire department administration.

- Reasons cited are current inefficiencies, difficulties in having those services physically located offsite, the department has changed and evolved since the JPA was formed in 2019, disconnects and appearance of fairness resulting in having only one of the three cities provide those services, and general reasons of seeking improved internal processes for SMCFD and future department functionality and sustainability.

Miscellaneous Recommendations

Recommendation 15: Continue to support and update San Mateo Consolidated Fire Department's succession planning and career development programs.

- Secession Planning at all levels was listed as the SMCFD Fire Chief's first critical issue.
- Succession planning and career development will be important for SMCFD to help ensure a "deeper bench," ensure that future leaders are trained and ready, and to make sure the right leaders are in place for future operational sustainability or should a leadership change happen quickly.
- SMCFD should continue to support succession planning for each of the critical positions within the organization. This should include all promoted positions plus some non-sworn administrative positions including:
  - Firefighter/Driver, Captains, Battalion Chiefs, Division/Deputy Chiefs, Fire Marshal, Board Secretary, Administrative Managers, and the Fire Chief.
- Consider utilizing NFPA 1021: Standard for Fire Service Officer Professional Qualifications as a general guide.
- SMCFD should consider training options for personnel, such as the National Fire Academy's Command & Control classes, Managing Officer Program, and Executive Fire Officer Program.

Recommendation 16: Continue to review and update the Strategic Plan for San Mateo Fire Department.

- A strategic plan is a living management tool that provides short-term direction, builds a shared vision, documents goals and objectives, and optimizes the use of resources.
- With the growth and service demands increasing, a Strategic Plan will help SMCFD with its future planning efforts.
- The current SMCFD Strategic Plan was developed in 2019 and periodic review and updating should be continued.
- As part of the strategic planning process, a formal capital facilities and apparatus replacement plan should also be developed and maintained.

Recommendation 17: Consider writing and implementing additional Firefighter Safety related Standard Operating Guidelines (SOGs).

- Look at developing additional standard operating procedures for incidents within SMCFD where opportunities to add additional safety precautions for these incidents can be gained. This could reduce the different expectations and ensure consistent safe procedures by the different shifts and BCs.
- Suggestions of safety related policies include; additional basic water safety policies by adding personal floatation devices to all apparatus, or at a minimum to the ladder.
- Stakeholder input received also stated that additional training is needed for Caltrain incidents and how to identify when power has been shut down.
- SMCFD has a higher number of freeways on all sides of the fire department. Firefighter and law enforcement freeway safety has become a pressing issue due to a high number of critical and fatal accidents involving first responders and freeway motorists.
- Numerous stakeholder feedback was received on the topic of basic firefighter safety while responding to highway accidents and the need for additional policies and training.

Section V:
APPENDICES

Appendix A: Risk Classifications

The following are the risk classifications determined by incident type.

Fire

Low Risk

These incidents are considered low in risk and are minor in scope and intensity. It requires a single fire apparatus and crew to manage fires involving passenger vehicles, fences, trash or dumpster, downed power lines, residential or commercial alarm investigations, or an odor investigation.

Moderate Risk

These incidents are the first alarm response needed to manage a moderate fire risk incident. These incidents include smoke in a building, small outside building fires, commercial vehicle fire, a single-family residence, lightning strike to a building, automatic fire alarm at a high-risk occupancy, or a hazardous materials pipeline fire.

High Risk

These incidents are a second alarm response needed to manage a high fire risk incident. These incidents include smoke in a high-life hazard property (school, skilled nursing, etc.), single-family residence with injured or trapped victims, multi-family residential building, or a moderate-sized commercial/industrial occupancy.

Maximum Risk

A third alarm response is needed to manage a maximum fire risk incident. These incidents include a hospital, assisted living facility, fire in an apartment building, high-rise building fire, a large commercial or industrial occupancy, hazardous materials railcar, or storage occupancy. Incident assignments will include additional command staff, recalling off-duty personnel, and mutual aid assistance for other critical tasking needs.

EMS Risks

Low Risk

A single EMS unit can manage a low-risk EMS incident involving an assessment of a single patient with a critical injury or illness, no-life threatening medical call, lift assist, or standby.

Moderate Risk

A two-unit response is required to control or mitigate a moderate-risk EMS incident. It involves assessing and treating one or two patients with critical injuries or illnesses or a motor vehicle crash with 1–2 patients.

High Risk
A multiple-unit response is required to control or mitigate a high-risk EMS incident. It involves 3-8 patients with injuries ranging from minor to critical. Patient care will involve triage, BLS, ALS treatment, and a coordinated transport of patients.

Maximum Risk
A multiple unit response is required to control or mitigate a maximum risk EMS incident. It involves more than nine patients with injuries ranging from minor to critical. Patient care will involve triage, BLS, ALS treatment, and a coordinated transport of patients. If this is an active shooter incident, the response may require a casualty collection area unit to treat patients, not in the hot zone.

Technical Rescue

Low Risk
A single fire unit can manage a low-risk technical rescue incident involving minor rescues, such as a child locked in a vehicle, elevator entrapment, or minor mechanical entrapment.

Moderate Risk
A two-unit response is required to control or mitigate a moderate technical rescue risk incident. Support is not usually required from a technical rescue team. This type of incident involves a motor vehicle crash that requires patient extrication, removal of a patient entangled in machinery or other equipment, or a person trapped by downed power lines.

High Risk
A multiple-unit response is required to control or mitigate a high-risk technical rescue incident. This type of incident may involve full-scale technical rescue operations ranging from structural collapse to swift water rescues. It may involve multiple motor vehicles that require extrication, commercial passenger carriers, or a vehicle impacting a building. Support is usually needed from a technical rescue team. This incident may require multiple alarms.

Maximum Risk
A multiple-unit response is required to control or mitigate a maximum risk technical rescue incident. Support is required from a specialized technical rescue team and may have multiple operations locations.

This type of incident will involve full-scale technical rescue operations such as victims endangered or trapped by structural collapse, swift water, or earth cave-ins. This incident will require multiple alarms and may expand beyond the identified critical tasking. Recall of off-duty personnel or assistance from auto or mutual aid may occur during a disaster or when additional alarms and command staff are needed.

Hazardous Materials

Low Risk

A single fire unit can manage a low-risk hazardous materials incident involving carbon monoxide alarms and other unknown hazmat investigations without symptomatic victims, less than 20 gallons of fuel, natural gas meter incident, downed power lines, equipment, or electrical problems, or attempted burning. Automatic alarms that may originate from a hazardous material.

Moderate Risk

A two-unit response is required to control or mitigate a moderate risk hazardous materials incident. Direct support is not usually required from a hazardous materials team. This type of incident involves a carbon monoxide alarm with symptomatic patients, a fuel spill of 20–55 gallons, or a gas or petroleum products pipeline break not threatening any exposures.

High Risk

A multiple-unit response with a hazmat team is required to control or mitigate a high-risk hazardous materials incident. For example, support is needed for a Level 2 hazmat incident that involves establishing operational zones (hot/warm/cold) and assigning multiple support divisions and groups. This response includes a release with 3-8 victims, gas leaks in a structure, hazmat alarm releases with victims, flammable gas or liquid pipeline breaks with exposures, fuel spills greater than 55 gallons, fuel spills in underground drainage or sewer systems, transportation or industrial chemical releases, or radiological incidents. Additional assistance may be required to expand operations past the identified critical tasks.

Maximum Risk

A multiple-unit response is required to control or mitigate a maximum risk hazardous materials incident. Support is required from an on-duty hazmat team and their specialized equipment. This type of incident involves establishing operational zones (hot/warm/cold) and assigning multiple support divisions and groups.

Examples include nine or more contaminated or exposed victims, a large storage tank failure, a hazmat railcar failure, or a weapon of mass destruction incident. This incident will require multiple alarms and may expand beyond the identified critical tasking. Additionally, recall of off-duty personnel or assistance from auto or mutual aid may occur during a disaster or when additional alarms and command staff are needed.

Wildland Urban Interface

Low Risk

A single fire unit can manage a low-risk wildland firefighting incident involving a fire minor in scope, structures not threatened, and Red Flag conditions that do not exist. These include low-risk wildland or grass fires, an outside smoke investigation, illegal or controlled burns, or small vegetation fires.

Moderate Risk

Multiple units are needed to manage a moderate-risk wildland firefighting incident involving a significant fire in brush, brush pile at a chipping site, grass, or cultivated vegetation. Red Flag conditions do not exist, and structures may or may not be threatened.

High Risk

Multiple units or alarms are needed to manage a high-risk wildland firefighting incident. The level is associated with Red Flag warnings with structures that may or may not be threatened. This fire involves a significant wildfire in brush, grasses, and cultivated vegetation. And woodland areas. Additional alarm assignment, command staff, recall of off-duty personnel, and mutual aid assistance may require the operations to extend beyond the identified critical tasks.

Appendix B: Summary of the Stakeholder Interviews

Introduction to the Stakeholder Interviews

Triton interviewed stakeholders representing a wide variety of the San Mateo Consolidated Fire Department's internal and external stakeholders. These interviews aimed to understand better the issues, current service levels, concerns, options regarding the emergency service delivery system, opportunities for improvements, and expectations.

It is important to note that the information solicited and provided during this process was in the form of "people inputs" (stakeholders individually responding to Triton's questions), some of which are perceptions reported by stakeholders. All information was accepted at face value without an in-depth investigation of its origination or reliability. The project team reviewed the information for consistency and frequency of comment to identify specific patterns and/or trends. Based on the information reviewed, the team identified a series of observations, recommendations, needs, and general comments that were significant enough to be included in this report.

Stakeholders were identified within the following groups: Elected Officials (San Mateo, Foster City, Belmont), City Management & Department Heads from all three cities, Rank & File line personnel, Chief Officers, Administrative Staff, and Community Leaders.

Elected Officials, City Management, City Department Heads

What strengths contribute to the successes of the San Mateo Consolidated Fire Department?

- The strength of our upper management.
- The SMCFD employees are great to work with and open to change.
- The staff is very adaptive to the needs of the customers.
- Since the JPA began, the pooling of resources and the borderless operations have been very good.
- SMCFD is viewed very favorably in the community. They participate in a lot of community activities.
- The Fire Chief has been instrumental in making the JPA work and has done an outstanding job.
- SMCFD provides the core services of fire suppression and fire prevention well and the response times are good.

- The new consolidated department personnel have mixed together well and built a good culture together.
- A strength is that there seems to always be a collaborative approach.
- With the current JPA, our city has access to resources that we didn't have on our own. We have an excellent fire department.
- Being a larger organization now, we have better access to grants and more resources.
- The city councils of the three cities have a reasonably good healthy relationship which is a strength.
- We have enormous faith in the current Fire Chief. He was a good choice that we need.
- There are cost savings realized with a larger organization like SMCFD. We are not too big and not too small.
- The walls have come down and we are not divided. We operate as one and we are very, very young, which is also a challenge.
- We have created efficiencies and economies of scale.
- Collectively as three separate cities, we work very well together serving all 3 cities.

What does San Mateo Consolidated Fire Department do well?

- They have open communications and the current management is much more accessible.
- SMCFD has a great administrative staff.
- They have great relationships with the communities they serve.
- The operations of the fire department are outstanding.
- SMCFD is very responsive.
- The fire department seems to have good response times and arrival to calls is never late.
- They have a good presence at community events in our city.
- SMCFD provides a positive & inclusive culture for a workplace. Our employees stick around and it's a friendly place to work.
- If you call 911, you will get a good fast response.

What are some areas in which you think the fire dept could make improvements?

- It was identified by many interviewed that the lack of branding and marketing from the department is an issue and there is little social media presence.
- Better communication with all three cities as most communication currently happens with mainly San Mateo.
- Since COVID, there is a little disconnect with the cities and the cities staff.
- The department needs a Strategic plan for the department and OEM.
- Fleet Maintenance.
- We lost the face to face with the cities and can engage and build the relationships more. We have perhaps become more distant. We knew everyone & now we don't.
- Having our own internal HR and Finance would be much more efficient.
- The police chiefs and fire chief could meet more regularly to keep connected.
- SMCFD prevention sometimes needs to let the cities know of fire requirements earlier on in projects.
- The staff at the cities need more face time with the SMCFD personnel and firefighters. We can create events or opportunities to meet the firefighters and the staff. We are in the same building and we don't even know them.
- It would be nice if the elected officials of the cities could meet more of the firefighters and staff members of the fire department.
- The question of what to do when one city facility needs major work or replacement? What happens and who should really pay for it? We need a plan for our facilities.
- The department is undersized. Personnel sometimes feel overwhelmed. We have a big opportunity to get our eyes on the horizon and plan for the future.
- The Human Resources 100% needs to be in the admin building. It is cumbersome now. Having HR on site with the other admin staff & managers would be a strength.
- The current administrative facility is not adequate.

What do you see as San Mateo Consolidated Fire's greatest risks?

- The open spaces and wildland interface areas with the small winding roads.
- Access to and operating on the freeways.
- Evacuating the area in the event of a large-scale emergency (earthquake, wildfire).

- We have a lot more research & development conversions and don't necessarily know what type of hazardous risks are going in them.
- Water flooding, Kite surfers in the bay, high rises, earthquakes, and bio tech facilities.

If you could change one thing in the San Mateo Consolidated Fire Department, what would it be?

- Staffing positions with a mix of duties and responsibilities.
- Not juggling too many balls at once and get overwhelmed and underperform.
- A new Fleet Maintenance facility for SMCFD.
- Having only one City Manager on the JPA board as a CAO is a concern.
- I think we need to be open to further regionalization. We may not be ready yet but we need to look at and study the question "are we better off having a larger fire department with neighbors"? Funding is getting more difficult and we may be duplicating services and positions. I like having our own department but it may not be financially sustainable.

What do you see as the top critical issues face by the San Mateo Consolidated Fire Department?

- Future development and growth, and being able to address future density growth.
- Wildland and the future reclassification of areas from the state.
- Areas with one way in and one way out.
- Wildland Education and enforcement.
- Hiring trained qualified future personnel within the department.
- The Wildfire Interface risks.
- The normalization of the SMCFD operations and operating as one.
- Relationship building and serving the three separate cities with continuity & connectiveness.
- The wildland crews that are sent around the state put a strain on the organization and the community both operationally and financially with crews out of the area.
- Top Critical issues are staffing with lots of retirements, getting prevention operating back to full capacity post Covid, and the risks of severe wildfires.
- Funding. There are tensions having 3 separate cities contributing different percentages to the JPA budget.
- Traffic congestion is changing. Our fire stations need to be in the right locations.

- Our workforce is evolving and changing. We are getting younger, different lifestyles, and our firefighters are not as interested in working overtime as they use to.
- We need to stay solvent. The JPA could break down which is a huge risk.

What opportunities, in your view, are available to improve the service and capabilities of the fire department?

- Improve relationships with the building departments of the cities.
- With the 3 separate cities, there are currently multiple systems to manage for tracking items and it could be beneficial to optimize and improve.
- Several interviewed stated that there are 3 different systems – in 3 different cities.
- We need more regularly scheduled fire education presentations at the schools rather than just when requested.
- The relationship with the three cities and how they think about emergency planning and operations.
- There was concern over the fact that it takes 2.5 hours in some cases to take apparatus out of service to deliver to fleet maintenance, and in some cases the apparatus are taken to Sacramento.
- The need to expand the administration building.

How would you describe the level of services provided by the fire department?

- SMCFD is a "Top Notch" department with solid leadership who does great work.
- Our city has a good relationship with fire prevention.

Officers, Rank & File, Firefighter Line Personnel

What strengths contribute to the successes of the San Mateo Consolidated Fire Department?

- A high percentage of those interviewed stated the department's success was due to the department's culture and the employees that work for San Mateo Consolidated. The department has a family-oriented atmosphere.
- The administration is strong right now. We have good hiring practices and the personnel have a high morale and togetherness.
- Many interviewed commented that the Fire Action Consensus Team (FACT) is great and very effective.
- A larger organization can do more and have more resources than a smaller one.
- Mandated inspections are completed to 100%.

- Prevention is managing the multi cities and jurisdictions and the work on new construction.
- The blending of cultures worked well. We blended 3 agencies together and it worked well.
- Having internal training, SMCFD will now be able to support the training needs of our personnel and deliver good training products to all divisions.
- Our community engagement is very good. Our personnel are always super engaged in the community.
- In some other agencies collaborative ventures, they collided, not merged. In 2019, our cultures came together very well. SMCFD is a really great place to work.
- We have a very collaborative work environment at San Mateo Consolidated.
- Personnel take ownership of their district and and/or zones.
- We are a county resource for Hazardous Materials response and do a great job.
- We do the "bread & butter" things well and provide an excellent product to the community.
- One of our strengths is that we do well on EMS and follow through assisting patients.
- The consolidation was a good thing for all three communities.
- Bringing and providing training back into the department internally is a good thing. Partnering in training made sense at the time, but not now.
- We took the best parts of each of the three organizations and made the new overall new department even better.

What are some areas in which you think the fire dept could make improvements?

- We have a large number of the younger generation. A critical issue is succession planning. We need a deeper bench.
- Familiarity of the three different cities, the buildings and target hazards.
- CAD issues and a lot of new dispatchers that don't understand the area.
- We need to continue to use the cadet program as it has helped get the right people hired.
- Concern over the Departments relationship with the cities (feel like it is us vs. them).
- Start an internal SMCFD finance division so that the finances are internally managed and not administered by the City of San Mateo.

- Several of those interviewed expressed concern how the department and surrounding jurisdictions conduct move ups.
- Future retirements and succession planning for the department as a whole, was expressed by many interviewed.
- Accountability on scenes in addition to improving strategy and tactics.
- Providing special operations using the Haz Mat model and provide special operations services region wide.
- The department needs a long-range fleet maintenance plan and a facility replacement plan.
- Nowadays, the community really wants to see you. We need to be out in the community even more.
- From a training perspective, it would be nice to have training on weekends due to the 48/96-hour work schedule. Currently, weekend training is not encouraged or scheduled.
- We need to get better at water rescue and can improve on providing those services.
- Due to the low volume of wildland calls, we need to keep up wildland training to stay proficient.
- Some citizens are not aware that there was a consolidation. Better branding and PR.

What do you see as San Mateo Consolidated Fire Department's greatest risks?

- Wildland fires in the Belmont area.
- The Bay Bridge and committing to the bridge.
- Travel for response apparatus on roads and areas with access issues.
- High Density Occupancies. There are a high number of people and families residing in units, many that are not rated for living quarters.
- Earthquake.
- Over 50% of our personnel live outside the county. If we have the potential of a large call back, our members are not living within or near our community.
- Access to certain areas and high traffic volume and flows.
- Sea level rise and flooding.

What do you see as the top critical issues face by the San Mateo Consolidated Fire Department?

- We need to make the Engineer position a designated rank and promotable position.
- The balance of some work groups handling a majority of the work. The work load needs to balance with those not doing as much.
- Several crew interviews expressed a high critical issue with the lack of pre-planning on target hazards and buildings.
- The change in businesses and growth happening in the community and being able to keep up with service demands.
- Several members expressed a concern for the lack of experience and community knowledge gap between members of the organization from the different cities.
- Filling 40-hour positions will be critically difficult in the future with so many members living so far away.
- Several members mentioned that SMCFD needed to make sure the organization and staffing kept up with the community's growth and the demand for services.
- Housing has out priced the ability of employees to reside in the county. There is fear that the department might have issues filling vacant administrative jobs because of the cost of living in the area. Unlike shift work where employees can travel further to work.
- Our communications systems are a critical issue. Dispatch problems occur, station alerting systems are out of order, no CAD-to-CAD transfer from PSAP to San Mateo County. We need to be able to trust that the communications systems will work.
- Turnover is a critical issue. The age of our staff will drop in the next 10 years and we will need to train people up.
- With inflation and an increasing cost of living, our financial position going forward will be challenging.

If you could change one thing in the San Mateo Consolidated Fire Department, what would it be?

- The Department Chaplain program.
- Have Internal Medic training.
- Several interviewed expressed concerns over the lack of a fleet maintenance facility and fleet staff.

You have significant mutual aid partnerships you rely on. How well do you work with Mutual aid (MA) partners?

- During the interviews, it was identified by many SMCFD personnel that working with surrounding mutual and auto aid partners is seamless and smooth.
- There is concern over the lack of future training with partners.
- From the community's perspective, the mutual aid and auto aid closest response works excellent. At the Battalion level, we should in many cases be handling our own Battalion calls in our community. I would like to see us go back to jurisdictional responses. We all go on fires anyway. If we keep auto aid, then it brings up the "why don't we consolidate" question?

In your opinion, what are the most serious problems or safety risks in your response area?

- The Wildland Urban Interface (WUI).
- Basement incidents.
- Flood zone from the dam.
- Cal Train incidents.
- Congestion and Access issues on tight roadways.
- Alternative dwellings in locations and occupancies not expected to be there.
- Several members stated working on the Freeways and Highways was a serious risk and concern.

Think back to a situation where you felt powerless to help a resident in need. What could have helped you in that situation?

- A bay bridge westbound accident where we had no equipment to extricate and had to wait a long period of time for the dispatch and response of an apparatus with extrication tools.
- A call on an elderly person that wasn't being taken care from her son and the crews followed all the processes to turn over to the proper authorities; however, nothing happened and nothing changed. The elderly resident was returned to her home.
- Several interviewed stated they are not sure how to deal with elder folks and not being able to get them the right resources to help them is frustrating.
- Several interviewed stated the difficulty of how to deal with the homeless that want to get help. Where? How? Only one city has one outreach person.

Fire Department Chief Officers & Administrative Staff

What strengths contribute to the successes of the San Mateo Consolidated Fire Department?

- The larger an organization is, the more operational potential you have in addition to budgetary flexibility.
- Everything we do involves all three cities. All three of the cities are in good shape.
- We have a great culture, great people, and good personalities.
- The SMCFD does well in our prevention efforts and we are 100% complete in our state mandated inspections.
- The department has great communication.
- Our people at SMCFD for sure are our strength.
- We have great support from all of our communities.
- Our diversity in the department is a strength.
- We have great stability at the top right now. Personnel feel that they are being heard and their concerns are being addressed.
- The greatest strength is that the department is mission focused. Everyone wants to provide great service.
- The department has great leadership. We adapted well during Covid and our good communications is one of our biggest strengths.
- Our staff trusts our administration and our leadership now.
- I was skeptical at first but our agencies came together very well. Everyone had buy-in and the merge was surprisingly easy. We looked at the positive opportunities.

What are some areas in which you think the fire dept could make improvements?

- We have outpriced the ability to keep support personnel. They can't afford to live here.
- The relationship between the department and the three cities can continue to improve. Some in the cities feel their departments left them.
- SMCFD should handle our own finances. Administering the finances through the City of San Mateo Finance Division is inefficient.
- The engine companies don't do enough pre fire planning.
- Our dispatch system. We currently don't have redundancy if there is a disruption. An engine even missed a night alarm in April.

- Getting the training division organized.
- The CAD system needs major improvements. Currently there are problems with phantom ringdowns, stations toned with no audio, & sending BCs to other jurisdictions. There are a lot of move-ups occurring now creating problems.
- I would like to see company officers be better with identifying when officers need to do evaluations and mitigate through performance issues and discipline.
- The administrative office facility is very cramped and it would be nice to have a headquarters office that is not necessarily in a City Hall.
- It would be nice for SMCFD to have their own finance division and HR manager. Finance with San Mateo City is challenging.
- We could hire more administrative staff as there are currently only five total.
- The communications systems and technology need improved. Tablets and programs don't work together and it's been "rough go" with dispatch. Reliability is in question.
- The fleet and facilities divisions need more help.
- The water rescue program could be better if we had funding. We do a lot with limited resources.

What do you see as San Mateo Consolidated Fire Department's greatest risks?

- Climate change and the affects that it will have on our region.
- Our urban interface is significant as it has not burnt.
- We have more and more significant bio tech. A lot goes on that our personnel don't know about in the bio tech facilities.
- Greatest risks are the railway, earthquakes, and the airport.
- The top risks I see are earthquakes and cyber-attacks.
- Urban interface fires are the greatest risk as Belmont burned off the map. We have two Type 6's that are state resources and we should have our own.
- Natural disasters of earthquake and floods are greatest risks.

What do you see as the top critical issues faced by the San Mateo Consolidated Fire Department?

- Succession planning at all levels is the highest critical issue.
- Identifying and implementing the appropriate organizational structure.
- We need to fully complete the consolidation; we are only halfway done.
- Budget sustainability.
- We are seeing a lot more wildland fire deployments.
- Top critical issues are secession planning, budgetary restraints, and getting the training division in place.
- Dispatch and CAD problems are our greatest critical issue.
- Water rescue calls in the bay.
- Personnel, as we are a really young and inexperienced department that needs experience and mentoring.
- Our budget is a critical issue and threat. The cities consider us part of their city sometimes when they need us, and sometimes they don't. The future sustainability of the JPA budget is critical.
- Additional funding comes into the cities and the increased percentage doesn't necessarily make it into our JPA fire budget account.

If you could change one thing in the fire department, what would it be?

- The County all looks the same. The County should be one large fire department.
- The department needs to draw on a more diverse workforce and population.
- The SMCFD would have more stable funding if we were a fire district.
- Dealing with the three separate cities for station funding and station large maintenance needs is difficult.

Community Members & Others

What strengths contribute to the successes of the San Mateo Consolidated Fire Department?

- SMCFD does an incredible job, I have no complaints.
- Having the boundaries dropped and the auto aid system in place is very good.

What does San Mateo Consolidated Fire Department do well?

- Integrating the three departments together and cross staffing station 23 was a very good decision. The department is outstanding.

What are some areas in which you think the fire dept could make improvements?

- SMCFD has gone through a long period of training with Central County and the training group will no longer include SMCFD. Training is now a weakness but could be a strength as it is transitioned and administered internally.

What do you see as San Mateo Consolidated Fire Department's greatest risks?

- We have the WUI risks with the overgrowth West of the Interstate.

What do you see as the top critical issues faced by the San Mateo Consolidated Fire Department?

- The organization itself. The JPA needs to be clarified as far as the duties & the responsibilities of the positions including the Chief Administrative Officer (CAO).

Appendix C: Table of Figures

Appendix D: References

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