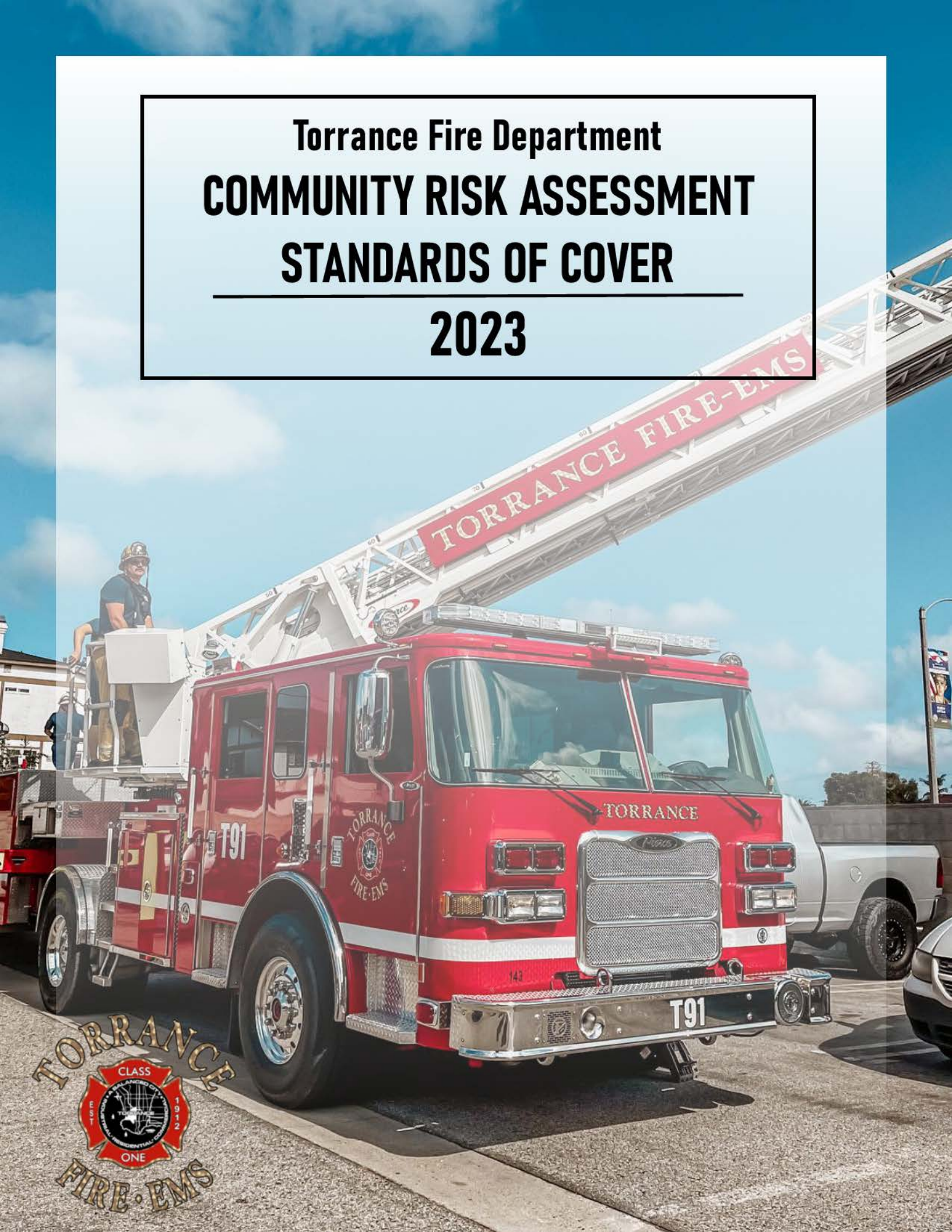
Torrance Fire Department

COMMUNITY RISK ASSESSMENT
STANDARDS OF COVER

2023



TORRANCE FIRE DEPARTMENT

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Published February 21, 2024

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Introduction

In the dynamic landscape of public safety, the primary goal of any fire department is to protect the lives, property, and well-being of the community it serves. To accomplish this mission effectively, the City of Torrance Fire Department recognizes the importance of proactively identifying, analyzing, and addressing the potential risks and challenges that may impact its response capabilities. This intention forms the basis for creating a Community Risk Assessment (CRA) and Standards of Cover (SOC).

The Community Risk Assessment is a systematic process to assess the unique risks and hazards present within the community. By performing an examination of demographic, geographic, economic, and environmental factors, this assessment aims to provide a clear understanding of the potential emergencies that could arise and serves as the basis for strategic planning, resource allocation, and operational decision-making to ensure that the fire department remains well-prepared to meet the community's expectations for hazard mitigation.

The Standards of Cover outlines the framework for the City of Torrance Fire Department's emergency response and deployment strategies. The SOC establishes benchmarks and performance expectations that guide the deployment of resources, staffing levels, apparatus placement, and response times. By aligning these operational metrics with the identified risks and hazards, the Standards of Cover intends to ensure that the fire department's services meet the specific needs of the community.

The intent of the Community Risk Assessment and Standards of Cover work is two-fold: to enhance the City of Torrance Fire Department's ability to anticipate, respond to, and mitigate emergencies, and to foster a culture of continuous improvement. This initiative embodies the fire department's commitment to data-based decision-making, transparency, and collaboration with the community it serves. Through active engagement with stakeholders, data-driven analysis, and the utilization of best practices, the fire department seeks to optimize its operational readiness while maintaining the highest standards of public safety.

The challenge in community risk management does not rely solely on the work necessary to assess the probability of an emergency event in a community, but also in the political world. It is common for policymakers to evaluate their return on investment; therefore, it is critical that policymakers are well informed about the community hazards and risks when making decisions that affect public safety. In California, local governments are facing increased budget scrutiny from their constituents, and it is essential that they justify expenditures by demonstrating a direct link to expected outcomes.

The Torrance Fire Department remains dedicated to the principles of adaptability and resilience. By leveraging the insights gleaned from the Community Risk Assessment and establishing the Standards of Cover, we not only fortify our capacity to respond effectively to emergencies but also empower our community members to be active partners in their own safety.

Section 1 - Community Served (Documentation of Area Characteristics)

City of Torrance Mission Statement

The mission of the City of Torrance is to encourage and respond to community participation as we provide for an attractive, clean, safe, secure, and enriching environment that assures a high quality of life.

We evaluate and act on the needs of the community within a complex, changing environment. We provide quality service with integrity, professionalism, and accountability in an efficient, cost-effective manner.

City History

In 1910, prompted by developing labor troubles in Los Angeles, a real estate developer from Pasadena named Jared Sidney Torrance decided to build a "workingman's paradise" -- a model industrial city halfway between Los Angeles and the San Pedro harbor. He formed the Dominguez Land Corporation and spent $1 million to buy 3,522 acres from the Dominguez family for the new city. Officially founded in 1912, Torrance was to be “A Balanced City” made up of a mixed industrial-residential community. The city was planned by world-famous landscape architects Olmsted and Olmsted in accordance with Jared Sydney Torrance's master plan. Along the City's eastern boundary, J.S. Torrance envisioned commercial and industrial zones physically separated from residential areas to the west. The reason for this design was due to the great amount of smoke generated by the City's early industries. Winds blew dependably from the west and generally kept the residential areas free of smoke. Today, this wind continues to provide residents with relief from heat and smog.

Figure 1: Pacific Electric Railway - El Prado Bridge

On the night of November 12, 1912, local businessmen met in a tent to discuss the needs of protecting the community from the threat of uncontrolled fires. These men felt that protection from fire was of prime importance and at 8:00 p.m. that evening, the businessmen and residents established the Torrance Volunteer Fire Department. Today the Torrance Fire Department (TFD) is a nationally recognized CPSE Accredited and ISO Class 1 Fire-EMS Department. This evolution was the result of many strong leaders that shared a commitment to protecting lives and property.

Torrance incorporated as a city in 1921, and through gradual annexation increased to its present-day size of 21 square miles, including a 1.5-mile beachfront. A late 1940s housing boom consumed virtually all the remaining vacant land and the population rapidly expanded to 145,000+ today.

City Governance

The City of Torrance is a Charter City governed as a Council/Manager form of government. On June 19, 2018, the Torrance City Council adopted an ordinance establishing by-district elections for City Council offices and approved an election calendar for the newly created districts. Previously, each Councilmember was elected for an "At-Large" 4-Year term which means they serve in an "At-large" capacity and are allowed to live anywhere in the City of Torrance. Now, they are required to live within the boundaries of the district that is on the ballot during that election in order for them to be able to run for a 4-Year term to that City Council district seat. Districts 2,4, and 6 were phased in during the 2020 election. Districts 1, 3, and 5 were introduced in 2022. The City Council is now comprised of six Councilmembers who each live in and represent one of the established districts and one Mayor, who will remain elected "At-Large". The Mayor and Councilmembers each serve a four-year term. The City of Torrance has a two-term limit for the City Council. The City Clerk and City Treasurer are elected every four years and do not have term limits. Elections are held every two years, on the even year.

In the Council/Manager form of government, the City Council, as the elected body, adopts legislation, sets policy, adjudicates issues, and establishes the budget of the City. The City Council appoints the City Manager and the City Attorney. The City Manager is charged with the duty of implementing City Council policy and laws as the administering head of the government. The City Council appoints volunteers to serve on various advisory boards, commissions, and committees. Councilmembers and the Mayor may serve as representatives on intergovernmental and regional boards, commissions, and committees as part of their elected capacity. Councilmembers and the Mayor are directly accountable to the electorate and must constantly balance the views of individuals and groups with the needs of the entire community.

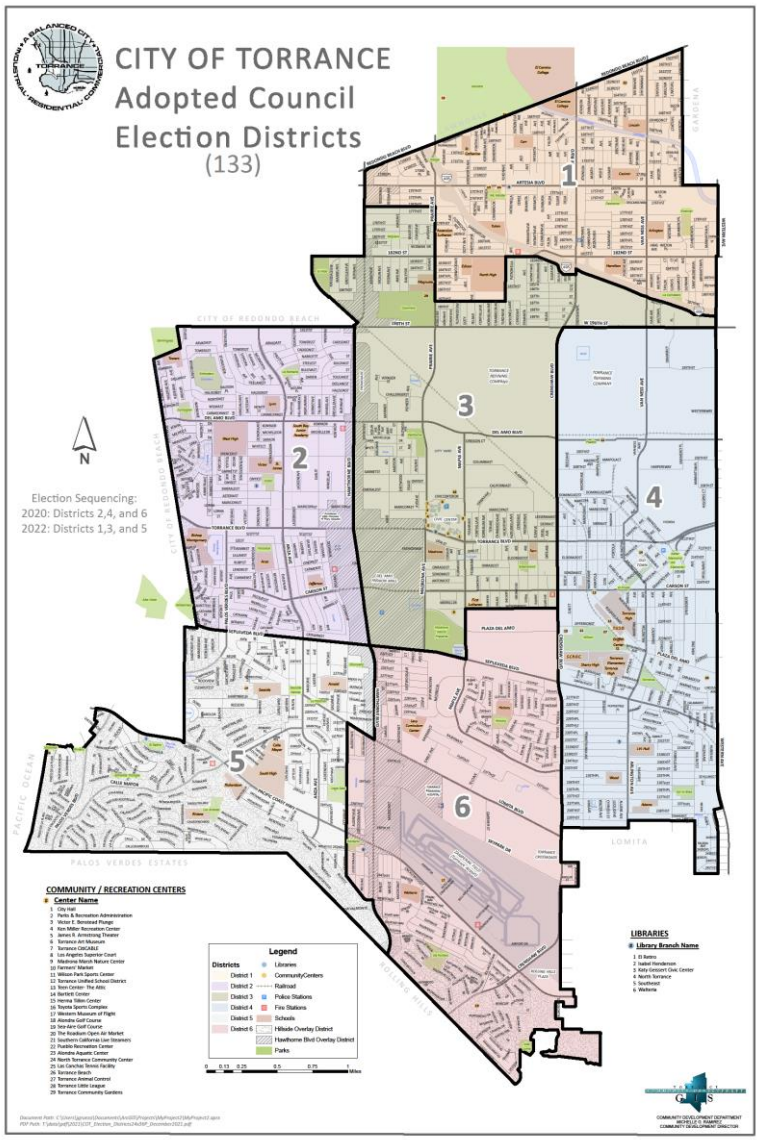
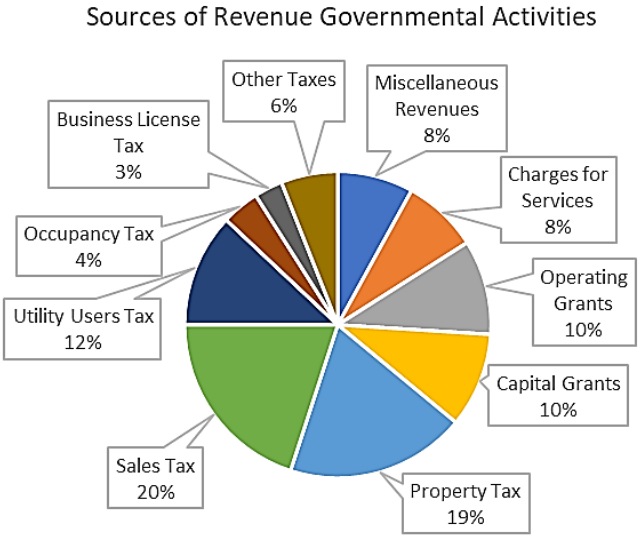


Figure 2: City of Torrance Election Districts Map Overview

City Budget

The City's governmental activities total revenues of $303.3 million were derived from the following: eight percent (8%) - from fees charged for services; twelve percent (12%) - from utility users tax; twelve percent (12%) - from occupancy tax, business license tax, and other taxes; twenty percent (20%) - from sales taxes; nineteen percent (19%) - from property taxes; ten percent (10%) - from operating grants; ten percent (10%) - from capital grants; and eight percent (8%) - from miscellaneous revenue fees and investment earnings. The graph below shows the revenues generated by the City from governmental activities in FY 2021-22.



The Department continuously monitors the City budget as impacts have a direct correlation to services. Recent events such as a cyber-incident in 2020 and the COVID-19 pandemic had an effect on the City budget. In 2022, City of Torrance voters approved a ½ cent sales tax increase (from 9.5% to 10.0%). Measure SST (Safe and Secure Torrance) was implemented in order to maintain city services such as public safety/911 response, local drinking water sources, keep parks clean, repair streets, maintain senior services and address homelessness.

Figure 3: City Budget Source: City of Torrance FY 2021-22 Comprehensive Financial Report

The City of Torrance spends fifty-five percent (55%) of the total governmental activities expenses for public safety; twelve percent (12%) – for general government; eleven percent (11%) – for public works; nine percent (9%) – for culture and recreation; six percent (6%) - for community development; and seven percent (7%) – for interest on debt. The graph below shows the percentage of funds spent on functional expenses.

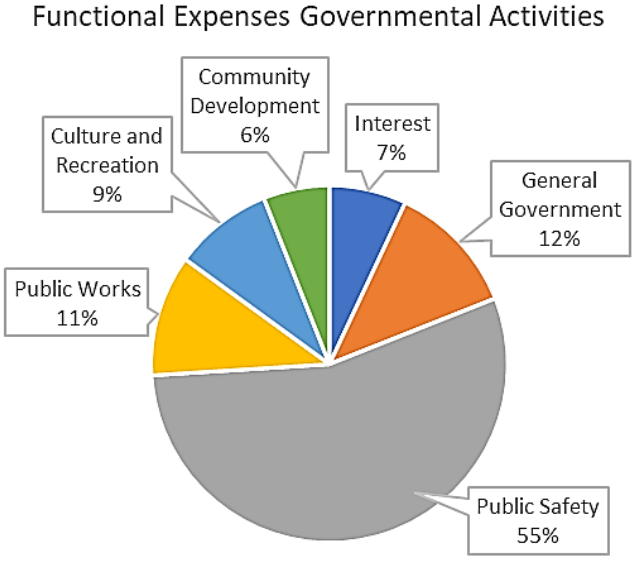


Figure 4: Functional Expenses Source: City of Torrance FY 2021-22 Comprehensive Financial Report

Physical Setting

The City of Torrance is a coastal community in the South Bay region of Los Angeles County, covering roughly 21 square miles, approximately 11 miles from downtown Los Angeles at its closest point. As of 2020, per the US Census, Torrance had an estimated population of 147,067, making it the eighth-most populous city in Los Angeles County

The original geographical boundaries of the City of Torrance were incorporated on May 12, 1921, and have progressively expanded over time through 18 annexation ordinances to their current state. The 18th annexation ordinance was adopted on December 22, 2014.

Figure 5: Torrance Within California - Source: ESRI

Today, the City of Torrance is bordered by the cities of Lawndale, Gardena, and the unincorporated community of El Camino Village to the north; by the cities of Los Angeles and Lomita to the east; by the cities of Rolling Hills Estates and Palos Verdes Estates to the south; and by the city of Redondo Beach and the Pacific Ocean to the west.

The Torrance Fire Department service / response area boundaries correspond with the geographical boundaries of the City of Torrance. The Torrance Fire Department shares response district borders with Los Angeles County Fire Department, Los Angeles Fire Department, and Redondo Beach Fire Department.

The TFD belongs to the Area G Operational Area, within Los Angeles County, and has mutual aid and automatic aid agreements with the other Area G Fire Departments which include El Segundo, Manhattan Beach and Redondo Beach. In addition, the TFD has an automatic aid agreement with Los Angeles City Fire Department to provide services to the Harbor Strip portion of Los Angeles (the Eastern border of Torrance).

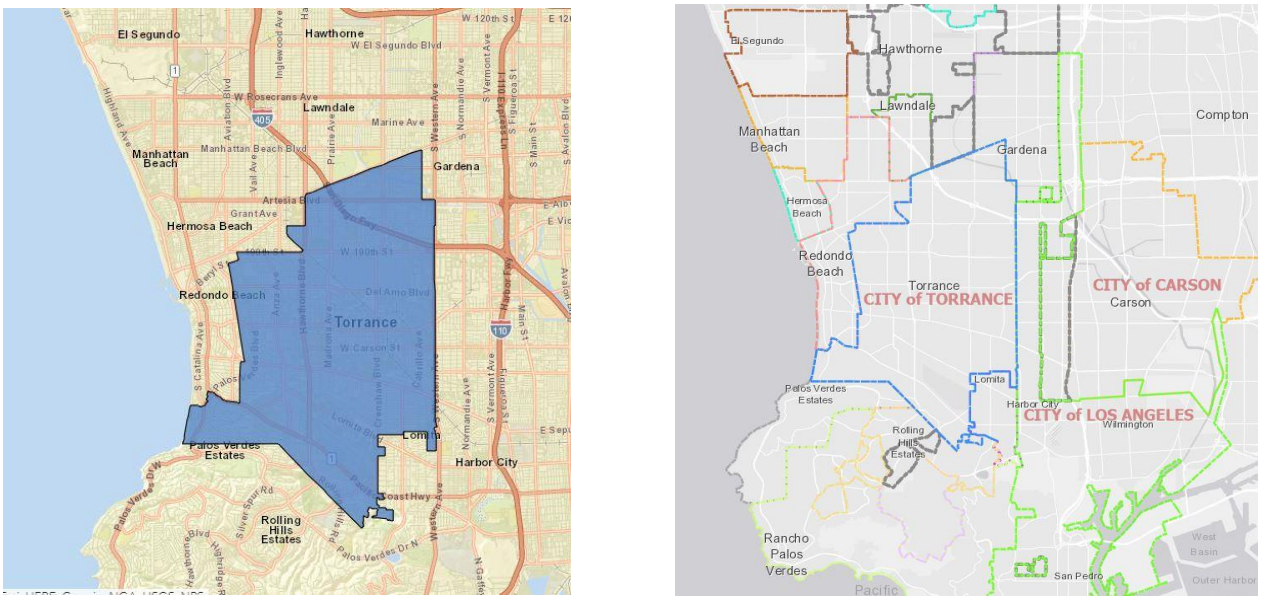


Figure 6: Torrance City Boundaries within South Bay, Including Mutual Aid Cities

Naturally Occurring characteristics

Climate

Torrance has a Dry-Summer Subtropical climate with warm dry summers and mild winters. On average, Torrance enjoys 279 sunny days per year. The average summer high is 76.3 degrees Fahrenheit. The average winter low is 47.0 degrees Fahrenheit.

Precipitation averages in Torrance are around 13.64 inches per year with measurable rain (.01") occurring 22.3 days per year. The rainy season is from November through March. Rainfall in Torrance tends to fall in large amounts during storms rather than consistently at somewhat regular intervals. These storms can bring significant onshore winds into the area. Torrance does not experience snow events.

SEASON	PRECIP (IN)	MIN TMP (°F)	AVG TMP (°F)	MAX TMP (°F)
Annual	13.64	54.1	63.0	71.9
Winter	9.26	47.0	56.7	66.4
Spring	2.87	52.2	61.1	69.9
Summer	0.13	60.9	68.6	76.3
Autumn	1.38	56.2	65.5	74.8

Figure 7: Torrance Climate Source: https://www.ncdc.noaa.gov/cdo-web/datatools/normals

Torrance is subject a weather phenomenon called "June Gloom or May Gray", which sometimes brings overcast or foggy skies in the morning on the coast, followed by sunny skies by noon during late spring and early summer.

Topography

The City's elevation starts at sea level and continues to rise to 1443 feet above sea level along the southern border of the community along the base of the Palos Verdes Peninsula. With the exception on the southern border and a few elevation increases along the western border, Torrance is considered to be relatively flat.

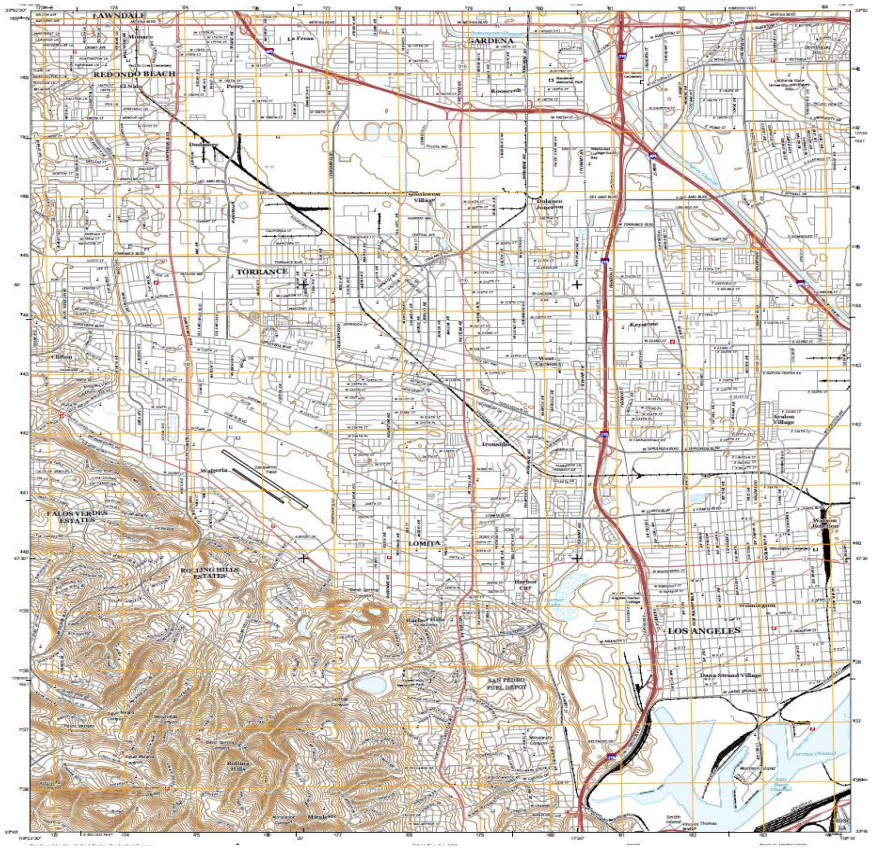


Figure 8: Torrance Topography Source: USGS

Human and Human-Related Characteristics

Population and Demographics

Population Overview

The 2020 U.S. Census estimated a population of 147,067 residents in Torrance. The average Torrance resident is older than the average resident of Los Angeles County. Historically, as populations increase the call volume for fire and EMS services increase. According to estimates provided by ESRI 2023 Updated Demographics, the population of Torrance in 2023 decreased to 145,217 and can expect to decline by 0.37% between 2023 and 2028, resulting in a 2028 population estimate of 142,581. This is a trend the TFD will monitor and make deployment adjustments as needed based upon hard data. Multiple residential projects have been proposed within the City of Torrance which may result in a slower decline or even population growth over the next 5 years.

The estimated median age of a Torrance resident in 2023 is 43.7 years old. Residents 65 years and older total an estimated 19.6% of the City's population. The table below shows the summary demographics for Torrance estimated as of 2023.

Torrance Demographics Summary	
Total population	145,217
Daytime population	189,868
Population density per Sq. Mile	7,070
Median age	43.7 years
Elderly population (65+ years)	19.6%
Median home value	$911,584
Number of households	55,956
Average household size	2.57
Median household income	$106,786
Language other than English spoken at home	41.0%

Figure 9: Torrance Demographics Summary. Source: Esri forecasts for 2023; ACS 5-yr 201-2021

Figure 10: Armed Forces Day Parade

Population Density

The map below provides an overview of population density within city boundaries. The legend shows the amount of people per census block. There are 2102 census blocks represented in the map below which are either within or touching the city boundary. Population density is further explored in greater detail in the All-Hazards Risk Assessment per Geographical Planning Zone section of the CRA / SOC.

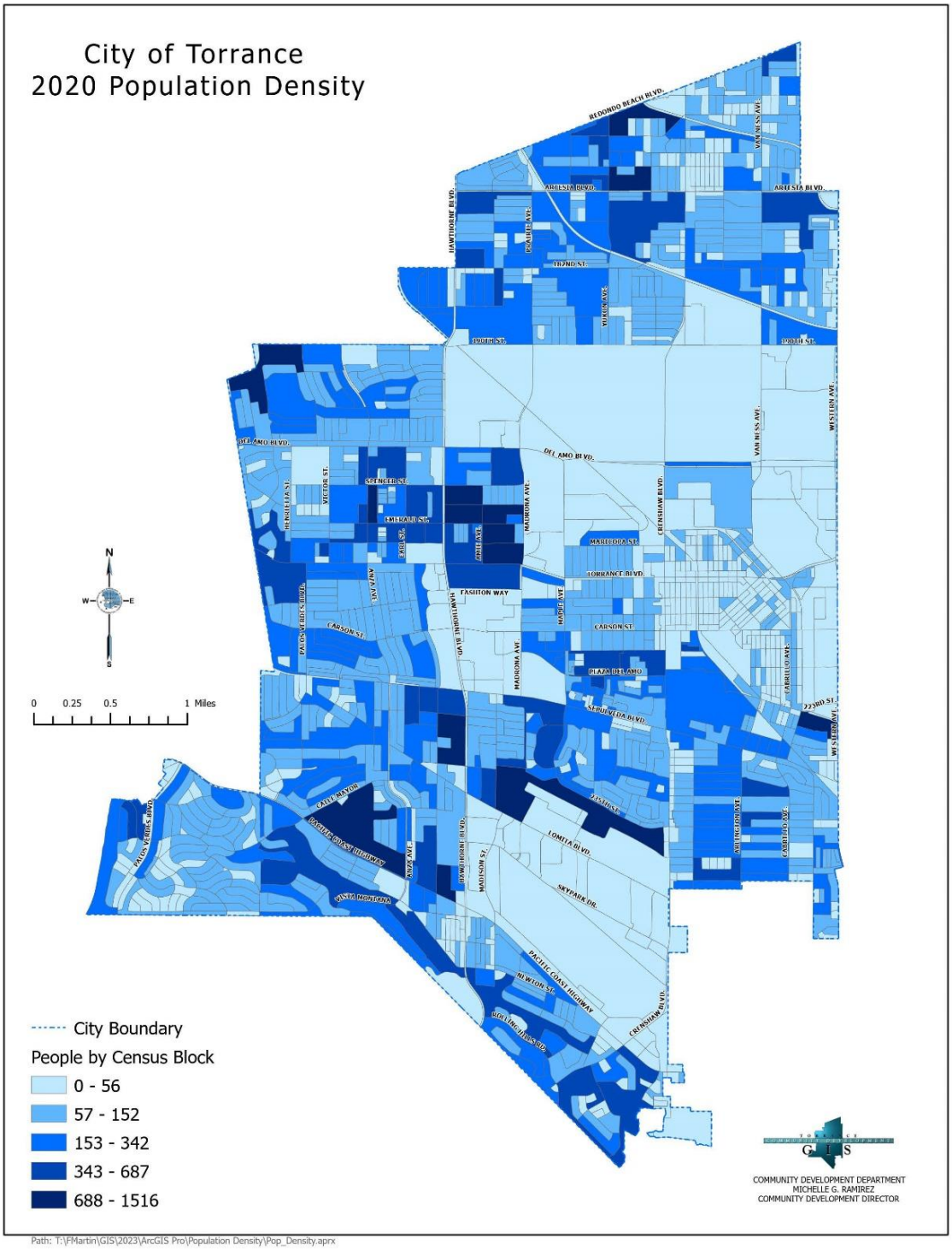


Figure 11: City of Torrance, Population Density - 2020

Race and Ethnicity

As of 2023, the estimated largest ethnic group identified as Asian at 37.3%. The second largest ethnic group identified as White at 36.6%. Hispanic or Latino persons of any race made up approximately 20.1% of Torrance residents. The Diversity Index, which measures the probability that two people from the same area will be from different race/ethnic groups, is 79.7. (The index ranges from 0 – no diversity to 100 – complete diversity). This is more diverse when compared to the US as a whole (72.1).

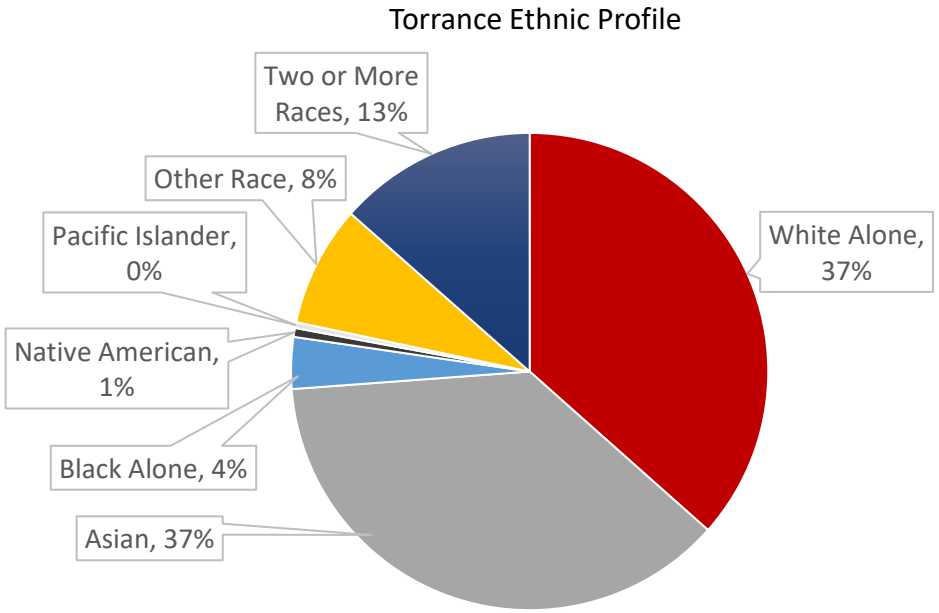


Figure 12: Torrance Ethnicity. Source: ESRI Executive Summary (2023 Updated Demographics)

Languages

Per the 5-year American Community Survey 2017-2021, a total of 58.99% of Torrance residents speak only English, while 41.1% speak other languages. The non-English language spoken by the largest group is Asian and Pacific Island languages, which is spoken by 31.42% of the population. According to Torrance Unified School District, there are over 80 different languages spoken in Torrance.

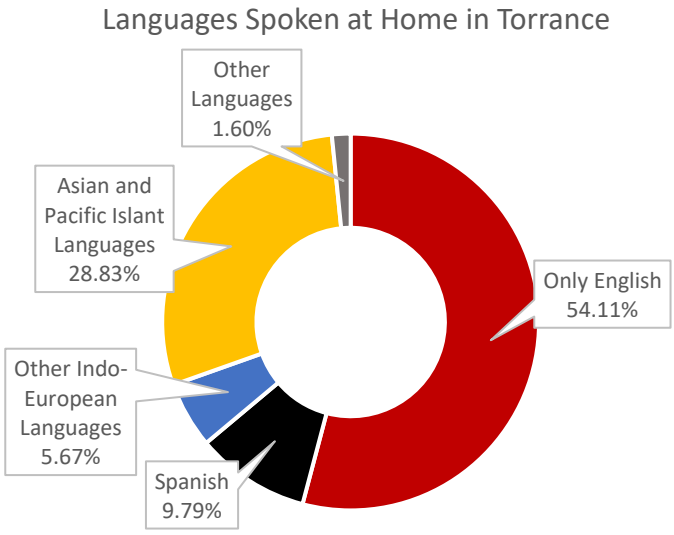


Figure 13: Languages Spoken at Home in Torrance; Source: US Census ACS 5-year survey (2017-2021)

Area Economics and Socioeconomics

Service Type Infrastructure

Torrance has transitioned from its original industrial city concept into a diverse business community. The largest employment sector is the services industry (40.5%) which includes hotels & lodging, automotive services, movies and amusement, health care, legal services, and education. Torrance is expanding and leading the way in the region in the health care industry. The retail trade sector makes up 17.1% of the business community and includes home improvement, general merchandise stores, food stores, auto dealers, apparel, furnishing stores, and eating and drinking establishments. The third largest sector are finance, insurance, and real estate related businesses accounting for 10.9% of the businesses in Torrance. The graph below represents a summary of all business sectors according to the Standard Industrial Classification Codes.

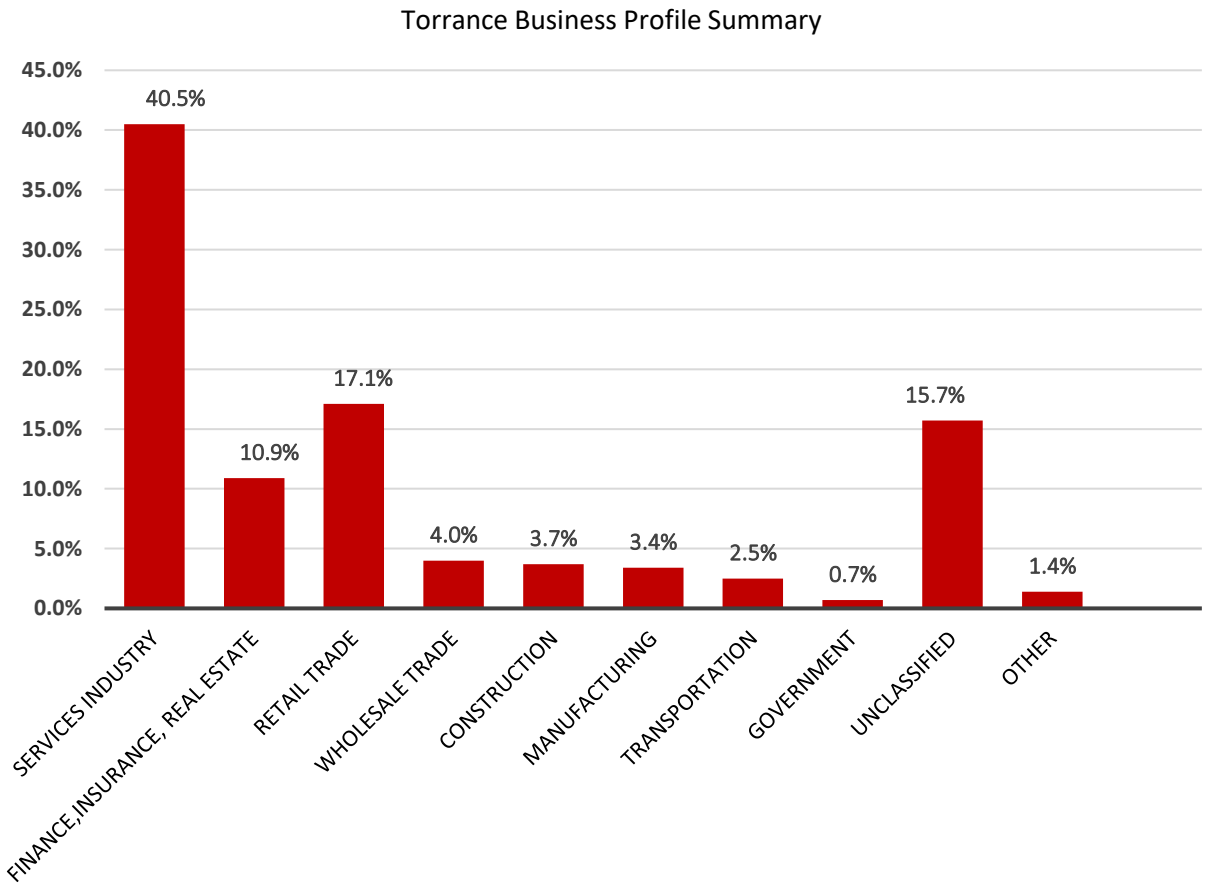


Figure 14: Torrance Business Profile Summary. Source: ESRI Business Summary 2023

Key employers

The table below lists the top ten (10) businesses in Torrance with the greatest number of employees, along with industry and number of employees:

Rank No.	Business Name	Industry	Number of Employees
1.	Sisters of Providence in California, Providence Health Systems	Nursing Care Facilities (Skilled Nursing Facilities)	4210
2.	Torrance Memorial Hospital	Hospitals	3678
3.	Contemporary Services Corporation	Security Guards and Patrol Services	1423
4.	American Honda Motor Co. Inc	Automobile and Other Motor Vehicle Merchant Wholesalers	1154
5.	Robinson Helicopter Co. Inc	Aircraft Manufacturing	957
6.	Airesearch Los Angeles Division, Allied Signal, Inc	Aerospace Product and Parts Manufacturing	680
7.	Stellant Systems, Inc	Communications Equipment Manufacturing	680
8.	Arc	Childcare Services	666
9.	MOOG, Inc	Aerospace Product and Parts Manufacturing	665
10	Starview Adolescent Center, Star Behavorial Health Group, Inc	Residential Mental Health and Substance Abuse Facilities	662

Figure 15: Key Torrance Employers; Source: City of Torrance Economic Development Division

Population Earning Characteristics

Torrance residents are more likely to have a higher household income and a smaller number of people in their household than the average resident of Los Angeles County. The Updated Demographics by Esri estimates a median household income of $106,786 and median home value of $911,584 in 2023.

Human-Made Characteristics

Housing and Development

Located in the urbanized Los Angeles Basin, Torrance is almost entirely developed and mostly surrounded by other urban areas. Although residential land uses make up approximately half of the community's area, Torrance also has extensive retail, office, and industrial land uses. A detailed map of the City's Land Use Plan is available for review on the City's website: City of Torrance Land Use Plan Map

The 5-year American Community Survey 2017-2021 estimated that Torrance has a total of, 59,569 housing units. Detached single family homes account for the majority of housing units at 53.5% with a total of 31,849 units. Single family attached homes account for 7.1% of the housing units with a total of 4,245 units. Multi-unit housing of 20 or more account for 23.0% of the housing units with a total of 13,698 units. The remainder of the housing units (16.3%) are multifamily units below 20 or mobile homes.

Only 8% of the housing units were built prior to 1949. Torrance experienced a housing boom from 1950-1979 when 74.3% of the housing units were built. Since 1980, Torrance has added 18.2% of its current estimated housing units. Additionally, Torrance is generally considered a "built out" city with very little room for new housing. In order to meet the demand for housing with a lack of new property to build upon, high and moderate density housing projects are being proposed by developers. Changing single family residential properties or rezoning non-residential properties for high density housing is an emerging trend in the City. This is a trend TFD will monitor due to the potential increase for services as the population grows.

Transportation structure

Interstate 405 runs through the northern part of the city; the Pacific Coast Highway (State Route 1) runs through southern Torrance; and Hawthorne Boulevard (State Route 107) runs through the length of the city. The community is divided roughly in two by rail lines, which are currently only used for freight.

Zamperini Field, the Torrance Municipal airport, is located at the southeast end of the City and serves as a general aviation airport with approximately 543 based aircraft. While home to primarily private aircraft, it also houses several Fixed Base Operators (FBOs) which are available for flight instruction, aircraft repair, and charter flights. The Airport is also the headquarters for Robinson Helicopters, the largest manufacturer of private helicopters in the United States. Torrance Municipal Airport - Zamperini Field is a valuable asset for both business promotion and recreation in the South Bay area.

Other man-made features

Other man-made features in the City include storm water sumps, the Dominguez Channel which runs through the norther part of the city, and storm drain infrastructure.

Community Feedback

An important aspect of determining the types and levels of services that the Torrance Fire Department provides to the community is the understanding of priorities and expectations of the department's external stakeholders – i.e. Torrance residents, businesses, public safety partners, chambers, associations, etc.

The Torrance Fire Department develops and maintains a multi-year, community based strategic plan with the participation of TFD external and internal stakeholders. The plan consists of strategic goals and objectives, that upon completion, guide the Torrance Fire Department to better service provision, better outcomes for Torrance residents and businesses that are in alignment with the needs, priorities, and expectations of the community.

In 2022, the TFD updated the Department's Strategic Plan. Development of the TFD 2023-2028 Strategic Plan included involvement from both the community and internal TFD staff, the development of strategic goals and objectives through personnel collaboration, a draft strategic plan document, focus group work to refine the draft and the presentation of the final draft to all stakeholders. During the external stakeholder portion of the plan development, staff members met with external community stakeholders to gather feedback and input on service delivery standards. This feedback was utilized to identify gaps and areas for improvement, based on which strategic goals and objectives were established.

Community Priorities

Understanding what the Torrance community considers to be a priority assists TFD with dedicating time, resources, and direction that is in alignment with the community and their needs. During an external stakeholder workshop held in 2022, the External Stakeholders representing the community were asked to prioritize the programs offered by the TFD through a process of direct comparison. The results were as follows:

Programs / Services	Rank	Score
Emergency Medical Services	1	258
Fire Suppression	2	215
Rescue - Basic and Technical	3	185
Hazardous Materials Mitigation	4	155
Domestic Preparedness Planning and Response	5	123
Community Risk Reduction	6	92
Fire Investigation	7	77
Public Fire and Life Safety Ed.	8	70

Figure 16: Community Program Priorities. Source: TFD Strategic Plan 2023-2028

2023-2028 Strategic Initiatives

As a result of the TFD strategic planning effort conducted in 2022, the department developed 7 strategic initiatives that are included in the 2023 - 2028 Strategic Plan. These strategic initiatives were identified based on feedback received from external stakeholders, an environmental scan conducted by internal stakeholders, and identified service gaps. The initiatives represent different areas of focus that were determined to be important for change and continuous improvement.

Torrance Fire Department Strategic Initiatives

Strategic Initiative 1 - Emergency Medical Services
Enhances current patient transportation program to build system resilience. Explore, adopt, and embrace current and future EMS Service Delivery Models. Participate in homelessness outreach to assist in reducing impact of homeless related incidents on emergency response.

Strategic Initiative 2 - Physical Resources
Addresses aging infrastructure, equipment, and apparatus that are essential to providing high level of service to the community and ensuring safety of TFD personnel.

Strategic Initiative 3 - Information Technology
Aims to improve reliability and efficiency of IT physical resources; enhance personnel resources to guarantee adequate IT support. Pursue new / emerging technologies and trends that can serve as opportunities for quality improvement.

Strategic Initiative 4 - Training and Response
Seeks to improve efficiency and effectiveness of department's training plans and specialty response teams.

Strategic Initiative 5 -Community Engagement
Contains goals to enhance community education / outreach programs. Maximize the usage of outreach mediums. Establish an internal infrastructure to support the Community Education / Engagement Program and increase interaction with the Community solicit feedback for program evaluation.

Strategic Initiative 6 -Workforce
Focuses on goals that aim to attract, retain, and build a stable, professional, healthy, and resilient workforce.

Strategic Initiative 7 - Continuous Improvement / Accreditation
Targets opportunities to increase the benefits of existing continuous improvement tools and processes. Focuses on meeting requirements for maintaining accredited status through the Center for Public Safety Excellence.

Figure 17: TFD Strategic Initiatives, Source: 2023-2028 Strategic Plan

Section 2 - Fire Department Overview

Mission Statement

We serve with excellence through preparedness, response, and engagement.

Vision

To be a premier, all risk public safety provider that adapts to exceed our community's expectations.

Values

- Excellence- We aspire to be experts in our profession and provide the highest quality of services.
- Integrity- Trust is critical to our mission. We do the right thing, not the easy one.
- Compassion- We believe that everyone – both within the community and inside of our department - deserves to be treated with kindness, care, and respect.
- Teamwork- We are better when we work together – including treating residents, businesses, and City departments as our partners to help keep our community safe.
- Responsiveness- We answer every call to serve—emergency or otherwise—as quickly and safely as possible.
- Duty - We take ownership of our actions on and off duty. We serve the needs of others before our own interests.
- Communication- We communicate respectfully and productively with each other and with our community. We invite and seriously consider any ideas or suggestions—from any level, internal or external—that will make us better.

Figure 18: TFD Strategic Initiatives, Source: 2023-2028 Strategic Plan

Department Programs and Services

Community Risk Reduction Program

The Community Risk Reduction (CRR) Program encompasses Fire Prevention, Public Education, and Fire Investigation, Origin and Cause efforts that are all focused on reducing risks in the community via legal enforcement, education, engineering, and economic incentives. The CRR Program provides services that range from answering simple fire safety questions for the general public to more complex fire protection concerns serving the business community. TFD personnel provide technical guidance to businesses on how to maintain a "code compliant" operation while fostering a “business friendly” environment.

CRR Program services include, but are not limited to; providing fire safety information and assistance to professional designers, contractors, our city planners, commissioners and other city staff about new and existing projects within Torrance; review and approve new construction plans for compliance of life safety and fire protection regulations, water supply for fire protection systems and suppression operations and emergency vehicle/personnel access; and investigate fires occurring within the city to determine their cause and origin.

The Torrance Fire Department conducts approximately 9,000 annual life safety inspections of various occupancies based on adopted codes. Some of these occupancies include businesses, schools, hospitals, convalescent homes, day care facilities, residential complexes, industrial facilities, and high-rise structures. Additionally, TFD conducts life safety inspections for special events, such as displays in common areas at mall functions, fundraising fairs, carnivals at local schools, film shoots, and big gala events. Inspectors look for obvious and sometimes not so obvious violations in the maintenance of life safety provisions for the building or the special event. Violations may include keeping exits clear or providing the proper type of fire extinguisher.

TFD issues operational permits for certain activities, practices or operations that have been determined by the Fire Code or the Fire Chief closer review to ensure compliance with current adopted life safety codes. These permits are issued by the CRRD. Some of these activities include:

- Public displays at the mall
- Carnivals and fairs
- Use and storage of flammable liquids
- Operation of a public assembly
- Open flames in public areas
- Installation or removal of underground fuel tanks and above ground fuel tanks
- Tents where the public is invited
- Use or storage of hazardous materials
- Welding
- Repair garages
- Christmas tree lots
- Installation of fire protection systems, including fire sprinklers and fire alarm systems

The TFD is mandated by the Federal Clean Water Act (amended 1972) to implement the National Pollutant Discharge Elimination System (NPDES) program. This authorizes states and local jurisdictions the issuance of permits to businesses that have the potential to release pollutants into local waterways. Additionally, the City of Torrance is required by NPDES to inspect these commercial and industrial facilities ensuring “Best Management Practices” are adhered to. The purpose is to prevent dangerous pollutants from entering the city’s storm drain system either by rainwater or non-rain water from these facilities. Inspections are conducted on a biennial basis and are managed

by the CRR Fire Prevention Manager/Fire Marshal. To effectively and efficiently perform inspections, they are divided into the following categories: Commercial/Industrial Businesses, Automotive Facilities, Restaurants and Nurseries. Lastly, a Clean Bay Certification is given to those establishments that are proactively preventing pollution of beaches and the ocean.

The TFD is committed to community engagement and education. TFD engages with the local schools and provides Basic Aid Training to every 5th grader enrolled in the Torrance School District. In addition, tours of the fire stations are routinely scheduled with local schools or other community groups. The Torrance Firefighters Association holds an annual bike safety rodeo for children in grades 3-5. TFD is also involved at the high school level by training every freshman student in CPR through a cooperative agreement with Little Company of Mary Hospital.

In addition to local school outreach, TFD has developed a Community Emergency Response Teams (CERT) and Business Emergency Response Teams (BERT) for times of disaster. These teams are expected to fill in the low-risk gaps when TFD resources are stretched thin during a major disaster such as an earthquake.

Additionally, TFD is actively engaged in the business community through fire extinguisher and basic safety training programs.

The following chart demonstrates the number of people reached by TFD personnel, by safety program, from 2018-2022:

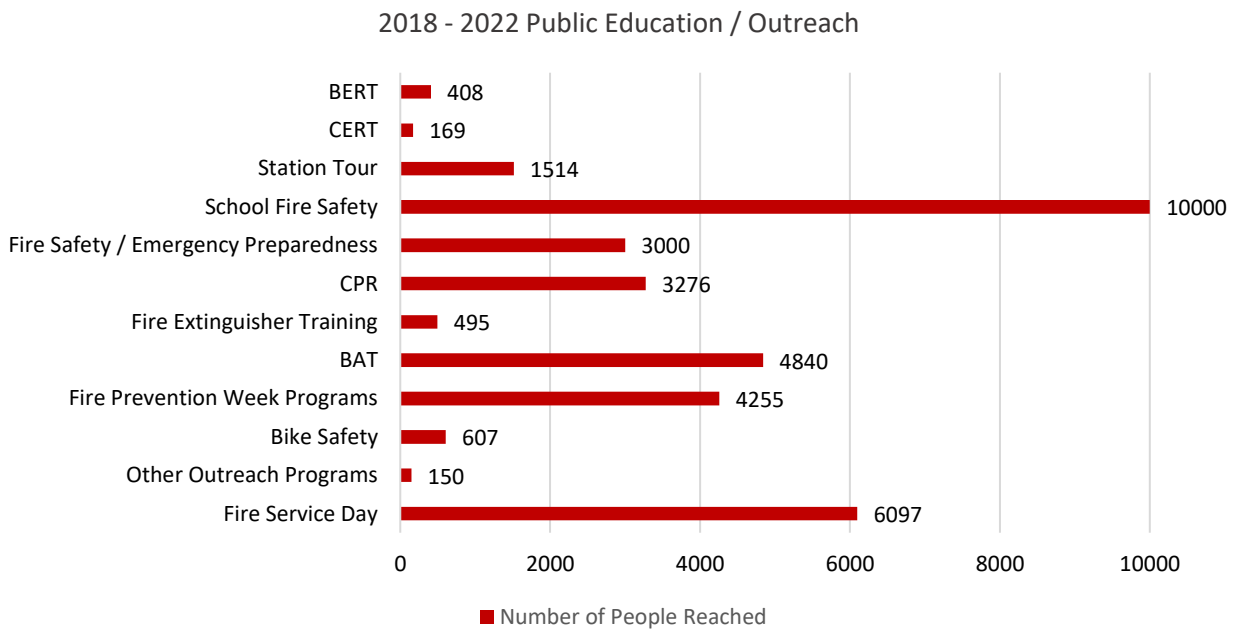


Figure 19: 2018 - 2022 Public Education/Outreach

Unfortunately, due to COVID-19 regulations, typical Public Education and Outreach programs were not conducted from 2020-2021. However, the TFD still found ways to perform outreach to the community. For example, from March 2020 to May 2020, CRRD personnel, in partnership with other City Departments, supported the "Torrance Cares 2-Go" program which provided over 1,200 care packages with meals and essential supplies to at risk Torrance residents such as: seniors (60+), those with disabilities and citizens with underlying health conditions.

Disaster Preparedness Program

TFD conducts annual Mass Casualty Incident (MCI) training scenarios to prepare for those events with many injured persons. During a disaster, it is assumed that there will be many "normal" types of incidents that need a response, happening at the same time. The TFD has a robust training schedule that prepares us to respond to all types of incidents. All on duty personnel conduct various types of training on a daily basis.

In the event of a large-scale disaster, resources in the area may become overwhelmed and depleted, which may hinder timely response and resources available. To help deal with these large-scale incidents, the City of Torrance participates in the statewide mutual aid system. Torrance is part of Area G, Region 1 in the mutual aid system. In the event our resources are overwhelmed, the mutual aid system is activated to provide needed resources from our neighboring local agencies, and eventually other regions within the state, if needed.

In 2023, the City of Torrance updated its Local Hazard Mitigation Plan (LHMP). The LHMP outlines the City's potential for all types of natural or man-made disasters. Using this information allows the City to evaluate risk within the City, and its capability to mitigate such incidents. The LHMP is anticipated to be adopted by the City Council, after approval by CAL OES and FEMA in September of 2023.

In a large-scale disaster, the City opens its Emergency Operations Center (EOC). Management from all City departments are represented in the EOC to aid in the management of the incident. In accordance with the 2017 edition of the State of California Emergency Plan (SEP), Cal OES aligns the State Activation Level sequence with Federal Emergency Management Agency (FEMA) and many of our local partners. The Activation Levels apply to the State Operation Center and the Inland, Coastal and Southern Regional Operations Centers.

- Level Three EOC Activation: Level Three is a minimum activation. This level may be used for situations which initially only require a few people, e.g., a short-term earthquake prediction at level one or two; alerts of storms, or tsunamis; or monitoring of a low-risk planned event. At a minimum, Level Three staffing consists of the EOC Director, Section Coordinators, and a situation assessment activity in the Planning and Intelligence Section. Other members of the organization could also be part of this level of activation e.g., the Communications Unit from the Logistics Section, or an Information Officer.
- Level Two EOC Activation: Level Two activation is normally achieved as an increase from Level Three or a decrease from Level One. This activation level is used for emergencies or planned events that would require more than minimum staff but would not call for a full activation of all organization elements, or less than full staffing. The EOC Director, in conjunction with the General Staff, will determine the required level of continued activation under Level Two, and demobilize functions or add additional staff to functions as necessary based upon event considerations. Representatives to the EOC from other agencies or jurisdictions may be required under Level Two to support functional area activations.
- Level One EOC Activation: Level One activation involves a complete and full activation of all organizational elements at full staffing and all Emergency Support Functions. Level One would normally be the initial activation during any major emergency requiring extreme State level help.

To help prepare the community, the TFD holds multiple Community Emergency Response Team (CERT), and Business Emergency Response Team (BERT) classes annually. Residents and employees of local companies are encouraged to take these courses to be prepared to help themselves and their community in the event of disaster. Over 1500 community members have been trained.

In January of 2018, TFD assumed responsibility of the City of Torrance Office of Emergency Services (OES) for the entire city. (Prior to 2018, the program was administered by the Torrance Police Department). In 2021, OES was transitioned from the Fire Department to the City Manager's Office. The program is now managed by a

Management Associate that reports to the City Manager. Although OES is no longer a part of the Fire Department, the TFD maintains a close relationship with the OES office and is consistently involved in the planning and preparation for potential disasters. The City has contingency plans in place in the case of facilities issues, equipment problems, staffing, and/or communication failures as a result of a disaster.

Emergency Medical Services Program

As an all-risk public safety provider, the TFD provides emergency medical first response services (EMS) including both Basic Life Support (BLS) and Advanced Life Support (ALS) services to Torrance's community. Emergency Medical incidents account for the vast majority of all TFD calls for service (77% of all incidents in 2022 were EMS in nature).

In April 2021, the TFD introduced an EMS Patient Transportation Program. Instead of contracting with a third-party company to provide transportation services, TFD personnel and equipment now fulfill that role.

In order to provide emergency medical first response services, many supporting activities are performed by the TFD, including: EMT, Paramedic, and CPR licensure/certification management, EMS contracts, EMS budget, the Department's EMS QA/QI program, EMS Continuing Education Program, Infection Control Program, EMS Pilot Programs, Ambulance Transport Program, EMS equipment and supply management, EMS transport billing, medical facilities billing, and oversight over EMS Special Programs (Tactical Paramedics, Fireline Paramedics, and partnership with the Mobile Stroke Unit),compliance with local, state, and national requirements, active participation in local and state EMS advisory committees, maintenance of strong partnerships for collaboration with Torrance area hospitals, EMS Agency, and other fire departments within the county.

Fire Suppression Program

The TFD is a comprehensive fire department responsible for safeguarding an area spanning over 21 square miles. The call volume for 2022 was 16,672 with 4.8% of incidents being fire related. The fire suppression personnel are trained to handle diverse incidents within Torrance and are equipped to provide a range of fire suppression services aiming to protect both individuals and property. These services include structure fires, vehicle fires, dumpster fires, hazardous materials fires, brush fires, and wildland urban interface fires which occur on mutual aid deployments responses.

Technical Rescue Program

The TFD provides both basic and technical rescue services that include incidents involving entrapment in vehicles, machinery, confined space, high angle sources, trench and water, and structural collapses.

Members assigned to the truck companies conduct training exercises throughout the year to remain proficient and compliant with regulations. Frequent training in auto extrication is imperative to stay up to date with the challenges faced in auto extrication with today's high-tech vehicles. Members also participate in multiple challenging confines space rescue scenarios annually. Additionally, members annually review trench rescue, building shoring, and many rope rescue scenarios are performed.

The TFD has a technical rescue training site located at the east end of the airport property where countless scenarios above ground and below ground can be presented to the rescue teams. When practicable, training is conducted at other off site residential, commercial, and industrial facilities, which can each present unique challenges, and provide "real world" situations.

Hazardous Materials Response Program

The Torrance Fire Department maintains personnel trained and equipped to respond, detect, and mitigate hazardous materials incidents within the city involving airborne chemicals, potential chemical releases, and odor complaints. All TFD sworn response personnel are trained at a minimum to the Hazmat First Responder Operational level and participate in ongoing annual mandatory Hazmat training. The TFD Hazmat team is comprised of personnel that are trained to a Hazmat Specialist level. The TFD coordinates and collaborates with local critical facilities on hazardous material training.

Aircraft Rescue Coverage

The Torrance Fire Department (TFD) plays a crucial role in providing emergency services and community risk reduction services for the Torrance Municipal Airport – Zamperini Field. The TFD responds to mitigate incidents relating to aircrafts experiences difficulties, as well as aircraft crashes (on airport property and outside the airport).

Department History

On the night of November 12, 1912, local businessmen met at the tent belonging to D.W. Gregory, the general foreman for the Dominguez Land Company. These men felt that protection from fire was of prime importance to this new community. At 8:00 p.m. that evening, the businessmen and residents established the Torrance Volunteer Fire Department. The first men to sign the roll of the membership were Harry McManus, elected as chief; Al Kirby, hose man; O.M. Erickson, hydrant man; George Blake, hose man; Charles Callahan, hydrant man; and D.W. Gregory for a total of seven men. Within two days the ranks had swelled to 40 men. The Chamber of Commerce would act as an advisory board to this new service until the city was incorporated.

During the early years, the old fire company grew as the city attracted more residents. The Torrance Volunteer Fire Department was also a social group, and it was quite prestigious to belong to it.

The first equipment used by the Volunteer Fire Company was a two-wheeled hose cart with a couple hundred feet of hose, some nozzles, axes, and soda-acid extinguishers. These were stored in a little, open shack on the north side of Carson Street where Andreo Avenue meets Carson. To sound alarm to the residents and the volunteers, a 5-foot diameter locomotive drive rim was acquired. When the alarm rang, the volunteers would show up, grab the ropes and handles of the hose cart and pull it to the fire. The first recorded fire was a haystack that burned on September 15, 1913.

Figure 20: TFD Volunteer Fire Company - Two Wheeled Hose Cart

Around 1916 the volunteers got an old, four wheeled buggy and converted it to carry ladders, axes, ropes, buckets, etc. for this "Hook and Ladder" company. The "Hook and Ladder" was also hand drawn and stored in the shed next

to the hose cart. The first motorized apparatus for the department was a "Combination" Chemical and Hose Car mounted on a 1919 Model "T" Ford one-ton chassis, purchased from the American-La France Company, Los Angeles. Although the City had a volunteer fire department since 1912, the only legal documents that attest to their existence is in newspaper clippings and historic photos.

On May 12, 1921, the City of Torrance was incorporated and had its first Council meeting. One of the first orders of business was to establish a fire department. The City Council appointed Ben Hannebrink, who was the volunteer chief, as the new paid fire chief. The department was re-organized into a paid/call department and all of the approximately 20 former volunteers were now paid $7.50 a month and required to respond to all fires.

In 1922, the department purchased its first pumper, an American-La France Triple Combination Pumper with solid rubber tires, an 80-gallon chemical extinguisher and a hose reel. On November 8, 1922, the City bought property at Cravens and El Prado for $8,000.00. On this site, a combination firehouse, City Hall and jail was built at a cost of $13,262.18.

The 1920's were a time of growth. The size and nature of fires were also growing within the city. By 1926, an American-La France city service truck was purchased. With this new piece of apparatus, the department had again outgrown its quarters. A new fire station, with the City Hall upstairs, was built next door to the existing station addressed at 1523 Cravens.

Torrance continued to grow even during the depression years of the 1930's. The City Council met on December 30, 1930 to pass an ordinance to "provide for the formation, organization and regulation of the Torrance Fire Department." As adopted on the third day of March, 1931, "The Torrance Fire Department of the City of Torrance shall consist of a Chief Engineer, one Assistant Chief Engineer, and the present active members of the Torrance Volunteer Fire Department and such other officers and firemen as may be appointed hereinafter provided."

To provide fire protection for the southern part of town, two private garages were used to house the apparatus manned by the volunteers, or "call men." W.K. Adolph's garage in the Walteria section was home to the Model T Chemical engine, and the other garage was across the street from the Hollywood Riviera Beach Club. These garages were used until land was purchased at 242nd Street and Neece Avenue and Station #2 was built. Walteria resident and call man Percy Bennet built the station in 1934 for a cost of $1,113.33. A 1923 four-cylinder American LaFrance pumper was then acquired from the City of Upland and manned by a two-man crew.

In 1938, the City created a Department of Public Safety, combining police and fire services under the direction of John Stroh. He was chief from December 1, 1938 until October 28, 1939 when the experiment was abandoned. During this short period, the Walteria Station acquired the adjoining lot for future expansion, and also had two phones installed, one at the station, the other at W.K. Adolph's garage. During the day, Adolph was in charge and at night, Lyle Sagel, one of the seven Walteria call men, slept at the station to receive alarms.

With the rumors of war in the early 1940's, Chief McMaster prepared the department. He convinced authorities that the "firemen" should be exempt from the draft due to the need for firemen to protect vital areas like San Pedro. Even though firemen became exempt from duty, over half the department enlisted. The department began hiring temporary replacements. Station 2, in the Walteria section, was cut back from two men to just one, and operated on a contract basis rather than a fully paid department.

With the end of the war, the firemen returned and the department went back to full time status. Station 2 was brought back up to two men and by 1948 a third man was added.

For fire protection in the north end of town, land was purchased in 1948 and a station was built at 3610 Artesia Blvd. The station was manned by one paid fireman and supplemented by several call men who were alerted by a roof top siren. Two 1949 Mack fire engines were purchased towards the end of the decade. One an open cab and the sister engine a closed cab.

The 1950's were again a time for expansion. The end of 1951 phased out the call men of the department. The Torrance Fire Department was now a fully staffed, fully paid, fire department consisting of 58 men.

On May 9, 1952, land was purchased for a new Headquarters Fire Station. The site was located at the town's edge in order to stay off the major streets. By September 12, 1955, the old downtown fire station was vacated and torn down. It had been in use for 20 years. The present-day Headquarters building, located at the corner of Carson Street and Crenshaw Blvd., was dedicated on October 28, 1955. Station 3 on Artesia was enlarged in 1954 and Station 4, in the Hollywood Riviera, was constructed at the corners of Calle Mayor and Pacific Coast Highway in 1955.

Figure 21:Torrance Fire Department Headquarters - 1955

The 1960's brought with it new stations and rigs. Two new American La France 1250 gpm pumpers were purchased and delivered. On April 5, 1962 the Walteria Station was replaced by the current Station 2. It was built on airport property and housed an engine for residences and a Crash Unit to provide protection for airplanes fires as well. The training tower and drill grounds adjoining Station 2 would be completed and dedicated by March 16, 1964.

On January 1, 1964, the Torrance Fire Department, by City Council Ordinance No. 1447, went from a two platoon to a three platoon system. The staffing would grow from 82 firefighters in 1963 to 128 firefighters by 1965-66. In 1966, the department purchased another American La France engine, we now had three new engines. By November 1966, a 100' aerial ladder was added to the fleet.

Figure 22: Fire Call Box – 1966

In 1966, under the direction of Chief Benner, fire call boxes were introduced to Torrance. After 5 years of planning 38 call boxes were installed and connected to the dispatching center where they were under 24-hour monitoring.

In 1967, Station 5 on Del Amo Blvd. was built and dedicated, followed by the relocation of Station 3 to its current location on 182nd St.

Continuing to grow, The Torrance Fire Department put its first Paramedic unit into service in 1972. By

December 1973 Paramedic calls accounted for 75% of all calls. By June 1974, the department added a second rescue. A third paramedic rescue unit was added in 1978.

On October 11, 1986, Fire Station 6 was built near the Del Amo Mall and the high-rise buildings of the Financial District.

Figure 23: Hazardous Material Equipment – 1988

1988 and 89 saw the development and implementation of a state-of-the-art Hazardous Materials Response Team. A forty-foot fifth wheel trailer stocked with chemical protective clothing, air monitoring equipment, reference materials, a chemical analysis laboratory, patching and decontamination capabilities was assembled by Torrance Fire Department personnel. At the same time, State and Federal legislation pertaining to the storage and use of industrial chemicals created a new role for the department. The City Council passed resolutions designating the Torrance Fire Department as an "Administering Agency" for the implementation and management of these environmental laws in the City. The department became responsible for the review and verification of chemical inventories, and Business Plans and Risk Management and Prevention Plans submitted by businesses in the community. The Fire Department's database became the access point for the public's "right to know" about what chemicals are stored and used in the community. These new programs have resulted in a significant reduction in the risk associated with the use of chemicals. With the role of Administering Agency came the addition of new personnel who have specific expertise in chemistry and chemical process safety.

In 1991, TFD reorganized to create a separate Hazardous Materials Administrative Division. One of the duties of this division is to represent the City's interests in the implementation of a legal Consent Decree between the City and the Mobil Oil Corporation. The Consent Decree authorized a stem to stern safety evaluation of Mobil's refinery.

In the early 90's, TFD recognized a need to increase its expertise and capability in the field of Technical Rescue Services. Over a period of several years, significant enhancements in both training and equipment have resulted in the creation of a first-class Tech Rescue Response Team. The Torrance Firefighters Association donated a heavy-duty trailer that was refurbished and specially equipped for this purpose. The department secured the use of an abandoned Nike missile silo at the Torrance Airport and converted it to a Technical Rescue Training Facility that has been certified by the State Fire Marshal's Office.

In 1995, the Torrance Fire Department received a rating as a Class 1 Fire Department by the Insurance Services Office (ISO) and has retained that rating until present day. The ISO rates fire departments nationwide for their effectiveness.

In 2019, the Torrance Fire Department sought and obtained an Accredited Agency status designation by the Commission on Fire Accreditation International (CFAI). The process of obtaining and maintaining accreditation focused the Department on the importance of continuous organizational improvement.

In 2021, in response to budgetary impacts of the COVID-19 pandemic, the TFD introduced a BLS Ambulance Transportation Program. Instead of contracting with a third-party company to provide transportation services, TFD personnel and equipment now fulfill that role.

Department Divisions

The TFD is organized into nine divisions. Each division manages a specific function or area of operations to support all aspects of the department's day-to-day business.

Administrative Division

The Administrative Division provides leadership, direction, and oversight of the administrative functions of the department. The division coordinates department efforts and functions relating to the following City departments: Human Resources, Risk Management, City Attorney, Finance, and the City Manager's Office. The Administrative Division plays a vital role in management of the TFD's human resources, data management and analysis, accreditation, city processes, and providing other divisions with clerical support where needed.

Communications and IT Division

The Communications Division provides leadership, direction and oversight of the communication and technology systems that are essential for the department's operations. The Assistant Chief assigned manages mobile and portable radio communications for all Torrance Fire Department personnel and participates in various committees that set policy and direction for emergency communications. The Assistant Chief is a liaison to Fire Dispatch personnel under the Police Department's Public Safety Dispatch Center and coordinates all related training to ensure the Torrance Fire Department is embracing efficiencies in dispatching appropriate resources. In collaboration with the city's Communications and Information Technology Department, the Assistant Chief provides direction and oversight of deployment and utilization of emerging information technologies in the fire industry.

Community Risk Reduction Division

The Community Risk Reduction Division provides leadership and management of the fire and life safety program, public education program, Hazardous Materials Administration/Regulation program and Fire Investigation program. The division applies Federal, State and Municipal regulations to new and existing structures, provides fire plan reviews and fire operational permits, performs fire investigations, and oversees hazardous materials regulations. The divisional responsibilities include fire and life safety inspections, hazardous materials inspections, National Pollutant Discharge Elimination System (NPDES) inspections, fire investigations and providing public education to the community.

Emergency Medical Services Division

The Emergency Medical Services (EMS) Division provides leadership and management of the EMS program. The division tracks and implements EMS mandates and training of firefighters and paramedics who provide medical care. The divisional responsibilities include the management of the Continuous Quality Improvement program related to EMS, medical supply stock tracking and ordering, providing EMS training, and coordination with outside vendors and agencies related to the EMS program. The EMS Division also oversees all aspects of our in-house Emergency Medical Services Patient Transportation Program.

Logistics Division

The Logistics Division provides leadership and management of the physical resource efforts of the department. The divisional responsibilities include purchasing and maintaining apparatus, equipment, and personal protective gear that is essential for safe and effective response to the community. Logistics is also responsible for repair, maintenance, and construction of all Fire Stations in the City.

Operations Division

The Operations Division provides leadership, direction and oversight for fire suppression, hazardous materials, technical rescue, specialized emergency response programs, and consistency across the three platoons. The divisional responsibilities include contract negotiations, promotional exams, domestic preparedness, disaster management and ISO Class 1 oversight. The Deputy Chief assigned to Operations sits on several Area Groups and Committees to ensure collaboration and standardization efforts are met.

Planning Division

The Planning Division provides leadership and management of the Strategic Plan for the Department. The divisional responsibilities include strategic and advanced planning functions of TFD, deployment and resource modeling, analytics, and statistical data review, quarterly and annual reporting, and standards of cover/community risk assessment.

Research and Development Division

The R&D Division's primary focus is to leverage regional and federal assets to benefit the City of Torrance. Grant management, procurement, and reimbursement are core responsibilities within this division. The Assistant Chief assigned to lead the R&D Division is also responsible for integrating Torrance Fire Department with the 28 other fire agencies located in the Los Angeles region- emphasizing interoperability, common communications, and unified training. These elements are a vital component of managing large-scale catastrophic events related to natural disasters and terrorist activity. The R&D Division is currently tasked with the coordination, planning and execution of Torrance Fire Department's recruit tower, ensuring newly hired firefighters receive the best possible training and are ready to serve the community during any emergency response.

Training Division

The Training Division coordinates and schedules department wide training, provides leadership, direction, and maintains training records for Department wide training. The Assistant Chief assigned to this division creates a master training plan which is posted on the department's SharePoint for all members to access. The division coordinates training for the following specialized programs; Fire Suppression, Hazardous Materials Response, Technical Rescue Response, and Specialized Emergency Response. The division chairs various internal and external advisory committees to provide consistency and coordination from a leadership perspective.

Organizational Structure

The Fire Chief is the principal executive and administrative officer. The Deputy Fire Chief is the second principal executive and administrative officer.

Under the direction of the Fire Chief, each division within the Department is managed by a Deputy Chief, Assistant Chief, Captain, Fire Prevention Manager/Fire Marshal, or the Administrative Services Manager. The Deputy Chief, one Assistant Chief and one Captain manage their divisions from a 9/80 work schedule. Three Assistant Chiefs are assigned to work a 48/96 shift schedule and lead as the Platoon Commander. Sworn safety personnel from the rank of Captain and below are assigned to work a 48/96 shift schedule. Company Officers are to lead and manage their stations, apparatus, and members under their command. The EMS Captain oversees the Ambulance Operators, who work either a 48/96 shift schedule, or a 40-hour week schedule if assigned to a peak-staffed ambulance.

All divisions are encouraged to avoid organizational silos and communicate regularly between divisions. Both the Community Risk Reduction Division (CRRD) and the Administrative Division are unique because they are not staffed with sworn safety personnel. In order to avoid a management silo, CRRD and Administrative staff perform cross training within their divisions. The Administrative Division provides administrative support to all department divisions.

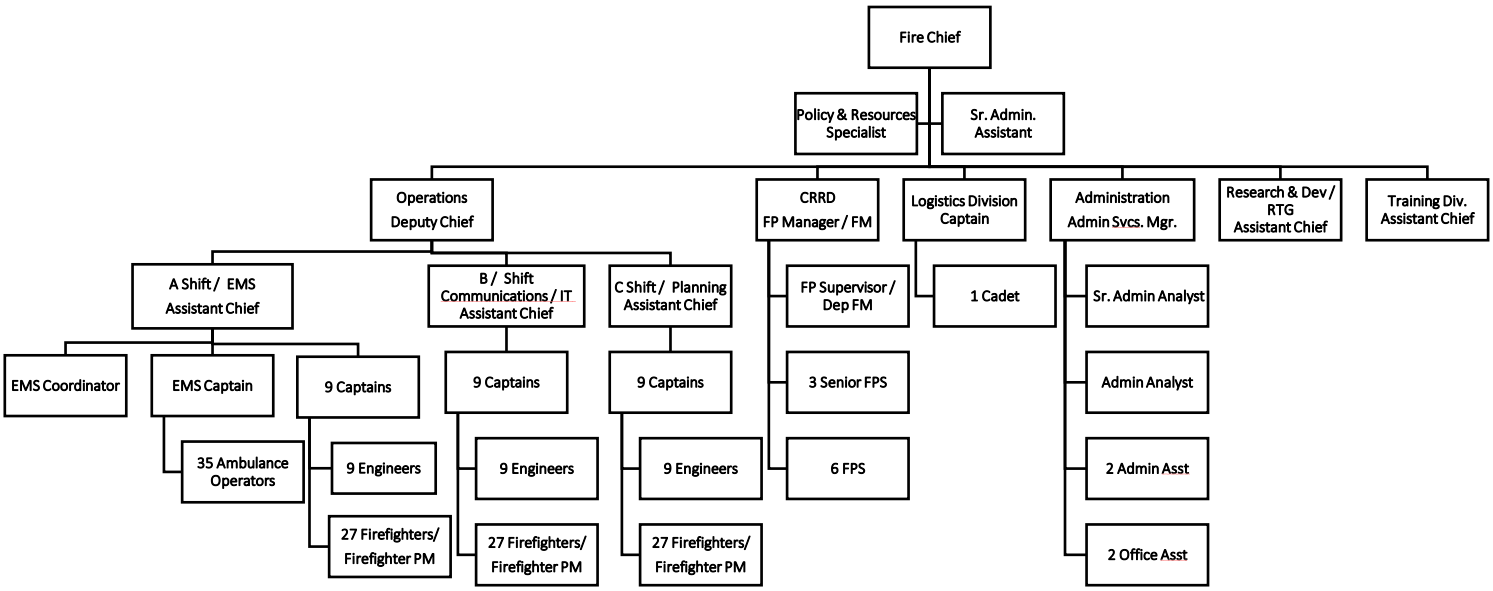


Figure 24: Organizational Structure

Department Financial Basis

The financial basis for providing fire and EMS services is contained in the Fire Department Operating Budget within the City's Operating Budget. The 2022-23 Fire Department Amended budget is $56,420,842. Salaries and employees benefits account for 87.9% of the total budget. The graphs below show the percentage breakdown of the budget. In addition to the operating budget, the fire department has funding sources available in the City Capital Budget.

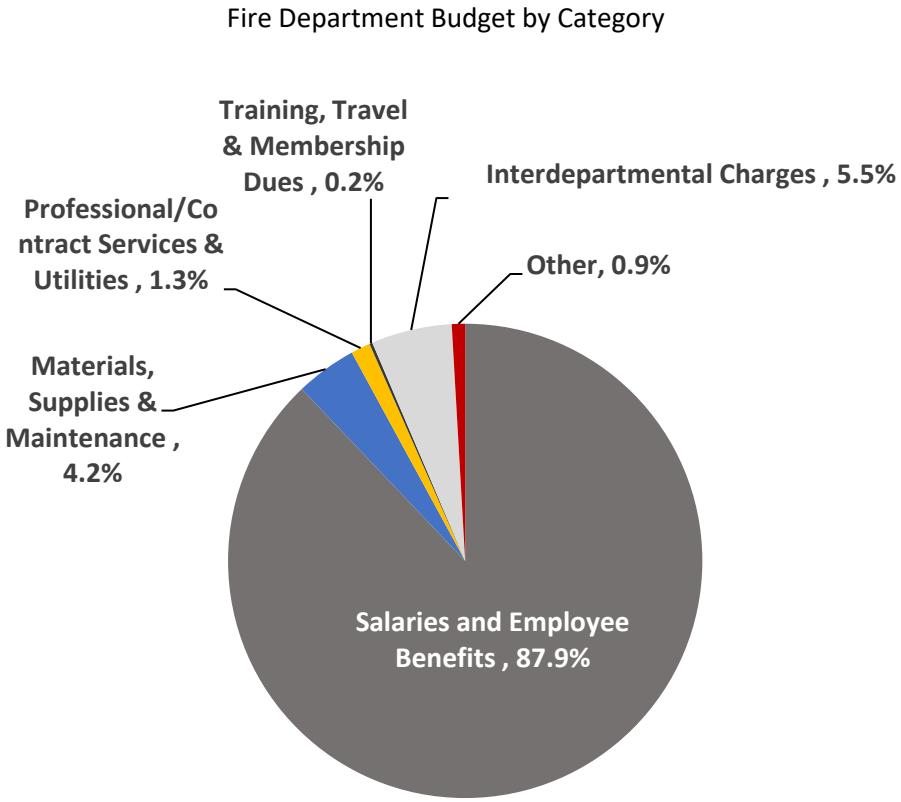


Figure 25: Fire Department Amended Budget by Category Source: City of Torrance FY 2022-23 Mid-Year Budget Review Report

Insurance Services Office (ISO) Rating

The Insurance Services Office (ISO) property class rating is important to a community. Many insurance companies base the fire risk portion of property insurance premiums on the community's ISO rating. ISO uses a 1 to 10 rating scale, with Class 1 being the best level of service (and lowest fire insurance premium cost) and Class 10 representing no service at all. ISO last rated the TFD in 2018 and the department was able to maintain an ISO Class 1 rating. (ISO surveyed the TFD again in March of 2023 and an updated rating is expected to be received by March of 2024). A rating breakdown of the 2018 TFD ISO survey is shown in the table below.

ISO Criteria	Actual	Maximum
Communication-Receiving and Handling Alarms	9.54	10
Water Supply	36.70	40
Fire Department Credible Points	46.29	50
Divergent Reduction (Community Risk Reduction Programs)	4.83	5.5
Total Credible Points	97.19	105.5

Figure 26: TFD ISO Survey Summary Evaluation Source: Insurance Services Office Property Class Rating (2018)

Torrance received a total credit of 97.19 points out of a possible 105.5. The fire department section of the Fire Suppression Rating Schedule (FSRS) reviews engine and ladder-service companies, equipment carried, response to fires, training and number of available firefighters. The following table is a detailed breakdown of the classification details assigned to TFD as a result of the ISO survey conducted in February of 2018.

Fire Department Classification	Actual	Maximum
Engine Companies	5.90	6
Reserve Pumpers	.49	.5
Pump Capacity	3.0	3
Ladder-Service Companies	3.85	4
Reserve ladder-Service Companies	.48	.5
Deployment analysis	7.96	10
Company Personnel	14.06	15
Training	8.55	9
Credit for Optional Considerations	2.0	2.0
Total	46.29	50

Figure 27: Fire Dept. Classification Source: Insurance Services Office Property Class Rating (2018)

Operational Coverage

The Torrance Fire Department operates from 6 stations throughout the City, 24 hours a day, 365 days a year. The TFD staffs 7 engines, 2 tiller operated trucks, 5 paramedic rescues, 4 BLS ambulances, 1 specialty BLS relief unit*, and a platoon commander vehicle 24 hours a day, with two additional (2) BLS ambulances staffed daily but only during peak volume hours. Daily operations staffing is currently 44 Sworn Response personnel on frontline apparatus, and 13 civilian Ambulance Operators on BLS units.

*The one 24-hour specialty BLS relief unit works to relieve other TFD ambulances at local hospitals while they are waiting for open beds to accept patients.

All TFD apparatus and units are named using standardized resource identification and numbering system consistent with California Mutual Aid, Region 1, Area G criteria. All TFD apparatus numbers begin with the number "9" to represent Torrance within Area G, followed by the station number they are assigned to. For example, E91 is a Torrance Engine from station 1. The two exceptions are E97, which is the second engine assigned at Fire Station 1, and BLS 98, which is the specialty relief unit assigned to respond where needed in the City.

The TFD also has numerous unstaffed and reserve units including a technical rescue vehicle, a hazardous materials response vehicle, 1 foam unit and multiple utility vehicles. These units are cross staffed with personnel to deliver the apparatus or vehicle to an emergency scene, as needed.

The TFD Administrative Division offices are housed at TFD Headquarters, located at Station 1. The Administrative Division operate on a 9/80 schedule from Monday through Friday, with every other Friday closed for business. The TFD Community Risk Reduction Division (CRRD) offices are located within the City's Civic Center, adjacent to City Hall. The CRRD Fire Investigation and Inspection team members work a 9/80 schedule.

Stations

The TFD has six (6) stations strategically distributed throughout the City.

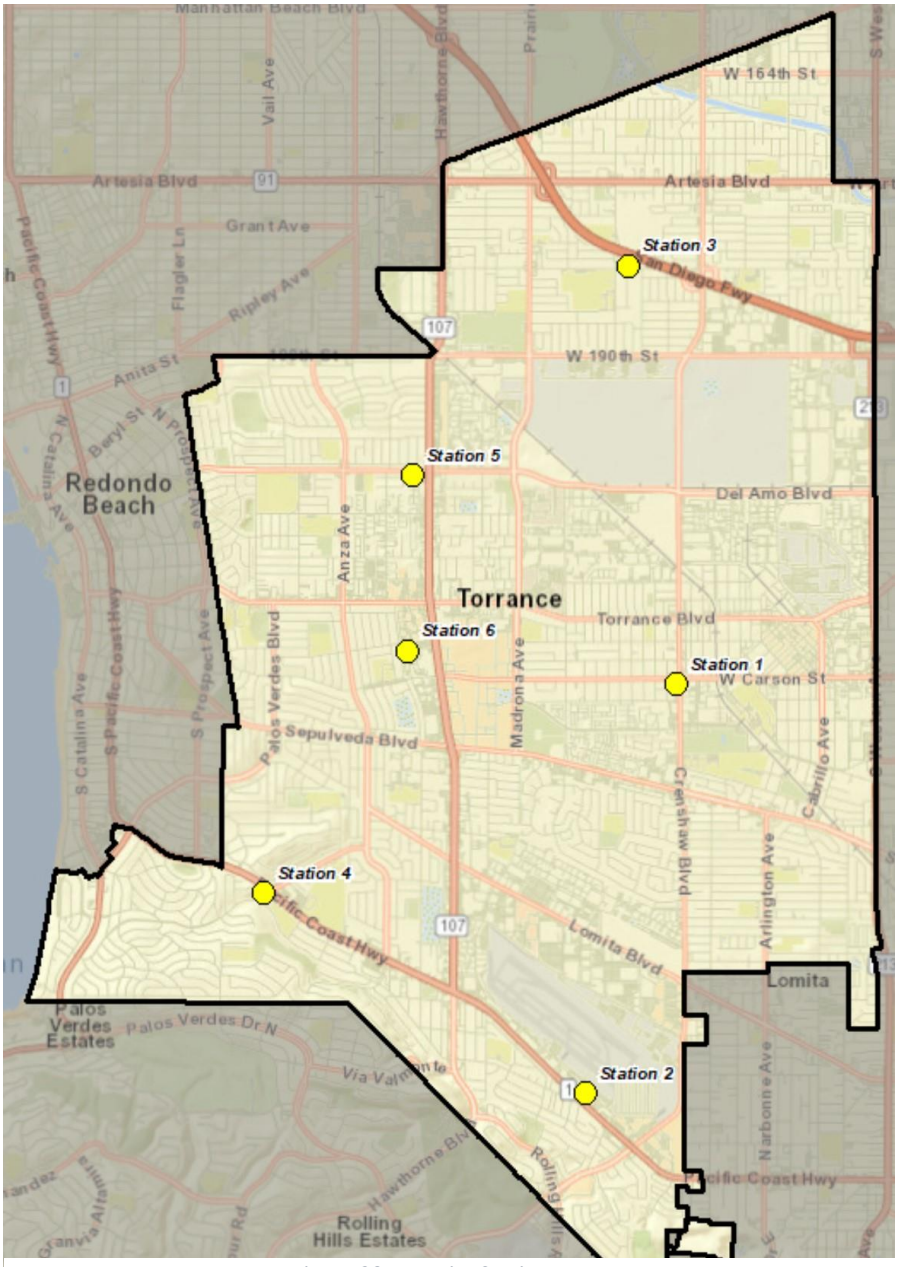


Figure 28: TFD Fire Stations Map

Fire Station 1- Headquarters

1701 Crenshaw Boulevard

Built in 1955, Station 1 is the oldest fire station in the city and is the location of the Torrance Fire Department Headquarters. Fire administration and civilian employees working for the department are housed at Station 1. Two structures at the rear of Station 1 provide offices for the EMS, Logistics and Training Divisions. There are 14 sworn response personnel and 3 ambulance operators on duty each day. Station 1 is home to a portion of the HazMat Team. Members of the department's explorer program report to Station 1 for their meetings and training. In addition, Station 1 contains an extractor to clean PPE after fires, a compressor for filling SCBA bottles and EMS supply storage.

Figure 29: Fire Station 1 -HQ

Frontline Apparatus	Make	Model	Year	GPM
Battalion 91	Ford	F-250 Crew Cab	2022	-
Truck 91	Pierce	107' Aerial Ladder Truck (Tiller)	2021	1000
Engine 91	Pierce	Triple Combination Pumper	2014	1500
Engine 97	Pierce	Triple Combination Pumper	2016	1500
Rescue 91	International	Terrastar Rescue Ambulance	2014	-
BLS 91	Ford	E-350 Ambulance	2021	-
BLS 98 (APOT)	Ford	E-350 Ambulance	2021	-
USAR 96	International	Utility	2000	-
Reserve Apparatus	Make	Model	Year	GPM
Battalion 92	Ford	F-250 Crew Cab	2022	-
Battalion 93	Ford	F-250 Crew Cab	2022	-
Truck 913	Pierce	100' Aerial Ladder Truck (Tiller)	2001	1000
Rescue 917	International	Navistar Rescue Ambulance	2009	-
BLS 97	Ford	E-350 Ambulance	2021	-
Other Apparatus	Make	Model	Year	GPM
Utility 91	Toyota	Tundra	2001	-
Utility 92	Ford	Van	2010	-
BA91 (Bariatric)	Ford	E-350 Ambulance	2011	-

Figure 30: Station 1 Apparatus Listing

Fire Station 2

25135 Robinson Way

Figure 31: Fire Station 2

Station 2 was built in 1962. There are 4 sworn response personnel and 2 ambulance operators (peak staffed) on duty each day. Station 2 is the training ground for all fire department personnel. The training tower and the department's recruit academy are held in the classroom at this location along with community CERT and BERT certification courses. Fire engine pump testing is performed here utilizing the drafting pit. In addition, Station 2 manages hose inventory and repairs and contains an extractor to clean PPE after fires.

Frontline Apparatus	Make	Model	Year	GPM
Engine 92	Pierce	Triple Combination Pumper	2017	1500
BLS 92	Ford	E-350 Ambulance	2021	-
Reserve Apparatus	**Make**	**Model**	**Year**	**GPM**
Engine 912	Seagrave	Triple Combination Pumper	2003	1500
Other Apparatus	**Make**	**Model**	**Year**	**GPM**
Engine 343 (Training Use Only)	Seagrave	Triple Combination Pumper	1997	1500

Figure 32: Fire Station 2 Apparatus Listing

Fire Station 3

3535 West 182 Street

Figure 33: Fire Station 3

Station 3 was built in 1973. There are 6 sworn response personnel and 2 ambulance operators on duty every day. This is a brush station and responds with Area G or Region I strike teams to brush and wildland fires on a Type 1 or Type 6 engine. A Cal OES Type 6 engine is stored at Station 3 and is cross-staffed with TFD personnel if requested to respond to wildland or all-hazard incidents within California. Station 3 is also first-in to Torrance Refining Company. All paramedics at this station are members of the department's Tactical Emergency Medical Services team, and train regularly with the Torrance Police Department SWAT team.

Frontline Apparatus	Make	Model	Year	GPM
Engine 93	Pierce	Triple Combination Pumper	2020	1500
Rescue 93	Dodge	4500 Paramedic Rescue	2018	-
BLS 93	Ford	E-350 Ambulance	2021	-
Reserve Apparatus	Make	Model	Year	GPM
Engine 913	Seagrave	Triple Combination Pumper	2006	1500
Engine 916	Seagrave	Triple Combination Pumper	2003	1500
Other Apparatus	Make	Model	Year	GPM
OES 1619	Ford/HME	Type 6 Pumper	2020	500

Figure 34: Fire Station 3 Apparatus Listing

Fire Station 4

5205 Calle Mayor

Figure 35: Fire Station 4

Station 4 was built in 1955. There are 6 sworn response personnel and 2 ambulance operators (peak staffed) on duty each day. This is a brush station and responds to immediate need requests within the region. Additionally, E94 responds with Area G partners when strike team requests are received through the State mutual aid system.

Frontline Apparatus	Make	Model	Year	GPM
Engine 94	Pierce	Triple Combination Pumper	2020	1500
Rescue 94	Dodge	4500 Paramedic Rescue	2018	-
BLS 94	Ford	E-350 Ambulance	2021	-
Reserve Apparatus	**Make**	**Model**	**Year**	**GPM**
Engine 914	Pierce	Triple Combination Pumper	2006	1500
Rescue 914	Ford	F450 Paramedic Rescue	2006	-

Figure 36: Fire Station 4 Apparatus Listing

Fire Station 5

3940 Del Amo Boulevard

Figure 37: Fire Station 5

Station 5 was built in 1967. At this station, there are 5 sworn response personnel and 2 ambulance operators on duty every day. Station 5 is home to Engine 95, Rescue 95 and BLS 95. The Department's Peer Support Canine is housed and taken care of by Station 5 personnel.

Frontline Apparatus	Make	Model	Year	GPM
Engine 95	Pierce	Triple Combination Pumper	2017	1500
Rescue 95	International	Terrastar Rescue Ambulance	2014	-
BLS 95	Ford	E-350 Ambulance	2021	-
Reserve Apparatus	**Make**	**Model**	**Year**	**GPM**
Engine 915	Seagrave	Triple Combination Pumper	2003	1500
Rescue 915	Dodge	4500 Paramedic Rescue	2018	-
Other Apparatus	**Make**	**Model**	**Year**	**GPM**
Utility 95	Ford	F450 Utility	2000	-

Figure 38: Fire Station 5 Apparatus Listing

Fire Station 6

21401 Del Amo Circle

Figure 39: Fire Station 6

Station 6 was built in 1986. There are 9 sworn response personnel and 2 ambulance operators on duty each day. Members of the HazMat team are assigned here in addition to the members at Station 1. This station manages SCBA maintenance and repair, repairs small tools, has an extractor to clean PPE after fires and a compressor for filling SCBA bottles.

Frontline Apparatus	Make	Model	Year	GPM
Engine 96	Pierce	Triple Combination Pumper	2014	1500
Truck 96	Pierce	105' Aerial Ladder Truck (Tiller)	2013	1000
Rescue 96	Dodge	4500 Paramedic Rescue	2018	-
BLS 96	Ford	E-350 Ambulance	2021	-
HM 96	Freightliner	FL-106	1999	-
Other Apparatus	Make	Model	Year	GPM
Foam 96	Ford	F450 Utility	2000	-

Figure 40: Fire Station 6 Apparatus Listing

Section 3 - All-Hazard Risk Assessment of the Community

The goal of an all-hazard risk assessment is to identify, classify, and categorize all fire and non-fire risks within Torrance to make informed decisions on the types and levels of service that the TFD provides to the community.

The TFD All-Hazard Risk Assessment evaluates the community's unique features and characteristics to identify potential hazards that may contribute to, or pose the threat of, causing harmful emergency incidents. Hazards are the causes of harm present in the community. Risk is the probability that any hazard will cause harm, while taking potential consequences into consideration.

In order to assess risk, the TFD conducts an analysis of historical community service demands and community features (including natural hazards, population demographics, community development, socioeconomic factors and critical infrastructure) to identify hazards and threats present in Torrance. Hazards, that were identified as probable to occur but had little quantitative data, were evaluated through historical analysis in Torrance or other communities that experienced those types of events. For example, the historical effects of a major earthquake in Torrance are not clearly documented; however, Torrance has studied and prepared for the effects of a major earthquake based on the historical effects in other California communities.

The TFD then establishes risk classifications which groups areas of risk based on types of hazards and threats identified within the community. The specific types of incidents or events that can occur within each risk classification are divided into risk categories risk categorization is based on the probability and consequence of each specific incident type. The Risk categories group incidents by their level of severity as low, medium, high, or maximum risk

The TFD utilizes the risk classifications and categories to determine the necessary structure to allocate personnel, apparatus, and fire stations as resources to mitigate those risks and meet the community's expectations. This methodology also provides information for the organization to consider alternative strategies to assist in the mitigation of risks.

Natural Hazards Assessment

Natural hazards have different impacts in varying locations and times, with the potential to severely impact human health and safety, property, ecosystems, and key services. Over a sufficient period of time, cyclical patterns of occurrence and recovery associated with natural hazards eventually become evident. These patterns can be identified and analyzed to create the most effective set of emergency management activities.

The City of Torrance updated the Local Hazard Mitigation Plan (LHMP) in 2023. Formal adoption of the Plan, by the City Council, is anticipated to be complete in September of 2023 following approval of the plan by CAL OES and FEMA. This plan is intended to help make Torrance a safer place to live, work, and visit by identifying effective and feasible actions to reduce the risks posed by various hazards. The LHMP is consistent with current standards and regulations, to ensure that the understanding of hazards facing the community reflects current conditions and best available science, that the mitigation measures in the plan are grounded in best practices and available resources, and that the plan is consistent with Federal Emergency Management Agency (FEMA) requirements. The risk assessment was performed using a City-wide, multi-departmental process, because many hazardous events are likely to affect numerous areas and Departments within the City. As a member of the larger city team, TFD recognizes the plan and accepts the plans risk assessment methodology as valid for natural hazards.

The City of Torrance utilized a third-party emergency management and public health consulting firm to assist with the Plan's development. The City's Local Hazard Mitigation Planning Team (the Planning Team) consisted of representatives from different City departments and other local stakeholders. The Planning Team included representatives from the following City departments: City Manager, City Treasurer, Communications and Information Technology, Community Development, Community Services, Finance, Fire, General Services, Police and Public Works.

Members of the Planning Team reviewed a list of potential hazards consistent with FEMA guidance for inclusion in the Local Hazard Mitigation Plan. The team eliminated hazards that were not relevant to Torrance or did not pose a substantive threat, and added hazards that were not included in FEMA guidance but are applicable to the community. The table on the following page shows the possible hazards consistent with FEMA guidance that were evaluated to be included in the LHMP, and the reasoning behind the decision for each hazard.

The City of Torrance is susceptible to a number of hazards. The LHMP profiles the most significant hazards. The list of hazards identified in the 2023 LHMP was reviewed by the Planning Team to reflect the hazards that pose the greatest risk. The Planning Team reviewed hazards from the 2017 LHMP and several potential new hazards including Climate Change/Sea Level Rise, Dam Failure, Fire and Tsunami.

Hazards	Torrance Local Hazard Mitigation Plan 2017	Torrance Local Hazard Mitigation Plan Update 2023
Climate Change/Sea level Rise	**Excluded**	**Include**
Dam Failure/Inundation	**Excluded**	**New in 2023 update. Added due to potential impacts of a dam failure and inundation.**
Drought	**Included**	**Updated due the unique nature of the hazard and the consequences on the City.**
Earthquake	**Included**	**Included in Geohazards, Earthquake and Seismic Hazards**
Expansive Soils	**Included**	**Included in Geohazards, Earthquakes and Seismic Hazards**
Extreme Cold	**Included**	**Included in Extreme Weather**
Extreme Heat	**Included**	**Included in Extreme Weather**
Extreme Weather	**Excluded**	**Included in Extreme Weather**
Flood	**Included**	**Included**
Hail	**Included**	**Included in Extreme Weather**
Landslide	**Included**	**Included**
Severe Wind	**Included**	**Included in Extreme Weather**
Subsidence	**Excluded**	**Included in Landslides**
Tornado	**Included**	**Included in Extreme Weather**
Tsunami	**Excluded**	**Included**
Wildfire	**Excluded**	**Included**

Figure 41: Summary of Hazards Source: 2023 Torrance Local Hazard Mitigation Plan

Ultimately the Planning Team included Climate Change, Dam Failure, Drought, Extreme Weather, Fire/Wildfire, Flood, Geohazards/Earthquakes/Seismic Hazards, Landslides and Tsunami as vulnerabilities to include in the LHMP. Each natural hazard includes a description of the hazard, the location and extent of the hazard, previous occurrence, probability of future events, and vulnerability & impact. The risk for each of these hazards was analyzed using a Calculated Priority Risk Index (CPRI). The CPRI examines four criteria for each hazard; probability, magnitude/severity, warning time, and duration.

Calculated Priority Risk Index (CPRI) Analysis Process

- Hazards are rated 1 to 4 in whole numbers for each CPRI category;
  - Probability (Unlikely, Possible, Likely, Highly Likely)
  - Magnitude – Severity (Negligible, Limited, Critical, Catastrophic)
  - Warning Time (>24 hours, 12-24 hours, 6-12 hours, <6 hours)
  - Duration (< 6 hours, 6-24 hours, 24 hours – 1 week, > 1 week)

- Each category is weighed by a percentage. Ratings and their weighted scores (weight x rating) are captured for each hazard;
- The weighted scores for each hazard are summed to create a cumulative weighted score.
- This score represents the comparative risk posed by a hazard where 1–1.9 is low risk (L), 2–2.9 is moderate risk (M), 3–3.9 is high risk (H), and 4 is severe risk (S).

A summary of the CPRI for each identified hazards is listed below. Further explanatory information regarding the methodology is available in the LHMP.

		Category and Weight				Cumulative Weighted Score	Risk Level
		Probability	Magnitude/ Severity	Warning Time	Duration		
Index Rating (R) Weighted Score (WS)		45%	30%	15%	10%		
Climate Change	***R***	2.36	1.27	1.18	3	**1.96**	**Low**
	WS	1.10	.38	.18	.3		
Dam Failure	***R***	1.45	1.64	2.18	2	**1.67**	**Low**
	WS	.65	.49	.33	.2		
Drought	***R***	3.18	1.45	1	3.45	**2.37**	**Moderate**
	WS	1.43	.44	.15	.35		
Extreme Weather	***R***	2.45	1.64	1.64	2.45	**2.09**	**Moderate**
	WS	1.10	.49	.25	.25		
Fire/Wildfire	***R***	1.64	1.73	3.36	1.55	**1.92**	**Low**
	WS	.74	.52	.50	.16		
Flood	***R***	1.64	1.91	2.18	1.91	**1.83**	**Low**
	WS	.74	.57	.33	.19		
Geohazards, Earthquakes and Seismic Hazards	***R***	2.73	2.64	3.45	2.90	**2.83**	**Moderate**
	WS	1.23	.79	.52	.29		
Landslides	***R***	2.45	2	3.36	2.36	**2.44**	**Moderate**
	WS	1.10	.60	.5	.24		
Tsunami	***R***	2	2.09	2.91	2	**2.17**	**Moderate**
	WS	.9	.63	.44	.2		

Figure 42: Natural Hazards Assessment – CPRI Results Source: 2023 Torrance Local Hazard Mitigation Plan

Climate Change/Sea-level Rise

The Earth's climate is changing. The state has warmed up to about two degrees Fahrenheit (°F) in the last century. Throughout the southwestern United States, heat waves are becoming more common, and snow is melting earlier in spring. In the coming decades, changing climate is likely to decrease the flow and amount of water in Rivers and Watersheds, threaten the health of livestock, increase the frequency and intensity of wildland fire, and convert some rangelands to desert.

Our climate is changing because the Earth is warming. People have increased the amount of carbon dioxide in the air by 40% since the late 1700s. Other heat-trapping greenhouse gases are also increasing. These gases have warmed the surface and lowered atmosphere of our planet about one degree during the last 50 years. Evaporation increases as the atmosphere warms, which increases humidity, average rainfall, and the frequency of heavy rainstorms in many places, but contributes to drought in others. Greenhouse gases are also changing the world's oceans and ice cover. Carbon dioxide reacts with water to form carbonic acid, so the oceans are becoming more acidic. The surface of the ocean has warmed about one degree during the last 80 years.

The U.S. Environmental Protection Agency (EPA) describes climate change as "any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer."

Many people confuse climate change with global warming, the recent and ongoing rise in global average temperatures near Earth's surface. However, global warming represents only one aspect of climate change. The Earth's average temperature has risen by 1.4°F over the past century and is projected to rise another 2°F to 11.5°F over the next hundred years. Rising global temperatures have been accompanied by changes in weather and climate. Many places have seen changes in rainfall resulting in more floods, droughts, or intense rain, as well as more frequent and severe heat waves. The planet's oceans and glaciers have also experienced changes. Oceans are warming and becoming more acidic, ice caps are melting, and sea levels are rising. The effects of these indicators include:

Greenhouse Gases – Human activities have increased the emissions of greenhouse gases. As a result of the increase in emissions, average concentrations of heat-trapping gases in the atmosphere are also increasing.

Weather and Climate – Average U.S. and global temperatures are increasing, while attributes of weather and climate, such as precipitation, drought, and tropical cyclone activity, are changing.

Oceans – Average oceanic temperatures are increasing. Sea levels are rising around the world due to thermal expansion and increases from ice melt, and waters are becoming more acidic.

Snow and Ice – Glaciers in the U.S. and around the world are generally shrinking, while snowfall and snow cover in the U.S. have decreased overall. The extent of the Arctic Sea ice is declining.

Health and Society – Warmer temperatures and later fall frosts allow ragweed plants to produce pollen later into the year, potentially prolonging allergy season. The length of ragweed pollen season has increased at ten out of eleven (10/11) locations studied in the central U.S. and Canada since 1995. The change becomes more pronounced from south to north.

Ecosystems – Many areas are experiencing earlier spring events, such as peak stream runoff and flower blooms. Bird migration patterns are changing, and wildland fire zone size has increased.

Climate Change Location and Extent

Warming and climate change are occurring globally with wide variations based on location and latitude. The polar regions have experienced particularly rapid changes in climate with increased ice melt and more sea-ice free days. Climate change affects the entire planning area. Los Angeles County confirms the occurrence of climate change within the Planning area in its All-Hazards Mitigation Plan, stating that "According to the National Climate Assessment, the entire Pacific coastal region, including Los Angeles County, has been affected by Climate Change."

Climate Change Previous Occurrence

Climate change is an ongoing occurrence. Essentially, it has occurred, is occurring and will continue to occur for several decades, centuries or longer. Climate change is ongoing. While individual impacts of climate change may be seen as discreet events such as drought, sea level rise or excessive heat, climate change is a continuous process.

Climate Change Probability of Future Events

Based on the Calculated Priority Risk Index conducted for Torrance, there is a low probability (rank score of 1.96) of climate change/sea level rise impacting the planning area. Climate change is an ongoing occurrence and will continue to be an occurrence for the foreseeable future within the region. Based on this fact, the likelihood of a climate change event happening in the planning area is considered highly likely.

Climate Change Vulnerability & Impact

Climate change by itself is not likely to cause potential losses to infrastructure or affect services to populations. Effects that are secondary to climate change, such as a greater likelihood of flooding due to more frequent storms or more annual days with excess heat, are included in individual hazards like a flood or excess heat. The result is climate change as a standalone hazard is assigned a zero percent loss.

Dam Failure

A dam failure is the structural collapse of a dam that releases the water stored in the impounded reservoir. Dam failures usually result due to the age of the structure, inadequate spillway capacity used in construction, or structural damage caused by an earthquake or flood. When a dam fails, large quantities of water may be suddenly released with a great potential to cause human casualties, economic loss, and environmental damage. This type of disaster is especially dangerous because it can occur suddenly, providing little warning or evacuation time for the downstream communities. The flows resulting from dam failure generally are much larger than the capacity of the downstream channels and therefore lead to extensive flooding. Flood damage occurs because of the momentum of the torrent caused by the sediment-laden water flooding over the channel banks and the impact of debris carried by the flow.

Dam Failure Location and Extent

The National Inventory of Dams indicates that there are 1,530 total Dams in the State of California, with an average age being 74 years. Within Los Angeles County there are 103 total Dams with an average age also being 74 years. Within the City of Torrance and neighboring jurisdictions, there are three Dams in the planning area. The City of Torrance owns, and City Public Works is responsible for, two Dams (18 MG Walteria Dam, 10 MG Walteria Dam) and the Palos Altos Reservoir is a public utility, just outside City limits, is owned and operated by Metropolitan Water District of Southern California.

The Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents and Failures (FEMA P-946, July 2013) defines downstream hazards for dam incidents. Downstream hazards are based "solely on the potential of downstream impacts to life and property should the dam fail when operating with a full reservoir." FEMA has developed three categories in increasing severity for downstream hazards: Low, Significant and High. Division of Safety of Dams (DSOD adds a fourth category of Extremely High. 18MG Walteria Dam and 10MG Walteria Dam are both categorized as High.

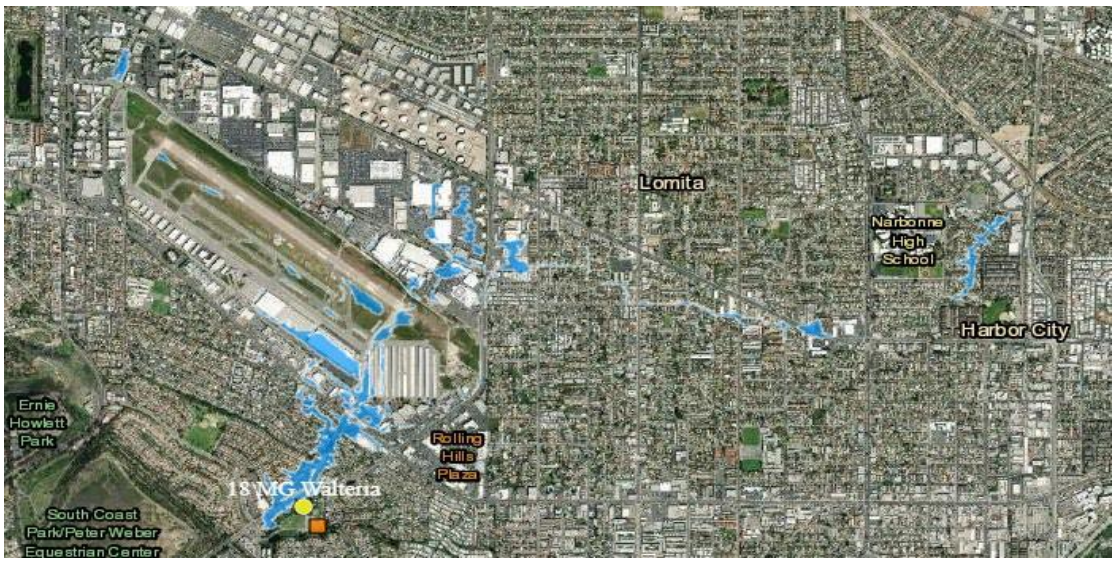


Figure 43: 18MG Wateria Dam Downstream Hazard Source: 2023 Torrance Local Hazard Mitigation Plan

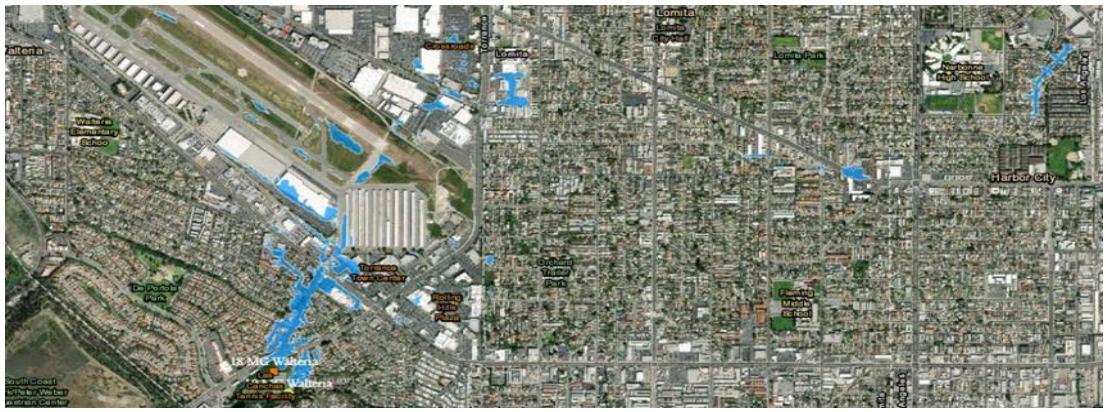


Figure 44: 10MG Wateria Dam Downstream Hazard Source: 2023 Torrance Local Hazard Mitigation Plan

Dam Failure Previous Occurrence

The County of Los Angeles' All-Hazards Mitigation Plan (2020) mentions that Los Angeles County was the scene of the worst dam failure in United States history. The St. Francis Dam was built in the San Francisquito Canyon, approximately 40 miles northwest of downtown Los Angeles, in 1924. On the night of March 12-13, 1928, the dam catastrophically failed, releasing approximately 12.4 billion gallons of water, and killing at least 411 people.

There have been no recorded dam failures within the City of Torrance.

Dam Failure Probability of Future Events

Dam failure can result from numerous natural or human activities. Earthquakes, internal erosion, improper siting structural and design flaws, or rising floodwaters can all result in the collapse or failure of a dam. A dam failure may also be a result of the age of the structure or inadequate spillway capacity. Based on the results of the Calculated Priority Risk Index (CPRI) conducted for the City of Torrance, there is a Low probability (rank score of 1.67) of dam failure for the planning area.

Dam Failure Vulnerability & Impact

The City of Torrance has recorded no incident of dam failure since the last mitigation plan update (2017). Still, a dam failure could have tremendous impact on the planning area, including the environment, much like a flood event.

Facilities downstream of a dam will have similar vulnerability to a flood event in the planning area. The potential impacts could render facilities unusable or permanently destroyed, producing significant impact on the City's ability to conduct day-to-day operations. Dam failure can cause considerable damage to residential and/or commercial structures that can irrevocably damage a community and its economy by creating economic hardship.

Drought

Drought is a normal, recurrent feature of virtually all climatic zones, including areas of both high and low rainfall, although characteristically will vary significantly from one region to another. Drought is a gradual phenomenon. Drought differs from normal aridity, which is a permanent feature of climate in areas of low rainfall. Drought is the result of a natural decline in the expected precipitation over an extended period of time, typically one or more seasons in length. Other climatic characteristics, such as high temperature, high wind, and low relative humidity, impact the severity of drought conditions. Normally, one dry year does not constitute a drought in California, but rather serves as a reminder of the need to plan for droughts. California's extensive system of water supply infrastructure (reservoirs, groundwater basins, and interregional conveyance facilities) generally mitigated the effects of short- term dry periods for most water users.

A drought's severity depends on numerous factors, including duration, intensity, and geographic extent, as well as regional water supply demands by humans and vegetation. Due to its multi- dimensional nature, drought is difficult to define in exact terms and poses difficulties in terms of comprehensive risk assessments.

Drought differs from other natural hazards in three ways. First, the onset and end of a drought are difficult to determine due to the slow accumulation and lingering effects of an event after its apparent end. Second, the lack of an exact and universally accepted definition adds to the confusion of its existence and severity. Third, in contrast with other natural hazards, the impact of drought is less obvious and may be spread over a larger geographic area. These characteristics have hindered the preparation of drought contingency or mitigation plans by many governments.

Drought Location and Extent

The occurrence of drought is regional in nature and scope, which holds true for the City of Torrance and Los Angeles County. As such, when drought occurs it affects the entire planning area.

The National Drought Mitigation Center produces drought monitor maps for the United States. It classifies drought into five categories: D0 is the least severe, with abnormally dry conditions; and D4 is the most severe, with exceptional drought conditions.

Drought Previous Occurrence

Per the National Drought Mitigation Center, California, including Los Angeles County, was in some form of drought for 376 consecutive weeks from December 20, 2011, to March 14, 2019. At the time of the LHMP update, the City of Torrance and portions of Los Angeles County were designated in drought by USDA. Categorized as being in a D0 – Abnormally Dry, with some portions of Los Angeles County being D1 – Moderate Drought. Within the Los Angeles County All-Hazards Mitigation Plan it lists droughts experienced in California over the past 100 years:

- 1917-1921 – Statewide except for central Sierra Nevada and north coast
- 1922-1926 – Statewide except for central Sierra Nevada
- 1928-1937 - Statewide
- 1943-1951 – Statewide
- 1959-1962 – Statewide
- 1976-1977 – Statewide, except for southwestern deserts
- 1987-1992 – Statewide
- 2007-2009 – Statewide, particularly central coast
- 2011-2015 – Statewide

Drought Probability of Future Events

According to Los Angeles County, “researchers from California’s Fourth Climate Change Assessment have noted that California has a “highly variable climate” with wet or dry periods that can span years and that are “heavily affected by extreme precipitation events.” Furthermore, climate scientists also suggest the possibility of longer and more destructive drought with climate change. As such, California (including Los Angeles Country) is likely to experience long-term drought at least every decade.”

Based on Calculated Priority Risk Index (CPRI) conducted for Torrance, there is a Moderate probability (rank score of 2.37) of drought for the planning area.

Drought Vulnerability & Impact

Climate change is affecting drought conditions in the State of California, including the City of Torrance. Climate change is already profoundly impacting California water resources, as evidenced by changes in snowpack, sea level, and river flows. These changes are expected to continue in the future. The City of Torrance Public Works Department is actively constructing planned wells and resolving water issues to existing wells to maximize groundwater production and sustainability.

Extreme Weather

Extreme Weather, more commonly known as Severe Weather, is any dangerous meteorological phenomenon with the potential to cause damage, serious social disruption, or loss of human life. Severe weather can happen at any time, and in any part of the country, and may present itself in a variety of ways. Severe weather phenomena include high winds, hail, excessive precipitation, thunderstorms, downbursts, tornadoes, waterspouts, tropical cyclones, blizzards, ice storms, dust storms, firestorms, extreme heat/cold, and extreme wetness, or drought. Types of severe weather phenomena can be influenced and vary depending on the latitude, altitude, topography, and atmospheric conditions of a certain location. The 2023 LHMP identified four specific severe weather hazards that have the potential to impact the City of Torrance: High Wind, Extreme Cold, High Heat, Hail and Tornadoes.

High Wind: Naturally occurring, wind is simply moving air that is caused by differences in air pressure within the Earth's atmosphere. Air under high pressure moves toward areas of low pressure. The greater the difference in pressure, the faster the air flows. Damaging winds are classified as those exceeding 60 mph. Damage from such wind accounts for half of all extreme weather report in the lower 48 states and is more common than damage from tornadoes. Winds speeds can reach up to 100 mph and can produce a damage path extending for hundreds of miles.

Extreme Cold: A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and bitter cold temperatures. Prolonged exposure to cold can cause frostbite or hypothermia and can be life threatening. Infants and the elderly are most susceptible. Pipes may freeze and burst in homes or buildings that are poorly insulated or without heat.

Heavy accumulations of ice, often the result of freezing rain, can bring down trees, utility poles, and communications towers, and disrupt communications and power for days. Even small accumulations of ice can be extremely dangerous to motorists and pedestrians.

In general, most winter storm events occur with some warning. With weather forecasting capabilities and warning systems, it is expected that most winter storm events will provide at least a 12 to 24-hour warning time. Additionally, while the effects can be long term, the storm's duration is generally less than a week.

Extreme Heat: In most areas of California, summer temperatures are expected to be warm; during certain periods, however, temperatures can rise much higher, to the point of being considered severe or possibly dangerous. Extreme Heat is defined as a period of high heat and humidity with temperatures above 90 degrees for at least two or three days. Two or more consecutive days with unusually high or extreme heat conditions is referred to as a heat wave. Heat wave activity is on the rise in California and humid heat waves, particularly, are becoming more prevalent. Heat ranks among the deadliest of all natural hazards. Even though heat-related deaths and illnesses are largely preventable, many people annually succumb to heat related illnesses during extreme heat events.

Heat-related illness includes heat cramps, heat exhaustion and life-threatening heat stroke. Heat- related illness results from the "body's inability to dissipate heat produced by metabolic activity, often as a result of increased ambient temperature". Heat waves are also predicted to cause two to three times more heat-related deaths by the mid-century. Socially vulnerable communities will experience the worst of these effects; these include impacts on individuals with access and functional needs including aging populations, the elderly, children, people with chronic illness, and those sensitive to heat exposure. When combined with populations with inequities, such as poverty, housing, and language limitations, these populations are at a higher risk of heat-related illness and death.

The NWS has a system in place to initiate alert procedures (advisories, watches and warnings) when high temperatures are expected to have a significant impact on public safety. The expected severity of the heat determines which type of alert is issued. Overall, extreme heat impacts would be critical in the City of Torrance, with extreme heat impacting vulnerable populations. High heat waves are also projected to worsen with climate change.

Hail: A form of precipitation, made up of rough lumps of ice. It is formed when strong winds in a thundercloud, called updrafts, force water droplets up into areas where the temperature drops below freezing, causing the droplets to turn into ice and stick together to form hailstones. Eventually, the weight of the hailstones becomes too heavy for the updrafts to keep them aloft, causing the hail to fall to the surface. Hail can damage windows, plants, and roofs. In rare instances, larger hail can cause more substantial damage, and in truly extreme cases, hail can cause serious injury or death.

Tornadoes: A tornado is a violent, dangerous, rotating column of air that is in contact with both the surface of the Earth and a cumulonimbus cloud or, in rare cases, the base of a cumulus cloud. Often referred to as a twister or a cyclone, they can strike anywhere and with little warning. Tornadoes come in many shapes and sizes but are typically in the form of a visible condensation funnel, whose narrow end touches the Earth and is often encircled by a cloud of debris and dust. Tornadoes are usually born in "supercell" thunderstorms and present certain physical signs which include a dark, greenish sky, large hail, and a powerful train-like roar.

Tornadoes can cause all kinds of damage to buildings, infrastructure, and property. Tornadoes have been known to lift and move objects weighing more than three tons, toss homes more than 300 feet from their foundations, and siphon millions of tons of water. However, less spectacular damage is much more common.

Tornadoes can also generate a tremendous quantity of flying debris. If wind speeds are high enough, airborne debris can be hurled at buildings with enough force to penetrate windows, roofs, and walls. Most tornado-related injuries or deaths are caused by flying debris. Violent tornadoes comprise only about two percent of all tornadoes, but they cause 70 percent of all tornado deaths and may last an hour or more. While tornado forecasters cannot provide the same kind of warning that hurricane watchers can, they can do enough to help save lives. Today the average warning time for a tornado alert is 13 minutes.

The strongest tornado in Los Angeles County in the last 40 years hit the City of Montebello on March 22, 2023, approximately 27 miles from the City of Torrance. The tornado which recorded winds of 110 miles per hour was the strongest tornado to touch down in Los Angeles County since 1983 according to the NWS. The overall damage of the path of the twister was ½ mile long and 50 yards wide damaging 17 buildings, countless vehicles and minimal injuries.

Extreme Weather Location and Extent

High Wind: Severe wind events have the potential to occur anywhere in Torrance. No one area is more susceptible than another.

Extreme Cold: The LHMP states that the historically average low temperature is 44°F. Temperatures below this can be constituted as extreme cold and are most likely to occur during the month of January.

Extreme Heat: The City of Torrance begins to experience hot weather in April or May of each year and the heat continues throughout the summer months. The 2017 LHMP states that the threshold for extreme heat is 87°F. Reaching these temperatures is most likely to occur during the months of August through October.

Hail: Hailstorms are a fairly rare event in Torrance, although they do occur, they are equally likely to occur anywhere in the planning area.

Tornadoes: The possibility of a tornado in California is rare, but not unheard of. The mountains and hills to the east and the Pacific Ocean to the west create a topographic challenge for the development of tornadoes. However, according to FEMA's National Risk Index, the City of Torrance is in a relatively high-risk area for tornadic activity.

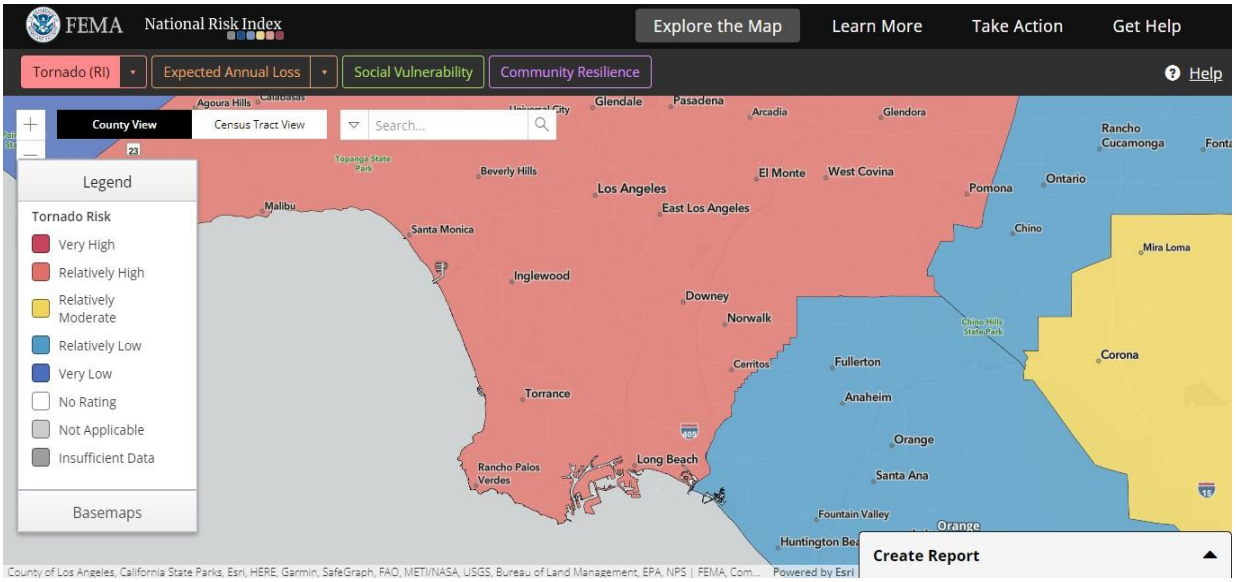


Figure 45: FEMA National Risk Index, Tornado. Source: 2023 Torrance Local Hazard Mitigation Plan

Extreme Weather Previous Occurrence

High Wind: The 2017 Torrance LHMP references nine high wind events which occurred near the City since 1955 with the strongest occurrence in April 2000 at 87mph. In February 2023, there were winds of more than 50 mph, causing trees to be knocked down in nearby Manhattan Beach. Significant wind events may cause a spike in calls of emergency response in Torrance. Torrance still has a majority of its electrical and communication equipment distributed on overhead power poles resulting in wires down and blown transformers.

Extreme Cold/Severe Winter Weather: There have been multiple occurrences of extreme cold temperatures in Los Angeles County ranging from 0°F to 38°F between 1988 and 2023.

Extreme Heat: In September 2022, a heat wave occurred causing temperatures in excess of 100°F and was cited by many sources as being the worst in the state's history. The 2017 Torrance LHMP stated that a 2006 heat wave was responsible for the death of 147 people statewide with other extreme heat events occurring in 1988 and 1990.

Tornadoes: There have been 20 recorded tornados since 1962 within 25 miles of Torrance. According to the 2017 Torrance LHMP, the closest tornado occurred in 1962 causing between $5,000 and $50,000 in damage. The most recently recorded tornado was in 2023 which occurred 27miles away.

Extreme Weather Probability of Future Events

High Wind: High winds are a constant possibility in Torrance based on past trends.

Extreme Cold/Severe Winter Weather: While rare, extreme cold and severe weather should remain a hazard of concern in Torrance.

Extreme Heat: Given the occurrence of past events, extreme heat is expected to pose a large risk to the City of Torrance.

Hail: Significant hail events are anticipated to continue to occur in Torrance, although based on the history of these incidents, they are likely to remain rare.

Tornadoes: Tornados in Torrance will continue to be a rare event but are expected to remain a risk based on past trends.

Based on Calculated Priority Risk Index (CPRI) conducted for Torrance, there is a **Moderate** probability (rank score of 2.09) of Extreme Weather for the planning area.

Extreme Weather Vulnerability & Impact

High Wind: It is possible that strong winds associated with storms may occur more frequently, as climate change is expected to cause already intense storms to become more intense in the Southern California area. Critical facilities and infrastructure exposed to a high wind event are vulnerable to damage. The amount of damage sustained can differ based on the structural components of facilities making them more damage resistant than others. The electrical infrastructure has the potential to face failures as transmission lines become damaged due to high winds.

Extreme Cold: Extreme cold events are likely to decline as global temperatures become warmer, although they are unlikely to go away entirely. The electrical infrastructure can face challenges as electric grid load or physical strain on transmission lines is high. Elderly and socially isolated individuals may be vulnerable to extreme cold due to physical conditions and a generally smaller social support network available to provide assistance when needed. While most Torrance households have heating, the households that lack heat are vulnerable to very cold conditions, as are lower-income residents who may be unwilling or unable to incur the cost of heating.

Extreme Heat: As the temperature increases due to climate change, extreme heat events are likely to become much more frequent, although the forecasts vary significantly depending on how substantially climate conditions change. While extreme heat does not pose a direct risk to critical facilities, it does pose a risk to mechanical and electrical infrastructure. The increase in heat can cause failure of components which are heat intolerant. Elderly residents are also more likely to live alone and to be socially isolated, increasing their vulnerability. Heat waves can be particularly dangerous for immunocompromised individuals and others with increased social isolation. Individuals who spend a lot of time outdoors, such as construction workers, are vulnerable to extreme heat. Households without air conditioning units, or lower-income households concerned about the cost of running an air conditioner, may also face an increased risk.

Hail: Climate change could cause an increase in the risk of extreme weather-related hazards including hail. All critical facilities and infrastructure exposed to the outdoor elements are equally at risk to hail across the planning area

Tornadoes: It is possible that tornadoes may become a more frequent event as a result of climate change although information about climate change's effects on tornadoes remains sparse and research is ongoing. However, tornadoes are already very rare in the area, and any increase due to climate change may not be significant enough to be readily noticed. Due to the rarity of tornados in the area, specific tornado-prone features of structures are not present. This creates equal risk across the City for facility or infrastructure damage in the path of a tornado

Fire/Wildfire

The National Weather Service (NWS) defines a wildfire as "any free-burning, uncontainable wildland fire not prescribed for the area which consumes the natural fuels and spreads in response to its environment." The Los Angeles County All-Hazards Mitigation Plan mentions that wildfires can be caused by human activities (e.g., unattended burns, campfires, or off-road vehicles without spark arresting muffles) or by natural events such as lightning. The predominant dangers of wildfire are the injury or loss of life to people in the affected area and the destruction of vegetation, property, and wildlife.

If not promptly controlled, wildfires may grow into an emergency or disaster. Even small fires can threaten lives and resources and destroy improved properties. Communities throughout California and Los Angeles County are increasingly concerned about wildfire safety as increased development in the foothills and mountain areas have affected the natural cycle of the ecosystem. Wildfire risk is predominately associated with Wildland/Urban Interface (WUI) areas however, significant wildfires can also occur in heavily populated areas, although urbanized and developed areas such as the City of Torrance are not bordering vast areas of wildlands, the City is typically considered safer from wildfires.

Fire/Wildfire Location and Extent

As per the Los Angeles County All-Hazards Mitigation Plan (2020), the City of Torrance is not located in a Fire Hazard Severity Zone. However, Torrance is adjacent to a 'Very High' Local Responsibility Area to the South throughout the Palos Verdes Estates/Rancho Palos Verdes/Rolling Hills area. The City of Torrance has dry summers where little to no rain falls from early June through late October. Since the last LHMP the City experienced an average of 9 inches of annual rainfall depending on location and weather patterns. The fire season is a time of increased risk to damage to residential property and other development within the City.

Fire/Wildfire Previous Occurrence

No recent documented wildfires have occurred within the Planning Area. There have been however multiple Federal declarations in the County of Los Angeles since 2017 for fires impacting jurisdictions nearby the City of Torrance.

Fire/Wildfire Probability of Future Events

The probability of a wildfire in the City of Torrance is low. Torrance is surrounded by large urban areas and does not lie on an urban-wildland interface. Based on Calculated Priority Risk Index (CPRI) conducted for Torrance, there is a Low probability (rank score of 1.92) of Fire, Wildland Urban Interface (Wildfire) for the planning area.

Fire/Wildfire Vulnerability & Impact

It is foreseeable that the City of Torrance will see higher daily temperatures, more heatwaves and increased wildfires either within the City or in neighboring communities thus impacting the City within this century as a result of climate change. Current scientific models expect California will be affected by increased numbers of forest fires with additional intensity due to longer warmer seasons, reduced distribution due to biodiversity, lack of moisture, changes in ecosystems, drought impacts (e.g. pest diseases and continued spread of invasive species) and other impacts in coming years.

Flood

A flood is the temporary inundation of water or mud on normally dry land. Urban flooding occurs in developed areas where the amount of water generated from rainfall and runoff exceeds the water system's capacity. Floods may result from intense rainfall, localized drainage problems, tsunamis or failure of flood control or water supply structures such as levees, dams, or reservoirs.

During a flood, excess water from rainfall or storm surge accumulates and overflows the channels of creeks and rivers onto the banks and adjacent floodplains and inundates beaches. Floodplains are lowlands adjacent to rivers, lakes and oceans that are subject to recurring floods. Several factors determine the severity of floods, including rainfall intensity and duration, creek and storm drain system capacity, and the infiltration rate of the ground. Floodwaters can carry large objects downstream with a force strong enough to destroy stationary structures such as homes and bridges and break utility lines. Floodwater also saturate materials and earth resulting in instability, collapse, and destruction of structures as well as the loss of human life. During urban floods, streets can become inundated, and storm drains often back up because of the volume of water and become blocked by vegetative debris like yard waste, which can cause

additional flooding. Development in or near the floodplain puts lives and property at risk. Flood damage can include structure inundation, erosion of stream banks, road embankments, foundations footings for bridges, impact damage from debris, blockage of infrastructure, and sewage release from damaged tanks.

Floods usually occur in relation to precipitation. Flood severity is determined by the quantity and rate at which water enters the waterway, increasing volume and velocity of water flow. The rate of surface runoff, the major component to flood severity, is influenced by the topography of the region as well as the extent to which ground soil allows for infiltration in addition to the percentage of impervious surfaces. It is important to note that a stream can crest long after the precipitation has stopped.

Flood Location and Extent

Torrance and surrounding areas are, like most of Southern California, subject to unpredictable seasonal rainfall. Most years, the scant winter rains are barely sufficient to turn the hills green for a few weeks, but every few years the region is subjected to periods of intense and sustained precipitation that results in flooding. To prepare and mitigate hazards from flooding, the City of Torrance participates in the National Flood Insurance Program. Flood Insurance Rate Maps (FIRMS) which are prepared by FEMA map potential flood zones.

The risk of flooding is highest in low-lying areas, particularly those adjacent to water bodies or flood control channels. Areas downstream of dams may also be at risk from flooding in the event of dam failure. Flood risks are usually described in years, e.g., 100-year or 500-year flood events. A 100-year flood event is one that has a 1 percent chance of occurring in any given year, while a 500-year flood event has a 0.2 percent chance (1 in 500) of happening in a given year. The areas within these flood risk zones are called floodplains. The boundaries of the floodplains are established by FEMA and are re- evaluated as the need arises (USGS 2015b).

The main areas at risk of flooding in Torrance include the western half of the Madrona Marsh nature preserve, which lies partly in the 100-year floodplain and partly in the 500-year floodplain. Some land north of the nature preserve across Plaza del Amo is within the 500-year floodplain, and a block of land northeast of the preserve (bordered by Plaza del Amo, Del Amo Circle East, West Carson Boulevard, and Madrona Avenue) is within the 100-year floodplain. Elsewhere in the City, the areas around the intersections of California Street and Alaska Avenue and of Amsler Street and Dormont Avenue are both in the 100-year floodplain, as is part of an undeveloped area near the intersection of Hawthorne Boulevard and Via Valmonte. Some land West of Crenshaw Boulevard between 235th and 237th Streets is within the 500-year floodplain, as are parts of the St. Lawrence Martyr School along the City's border with Redondo Beach. Torrance's beaches also are at risk of coastal flooding, but beachside development is outside of both the 100-year and 500-year floodplains.

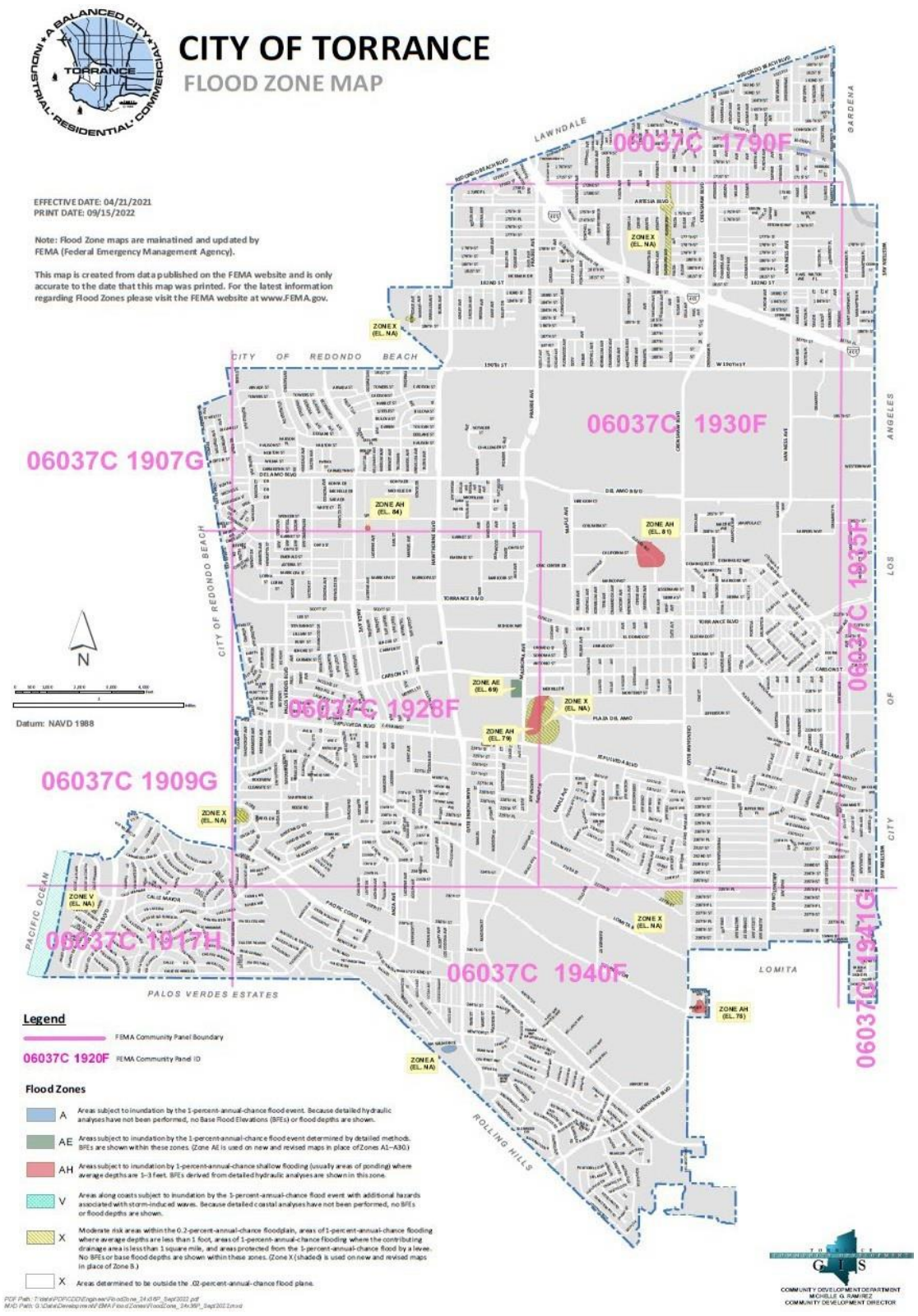


Figure 46: City of Torrance Flood Zone Map, 2021. Source: 2023 Torrance Local Hazard Mitigation Plan

Flood Previous Occurrence

While flooding has been an occasional hazard in the Los Angeles Basin, it has been mostly limited to the areas near major natural rivers such as the Los Angeles, San Gabriel, and Santa Ana Rivers. A series of major flood events in the first half of the 1900s sparked the beginning of widespread flood control efforts, including the channelization of the area's major rivers. These efforts have reduced the frequency and severity of flood events although they have not removed the risk of flood entirely, as Los Angeles County still saw 22 declared flood-related disasters between 1950 and 2018.

Torrance, which is not located near the major waterways of the Los Angeles Basin, has largely been free of significant flood events. Localized flooding has occurred occasionally, particularly prior to the construction of modern storm drains and water retention basins.

Flood Probability of Future Events

Based on Calculated Priority Risk Index (CPRI) conducted for Torrance, there is a Low probability (rank score of 1.83) of Flooding for the planning area.

Localized flooding is likely to continue to occur in the future, especially during significant storm events. Major storms in California are frequently the result of meteorological phenomena called atmospheric rivers, which are narrow bands of very most air which in effect act as pathways for heavy precipitation. Although these storms make up a relatively small number of weather systems that affect the western United States, they typically cause 30 to 50 percent of all precipitation in the area. Another type of event, the El Niño Southern Oscillation (ENSO, or El Niño), can cause more intense storms and higher levels of precipitation in the western United States, especially in Southern California. Although Torrance does not have a history of significant flooding, a particularly severe storm or series of intense storms may cause more widespread flooding emergencies.

Torrance is also at risk of flooding from infrastructure failure. The Walteria and Ben Haggot Reservoirs, both owned by the City, are two buried water storage facilities with a combined capacity of 28.7 million gallons located along Crenshaw Boulevard near the City's border with Rolling Hills Estates. The failure of one or both facilities could create flooding in the area below the reservoirs. The prime risk of infrastructure failure to either reservoir is a significant earthquake, although the most likely outcome is cracks in the reservoirs that cause leaks and some localized flooding. However, a significantly strong earthquake could cause catastrophic failure of the reservoir walls. This "worst-case" scenario would drain the reservoirs in as little as 18 minutes and could inundate 215 acres. The inundation zone includes numerous residential and commercial properties, as well as the southeast portion of Torrance Municipal Airport

Flood Vulnerability & Impact

The flood risk in Torrance in limited to specific areas, as previously discussed. There are no critical facilities within Torrance's flood hazard zones. Elderly or disabled individuals or persons without access to a private vehicle within the flood hazard zone may face an increased vulnerability to flood events, as they may have difficulty evacuating if floodwaters rise high enough. Lower-income residents or renters may also be more vulnerable to flood events, as they may lack financial resources or sufficient control over their residences to install flood-resistant features.

The City of Torrance is equipped to handle future growth within flood hazard areas and the City's General Plan offers goals and policies to avoid and mitigate flood impacts from new development. Noted in the City's General Plan Safety Element, flood hazards within the City of Torrance have been estimated by FEMA to be minor, property owners in potential flood areas can make modifications to their houses to reduce the impact of flooding. FEMA has identified several flood protection measures that can be implemented by property owners to reduce flood damage. These include installing waterproof veneers on the exterior walls of buildings; putting seals on all openings, including doors, to prevent the entry of water; raising electrical components above the anticipated water level improvements; and installing backflow valves that prevent sewage from backing up into the house through the drainpipes. The City will continue to improve and maintain storm drain systems to convey water flows and minimize damage from flood events.

Geohazards, Earthquakes and Seismic Hazards

An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that form the Earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. Earthquakes can strike suddenly, without warning. Earthquakes can occur at any time of the year and at any time of the day or night. On a yearly basis, 70 to 75 damaging earthquakes occur throughout the world. Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths and injuries and extensive property damage.

Earthquakes can last from a few seconds to over five minutes; they may also occur as a series of tremors over several days. The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Casualties generally result from falling objects and debris, because the shocks shake, damage or demolish buildings and other structures. Disruption of communications, electrical power supplies and gas, sewer and water lines should be expected. In addition, ground shaking, landslides, liquefaction, and amplification are the specific hazards associated with earthquakes. The severity of these hazards depends on several factors, including soil and slope conditions, proximity to the fault, earthquake magnitude and depth, and the type of earthquake:

Ground Shaking – Ground shaking is the motion felt on the Earth's surface caused by seismic waves from an earthquake. It is the primary cause of earthquake damage. The strength of ground shaking depends on the magnitude of the earthquake, the type of fault, and distance from the epicenter. Buildings on poorly consolidated and thick soils will typically see more damage than buildings on consolidated soils and bedrock.

Amplification – Soils and soft sedimentary rocks near the Earth's surface can modify ground shaking caused by earthquakes. One of these modifications is amplification. Amplification increases the magnitude of the seismic waves generated by the earthquake. The amount of amplification is influenced by the thickness of geologic materials and their physical properties. Buildings and other structures built on soft and unconsolidated soils can face greater risk. Amplification can also occur in areas with deep sediment-filled basins and ridge tops.

Earthquake-Induced Landslides – Earthquake-induced landslides are secondary earthquake hazards that occur from ground shaking. They can destroy the roads, buildings, utilities, and other critical facilities necessary to respond and recover from an earthquake and are common in areas with steep slopes.

Liquefaction – Liquefaction, a secondary earthquake hazard, occurs when ground shaking causes wet granular soils to change from solid to liquid. This results in the loss of soil strength and ability to support the weight. Buildings and their occupants are at risk when the ground can no longer support these buildings and structures. In some cases, this ground may be subject to liquefaction, depending on the depth of the water table. Liquefaction occurs primarily in saturated and loose, fine- to medium-grained soils in areas where the groundwater table lies within 50 feet of the ground surface. Areas of elevated liquefaction potential are only present in Torrance in very limited locations, as only a few places have both the high water table and the loose sediments in the soil necessary to create the liquefaction risk.

Expansive Soils – are those which contain high levels of materials that can absorb large amounts of water, such as certain types of clay. When the ground is wet, these materials absorb water and swell, and then shrink as they dry out. This process can exert significant force on structures, and over repeated cycles of expansion and contraction this force can be sufficient to crack foundations, floors, and other ground-level or subterranean structures. Cracks may form in expansive soils when they are dry, potentially creating a safety hazard. Figure 47 depicts areas where the City of Torrance has highlighted the presence of expansive soils.

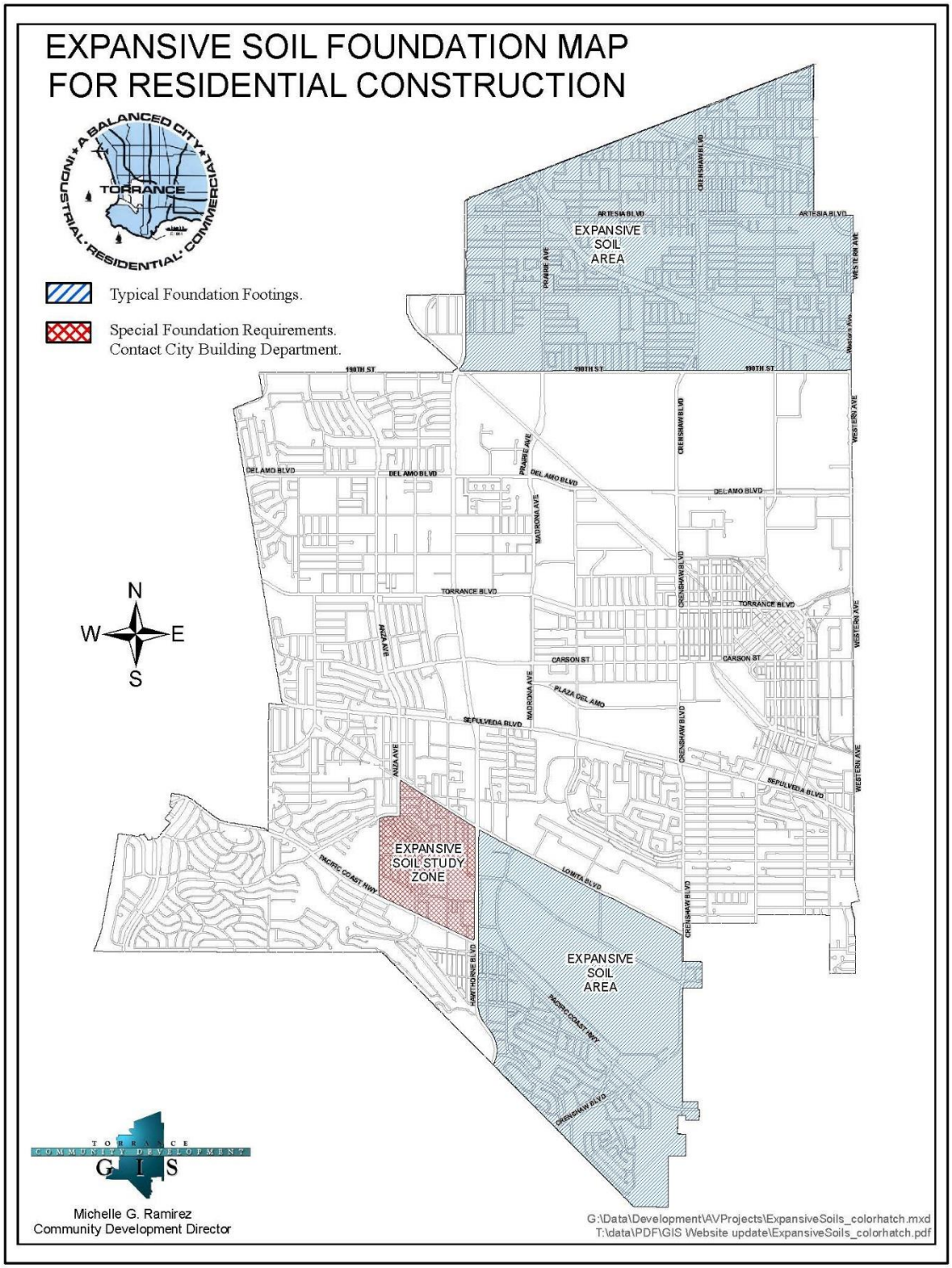


Figure 47: City of Torrance Expansive Soil Foundation Map for Residential Construction

Geohazards, Earthquakes and Seismic Hazards Location and Extent

According to the City of Torrance Emergency Operations Plan (2022), Torrance is in a highly active earthquake zone with the 750-mile-long San Andres Fault well within range to cause considerable effects. The City of Torrance is bounded on the southwest by the Palos Verdes Fault and on the west the Newport-Inglewood Fault. Both faults are less than five (5) miles from the City of Torrance.

To the west of the Newport Inglewood Fault, running along the Palos Verdes Peninsula is the equally disturbing Palos Verdes Fault. The fault is located along the hills of the peninsula and extends out to sea along Hermosa and Manhattan Beach.

Other faults running through the South Bay area are the Redondo Canyon and Torrance Wilmington thrust faults, both of which can generate quakes in the 6.0 to 6.5 range. While geologists consider them active, experts remain unaware of when these faults may have last ruptured.

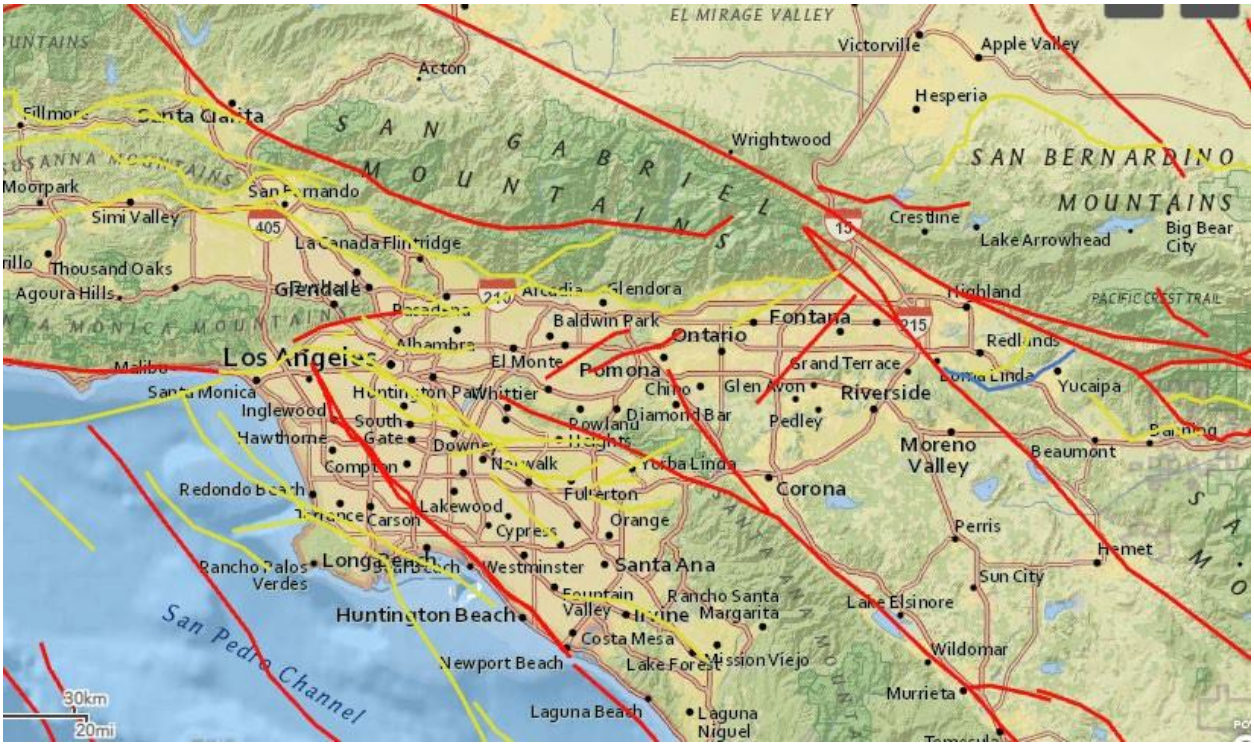


Figure 48: Quaternary Faults near Torrance, CA. Source: 2023 Torrance Local Hazard Mitigation Plan, USGS

Geohazards, Earthquakes and Seismic Hazards Previous Occurrence

There have been 463 earthquakes of a magnitude greater than 2.5 between January 1, 2020 and March 2023 in and around the City of Torrance. (See Figure 48). Data from the California Department of Conservation indicates there have been no earthquakes near the City of Torrance of magnitude greater than or equal to 6.5, that caused loss of life or more than $200,000 in damage since the 1933 Long Beach Earthquake which was a 6.4 magnitude and occurred 15 miles from the City of Torrance. However, other notable earthquakes in the Los Angeles Basin include; the 1971 Sylmar Earthquake (magnitude 6.7) in the

San Fernando Valley area, the 1987 Whittier Narrows Earthquake (magnitude 5.9) located 21 miles northeast of Torrance and the 1994 Northridge Earthquake (magnitude 6.7), in the San Fernando Valley, that resulted in 57 deaths and 5700 injuries.

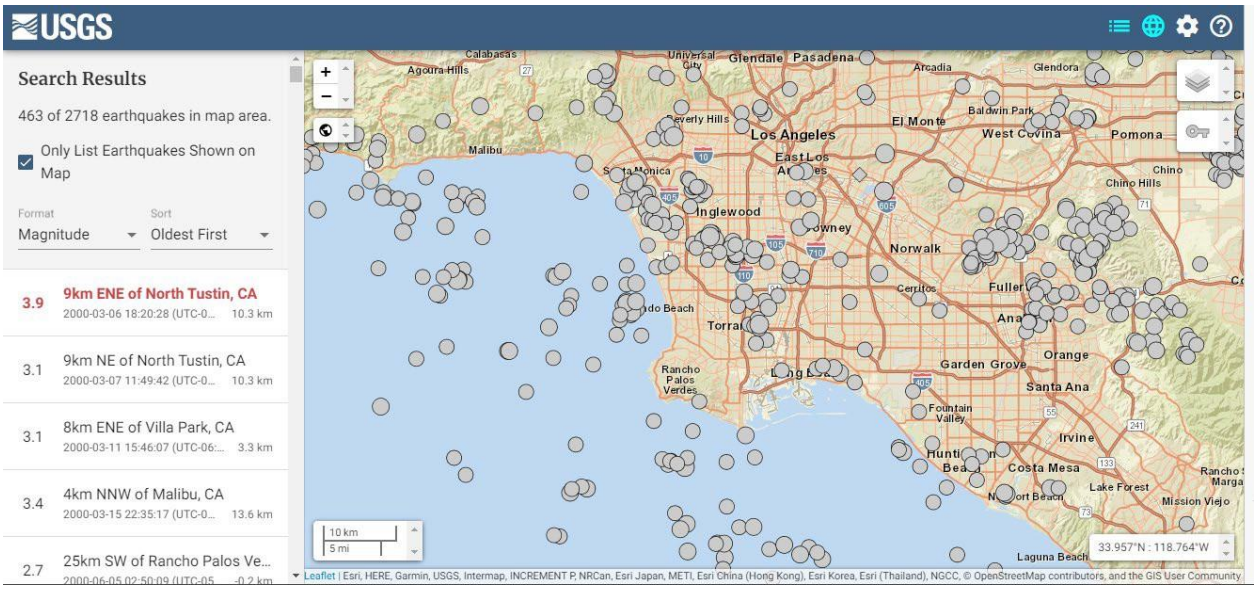


Figure 49: Torrance, CA Earthquake >2.5 Intensity, January 1, 2000 – March 2023 Source: 2023 Torrance Local Hazard Mitigation Plan, USGS

Geohazards, Earthquakes and Seismic Hazards Probability of Future Events

According to the California State Hazard Mitigation Plan, earthquakes large enough to cause moderate damage to structures, those of magnitude 5.5 or larger, occur three to four times a year statewide. Strong earthquakes of magnitude 6 to magnitude 6.9 strike on an average of once every two to three years. Major earthquakes of M7.0 to M7.9 occur in California about once every 10 years. A strong earthquake can cause major damage depending on the epicenter's location with regards to populated areas, and can lead to billions of dollars in disasters, injuries, and disruptions in services and the way of life for communities.

Based on Calculated Priority Risk Index (CPRI) conducted for Torrance, there is a Moderate probability (rank score of 2.83) of Geohazards, Earthquake and Seismic Hazards for the planning area.

According to the FEMA National Risk Index (see Figure 50), Torrance is in a "very high" risk area. This makes future earthquake events very likely and have the potential to be severe.

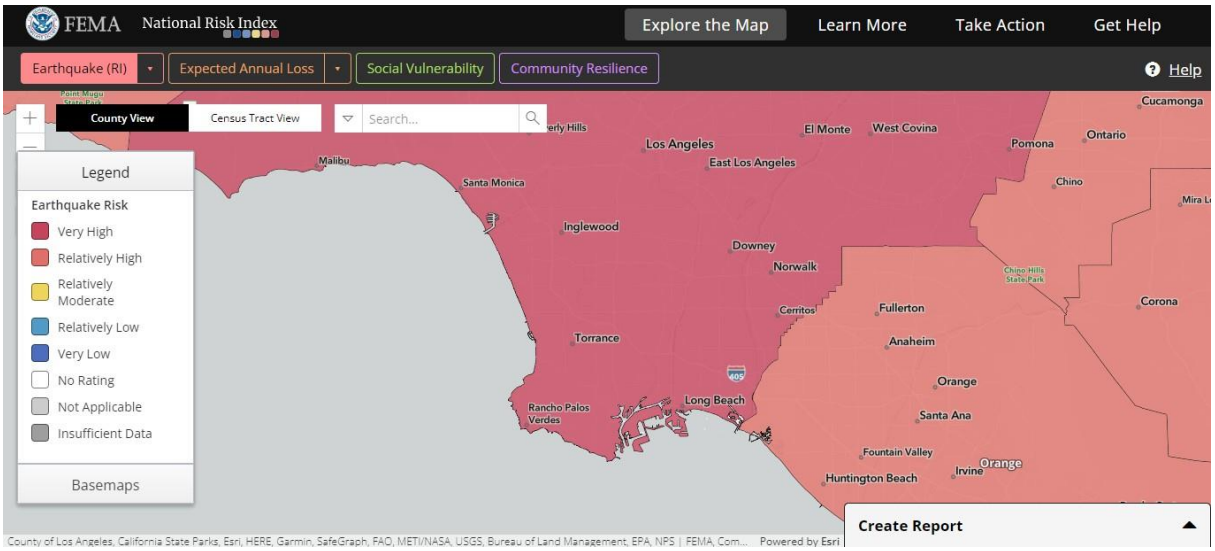


Figure 50: FEMA National Risk Index, Earthquake Source: 2023 Torrance Local Hazard Mitigation Plan, FEMA

Fault	6.7 Mw	7.0 Mw	7.5 Mw	8.0 Mw
Palos Verdes	3.17%	2.84%	.01%	-
Puente Hills	0.78%	0.58%	0.19%	-
Puente Hills (Coyote Hills segment)	0.95%	0.65%	0.19%	-
Puente Hills (Los Angeles segment)	1.01%	0.51%	0.15%	-
Puente Hills (Santa Fe Springs segment)	0.96%	0.76%	0.29%	<0.01%
Newport-Inglewood (onshore only)	0.99%	0.88%	0.43%	-
Elysian Park	0.06%	0.05%	0.02%	-
Santa Monica	1.19%	1.02%	0.29%	<0.01%
Malibu Coast	0.75%	0.65%	0.37%	<0.01%
Hollywood	1.59%	1.18%	0.29%	<0.01%
Upper Elysian Park	1.26%	0.78%	0.07%	-
Anacapa-Dume	0.90%	0.66%	0.25%	<0.01%
Whittier	1.58%	1.43%	0.80%	<0.01%
Raymond	1.70%	1.18%	0.35%	<0.01%
Verdugo	0.51%	0.45%	0.32%	<0.01%
San Andreas *	22.34%	19.68%	18.74%	6.91%
* Only fault sections in the greater Los Angeles region are included. This does not represent the risk of future events on the entire San Andreas fault.				
Note: The magnitude of the events shown in this table are for the site of the earthquake. Depending on the location of the earthquake, the magnitude may be less severe within Torrance itself.				

Figure 51: Max Likelihood of Earthquake Events by Size and Fault in the Next 30 Years. Source: 2023 Torrance Local Hazard Mitigation Plan

Geohazards, Earthquakes and Seismic Hazards Vulnerability & Impact

All critical facilities in the planning area are equally vulnerable to the effects of an earthquake. The level of damage will vary based on the condition of the building. The intensity of an earthquake will vary based on distance from the epicenter.

Future development in the City is not anticipated to significantly affect vulnerability to earthquakes when designed according to modern building codes. However, seismic risks, or losses, that are likely to result from exposure to seismic hazards include:

- Utility outages.
- Economic losses for repair and replacement of critical facilities, roads, buildings, etc.;
- Indirect economic losses, such as income lost during infrastructure downtime; and
- Roads or railroads that are blocked or damaged, preventing access throughout the area and isolating residents and emergency service providers that need to reach vulnerable populations or make repairs.

Development in the City will be regulated through building standards and performance measure so that the degree of risk will be reduced.

Landslides

According to the USGS National Landslide Information Center (NLIC), the term "landslide" is defined as the movement of a mass of rock, debris, or earth down a slope. The force of gravity acting upon a steep (or sometimes, even a moderately steep) slope is the primary cause of a landslide. Slope failure occurs when the force of gravity pulling the slope downward exceeds the strength of the earth materials that comprise the slope to hold it in place. In addition to the force of gravity, other contributing factors to landslides can include rainfall, earthquakes, changes in groundwater, and human-induced modifications to existing slopes. The potential for a landslide to occur exists in every state wherever very weak or fractured materials are resting on a moderate to steep slope.

The severity of a landslide depends in large part on the degree of development in the area in which it occurs and the geographic area of slide itself. Generally speaking, landslides often result in devastating consequences, but in very localized areas. A landslide occurring in an undeveloped area would be less severe because lives and property would not be affected; the only impacts would be to land, vegetation, and possibly some wildlife. On the contrary, a landslide occurring in a developed area could have devastating effects, ranging from structure and infrastructure damage to injury and/or loss of life. Structures or infrastructure built on susceptible land would likely collapse as their footings slide downhill, while those below the land failure would likely be crushed. Landslides around roadways could have the potential to fall and damage or destroy vehicles and force other drivers to have accidents.

Saturation of slopes by precipitation (rain or snowmelt) weakens soil and rock by reducing cohesion and increasing the pressure in pore spaces, pushing grains away from each other. Erosion and undercutting of slopes by streams, rivers, glaciers, or waves increase slope angles and decrease slope stability. Earthquakes create stresses that weaken slopes and physically cause slope movement.

Landslides Location and Extent

In Torrance, the areas with an elevated landslide risk are along the southern border of the community along the base of the Palos Verdes Peninsula. Figure 50 provides a visual representation of the areas vulnerable to potential landslide activity. The vast majority of these landslide areas are south of Pacific Coast Highway. The shores of Walteria Lake, north of Pacific Coast Highway, are also at risk from landslides. Outside of these areas, there is also a risk of lateral spreading on soils that are prone to liquefaction.

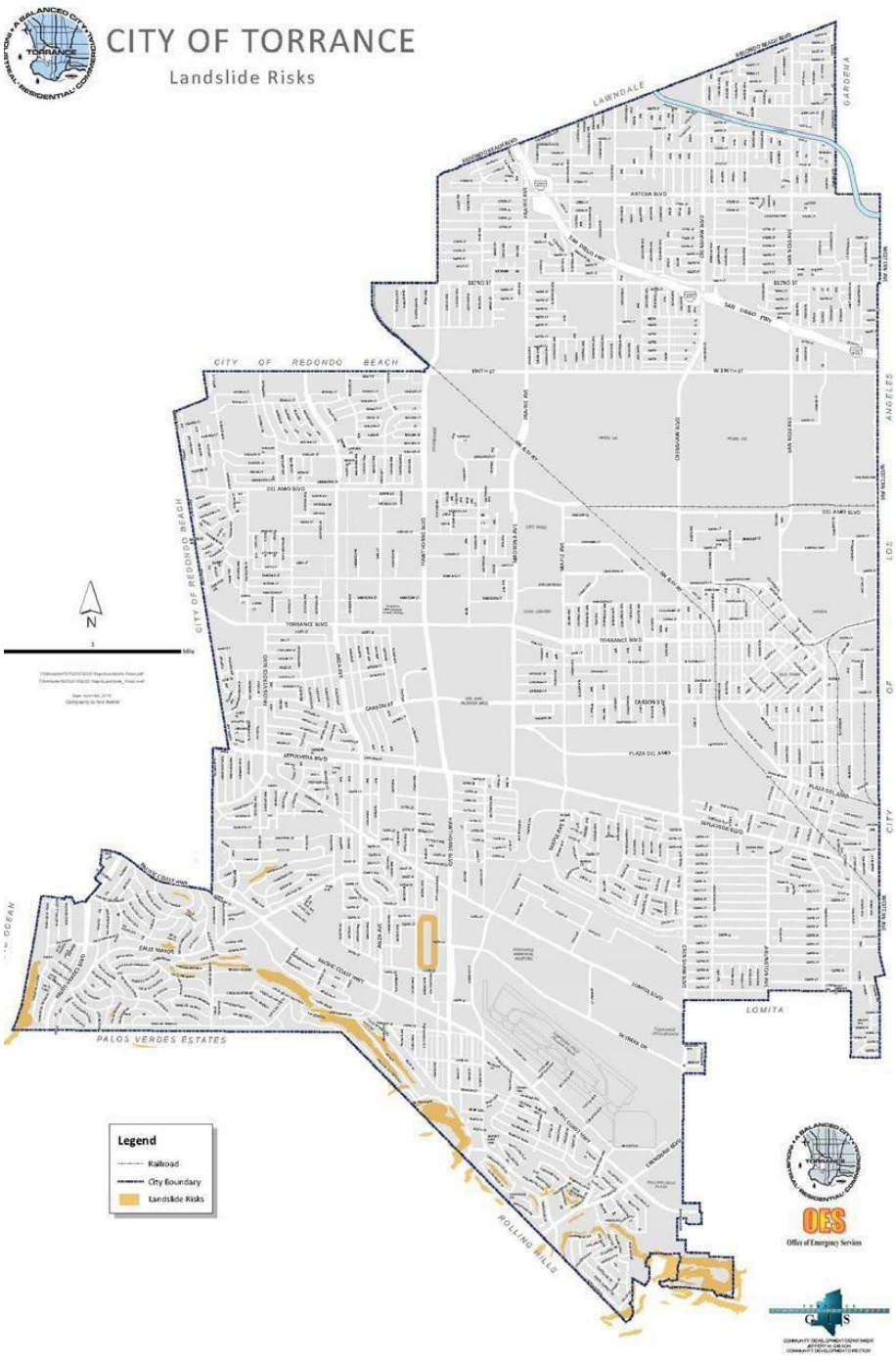


Figure 52: Torrance Landslide Risk Area. Source: 2023 Torrance Local Hazard Mitigation Plan

Landslides Previous Occurrence

Torrance has seen occasional landslides in the southern parts of the community along the sea cliff and the base of the Palos Verdes Peninsula. Two substantial landslides have occurred in recent history. In 1986, a landslide near Vista Largo and Via Corona caused severe damage to two homes, which were demolished as a result. A 1998 landslide near Carolwood Lane and Singingwood Drive affected the backyards of 24 homes.

Landslides Probability of Future Events

Based on Calculated Priority Risk Index (CPRI) conducted for Torrance, there is a Moderate probability (rank score of 2.44) of Landslides for the planning area. Landslides are likely to continue to occur occasionally in Torrance. Increased development activities at the top or base of landslide-prone slopes, including construction activity in the Palos Verdes Peninsula communities above Torrance, may exacerbate landslide risks. Slope failures are most frequently triggered in periods of high rainfall. The hazard is greatest in areas with steep slopes. Slope steepness and underlying soils are the most important factors affecting the landslide hazard. However, surface and subsurface drainage patterns also have an effect, and vegetation removal can increase the likelihood of a landslide. (United States Geological Survey, 2004). Slope failures are often triggered by other natural hazards, such as earthquakes, heavy rain, floods, or wildfires. Consequently, landslide frequency is often related to the frequency of these other hazards.

Landslides Vulnerability & Impact

Landslides may be affected by the increased risk of flooding brought on by climate change, as soil subject to heavy rains may be more prone to sliding. However, more research is likely needed to determine the specific effects of climate change on landslide risks. Several types of infrastructure are exposed to mass movements, including transportation, water, sewer, and power infrastructure. These types of infrastructure present a particular vulnerability because of their geographic extent and susceptibility to physical distress. Improving mapping and information on landslide hazards and incorporating this information into the development review process could prevent siting of structures and infrastructure in identified hazard areas.

The presence of landslides has recently occurred in neighboring jurisdictions and along some of the major transportation routes to Torrance. While the presence of a landslide may not fall within the planning area, the City might still feel the impact. Most notably if a landslide occurs as a secondary effect to another hazard previously mentioned within this plan. These impacts could have negative effects on the overall accessibility or response efforts to the City, if such actions or assistance was needed.

Tsunami

The U.S. Geological Survey describes Tsunamis as large, potentially deadly, and destructive sea waves, most of which are formed as a result of submarine earthquakes. They can also result from the eruption or collapse of island or coastal volcanoes and from giant landslides on marine margins. These landslides, in turn, are often triggered by earthquakes. Tsunamis can be generated on impact as a rapidly moving landslide mass enters the water or as water displaces behind and ahead of a rapidly moving underwater landslide.

A tsunami (seismic sea wave) is a series of waves most commonly caused by an earthquake beneath the sea floor or by a large undersea landslide. In the open ocean, tsunami waves travel at speeds of up to 600 miles per hour, but their wave height is generally too small to be observed. As the waves enter shallow

water, they slow down and may rise to several feet or, in rare cases, tens of feet. There are two types of tsunamis defined:

- Local tsunami (also called near-source): If a large earthquake or undersea landslide occurs at or near the California coast, the first waves may reach coastal communities within minutes. There may be little or no time for authorities to issue a warning. An offshore earthquake or landslide with a magnitude of 6.8 has the potential to create a local source.
- Distant tsunami (also called distant source): Very large earthquakes in other areas of the Pacific Rim may also cause tsunamis, which could impact California's coast. The first waves would reach Los Angeles County's coastline many hours after the earthquake occurred.

Tsunami Location and Extent

According to California Department of Conservation, the City of Torrance lies outside of the Tsunami hazard area, as shown in Figure 53.

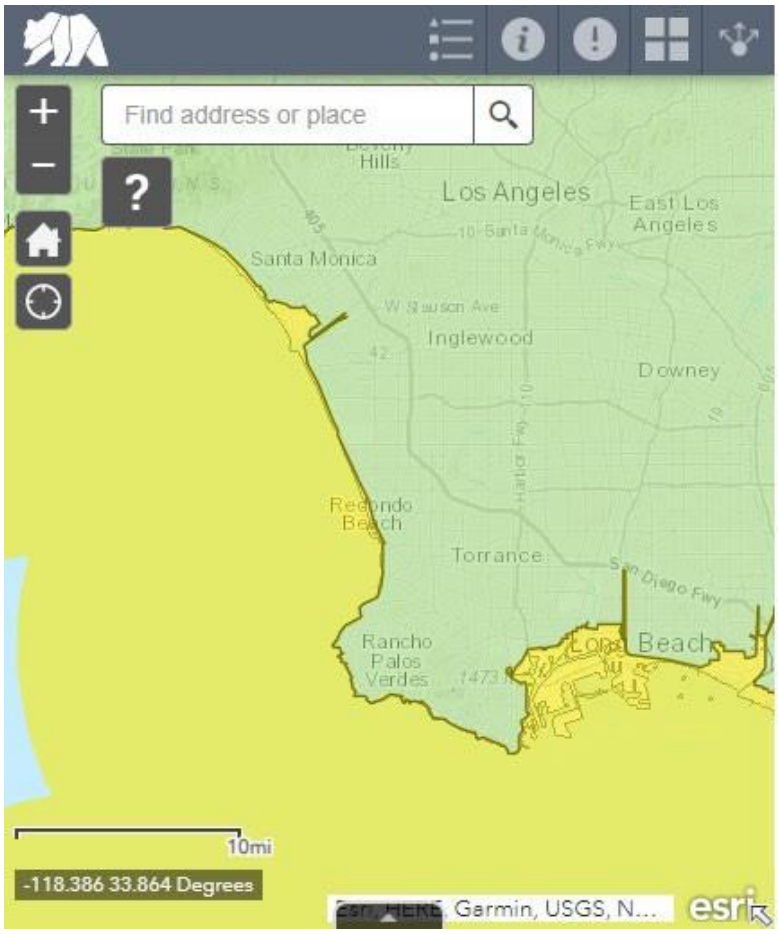


Figure 53: California Department of Conservation, Tsunami Risk Area. Source: 2023 Torrance Local Hazard Mitigation Plan

Tsunami Previous Occurrence

There have been no reports of tsunamis affecting Torrance in recent history. The most recent notable tsunami which affected Los Angeles County occurred on March 11, 2011, and measured 2.8 feet causing minimal damage.

Tsunami Probability of Future Events

Based on Calculated Priority Risk Index (CPRI) conducted for Torrance, there is a Moderate probability (rank score of 2.17) of Tsunami for the planning area. An earthquake anywhere in the Pacific Ocean can cause tsunamis around the entire Pacific basin. Since the Pacific Rim is highly seismically active, tsunamis are not uncommon, but historically have been only a few meters in height. The likelihood of a tsunami affecting the City of Torrance is low.

Tsunami Vulnerability & Impact

There are no buildings or structures in Torrance within the recognized tsunami hazard area. The City of Torrance has 1.5 miles of lifeguard patrolled beach. Lifeguard services fall within the jurisdiction of Los Angeles County Fire Department. In the event of a tsunami, this entire area has the potential to be impacted. In an effort to mitigate the impact of a tsunami or other beach emergency at Torrance Beach, the Los Angeles County Department of Beaches and Harbors installed a Beach Emergency Evacuation Lights System (BEELS) as an evacuation alert system designed for all beachgoers, including those who are deaf or hard of hearing. During a beach evacuation, BEELS will flash white LED lights mounted on permanent structures and some lifeguard towers, as well as broadcast a siren and an audible evacuation alert in both English and Spanish. The alert message will change depending on the evacuation type, and the lights will flash slowly for a water-only evacuation and quickly for a full beach evacuation.

Critical Facilities Assessment

Critical facilities are of particular concern when planning to mitigate hazards. A critical facility is a structure or other improvement that, because of its function, size, service area, or uniqueness, has the potential to cause disruption to vital socioeconomic activities if it is destroyed, damaged, or functionally impaired.

Certain facilities have a net positive value for the community, i.e., they contribute to the public good by facilitating the basic functions of society. These facilities maintain order, public health, and education, and help the economy function. Additionally, there are infrastructure and facilities integral to disaster response and recovery operations. Conversely, some facilities and infrastructure are of extreme importance due to the negative externalities created when they are impacted by a disaster. What fits this definition will vary slightly from community to community, but the definition remains as a guideline for identifying critical facilities and infrastructure.

Critical facility points for the City of Torrance include police stations, fire stations, hospitals, elder care facilities, childcare facilities, schools, transportation infrastructure, refineries, bridges, utilities, airports and government buildings. Lifelines include facilities related to electrical power, liquid fuel, natural gas, and transportation routes. The exact number of critical facilities in each category is deemed sensitive information and not released to the public.

Figure 54 below reflects the location of critical facilities within the service area.

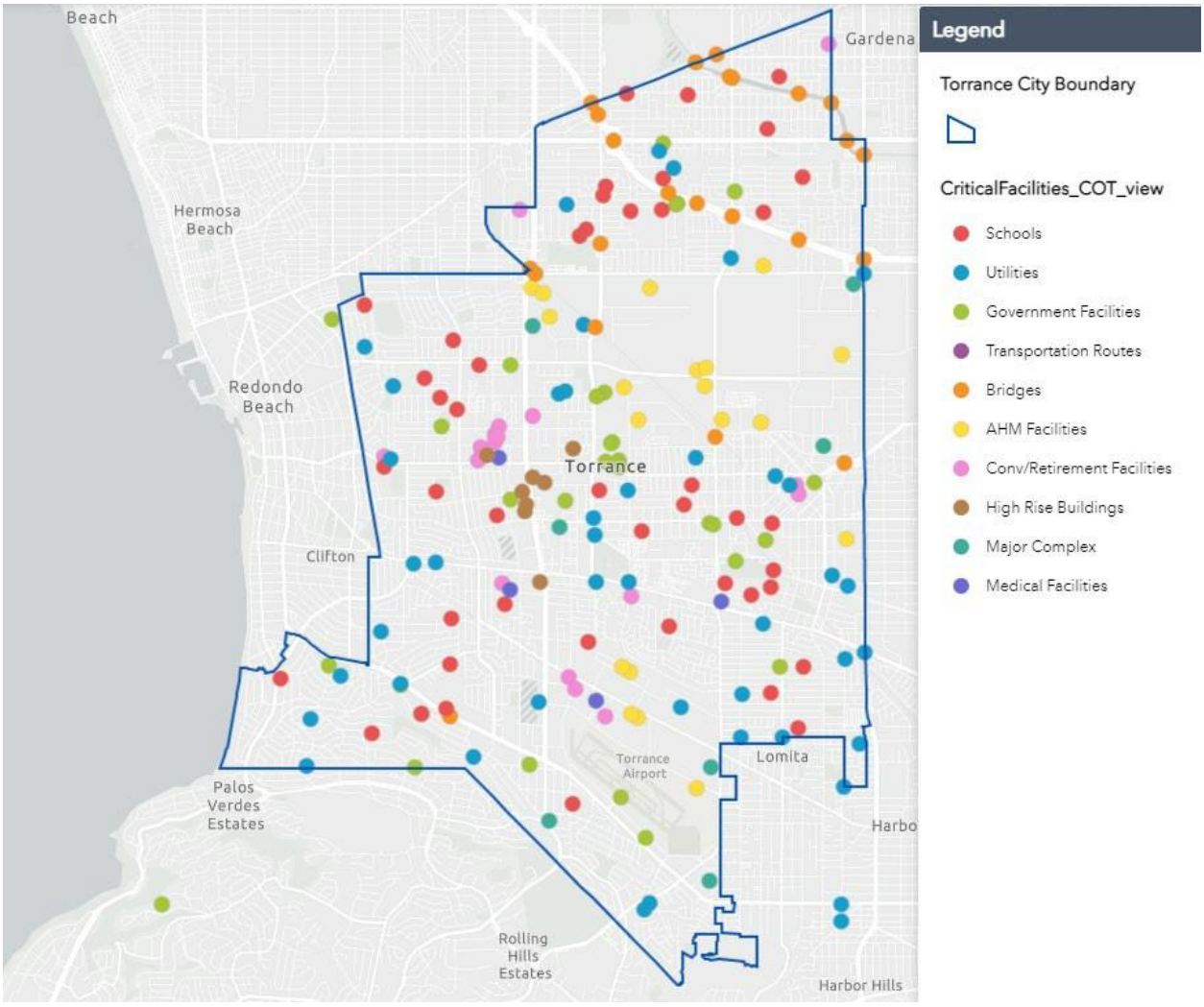


Figure 54: City of Torrance Critical Facilities Map

Community Service Demands

Community service demands are analyzed by historical data on incident nature type, Incident volume, locations, time of day, and day of the week. Over the five-year period of 2018-2022, the TFD responded to a total of 76,431 requests for service and/or mutual aid requests. The following tables and figures summarize the total responses. The service demands are shown in greater detail in the Risk Assessment by Geographical Planning Zones section of the Community Risk Assessment and Standards of Cover (CRA/SOC).

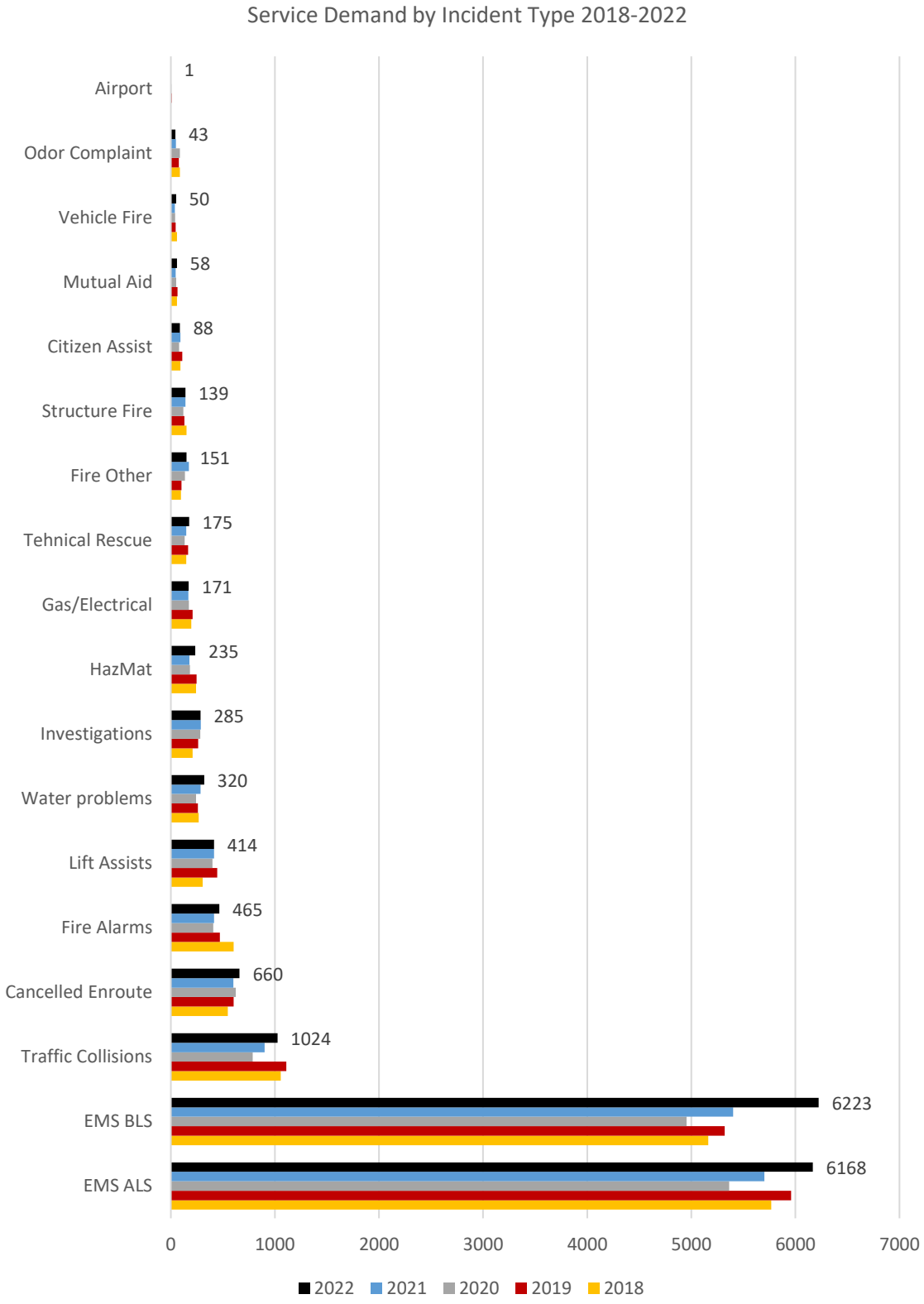


Figure 55: Service Demand by Call Type, Historical data 2018-2022

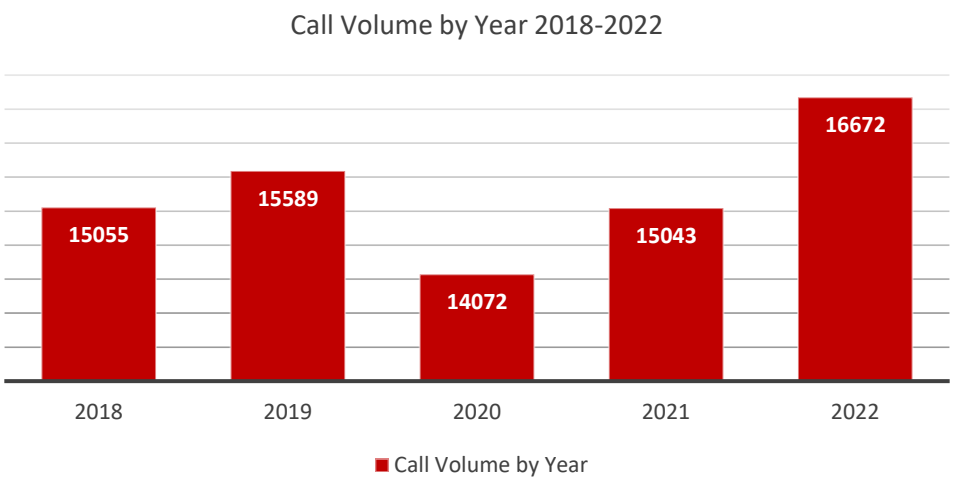


Figure 56: Call Volume by Year, Historical data from 2018-2022

Significant Findings

- Call volume decreased in 2020 due to the COVID-19 pandemic.
- Call volume returned to near pre-pandemic levels in 2021.
- 2022 was highest call volume in the Department's history.
- Call volume increased by 1,617 incidents (10.7%) from 2018 to 2022.

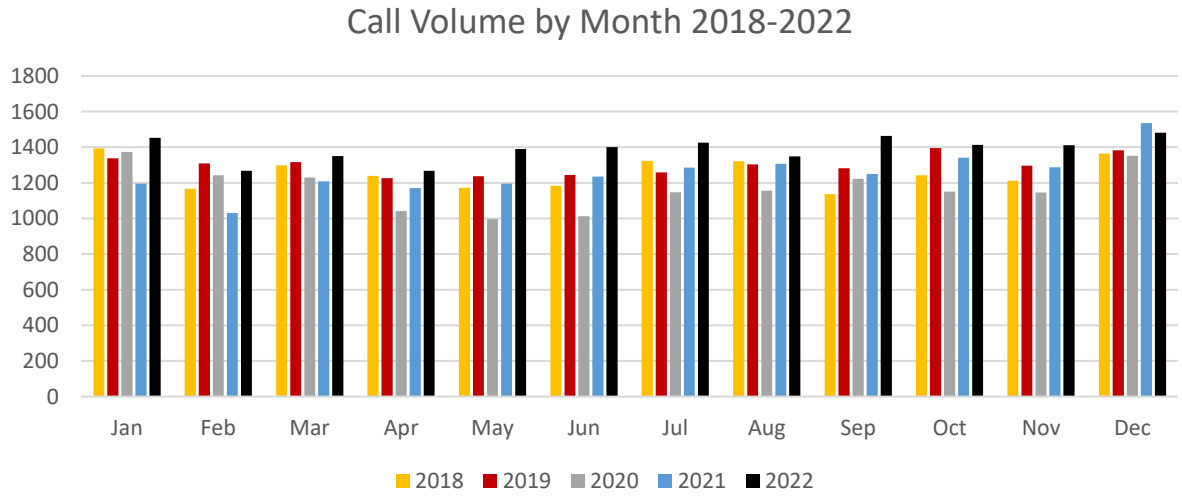
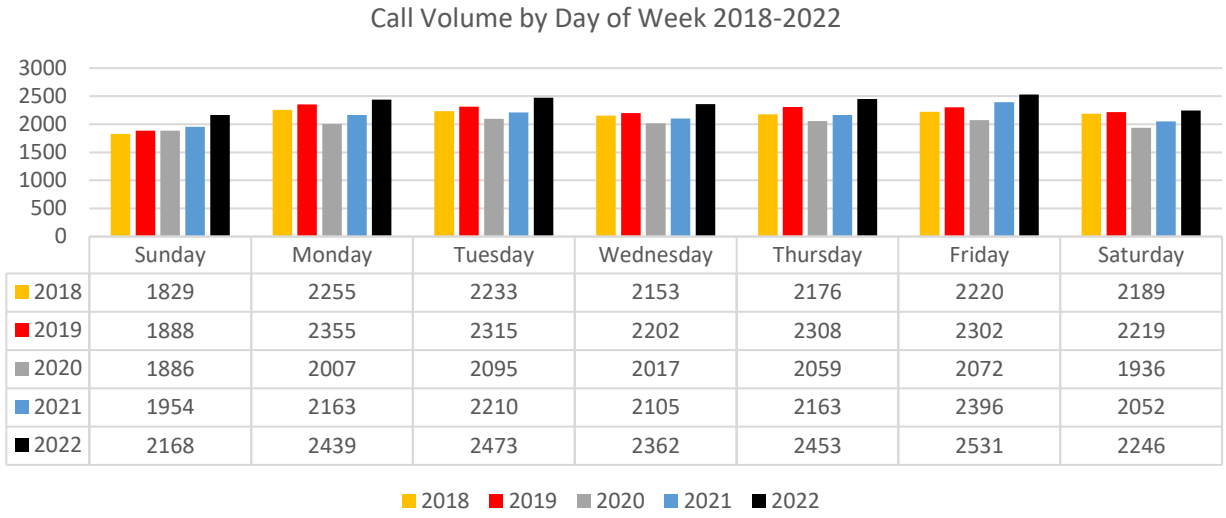


Figure 57: Call Volume by Month, Historical data from 2018-2022



	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2018	1829	2255	2233	2153	2176	2220	2189
2019	1888	2355	2315	2202	2308	2302	2219
2020	1886	2007	2095	2017	2059	2072	1936
2021	1954	2163	2210	2105	2163	2396	2052
2022	2168	2439	2473	2362	2453	2531	2246

Figure 58: Annual Call Volume by Day of the Week, Historical data from 2018-2022

Significant Findings

- All days are trending upwards on call volume and mirror trends in annual call volume.
- Weekends are slightly less impacted with Sunday experiencing the lowest call volume.

Call Volume by Unit

The following charts contain the call volume by front line apparatus. Call volume does not indicate the effectiveness of the response; rather it is a measurement that indicates the busyness of the unit on emergency incidents. Units assigned to incidents affect the resiliency of the entire system to respond to calls for service within the affected area.

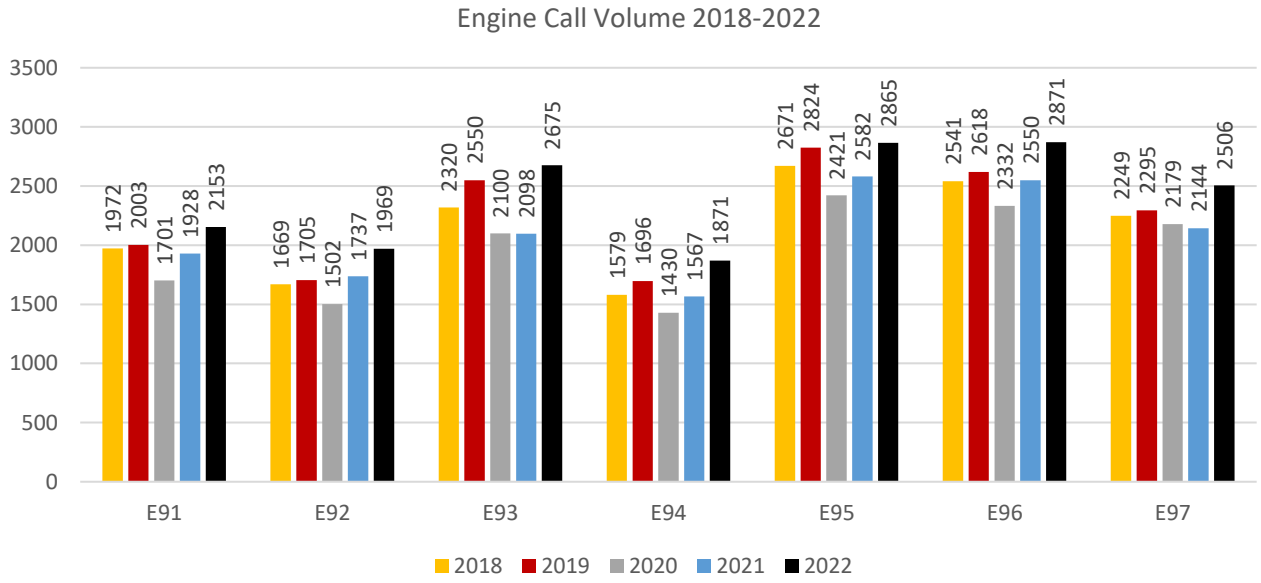


Figure 59: Engine Call Volume 2018-2022, Historical data 2018-2022

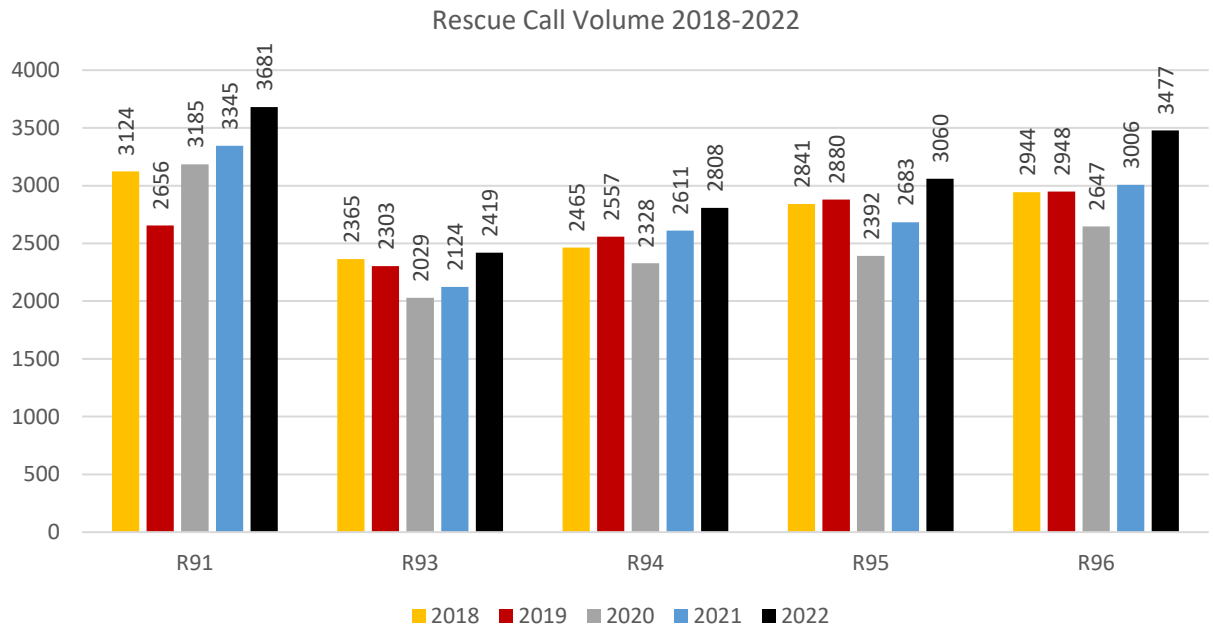


Figure 60: Rescue Call Volume 2018-2022. Historical data 2018-2022

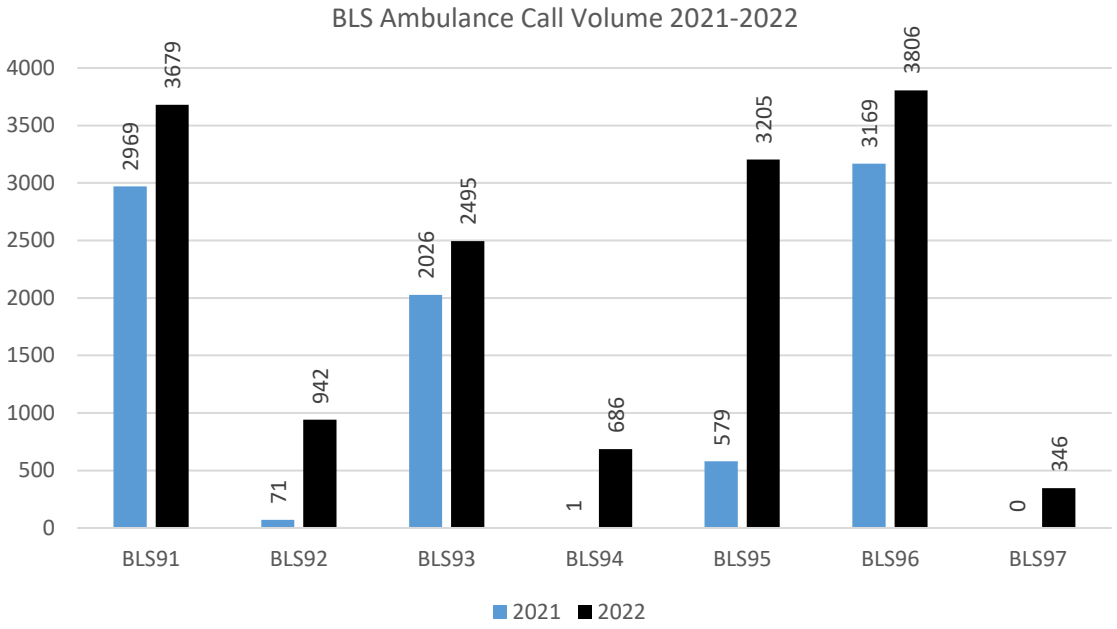


Figure 61: BLS Ambulance Call Volume 2021-2022. Historical data 2021-2022

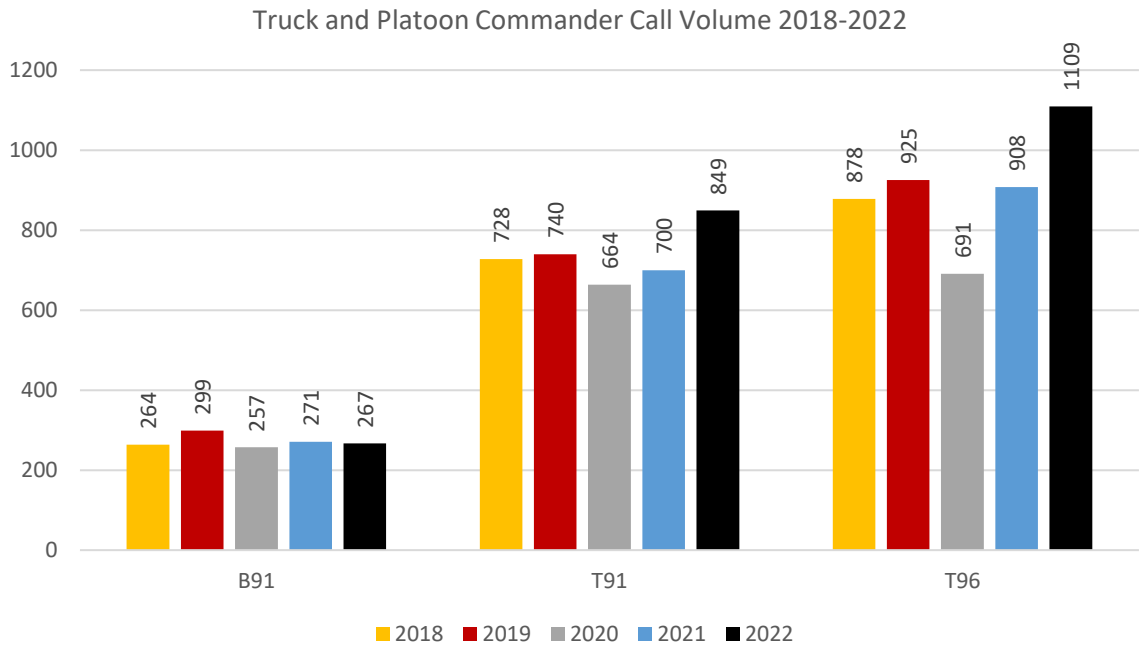


Figure 62: Truck/Platoon Commander Call Volume 2018-2022, Historical Data 2018-2022

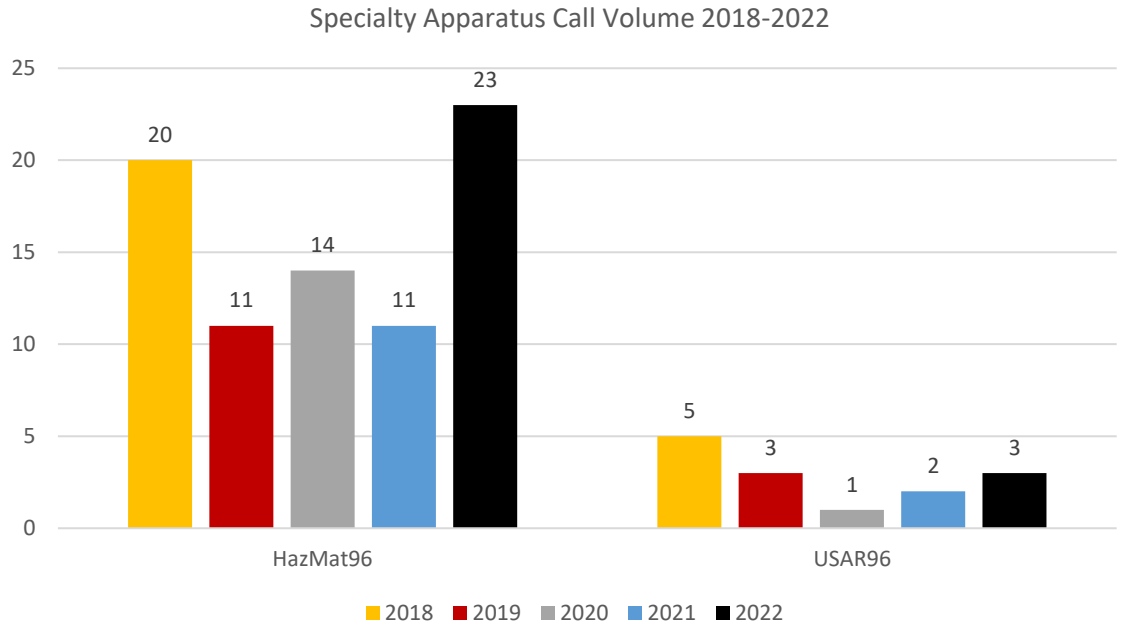


Figure 63: Specialty Apparatus Call Volume 2018-2022, Historical Data 2018-2022

Significant Findings

- Call volume for all apparatus (except B91) is trending upward and mirrors the annual call volume trends.
- BLS Ambulance call volume increased significantly from 2021 to 2022 and is line with the following factors:
    - Program started in April of 2021. (2021 data doesn't represent a full year of incidents).
    - Expansion of the program and transition of BLS95 from a peak staffed to 24-hour resource.
    - BLS92 and BLS94 became peak staffed units in 2022.
    - BLS97 was placed into service, intermittently, in the beginning of 2022 to assist with resilience during a COVID surge.
- Call volume for engine companies is higher in portions of the City that have a higher population

Call Volume by Hour of Day

Hour of Day	2018	2019	2020	2021	2022
0	391	373	341	355	437
1	298	335	309	332	376
2	294	302	246	282	319
3	276	234	215	256	304
4	287	237	212	243	281
5	316	291	275	316	309
6	408	413	345	383	404
7	555	565	498	515	543
8	719	748	709	688	783
9	852	897	839	794	896
10	917	950	839	844	1012
11	912	958	940	949	1058
12	957	938	895	891	1018
13	888	958	848	943	1061
14	902	962	837	920	989
15	894	944	842	878	1003
16	812	852	752	869	878
17	837	862	774	830	983
18	756	820	677	806	850
19	691	689	697	727	758
20	610	685	611	667	666
21	579	594	516	608	689
22	486	530	433	543	571
23	418	452	422	404	484

Figure 64: Call Volume by Hour of Day, Historical data 2018-2022

Significant Findings

- Call volume increases significantly from 8am-8pm
- The increased service demand and traffic patterns during the day present challenges to the TFD when it comes to meeting the response time criteria established to meet the community expectations

Significant Findings

- EMS calls accounted for 77% of all dispatched calls for service in 2022.
- Traffic accidents accounted for 6.1% of all calls for service.

Regional and City Trends

The TFD monitors emerging trends in the Fire Service, within the City of Torrance and the surrounding jurisdictions in order to maintain awareness of future impacts to the Department and/or the need to modify programs and services. Some emerging trends include:

- Impact of Homelessness
- New Development and Housing in the City
- Recruitment, retention and development of personnel
- Potential outsourcing of City services
- Lithium Ion Batteries
- Changes to Area G Fire Agencies

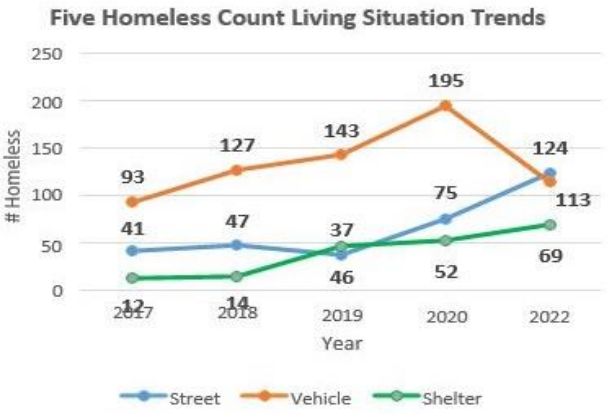
While the TFD does not have direct control over many of these issues, the Department realizes the impacts these issues can have on fire and EMS service in Torrance; therefore, it is essential to be proactively engaged with the "whole" community in order to serve the mission. TFD will continue to be active in community groups and work groups and will maintain relationships with city officials from all departments to ensure we work cooperatively to reduce risks.

The following emerging trends have been further evaluated for potential impact on the TFD:

- Impact of Homelessness
- New Development and Housing in the City

Impact of Homelessness

Persons experiencing homelessness is a regional issue that is also affecting the City of Torrance. The number of persons experiencing homelessness has steadily increased over the years with the most recent data showing a total of 306 persons experiencing homelessness (2022 Greater Los Angeles Homeless Count). In 2022, the City of Torrance created a temporary housing program for displaced and homeless individuals



near City Hall, to address Torrance's population of people experiencing homelessness. The City works in collaboration with an experienced community based service provider to provide services at the site and to provide navigation to reach permanent housing along with outreach services. In addition, the City employs a Homeless Outreach Coordinator, within the Community Development Department, to take the lead in providing services to the homeless. The following figures show the location of unsheltered persons (at the time of the 2022 count) and the trends from the last 5 homeless counts. (No count was conducted in 2021 due to COVID).

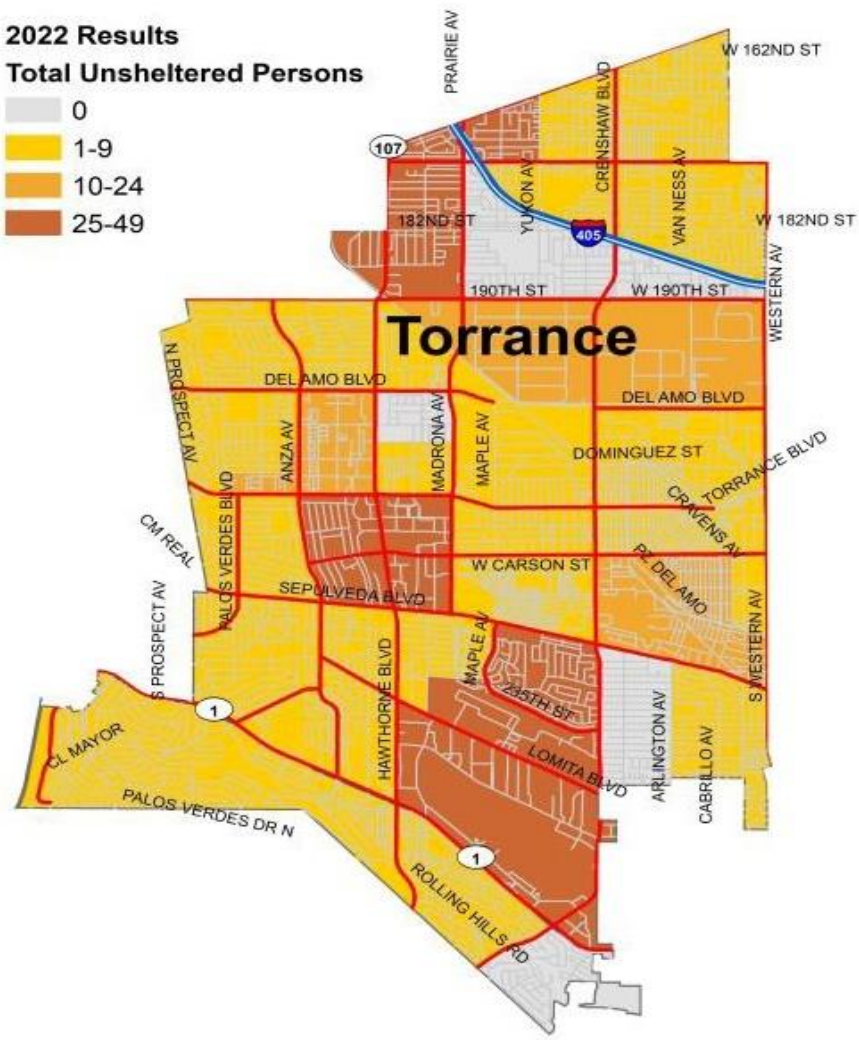


Figure 65: Location of unsheltered persons in Torrance, 2022. Source: Los Angeles Homeless Services Authority (LAHSA), lahsa.org

On March 1st, 2020, the Torrance Fire Department began to collect data regarding the impact of incidents related to homelessness. In order to better understand this emerging issue, a required data field was added to all incident reports that would indicate whether the crew found the incident type involving a person that was experiencing homelessness. The Department's intent is to track the data, analyze the results over time and make adjustments to the Department's service delivery as needed. The information below reflects data collected from March 1, 2020 to December 31, 2022.

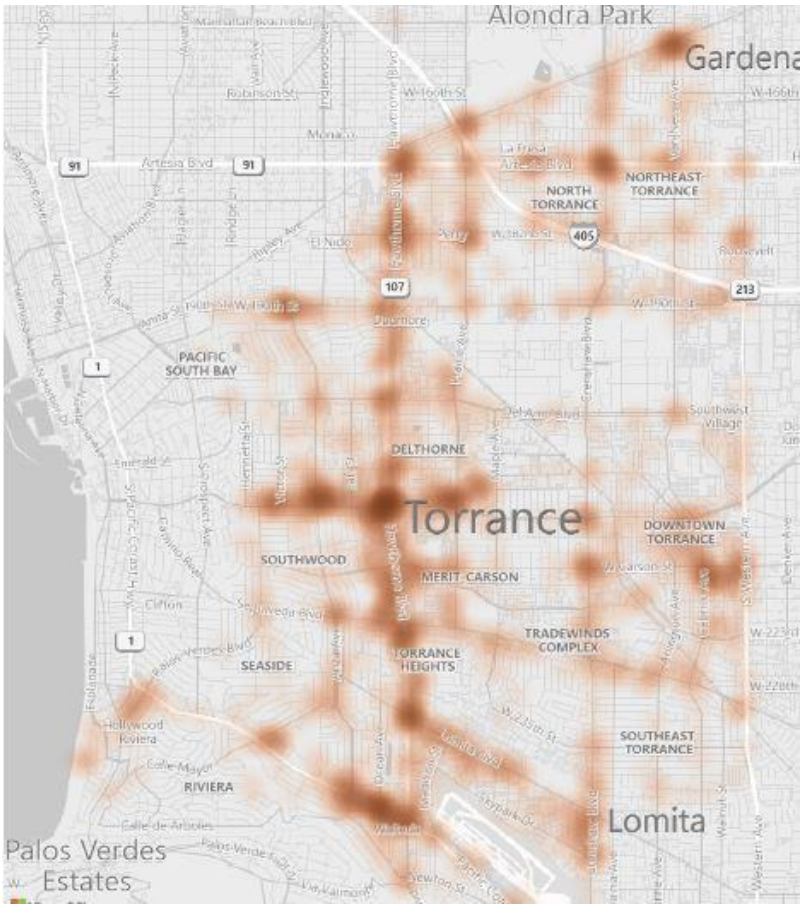


Figure 67: TFD Homelessness related incidents March 2020-2022

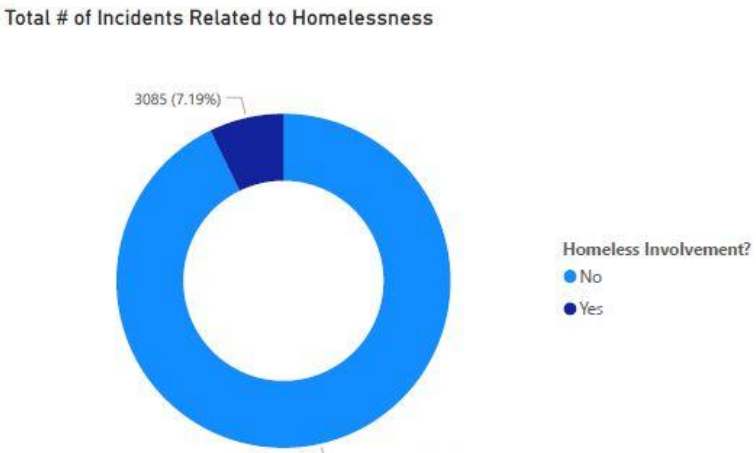


Figure 66: TFD incidents related to Homelessness March 2020-2022

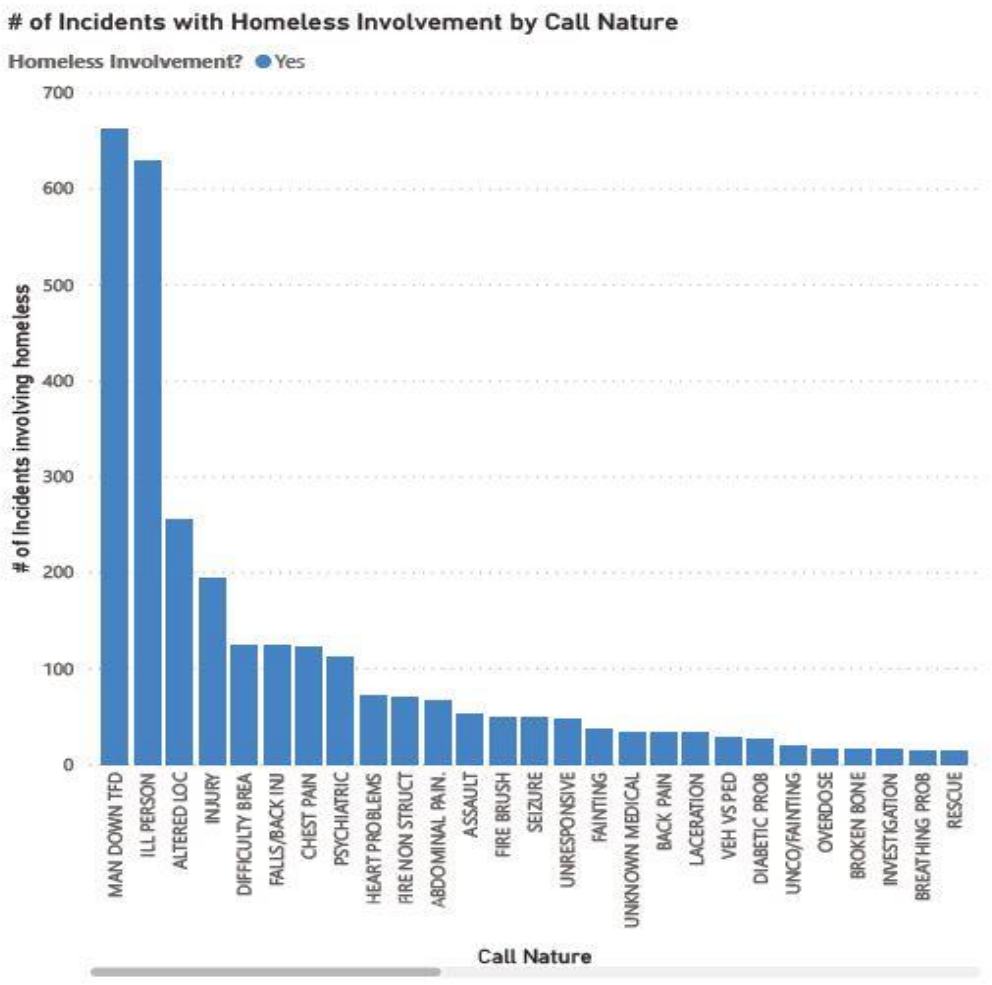


Figure 68: TFD Homelessness related incidents by call nature March 2020-2022

Significant Findings

- 7.19% of all incidents were related to homelessness.
- "Man Down" and "Ill person" were the most common call natures related to homelessness incidents.
- The heat map indicates that the most prevalent area for homelessness related incidents occur along Hawthorne Blvd., most notably in the area of:
    - Hawthorne Blvd. and Torrance Blvd. (On the edge of PZ95 and PZ96).
    - Other notable areas include:
        - PCH – between Anza Ave and Hawthorne Blvd. (PZ94).
        - Artesia Blvd. and Crenshaw Blvd. (PZ93).

The Torrance Fire Department recognizes the impact that homelessness has on TFD response and the community as a whole. The Department is committed to partnering with the City of Torrance and other external stakeholders in order to provide services and reduce the impact of homelessness related incidents on emergency response.

New Development and Housing

The City is expecting the emergence of new housing and commercial development over the next few years. The City of Torrance is not growing geographically, however, there is anticipated growth internally. The TFD partnered with a data analytic provider to utilize predictive analytic software to analyze the potential impacts. The following methodology was applied:

- A list of all major projects within the City was obtained from the City of Torrance Community Development Department. The City updates the list on a quarterly basis. The list of projects from the end of Q2 2023 was used for analysis.
- Major Projects can be in the development review, plan check or construction phase.
- A total of 27 projects were selected for analysis.
- Some projects (5) were excluded from analysis due to no anticipated impact. (For example, facade improvements at a motel were not considered to have an impact on TFD programs or services).
- Each proposed project was compared to an existing property within the City.
- Initially the analysis was undertaken with the intent of finding comparison locations that would look and function similarly to the 27 finished developments. Workloads of these comparison locations would be applied to the projected workloads to the 27 new development areas.
- Upon finalization of this process, it was discovered this method projected roughly 50% of the workloads that would have been added if we based this project solely off expected population added.
- It was decided to continue this project through a more accurate estimation of workloads based upon expected added population.

The analysis revealed the following results:

- The proposed developments, once complete, could result in an additional 525 incidents per year.
- The analytic model projects that the TFD will be able to absorb approximately 525 additional incidents without a noticeable impact to current response standards. This is primarily due to the first due apparatus having a high enough availability to absorb these additional runs without having to rely upon a second or third due apparatus.
- The Planning Zone with the greatest potential impact is PZ96.

Figures 69 and 70 depict the locations of the proposed developments (as of 2023), along with a visual prediction of the major impact these development are projected to have on TFD workload.

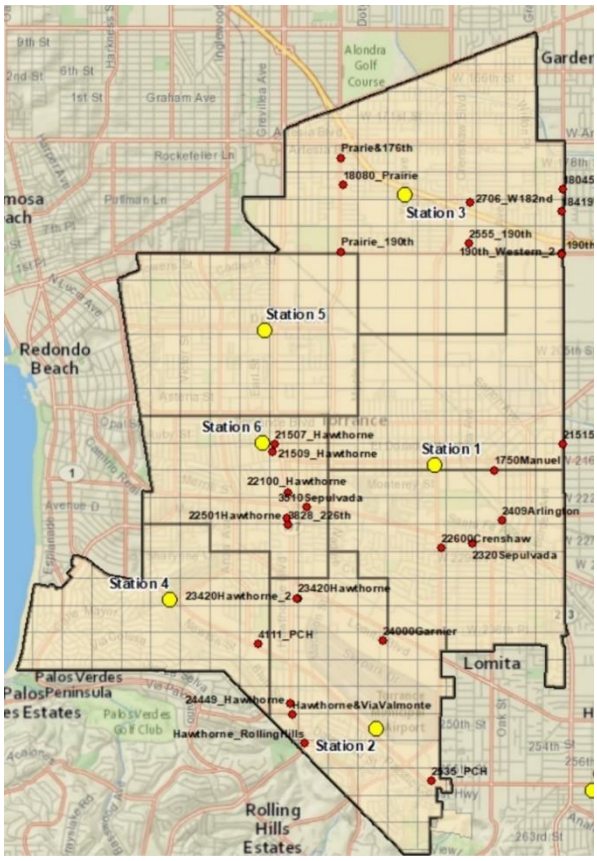


Figure 70: City of Torrance Major Project Locations (As of 2023)

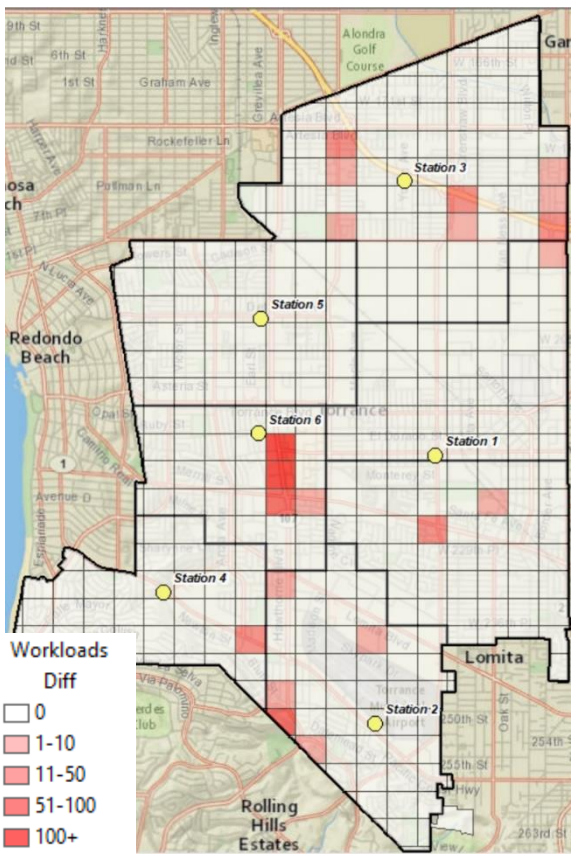


Figure 69: City of Torrance Major Project Impact on TFD Workload

The Torrance Fire Department will continue to monitor the impact of proposed developments in the City and adjust deployment as needed.

Risk Assessment by Geographical Planning Zones

Geographical Planning Zones (First-in Districts)

Torrance is divided into seven geographical planning zones commonly referred to as “first-ins”. Each planning zone is served by a fire station and generally defines the first-due response area for each station when all units are in quarters. The number of the planning zone is reflective of the engine company that is housed within the area. For example, planning zone 93 houses Engine 93 at Fire Station 3. The 90 numeric is a specific Area mutual aid identifier indicating the apparatus is from the TFD.

The CAD system uses vehicle locators and GPS to dispatch the closest unit to calls for service; therefore, the first due areas change as apparatus move throughout the city to conduct business. Each fire station is located to ensure effective distribution of resources and limit undue risk from extended responses. Data on incident type, location, and frequency is reviewed on an annual basis.

The planning zones range in size from 1.92 square miles to 4.77 square miles. The largest geographic planning zone is home to the refinery that sits on 750 acres. In addition to being strategically designed for resource deployment, the planning zones correspond to ¼ mile CAD quadrants, which allows the TFD to analyze the data related to each zone. The map below shows the planning zones.

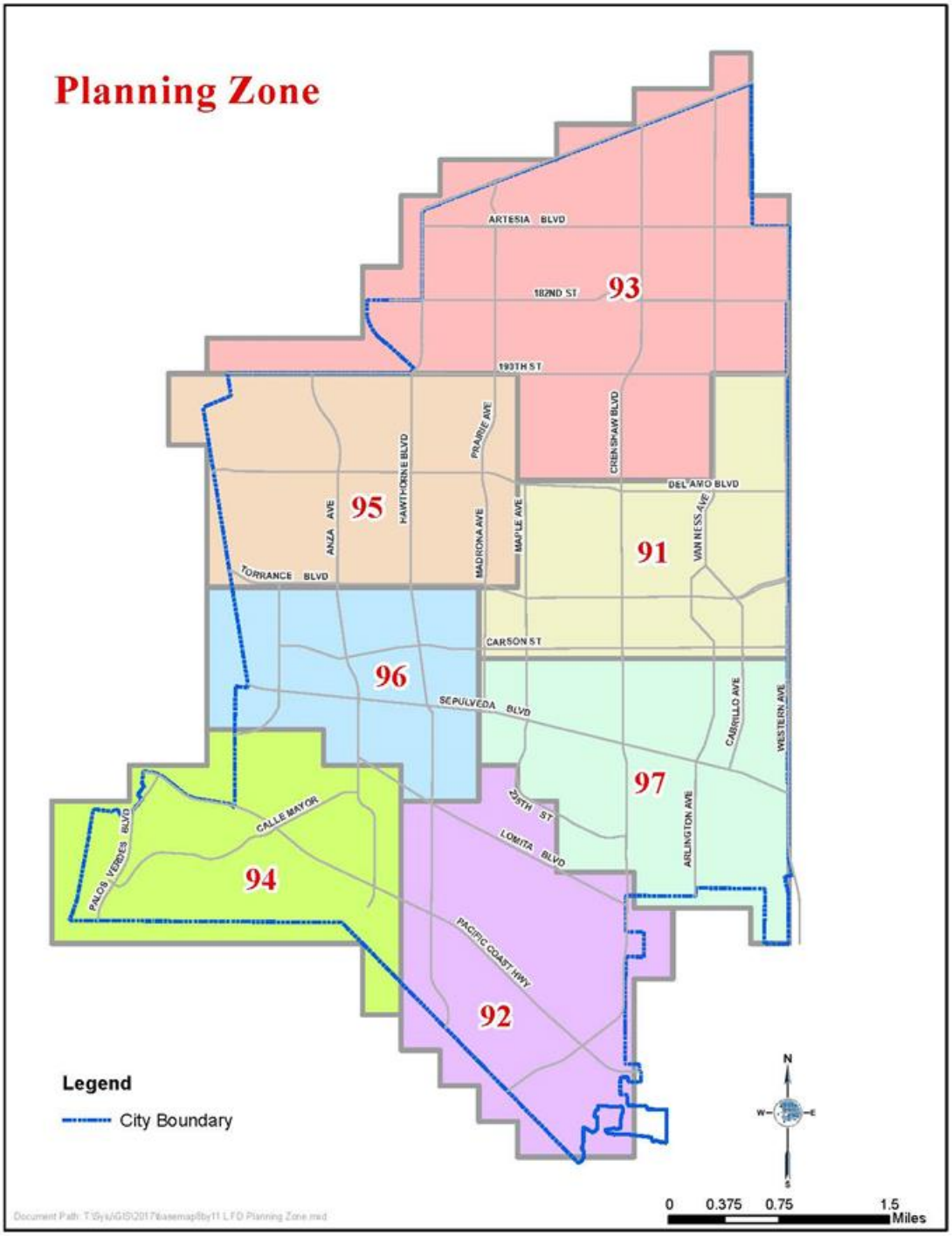
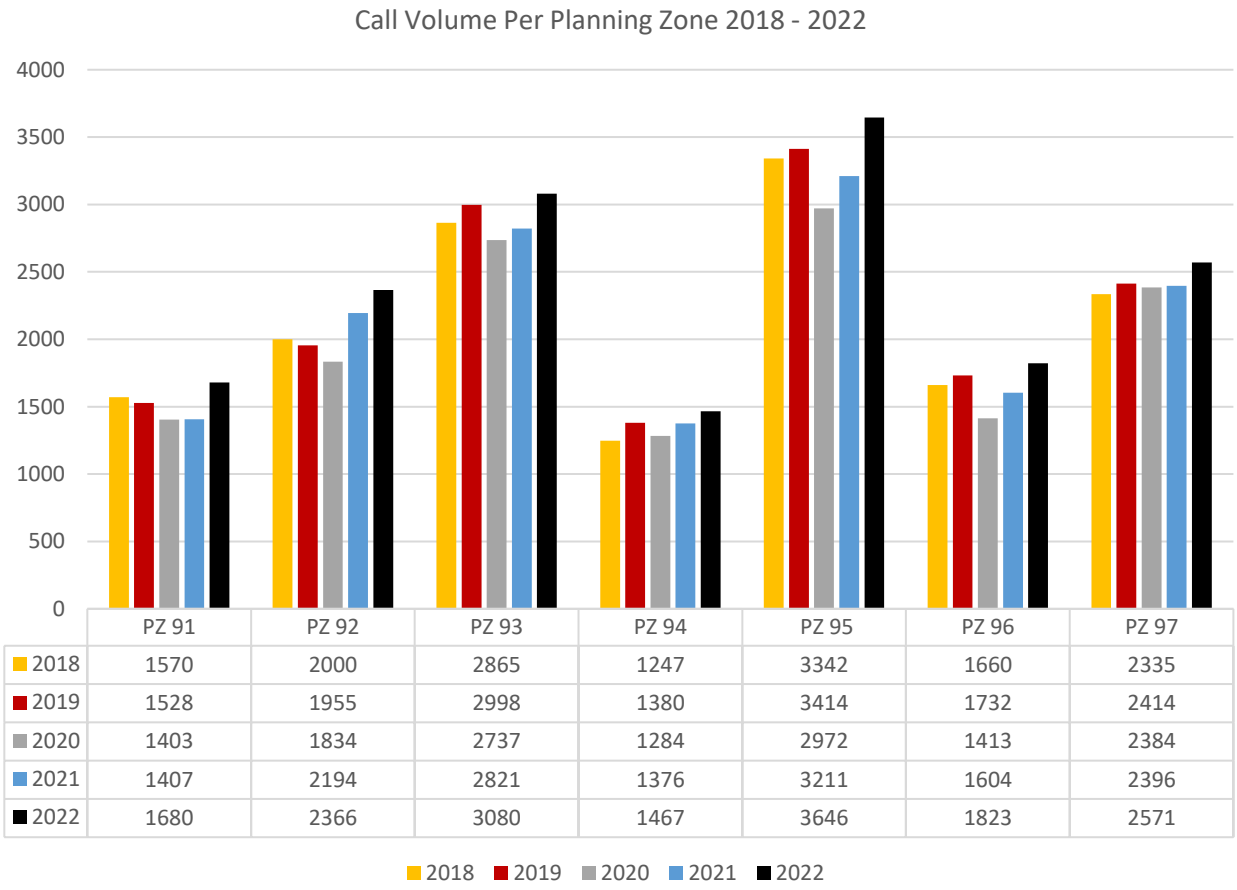


Figure 71: Torrance Fire Department Planning Zones

The table below contains a breakdown of TFD's historical call volume per planning zone, from 2018-2022.



	PZ 91	PZ 92	PZ 93	PZ 94	PZ 95	PZ 96	PZ 97
2018	1570	2000	2865	1247	3342	1660	2335
2019	1528	1955	2998	1380	3414	1732	2414
2020	1403	1834	2737	1284	2972	1413	2384
2021	1407	2194	2821	1376	3211	1604	2396
2022	1680	2366	3080	1467	3646	1823	2571

Figure 72: Planning Zone Call Volumes, Historical Data 2018-2022

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Planning Zone 91

Planning Zone 91 (PZ91) is 2.67 square miles and is home to Fire Station 1, Honda Motors Corporation Headquarters and Historic Downtown Torrance. The downtown area presents unique risks due to some of the original buildings being built of unreinforced masonry prior to 1933. Many of these buildings have been retrofitted, however, they still present unique hazards in earthquakes or under fire conditions.

Large portions of the northeastern area in PZ91 are zoned for commercial and light industrial uses. This area is home to Moog Aerospace and a variety of other businesses that require manufacturing, office, and warehouse space. This area is undergoing a major development project due to Toyota Motor Corporation selling their campus to a development group.

The area along Western Avenue is an industrial area with retail sales businesses, commercial office space, and hotels.

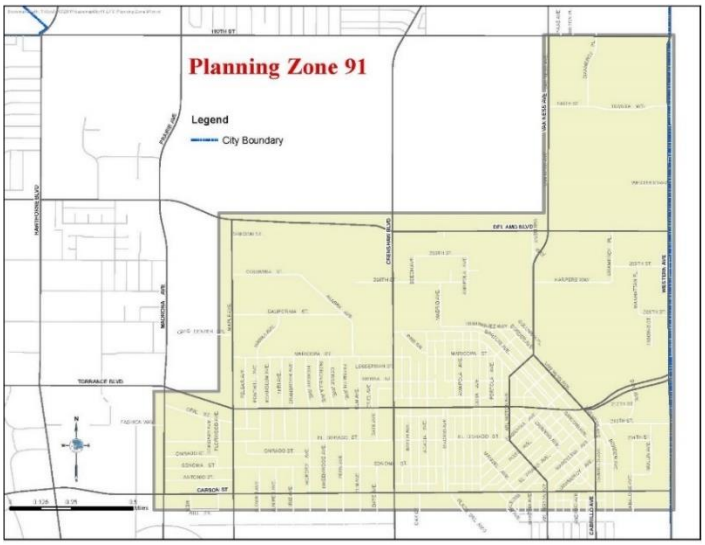


Figure 73: Planning Zone 91 Map

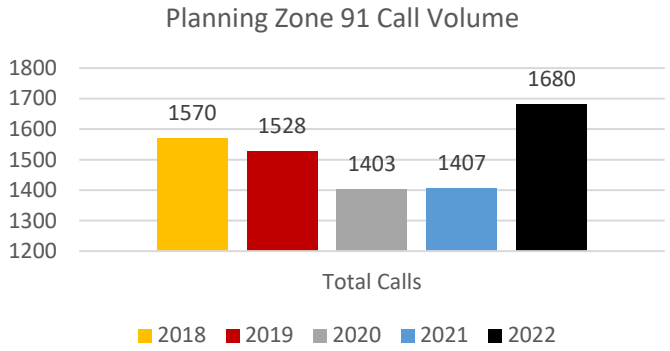


Figure 74: Planning Zone 91 Call Volume 2018-2022

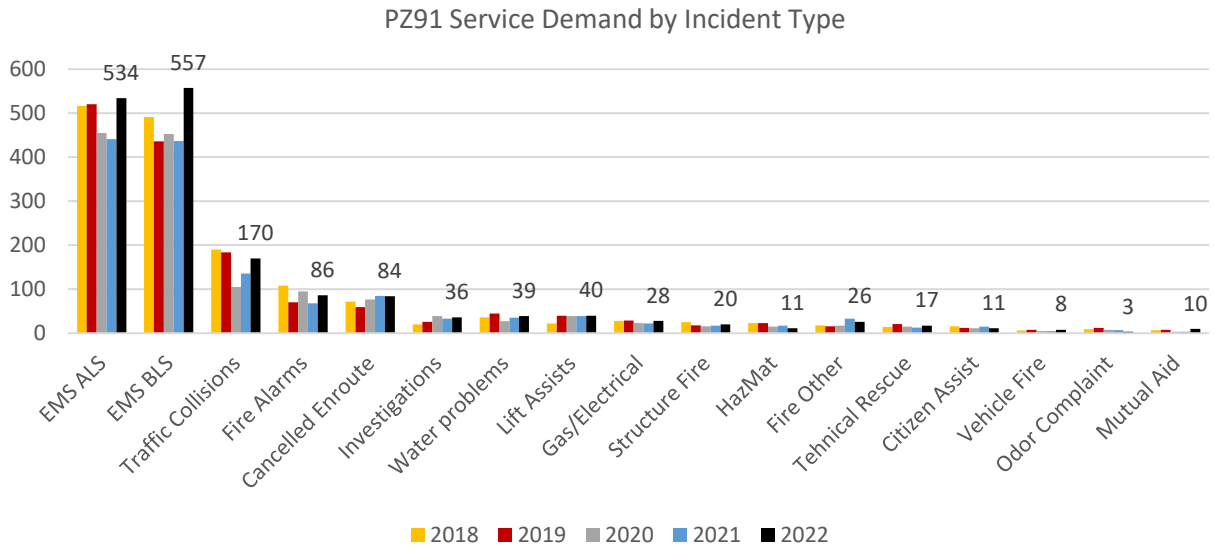


Figure 75: Planning Zone 91 Service Demand by Incident Type 2018-2022

The central portion of PZ91 is generally commercial and manufacturing businesses with the exception of a residential neighborhood on Del Amo Blvd., between Crenshaw Blvd. and Van Ness Ave. The central area is home to American Styrenics, Messer Gas, Airgas, Ganahl Lumber, and several businesses complexes with offices and warehouses.

The bulk of the properties in the southern end of PZ91 are single family and multifamily residential properties. The residential population in PZ91 is estimated to be 11,652, making it the least populated residential zone. PZ91 is estimated to have 4,767 housing units with an average household size of 2.53. The median household income is $99,736 as of 2023.

Additional critical facilities and infrastructure unique to PZ91 include a Los Angeles County Courthouse, Torrance High School, CalARP facilities, a significant number of underground pipelines, the BNSF railroad and bridge over Crenshaw Blvd., and older buildings that were not built to modern building codes.

Infrastructure challenges that may affect incident response and mitigation include railroad crossings and some narrow streets.

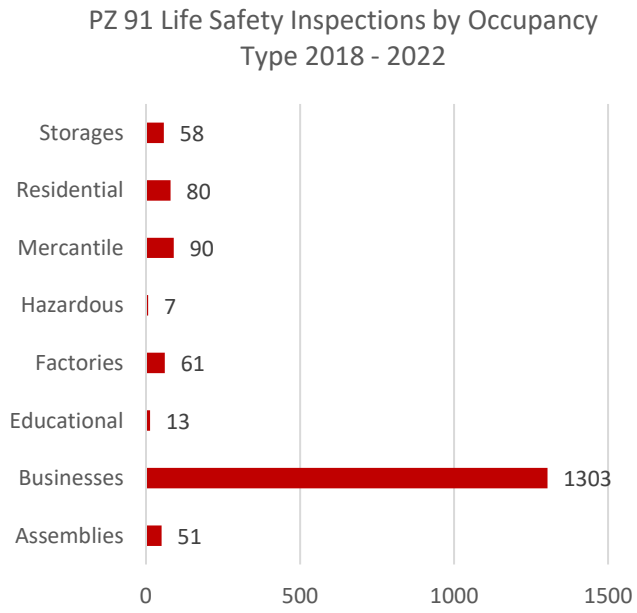
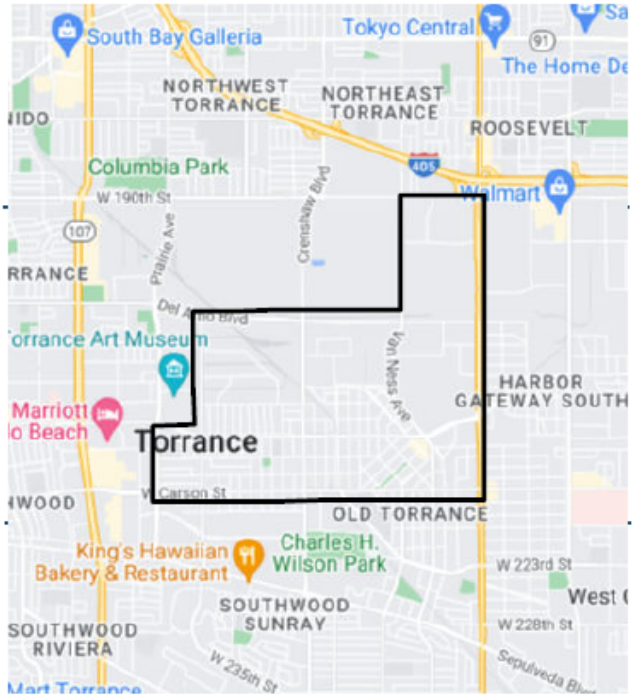


Figure 76: PZ91 Life Safety Inspections by Occupancy Type 2018-2022

Hour	2018	2019	2020	2021	2022
0	37	30	35	26	44
1	35	27	26	31	40
2	33	31	34	29	28
3	28	20	24	21	35
4	35	26	24	17	30
5	31	16	26	25	26
6	48	42	32	29	47
7	54	66	52	51	66
8	83	77	67	76	63
9	82	83	79	76	87
10	87	86	87	88	91
11	103	80	92	94	100
12	90	80	92	91	112
13	90	91	83	91	117
14	84	104	81	83	94
15	98	87	71	74	99
16	79	88	76	75	94
17	102	98	74	95	93
18	83	87	83	76	79
19	78	79	75	80	78
20	51	72	64	51	67
21	59	54	45	44	77
22	41	53	45	44	61
23	59	51	36	40	52

Figure 77: PZ91 Incidents by hour 2018-2022

Community Risk Assessment - Planning Zone 91



11,652 Total Population

4,235.5 Population Density

35,634 Total Daytime Population

2.53 Average Household Size

4,767 Housing Units

$99,736 Median Household Income

$795,188 Median Home Value

BUSINESS

2,120 Total Businesses

30,685 Total Employees

AT RISK POPULATION

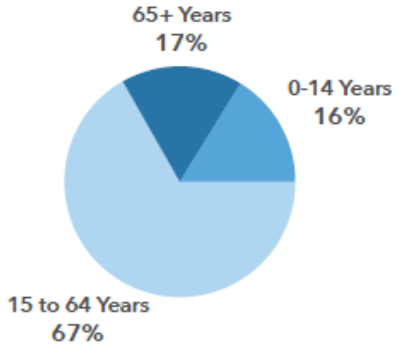
1,963 Population 65+

845 Households with a Disability

341 Households Below the Poverty Level

BUSINESS PROFILE

POPULATION BY AGE



Source: Total Population - U.S. Census 2020; Population Density - U.S. Census 2020; Total Daytime Population - Esri-Data Axle 2023; Average Household Size - U.S. Census 2020; Housing Units - U.S. Census 2020; Median Household Income - ACS 5-yr 2017-2021; Median Home Value - ACS 5-yr 2017-2021; Total Businesses - (NAICS11-99) Esri-Data Axle 2023; Total Employees - (NAICS11-99) Esri-Data Axle 2023; Population 65+ - Esri 2023 Updated Demographics; Households with Disability - ACS 5-yr 2017-2021; Households Below Poverty Level - ACS 5-yr 2017-2021; Population by Age - Esri 2023 Updated Demographics; Business Profile - (NAICS) Esri-Data Axle 2023

Figure 78: Planning Zone 91 Infographic. Source: Esri

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Planning Zone 92

Planning Zone 92 (PZ92) is 2.84 square miles and is home to Fire Station 2, the Torrance Municipal Airport, and Torrance Memorial Medical Center. In addition, PZ92 is home to residential neighborhoods, commercial properties, large retailers, and car dealerships.

The area of PZ92 north of Lomita Blvd. is primarily manufacturing, hazardous, and commercial occupancies. This area is home to Pelican Products, Bachem, Phillip 66 tank farm, and a variety of other businesses that require manufacturing, office, and warehouse space. As a result, there is a significant risk related to hazardous materials and pipeline transportation.

The area between Lomita Blvd. and Skypark Dr. is a mix of occupancies including medical facilities, commercial properties, manufacturers, and big box retailers such as Sam's Club, Home Depot, Costco, and Lowes.

The central portion of PZ92 is occupied by the airport and a majority of the auto dealerships in the city. While the airport presents a unique piece of property with atypical hazards, the airport does not support large aircraft operations with the exception of special events. The airport further lacks on-site jet fuel sales, meaning that the majority of aircraft in use are not jet-propelled. Robinson Helicopters headquarters, manufacturing, and testing facility is located on the airport property.

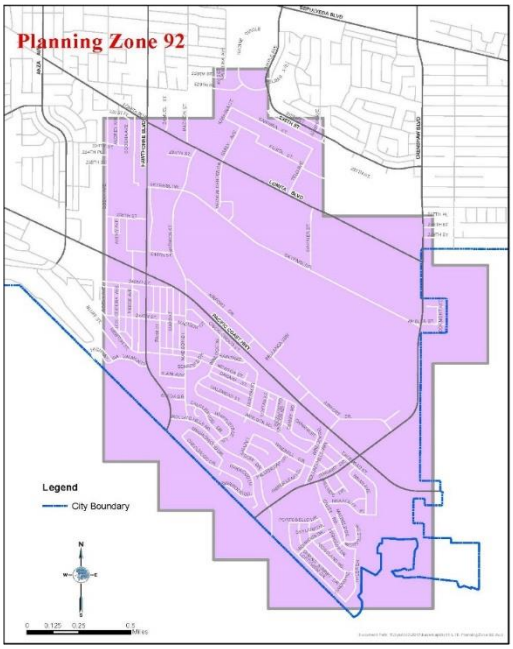


Figure 79: Planning Zone 92 Map

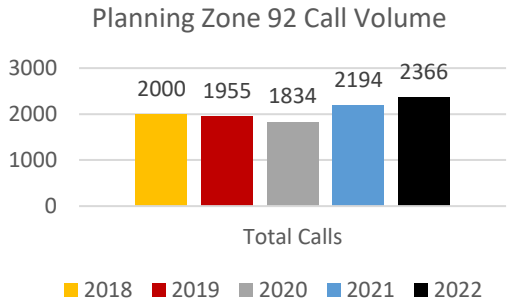


Figure 80: Planning Zone 92 Call Volume 2108 - 2022

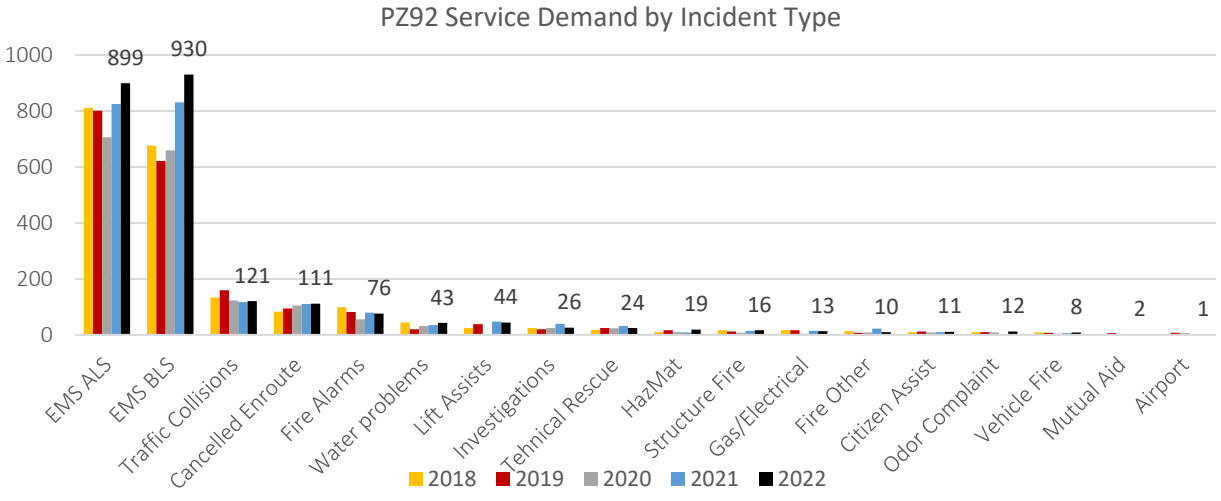


Figure 81: Planning Zone 92 Service Demand by Incident Type 2018-2022

The bulk of the properties in the western and southern end of PZ92 are single family and multifamily residential properties. The total population in PZ92 is estimated to be 13,747. PZ92 is estimated to have 5,745 housing units with an average household size of 2.48. The median household income is $86,349.

Critical facilities and infrastructure unique to PZ92 include manufacturing and hazardous occupancy facilities, underground pipelines, the tank farm, the airport, a large mobile home complex for seniors, Walteria water reservoir, Butcher Hill, Torrance Memorial Medical Center and major transportation routes including Crenshaw Blvd., Hawthorne Blvd., and Pacific Coast Highway.

Infrastructure challenges that may affect incident response and mitigation include limited water supply at the Torrance Airport.

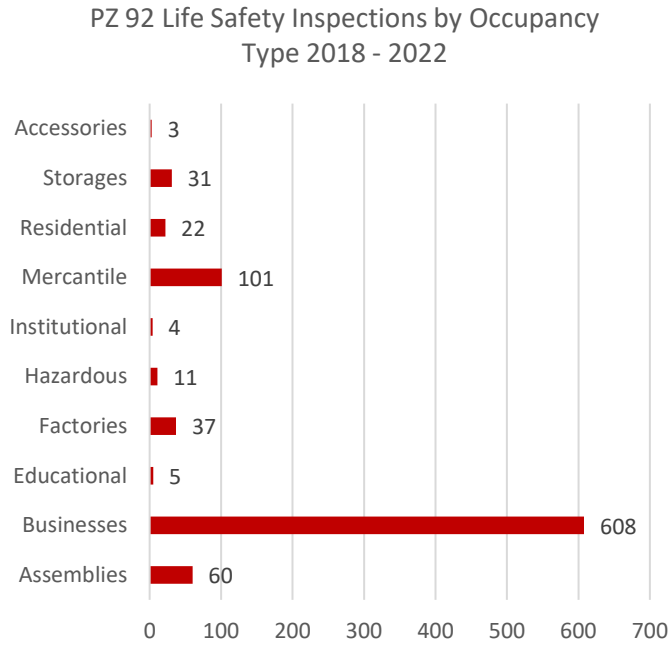
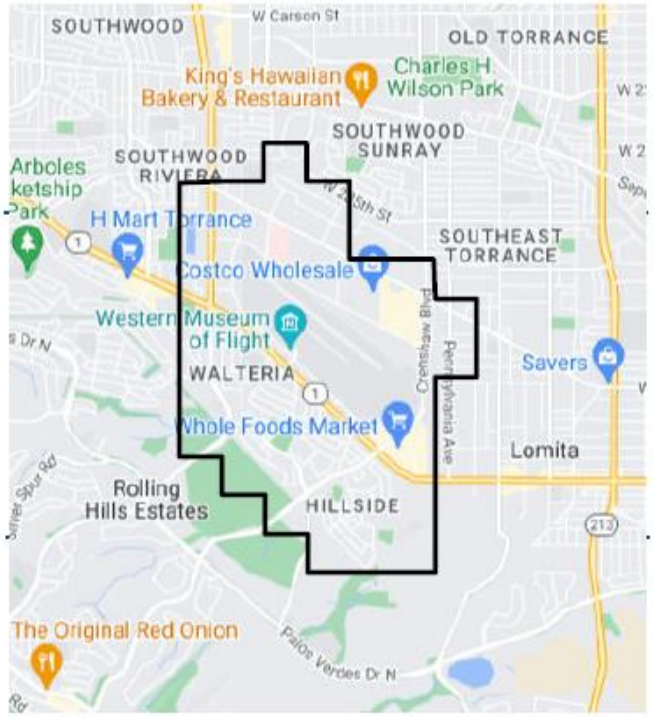


Figure 83: PZ92 Life Safety Inspections by Occupancy Type 2018-2022

Hour	2018	2019	2020	2021	2022
0	50	33	40	43	54
1	18	31	36	24	56
2	30	25	19	24	40
3	20	23	25	22	41
4	30	16	18	35	23
5	28	21	19	30	38
6	49	50	42	56	55
7	72	61	63	74	74
8	89	81	92	116	113
9	120	128	126	113	145
10	132	146	131	153	173
11	125	158	148	138	172
12	155	150	142	153	155
13	132	149	141	165	172
14	155	140	130	162	159
15	138	123	126	149	151
16	123	101	114	121	140
17	120	101	90	113	126
18	90	94	81	116	106
19	85	90	60	84	84
20	76	78	61	89	82
21	67	72	57	93	84
22	58	47	46	71	72
23	38	37	27	50	51

Figure 82: PZ92 Incidents by hour 2018-2022

Community Risk Assessment - Planning Zone 92



13,747
Total Population

4,053.9
Population Density

33,857
Total Daytime Population

2.48
Average Household Size

5,745
Housing Units

$86,349
Median Household Income

$869,985
Median Home Value

BUSINESS

2,184
Total Businesses

25,674
Total Employees

AT RISK POPULATION

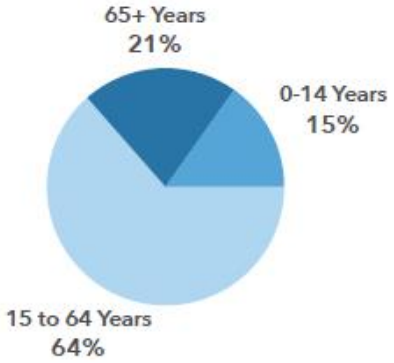
2,883
Population 65+

1,030
Households with a Disability

393
Households Below the Poverty Level

BUSINESS PROFILE

POPULATION BY AGE



Source: Total Population - U.S. Census 2020; Population Density - U.S. Census 2020; Total Daytime Population - Esri-Data Axle 2023; Average Household Size - U.S. Census 2020; Housing Units - U.S. Census 2020; Median Household Income - ACS 5-yr 2017-2021; Median Home Value - ACS 5-yr 2017-2021; Total Businesses - (NAICS11-99) Esri-Data Axle 2023; Total Employees - (NAICS11-99) Esri-Data Axle 2023; Population 65+ - Esri 2023 Updated Demographics; Households with Disability - ACS 5-yr 2017-2021; Households Below Poverty Level - ACS 5-yr 2017-2021; Population by Age - Esri 2023 Updated Demographics; Business Profile - (NAICS) Esri-Data Axle 2023

Figure 84: Planning Zone 92 Infographic

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Planning Zone 93

Planning Zone 93 (PZ93) is 4.77 square miles and is home to Fire Station 3, the 750 acre Torrance Refinery, and the San Diego freeway (405 Freeway). In addition, PZ93 is home to several single-family residential neighborhoods, a significant number of high-density apartments, commercial properties, and car dealerships.

The majority of PZ93 is residential property. The zone has large multifamily residential apartments on Redondo Beach Blvd., Artesia Blvd., Yukon Ave., 182nd St., and Van Ness Ave. In addition, PZ93 is home to a large senior living complex on 186th St., west of Hawthorne Blvd. and a large facility on 162nd St., east of Van Ness. The area includes several mobile home parks which present unique challenges under fire conditions. The total population in PZ93 is estimated to be 40,732. PZ93 is estimated to have 15,520 housing units with an average household size of 2.69. The median household income is $95,193.

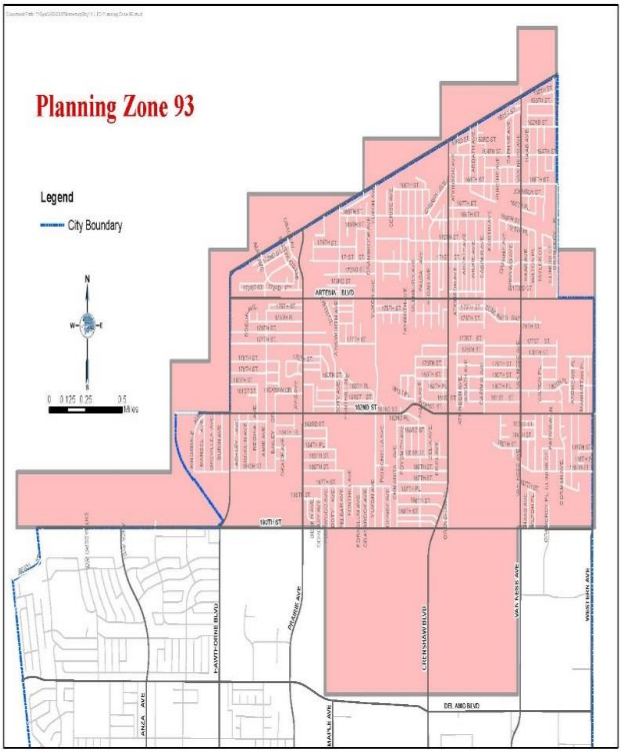


Figure 85: Planning Zone 93 Map

The area south of 190th is occupied by the Torrance refinery and tank farm. The area on the north side of 190th street between Crenshaw Blvd. and Van Ness Ave. is a business park area that includes Honeywell Aerospace and several other manufacturing and commercial occupancies.

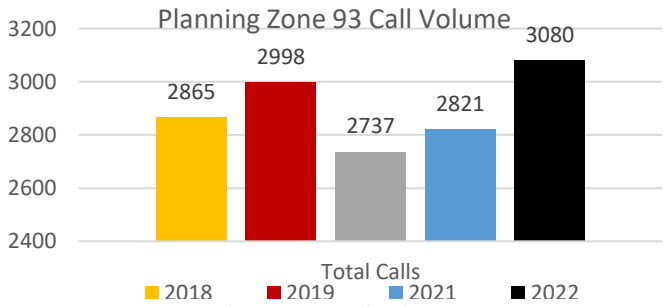


Figure 87: Planning 93 Call Volume 2018-2022

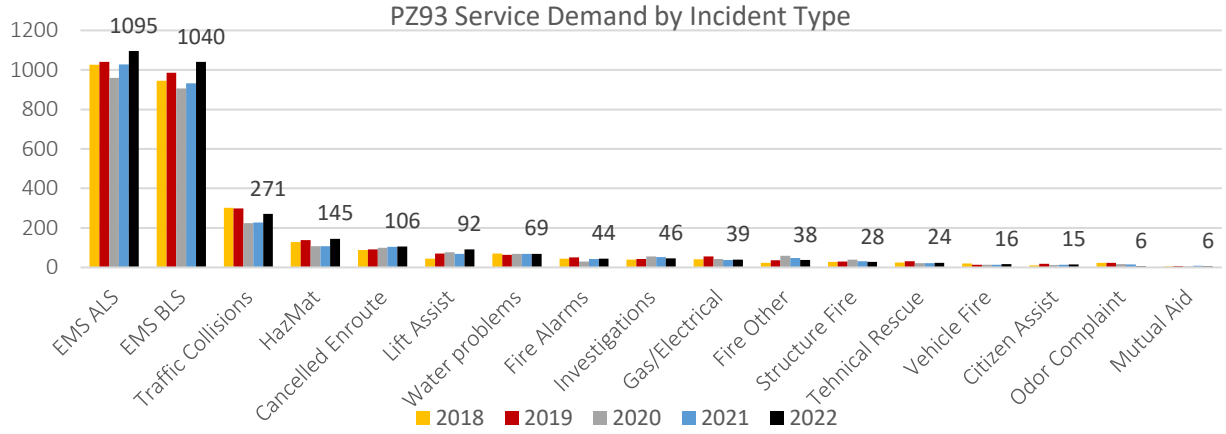


Figure 86: Planning Zone 93 Service Demand by Incident Type 2018-2022

PZ93 has unique transportation hazards that include the San Diego (405) Freeway and a portion of the BNSF railway. These transportation routes have hazardous cargo being transported through the city on a daily basis. In addition, PZ93 has several major streets including Western Ave, Crenshaw Blvd., Van Ness Ave, and Hawthorne Blvd.

Additional critical facilities and infrastructure unique to PZ93 include North High School, the Dominguez Channel and several bridges that carry traffic over the Dominguez Channel or carry the 405 fwy over surface streets.

Infrastructure challenges that may affect incident response and mitigation include access points for the 405 freeway and hydrant access for the 405 freeway.

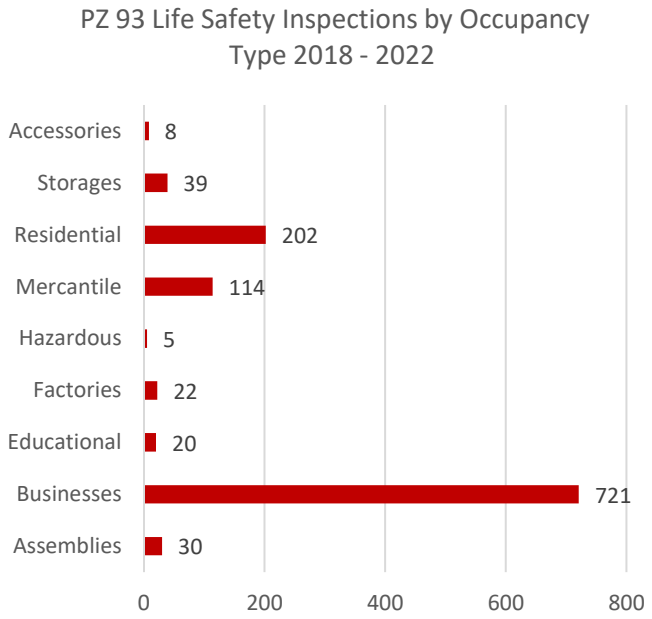
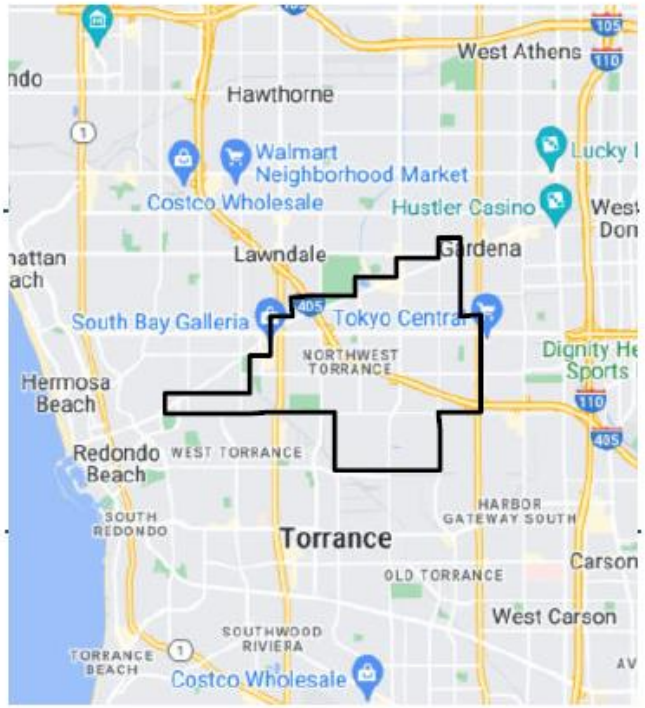


Figure 89: PZ 93 Life Safety Inspections by Occupany Type 2018-2022

Hour	2018	2019	2020	2021	2022
0	90	76	69	70	87
1	77	74	70	68	63
2	71	68	48	60	69
3	64	40	49	68	63
4	63	50	44	59	68
5	59	64	57	51	67
6	78	73	68	76	73
7	108	125	98	88	104
8	135	164	140	128	151
9	149	152	161	154	165
10	166	166	175	142	168
11	171	176	170	183	166
12	170	162	148	155	183
13	143	187	160	173	183
14	138	184	175	161	165
15	178	174	160	155	177
16	151	154	132	160	176
17	171	161	147	158	181
18	165	168	123	132	169
19	131	129	115	150	141
20	112	125	133	135	126
21	107	129	99	120	136
22	94	106	93	98	105
23	74	91	103	77	94

Figure 88: PZ93 Incidents by hour 2018-2022

Community Risk Assessment - Planning Zone 93



40,732
Total Population

7,153.4
Population Density

35,258
Total Daytime Population

2.69
Average Household Size

15,520
Housing Units

$95,193
Median Household Income

$713,685
Median Home Value

BUSINESS

1,561
Total Businesses

11,619
Total Employees

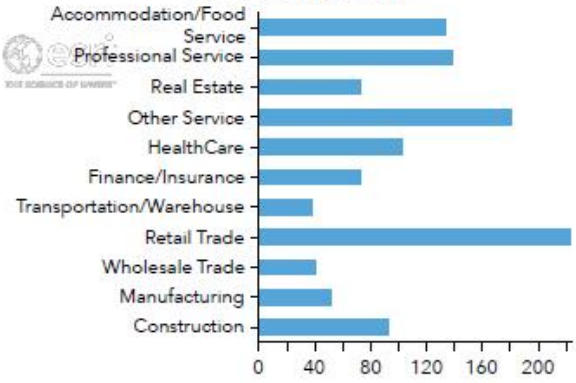
AT RISK POPULATION

7,416
Population 65+

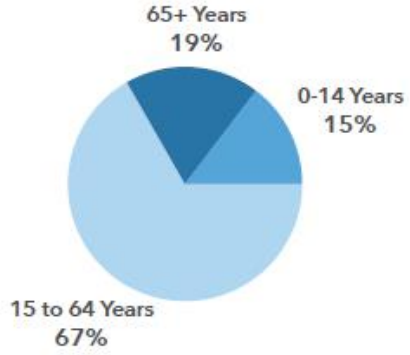
2,727
Households with a Disability

1,158
Households Below the Poverty Level

BUSINESS PROFILE



POPULATION BY AGE



Source: Total Population - U.S. Census 2020; Population Density - U.S. Census 2020; Total Daytime Population - Esri-Data Axle 2023; Average Household Size - U.S. Census 2020; Housing Units - U.S. Census 2020; Median Household Income - ACS 5-yr 2017-2021; Median Home Value - ACS 5-yr 2017-2021; Total Businesses - (NAICS11-99) Esri-Data Axle 2023; Total Employees - (NAICS11-99) Esri-Data Axle 2023; Population 65+ - Esri 2023 Updated Demographics; Households with Disability - ACS 5-yr 2017-2021; Households Below Poverty Level - ACS 5-yr 2017-2021; Population by Age - Esri 2023 Updated Demographics; Business Profile - (NAICS) Esri-Data Axle 2023

Figure 90: Planning Zone 93 Infographic. Source:Esri

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Planning Zone 94

Planning Zone 94 (PZ94) is 2.35 square miles and is home to Fire Station 4, Torrance Beach, and the hillside residential neighborhood known as Hollywood Riviera. In addition, PZ94 is home to the Seaside Ranchos home to the Seaside Ranchos neighborhood, retail centers, and several large multifamily residential occupancies.

The area of PZ94 along Palos Verdes Blvd. and moving west towards the beach is largely comprised of apartment and condominium complexes.

This includes the Cote De Azure complex which is home to a senior living community. The zone also includes several large apartment complexes along Pacific Coast Highway and Anza Ave. The total population in PZ94 is estimated to be 23,106. PZ94 is estimated to have 10,064 housing units with an average household size of 2.41. The median household income is $117,267.

Figure 92: Planning Zone 94 Map

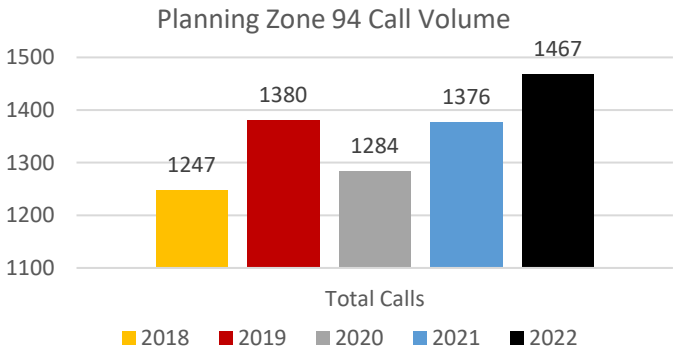


Figure 91: Planning Zone 94 Call Volume 2018-2022

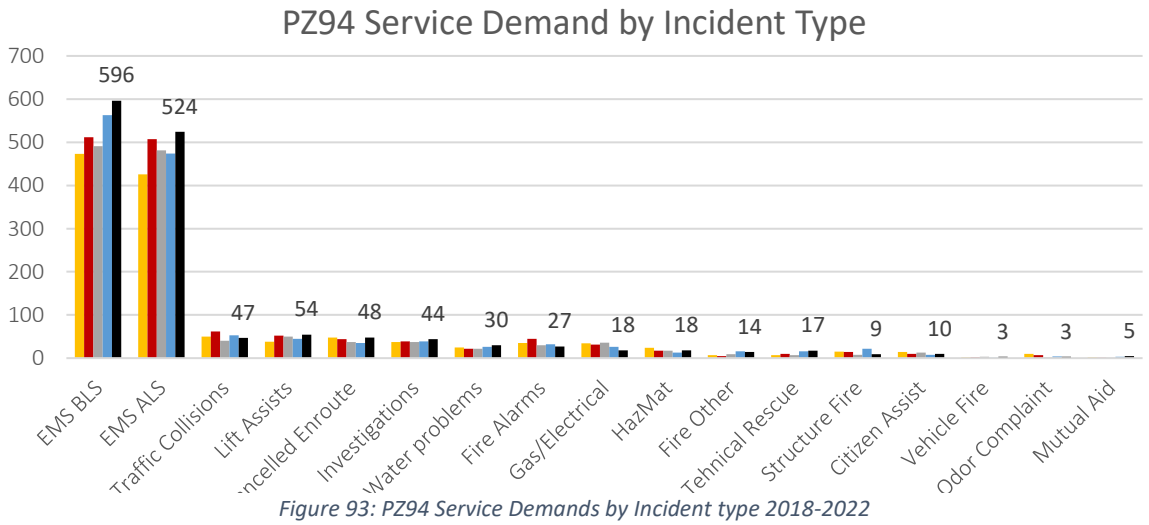


Figure 93: PZ94 Service Demands by Incident type 2018-2022

A majority of the businesses in PZ94 are located on Pacific Coast Highway, Anza Ave., and Palos Verdes Blvd.

Significant hazards unique in PZ94 include large apartment and housing complexes, such as the Willow Tree Complex, the hillside area that is prone to landslides, the presence of ascending and descending hillside homes, and the transportation corridor on Pacific Coast highway.

Additional critical facilities and infrastructure unique to PZ94 include South High School and a pedestrian bridge crossing Pacific Coast Highway.

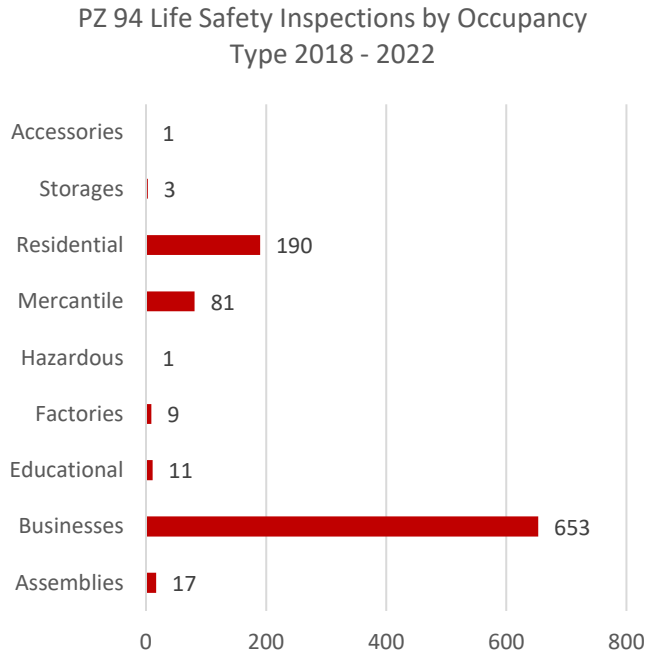
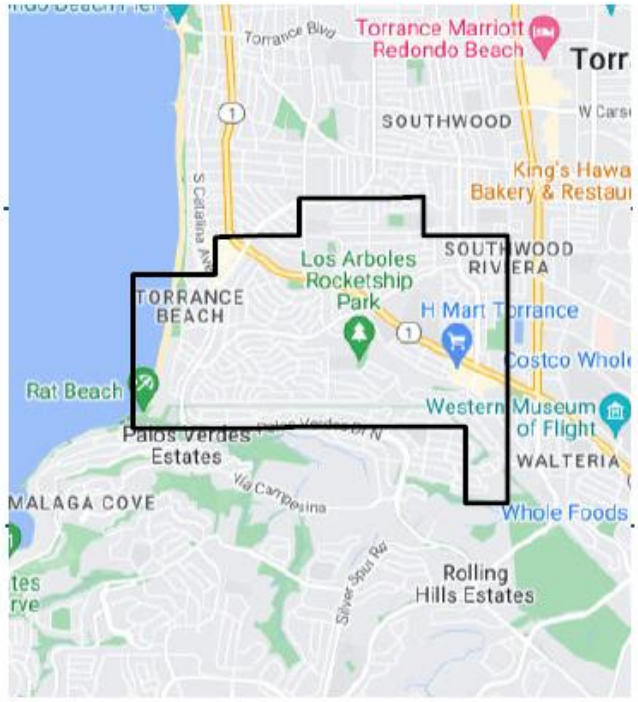


Figure 95: PZ94 Life Safety Inspections by Occupancy Type 2018-2022

Hour	2018	2019	2020	2021	2022
0	26	40	26	35	35
1	26	38	30	43	30
2	22	30	23	30	16
3	22	28	19	25	19
4	30	24	15	19	31
5	24	25	19	30	29
6	31	43	29	32	28
7	48	42	54	45	51
8	60	50	63	66	72
9	64	82	71	60	73
10	66	83	77	72	88
11	87	83	92	88	97
12	82	90	82	70	84
13	65	76	73	65	102
14	70	66	75	77	97
15	70	83	70	76	93
16	58	80	68	85	67
17	46	69	78	65	98
18	68	64	63	85	74
19	71	67	67	72	71
20	58	71	62	69	54
21	64	50	57	68	68
22	49	55	35	57	45
23	40	41	36	42	45

Figure 94: PZ94 Incidents by hour 2018-2022

Community Risk Assessment - Planning Zone 94



23,106 Total Population

7,524.3 Population Density

16,952 Total Daytime Population

2.41 Average Household Size

10,064 Housing Units

$117,267 Median Household Income

$1,238,873 Median Home Value

BUSINESS

776 Total Businesses

4,528 Total Employees

AT RISK POPULATION

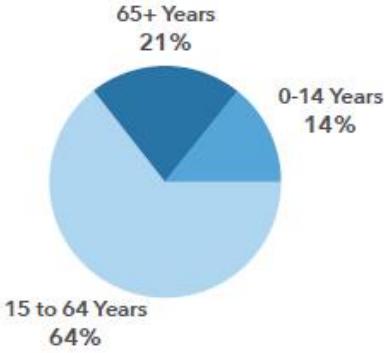
4,874 Population 65+

1,430 Households with a Disability

619 Households Below the Poverty Level

BUSINESS PROFILE

POPULATION BY AGE



Source: Total Population - U.S. Census 2020; Population Density - U.S. Census 2020; Total Daytime Population - Esri-Data Axle 2023; Average Household Size - U.S. Census 2020; Housing Units - U.S. Census 2020; Median Household Income - ACS 5-yr 2017-2021; Median Home Value - ACS 5-yr 2017-2021; Total Businesses - (NAICS11-99) Esri-Data Axle 2023; Total Employees - (NAICS11-99) Esri-Data Axle 2023; Population 65+ - Esri 2023 Updated Demographics; Households with Disability - ACS 5-yr 2017-2021; Households Below Poverty Level - ACS 5-yr 2017-2021; Population by Age - Esri 2023 Updated Demographics; Business Profile - (NAICS) Esri-Data Axle 2023

Figure 96: Planning Zone 94 Infographic. Source: Esri

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Planning Zone 95

Planning Zone 95 (PZ95) is 2.96 square miles and is home to Fire Station 5, City of Torrance Maintenance Facility, Little Company of Mary Hospital, the Torrance City Hall and Civic Center complex and several car dealerships along Hawthorne Blvd. In addition, PZ95 is home to several skilled nursing facilities, multiple senior residential living facilities, and a large retail center known as the Torrance Promenade.

PZ95 has the highest overall service demand as well as the highest EMS service demand when compared to other TFD planning zones.

PZ95 is mostly residential west of Hawthorne Blvd., north of Del Amo Blvd. and west of Earl Street below Del Amo Blvd. There are several large apartment complexes on Anza Ave. between Torrance Blvd. and Del Amo Blvd.

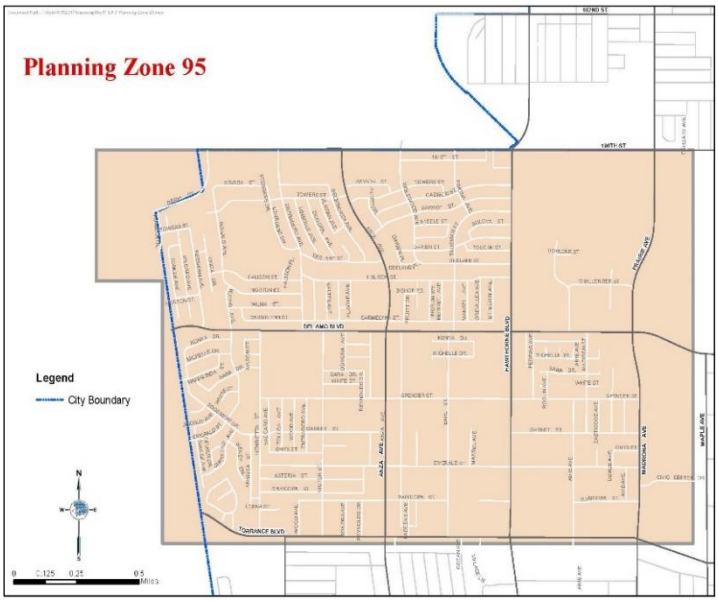


Figure 97: Planning Zone 95 Map

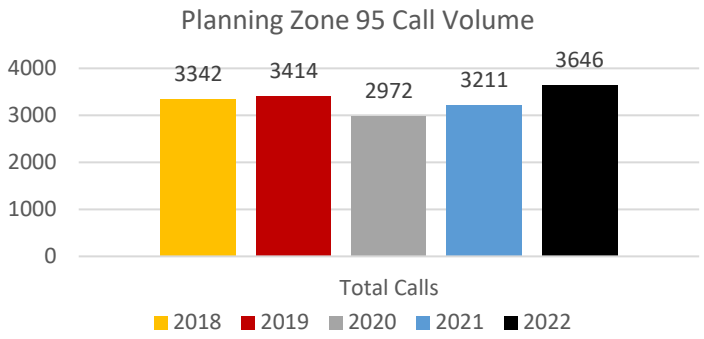


Figure 99: Planning 95 Call Volume 2018-2022

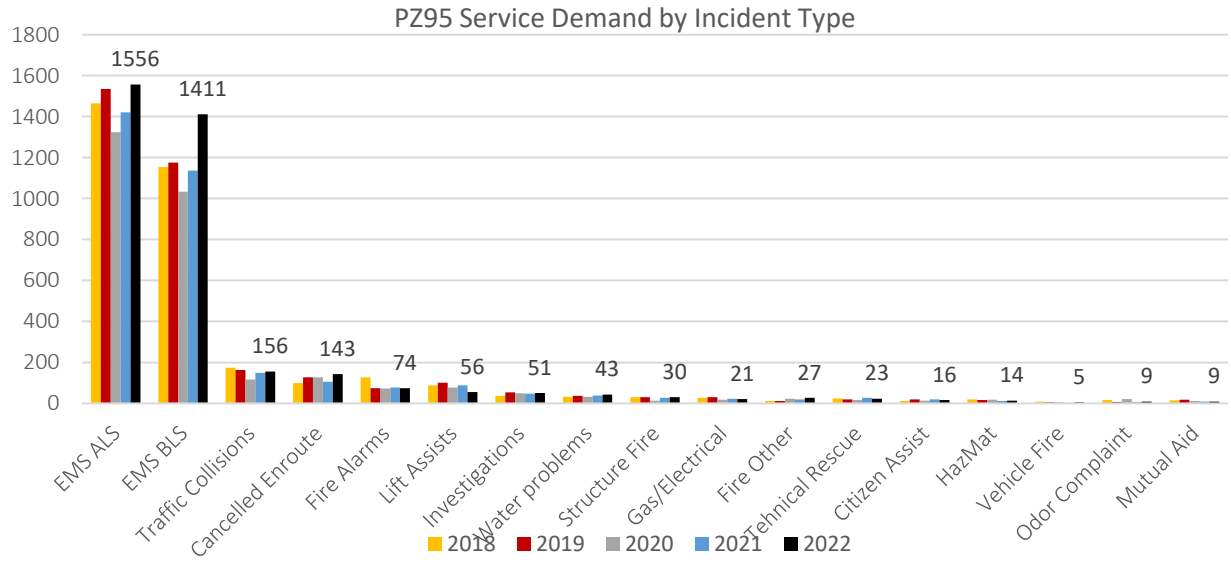


Figure 98: Planning Zone 95 Service Demand by Incident Type 2018-2022

In addition, several large apartment complexes are located on Spencer St., Emerald St., Amie Ave., and Maricopa Ave. This includes Goldenwest Towers which is a sprinklered high rise apartment building that houses seniors that are mostly non-English speaking.

The total population in PZ95 is estimated to be 31,678. PZ95 is estimated to have 12,287 housing units with an average household size of 2.51. The median household income is $90,609.

Critical facilities and infrastructure unique to PZ95 include West High School, Bishop Montgomery High School, large apartment and housing complexes, the industrial business in the northeast quadrant, Little Company of Mary Hospital, and a significant number of skilled nursing facilities.

Infrastructure challenges that may affect incident response and mitigation include secured doors/gates to large apartment complexes.

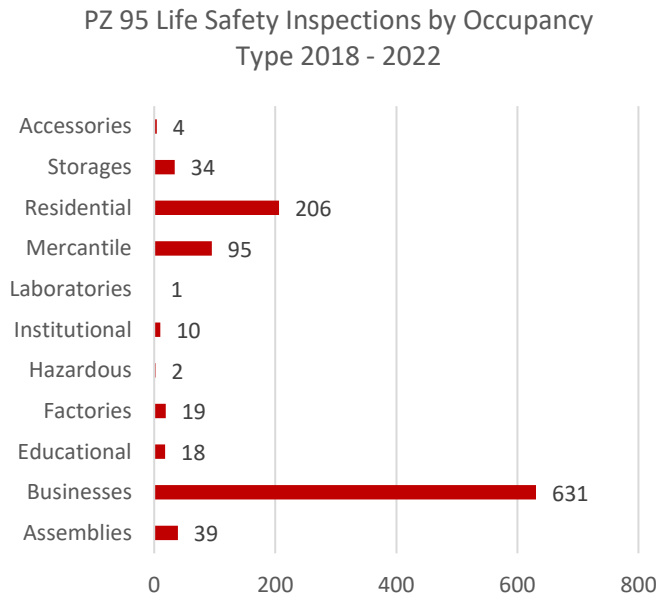
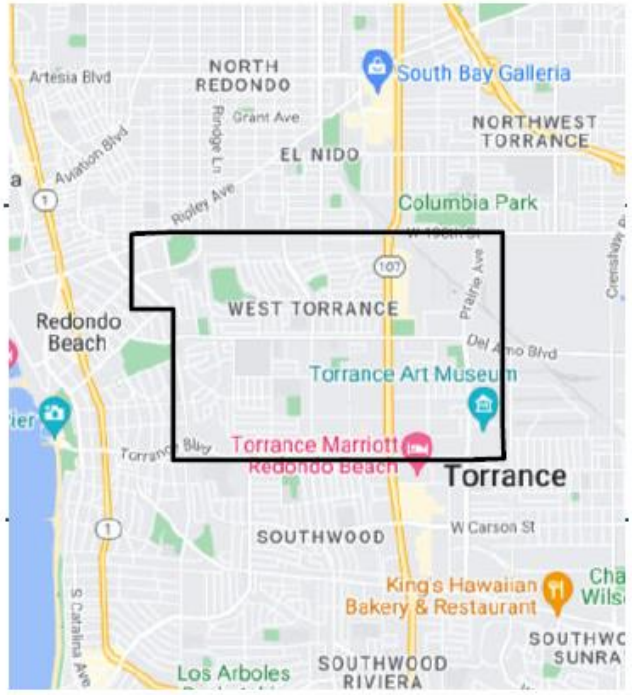


Figure 101: PZ95 Life Safety Inspections by Occupancy Type 2018-2022

Hour	2018	2019	2020	2021	2022
0	89	97	74	85	98
1	75	70	71	84	90
2	72	76	59	71	83
3	74	61	52	55	76
4	59	51	51	56	56
5	96	89	70	70	76
6	101	99	74	89	91
7	132	122	102	118	109
8	170	164	157	159	168
9	205	210	171	177	198
10	217	220	163	165	216
11	191	208	185	189	226
12	212	209	178	181	207
13	185	179	177	189	224
14	198	193	158	176	211
15	170	190	191	185	230
16	180	190	155	174	185
17	167	177	168	170	210
18	152	168	144	173	175
19	135	136	154	139	191
20	126	151	108	147	144
21	123	123	114	125	141
22	110	121	98	140	130
23	103	110	98	94	111

Figure 100: PZ95 Incidents by hour 2018-2022

Community Risk Assessment - Planning Zone 95



31,678 Total Population

9,902.9 Population Density

34,991 Total Daytime Population

2.51 Average Household Size

12,287 Housing Units

$90,609 Median Household Income

$936,536 Median Home Value

BUSINESS

1,545 Total Businesses

16,459 Total Employees

AT RISK POPULATION

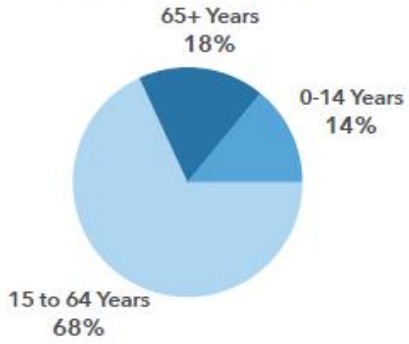
5,583 Population 65+

1,943 Households with a Disability

1,065 Households Below the Poverty Level

BUSINESS PROFILE

POPULATION BY AGE



Source: Total Population - U.S. Census 2020; Population Density - U.S. Census 2020; Total Daytime Population - Esri-Data Axle 2023; Average Household Size - U.S. Census 2020; Housing Units - U.S. Census 2020; Median Household Income - ACS 5-yr 2017-2021; Median Home Value - ACS 5-yr 2017-2021; Total Businesses - (NAICS11-99) Esri-Data Axle 2023; Total Employees - (NAICS11-99) Esri-Data Axle 2023; Population 65+ - Esri 2023 Updated Demographics; Households with Disability - ACS 5-yr 2017-2021; Households Below Poverty Level - ACS 5-yr 2017-2021; Population by Age - Esri 2023 Updated Demographics; Business Profile - (NAICS) Esri-Data Axle 2023

Figure 102: Planning Zone 95 Infographic. Source: Esri

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Planning Zone 96

Planning Zone 96 (PZ96) is 1.92 square miles and is home to Fire Station 6, Del Amo Fashion Center, Marriott Hotel, Doubletree Hotel, and Del Amo Crossings. In addition, PZ96 is home to many retail occupancies along Hawthorne, Torrance, and Sepulveda boulevards.

The western area of PZ96 is largely comprised of single-family homes in the Southwood Neighborhood. There are also several large apartment and condominium complexes on Ocean Ave., Kent Ave., and 226th St. The total population in PZ96 is estimated to be 17,421. PZ96 is estimated to have 6,927 housing units with an average household size of 2.58. The median household income is $110,429.

A majority of the businesses in PZ96 are located on Hawthorne Blvd., Carson St., and Sepulveda Blvd.

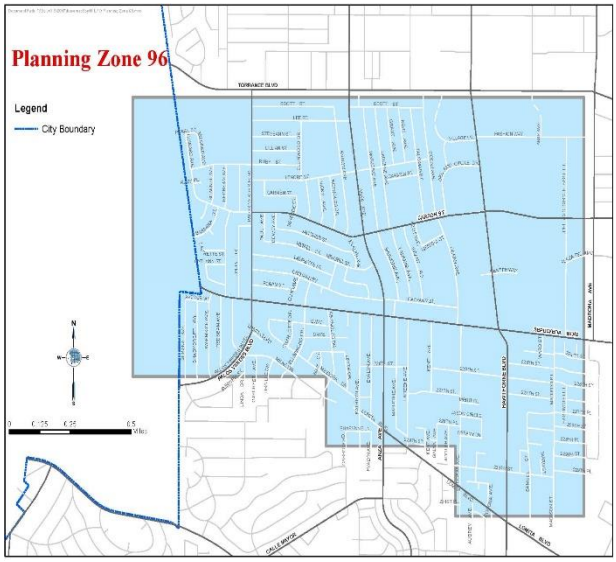


Figure 103: Planning Zone 96 Map

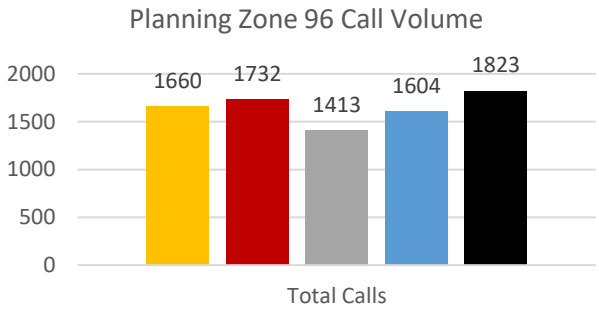


Figure 105: Planning Zone 96 Call Volume 2018-2022

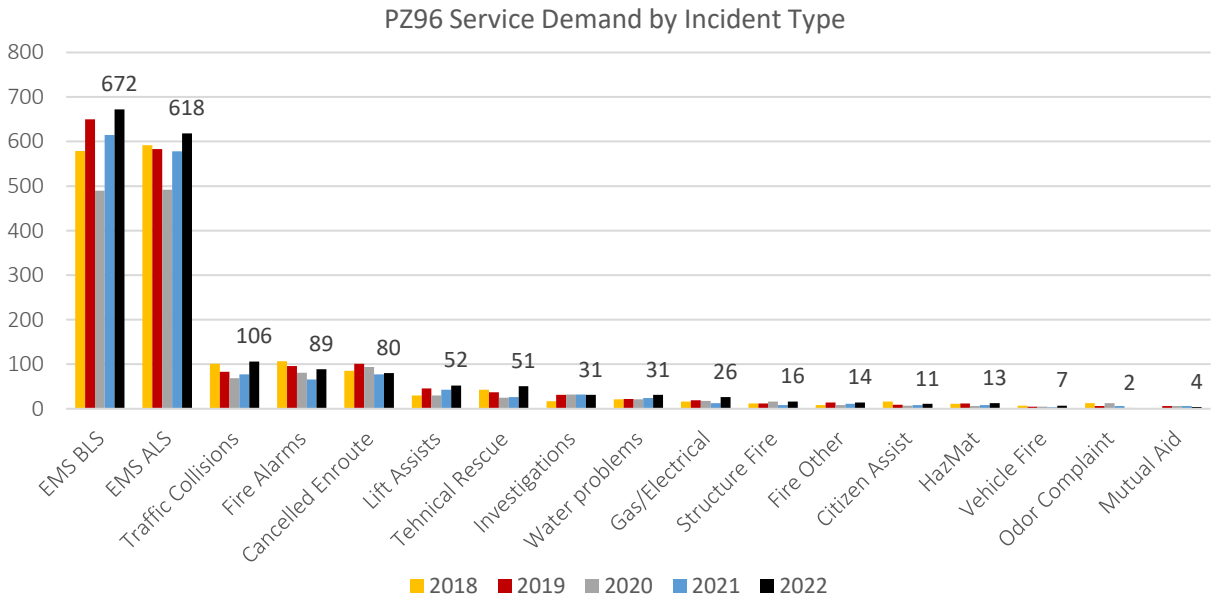


Figure 104: Planning Zone 96 Service Demand by Incident Type 2018-2022

Critical facilities and infrastructure unique to PZ96 include large apartment complexes, high rise buildings, and the Del Amo Fashion Center which attracts shoppers and people looking for entertainment in large numbers. Multiple major projects are planned for planning zone 96 over the next few years that will increase the number of residential and retail units.

Infrastructure challenges that may affect incident response and mitigation include identifying appropriate access points for the Del Amo Fashion Center.

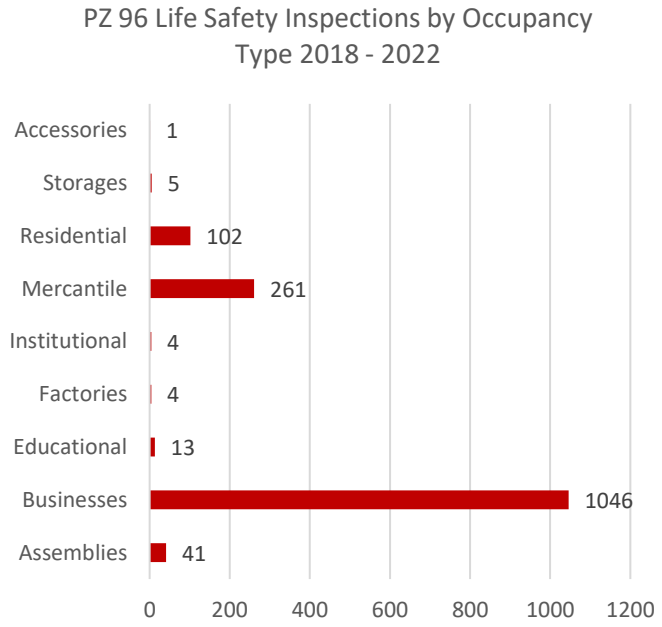
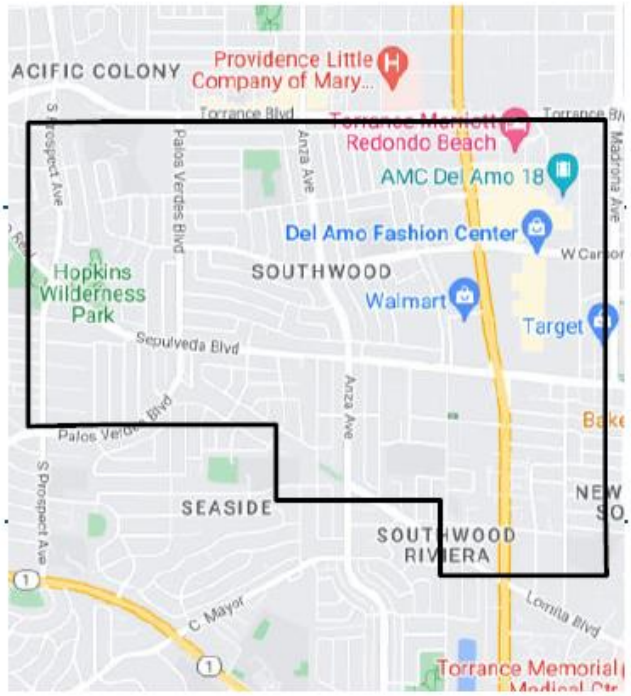


Figure 107: PZ 96 Life Safety Inspections by Occupancy Type 2018-2022

Hour	2018	2019	2020	2021	2022
0	43	35	25	37	52
1	30	38	26	29	32
2	28	23	25	30	25
3	30	24	17	20	29
4	25	25	24	31	33
5	29	22	32	37	26
6	41	41	30	35	34
7	48	57	43	50	55
8	67	65	53	52	75
9	71	89	87	74	88
10	98	96	73	78	132
11	91	110	98	87	124
12	100	107	86	93	116
13	120	131	80	101	116
14	123	120	81	99	106
15	113	118	83	103	104
16	87	86	83	95	80
17	106	99	85	91	102
18	89	109	70	102	112
19	89	76	91	88	93
20	78	79	78	97	99
21	68	63	63	74	64
22	46	72	41	48	62
23	40	47	39	53	64

Figure 106: PZ96 Incidents by hour 2018-2022

Community Risk Assessment - Planning Zone 96



17,421
Total Population

8,008.9
Population Density

24,799
Total Daytime Population

2.58
Average Household Size

6,927
Housing Units

$110,429
Median Household Income

$888,588
Median Home Value

BUSINESS

1,668
Total Businesses

15,166
Total Employees

AT RISK POPULATION

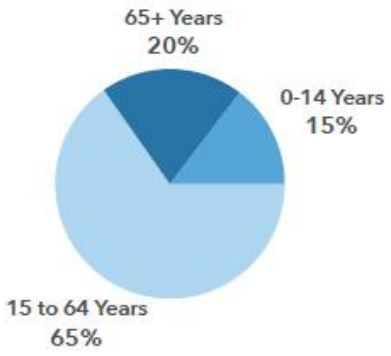
3,455
Population 65+

1,245
Households with a Disability

410
Households Below the Poverty Level

BUSINESS PROFILE

POPULATION BY AGE



Source: Total Population - U.S. Census 2020; Population Density - U.S. Census 2020; Total Daytime Population - Esri-Data Axle 2023; Average Household Size - U.S. Census 2020; Housing Units - U.S. Census 2020; Median Household Income - ACS 5-yr 2017-2021; Median Home Value - ACS 5-yr 2017-2021; Total Businesses - (NAICS11-99) Esri-Data Axle 2023; Total Employees - (NAICS11-99) Esri-Data Axle 2023; Population 65+ - Esri 2023 Updated Demographics; Households with Disability - ACS 5-yr 2017-2021; Households Below Poverty Level - ACS 5-yr 2017-2021; Population by Age - Esri 2023 Updated Demographics; Business Profile - (NAICS) Esri-Data Axle 2023

Figure 108: Planning Zone 96 Infographic. Source: Esri

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Planning Zone 97

Planning Zone 97 (PZ97) is 3.03 square miles and is home to several large residential neighborhoods, Wilson Park, and the Madrona Marsh. The bulk of the properties in PZ97 are residential.

The total population in PZ97 is estimated to be 30,781, making it the most populated planning zone. PZ97 is estimated to have 12,122 housing units with an average household size of 2.60. The median household income is $102,731.

The area along Crenshaw Blvd. and Sepulveda Blvd. makes up a large portion of the business occupancies, most of which are retailers or commercial offices. The exception are some of the businesses on Western Ave. and the commercial and manufacturing businesses west of Crenshaw Blvd. at 237th St.

There are several high-density gated communities between Crenshaw Blvd. and Madrona Ave. on Plaza del Amo. In addition, Nadine Circle houses a large senior community, known as New Horizons. There are several very large apartment complexes scattered throughout the zone.

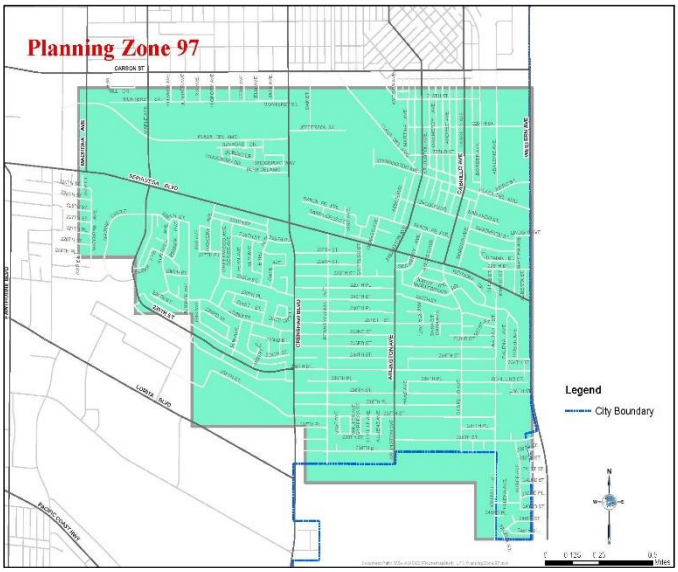


Figure 109: Planning Zone 97 Map

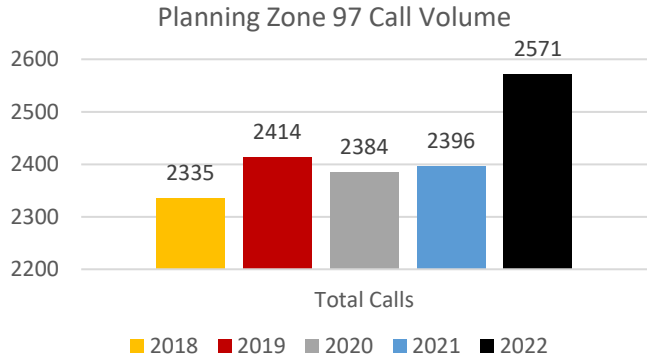


Figure 110: Planning Zone 97 Call Volume

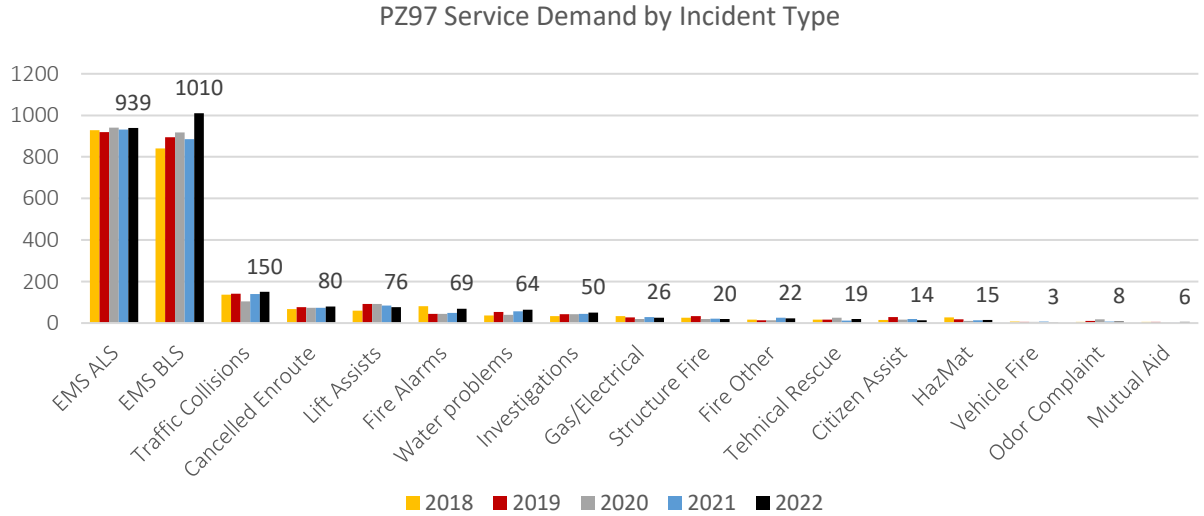


Figure 111: Planning Zone 97 Service Demand by Incident Type 2018-2022

Critical facilities and infrastructure unique to PZ97 include the main offices for the Torrance Unified School District (TUSD), some skilled nursing facilities, pipelines that run underneath Crenshaw Blvd. and out of the tank farm at Crenshaw Blvd. and Lomita Blvd.

Infrastructure challenges that may affect incident response and mitigation include gated access at large apartment complexes or townhouse communities.

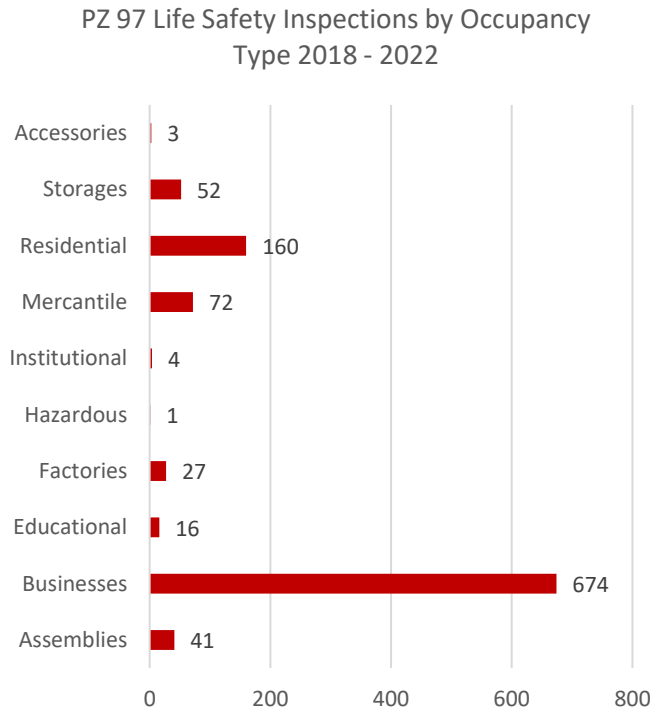
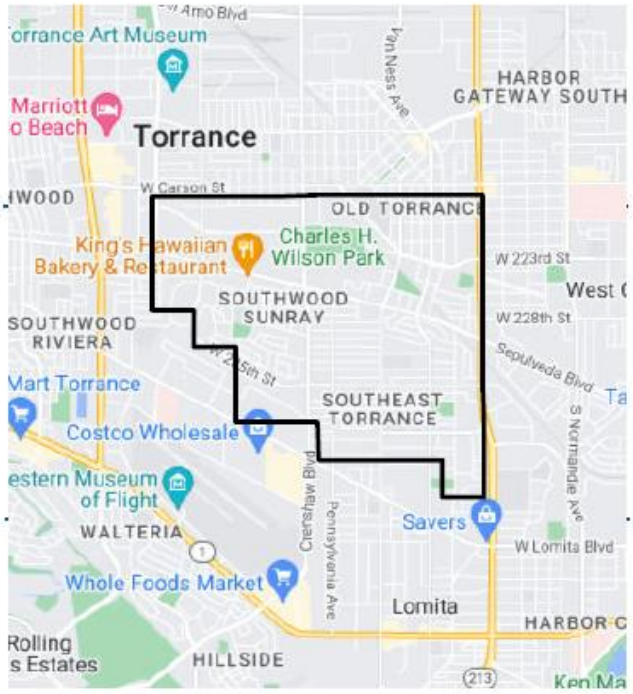


Figure 113: Planning Zone 97 Life Safety Inspections by Occupancy Type 2018-2022

Hour	2018	2019	2020	2021	2022
0	54	57	69	59	67
1	36	51	49	52	64
2	37	48	38	38	56
3	37	36	29	44	41
4	45	41	34	26	39
5	48	52	52	71	47
6	57	60	70	65	74
7	91	87	86	89	84
8	114	139	132	88	141
9	160	141	141	139	140
10	151	144	132	145	143
11	141	134	153	168	169
12	146	130	165	148	159
13	151	138	130	157	147
14	132	146	133	159	154
15	124	162	136	135	146
16	132	143	124	157	134
17	124	140	129	137	170
18	109	120	113	120	129
19	99	105	134	110	97
20	108	105	104	75	90
21	90	95	80	83	118
22	86	72	71	83	95
23	63	68	80	48	67

Figure 112: PZ97 Incidents by hour 2018-2022

Community Risk Assessment - Planning Zone 97



30,781
Total Population

10,023.6
Population Density

28,320
Total Daytime Population

2.60
Average Household Size

12,122
Housing Units

$102,731
Median Household Income

$762,649
Median Home Value

BUSINESS

1,342
Total Businesses

11,125
Total Employees

AT RISK POPULATION

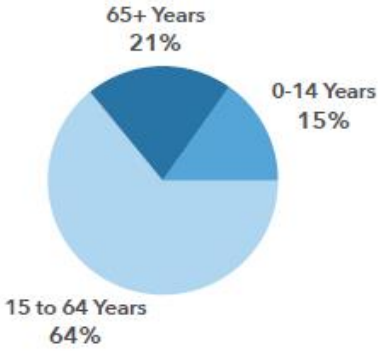
6,340
Population 65+

2,251
Households with a Disability

908
Households Below the Poverty Level

BUSINESS PROFILE

POPULATION BY AGE



Source: Total Population - U.S. Census 2020; Population Density - U.S. Census 2020; Total Daytime Population - Esri-Data Axle 2023; Average Household Size - U.S. Census 2020; Housing Units - U.S. Census 2020; Median Household Income - ACS 5-yr 2017-2021; Median Home Value - ACS 5-yr 2017-2021; Total Businesses - (NAICS11-99) Esri-Data Axle 2023; Total Employees - (NAICS11-99) Esri-Data Axle 2023; Population 65+ - Esri 2023 Updated Demographics; Households with Disability - ACS 5-yr 2017-2021; Households Below Poverty Level - ACS 5-yr 2017-2021; Population by Age - Esri 2023 Updated Demographics; Business Profile - (NAICS) Esri-Data Axle 2023

Figure 114: Planning Zone 97 Infographic. Source: Esri

Risk Classification by Hazard Type and Risk Event

The TFD recognizes the following six risk classifications identified through assessment of hazard and incident threat types present in the community:

- Emergency Medical Risks
- Fire Emergency Risks
- Technical Rescue Emergency Risks
- Hazardous Materials Emergency Risks
- Aircraft Emergency Risks
- Other Hazard Types

These risk classifications group the different types of risk events (emergency incidents) that pose a threat to the community (i.e., have a probability of happening with negative consequences).

The TFD focuses on mitigating the risks in each of the classifications through its corresponding programs: Emergency Medical Services, Fire Suppression, Technical Rescue, Hazardous Materials Mitigation, Aircraft Rescue, Public Education, Domestic Preparedness, and Community Risk Reduction service programs.

Emergency Medical Risks

Requests for Emergency Medical Services (EMS) are the most frequent type of service provided by the Torrance Fire Department. In 2022, EMS incidents account for 77% of emergency activities and correspondingly have the greatest impact on the concentration and distribution of TFD resources within the community. The residential and daytime population are a significant factor in assessing the probability of EMS incidents. Additionally, as the population of Torrance increases and ages, the demand for EMS will increase proportionately. In many cases the increased population is an elderly demographic due to the access to healthcare and property developers building high density housing for the senior community. The following charts indicate the community EMS demand for services listed and grouped first by trauma mechanism of industry and then by medical chief complaint. All the data reported in the charts are the result of patient care reports being completed and turned into the Los Angeles County Emergency Medical Services Agency. This data accounts for 53,552 patient care reports including 42,176 medical complaints and 11,376 trauma complaints. Medical requests that require a patient care report account for 79% of all EMS complaints. Trauma calls account for 21% of all EMS complaints.

The following table shows a breakdown of the types of EMS incidents by mechanism of trauma from 2018-2022.

Types of EMS Trauma Mechanism from 2018-2022	
FA Fall	6378
EV Enclosed Vehicle	2178
AS Assault	696
SA Self-Inflicted Accidental	433
CR Crush	378
PB Ped/Bike Less Than 20 MPH	363
SP Sports/Recreation	206
RT Ped/Bike Thrown/Runover/Impact Greater Than 20 MPH	141
MM Motorcycle/Moped	122
SI Self Inflicted Intentional	108
20 Impact More Than 20 MPH (Unenclosed Vehicle)	79
AN Animal Bite	73
WR Work Related	58
UN Unknown	48
GS GSW	41
ST Stabbing	35
TB Thermal Burn	27
ES Electrical Shock	12
Total	**11,376**

Figure 115: EMS Trauma Contacts by Mechanism 2018-2022

Significant Findings

- 56% of all patients with a trauma complaint from 2018-2022 were the result of a fall. Prior to September, 2021, falls or citizen assists that are coded "assist invalid" in the NFIRS report did not have a patient care report completed. In 2021, the Los Angeles County EMS Agency required patient care reports for all lift assist patients.
- 19% of all patients with a trauma mechanism of injury from 2018-2022 were the result of traffic accidents.

The following table shows a breakdown of the types of EMS incidents by type of medical complaint from 2018-2022.

Types of EMS Medical Complaints from 2018-2022	
WE Weakness	5276
EH Behavioral	4236
AL Altered LOC	3106
AP Abd/Pelvic Pain	3053
SB Shortness of Breath	2622
NC No Medical Complaint	2604
OP Other Pain	2312
NV Nausea/Vomiting	2107
SY Syncope	2014
CP Chest Pain	1867
DI Dizzy	1716
SE Seizure	1445
CC Cough/Congestion	1137
OT Other	1126
NB Neck/Back Pain	827
OD Overdose	708
DO DOA	709
FE Fever	687
LN Local Neuro Signs	649
HP Head Pain	615
CA Cardiac Arrest	556
DY Dysrhythmia	451
OS Bleeding Other Site	303
PS Palpitations	301
GI GI Bleed	299
HY Hypoglycemia	280
AR Allergic Reaction	244
CH Choking/Airway Obstruction	231

Types of EMS Medical Complaints from 2018-2022 (Cont'd)	
DC Medical Device Complaint	211
NO Nosebleed	153
VA Vaginal Bleed	77
AD Agitated Delirium	43
PO Poisoning	39
LA Labor	36
RA Respiratory Arrest	32
RU Brief Resolved Unexplained Event	29
OB Obstetrics	23
IM Inpatient Medical	16
NW Newborn	14
FB Foreign Body	12
AE Apneic Episode	5
ND Near Drowning	5
Total	**42,176**

Figure 116: EMS Trauma Contacts by Medical Complaint 2018-2022

Significant Findings

- The largest percentage of all patients with a medical complaint, from 2018-2022, were the result weakness (13%).
- The second highest percentage of all patients, with a medical complaint, were the result of a behavioral emergency (10%). This is consistent with increasing Countywide trends.
- 8% of all patients, from 2018-2022, were found to have "no medical complaint". Recent changes to LA County EMS agency policy requires that patients only needing a lift assist or patients with no medical issues receive a patient care report.

ALS Transport Heat Map

To further understand the areas of greatest impact of ALS service demand, the TFD utilized EPCR data, from April 2018 (the implementation of EPCR for TFD) through April 2023, to create a heat map to visualize the location of EMS incidents that resulted in patient transport and included Advanced Life Support interventions by TFD paramedics.

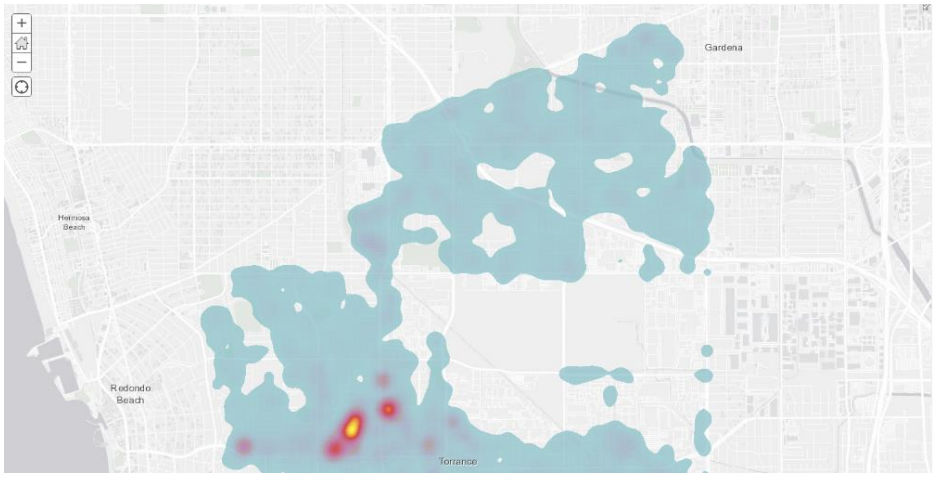


Figure 117: TFD ALS Transports Heat Map - Northern portion of the City (EPCR Data Apr 2018- Apr 2023)

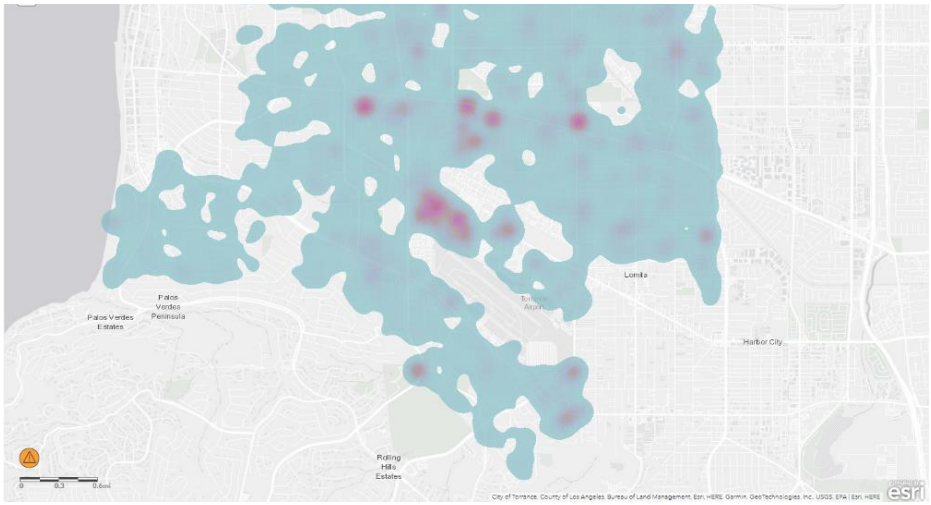


Figure 118: TFD ALS Transports Heat Map – Southern portion of the City (EPCR Data Apr 2018- Apr 2023)

Significant Findings

- Planning Zone 95 shows the highest concentration of ALS transports.
- The areas with a higher concentration of ALS transports correspond to known facilities or address that include; skilled nursing facilities, assisted living facilities, urgent care centers, doctor offices or senior living communities.

EMS Outcomes

Cardiac Arrest

The following charts depict the TFD's efforts to increase the capabilities within the community and the Department when responding to non-traumatic cardiac arrests. (*Data does not include patients that were found to be dead on arrival, DOA).

Bystander CPR is a critical component of increasing survival from out-of-hospital cardiac arrest. One recent study from the American Heart Association (AHA) found that an individual experiencing out-of-hospital cardiac arrest is almost twice as likely to survive when witnesses perform CPR while emergency personnel are en route. AHA data shows that approximately 35%-40% of individuals receive bystander CPR. The Torrance Fire Department conducts hands-only CPR training, as one of community outreach programs, in order to better equip the community. Over the previous 5 years, the TFD has recorded bystander CPR rates between 44% to 54%.

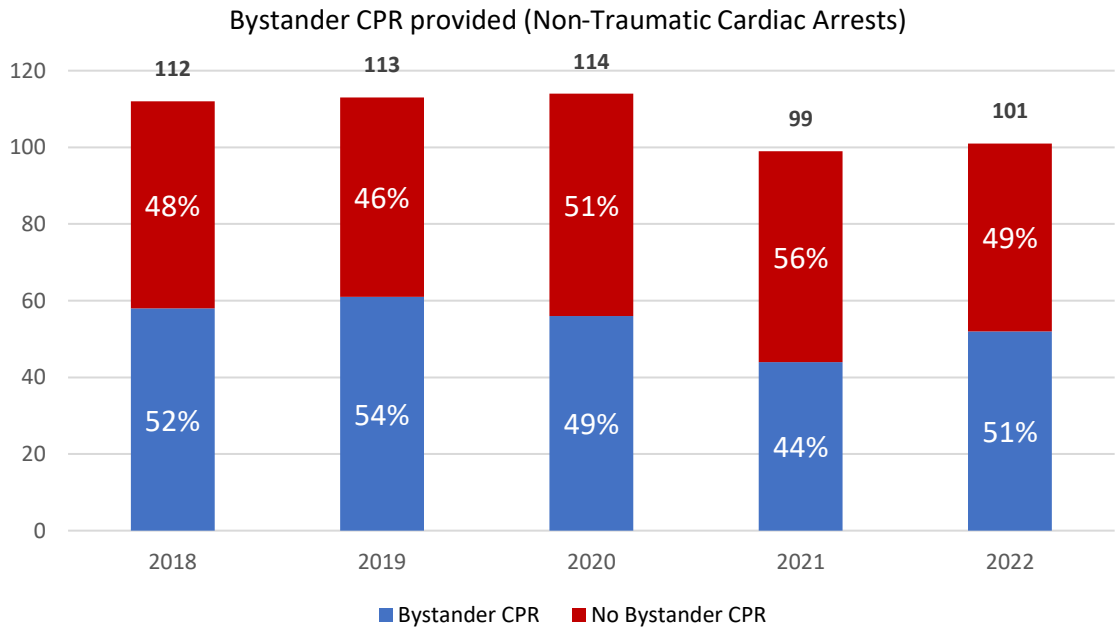


Figure 119: Percentage of Bystander CPR provided in Non-Traumatic Cardiac Arrests (Not witnessed by EMS personnel) 2018-2022

The TFD also conducts internal training and education in order to improve treatments during cardiac arrests. In 2021, the Department implemented the continuous CPR model, reinforced the pit crew CPR model (Feb 2021), focused on chest compression fraction follow-up, and deployed AutoPulse devices (Oct 2021) to assist with quality chest compressions throughout a cardiac arrest incident. From 2020 to 2022, the Department observed a decrease in the percentage of patients that obtained a return of spontaneous circulation (ROSC), however, the increase in the percentage of cardiac arrest patients ultimately discharged from the hospital was promising. (Hospital discharge data, for patients that experienced non-traumatic cardiac arrest, was not available until 2020). The tracking of hospital discharge data is an important component to the overall outcome of a patient after non-traumatic cardiac arrest and may be more indicative of the quality of care provided by the TFD. The cardiac arrest patient outcome data justifies continued public outreach and Department training related to CPR and cardiac arrest.

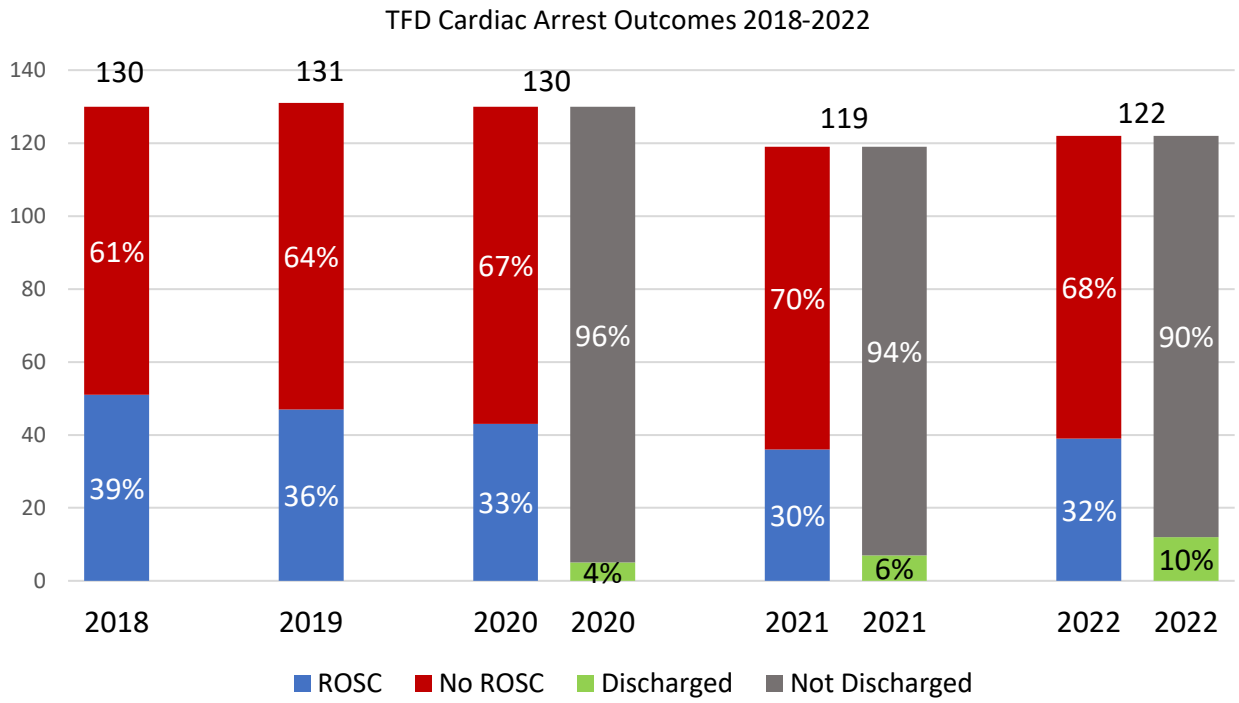


Figure 120: Percentage of Bystander CPR provided in Non-Traumatic Cardiac Arrests (Not witnessed by EMS personnel) 2018-2022

The presence of Automated External Defibrillators (AEDs) is another tool that the Department and City utilizes to help provide early defibrillation for non-traumatic cardiac arrests with the intent to improve cardiac arrest outcomes. The TFD has AEDs on BLS apparatus that can be used if they are on scene prior to an ALS resource. In addition, there are AEDs present in the following locations; TPD patrol vehicles, select City buildings and select Torrance Unified School District schools. In 2023, the Department proposed an expansion of the AED program and secured funding for the project. The number of AEDs present at City buildings will increase to 42 City government buildings. The following graph shows the number of incidents where an AED (TFD and non-TFD) was utilized during the treatment of a non-traumatic cardiac arrest.

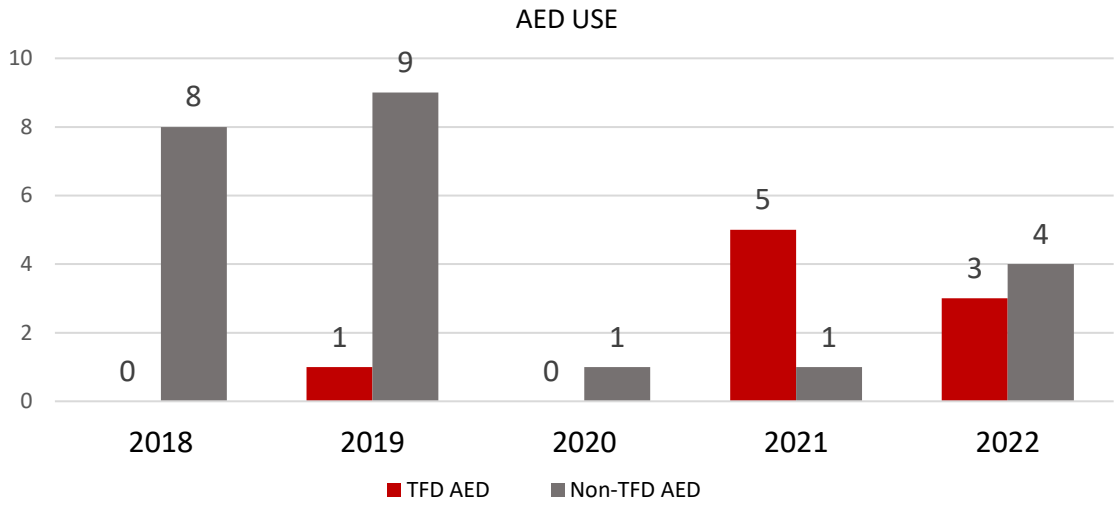


Figure 121: AED use with non-traumatic cardiac arrest 2018-2022

Stroke

In September of 2019, the Torrance Fire Department began a partnership with the County of Los Angeles to operate a Mobile Stroke Unit (MSU) in the South Bay region of Los Angeles County. The purpose of the MSU is to provide more advanced diagnostics and treatment in the field. The MSU is a regional resource that responds in multiple jurisdictions and rotates being based out of Torrance, Long Beach, or West Los Angeles. The MSU operates, out of Torrance, three days a week. The unit is staffed with a TFD firefighter/paramedic (along with other MSU medical professionals) on Thursdays, Fridays, and Saturdays from 7:00 AM to 7:00 PM. The graph below shows MSU responses to stroke calls within the City of Torrance from 2019 - 2022. The data does not reflect all MSU responses because some are outside of the City of Torrance, and some, after assessment, are determined not to meet MSU criteria.

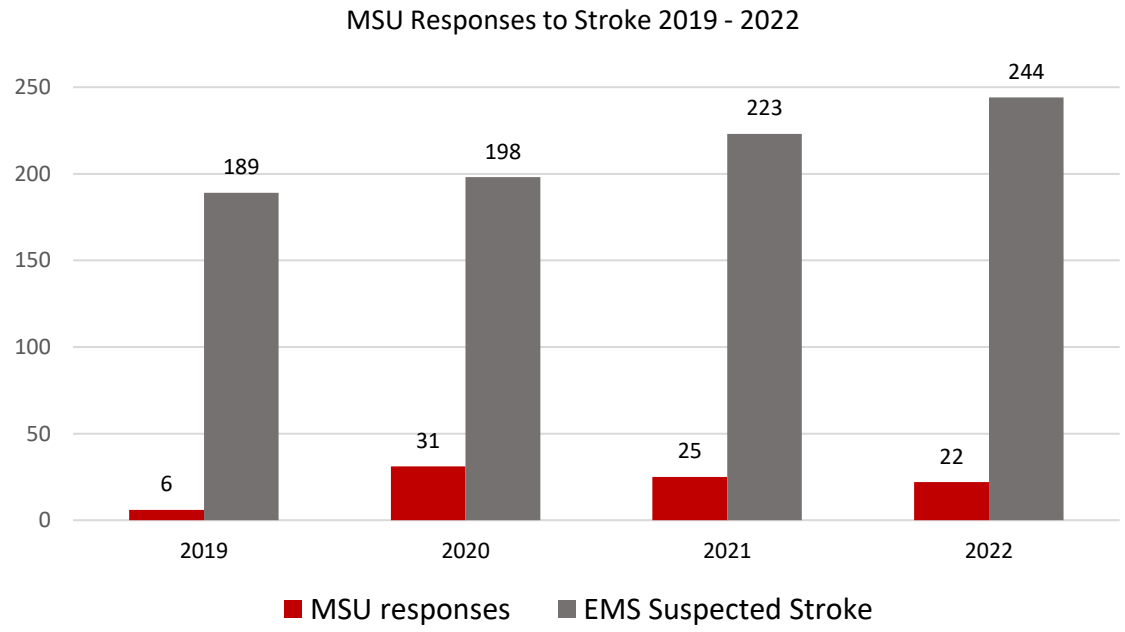


Figure 122: Mobile Stroke Unit (MSU) Responses 2019-2022

Outcome data for patients that have suffered a stroke is difficult to obtain. No data exists currently; however, the TFD is researching how to utilize existing relationships with hospitals to obtain the data moving forward. The Department recognizes that one way to provide for the best possible outcome for patients suffering a stroke is to ensure high quality treatment. In 2022, the TFD EMS Division began tracking, on a quarterly basis, the Department's compliance with certain assessment and treatment benchmarks, through the QA/QI (quality assurance/quality improvement) process. The categories include performing a Malpass (Modified Los Angeles Prehospital Stroke Screen) assessment, obtaining a LAMS (Los Angeles Motor Scale) score, assessing last known well time (LKWT), obtaining a blood glucose reading, assessing heart rhythm (via ECG), establishing intravenous (IV) access, making base hospital contact and documenting the patient's transportation to the appropriate facility. The following graph in figure 123 outlines TFD compliance with meeting stroke treatment benchmarks from Q1 2022 to Q2 2023.

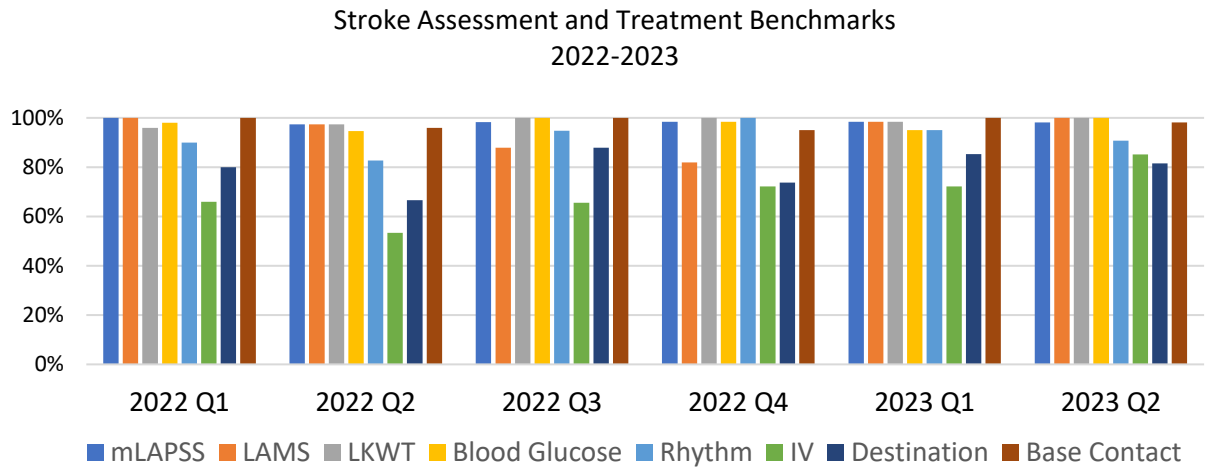


Figure 123: TFD compliance with performing Stroke assessment and treatment benchmarks 2022- Q2 2023

The City of Torrance is home to both Torrance Memorial Medical Center and Little Company of Mary Hospital. The LA County EMS Agency designates both hospitals as a Primary Stroke Center (PSC) and Comprehensive Stroke Center (CSC) facilities. These facilities have specialized capabilities, staffing, training, and equipment to assess and treat stroke patients and must meet certain procedural and time standards related to their care. PSCs are capable of providing clot-busting medications to breakdown small blockages in ischemic strokes. CSCs must have the ability to treat and care for all types of strokes (i.e., large ischemic strokes, hemorrhagic strokes) using endovascular procedures (thrombectomy), vascular neurology and neurosurgery. The presence of these two facilities in the City allows for the highest level of stroke treatment for the community.

Falls

Falls are the most prevalent mechanism of injury (MOI) for trauma related medical calls within Torrance. The TFD recognized the need to reduce the number of falls, particularly in the elderly population. From 2017-2020, the Department collaborated with Partners in Care (a third-party non-profit organization), Torrance Memorial Medical Center and Torrance Library to provide fall prevention mailers to residences with MOI of falls and a patient age ≥60 years. The mailers include fall prevention tips and information about free Matter of Balance Classes (provided by Partners in Care). The class focused on participants learning to change their environment to reduce fall risk factors, to view falls and the fear of falling as controllable, and to set realistic goals to increase activity and exercise to increase strength and balance. Classes ended due to COVID; however, the Department is working with Partners in Care to re-establish the partnership and leverage new programs when they are available. While no reduction in the percentage of falls (≥ 60ys) was observed due to the implementation of the program, the feedback from the participants was very positive and the Department still finds value in providing this program to the community.

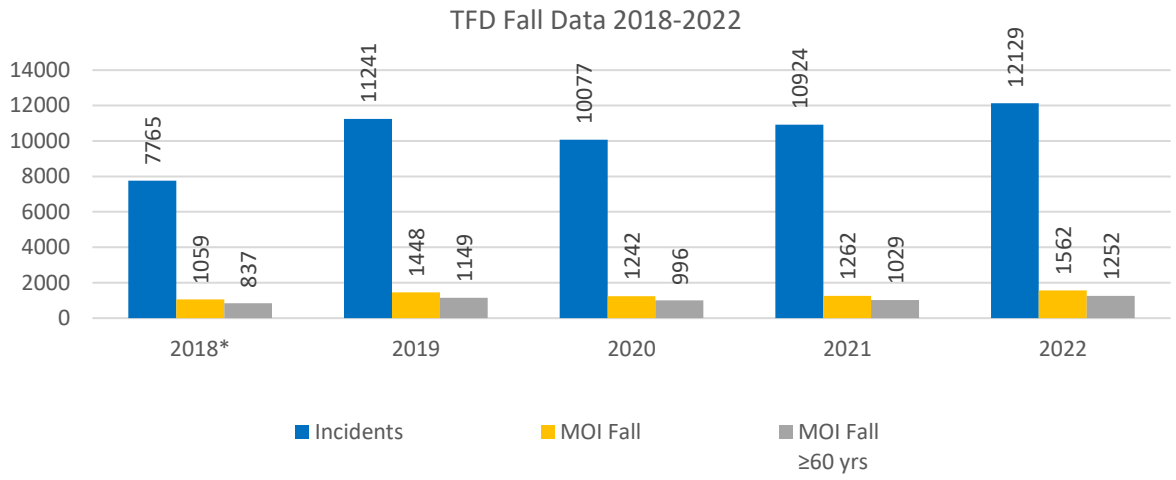


*Figure 124: Trauma incidents with mechanism of injury of fall 2018-2022. (*Data only available for April 8 to Dec 31, 2018)*

Fire Risks

Torrance Fire Department responds to over 16,000 calls for service annually. TFD groups fire incidents into **"Structure Fires"**, "**Vehicle Fires"**, **"Fire Alarms"** and "**Other Fire"** types. "**Other Fire**" types include rubbish fires, brush fires, non-vehicle mobile property fires, and other outside fires. The below chart demonstrates the community demand for fire suppression incident types for the years 2018-2022.

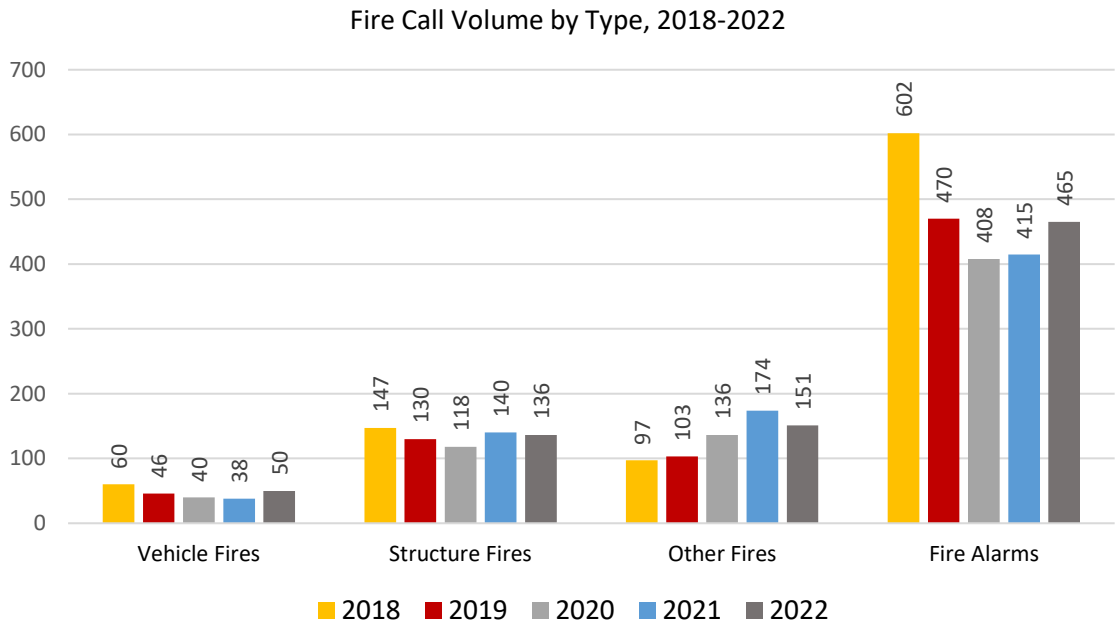


Figure 125: Fire Call Volume by Type, 2018-2022

The above call type data is based on CAD dispatch codes which typically represent the initial reported emergency. Often, the actual incident will end up being something different than the initial report. These changes are reflected in the records management system when the member making the report for the National Fire Incident Reporting System (NFIRS) provides the most accurate data related to the incident.

The CAD data for years 2018-2022 indicates that TFD responded to 671 reported structure fires; however, during the same period, "building and structure" fires only accounted for 127 incidents, as reported in the National Fire Incident Reporting System (NFIRS). There are a variety of factors that lead to the gap between the number of incidents dispatched in CAD as structure fires and the actual number of structure fires. The number one reason for the discrepancy is a lack of reliable and timely information during the call handling. If there is any doubt about the nature of the fire, the dispatcher is trained to send resources to deal with the "worst case" scenario based upon the known information. As more information becomes available, the resource request can be appropriately downgraded.

In addition to community demand, the TFD records data on property/content lost and saved as well as where the fire is confined. The chart below illustrates community outcomes related to the confinement of fires. (Source: TFD Records Management System).

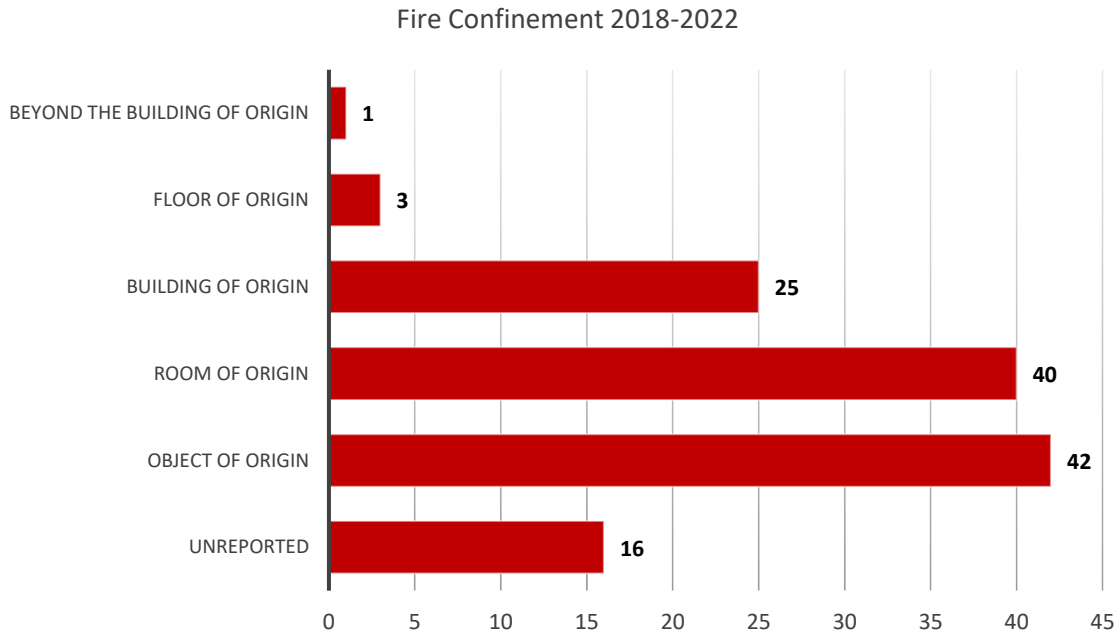


Figure 126: Fire Containment Chart for building and structure fires from 2018-2022 Source: TFD Records Management System

Significant finding from the above chart include:

- TFD documented 127 building or structure fires during the 5-year period
- 65% of the building fires were contained to the object or room of origin
- 99% of all building fires were contained to the building of origin

In conducting fire risk assessment, TFD tracks and measures the monetary loss of property and contents because of fires. The charts below demonstrate the property lost and saved for calendar years 2018-2022.

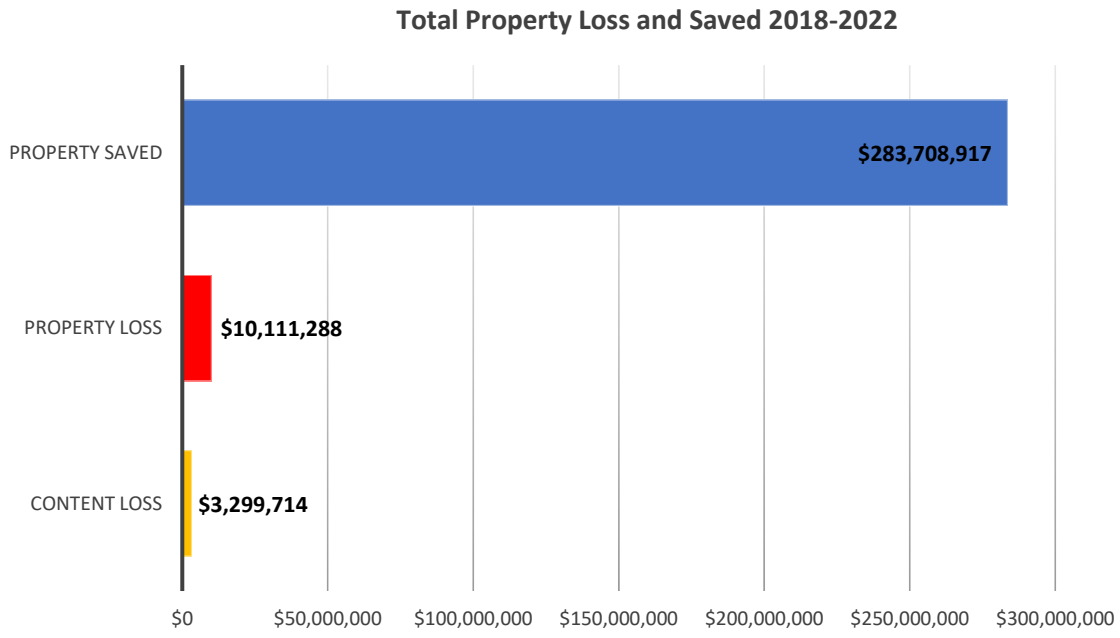


Figure 127: Total Property Loss and Saved 2018-2022, Historical data 2018-2022

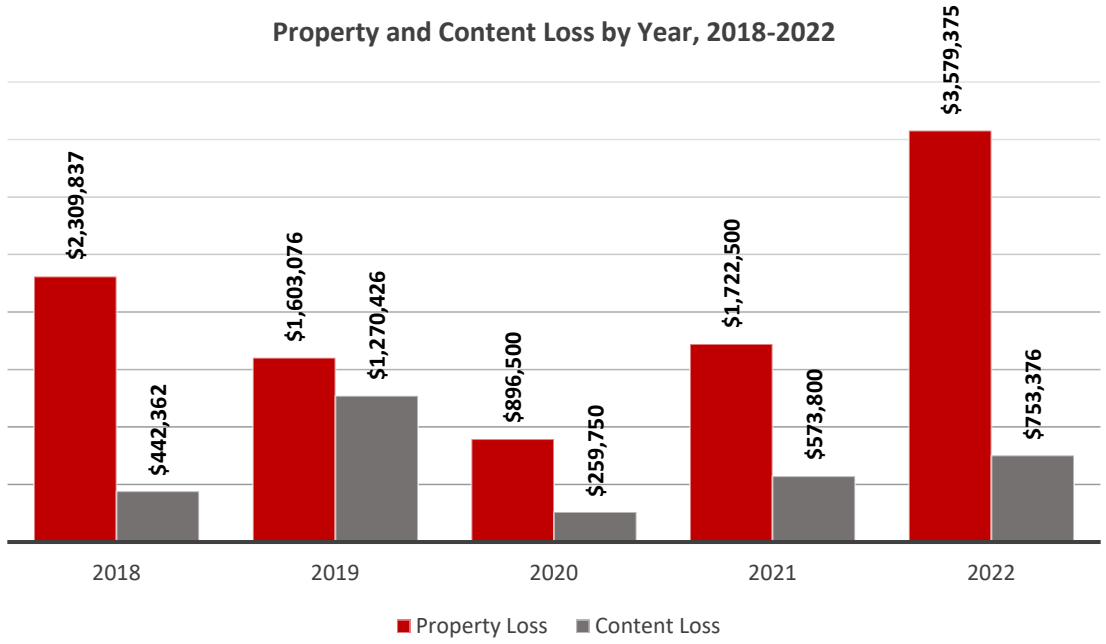


Figure 128: Property & Contents Loss by Year, Historical data 2018-2022

Figure 129: Property Saved by Year, Historical Data 2018-2022

From 2018-2022, no civilian fatalities and only 5 civilian injuries were reported as a result of structure fires. No firefighter injuries or fatalities were reported.

In 2022, external stakeholders participated in the 2018-2023 TFD Strategic Plan development and identified Fire Suppression as the second highest priority program that the TFD provides. The community further expected the fire personnel to respond quickly, be professionally trained, and have proper equipment to mitigate the effects of destructive fires.

Firefighters encounter a wide variety of conditions and hazards at every fire. Providing for Life Safety, Incident Stabilization, Property Conservation, and Firefighter Safety are critical to reducing the negative impacts of fire events. During fire suppression, service-level objectives are intended to prevent the flashover point, a particular point of a fire's growth that makes a significant shift in its threat to life and property. Fire suppression tasks required at a typical fire scene can vary a great deal based on conditions found by the responding units. What all TFD companies must do, simultaneously and rapidly if they are to limit negative impacts, is to arrive within a short period of time with adequate resources to accomplish control objectives.

Changing Fire Environment

While there has been a lot of scientific research completed to validate the changes in the modern fire environment, the basic chemistry and physics of fire remain the same. The major change in the modern fire environment is the compartments that modern fires are burning in and the products that are within the environment. Synthetic products, plastics, vaulted ceilings, dual paned windows, and a variety of other factors have accelerated fire growth and increased heat release rates resulting in a greater risk to occupants and firefighters. Virtually all structure fires progress through a series of 4 identifiable stages:

Stage 1: The Incipient Stage- This first stage begins when heat, oxygen and a fuel source combine and have a chemical reaction resulting in fire. This is also known as “ignition” and is usually represented by a very small fire that often goes out on its own, before the following stages are reached. Recognizing a fire in this stage provides your best chance at suppression or escape. This is the stage of fire that TFD train lay persons to implement the use of a fire extinguisher.

Stage 2: The Growth Stage- During the growth stage the structure’s fire load and oxygen are used as fuel for the fire. There are numerous factors affecting the growth stage including where the fire started, what combustibles are near it, ceiling height and the potential for “thermal layering”. It is at the conclusion of this shortest of the four stages where a deadly “flashover” can occur; potentially trapping, injuring or killing occupants or firefighters.

- Flashover The fire rapidly transitions to the fully developed stage. Research into the flashover phenomenon has yielded criteria that precisely measure when flashover occurs; however, any exact scientific measurement in the field is extremely difficult. Observable events that would indicate a flashover has occurred are "total room involvement" and "free burning." Flashover has been a contributing factor on many firefighter line of duty deaths and must be considered during every compartmentalized fire. Temperatures can reach between 1,000 and 1,200 degrees Fahrenheit during a flashover. When this temperature range is reached, all combustibles are immediately ignited. At the point of flashover, lethal fire gases (carbon monoxide, hydrogen sulfide, cyanide) increase explosively. People exposed to these gases, even when not directly exposed to the fire, have drastically reduced chances of survival. *Human survival after this point is highly improbable without specialized protective equipment.*
- Flashover can occur within a relatively short period of time. Precisely controlled scientific tests indicate that flashover can occur in as little as two minutes from the flame stage; however, that is not always the case in the field. There is hard data on time to flashover since it is not possible to determine when a fire started. Nevertheless, a correlation can be drawn between flashover and the fire protection system or extinguishment process.
- The number of times that fires are controlled before flashover depends on the entire fire protection system and is not solely dependent on TFD personnel. Built-in fire protection, community risk reduction strategies, public education, extinguishment by citizens, and even the type of fuel on fire are all factors that affect flashover. Once a fire reaches flashover, a greater number of firefighters will be required to extinguish the fire. A post-flashover fire burns hotter and moves faster, compounding the search-and-rescue problems in the remainder of the structure at the same time more firefighters are needed for fire combat operations.
- The illustration below indicates fire growth and the need to incorporate fire protection systems prior to flashover in an effort to increase occupant survivability and firefighter safety.

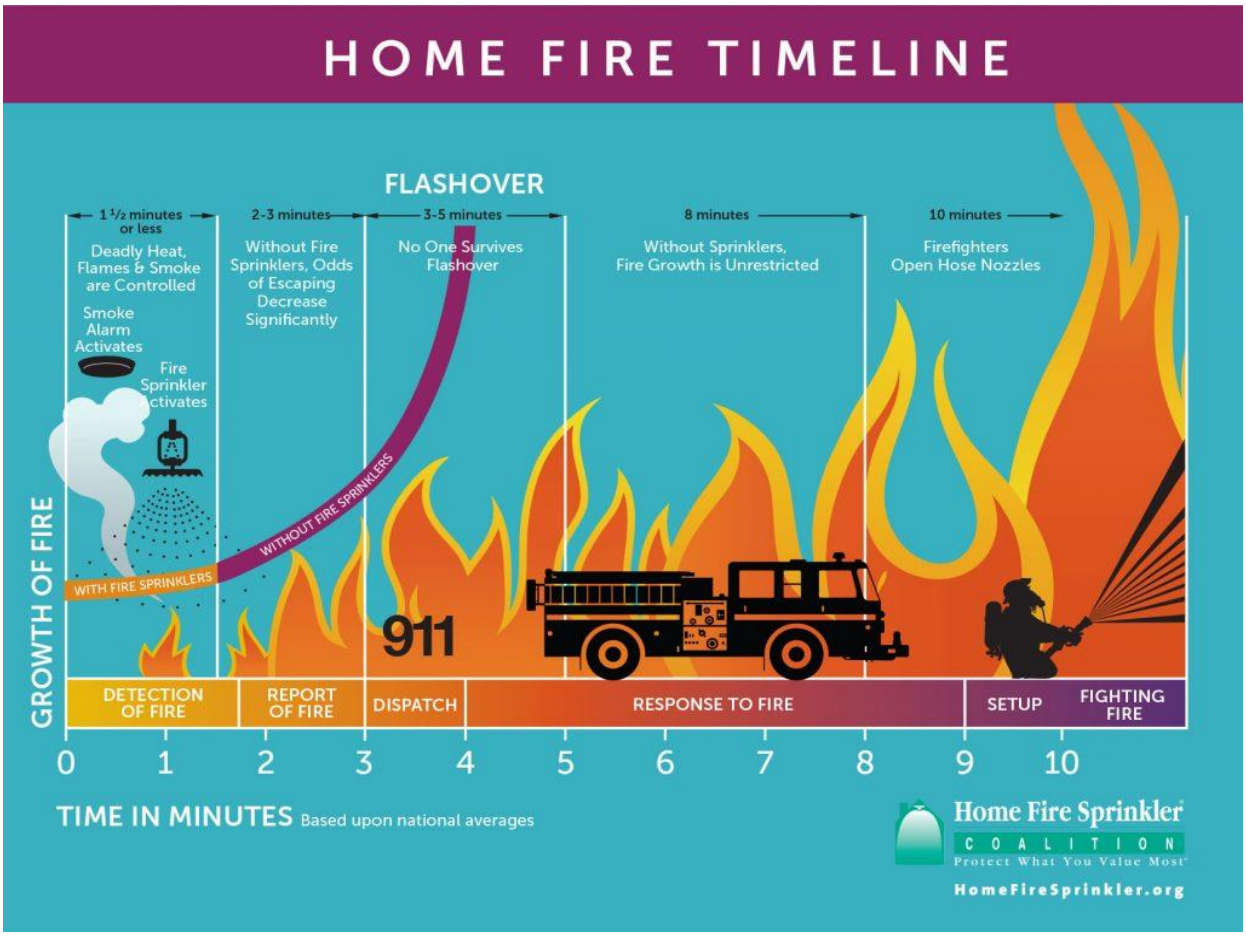


Figure 130: Home Fire Timeline Source: HomeFiresprinkler.Org

Stage 3: Fully Developed Stage- When the growth stage has reached its max and all combustible materials have been ignited, a fire is considered fully developed. This is the hottest phase of a fire and the most dangerous for anybody trapped within.

Stage 4: The Decay Stage- Usually the longest stage of a fire, the decay stage is characterized by a significant decrease in oxygen or fuel, putting an end to the fire. Two common dangers during this stage are first—the existence of non-flaming combustibles that can potentially start a new fire if not fully extinguished. Second, there is the danger of a backdraft when oxygen is reintroduced to a volatile, confined space.

Fire Sprinkler Systems

According to data from a 2021 Report by NFPA (US Experience with Sprinklers), from 2015 to 2019, local fire departments responded to an estimated average of 51,000 structure fires per year (10 percent) in which sprinklers were present. These fires caused an average of 36 civilian deaths (1 percent) and $1 billion in direct property damage (9 percent) annually.

Sprinklers were present in an estimated average of 23,600 of the reported home structure fires per year in 2015–2019, resulting in an average of 23 civilian deaths, 555 civilian injuries, and $194 million in direct property damage annually. The 7 percent of reported home structure fires that occurred in properties with

sprinklers accounted for 1 percent of home fire deaths, 5 percent of home fire injuries, and 3 percent of home property loss.

Sprinklers operated in 95 percent of the home fires in which the systems were present, and the fires were considered large enough to activate them. They were effective at controlling the fire in 97 percent of the fires in which they operated.

From 2015 to 2019, the civilian death and injury rates per reported home fire were 88 and 28 percent lower, respectively, and average property loss per home fire was 62 percent lower in reported home fires in which sprinklers were present compared to fires in homes with no AES. The rate of firefighter injuries per home fire in which sprinklers were present was 78 percent lower than in homes with no AES.

The NFPA report concluded that sprinklers are a very reliable and effective part of fire protection. Their impact is most visible in the reduction of civilian fire deaths per 1,000 reported fires when sprinklers are present compared to fires without AES. Notable reductions can also be seen in the injury rates, in most occupancies, in the average loss per fire. Increasing the use of sprinklers can reduce loss of life and property damage caused by fire.

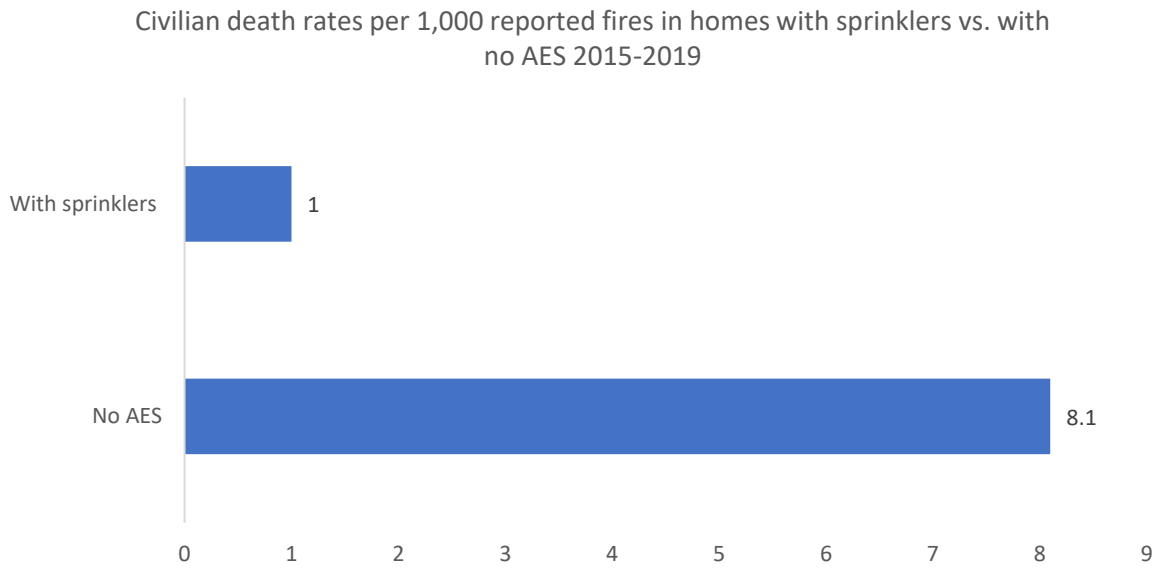


Figure 131: Civilian death rates per 1,000 fires in homes with sprinklers and with no AES (Source: NFPA – "US Experience with Sprinklers" – Marty Aherns, 2021)

A key component in the 2010 California Fire and Building code adoption was the addition of residential fire sprinklers required in all new one and two-family dwellings and townhouse construction statewide. For many years, installation of fire sprinkler systems had only been required in office buildings and multi-family dwellings (i.e., apartments). These sprinkler systems have been proven to save lives and extinguish fires. Since 2016, The City of Torrance established an additional requirement that mandates all new residential additions 1,000 Square feet or greater to include fire sprinklers.

When assessing the mitigating effect sprinklers have on the consequence and probability of fire risks, the TFD considers the following:

- Residential fire sprinklers do not cover the entire structure like similar systems installed in commercial occupancies.
- Fire sprinkler systems are designed to keep fire contained long enough to allow occupants to exit, not fully extinguish the fire. A fire department response is still needed.
- Installing both smoke alarms and a fire sprinkler system reduces the risk of fire death by 82%.
- Sprinkler systems allow quicker control and extinguishment by the fire department and less time committed for overhaul.
- Over time, sprinkler systems will lower property loss due to fire, which will have a positive effect on residential fire insurance premiums citywide.
- Sprinkler systems do not lessen the need for fire stations (distribution) but will lessen the need for multiple units responding from the same stations (concentration).
- Home fire sprinklers are affordable, reliable, and require little or no maintenance. The following are myths:
    - A smoke alarm provides enough protection.
    - Newer homes are safer homes; the fire and death problem is limited to older homes.
    - When a fire occurs, every sprinkler will activate and everything in the house will be ruined.

As of 2017, there were 1647 occupancies with automatic fire sprinklers installed. From 2018-2022, an additional 171 occupancies installed fire sprinkler systems. The TFD is committed to working cooperatively with residents, business owners, developers and other City Departments to increase the installation of automatic fire sprinklers. The chart and map below indicates all automatic fire sprinklers installed within the City of Torrance broken down by planning zone.

Fire Planning Zone	Number of Sprinkler2017	Number of Sprinkler2023	Number of Total Sprinkler
91	448	16	464
92	428	18	446
95	235	39	274
96	204	19	223
93	141	24	165
97	125	20	145
94	66	35	101
	Total Number 1647	Total Number 171	Total Number 1818

Figure 132: City of Torrance – Number of Fire Sprinklers by Planning Zone

The map below shows the location of installed sprinkler protection systems within each planning zone and entire city.

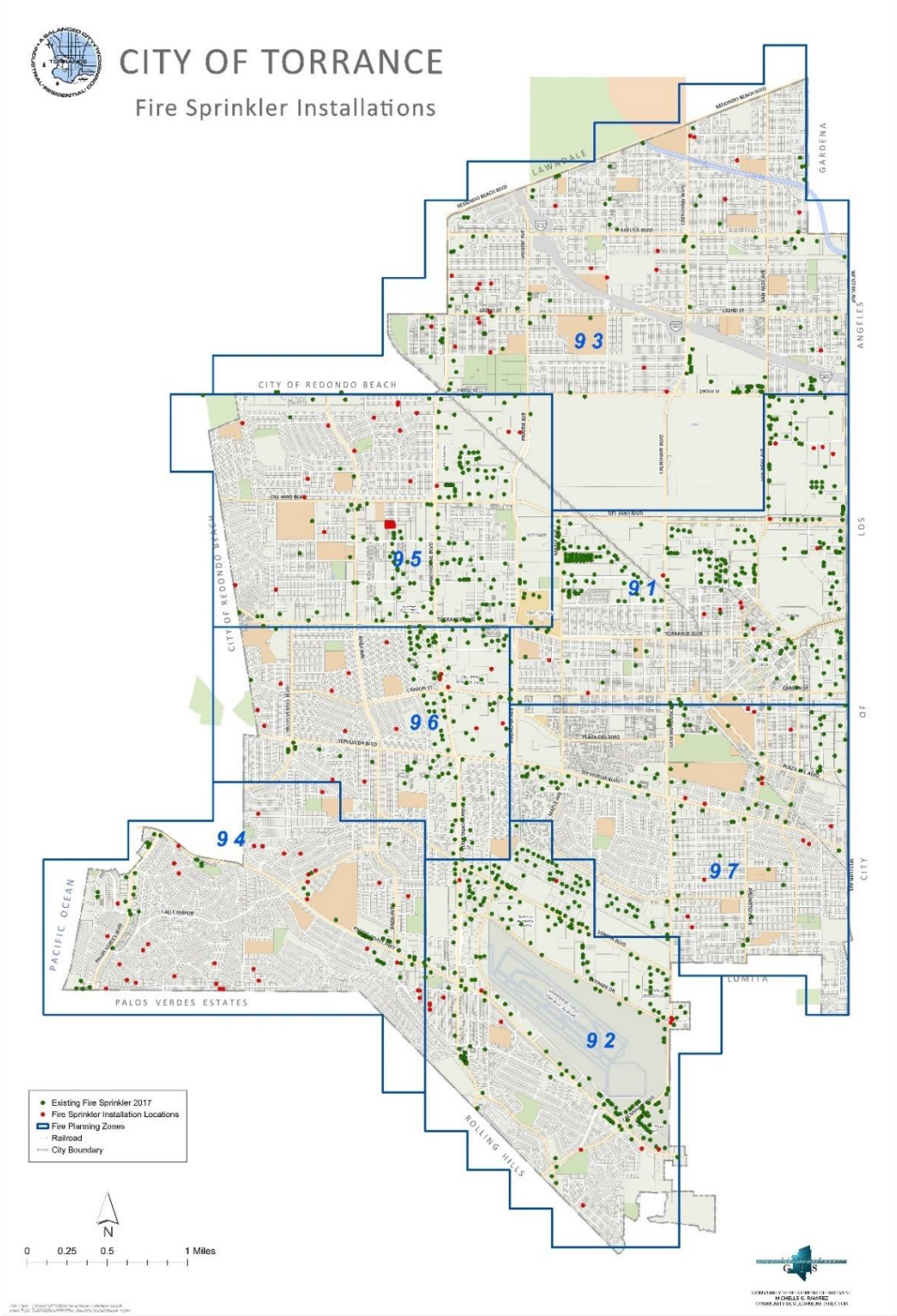


Figure 133: City of Torrance Fire Sprinkler Location Map

Technical Rescue Emergency Risks

Technical Rescue Emergency Risks include incidents involving trench rescues, high and low angle emergencies, confined space emergencies, structural instability, structure collapse, and any other forms of rescue that require specialized training and/or equipment.

Technical Rescue are low frequency events compared to other community service demands and are often accompanied by a secondary hazard such as an earthquake, injured victim, utility emergency, etc. Despite the low frequency the consequences of the event could be significant. Many of these events are regulated by OSHA due to the elevated risks to the rescue workers.

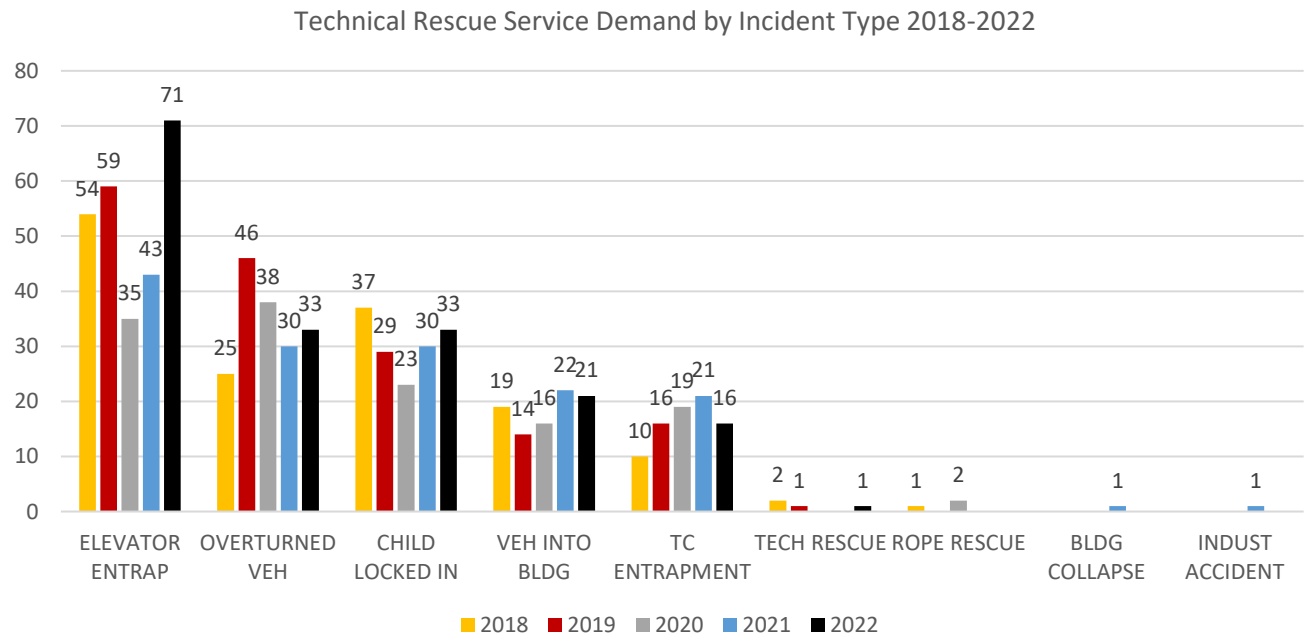


Figure 134: Technical Rescue Service Demand 2018-2022

Hazardous Materials Emergency Risks

Hazardous Materials incident types include odor complaints, vehicles leaking fluids, carbon monoxide leaks, refinery reports and single engine responses, hazardous releases and leaks, unknown substances, and hazardous and unknown spills. Hazardous Materials Level 2 incidents require TFD HazMat Specialists to make entry into the exclusion zone for containment, control, or sampling. The chart in figure 135 shows the community demand related to hazardous materials, for years 2018-2022.

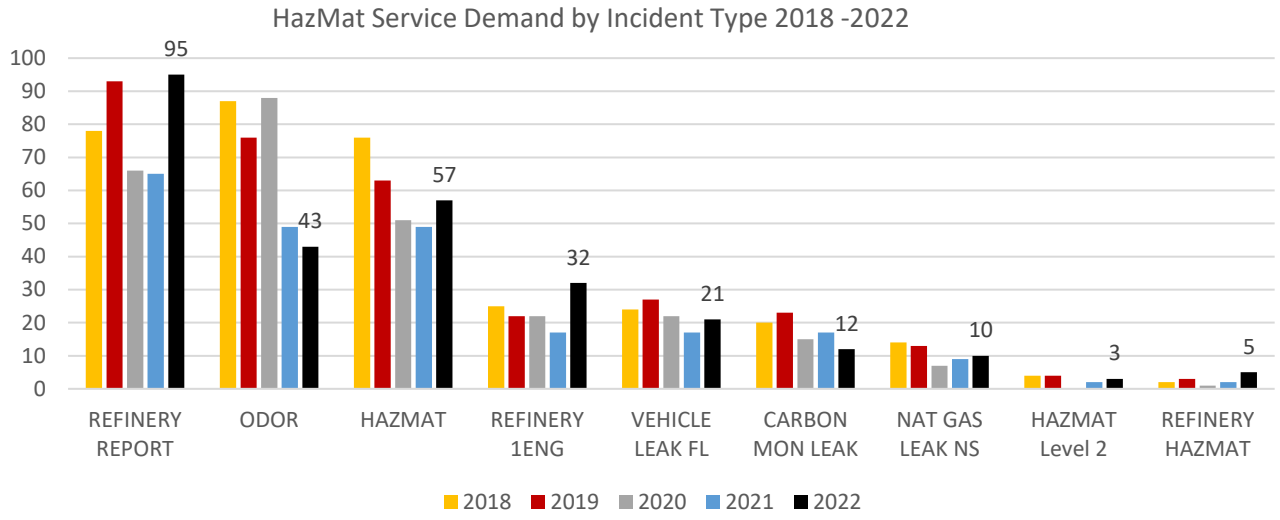


Figure 135: Hazardous Materials Service Demand by Incident Type 2018-2022

The use, storage, and transportation of hazardous materials and wastes are areas of great importance to the protection of life, property, and the environment in the City of Torrance. The prevalence of businesses and residents routinely storing and handling hazardous materials and waste have necessitated an increased awareness and concern for the community's health and safety. The risks associated with hazardous materials results in responsibilities for businesses and emergency responders. As a result, TFD has a Hazardous Materials Area Plan that complies with the State of California's Health and Safety Code Chapter 6.95 for implementing a hazardous materials emergency response program.
The TFD Hazardous Materials Area Plan has three purposes:

1. It serves the TFD as a planning guide outlining actions required by the TFD to protect the community from threatened releases. The plan, in conjunction with department operating guidelines, delineates the organization and responsibilities of the fire department during pre-emergency planning and emergencies.
2. The Area Plan provides businesses with response planning and guidance to assist them in establishing their level of response for any size of release their business can safely handle.
3. The Area Plan serves as one aspect of the SARA Title III "Community Right to Know" law that allows the community the right to know about chemicals hazards in the community and how the City plans for such emergencies.

In addition to the Torrance Hazardous Area Plan, the California Accidental Release Prevention (CalARP) program was implemented to prevent accidental releases of substances that can cause serious harm to the public and the environment, to minimize the damage if releases do occur, and to satisfy community right-to-know laws. This is accomplished by requiring businesses that handle more than a threshold quantity of a regulated substance listed in the regulations to develop a Risk Management Plan (RMP). A RMP is a detailed engineering analysis of the potential accident factors present at a business and the mitigation measures that can be implemented to reduce this accident potential. The RMP contains:

- Safety information
- A hazard review
- Operating procedures

- Training requirements
- Maintenance requirements
- Compliance audits
- Incident investigation procedures

Hazardous Materials Inventory in Torrance

The table below includes the CalARP chemicals present in regulated quantities in Torrance:

CalARP Regulated Chemicals in Torrance	
Anhydrous Ammonia	Propane
Pentane	Hydrazine
Chlorine	Butane
Acrylonitrile	Vinyl acetate
Hydrogen	Pyridine/HF

Figure 136: CAL ARP Regulated Chemicals in Torrance

The following Table lists the CalARP regulated facilities within the City of Torrance:

Business name	Address
Howmet Global Fastening Systems, Inc	3000 Lomita
Polypeptide Laboratories Inc	365 Maple
Arkema Coatings Resins	19206 Hawthorne
Bachem	3132 and 3152 Kashiwa
Hi Shear Corporation	2600 Skypark Dr.
Honeywell Aerospace	2525 190th
Messer Gas	2535 Del Amo Blvd.
Moog	20263 Western Ave
Preston Products	19500 Mariner
Torrance Refining Company	3700 190th St.
Torrance Refinery (Air Products Hydrogen)	3700 190th St.
Medical Chemical	19430 Van Ness

Figure 137: CAL ARP Regulated Facilities in Torrance

In addition to CalARP, Torrance has other businesses that are required to report to the California Environmental Reporting System (CERS) due to reportable quantities. The below table lists the other hazardous materials reportable programs and the number of facilities regulated in the City of Torrance.

Program Element	Total Regulated Facilities
Hazardous Materials Release Response Plans (HMRRP)	422
Underground Storage Tank (UST)	52
Hazardous Waste Generator (HW)	414
Hazardous Waste Resource Conservation and Recovery Act (RCRA) Large Quantity Generator (RCRA LQG)	39

Figure 138: Hazardous Materials Program Elements for CERS

Hazardous Materials in Transit

Hazardous Materials are transported through the city in four primary modes: highway and road, railway, pipeline, and air. The hazardous commodities moving through the city are not necessarily used within the city limits; however, they still present a significant daily risk for a hazardous materials emergency.

Highways/Roads

The City of Torrance has one major freeway, the 405 San Diego Freeway. The freeway runs northwest and southeast on the northern portion of the city. The freeway is designated as a hazardous materials transportation corridor by the California Highway Patrol (CHP). In addition to the 405, several major streets in Torrance serve as truck routes including Hawthorne Blvd., Western Ave. and Crenshaw Blvd. in the north-south direction and Sepulveda Blvd., Artesia Blvd., Carson St., Pacific Coast Highway, and 190th St. in the east-west direction. The majority of hazardous materials are transported in and through Torrance using the surface streets. See the truck route map below:

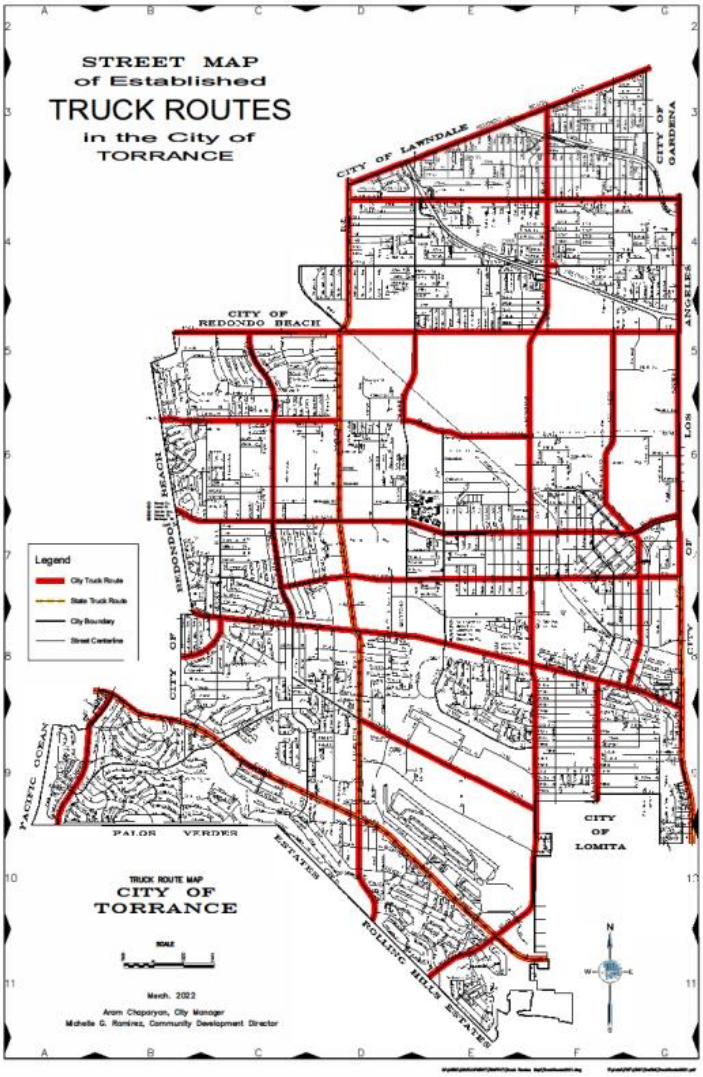


Figure 139: City of Torrance Truck Route Map

Railway

There is one major rail line that runs diagonally through the city. This is the Burlington Northern Santa Fe Railroad line. The rail activity has decreased dramatically since the Alameda Corridor has been in operation out of the Port of Los Angeles. The rail does supply a few larger handlers of hazardous materials in Torrance and hauls raw materials north to El Segundo. The rail line transports 43 known commodities; however, for security reasons the hazardous material commodity list is not available for listing in this public document. The map below shows the railway and the crossings that can affect response times east of the railway.

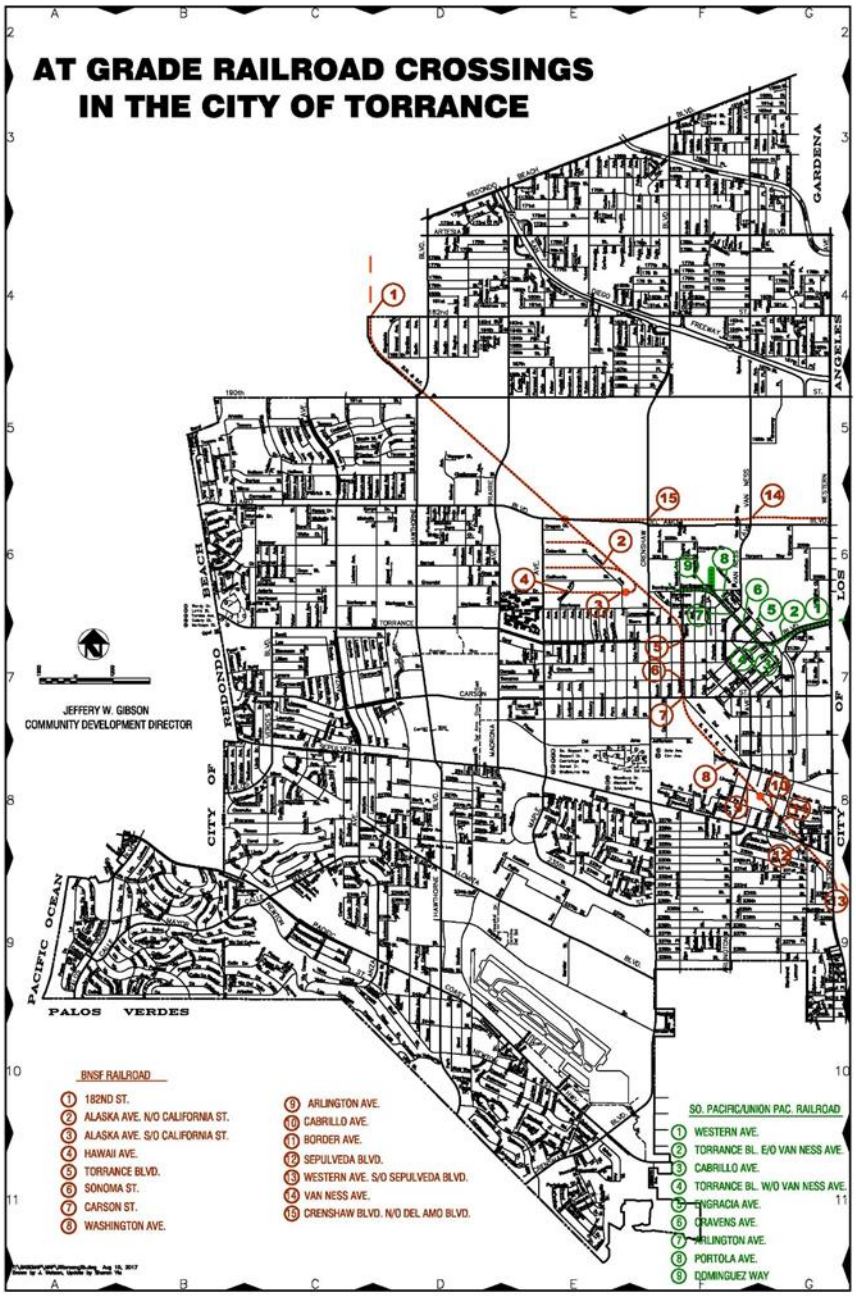


Figure 140: City of Torrance Railroad Crossing Map

One additional hazardous material risk to Torrance is a plant that stores and uses 90-ton chlorine railcars located ¼ mile east of Western Avenue and Del Amo Blvd (outside of the City). The plant brings in the railcars and transfer the product to trucks and smaller cylinders for industrial uses in the Los Angeles basin.

Pipeline

The City of Torrance has a number of identified underground hazardous materials pipelines. These pipelines are typically operated at high pressures (300-600 psi) and transport refined and unrefined petroleum products and natural gas. The lines are typically 42" below grade. Due to the city's significant history as an oilfield, the potential exists for unmapped or abandoned pipelines, although there is a very low probability of there being unknown pressurized transmission lines. The map below shows the location of major known pipelines.

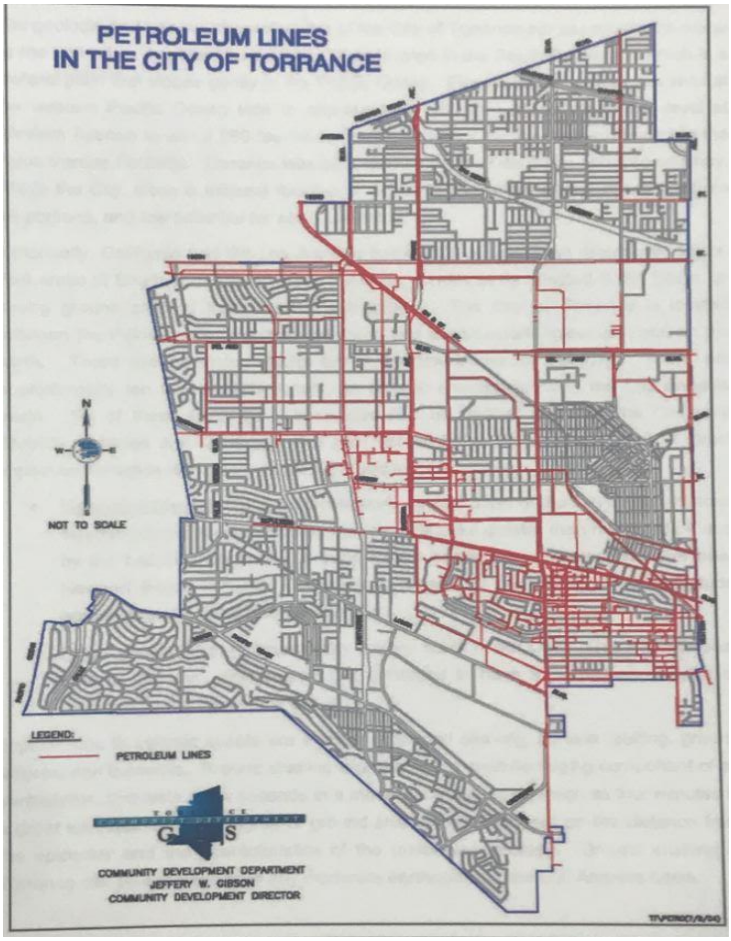


Figure 141: Petroleum Lines in the City of Torrance

Air

The Los Angeles County airspace is among the busiest in the nation. Torrance is located approximately 4 miles south of Los Angeles International Airport and the flight landing pattern. Hazardous materials may be transported by air over the city and there is a very low probability of a plane crashing resulting in a hazardous material release. The Torrance Municipal Airport does not pose a hazardous materials threat under normal conditions.

National Pollution Discharge Elimination System

In addition to hazardous materials hazards, TFD conducts National Pollution Discharge Elimination System (NPDES) inspections at facilities that are potential polluters of navigable waterways. The TFD program targets nurseries, industrial facilities, automotive repair facilities, and restaurants to ensure compliance with best management practices. The chart below shows NPDES activity within the TFD for calendar years 2018-2022. These inspections are completed biennially, with even addresses inspected during even years and odd addresses being inspected during the odd years. The number of inspections completed and ensuing violations found were limited in 2020 and 2021 due to the COVID-19 pandemic. In addition, the NPDES violation data from 2018 and 2019 is lower than anticipated due to data collection methods. (These years were completed on paper inspection forms and not properly tracked electronically. In 2020, the TFD transitioned to a full electronic inspection format which allowed for better analytics and reliability of violation data).

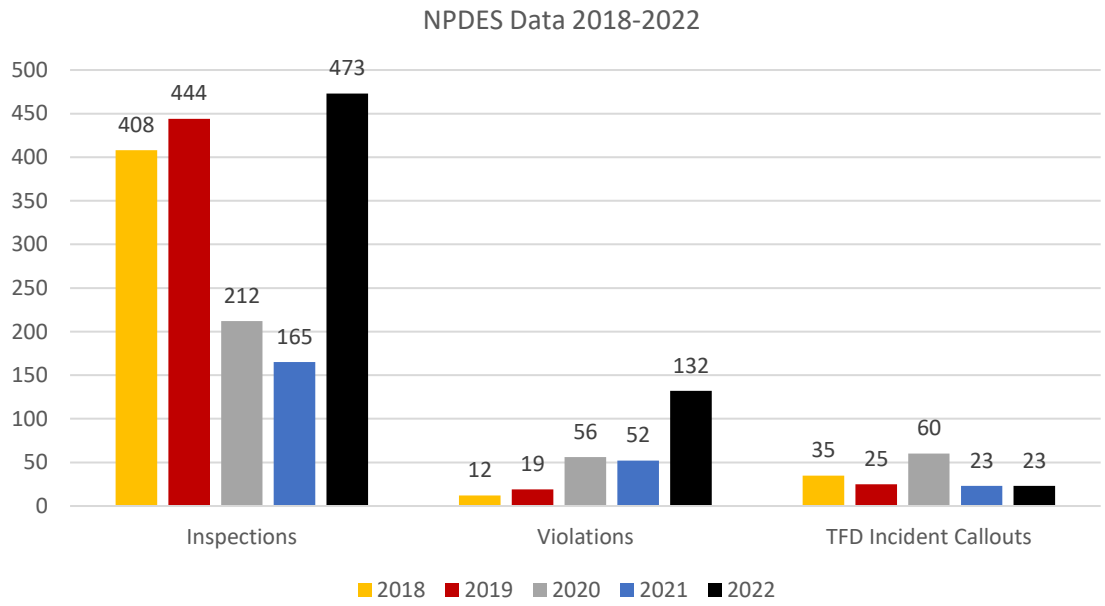


Figure 142: NPDES Data Historical Data 2018-2022

Aircraft Rescue and Fire Fighting Emergency Risks

The Torrance Municipal Airport, also known as Zamperini Field, serves as a general aviation airport covering approximately 500 acres of property in the South end of the City. While home to primarily private aircraft, with approximately 543 based aircraft, it also houses several Fixed Base Operators (FBOs) which are available for flight instruction, aircraft repair, and charter flights. The Airport is also the headquarters for Robinson Helicopters, the largest manufacturer of private helicopters in the United States. Torrance Municipal Airport - Zamperini Field is a valuable asset for both business promotion and recreation in the South Bay area.

The City operates a general aviation center (GAC) that serves as a location for Airport administration (Facilities), Airport operations (Airfield) and noise abatement. The GAC also includes a pilot's lounge, pre-flight preparation room with satellite weather computer and a meeting room that is available for rental.

The Airport contains two runways (3,000' and 5,000') that are capable of handling a maximum aircraft weight of 20,000 lbs. per wheel. The combination of length and weight capacity makes the runways near ideal for general aviation but are not recommended for air carrier type aircraft.

The airport is 101' above sea level and is served by an FAA Control Tower. Modem navigational safety aids are in use to assure safe takeoff and landing operations.

The City owns 341 hangars. In addition, there are currently 85 independent hangars owned and operated by private companies. The City limits based aircraft to 825 airplanes. Based aircrafts do not include transient aircrafts, which visit the field for a brief time, and which may be parked/tied down at an FBO site.

City of Torrance employees assigned to Airport Operations (known as "Mobile 102") are on site from 0600-2200 hrs. The Torrance Tower (Airport Air Traffic Control) is staffed from 0900-1800 hrs.

The types of emergency incidents identified within this classification include aircrafts experiencing difficulties, aircraft crashes, and crashes into buildings (inside and outside of the airport).

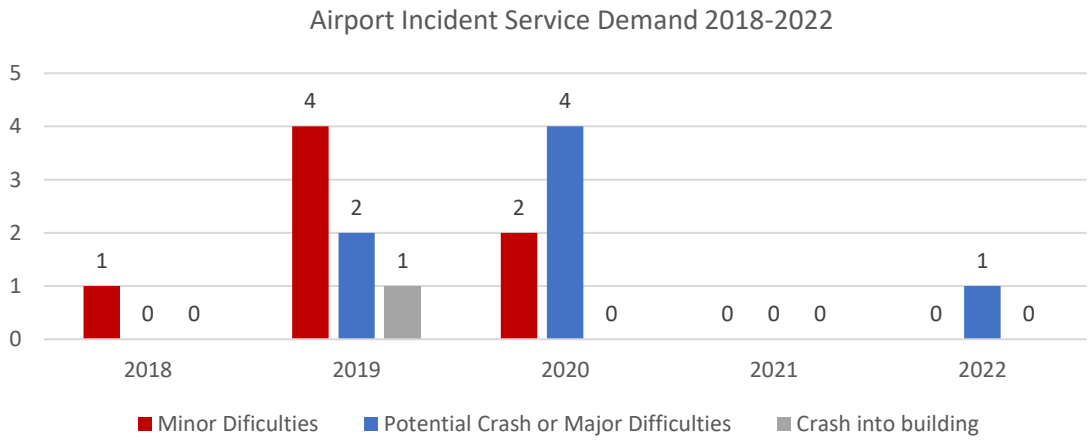


Figure 143: Airport Incident Service Demand 2018-2022

Other Identified Emergency Risks

In addition to the already defined hazards in the community (Fire, EMS, Technical Rescue, Hazardous Materials and Aircraft), the TFD also has identified hazards that are not easily categorized in the above groups. Those hazards include traffic collisions, utility hazards (electrical, water and gas leaks inside a structure), and security hazards (SWAT, civil unrest, terrorism and active shooter).

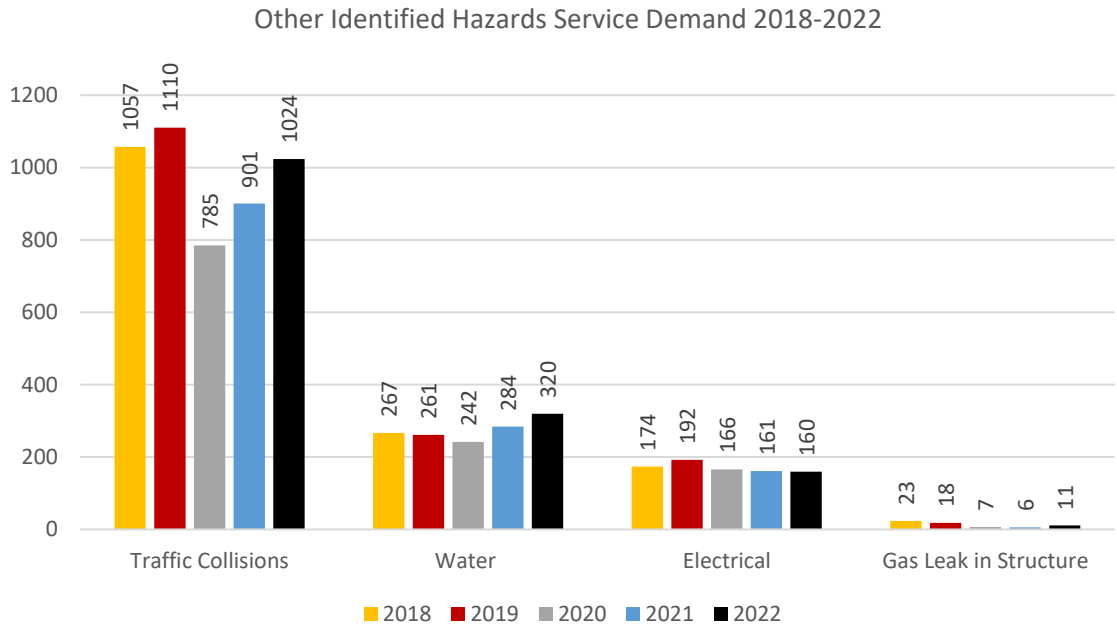


Figure 144: Other Identified Hazards Service Demand, 2018-2022

Traffic Collisions

In the City of Torrance, Traffic Collisions are the second highest demand for service, with a total of 4,877 incidents from 2018-2022. (EMS calls constitute the highest demand). TFD tracks Traffic Collisions separate from Emergency Medical Services incidents due to the differing turnout time benchmarks. For responder safety, the TFD requires responders to don firefighter turnouts prior to responding to traffic accidents with a turnout benchmark time of 80 seconds, rather than 60 seconds for EMS calls. This excludes traffic accidents categorized as moderate risk technical rescues.

Utility Hazards

For purposes of risk assessment, TFD considers utilities to be electrical generation or distribution centers, electrical wires, communication equipment, water mains and other forms of fuel equipment that are not considered a hazardous materials pipeline. Typical calls for service include wires down, outside water problems (including water main breaks), water problems inside a structure and gas leaks inside a structure. The majority of the electrical supply in Torrance is run overhead on power poles, although there are many underground electrical vaults and surface mounted transformers. The chart in Figure 145 provided by American Community Survey shows the heating fuel used in homes in the City of Torrance.

OCCUPIED HOUSING UNITS BY HOUSE HEATING FUEL		
Total	55,585	100.0%
Utility gas	37,953	68.3%
Bottled, tank, or LP gas	812	1.5%
Electricity	14,940	26.9%
Fuel oil, kerosene, etc.	26	0.0%
Coal or coke	0	0.0%
Wood	67	0.1%
Solar energy	135	0.2%
Other fuel	35	0.1%
No fuel used	1,617	2.9%

Figure 145: Heating Fuel Used in Homes in the City of Torrance Source: American Community Survey (2017-2021 Estimate)

Security Hazards

In today's fire service, violent activity responses are becoming more common. Violent activities to which firefighters may respond to can include; bomb threats, shootings, stabbings, domestic violence, gang violence, civil unrest, assaults, suicides, hostage situations, and terrorism. These security hazards can impact the socio-economic environment of the community and have a major effect upon the population.

Security incidents involve responses from both TFD and TPD. TFD units will stage, if needed, until the scene is secured by the Police Department. Incidents that involve an injured patient (such as assaults, shootings, stabbings, etc.) are initially dispatched with a single engine company, rescue and ambulance. More complex security incidents would receive additional personnel to meet the incident needs. TFD sends specially trained Tactical Emergency Medical Support (TEMS) medics with every SWAT callout. Special risks such as an active shooter or terrorist event are areas of significant concern and a focus of training and preparation within the operations division of TFD, with an emphasis on having a unified command with TPD.

Terrorism - Numerous factors make Torrance a potential target for both domestic and international terrorist attacks: location of the City within the greater Los Angeles Basin, population, industrial infrastructure, large retail shopping center, and the City's commitment to supporting the armed forces. Torrance is also becoming a transportation hub by building a regional transit center that will serve the greater Los Angeles area. The city also has a cargo rail line, municipal airport and a major freeway that supports statewide commerce and travel.

The Torrance Police monitor the tracking of the City's infrastructure identified as being possibly vulnerable to attack by domestic or foreign-born terrorists, which can change over time. This information is shared internally with the TFD. Additionally, the Department maintains a close relationship with regional partners through the Torrance Fire Department Assistant Chief (Research and Development Division) that is assigned to Los Angeles Area Fire Chiefs (LAAFCA) Regional Training Group (RTG). This position and relationships helps TFD maintain situational awareness regarding terrorism-related alerts, requests for information, warnings, and other notifications from regional, state, or federal homeland security agencies.

Civil Unrest- The potential for civil unrest originating in Torrance is considered very unlikely; however, the potential for civil unrest in LA County that could negatively impact the Torrance area is more plausible. Civil unrest is generally a police issue, but associated events may require the assistance of TFD. Medical aid, fire suppression, TEMS, and hazardous materials response are areas of assistance that may be necessary if the unrest escalates. Torrance has supported adjacent jurisdictions' efforts by responding to mutual aid requests to handle the fires as a result of civil unrest. Areas of concern in Torrance are venues such as the

Courthouse, Civic Center, and Del Amo Fashion Center, where large groups congregate and emotions or inappropriate behavior can change the focus and demeanor of the crowd. In 2020, the Department staffed additional resources based upon TPD intelligence that civil unrest was a possibility. A unified command was established, however, TFD did not respond to any incidents related to civil unrest.

Unified Response to Violent Incidents (URVI) – Violent incidents, such as an active shooter, can occur anywhere at any time; therefore, it is critical the TFD not exclude any facility or area of the city from this threat assessment. While the police department is typically the lead agency for these types of incidents, a unified response from both the police and fire department is a key factor towards effective incident resolution. The TFD has established guidelines to provide a standard format to ensure the safety and accountability for responding personnel while providing the essential emergency response activities expected from the community.

Tactical Paramedics (TEMS) - The Department's TEMS program was established in 2014. TFD tactical paramedics are firefighter/paramedics that have been specially equipped and trained to provide medical care in the tactical environment. Tactical paramedics are attached to the Torrance Police Department SWAT (Special Weapons and Tactics) team as specialized medical and rescue providers. The primary mission of the tactical paramedic is to provide immediate care to sick or injured persons during police incidents. Tactical paramedics bring the medical and rescue expertise of the Torrance Fire Department to assist in the efficient mitigation of police incidents.

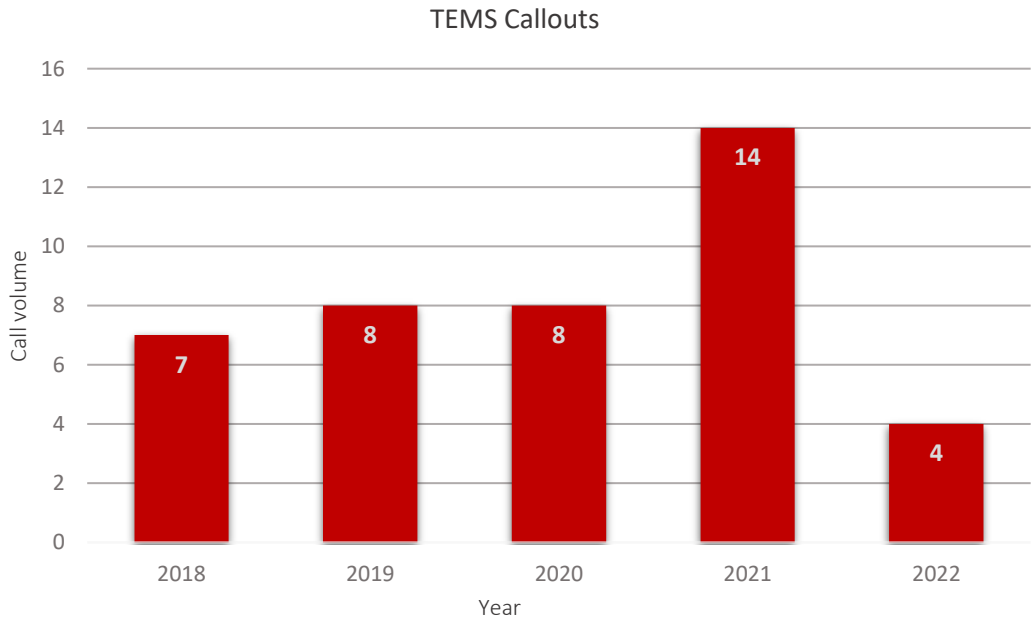


Figure 146: TEMS Callouts Volume Historical Data 2018-2022

Risk Categorization

Risk Categorization Methodology

The risk categorization process determines the level of risk posed by identified threats / emergency event types within each risk classification. The categories are defined as low, moderate, high, or maximum risk. The TFD utilizes risk categories to establish response strategies necessary to mitigate the threat / emergency event.

The three primary components of categorizing risks are an analysis of probability, consequence, and impact on the agency. Probability is the likelihood that a particular event will occur in a given time period. An event that occurs daily is highly probable. An event that occurs once every decade is unlikely. An assessment of consequences measures the result of an event. There are four main areas of concern when evaluating consequences: Firefighter Safety, Life Safety, Environmental (irreparable or long-term damage to the environment) and Economic (loss of property, contents, income, or irreplaceable assets). The impact is evaluated by the number and type of resource required to mitigate the incident and the time it will require for the resources to complete the tasks. From the risk analysis, hazards are categorized as either low, moderate, high, or maximum risks.

The Torrance Fire Department utilizes a two-axis parabolic curve approach to categorize risk in the community (See Figure 147). The probability of an incident is depicted on the Y-axis with the probability increasing when moving vertically. The consequence of an event is depicted on the X-axis with a higher magnitude illustrated when moving from left to right. Typically, the higher consequence of an incident, the higher the impact on TFD resources needed to mitigate.

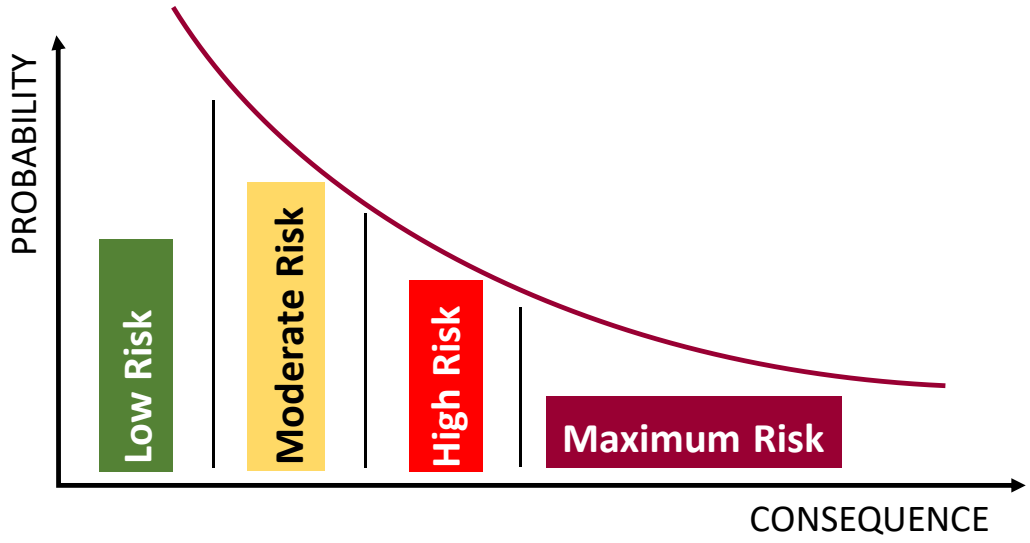


Figure 147: TFD Risk Categorization Method - Two-Axis Parabolic Curve

EMS Risk Categories

Based on an assessment of occurrence probability and potential consequences, the TFD grouped EMS related hazards / emergency event threats into the following risk categories:

- **Low Risk:** Lift Assist
- **Moderate Risk:** BLS incidents including ill person, falls, back injuries, lacerations, animal bites, etc.
- **High Risk:** ALS incidents including allergic reactions, airway problems, chest pain, cardiac arrest, unconscious, man down, seizures, strokes, shootings, etc.
- **Maximum Risk:** Multi Victim Incidents (MVI), Active Shooter

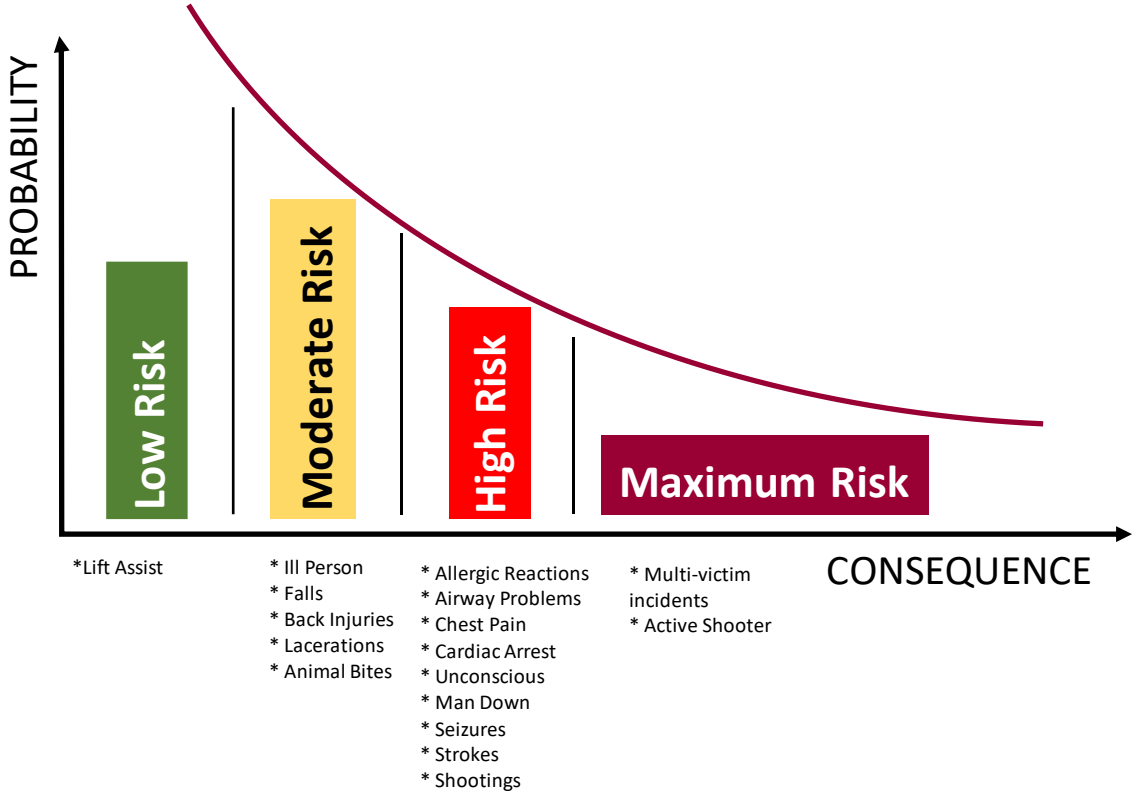


Figure 148: TFD EMS Risk Categorization

EMS Risk Categories by Planning Zone

EMS service demand data, from 2018-2022, indicated the following:

- EMS low, moderate and high-risk incidents are more prevalent in planning zones 93, 95 and 97. This corresponds to areas of higher population, the presence of skilled nursing facilities and/or senior housing.
- Planning zones 91 and 94 have the lowest EMS service demand.
- There is the potential for a maximum risk incident across all planning zones.
    - However, incidents with more than five patients were mostly as a result of traffic collisions. Planning zone 93 has the highest rate of traffic collisions.

Fire Risk Categories

Based on an assessment of occurrence probability and potential consequences, the TFD grouped Fire related hazards / emergency event threats into the following risk categories

- **Low Risk:** Illegal burning, vegetation fire, exterior trash fire, vehicle fire
- **Moderate Risk:** Structure fire in a single-family residence
- **High Risk:** Structure fire in a multi-family residence (apartment), strip malls, commercial/industrial buildings, hotels/motels
- **Maximum Risk:** Haz Mat Fires, Refinery Fire, High Rise Fire

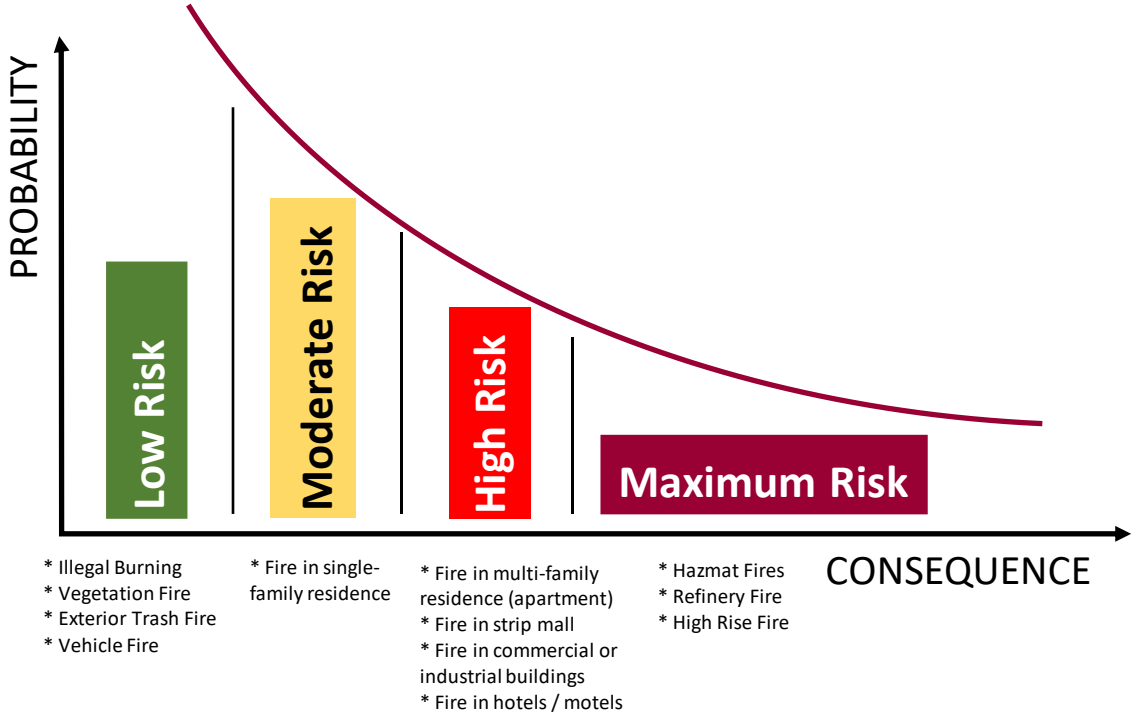


Figure 149: TFD Fire Risk Categorization

Fire Risk Categories by Planning Zone

Fire service demand data, from 2018-2022, indicated the following:

- Low Risk fires (including illegal burning, vegetation fire and trash fires) were more prevalent in planning zones 91 and 93.
    - Vehicle fires were most prevalent in planning zone 93.
- Planning zones 93 and 95 had the greatest service demand for reported structure fires.
    - Planning zone 93 had the highest number of high-risk fires.
- Refinery fires would be characteristic of planning zone 93 because of the Torrance Refining Company.
- A fire in a HazMat facility (other than the refinery) would be more likely in planning zones 91 or 92 based upon the location of HazMat critical facilities.
- A high-rise fire would be most likely in planning zone 96.

Technical Rescue Risk Categories

Based on an assessment of occurrence probability and potential consequences, the TFD grouped technical rescue related hazards / emergency event threats into the following risk categories:

- **Low Risk:** Child locked in, Elevator Entrapment
- **Moderate Risk:** Traffic Collision with entrapment, Vehicle into a building.
- **High Risk:** Confined Space Rescue, Trench Rescue, Rope Rescue, Industrial Accident/Entrapment, Building Collapse.
- **Maximum Risk:** High Risk incidents that include a MVI component or other complicating factors such as fire or natural disaster.

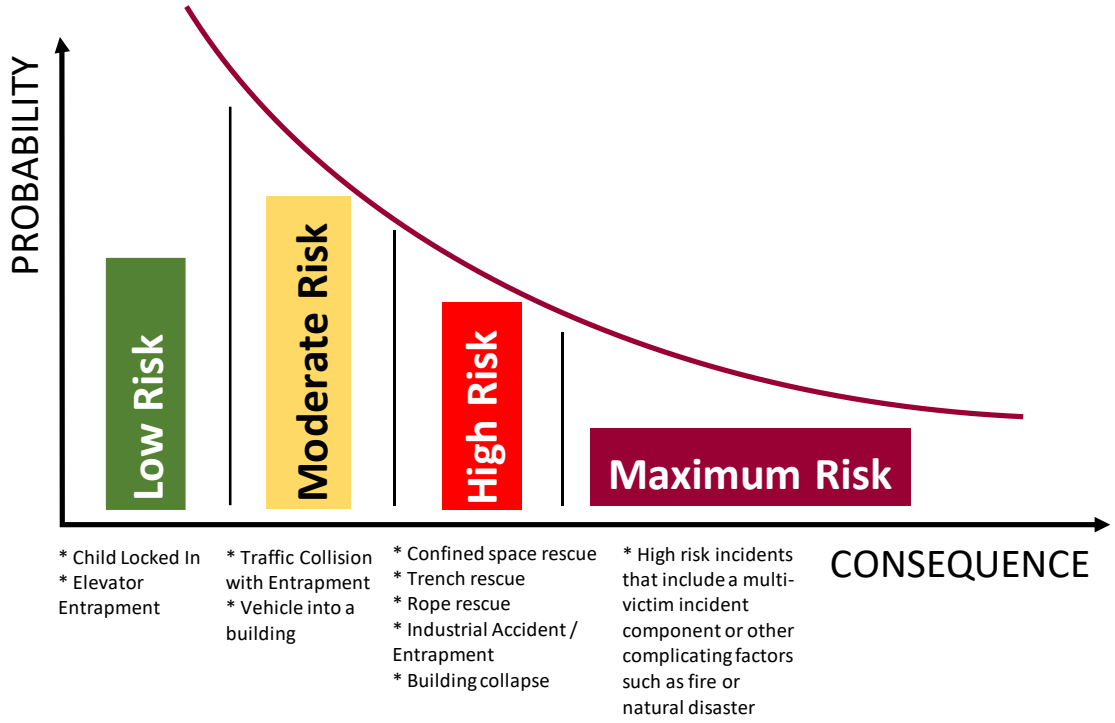


Figure 150: TFD Technical Rescue Risk Categorization

Technical Rescue Risk Categories by Planning Zone

Technical Rescue service demand data, from 2018-2022, indicated the following:

- Low Risk technical rescue incidents (most notably elevator entrapments) were more prevalent in planning zone 96 due to the greater presence of elevators at high rise buildings and the Del Amo Fashion Center (DAFC).
- Moderate Risk technical rescue incidents were more prevalent in planning zone 93. This is consistent with the other data that shows PZ93 with the highest number of traffic collisions.
- High Risk technical rescue service demand was present across multiple planning zones, however, the TFD is aware of the potential risks that certain target hazards have; such as a rope rescue on Butcher Hill (PZ92) or a confined space rescue at the Torrance Refining Company (PZ93).

Hazardous Materials Risk Categories

Based on an assessment of occurrence probability and potential consequences, the TFD grouped hazardous materials related hazards / emergency event threats into the following risk categories:

- **Low Risk:** Odor Complaint, Vehicle fluid spills, Refinery Report only (No apparatus dispatched), Refinery Single Engine response (Typically Code 2), CO Alarm, NPDES callout (no storm drain impact)
- **Moderate Risk:** Natural Gas Leak Outside, NPDES callout (with storm drain impact)
- **High Risk:** Active leak or spill that impacts public safety, Refinery HazMat Response
- **Maximum Risk:** Train Derailment

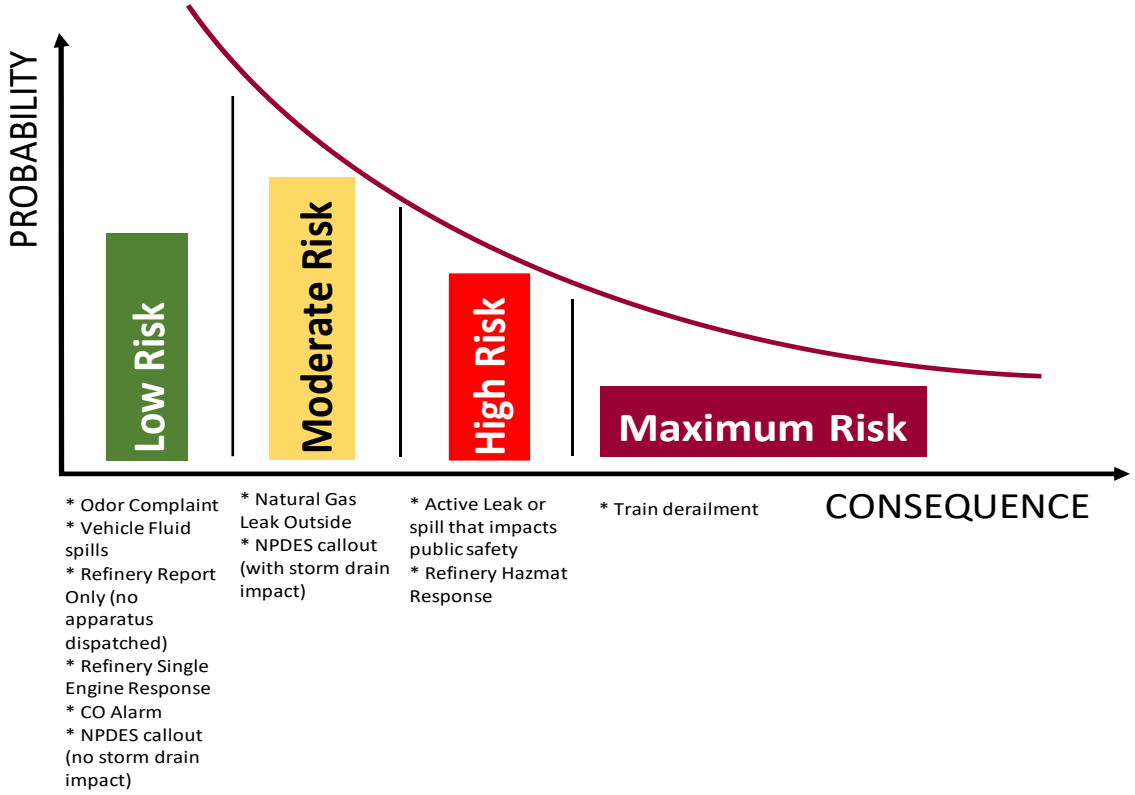


Figure 151: TFD Hazardous Materials Risk Categorization

Hazardous Materials Risk Categories by Planning Zone

Hazardous Materials service demand data, from 2018-2022, indicated the following:

- HazMat low risk incidents were most prevalent in planning zone 93 (PZ93). This correlates to the service demand for refinery reports and single engine responses to the Torrance Refining Company.
- HazMat moderate risk incidents were most noted in planning zones 91, 92 and 93. This is consistent with the location of Hazardous Materials critical facilities within the City.
- HazMat high risk incidents were most prevalent in PZ93.
- No Maximum Risk HazMat incidents occurred from 2018-2022, however, the location of active rail lines would indicate that planning zones 97, 91 and/or 95 would have the greatest risk of an event.

Aircraft Rescue and Fire Fighting Risk Categories

Based on an assessment of occurrence probability and potential consequences, the TFD grouped aircraft rescue and firefighting hazards / emergency event threats into the following risk categories:

- Low Risk: Aircraft experiencing minor difficulty
- Moderate Risk: None
- High Risk: Aircraft crash or crash is imminent (on airport grounds with no other compounding factors)
- Maximum Risk: Aircraft crash into a building or crash off airport property

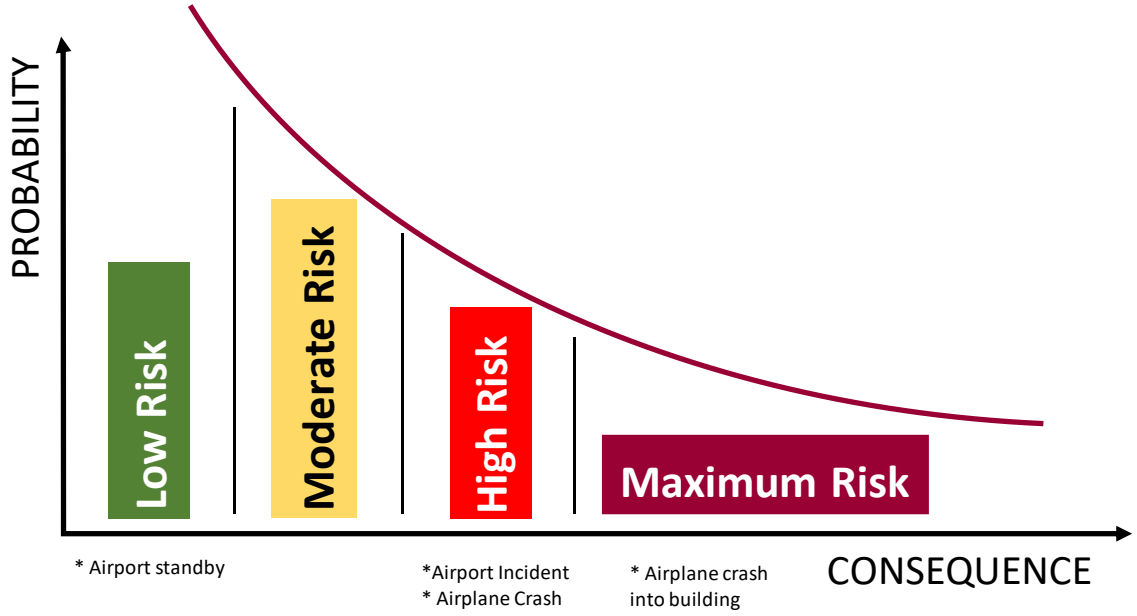


Figure 152: TFD Aircraft Rescue Risk Categorization

Note: The TFD does not identify a moderate risk category for airport incidents. Instead, aircraft that are experiencing major difficulty on approach to the airport have been included in the high-risk category. It is reasonable to consider that an incident with an aircraft experiencing major difficulty on approach could transition to an airplane crash while TFD units are en route.

Aircraft Rescue Risk Categories by Planning Zone

Aircraft Rescue incidents are concentrated in Planning Zone 92 due to the presence of the Torrance Municipal Airport.

Section 4 - Current Deployment Strategies and Coverage Performance

TFD Considerations for Deployment and Coverage Strategies

The elements of time and number of responders are critical considerations when evaluating deployment and coverage strategies. Simply stated, TFD deployment and coverage strategies are about the response time and the effectiveness of the response force required to initiate a proper attack or intervention.

Deployment strategies require that resources (engine, truck, rescue companies) are strategically distributed throughout the response area to produce response times that provide positive outcomes. Placing resources strategically allows the first due units to keep incidents from escalating in size, scope, and complexity. A quick response keeps minor or moderate emergencies from needing additional resources, which maintains the proper levels of resources within the rest of the community.

Distribution is where resources are strategically located throughout the city. Concentration is the Effective Response Force (i.e., number of resources) required in a given response area within the city based upon critical tasks that must be accomplished for expected outcomes. The distribution and concentration of resources is constantly evaluated based upon the number of calls for service, the risk factors of the area, the availability, reliability, and time of arrival of an effective response force, etc. By evaluating the impact of each risk type on the available resources the Department is able to strategically deploy resources and ensure optimal coverage capabilities. The community's threat of injury or loss increases as fire and emergency resources become depleted and are less available for emergency incident mitigation within the established time standards. The TFD is constantly evaluating the proper distribution and concentration of resources to meet the service demands of the city within the department budget. The probability and consequence and the community's service level expectation determine the concentration and distribution of TFD resources.

This distribution and concentration of resources strategy is illustrated in the below table:

	Meaning	Purpose
Speed of Response: "Distribution" • Location of resources • Response time	Total response time of first-due units strategically located across the community	Control emergencies without the incident escalating in size, scope, and complexity.
Effectiveness of Force: "Concentration" • Effective Response Force • Critical Tasking	Proper number of firefighters sent to effectively mitigate the incident	Assembling enough qualified personnel within a reasonable time frame to safely control the emergency.

Figure 153: Distribution and Concentration of Resources Strategy

The deployment strategy is to distribute well-trained, properly equipped personnel across the community for quick response to improve emergency outcomes, without spreading the crews so far apart that they cannot arrive in the proper concentration to be effective in major emergencies. Low and moderate risk fires and medical emergencies typically require only one or two resources with a quick response time to keep the incident from escalating; therefore, TFD sends only one or two resources leaving other units available for other potential incidents. This philosophy increases the systems reliability and resiliency to respond to other emergencies at the same time. Larger incidents require more resources and typically cause coverage issues in the rest of the community until units return to service. In either case, if the crews arrive too late or with too little trained personnel, they are drawn into a losing and more dangerous battle.

Typically, the longer it takes for TFD personnel to arrive at the emergency scene, the worse the outcome of the event. For that reason, the TFD considers the importance of time and its connection to better incident outcomes. The TFD considers four significant time-based factors:

- Cascade of Events
    - The Cascade of Events is a predictable sequence of events resulting from an act or event impacting the response system. The Cascade of Events starts from a state of normalcy and returns to a state of normalcy. By understanding the cascade, it is possible for the TFD to assess and predict future effects and their subsequent demands of the response system.
- Fire Behavior
    - The modern fire environment inside residential properties has changed dramatically. A scientific report from Underwriters Laboratories (UL) states that while the physics of fire development has not changed over time, the fire environment inside homes has evolved. Several factors including home size, geometry, flammability of contents, and construction materials have changed significantly. These factors result in faster fire growth, shorter time to flash over, rapid changes in fire dynamics, shorter escape times, and shorter time to structural collapse. Ultimately, these factors directly affect the safety and well-being of both citizens and firefighters. Given the science, it is critical that TFD continue to strive to limit total response times to structure fires by distributing fire engines, trucks, and rescues strategically to reduce travel time; and therefore, extinguish fires in the early stages
- Golden Hour
    - Time is also a factor for patients that meet trauma center criteria. For the best patient outcomes, patients must be in surgery within 1 hour from the time of the trauma occurring. This is known as “the golden hour”. For this reason, most trauma patients do not remain on the emergency scene and receive extensive treatments. Most patient treatment is provided while en route to the trauma center.
- Chain of Survival
    - The American Heart Association’s chain of survival is a metaphor for the elements of the emergency cardiovascular care systems concept. The graphic in Figure 154 from the American Heart Association’s website illustrates the chain of survival.

Figure 154: Chain of Survival. Source: American Heart Association

Much like the need to respond to fire quickly, the total response time to cardiac emergencies plays a critical role in patient outcome. Circulating blood that contains oxygen is required to keep tissues in the body alive and functioning. The brain may sustain damage after blood flow has been stopped for about 4 minutes. There is irreversible damage to the brain after blood flow has stopped for 7 minutes. To be successful, CPR should be started within 6 minutes of a person having a sudden cardiac arrest. Early recognition and activation of the emergency response system is a focus of the TFD public education program. Additionally, early and effective CPR and defibrillation increases patient survivability, even when performed by a lay rescuer. The arrival of trained EMT's and paramedics is a critical component to positive outcomes and was the foundation of the early paramedic program in Los Angeles County. Finally, transferring care to doctors at our world-class hospitals is the final link in the chain.

According to the American Heart Association, more than 350,000 people in the United States suffer from out-of-hospital cardiac arrest each year and just 12 percent survive. However, statistics show that if more people knew CPR, more lives could be saved. Immediate CPR can double, or even triple, a victim's chance of survival.

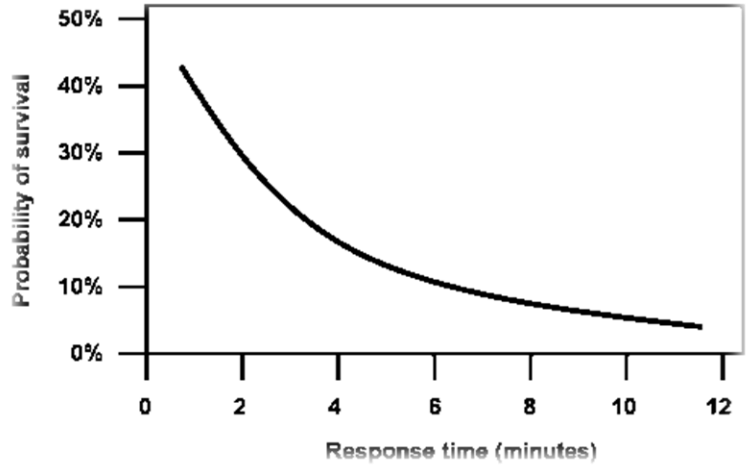


Figure 155: CPR Statistics. Source: JAMA/American Medical Heart Association

In addition to early CPR, early intervention into other cardiac related events can have a positive outcome. While many use the terms heart attack and cardiac arrest interchangeably, they are significantly different events. Cardiac arrest occurs when the heart malfunctions and stops beating unexpectedly. Cardiac arrest is triggered by an electrical malfunction in the heart that causes an irregular heartbeat (arrhythmia). With its pumping action disrupted, the heart cannot pump blood to the brain, lungs and other organs resulting in tissue death and irreversible effects.

A heart attack occurs when blood flow to the heart is insufficient resulting in damage. Generally speaking, a heart attack is a circulation problem, not an electrical issue. When oxygen rich blood is prevented from reaching cardiac tissue for a period of time, the part of the cardiac tissue that is normally nourished by the artery begins to die. Unlike with cardiac arrest, the heart usually does not stop beating during a heart attack. The longer the person goes without treatment, the greater the damage; thus the need to respond quickly with highly trained professionals to intervene with proven therapies for better patient outcomes. For these reasons, TFD believes that every second counts!

Total Response Time and Components

The TFD monitors and evaluates its deployment and performance by measuring the time it takes to respond to an incident and begin intervention. The total response time is a continuum of three separate time components: Alarm handling time, turnout time, and travel time. These components take both first due (distribution) and effective response force (concentration) into account.

The alarm handling time is measured from the time the call is initiated at the Public Safety Answering Point (PSAP), which is located at the Torrance Police Station, until the call is assigned in the dispatch system and sent to the responding apparatus. TFD operations personnel have very little impact on alarm handling times; with the exception of ensuring their response status is correct within the CAD.

The turnout and travel times are times that TFD operations personnel can directly impact through their performance. Turnout time measured from the time the unit is notified, gets to their apparatus, get dressed properly for the call type, and gets the wheels rolling out the door. Efficient turnout times ensure operations personnel respond safely with a sense of urgency. Travel time is measured from the time the unit is en route until they arrive on scene. Travel time can be altered slightly by a driver that uses good driving techniques and follows the proper route. Traveling safely at an effective speed should be the highest priority of the crew, not the rate of traveling speed. The TFD utilizes the Opticom platform on its apparatus and select intersections in the City in order preempt traffic signals to provide a temporary right of way to emergency vehicles. The system is intended to decrease response times and improve safety for emergency responders and the community. Total Response Time is measured from the alarm answering time until the apparatus arrives on scene and initiates action.

In order to effectively measure performance, the TFD sets benchmark performance statements and measures them against baseline performance.

Benchmark performance statements are goals or performance objectives that the Department aims to meet 90 percent of the time. Baseline performance describes measures that the Department is currently meeting 90 percent of the time.

Benchmark Time Chart

The following table summarizes the benchmark time targets for all risk classifications and categories. The established time targets are reflective of NFPA standards.

TFD Benchmark Time Target Table						
		EMS	**Fire**	**HazMat**	**Tech Rescue**	**Airport**
Alarm Handling	Pick-Up to Dispatch	1:04	1:04	1:04	1:04	1:04
Turnout Time	Turnout Time 1st In	1:00	1:20	1:20	1:20	1:20
Travel Time	Travel Time 1st In	4:00	4:00	4:00	4:00	4:00
	Travel Time Moderate ERF	8:00	8:00	8:00	8:00	N/A
	Travel Time High ERF	8:00	10:10	8:00	8:00	8:00
	Travel Time Max ERF	10:10	10:10	10:10	8:00	10:10
Response Time	Total Response Time 1st In	6:04	6:24	6:24	6:24	6:24
	Total Response Time Moderate ERF	10:04	10:24	10:24	10:24	N/A
	Total Response Time High ERF	10:04	12:34	10:24	10:24	10:24
	Total Response Time Max ERF	12:14	12:34	12:34	10:24	12:34

In addition, the following BLS Ambulance Time Targets have been established by the Torrance Fire Department. The time targets are reflective of NFPA standards and LA County EMS Agency guidelines for ambulance travel time:

- Pick up to Dispatch: 1:04
- Turnout Time: 1:00
- Travel Time: 8:00
- Total response time: 10:04

Effective Response Force and Critical Tasking

An effective response force (ERF) is the minimum amount of equipment and staffing that must reach the scene of emergency to accomplish an effective intervention strategy. The ERF consists of enough firefighters assembled on scene to safely control the emergency and keep it from escalating to a greater alarm incident. The community expects the TFD to be able to quickly and safely handle the typical emergency medical incident or a typical fire. Considering the TFD cannot arrive instantly to save every person or hold every fire to the room of origin, the department's response objective must always consider the effectiveness, efficiency, and reliability of the ERF to keep the community risk level reasonable. At the same, the department always considers the safety of the responders.

Critical tasking defines actions to be accomplished for positive outcomes at incidents. In developing critical tasks, TFD considered the size, scope, and, complexity of the event. Additionally, TFD considered the response capabilities of personnel and equipment. The determination and summation of critical tasks is

the foundation of an Effective Response Force for each response classification (e.g., fire, rescue). Critical Tasking provides answers to the "what and why" questions regarding the number of personnel and type of apparatus sent to an emergency scene. The justification for each of the tasks can be found in standard operating guidelines (SOG's) related to the particular call nature. SOG's are based on a combination of industry standards, laws and regulations, community expectations, available resources, and the training level of the responders. All critical tasks are consistent with the following goals and objectives:

Strategic Goals at all fires are (1) Life Safety, (2) Incident Stabilization, (3) Property Conservation, and (4) Safety, Accountability, and Welfare of all personnel working at the incident. Strategic goals will be met through the use of tactical objectives, support objectives and task assignments.

Tactical Objectives for TFD structure fires are REVAS: Rescue, Exposures, Ventilation, Attack, & Salvage. The incident will dictate the order of tactical objective assignments.

Support Objectives are secondary objectives at an emergency that are implemented based on the size, scope, and complexity of the fire. Support objectives include fire investigation, ambulance on scene, agency notification, city coverage for other incidents, Public Information Officer, police support, crew rotation and rehabilitation, and public notifications.

Situational Awareness is maintained by constantly evaluating the fire environment. All TFD personnel are trained to use problem solving techniques to increase situational awareness and make sound decisions. FADE is the acronym (Facts, Alternatives, Decisions, Evaluate) used for problem solving as incident information becomes available to firefighting personnel. As facts come in, they are addressed with multiple alternatives. A decision is made on what alternative to implement. The decision is implemented and evaluated for effectiveness. FADE always includes a risk/benefit analysis.

TFD Response Plan Strategy and Deployment Structure

The TFD employs a response plan strategy that is focused on sending the appropriate number and type of apparatus in a timely manner that allows trained firefighters to do their job in a safe and effective manner. While each emergency is unique and presents its own challenges, properly trained and equipped personnel are capable of forecasting and calling for additional resources when they are needed. Generally, the higher the risk or more complex the operation, the more resources will be needed. For example, more resources are required to effectively control a fire inside a building when a confirmed rescue problem is presented. On the flipside, fewer resources would be required for a vehicle fire that is not impinging upon a structure. Creating the appropriate level of response requires making decisions regarding the distribution and concentration of resources in relation to the potential demand of the incident, as well as being available for the next incident. The Incident Commander is the best equipped to make a decision on additional resources that may be needed to safely mitigate the incident.

In addition to emergency requests for service, the TFD does respond to a variety of low-risk requests for service such as citizen complaints, unusual odors, nuisance alarms, non-emergency police assist, etc. While these incidents do not require units to respond with the same sense of urgency as an emergency, the TFD does have a target of arriving in less than 15-minute travel time to maintain reliability of the system. While en route to these incidents, company officers are encouraged to monitor the radio traffic for emergency incidents in their area. If the company officer hears a higher priority call in their area, they are empowered to make themselves available for the emergency call. Empowering company officers to make decisions within their jurisdiction provides the highest level of service to the community. In these cases, the lower priority call will be handled by the next due unit.

Strategy for Apparatus and Staffing Structure

The TFD is an all-risk fire department responsible for safeguarding an area spanning over 21 square miles. TFD's frontline response personnel work on a 56-hour schedule, staffed across 14 frontline apparatus and one platoon commander unit. This is organized under a 48/96, 3 platoon shift schedule. Comprising 6 fire stations, TFD frontline personnel operate 7 engines, 2 tiller trucks, 5 paramedic rescues, and a platoon commander vehicle 24/7. The daily staffing for frontline responses stands at 44 sworn personnel.

In September of 2022, the TFD began "running down" 2 firefighter positions per day in response to an updated Memorandum of Understanding (MOU) with the Torrance Firefighter Association (TFFA). The run down took daily operations staffing from 46 personnel to 44 personnel by adjusting staffing on select engine companies from 4 personnel to 3 personnel. The intent is to consistently "run down" the same engine companies in order to provide consistency and predictability with staffing, however, adjustments may be made due to needed specialty positions and/or Department need. The run down is scheduled to continue until the end of 2023. In addition, staffing on one truck company (T96) was increased from 3 personnel to 4 personnel in order to accommodate additional truck training for probationary firefighters. As a result, staffing on one engine company was reduced from 4 personnel to 3 personnel. An analysis was conducted, utilizing predictive analytic software, to determine the best location of the 3-person engine companies in order to limit the impact on the Department's performance when delivering an effective response force (ERF) to fire incidents. E91, E95 and E96 were selected as the engine companies to be staffed with 3 personnel.

The department also staffs four (4) 24-hour BLS ambulances, two (2) peak staffed BLS ambulances (12-hour shifts, Monday through Saturday, and 8-hour shifts on Sunday) and one (1) 24-hour specialty ambulance that focuses on relieving frontline ambulances from extended wall times. These units are staffed with civilian Ambulance Operators. The daily staffing for the BLS units is 13 non-sworn personnel (Ambulance Operators).

The TFD's frontline Fire and BLS Ambulance apparatus and unit resources, including minimum daily staffing is listed in the tables below:

TFD Operations	
Apparatus	Staffing
Engine 91	3 Person
Engine 92	4 Person
Engine 93	4 Person
Engine 94	4 Person
Engine 95	3 Person
Engine 96	3 Person
Engine 97	4 Person
Truck 91	4 Person
Truck 96	4 Person
Rescue 91	2 Person
Rescue 93	2 Person
Rescue 94	2 Person
Rescue 95	2 Person
Rescue 96	2 Person
B91	1 Person
Total	**44 Sworn Response Personnel**

Figure 156: TFD Operations Apparatus Listing and Staffing

TFD BLS Ambulances	
Apparatus	Staffing
BLS 91	2 Person (24-hour)
BLS 92	2 Person (Peak staffed)
BLS 93	2 Person (24-hour)
BLS 94	2 Person (Peak staffed)
BLS 95	2 Person (24-hour)
BLS 96	2 Person (24-hour)
BLS 98 (specialty relief unit)	1 Person (24-hour)
Total	**13 Ambulance Operators (civilian, non-sworn)**

Figure 157: TFD BLS Ambulance Listing and Staffing

EMS Apparatus and Staffing Structure

All firefighters in the City of Torrance are either emergency medical technicians or paramedics. TFD staffs 5 ALS Rescue Ambulances/Squads (with 2 paramedics 24 hours a day at stations 1, 3, 4, 5, and 6), 5 ALS Assessment Engines (with at least 1 paramedic 24 hours a day at stations 1, 2, 3, 4, and 5), 2 BLS Engines (at stations 1 and 6), and 2 BLS Trucks (at stations 1 and 6). ALS units (2 paramedics) carry the full complement of advanced life support equipment and medications. Paramedic assessment units (1 paramedic) carry advanced life support equipment and some medication, which allow advanced care to be initiated prior to the arrival of the closest ALS unit. As a minimum, there are 15 paramedics on duty 24/7. In addition to the firefighter paramedics, many of our members that have promoted to Engineer or Captain maintain their paramedic certifications, so under normal conditions, there are generally more than 15 paramedics on duty each day. In July of 2023, the Department began a "Paramedic in Rank" program that allows the Engineer and/or Captain to function as the paramedic on a paramedic assessment engine.

In April of 2021, the TFD implemented an EMS Patient Transportation Program. The program was developed by Fire Department staff in response to the budgetary impacts of the COVID-19 pandemic and was subsequently approved by City staff and the Torrance City Council.

The transportation program had a phased implementation that allowed for units to be placed into service as personnel were trained and apparatus were secured. The Department consulted with a data analytic provider to conduct an analysis to guide the most appropriate locations for 24 hour and peak staffed units. The hours of service for the peak staffed units were based upon historical call volume (by time of day and day of the week).

Previously, the TFD contracted with a private provider to provide ambulances, staffed with 2 Emergency Medical Technicians (EMT), for the transportation of patients. As TFD ambulances were placed into service, the private provider decreased the number of private ambulances available in the City for response.

By June 2021, the TFD was staffing a total of (3) 24-hour ambulances and (1) peak staffed ambulance on select days of the week.

By the end of December 2021, the private party ambulances no longer provided ambulance coverage for the City.

By April 2022, the TFD was staffing a total of (4) 24-hour ambulances, (2) peak staffed ambulances on select days of the week and (1) peak staffed APOT unit. The Ambulance Patient Offload Time (APOT) unit was staffed with one EMT who was appointed to relieve ambulances waiting to offload patients at impacted hospitals so that they could return to service for additional incidents.

Currently, 35 civilian ambulance operators (EMTs), staff four (4) 24-hour BLS ambulances and two (2) peak staffed BLS ambulances (12-hour shifts Monday through Saturday and 8 hour shifts on Sunday). Each BLS Ambulance is staffed with 2 Ambulance Operator EMTs. For BLS level calls, BLS ambulances receive a transfer of care following assessment/treatment from a Rescue/Squad, Engine, or Truck, and then provide patient care and transport to the hospital. For ALS level calls, the BLS ambulance provides the transport, however paramedics provide patient care in the back of the ambulance. BLS Ambulances are located at each Fire Station throughout the City to provide maximum coverage. In response to increasing ambulance patient offload times (APOT), TFD also staffs an APOT unit (24 hours a day), that consists of 1 EMT

Ambulance Operator. The role of this EMT is to assume care of up to 4 BLS patients at the hospital so that TFD ambulances, that are waiting to offload patients, can be made available to respond to calls.

Fire Suppression Apparatus and Staffing Structure

At all times, the department is staffed with 44 sworn personnel, all of whom are trained to perform fire suppression tasks. The Department staffs 7 front line fire engines with 3 or 4 personnel and are capable of producing 1500 gpm at draft. Additionally, each engine company carries 500 gallons of water and a built in foam tank capable of delivering Class A foam. The Department staffs 2 tiller operated trucks, each staffed with 4 personnel. The truck companies are strategically located at Station 1 and Station 6 to provide the best overall coverage for the city. Additionally, the Department staffs 5 two-person paramedic rescues. All TFD paramedics are trained firefighters capable of performing all engine and truck company tasks.

Hazardous Materials Apparatus and Staffing Structure

A minimum of 5 State Certified Hazardous Material Specialists, assigned to E96 and E91, are on duty at all times. These engines carry special monitors to detect hazardous airborne chemicals in the event of an odor complaint or possible release. These members also cross staff Hazmat 96 (HM-96). HM-96 carries a combination of resources for investigating possible hazardous materials, and incident mitigation in the event of a hazardous materials release. This cache includes chemical identification kits, patches and plugs, chemical suits, decontamination equipment, etc. Along with their initial training, the Hazmat team follows an extensive training program. In a large-scale incident, other agencies from neighboring communities may be utilized to augment our team. All other TFD personnel are state certified operations level personnel trained to respond in a defensive manner.

Technical Rescue Apparatus and Staffing Structure

Both TFD truck companies are equipped with basic equipment to perform rope rescue, vehicle extrication, elevator entrapments, etc. For a larger scale or a more complex emergency, the TFD has a well-equipped Urban Search and Rescue vehicle (USAR 96). USAR 96 is housed at station 1, and is cross staffed with truck company personnel when needed. All personnel that are permanently assigned to a truck company are trained in Rescue Systems 1 & 2, Trench Rescue, Confined Space Rescue, and Auto Extrication.

In addition, the TFD supports the California Regional Task Force 2 (RTF-2) by providing trained employees to respond to technical rescue incidents throughout the region and state.

Aircraft Rescue Apparatus and Staffing Structure

The Torrance Fire Department (TFD) operates an engine from Fire Station 2, which is conveniently situated adjacent to Zamperini Field, also known as Torrance Municipal Airport. This station accommodates a sole triple combination pumper, equipped with a 500-gallon water tank, 40 gallons of foam, and capable of delivering 1500 gallons per minute (gpm). Engine 92 (E92) is further outfitted with an FAA radio and aircraft rescue hand tools, specifically designed for potential airplane crash scenarios. E92 ensures continuous coverage for the local area. The airport premises are staffed by City of Torrance employees between 6:00 am and 10:00 pm daily, facilitated by the Airport Response Unit 102. This specialized unit works in collaboration with E92 personnel to manage critical aspects like aircraft information, accident reporting, and compliance with Federal Aviation Administration (FAA) regulations.

Methodology for Measuring Coverage Performance

Data set Identification

The data used to analyze coverage performance was obtained from the department's record management system (RMS). Incident data (including incident location, call nature, times, etc.) from the computer aided dispatch (CAD) program, that is managed by the Torrance Public Safety Dispatch Center, populates the department's RMS. Performance analysis is conducted on incidents by the CAD call nature at the time of incident. The RMS system queries the CAD every minute, until the incident is closed, in order to reflect the most accurate call nature. Data from the RMS system is then uploaded into a CAD Analyst and Deployment software program for summary analysis. In addition, structure fire call natures are separated into Moderate Risk or High-Risk categories by post processing the data by NFIRS occupancy type code. The data analysis for this CRA/SOC is based on data from 1/1/2018 through 12/31/2022.

Data Quality

The RMS data is quality controlled by one of the TFD Administrative Analysts to ensure consistent and accurate reporting. Data outside of set perimeters are indicated by an error message in the RMS system. Error messages are forwarded to the TFD IT personnel for investigation and correction when necessary. When the investigation reveals the data is accurate, the values that are outside the timeframes remain unchanged. In addition, Operations personnel may submit data correction requests, in response to errors and warning messages while filling out incident reports, when known errors exist. (For example, a technical issue that prevented accurate status changes). TFD IT personnel evaluate the request and make changes when appropriate. Furthermore, the data analytic software utilized by the Department is reviewed by the Planning Division and software analysts, at least annually, to ensure that any changes to apparatus, resource deployment or incident types are updated in the software.

Outlier Policy

The establishment of thresholds for Alarm Handling, Turnout, Travel, and Total Response Time is a matter of deciding which data is to be included in an analysis and which is to be excluded.

In order to establish the upper and lower thresholds, all interval times needed to be reviewed in the aggregate. However, some limitations were required to ensure that the analysis was based on the correct data. The following parameters were used to limit the analysis:

- Only Code-3 calls were included.
- All permanently staffed apparatus were included in the analysis.
- All incidents that had a "null" value in the en route, arrival, or dispatch time were excluded.
- Mutual aid given was excluded.

The upper threshold is the highest value included in the analysis. All values above will be excluded from 2018 and beyond. All values equal to or below the lower threshold – which in the case of the intervals analyzed here are only values "null" and missing values- are excluded.

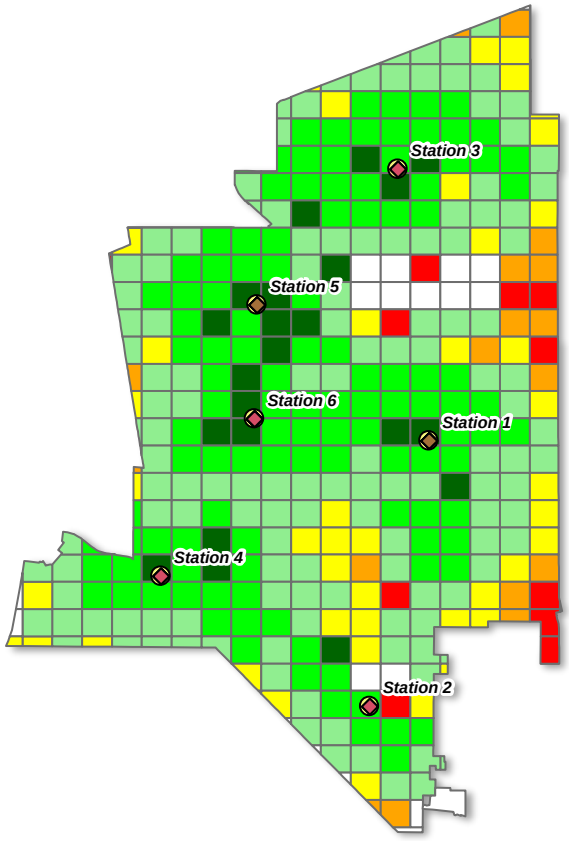
The following chart shows the upper threshold limits set for data that have been used for deployment modeling purposes since 2018.

Time #1	Time #2	Timeframe Definition	Upper Threshold	Percentage Captured
Time Received	Time Dispatched	Alarm Handling	5 minutes	98.7%
Time Dispatched	Time En Route	Turnout Time	5 minutes	98.6%
Time En Route	Time On Scene	Travel Time	15 minutes	98.4%
Time Received	Time On Scene	Total Response Time	20 minutes	99.6%

Figure 158: Upper Threshold Limits

Overall Code 3 (Emergency) Response Time Performance Maps

The map below provides a visual indicator of where TFD baseline performance by ¼ mile CAD quadrants for calendar years 2018-2022. This map accounts for 66,052 Code 3 responses. Areas in dark green are within the performance benchmark while areas in red are meeting the benchmark on less than 20% of all Code 3 responses. The legend below provides further clarification on the map colors. Overall TFD is 77% in compliance with the Code 3, total response time benchmark standards, for the arrival of the first unit on scene. The following pages indicate the same performance data specific to each planning zone.



Overview of entire City

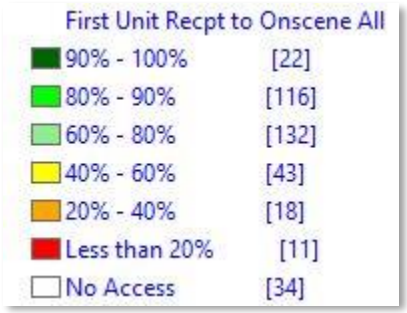


Figure 159: TFD Overall Code 3 2018-2022 Response Time Performance Map - City Overview

All Code 3 (Law/Fire) - 90th Percentile Times Performance			2018-2022 (Baseline)	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:59	2:09	2:05	1:58	1:49	1:54
Turnout Time	Turnout Time 1st Unit	Urban	1:36	1:23	1:16	1:24	1:39	2:03
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:57	5:16	5:00	4:50	4:46	4:48
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	7:32	7:52	7:28	7:17	7:18	7:38
			n= 66,052	n= 14,266	n= 12,884	n= 11,769	n= 13,478	n= 13,655

Figure 160: TFD Overall Code 3 Response Time Performance Chart 2018-2022

Planning Zone 91

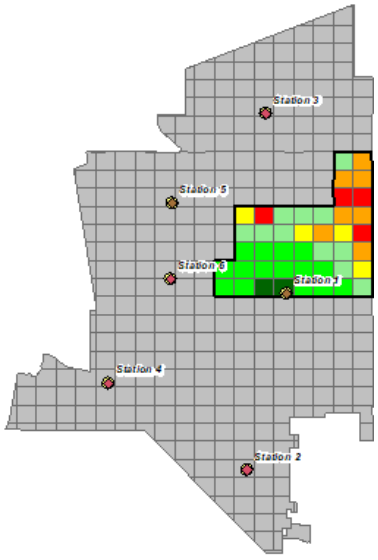


Figure 161: Planning Zone 91 - TFD 90th Percentile Response Time Performance 2018-2022

The above map visually indicates the performance of TFD at the 90th percentile for total response time performance, for the first arriving unit, within Planning Zone 91. The 90th percentile baseline time is **7 minutes and 42 seconds**. TFD units responded in compliance with the benchmark **76%** of the time in Planning Zone 91.

Planning Zone 92

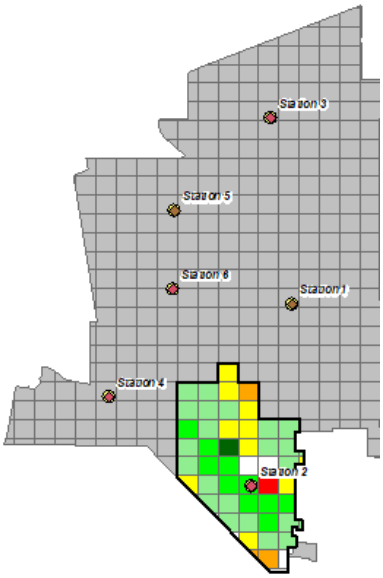


Figure 162: Planning Zone 92 - TFD 90th Percentile Response Time Performance 2018-2022

The above map visually indicates the performance of TFD at the 90th percentile for total response time performance, for the first arriving unit, within Planning Zone 92. The 90th percentile baseline time is **7 minutes and 45 seconds.** TFD units responded in compliance with the benchmark **72%** of the time in Planning Zone 92.

Planning Zone 93

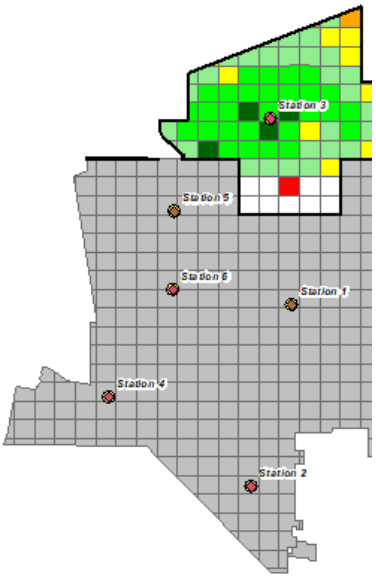


Figure 163: Planning Zone 93 - TFD 90th Percentile Response Time Performance 2018-2022

The above map visually indicates the performance of TFD at the 90th percentile for total response time performance, for the first arriving unit, within Planning Zone 93. The 90th percentile baseline time is **7 minutes and 43 seconds.** TFD units responded in compliance with the benchmark **76%** of the time in Planning Zone 93.

Planning Zone 94

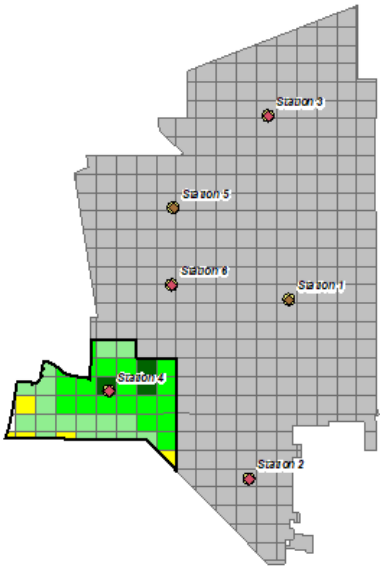


Figure 164: Planning Zone 94 - TFD 90th Percentile Response Time Performance 2018-2022

The above map visually indicates the performance of TFD at the 90th percentile for total response time performance, for the first arriving unit, within Planning Zone 94. The 90th percentile baseline time is **7 minutes and 30 seconds**. TFD units responded in compliance with the benchmark **80%** of the time in Planning Zone 94.

Planning Zone 95

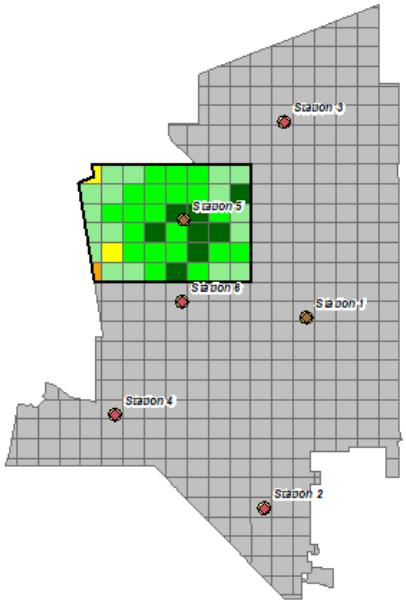


Figure 165: Planning Zone 95 - TFD 90th Percentile Response Time Performance2018-2022

The above map visually indicates the performance of TFD at the 90th percentile for total response time performance, for the first arriving unit, within Planning Zone 95. The 90th percentile baseline time is **6 minutes and 58 seconds**. TFD units responded in compliance with the benchmark **84%** of the time in Planning Zone 95.

Planning Zone 96

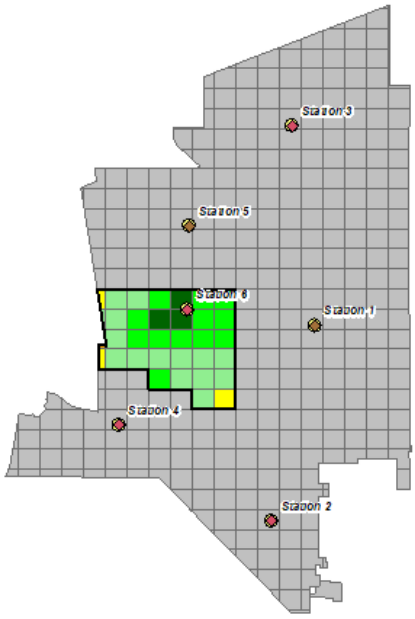


Figure 166: Planning Zone 96 - TFD 90th Percentile Response Time Performance 2018-2022

The above map visually indicates the performance of TFD at the 90th percentile for total response time performance, for the first arriving unit, within Planning Zone 96. The 90th percentile baseline time is **7 minutes and 10 seconds**. TFD units responded in compliance with the benchmark **80%** of the time in Planning Zone 96.

Planning Zone 97

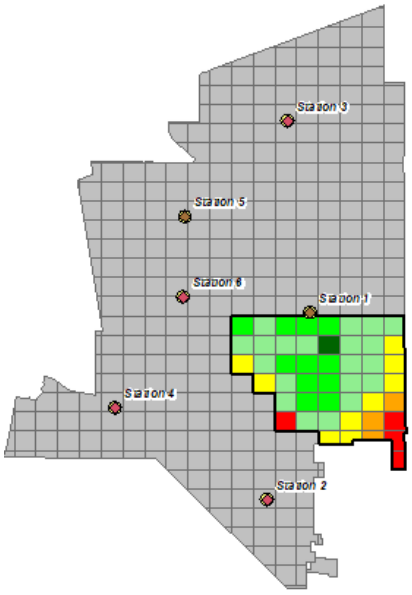


Figure 167: Planning Zone 97 - TFD 90th Percentile Response Time Performance 2018-2022

The above map visually indicates the performance of TFD at the 90th percentile for total response time performance, for the first arriving unit, within Planning Zone 97. The 90th percentile baseline time is **7 minutes and 52 seconds**. TFD units responded in compliance with the benchmark **68%** of the time in Planning Zone 97.

Emergency Medical Services Deployment Strategies and Coverage Performance

EMS Critical Task Definitions

Basic Life Support (BLS) – Medical treatments that include a patient assessment and interventions for circulation, airway, breathing and minor injuries. These skills are performed by an Emergency Medical Technician (EMT).

Advanced Life Support (ALS) – Medical treatments that include BLS interventions along with more advanced therapies such as advanced airways, administration of medications, cardiac monitoring, and the establishment of an IV. These skills are performed by a paramedic.

Patient Assessment – A primary and secondary appraisal of a patient's medical condition, injuries, chief complaint, and treatment needs.

Defibrillation – The administration of a controlled electric shock in order to allow for the restoration of a normal heart rhythm.

Documentation – The documentation of patient assessment findings and treatments through online and offline medical control procedures.

Patient Transportation – The delivery of a patient from the scene of the emergency to the appropriate medical facility.

Multi – Casualty Incident (MCI) - The combination of numbers of ill/injured patients and the type of injuries going beyond the capability of an agency's normal first response. Guidelines for contacting the LA County EMS Agency Medial Alert Center for patient destination and bed availability is for 5 or more patients.

Medical Communication (Med Com) – In an MCI, the position responsible for establishing communications with the Medical Alert Center (MAC) or designated base hospital to obtain status of available hospital beds. Assigns appropriate patient destinations based on available resources.

Triage Unit Leader – In an MCI, the position responsible for implementing the triage process (sorting of patients by severity) and coordinating the movement of patients to the appropriate treatment area.

Treatment Unit Leader – In an MCI, the position responsible for establishing and managing treatment areas, preparing patients for transport and moving patients to loading location(s).

Ground Ambulance Coordinator – In an MCI, the position responsible for managing the ambulance staging area and requests additional ambulance/transportation resources as needed.

Rescue Group Supervisor – In an active shooter incident, the position that coordinates the formation and deployment of rescue task forces (RTFs), composed of both Fire Department and Police Department personnel, to find patients, triage patients, treat with lifesaving interventions and extract patients to safe treatment areas.

Low Risk EMS incident Deployment Strategies and Coverage Performance

Critical Tasking

EMS – Low Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Incident command • Scene safety • BLS patient assessment • BLS skills • Documentation • Ambulance coordination, if needed.	2	Engine or Truck	3 (4)
Totals	2		3 (4)

Figure 168: TFD Critical Tasking for EMS – Low Risk

EMS – Low Risk incidents are typically "lift assist" calls that receive the closest engine or truck company. However, the incident could also be mitigated by a rescue, staffed by 2 paramedics. Once on scene and an assessment is completed, TFD personnel may request additional units to assist with more advanced treatment and transport, if needed.

EMS – Low Risk incidents have an established ERF of 2 personnel. The ERF is met by deploying a single unit (staffed by a minimum of 3 personnel), which is also considered the first arriving unit for performance measurement purposes.

EMS – Low Risk Benchmark Statement:

For 90 percent of all EMS - Low Risk incidents, the total response time for the arrival of the first-arriving unit (and effective response force -ERF), staffed with a minimum of 3 emergency medical technicians (EMTs) or 2 paramedics, shall be **6 minutes and 4 seconds**. (The first arriving unit meets the ERF requirement). The first-arriving unit shall be capable of establishing command, evaluating the need for additional resources and initiating basic life support.

EMS – Low Risk Baseline Statement:

For 90 percent of all EMS - Low Risk incidents, the total response time for the arrival of the first-arriving unit and effective response force (ERF), staffed with a minimum of 2 paramedics or 3 emergency medical technicians (EMTs), was **10 minutes and 21 seconds**. The first-due unit was capable of establishing command, evaluating the need for additional resources and initiating basic life support.

(Low Risk) EMS - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	1:49	**0:45**	2:00	1:50	1:52	1:36	1:39
Turnout Time	Turnout Time 1st Unit	Urban	1:00	2:48	**1:48**	2:04	2:05	2:16	2:56	3:10
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	7:36	**3:36**	8:24	8:08	8:14	6:05	6:21
	Travel Time ERF **Concentration**	Urban	N/A	N/A	**N/A**	N/A	N/A	N/A	N/A	N/A
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:04	10:21	**4:17**	11:13	10:36	10:40	9:57	9:53
				n=713		n=149	n=119	n=82	n=153	n=210
	Total Response Time ERF **Concentration**	Urban	N/A	N/A	**N/A**	N/A	N/A	N/A	N/A	N/A
				n=		n=	n=	n=	n=	n=

Figure 169: EMS Low-Risk Performance Table 2018-2022

Moderate Risk EMS incident Deployment Strategies and Coverage Performance

Critical Tasking

EMS – Moderate Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Incident command • Scene safety • Apparatus placement • Ambulance coordination • BLS skills	1 (Can be the Rescue Driver or 1 person from the Engine/Truck Company)	Engine or Truck	3 (4)
• BLS patient assessment • Documentation • Ambulance communications	1	Rescue	2
• Patient Transportation	2	BLS Ambulance	2
Totals	4		7 (8)

Figure 170: TFD Critical Tasking for EMS – Moderate Risk

EMS – Moderate Risk incidents have an established ERF of 4 personnel and receive an initial dispatch of a rescue, an engine or truck company, and a BLS ambulance. The ERF is met by the arrival of the BLS

ambulance and either the engine/truck or rescue. Once the first arriving unit verifies that the incident only requires Basic Life Support (BLS) level treatment and there are no incident factors that require additional personnel, the second responding apparatus may be cancelled by the first arriving unit. In the case of a rescue arriving on scene first and determining the call to only require BLS care, then the 2 paramedics would handle all critical tasks. If an engine or truck arrives first, the critical tasks may be distributed amongst the three or four personnel to bring the incident to conclusion. If there is any doubt about the need for additional help to accomplish critical tasks in a timely manner, then the second responding unit should arrive and apply the EMS – High Risk critical tasks table. All EMS – Moderate Risk calls receive a TFD BLS Ambulance for transportation. The BLS Ambulance is staffed with a minimum of 2 Ambulance Operators trained to the minimum level of emergency medical technicians (EMT).

EMS – Moderate Risk Benchmark Statement:

For 90 percent of all EMS - Moderate Risk incidents, the total response time for the arrival of the first-arriving unit, staffed with a minimum of 2 paramedics or 3 emergency medical technicians (EMTs), shall be 6 minutes and 4 seconds. The first-due unit shall be capable of establishing command, evaluating the need for additional resources, initiating early defibrillation, initiating basic life support actions in accordance with Los Angeles County EMS protocol, and assisting transport personnel with packaging the patient for a safe ride to the local hospital.

For 90 percent of all EMS – Moderate Risk incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 2 paramedics or 3 emergency medical technicians (EMTs), and 2 ambulance operators, shall be 10 minutes and 4 seconds. The ERF shall be capable of establishing command, evaluating the need for additional resources, initiating early defibrillation, initiating basic life support actions in accordance with Los Angeles County EMS protocol, assisting transport personnel with patient packaging, and delivering the patient from the scene of the emergency to the appropriate medical facility.

EMS – Moderate Risk Baseline Statement:

For 90 percent of all EMS - Moderate Risk incidents, the total response time for the arrival of the first-arriving unit, staffed with a minimum of 2 paramedics or 3 emergency medical technicians (EMTs), was 7 minutes and 19 seconds. The first-due unit was capable of establishing command, evaluating the need for additional resources, initiating early defibrillation, initiating basic life support actions in accordance with Los Angeles County EMS protocol, and assisting transport personnel with packaging the patient for a safe ride to the local hospital.

For 90 percent of all EMS – Moderate Risk incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 2 paramedics or 3 emergency medical technicians (EMTs), and 2 ambulance operators, was 11 minutes and 38 seconds. The ERF was capable of establishing command, evaluating the need for additional resources, initiating early defibrillation, initiating basic life support actions in accordance with Los Angeles County EMS protocol, assisting transport personnel with patient packaging, and delivering the patient from the scene of the emergency to the appropriate medical facility.

(Moderate Risk) EMS - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	2:00	**0:56**	2:09	2:09	2:01	1:45	1:47
Turnout Time	Turnout Time 1st Unit	Urban	1:00	1:30	**0:30**	1:22	1:15	1:21	1:32	1:48
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	4:53	**0:53**	5:10	4:56	4:44	4:38	4:42
	Travel Time ERF **Concentration**	Urban	4:00^ 8:00*	4:41^ 9:21*	**0:41^** **1:21***	9:15*	4:39^ 9:28*	4:44	4:38	4:42
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:04	7:19	**1:15**	7:45	7:25	7:11	7:02	7:12
				n= 26,741		n= 6,147	n= 5,347	n= 4,876	n= 5,248	n= 5,123
	Total Response Time ERF **Concentration**	Urban	6:04^ 10:04*	7:08^ 11:38*	**1:04^** **1:34***	11:38*	7:03^ 11:39*	7:11	7:02	7:12
				n= 16,446^ 8,723*		n= 5,563*	n= 1,199^ 3,160*	n= 4,876	n= 5,248	n= 5,123

Figure 171: EMS Moderate-Risk Performance Table 2018-2022

TFD began phasing in the BLS ambulance patient transportation program in April 2021 and still partnered with a third-party provider to supplement ambulance coverage. The TFD became the sole provider of patient transportation as of January 2022, with continued modifications and enhancements to the program. The TFD redefined the parameters for a Moderate Risk EMS Effective Response Fore (ERF) beginning of April 2021.

Prior to April 2021, the ERF was met by the first arriving unit (rescue or engine/truck).
As of April 2021, the ERF was met by the arrival of the first arriving rescue or engine/truck and a TFD BLS unit.

^ Jan 2018 – Mar 2021. Moderate Risk EMS ERF was met with the arrival of the 1st unit.
*Apr 2021 – Dec 2022. Moderate Risk EMS ERF was met with the arrival of the 1st unit and BLS unit.

High Risk EMS incident Deployment Strategies and Coverage Performance

Critical Tasking

EMS – High Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Incident Command • Scene safety • Apparatus placement • Ambulance coordination • BLS skills	2 minimum. (In most cases 3 or 4 personnel arrive on an engine or truck company).	Engine or Truck	3 (4)
• ALS patient care • Documentation • Hospital communications	2	Rescue	2
• Patient Transportation	2	BLS Ambulance	2
Totals	6		7 (8)

Figure 172: TFD Critical Tasking for EMS-High Risk

EMS High-Risk incidents include Advanced Life Support level incidents including allergic reactions, airway problems, chest pain, cardiac arrest, unconscious, man down, seizures, strokes, shootings, etc.

EMS – High Risk calls receive a dispatch of an engine or truck, rescue company, and BLS ambulance. EMS – High Risk calls always require a minimum of 2 paramedics capable of providing Advanced Life Support (ALS) level care in accordance with LA County EMS protocol. The BLS Ambulance is staffed with a minimum of 2 Ambulance Operators trained to the minimum level of emergency medical technicians (EMT).

EMS – High Risk Benchmark Statement

For 90 percent of all EMS – High Risk incidents, the total response time for the arrival of the first-arriving unit, staffed with a minimum of 2 paramedics or 3 emergency medical technicians (EMTs), shall be **6 minutes and 4 seconds**. The first-due unit shall be capable of assessing scene safety, establishing command, evaluating the need for additional resources, conducting an initial patient assessment, initiating basic life support, and initiating early defibrillation.

For 90 percent of all EMS – High Risk incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 2 paramedics, a minimum of 4 operations personnel total, and 2 ambulance operators shall be **10 minutes and 4 seconds**. The ERF shall be capable of conducting a comprehensive patient assessment; obtaining vitals and a detailed medical history of the patient; initiating advanced life support actions in accordance with Los Angeles County EMS protocol; assisting transport personnel with packaging the patient, delivering the patient from the scene of the emergency to the appropriate medical facility, and caring for the patient until care is transferred to an equal or higher medical authority at the receiving facility.

EMS – High Risk Baseline Statement

For 90 percent of all EMS – High Risk incidents, the total response time for the arrival of the first-arriving unit, staffed with a minimum of 2 paramedics or 3 emergency medical technicians, was **7 minutes and 2 seconds.** The first-due unit was capable of establishing command, evaluating the need for additional resources, initiating basic life support, and early defibrillation.

For 90 percent of all EMS – High Risk incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 2 paramedics, a minimum of 4 operations personnel total, and 2 ambulance operators was **12 minutes and 04 seconds**. The ERF was capable of conducting a comprehensive patient assessment; obtaining vitals and a detailed medical history of the patient; initiating advanced life support actions in accordance with Los Angeles County EMS protocol; assisting transport personnel with packaging the patient, delivering the patient from the scene of the emergency to the appropriate medical facility, and caring for the patient until care was transferred to an equal or higher medical authority at the receiving facility.

(High Risk) EMS - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	1:44	**0:44**	1:56	1:51	1:42	1:33	1:34
Turnout Time	Turnout Time 1st Unit	Urban	1:00	1:29	**0:29**	1:17	1:14	1:21	1:31	1:49
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	4:44	**0:44**	5:04	4:49	4:40	4:33	4:32
	Travel Time ERF **Concentration**	Urban	4:00^ 8:00*	6:59^ 9:59*	**2:59^ 1:59***	10:06*	6:54^ 9:46*	6:55	7:00	7:03
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:04	7:02	**0:58**	7:26	6:59	6:50	6:46	7:00
				n= 28,695		n= 6,109	n= 5,651	n= 5,307	n= 5,887	n= 5,741
	Total Response Time ERF **Concentration**	Urban	6:04^ 10:04*	9:16^ 12:04*	**3:12^ 2:04***	12:11*	9:10^ 11:52*	9:06	9:08	9:26
				n= 16,647^ 7,456*		n= 4,666*	n= 1,185^ 2,790*	n= 4,801	n= 5,306	n= 5,355

Figure 173: EMS High-Risk Performance Table 2018-2022

Prior to April 2021, the ERF was met by the arrival of the rescue and engine/truck.
As of April 2021, the ERF was met by the arrival of the first arriving rescue and engine/truck and a TFD BLS unit.

^ Jan 2018 – Mar 2021. High Risk EMS ERF was met with the arrival of the rescue and engine/truck.
*Apr 2021 – Dec 2022. High Risk EMS ERF was met with the arrival of the rescue and engine/truck and TFD BLS unit.

Maximum Risk EMS incident Deployment Strategies and Coverage Performance

Critical Tasking

EMS – Maximum Risk			
Tasks	Min Personnel Needed	Current Deployment (Medical Level 1 Response)	
		Apparatus	Staffing
• Establish command • Complete 360 size-up • Identify Hazards • Initiate Triage	3	First Engine	3 (4)
• Triage Unit Leader • Medical Communications (Med Com)	2	First Rescue	2
• Treatment Unit Leader • Patient Loading Coordinator • Establish Treatment Areas (Immediate, Delayed, Minor)	3	Second Engine	3 (4)
• Assist Triage Unit • Litter Bearers	3	Third Engine	3 (4)
• Assist with establishing and/or managing Treatment Areas	4	Fourth Engine	4
• Rescue Group Supervisor, if needed • Patient Transportation Unit Leader • Ground Ambulance Coordinator	4	First Truck	4
• Assist with establishing and/or managing Treatment Areas	2	Second Rescue	2
• Assist Triage or Treatment Unit, as needed	2	Third Rescue	2
• Assist with Triage or Treatment Unit, as needed	2	Fourth Rescue	2
• Incident Command/Safety	1	Platoon Commander	1
• Patient Transportation	12	TFD BLS Amb. (6)	12
	4	Mutual Aid Amb. (2)	4
• Contacted for notification purposes • May assist with general command duties • May assume B92 duties	1	Additional Staff (AC's)	1
• Law Branch	1	TPD Sergeant	1
Totals	**44**		44 (47)

Figure 174: TFD Critical Tasking for EMS – Maximum Risk

EMS – Maximum Risk incidents include Multi Casualty Incidents (MCI). An MCI can be complex incidents that require not only the triage, treatment, and transport of patients but also the mitigation of other

hazards based upon the nature of the incident. For EMS Maximum Risk incidents, the TFD deploys a Medical Level 1 response. Incident Commanders should request additional Medical Alarm Levels and/or specialty resources to effectively mitigate the incident. In order to meet patient transportation needs of the ERF, the TFD utilizes a combination of its own resources and mutual aid ambulances that are requested through the Los Angeles County Fire Operational Area Coordinator (FOAC).

EMS – Maximum Risk Benchmark Statement:

For 90 percent of all EMS – Maximum Risk incidents, the total response time for the arrival of the first-due unit, staffed with a minimum of 2 paramedics or 3 emergency medical technicians, shall be **6 minutes and 4 seconds**. The first-due unit shall be capable of assessing scene safety, establishing command, evaluating the need for additional resources, triaging patients, initiating life-saving interventions and providing basic life support treatment.

For 90 percent of all EMS – Maximum Risk incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 44 personnel, shall be **12 minutes and 14 seconds**. The ERF shall be capable of assessing scene safety, establishing command, evaluating the need for additional resources, mitigating hazards, removing trapped patients, triaging patients, initiating life-saving interventions, providing basic life support and advanced life support treatment, establishing treatment areas, coordinating with LA County Medical Alert Center for transportation destinations, and delivering the patients from the scene of the emergency to the appropriate medical facility.

EMS – Maximum Risk Baseline Statement:

From 2018-2022, there were no EMS Maximum incidents that resulted in the deployment of a Medical Level 1 response.

There was a total of 12 incidents that met the LA County EMS Agency's guidelines for contacting the Medical Alert Center (MAC) for an MCI because they involved more than 5 patients. The incident with the greatest number of patients was a multiple shooting with a total number of 7 patients. Ten of the twelve incidents were as a result of a traffic collision. In all instances, the first on scene unit requested the necessary number of resources to effectively mitigate the incident, however, it did not rise to the defined size of an EMS Maximum Risk ERF.

(Maximum Risk) EMS - 90th Percentile Times Performance	Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018

Figure 175: EMS Maximum-Risk Performance Table 2018-2022

No EMS Maximum Risk incidents occurred from 2018 - 2022.

BLS Unit Deployment and Performance Strategy

BLS Unit Deployment Benchmark Statement:

For 90 percent of all BLS Ambulance responses, regardless of risk class or category, the total response time shall be 10 minutes and 4 seconds. The BLS Ambulance shall be staffed with a minimum of 2 emergency medical technicians (EMTs) and be capable of conducting a scene survey, performing a primary assessment, evaluating the need for additional resources, initiating basic life support, initiating early defibrillation, assisting paramedics while they perform ALS interventions, moving/loading patients and providing transport to a receiving facility.

BLS Unit Deployment Baseline Statement:

For 90 percent of all BLS Ambulance responses, regardless of risk class or category, the total response time for the arrival of the first-arriving unit was 11 minutes and 26 seconds. The first-due unit was staffed with a minimum of 2 emergency medical technicians (EMTs) and was capable of conducting a scene survey, performing a primary assessment, evaluating the need for additional resources, initiating basic life support, initiating early defibrillation, moving/loading patients and providing transport to a receiving facility.

BLS Transportation - 90th Percentile Times Performance			**Benchmark (Target)**	**2021 - 2022 (Baseline)**	**Gap**	**2022**	**2021**
Alarm Handling	Pick-up to Dispatch	Urban	1:04	1:59	**0:55**	2:09	2:05
Turnout Time	Turnout Time 1st Unit	Urban	1:00	1:18	**0:18**	1:20	1:14
Travel Time	Travel Time 1st Unit **Distribution**	Urban	8:00	9:14	**1:14**	9:12	9:18
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	10:04	11:26	**1:22**	11:28	11:24
				n= 18,916		n= 11,920	n= 6,993

Figure 176: BLS Ambulance Performance Table 2018-2022

Note: The BLS Transportation program began in April of 2021. 5-year data set not available.

TFD BLS Ambulance Performance - Overall

The map in Figure 175 visually indicates the performance of TFD BLS Ambulances at the 90th percentile for total response time performance within the City. The 90th percentile baseline time is 11 minutes and 26 seconds. TFD units responded in compliance with the benchmark 82% of the time. The BLS Transportation program was implemented in April of 2021.

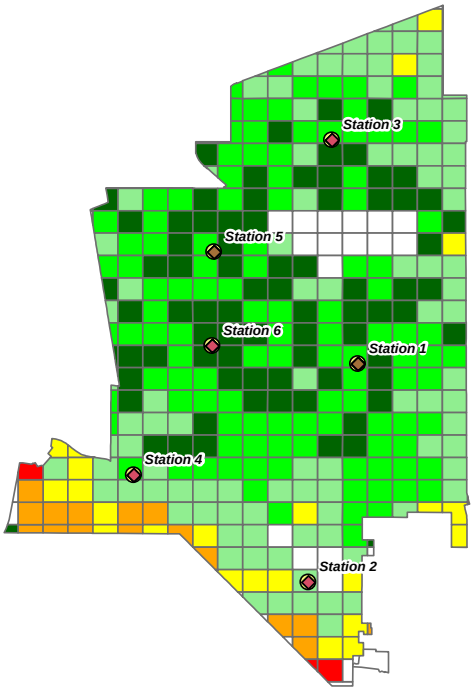
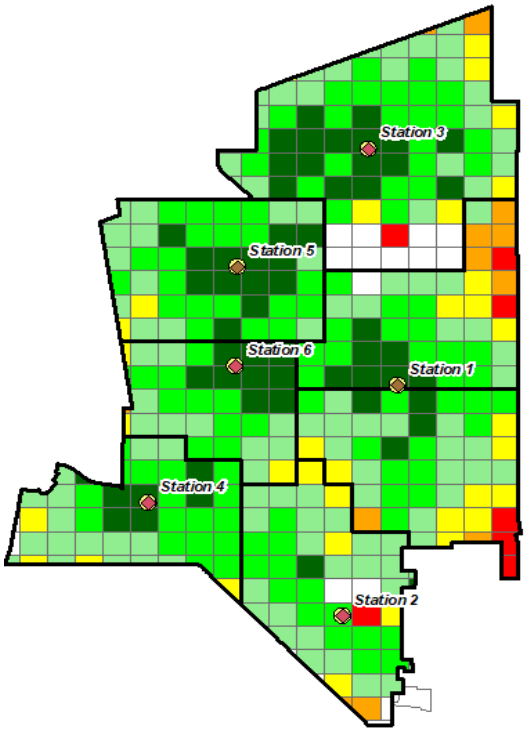


Figure 177: TFD BLS Ambulance 90th Percentile Response Time Performance

Overall EMS Response Time Performance Maps per planning zone



The map visually indicates the performance of TFD at the 90th percentile for total response time performance, for the first arriving unit, on all EMS incidents from 2018 through 2022. The 90th percentile baseline time is **7 minutes and 13 seconds**. TFD units responded in compliance with the benchmark **80%** of the time.

Figure 178: TFD EMS Incident 90th Percentile Response Time Performance 2018-2022

Fire Suppression Deployment Strategies and Coverage Performance

Reported structure fires initially receive a first alarm assignment, consisting of a minimum of 16 personnel, that is designed to get personnel and apparatus en route to mitigate the incident. If a structure fire is confirmed, or the dispatch center is receiving multiple calls indicating a structure fire, then the alarm should be upgraded to a 2nd or 3rd alarm based upon the reported conditions and/or structure type.

Fire Suppression Critical Task Definitions

Incident Command - The Incident Commander is the person responsible for all aspects of an emergency response; including quickly developing incident objectives, managing all incident operations, assigning resources based on the risk management plan of the incident action plan, as well as the safety of all emergency personnel.

Fire Attack - An effective fire attack requires a pump operator to deliver effective fire streams using the apparatus mounted pump. A minimum of two firefighters is required to deploy a 1 ¾" hose line capable of delivering 150 gpm or a 2 ½" hose line capable of delivering 250 gpm or more for fire attack.

Back-up Fire Attack - A minimum of two firefighters with a 1 ¾" hose line is deployed to back up the initial fire attack company with an additional 150 gpm of water. The added line will help extinguish the fire and provide protection for the initial fire attack crew in the event of a burst hose or loss of water.

Forcible Entry – Utilizing power saws and hand tools, firefighters make access into a vehicle, property, structures to check for victims and/or fire.

Ventilation - Ventilation is the systematic process of removing smoke and superheated gases out of a structure. This is performed by cutting vents or making use of existing openings in the roof of the structure. Accomplishing vertical ventilation effectively may requires a large number of resources. TFD is an aggressive vertical ventilation department when the incident risk profile justifies the action.

Search and Rescue - A search and rescue crew is assigned to complete a rapid and systematic search of the fire area intended to find and remove viable victims to an area of safety.

Medical Group - A medical group is assigned to triage, treat, and transport the sick and injured from the fire scene to advanced medical care at the hospital.

Utilities – The control of natural gas, electrical and water to a structure to enhance firefighter safety, mitigate risk and limit damage.

Salvage – The protection of a building and its contents from unnecessary damage from heat, smoke, fire or water during and/or after a fire.

Water Supply – The establishment of a dedicated supply of water, typically from a hydrant, that meets the demand for extinguishing a fire.

Rapid Intervention Crew (RIC) - A stand-by rescue team for fire personnel that available for the immediate search and rescue of any missing, trapped, injured or unaccounted personnel. Typically, this assignment is not given to a first alarm unit.

Incident Safety Officer – An officer dedicated to developing and recommending measures for assuring personnel safety, assessing threats to firefighter safety and implementing control measures to rectify hazardous or unsafe conditions.

Lobby Control – At a high-rise incident, the control of building access points, control and operation of elevators, direction of occupants exiting to safe areas, control of building systems and accountability of firefighting personnel.

Base – At a high-rise incident, the establishment of a ground level staging area for incoming apparatus, personnel, and equipment.

Two in/Two out rule - This safety rule applies if the fire has extended beyond the incipient stage and no rescue problem exists. The rule states that the fire attack crew must consist of two personnel; additionally, two personnel must be outside the fire environment for safety.

Low Risk Fire Deployment Strategies and Coverage Performance

Critical Tasking

Fire – Low Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Establish command • Complete 360 size-up • Establish water supply and pump operations. • Initiate fire attack • Forcible entry on vehicle (for vehicle fires)	3	First Engine	3 (4)
Totals	3		3 (4)

Figure 179: TFD Critical Tasking for Fire – Low Risk

Low Risk Fire incidents include responses to illegal burning, vegetation fires, exterior trash fires and vehicle fires. Typically, these incidents are mitigated with the arrival of a single engine company. The company officer may request additional resources if the incident dictates.

Fire – Low Risk incidents have an established ERF of 3 personnel. The ERF is met by deploying a single unit (staffed by a minimum of 3 personnel), which is also considered the first arriving unit for performance measurement purposes.

Fire – Low Risk Benchmark Statement

For 90 percent of all Fire – Low Risk Incidents, the total response time for the arrival of the first-arriving unit and effective response force (ERF), staffed with a minimum of 3 personnel, shall be 6 minutes and 24 seconds. (The first arriving unit meets the ERF requirement). The first-due unit shall be capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity and advancing a fire attack line to extinguish the fire.

Fire – Low Risk Baseline Statement

For 90 percent of all Fire – Low Risk Incidents, the total response time for the arrival of the first-arriving unit and effective response force (ERF), staffed with a minimum of 3 personnel, was 8 minutes and 52 seconds. The first-due unit was capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity and advancing a fire attack line to extinguish the fire.

(Low Risk) Fire Suppression - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	2:19	**1:15**	2:46	2:22	2:17	2:09	2:06
Turnout Time	Turnout Time 1st Unit	Urban	1:20	2:22	**1:02**	2:08	1:48	2:11	2:10	3:01
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	5:47	**1:47**	6:15	6:01	5:39	5:33	5:27
	Travel Time ERF **Concentration**	Urban	N/A	N/A	**N/A**	N/A	N/A	N/A	N/A	N/A
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	8:52	**2:28**	9:17	8:44	8:28	8:50	9:09
				n=843		n=188	n=202	n=163	n=140	n=150
	Total Response Time ERF **Concentration**	Urban	N/A	N/A	**N/A**	N/A	N/A	N/A	N/A	N/A
				n=		n=	n=	n=	n=	n=

Figure 180: Fire Low-Risk Performance Table 2018-2022

Moderate Risk Fire Deployment Strategies and Coverage Performance

Critical Tasking

Fire - Moderate Risk			
Tasks	**Min Personnel Needed**	**Current deployment**	
		Apparatus	**Staffing**
• Establish command (1) • Complete 360 size-up • On arrival of A/C, assume appropriate division or reunite with company • Establish water supply and pump operations (1) • Initiate fire attack on floor involved (2) • Exposure Protection (1) • Forcible Entry (1) • Back Up fire attack (2)	8	**First Engine**	3 (4)
		Second Engine	3 (4)
		Third Engine	3 (4)
• Ladders • Ventilation • Utilities	3	**Truck**	4
• Search and Rescue	2	**First Rescue**	2
• Incident Command/Safety	1	**Platoon Commander**	1
• Medical Group	2	**Second Rescue**	2
Totals	**16**		**18 (21)**

Figure 181: TFD Critical Tasking for Fire – Moderate Risk

Moderate Risk Fire Incidents include structure fires in single family dwellings.

Reported structure fires initially receive a first alarm assignment, consisting of a minimum of 16 personnel, that is designed to get personnel and apparatus en route to mitigate the incident. If a structure fire is confirmed or the dispatch center is receiving multiple calls indicating a structure fire, then the alarm should be upgraded to a 2nd or 3rd alarm based upon the reported conditions and/or structure type.

Fire – Moderate Risk Benchmark Statement

For 90 percent of all Fire – Moderate Risk Incidents, the total response time for the arrival of the first-arriving unit, staffed with a minimum of 3 personnel, shall be 6 minutes and 24 seconds. The first-due unit shall be capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity and initiating rescue and/or advancing a fire attack line.

For 90 percent of all Fire – Moderate Risk Incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 16 personnel, shall be 10 minutes and 24 seconds. The ERF shall be capable of establishing a command structure that complies with TFD Strategic Goals of providing for life safety, incident stabilization, and property conservation while providing for firefighters safety, accountability, and welfare. The ERF shall be capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, advancing a primary and backup fire attack line, performing search and rescue of viable victims, providing

medical care, establishing a rapid intervention crew, ventilating the structure, controlling utilities and performing salvage and overhaul.

Fire – Moderate Risk Baseline Statement

For 90 percent of all Fire – Moderate Risk Incidents, the total response time for the arrival of the first-arriving unit, staffed with a minimum of 3 personnel, was 7 minutes and 39 seconds. The first-due unit was capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity and initiating rescue and/or advancing a fire attack line.

For 90 percent of all Fire – Moderate Risk Incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 16 personnel, was 12 minutes and 58 seconds. The ERF was capable of establishing a command structure that complies with TFD Strategic Goals of providing for life safety, incident stabilization, and property conservation while providing for firefighters safety, accountability, and welfare. The ERF was capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, advancing a primary and backup fire attack line, performing search and rescue of viable victims, providing medical care, establishing a rapid intervention crew, ventilating the structure, controlling utilities and performing salvage and overhaul.

(Moderate Risk) Fire Suppression - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	2:06	**1:02**	2:55	1:38	2:03	2:02	2:09
Turnout Time	Turnout Time 1st Unit	Urban	1:20	1:27	**0:07**	0:49	1:06	1:27	1:20	2:16
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	5:34	**1:34**	5:54	5:25	4:42	5:32	5:40
	Travel Time ERF **Concentration**	Urban	8:00	10:43	**2:43**	10:43	10:12	10:43	12:24	10:53
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	7:39	**1:15**	8:01	6:58	7:46	7:21	8:01
				n=260		n=46	n=60	n=49	n=51	n=54
	Total Response Time ERF **Concentration**	Urban	10:24	12:58	**2:34**	12:19	12:23	12:34	14:31	12:58
				n=84		n=22	n=11	n=17	n=17	n=17

Figure 182: Fire Moderate-Risk Performance Table 2018-2022

High Risk Fire Deployment Strategies and Coverage Performance

Critical Tasking

Fire – High Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Establish command (1) • Complete 360 size-up • On arrival of A/C, assume appropriate division or reunite with company • Establish water supply and pump operations (1) • Initiate fire attack on floor involved (2) • Back Up Fire Attack (2) • Exposure Protection (1) • Forcible Entry (1)	8	First Engine	3 (4)
		Second Engine	3 (4)
		Third Engine	3(4)
• Rapid Intervention Crew • Establish secondary water supply	4	Fourth Engine	4
• Per SOG 1 Engine or Truck in staging • Assigned based on incident needs (Assist Fire Attack, Additional RIC, Exposures, etc.)	4	Fifth Engine	4
• Ladders • Ventilation • Utilities	3	First Truck	4
• Assist 1st truck with ventilation, ladders • Salvage • Safety	4	Second Truck	4
• Search and Rescue	2	First Rescue	2
• Incident Command/Safety	1	Platoon Commander	1
• Medical Group	2	Second Rescue	2
• Assigned based on incident needs (Assist Ventilation, Assist Fire Attack, Exposures etc.)	2	Third Rescue	2
Totals	30		32 (35)

Figure 183: TFD Critical Tasking for Fire – High Risk

High Risk Fire Incidents include structure fires in a multi-family residence (apartment), strip malls, commercial/industrial buildings, and hotels/motels.

Reported structure fires initially receive a first alarm assignment, consisting of a minimum of 16 personnel, that is designed to get personnel and apparatus en route to mitigate the incident. If a structure fire is confirmed or the dispatch center is receiving multiple calls indicating a structure fire, then the alarm should be upgraded to a 2nd or 3rd alarm based upon the reported conditions and/or structure type. Typically, fires in multi-family residences, strip malls, and/or commercial buildings require additional apparatus and personnel to effectively mitigate the incident.

Fire – High Risk Benchmark Statement

For 90 percent of all Fire – High Risk Incidents, the total response time for the arrival of the first-arriving unit, staffed with a minimum of 3 personnel, shall be 6 minutes and 24 seconds. The first-due unit shall be capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity and initiating rescue and/or advancing a fire attack line.

For 90 percent of all Fire – High Risk Incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 30 personnel, shall be 12 minutes and 34 seconds. The ERF shall be capable of establishing a command structure that complies with TFD Strategic Goals of providing for life safety, incident stabilization, and property conservation while providing for firefighters safety, accountability, and welfare. The ERF shall be capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, advancing a primary and backup fire attack line, performing search and rescue of viable victims, providing medical care, establishing a rapid intervention crew, ventilating the structure, controlling utilities and performing salvage and overhaul.

Fire – High Risk Baseline Statement

For 90 percent of all Fire – High Risk Incidents, the total response time for the arrival of the first-arriving unit, staffed with a minimum of 3 personnel, was 8 minutes and 5 seconds. The first-due unit was capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity and initiating rescue and/or advancing a fire attack line.

For 90 percent of all Fire – High Risk Incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 30 personnel, was 16 minutes and 50 seconds. The ERF was capable of establishing a command structure that complies with TFD Strategic Goals of providing for life safety, incident stabilization, and property conservation while providing for firefighters safety, accountability, and welfare. The ERF was capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, advancing a primary and backup fire attack line, performing search and rescue of viable victims, providing medical care, establishing a rapid intervention crew, ventilating the structure, controlling utilities and performing salvage and overhaul.

(High Risk) Fire Suppression - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	2:24	**1:20**	2:38	2:06	2:32	2:10	2:14
Turnout Time	Turnout Time 1st Unit	Urban	1:20	1:41	**0:21**	1:16	1:16	1:27	1:38	2:21
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	5:17	**1:17**	5:26	5:26	4:51	5:54	5:09
	Travel Time ERF **Concentration**	Urban	10:10	14:42	**4:32**	11:09	14:46	11:57	14:50	14:42
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	8:05	**1:41**	8:15	8:15	7:55	8:50	8:24
				n=391		n=80	n=80	n=68	n=74	n=90
	Total Response Time ERF **Concentration**	Urban	12:34	16:50	**4:16**	12:56	15:50	13:33	17:17	19:05
				n=23		n=3	n=6	n=4	n=3	n=7

Figure 184: Fire High-Risk Performance Table 2018-2022

Maximum Risk Fire Deployment Strategies and Coverage Performance

Critical Tasking

Fire – Maximum Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Establish command (1) • Complete 360 size-up • On Arrival of A/C, assume appropriate division/group or reunite with Company • Establish water supply, FDC connection and pump operations (2) • Initiate fire attack (2) • Back Up Fire Attack (2) • Forcible Entry (1)	8	First Engine	3 (4)
		Second Engine	3 (4)
		Third Engine	3 (4)
• Establish Staging (two floors below fire)	4	Fourth Engine	4
• Initiate fire attack on floor above fire	4	Fifth Engine	4
• Rapid Intervention Crew • Establish secondary water supply	4	Sixth Engine	4
• Assigned based on incident needs (Assist Fire Attack, Additional RIC, Exposures, etc.)	4	Seventh Engine	4
• Lobby • Elevator Control • Stairwell Control	3	First Truck	4
• Ventilation • Establish Base	4	Second Truck	4
• Assigned to first in truck unless immediate medical need	2	First Rescue	2
• Search and Rescue	2	Second Rescue	2
• Medical Group	2	Third Rescue	2
• Incident Command/Safety	1	Platoon Commander	1
• Contacted for notification purposes only • May assist with general command duties • May assume B92 duties	1	Additional Staff (AC's)	1
• Law Branch	1	TPD Sergeant	1
Totals	40		42 (45)

Figure 185: TFD Critical Tasking for Fire – Maximum Risk

Maximum Risk Fire Incidents include HazMat fires, Refinery fires, and high-rise fires. The incident commander may request additional resources, above the defined ERF, to handle the increased logistical and manpower needs of a high-rise incident, or the specialized personnel needs at a Haz Mat fire.

Fire – Maximum Risk Benchmark Statement

For 90 percent of all Fire – Maximum Risk Incidents, the total response time for the arrival of the first-arriving unit, staffed with a minimum of 3 personnel, shall be 6 minutes and 24 seconds. The first-due unit shall be capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity and initiating rescue and/or advancing a fire attack line.

For 90 percent of all Fire – Maximum Risk Incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 40 personnel, shall be 12 minutes and 34 seconds. The ERF shall be capable of establishing a command structure that complies with TFD Strategic Goals of providing for life safety, incident stabilization, and property conservation while providing for firefighters safety, accountability, and welfare. The ERF shall be capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, advancing a primary and backup fire attack line, performing search and rescue of viable victims, providing medical care, establishing a rapid intervention crew, ventilating the structure, controlling utilities and performing salvage and overhaul.

Fire – Maximum Risk Baseline Statement

For 90 percent of all Fire – Maximum Risk Incidents, the total response time for the arrival of the first-arriving unit, staffed with a minimum of 3 personnel, was 9 minutes and 42 seconds. The first-due unit was capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity and initiating rescue and/or advancing a fire attack line.

For all Fire – Maximum Risk Incidents within the dataset (occurring between 2018-2022), the total response time for the arrival of the effective response force (ERF) with a minimum of 40 personnel, was not applicable, as the defined ERF had not been met for any of these incidents. TFD succeeded in effectively mitigating these incidents before the arrival of the full ERF. TFD personnel gauged needs as resources arrived on scene of the incident. When an appropriate number of resources was deemed to have arrived, TFD incident command canceled any outstanding dispatched resources. The resources on scene were capable of establishing a command structure that complies with TFD Strategic Goals of providing for life safety, incident stabilization, and property conservation while providing for firefighters safety, accountability, and welfare. The ERF was capable of completing a 360 size-up, establishing command, evaluating the need for additional resources, performing forcible entry, establishing a water supply, advancing a primary and backup fire attack line, performing search and rescue of viable victims, providing medical care, establishing a rapid intervention crew, ventilating the structure, controlling utilities and performing salvage and overhaul.

This approach allows for flexibility of resource deployment that ensures effective incident intervention while minimizing impact to the level of resources left available to respond to other incidents in the city.

(Maximum Risk) Fire Suppression - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	1:48	**0:44**	1:15	N/A	1:29	1:48	1:11
Turnout Time	Turnout Time 1st Unit	Urban	1:20	2:11	**0:51**	1:04	N/A	0:37	2:11	1:42
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	6:49	**2:49**	5:00	N/A	4:42	4:31	6:49
	Travel Time ERF **Concentration**	Urban	10:10	N/A No data	**N/A**	N/A No data	N/A No data	N/A No data	N/A No data	N/A No data
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	9:42	**3:18**	7:19	N/A	6:48	8:30	9:42
				n=9		n=3	n=0	n=1	n=1	n=4
	Total Response Time ERF **Concentration**	Urban	12:34	N/A No data	**N/A**	N/A No data	N/A No data	N/A No data	N/A No data	N/A No data
				n=0		n=0	n=0	n=0	n=0	n=0

Figure 186: Fire Max-Risk Performance Table 2018-2022

Technical Rescue Deployment Strategies and Coverage Performance

Technical Rescue Critical Task Definitions

Patient Extrication – The use of trained personnel, with specialty equipment, to gain access and remove an entrapped patient from a vehicle, building or machine.

Vehicle Stabilization – The process of securing a vehicle and mitigating hazards prior to performing patient extrication.

Rescue Group Supervisor – The person responsible for the overall rescue strategy and deployment of personnel at a technical rescue incident.

Entrant – The person responsible for the primary entry into a confined space to conduct search and rescue of victims.

Attendant – The person responsible for the welfare of the entrant(s) while they are in a confined space.

Ventilation – The removal of hazardous, or potentially hazardous, atmospheres from a given space through natural or mechanical methods.

Air Supply – The establishment, coordination and monitoring of air supply needs for entrants in a confined space.

Air Monitoring – The measurement of air in a given space, using technical equipment, for a hazardous or potentially hazardous atmosphere.

Rigging/Hauling – The establishment of primary and secondary rope systems, with mechanical advantage, for the safe access and removal of rescuers and victims.

Low Risk Technical Rescue Incident Deployment Strategies and Coverage Performance

Critical Tasking

Tech Rescue – Low Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Establish command • Complete 360 size-up • Control hazards • Access stuck elevators • Access locked vehicles	3	First Engine or Truck	3 (4)
Totals	3		3 (4)

Figure 187: TFD Critical Tasking for Technical Rescue – Low Risk

Low Risk Technical Rescue incidents include children locked in a vehicle and elevator entrapments.

Technical Rescue – Low Risk incidents have an established ERF of 3 personnel. The ERF is met by deploying a single unit (staffed by a minimum of 3 personnel), which is also considered the first arriving unit for performance measurement purposes.

Technical Rescue – Low Risk Benchmark Statement

For 90 percent of all Technical Rescue – Low Risk incidents, the total response time for the arrival of the first-arriving company and the effective response force shall be **6 minutes and 24 seconds**. (The first arriving unit meets the ERF requirement). The first-due unit shall be staffed with a minimum of 3 firefighters and be capable of conducting a 360 size-up, establishing command, evaluating the need for additional resources, and controlling immediate hazards. In addition, the personnel shall be capable of accessing stuck elevators and accessing locked vehicles.

Technical Rescue – Low Risk Baseline Statement

For 90 percent of all Technical Rescue – Low Risk incidents, the total response time for the arrival of the first-arriving company and the effective response force was **9 minutes and 12 seconds**. The first-due unit was staffed with a minimum of 3 firefighters and be capable of conducting a 360 size-up, establishing command, evaluating the need for additional resources, and controlling immediate hazards. In addition, the personnel shall be capable of accessing stuck elevators and accessing locked vehicles.

(Low Risk) Technical Rescue - 90th Percentile Times Performance			**Benchmark (Target)**	**2018-2022 (Baseline)**	**Gap**	**2022**	**2021**	**2020**	**2019**	**2018**
Alarm Handling	Pick-up to Dispatch	Urban	1:04	2:13	**1:09**	2:42	2:13	3:17	1:44	1:53
Turnout Time	Turnout Time 1st Unit	Urban	1:20	2:38	**1:18**	2:01	1:52	1:58	2:45	3:23
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	6:18	**2:18**	7:56	4:30	4:40	6:47	5:26
	Travel Time ERF **Concentration**	Urban	N/A	N/A	**N/A**	N/A	N/A	N/A	N/A	N/A
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	9:12	**2:48**	10:33	7:27	8:09	9:54	9:08
				n=281		n=57	n=41	n=36	n=58	n=89
	Total Response Time ERF **Concentration**	Urban	N/A	N/A	**N/A**	N/A	N/A	N/A	N/A	N/A
				n=		n=	n=	n=	n=	n=

Figure 188: Tech Rescue Low -Risk Performance Table 2018-2022

Moderate Risk Technical Rescue Incident Deployment Strategies and Coverage Performance

Critical Tasking

Tech Rescue – Moderate Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Establish command • Complete 360 size-up • Call for additional resources if needed • Establish safe working area • Isolate any vehicle hazards (airbags, fuel leaks, etc.) • Place a hose line in service • Triage patients • Provide BLS patient care • Assist with ALS patient care • Coordinate hospital transportation • Remove any vehicle fluids from street	3	First Engine	3 (4)
• ALS patient care • Documentation • Hospital communications	2	First Rescue	2
• Vehicle stabilization • Stabilize compromised structures • Patient extrication	4	First Truck	4
• Incident Command/Safety	1	Platoon Commander	1
• Assist truck with extrication/stabilization needs	2	Second Rescue	2
Totals	12		12 (13)

Figure 189: TFD Critical Tasking for Technical Rescue – Moderate Risk

Moderate Risk Technical Rescue incidents include traffic Collisions with entrapment, and vehicle into a building. The deployment to these types of incidents take into consideration the need for apparatus with specialty equipment and personnel to effectively mitigate the incident.

Technical Rescue – Moderate Risk Benchmark Statement

For 90 percent of all Technical Rescue – Moderate Risk incidents, the total response time for the arrival of the first-arriving company and the effective response force shall be **6 minutes and 24 seconds**. The first-due unit shall be staffed with a minimum of 3 firefighters and be capable of conducting a 360 size-up, establishing command, evaluating the need for additional resources, and controlling immediate hazards. In addition, the personnel shall be capable of accessing stuck elevators and accessing locked vehicles.

For 90 percent of all Technical Rescue – Moderate Risk incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 12 personnel, shall be **10 minutes and 24 seconds**. The ERF shall be capable of conducting a 360 size-up, establishing command, evaluating the need for

additional resources, controlling immediate hazards, extricating patients from vehicles and stabilizing compromised structures.

Technical Rescue – Moderate Risk Baseline Statement

For 90 percent of all Technical Rescue – Moderate Risk incidents, the total response time for the arrival of the first-arriving company and the effective response force was **7 minutes and 35 seconds**. The first-due unit was staffed with a minimum of 3 firefighters and be capable of conducting a 360 size-up, establishing command, evaluating the need for additional resources, and controlling immediate hazards. In addition, the personnel shall be capable of accessing stuck elevators and accessing locked vehicles.

For 90 percent of all Technical Rescue – Moderate Risk incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 12 personnel, was **13 minutes and 21 seconds**. The ERF was capable of conducting a 360 size-up, establishing command, evaluating the need for additional resources, controlling immediate hazards, extricating patients from vehicles and stabilizing compromised structures.

(Moderate Risk) Technical Rescue - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	1:44	**0:44**	1:50	2:24	1:41	1:31	1:55
Turnout Time	Turnout Time 1st Unit	Urban	1:20	1:33	**0:13**	1:24	1:07	1:22	1:36	1:53
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	5:06	**1:06**	5:14	5:14	5:12	4:18	5:00
	Travel Time ERF **Concentration**	Urban	8:00	11:07	**3:07**	10:03	9:51	12:47	9:22	11:28
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	7:35	**1:11**	7:53	7:46	7:35	6:20	7:53
				n=343		n=70	n=72	n=73	n=74	n=54
	Total Response Time ERF **Concentration**	Urban	10:24	13:21	**2:57**	11:42	11:27	13:54	11:48	14:51
				n=101		n=14	n=20	n=25	n=22	n=20

Figure 190: Tech Rescue Moderate -Risk Performance Table 2018-2022

High Risk Technical Rescue Incident Deployment Strategies and Coverage Performance

Critical Tasking

Technical Rescue- High Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Establish Command/Safety • Size up • Initial action plan • Site Access Control	3	First Engine	3 (4)
• Rescue Group Supervisor • Minimize hazards • Rigging/Hauling	4	First Truck with USAR	4
• Assist Rescue Group Supervisor • Rescuers or Entrants • Assigned as needed based on incident needs	4	Second Truck	4
• Assistant Safety Officer • Ventilation • Air Monitoring	3*	Second Engine (HM96)*	3 (4)*
• Air Supply • Attendant	3*	Third Engine (E91)*	3 (4)*
• Assigned to first in truck unless immediate medical need • Back up Rescuers or Entrants	2	First Rescue	2
• Medical Group	2	Second Rescue	2
• Incident Commander / Safety	1	Platoon Commander	1
• Contacted for notification purposes only • May assist with general command duties • May assume B92 duties	1	Additional Staff (AC's)	1
Totals	17 23*		17 (18) 23 (26)*

Figure 191: TFD Critical Tasking for Technical Rescue – High Risk

High Risk Technical Rescue incidents include Confined Space Rescue, Trench Rescue, Rope Rescue, Industrial Accident/Entrapment, and Building Collapse. The deployment to these types of incidents takes into consideration the need for apparatus with specialty equipment and personnel to effectively mitigate the incident.

*The TFD recognizes that some Technical Rescue – High Risk incidents, specifically Trench and Confined Space Rescues, contain additional critical tasks that need to be performed such as; air Monitoring, ventilation and air supply. The TFD includes the two HazMat engines on Trench Rescue and Confined Space incidents to assist with the additional tasks.

Technical Rescue – High Risk Benchmark Statement

For 90 percent of all Technical Rescue – High Risk Incidents, the total response time for the arrival of the first-arriving company shall be **6 minutes and 24 seconds**. The first-due unit shall be staffed with a minimum of 3 firefighters, capable of establishing command, evaluating the need for additional resources and evaluating and mitigating hazards.

For 90 percent of all Technical Rescue – High Risk Incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 17 personnel, shall be **10 minutes and 24 seconds**. The ERF shall be capable of establishing command, evaluating the need for additional resources, evaluating and mitigating hazards, appointing a qualified site safety officer; establishing patient contact; staging and apparatus set up; providing technical expertise, knowledge, skills, and abilities (KSA's) during technical rescue incidents; and providing first responder medical support. The technical KSA's and associated tasks will vary depending on the specific nature of the hazard present.

Technical Rescue – High Risk Baseline Statement

For 90 percent of all Technical Rescue – High Risk Incidents, the total response time for the arrival of the first-arriving company was **9 minutes and 10 seconds**. The first-due unit was staffed with a minimum of 3 firefighters, capable of establishing command, evaluating the need for additional resources and evaluating and mitigating hazards.

For 90 percent of all Technical Rescue – High Risk Incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 17 personnel, was **14 minutes and 4 seconds**. The ERF was capable of establishing command, evaluating the need for additional resources, evaluating and mitigating hazards, appointing a qualified site safety officer; establishing patient contact; staging and apparatus set up; providing technical expertise, knowledge, skills, and abilities (KSA's) during technical rescue incidents; and providing first responder medical support.

(High Risk) Technical Rescue - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	1:50	**0:46**	N/A	1:45	1:50	0:48	1:28
Turnout Time	Turnout Time 1st Unit	Urban	1:20	2:57	**1:37**	N/A	0:33	1:53	0:23	2:57
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	6:43	**2:43**	N/A	3:06	5:49	4:18	6:43
	Travel Time ERF **Concentration**	Urban	8:00	11:37	**3:37**	N/A	N/A	N/A	N/A No data	11:37
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	9:10	**2:46**	N/A	5:24	8:33	5:29	9:10
				n=7		n=0	n=1	n=2	n=1	n=3
	Total Response Time ERF **Concentration**	Urban	10:24	14:04	**3:40**	N/A	N/A	N/A	N/A	14:04
				n= 2		n=0	n=0	n=0	n=0	n= 2

Figure 192: Tech Rescue High -Risk Performance Table 2018-2022

Maximum Risk Technical Rescue Incident Deployment Strategies and Coverage Performance

Critical Tasking

Technical Rescue Maximum Risk Incidents are defined as High-Risk incidents that contain a Multi-Casualty component or other complicating factors such as a fire or natural disaster. The Tech Rescue Maximum Risk critical tasks will initially mirror the critical task table for High-Risk incidents, however, the amount of personnel necessary to mitigate the incident would increase, at the Incident Commander's discretion, to be commensurate with the additional elements.

Technical Rescue – Maximum Risk Benchmark Statement

For 90 percent of all Technical Rescue – Maximum Risk Incidents, the total response time for the arrival of the first-arriving company shall be 6 minutes and 24 seconds. The first-due unit shall be staffed with a minimum of 3 firefighters, capable of establishing command, evaluating the need for additional resources and evaluating and mitigating hazards.

For 90 percent of all Technical Rescue – Maximum Risk Incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 17 personnel, shall be 10 minutes and 24 seconds. The ERF shall be capable of establishing command, evaluating the need for additional resources, evaluating and mitigating hazards, appointing a qualified site safety officer; establishing patient contact; staging and apparatus set up; providing technical expertise, knowledge, skills, and abilities (KSA's) during technical rescue incidents; and providing first responder medical support. The amount of personnel necessary to mitigate the incident would increase, at the Incident Commander's discretion, to be commensurate with any increase in incident complexity.

Technical Rescue – Maximum Risk Baseline:

No Technical Rescue Maximum Risk incidents occurred from 2018 - 2022.

(Maximum Risk) Technical Rescue - 90th Percentile Times Performance	Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018

Figure 193: Tech Rescue Maximum -Risk Performance Table 2018-2022

Hazardous Materials Program Deployment Strategies and Coverage Performance

Hazardous Materials Critical Task Definitions

Assistant Safety Officer – Haz Mat – Coordinates safety related activities directly relating to the HazMat Group operations. Advises on all aspects of health and safety, continuously monitors for modifying conditions and has the authority to stop or prevent unsafe acts. Reports to the Incident Commander or incident Safety Officer (if established).

HazMat Group Supervisor – The officer responsible for the implementation of the incident action plan dealing with hazardous materials group operations and the assignment of resources in the HazMat group.

Entry Team – A two member team, of hazardous materials specialists, that makes entry into an exclusion zone/hazardous area to identify threats and mitigate a hazardous materials release or threatened release.

Back up Team – A two member team, of hazardous materials specialists, that are the rescuers for the entry team and/or the

Decontamination – The removal of contaminants from people and equipment that have been exposed to hazardous materials.

Technical Reference – Provides technical information and assistance to the HazMat Group using various resources.

Low Risk Hazardous Materials Incident Deployment Strategies and Coverage Performance

Critical Tasking

Hazmat – Low Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Incident command • Scene safety • I.D & assess • Isolate & deny entry • Minor clean up	3	Engine or Truck	3 (4)
Totals	3		3 (4)

Figure 194: TFD Critical Tasking for Hazmat - Low Risk

Within the TFD, a HazMat – Low Risk event would receive a HazMat Level 1 response. These include hazardous material events that can be safely and properly handled with a minimum of 3 first responder operational personnel. These incidents do not pose an immediate health or safety risk to the community. Examples include odor complaints, vehicle fluid spills, refinery report only (No apparatus dispatched), Refinery Single Engine response (Typically Code 2), CO Alarm and NPDES callout (no storm drain impact).

HazMat– Low Risk incidents have an established ERF of 3 personnel. The ERF is met by deploying a single unit (staffed by a minimum of 3 personnel), which is also considered the first arriving unit for performance measurement purposes.

Hazmat – Low Risk Benchmark:

For 90 percent of all HazMat – Low Risk incidents, the total response time for the arrival of the first-arriving company and effective response force (ERF), with a minimum of 3 personnel, shall be 6 minutes and 24 seconds. (The first arriving unit meets the ERF requirement). The first-due unit shall be capable of establishing command, evaluating the need for additional resources, recognizing hazardous materials risks, and taking defensive actions to prevent harm to life, property, and the environment.

Hazmat – Low Risk Baseline:

For 90 percent of all HazMat – Low Risk incidents, the total response time for the arrival of the first-arriving company and effective response force (ERF), with a minimum of 3 personnel, was 10 minutes and 42 seconds. The first-due unit was capable of establishing command, evaluating the need for additional resources, recognizing hazardous materials risks, and taking defensive actions to prevent harm to life, property, and the environment.

(Low Risk) Hazardous Materials - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	3:13	**2:09**	3:44	3:17	3:33	3:10	3:03
Turnout Time	Turnout Time 1st Unit	Urban	1:20	2:43	**1:23**	1:59	1:37	2:25	2:46	3:06
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	6:25	**2:25**	6:50	6:41	7:06	6:23	5:48
	Travel Time ERF **Concentration**	Urban	N/A	N/A	**N/A**	N/A	N/A	N/A	N/A	N/A
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	10:42	**4:18**	11:58	9:49	10:15	11:03	10:34
				n=349		n=47	n=37	n=35	n=86	n=144
	Total Response Time ERF **Concentration**	Urban	N/A	N/A	**N/A**	N/A	N/A	N/A	N/A	N/A
				n=		n=	n=	n=	n=	n=

Figure 195: Hazardous Materials Low -Risk Performance Table 2018-2022

Moderate Risk Hazardous Materials Incident Deployment Strategies and Coverage Performance

Critical Tasking

Hazmat – Moderate Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Incident command • Scene safety • I.D & assess • Isolate & deny entry • Support Hazmat Group	3	First Engine/Truck	3 (4)
• Hazmat Group Supervisor • Assist Safety Officer-Hazmat (ASOH) • Technical reference • Entry Team members	3	Second Engine (HM 96)	3 (4)
• Entry Team Leader • Back up Team members • Welfare Person	3	Third Engine (E91)	3 (4)
Totals	9		9 (12)

Figure 196: TFD Critical Tasking for Hazmat - Moderate Risk

Within the TFD, a HazMat – Moderate Risk event would receive a HazMat Level 2 response. Level 2 Hazardous Materials events require the TFD HazMat Specialists to make entry into the exclusion zone for containment, control, or sampling. TFD has the minimum daily staffing required by OSHA to make an entry into an exclusion zone.

Hazmat – Moderate Risk Benchmark:

For 90 percent of all HazMat – Moderate Risk incidents, the total response time for the arrival of the first-arriving company, with a minimum of 3 personnel, shall be 6 minutes and 24 seconds. The first-due unit shall be capable of establishing command, evaluating the need for additional resources, recognizing hazardous materials risks, and taking defensive actions to prevent harm to life, property, and the environment.

For 90 percent of all HazMat – Moderate Risk incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 9 personnel, shall be 10 minutes and 24 seconds. The effective response force (ERF) shall be capable of establishing command, evaluating the need for additional resources, recognizing hazardous materials risks, and taking defensive actions to prevent harm to life, property, and the environment, researching and gathering situational awareness related to the hazardous material, performing air monitoring, isolating and denying entry into the exclusion zone, building dams and dikes away from the hazard, coordinating with regulatory agencies, and providing any decontamination necessary.

All personnel must be trained to First Responder Operational level in accordance with Title 29 Code of Federal Regulations 1910.120 and the California Code of Regulations, Title 8, Section 5192, Paragraph Q. Tasks that shall be accomplished include locating personnel in a safe area, researching and gathering situational awareness related to the incident and hazardous material, identifying potential victims and opportunities for rescues, isolating and denying entry into the exclusion zone, building dams and dikes away from the hazard, evacuating and sheltering potential victims, coordinating with regulatory agencies, and providing any decontamination necessary.

Hazmat – Moderate Risk Baseline:

For 90 percent of all HazMat – Moderate Risk incidents, the total response time for the arrival of the first-arriving company, with a minimum of 3 personnel, was **11 minutes and 23 seconds**. The first-due unit was capable of establishing command, evaluating the need for additional resources, recognizing hazardous materials risks, and taking defensive actions to prevent harm to life, property, and the environment.

For 90 percent of all HazMat – Moderate Risk incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 9 personnel, was **17 minutes and 11 seconds**. The effective response force (ERF) was capable of establishing command, evaluating the need for additional resources, recognizing hazardous materials risks, and taking defensive actions to prevent harm to life, property, and the environment, researching and gathering situational awareness related to the hazardous material, performing air monitoring, isolating and denying entry into the exclusion zone, building dams and dikes away from the hazard, coordinating with regulatory agencies, and providing any decontamination necessary.

(Moderate Risk) Hazardous Materials - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	2:54	**1:50**	2:12	2:41	2:57	2:54	2:53
Turnout Time	Turnout Time 1st Unit	Urban	1:20	2:45	**1:25**	3:30	2:46	2:24	2:03	2:49
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	6:47	**2:47**	9:14	6:50	6:52	6:21	6:45
	Travel Time ERF **Concentration**	Urban	8:00	12:32	**4:32**	7:37	11:15	5:42	12:32	11:24
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	11:23	**4:59**	12:21	10:16	8:40	10:37	9:36
				n=58		n=10	n=11	n=6	n=15	n=16
	Total Response Time ERF **Concentration**	Urban	10:24	17:11	**6:47**	9:29	15:04	9:12	18:36	15:47
				n=10		n=1	n=2	n=1	n=3	n=3

Figure 197: Hazardous Materials Moderate -Risk Performance Table 2018-2022

High Risk Hazardous Materials Incident Deployment Strategies and Coverage Performance

Critical Tasking

Hazmat – High Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Incident command • Scene safety • I.D & assess • Isolate & deny entry • Decontamination Team	3	First Engine	3 (4)
• Hazmat Group Supervisor • Assist Safety Officer-Hazmat (ASOH) • Technical reference • Entry Team members	3	Second Engine (HM 96)	3 (4)
• Entry Team Leader • Back up Team members • Welfare Person	3	Third Engine (E91)	3 (4)
• Medical Group	2	First Rescue	2
• Incident Commander Safety	1	Platoon Commander	1
• Contacted for notification purposes only • May assist with general command duties • May assume B92 duties	1	Additional Staff (AC's)	1
• Law Branch	1	TPD Sergeant	1
Totals	14		14 (17)

Figure 198: TFD Critical Tasking for Hazmat - High Risk

Within the TFD, a HazMat – High Risk event would receive a HazMat Level 3 response. Level 3 responses are more dynamic events that will require additional resources to support the incident objectives. While the TFD Hazmat Team has the minimum staffing to make entry legally, it is often a slow process to ensure the entry team is operating in the safest manner possible in accordance with all OSHA regulations. More dynamic incidents such as a rescue or an incident that is affecting the public require a higher sense of urgency and will require assistance from other qualified agencies such as the Torrance Refining Company Fire Department, Los Angeles County Fire Department (LACoFD) or Los Angeles Fire Department (LAFD). The mutual aid allows the incident commander to fill critical positions in the Hazardous Materials Branch with qualified personnel to ensure the safety of the responders and the public. The positions filled are in accordance with the State of California Training and FIRESCOPE.

Hazmat – High Risk Benchmark:

For 90 percent of all HazMat – High Risk incidents, the total response time for the arrival of the first-arriving company, with a minimum of 3 personnel, shall be 6 minutes and 24 seconds. The first-due unit shall be capable of establishing command, evaluating the need for additional resources, recognizing hazardous materials risks, and taking defensive actions to prevent harm to life, property, and the environment.

For 90 percent of all HazMat – High Risk incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 14 personnel, shall be 10 minutes and 24 seconds. The effective response force (ERF) shall be capable of establishing command, evaluating the need for additional resources, recognizing hazardous materials risks, and taking defensive actions to prevent harm to life, property, and the environment, researching and gathering situational awareness related to the hazardous material, identifying potential victims and opportunities for rescues, isolating and denying entry into the exclusion zone, building dams and dikes away from the hazard, evacuating and sheltering potential victims, coordinating with regulatory agencies, and providing any decontamination necessary. In addition, the ERF shall be capable of entering the exclusion zone with chemical protective clothing, plugging and patching leaks, performing air monitoring within the exclusion zone and surrounding areas, and providing technical assistance expertise to the responsible party. Incidents that involve rescue in the exclusion zone or an airborne product affecting public health should warrant a request for mutual aid hazardous materials teams early in the incident.

Hazmat – High Risk Baseline:

For 90 percent of all HazMat – High Risk incidents, the total response time for the arrival of the first-arriving company, with a minimum of 3 personnel, was 8 minutes and 26 seconds. The first-due unit was capable of establishing command, evaluating the need for additional resources, recognizing hazardous materials risks, and taking defensive actions to prevent harm to life, property, and the environment.

For 90 percent of all HazMat – High Risk incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 14 personnel, was 15 minutes and 0 seconds. The effective response force (ERF) was capable of establishing command, evaluating the need for additional resources, recognizing hazardous materials risks, and taking defensive actions to prevent harm to life, property, and the environment, researching and gathering situational awareness related to the hazardous material, identifying potential victims and opportunities for rescues, isolating and denying entry into the exclusion zone, building dams and dikes away from the hazard, evacuating and sheltering potential victims, coordinating with regulatory agencies, and providing any decontamination necessary. In addition, the ERF was capable of entering the exclusion zone with chemical protective clothing, plugging and patching leaks, performing air monitoring within the exclusion zone and surrounding areas, and providing technical assistance expertise to the responsible party.

(High Risk) Hazardous Materials - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	1:35	**0:31**	1:49	1:23	1:19	1:32	1:19
Turnout Time	Turnout Time 1st Unit	Urban	1:20	1:41	**0:21**	1:11	0:57	0:37	1:41	1:43
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	5:46	**1:46**	7:33	3:49	5:46	5:38	2:36
	Travel Time ERF **Concentration**	Urban	8:00	13:52	**5:52**	13:52	8:16	9:23	N/A No data	12:15
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	8:26	**2:02**	8:41	5:16	7:42	8:26	4:19
				n=13		n=5	n=2	n=1	n=3	n=2
	Total Response Time ERF **Concentration**	Urban	10:24	15:00	**4:36**	15:00	9:43	11:19	N/A No data	14:49
				n=7		n=3	n=1	n=1	n=0	n=2

Figure 199:Hazardous Materials High -Risk Performance Table 2018-2022

Maximum Risk Hazardous Materials Incident Deployment Strategies and Coverage Performance

Critical Tasking

Hazmat – Maximum Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Establish command. • Complete 360 size-up • Address critical components Of AIRICEADDR • Establish water supply and pump operations • On Arrival of A/C, assume appropriate division/group or reunite with Company.	4	First Engine	4
• Assist first in engine as needed • May be assigned Division/Group Supervisor based on incident needs	3	Second Engine	3 (4)
• Hazmat Group Supervisor • Assist Safety Officer-Hazmat (ASOH) • Technical reference • Entry Team members • Support operational needs	3	Third Engine (Hazmat)	3 (4)
• Entry Team Leader • Back up Team members • Welfare Person • Support operational needs	3	Fourth Engine (Hazmat)	3 (4)
• Rescue Group Supervisor • Train stabilization	4	First Truck	4
• Assigned to first in truck • Support operational needs	4	Second Truck With USAR	4
• Assigned to first in truck unless immediate medical need	2	First Rescue	2
• Medical Group	2	Second Rescue	2
• Incident Command/Safety	1	Platoon Commander	1
• Law Branch Contacted for notification purposes only • May assist with general command duties • May assume B92 duties	1	Additional Staff (AC's)	1
• Law Branch	1	TPD Sergeant	1
Totals	28 (31)		28 (31)

Figure 200: TFD Critical Tasking for Hazmat – Maximum Risk

Within the TFD, a train derailment is categorized as a HazMat – Maximum Risk event, and would receive a specialized response that includes both TFD HazMat personnel and Technical Rescue personnel. This type of response is a dynamic event that will require additional resources to support the incident objectives. While the TFD Hazmat Team has the minimum staffing to make entry legally, it is often a slow process to ensure the entry team is operating in the safest manner possible in accordance with all OSHA regulations. More dynamic incidents such as a rescue or an incident that is affecting the public require a higher sense of urgency and will require assistance from other qualified agencies such as the Los Angeles County Fire Department (LACoFD) or Los Angeles Fire Department (LAFD). The mutual aid allows the incident commander to fill critical positions in the Hazardous Materials Branch with qualified personnel to ensure the safety of the responders and the public. The positions filled are in accordance with the State of California Training and FIRESCOPE.

Hazmat – Maximum Risk Benchmark:

For 90 percent of all HazMat – Maximum Risk incidents, the total response time for the arrival of the first-arriving company, with a minimum of 3 personnel, shall be 6 minutes and 24 seconds. The first-due unit shall be capable of establishing command, evaluating the need for additional resources, recognizing hazardous materials risks, and taking defensive actions to prevent harm to life, property, and the environment.

For 90 percent of all HazMat – Maximum Risk incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 28 personnel, shall be 12 minutes and 34 seconds. The effective response force (ERF) shall be capable of establishing command, evaluating the need for additional resources, recognizing hazardous materials risks, and taking defensive actions to prevent harm to life, property, and the environment, researching and gathering situational awareness related to the hazardous material, identifying potential victims and opportunities for rescues, isolating and denying entry into the exclusion zone, building dams and dikes away from the hazard, evacuating and sheltering potential victims, coordinating with regulatory agencies, and providing any decontamination necessary. In addition, the ERF shall be capable of entering the exclusion zone with chemical protective clothing, plugging and patching leaks, performing air monitoring within the exclusion zone and surrounding areas, and providing technical assistance expertise to the responsible party. Incidents that involve rescue in the exclusion zone or an airborne product affecting public health should warrant a request for mutual aid hazardous materials teams early in the incident.

Hazmat – Maximum Risk Baseline:

No Technical Rescue Maximum Risk incidents occurred from 2018 - 2022.

(Maximum Risk) Hazardous Materials - 90th Percentile Times Performance	Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018

Figure 201: Hazardous Materials Maximum -Risk Performance Table 2018-2022

Aircraft Rescue and Fire Fighting Deployment Strategies and Coverage Performance

Low Risk Aircraft Rescue and Fire Fighting Incident Deployment Strategies and Coverage Performance

Critical Tasking

Airport Response – Low Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Establish command • Complete 360 size-up • Communicate with Airport personnel • Establish water supply and pump operations • Address fire control concerns or mechanical issue	3	First Engine	3 (4)
Totals	3		3 (4)

Figure 202: TFD Critical Tasking for Airport – Low Risk

Low Risk Airport incidents include reports of an aircraft having minor difficulty upon approach to the Torrance Airport.

Airport – Low Risk incidents have an established ERF of 3 personnel. The ERF is met by deploying a single unit (staffed by a minimum of 3 personnel), which is also considered the first arriving unit for performance measurement purposes.

Airport – Low Risk Benchmark:

For 90 percent of all Airport – Low Risk emergency incidents, the total response time for the arrival of the first-arriving company and effective response force (ERF), with a minimum of 3 personnel, shall be 6 minutes and 24 seconds. (The first arriving unit meets the ERF requirement). The first-due unit shall be capable of establishing command, communicating with Airport personnel, evaluating the need for additional resources and conducting fire suppression activities.

Airport – Low Risk Baseline:

For 90 percent of all Airport – Low Risk emergency incidents, the total response time for the arrival of the first-arriving company and effective response force (ERF), with a minimum of 3 personnel, was 11 minutes and 36 seconds. The first-due unit was capable of establishing command, communicating with Airport personnel, evaluating the need for additional resources and conducting fire suppression activities.

(Low Risk) Airport Response - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	2:05	**1:01**	N/A	N/A	1:10	2:05	0:42
Turnout Time	Turnout Time 1st Unit	Urban	1:20	3:26	**2:06**	N/A	N/A	1:39	3:26	3:02
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	10:04	**6:04**	N/A	N/A	2:53	10:04	1:59
	Travel Time ERF **Concentration**	Urban	N/A	N/A	**N/A**	N/A	N/A	N/A	N/A	N/A
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	11:36	**5:12**	N/A	N/A	4:50	13:10	5:43
				n= 6		n=0	n=0	n=2	n=3	n=1
	Total Response Time ERF **Concentration**	Urban	N/A	N/A	**N/A**	N/A	N/A	N/A	N/A	N/A
				n=		n=0	n=0	n=	n=	n=

Figure 203: Airport Response Low -Risk Performance Table 2018-2022

Moderate Risk Aircraft Rescue and Fire Fighting Incident Deployment

The TFD does not identify a moderate risk category for airport incidents. Instead, aircraft that are experiencing major difficulty on approach to the airport have been included in the high-risk category. It is reasonable to consider that an incident with an aircraft experiencing major difficulty on approach could transition to an airplane crash while TFD units are en route.

High Risk Aircraft Rescue and Fire Fighting Incident Deployment Strategies and Coverage Performance

Critical Tasking

Airport Response – High Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Establish command/Safety (1) • Communicate with Airport personnel • Complete 360 size-up • On arrival of A/C, assume appropriate division/group or reunite with company • Establish water supply and pump operations (2) • Initiate fire attack (2) • Exposure Protection (1) • Back Up fire attack (2)	8	First Engine	3 (4)
		Second Engine	3 (4)
		Third Engine	3 (4)
• Rescue Group Supervisor • Aircraft stabilization • Patient removal/extrication • Assist incident as assigned	3	First Truck	4
• Assigned to first in truck unless immediate medical need • Patient removal/extrication	2	First Rescue	2
• Incident Command/Safety • Communicate with Airport personnel	1	Platoon Commander	1
• Medical Group	2	Second Rescue	2
• Law Branch	1	TPD Sergeant	1
Totals	17		19 (22)

Figure 204: TFD Critical Tasking for Airport Response – High Risk

High Risk Airport incidents include reports of an aircraft having major difficulty upon approach to the Torrance Airport or the report of an aircraft crash on Airport Property.

Airport – High Risk Benchmark:

For 90 percent of all Airport – High Risk emergency incidents, the total response time for the arrival of the first-arriving company, with a minimum of 3 personnel, shall be **6 minutes and 24 seconds**. The first-due unit shall be capable of establishing command, communicating with Airport personnel, evaluating the need for additional resources and conducting fire suppression activities.

For 90 percent of all Airport – High Risk emergency incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 17 personnel, shall be **10 minutes and 24 seconds**. The effective response force (ERF) shall be capable of establishing command, communicating with Airport personnel, stabilizing the aircraft, extricating any trapped victims, conducting fire suppression activities, appointing a qualified site safety officer and triaging, treating, and transporting any victims.

Airport – High Risk Baseline:

For 90 percent of all Airport – High Risk emergency incidents, the total response time for the arrival of the first-arriving company, with a minimum of 3 personnel, was **7 minutes and 15 seconds**. The first-due unit was capable of establishing command, communicating with Airport personnel, evaluating the need for additional resources and conducting fire suppression activities.

For 90 percent of all Airport – High Risk emergency incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 17 personnel, was **13 minutes and 10 seconds**. The effective response force (ERF) was capable of establishing command, communicating with Airport personnel, stabilizing the aircraft, extricating any trapped victims, conducting fire suppression activities, appointing a qualified site safety officer and triaging, treating, and transporting any victims.

(High Risk) Airport Response - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	1:21	**0:07**	1:10	N/A	1:18	1:21	N/A
Turnout Time	Turnout Time 1st Unit	Urban	1:20	2:10	**0:50**	1:12	N/A	0:45	2:10	N/A
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	5:09	**1:09**	4:53	N/A	5:09	3:01	N/A
	Travel Time ERF **Concentration**	Urban	8:00	10:48	**2:48**	10:48	N/A	N/A No data	N/A	N/A
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	7:15	**0:51**	7:15	N/A	7:04	6:07	N/A
				n=6		n=1	n=0	n=3	n=2	n=0
	Total Response Time ERF **Concentration**	Urban	10:24	13:10	**2:46**	13:10	N/A	N/A No data	N/A	
				n=1		n=1	n=0	n=0	n=0	n=0

Figure 205: Airport Response High -Risk Performance Table 2018-2022

Maximum Risk Aircraft Rescue and Fire Fighting Incident Deployment Strategies and Coverage Performance

Critical Tasking

Airport Response – Maximum Risk			
Tasks	Min Personnel Needed	Current Deployment	
		Apparatus	Staffing
• Establish command (1) • Communicate with Airport personnel • Complete 360 size-up • On arrival of A/C, assume appropriate division or reunite with company • Establish water supply and pump operations (1) • Initiate fire attack on floor involved (2) • Back Up Fire Attack (2) • Exposure Protection (1) • Forcible Entry (1)	8	First Engine	3 (4)
		Second Engine	3 (4)
		Third Engine	3(4)
• Rapid Intervention Crew • Establish secondary water supply	4	Fourth Engine	4
• Per SOG 1 Engine or Truck in staging • Assigned based on incident needs (Assist Fire Attack, Additional RIC, Exposures, etc.)	4	Fifth Engine	4
• Rescue Group Supervisor • Aircraft stabilization • Patient removal/extrication	3	First Truck	4
• Ventilation • Ladders • Utilities • Salvage	4	Second Truck	4
• Assist with patient removal/extrication, unless immediate medical need	2	First Rescue	2
• Incident Command/Safety • Communicate with Airport personnel	1	Platoon Commander	1
• Medical Group	2	Second Rescue	2
• Assigned based on incident needs (Medical Group, Assist Fire Attack, Exposures, etc.)	2	Third Rescue	2
• Law Branch	1	TPD Sergeant	1
Totals	31		33 (36)

Figure 206: TFD Critical Tasking for Airport Maximum-Risk

Airport Maximum Risk Incidents are defined as High-Risk incidents, typically an aircraft crash, that occur off Airport property and/or contain other complicating factors such as multiple victims or an aircraft into a building.

Airport – Maximum Risk Benchmark Statement:

For 90 percent of all Airport – Maximum Risk emergency incidents, the total response time for the arrival of the first-arriving company, with a minimum of 3 personnel, shall be **6 minutes and 24 seconds**. The first-due unit shall be capable of establishing command, communicating with Airport personnel, evaluating the need for additional resources and conducting fire suppression activities.

For 90 percent of all Airport – Maximum Risk emergency incidents, the total response time for the arrival of the effective response force (ERF), with a minimum of 31 personnel, shall be **12 minutes and 34 seconds**. The effective response force (ERF) shall be capable of establishing command, communicating with Airport personnel, stabilizing the aircraft, extricating any trapped victims, conducting fire suppression activities, appointing a qualified site safety officer, and triaging, treating, and transporting any victims. (The amount of personnel necessary to mitigate the incident would increase, at the Incident Commander's discretion, to be commensurate with any increase in incident complexity).

Airport – Maximum Risk Baseline Statement:

For 90 percent of all Airport – Maximum Risk emergency incidents, the total response time for the arrival of the first-arriving company, with a minimum of 3 personnel, was **6 minutes and 40 seconds**. The first-due unit was capable of establishing command, communicating with Airport personnel, evaluating the need for additional resources and conducting fire suppression activities.

No data was available for the total response time ERF for the one Maximum Risk Airport incident in 2019.

(Maximum Risk) Airport Response - 90th Percentile Times Performance			**Benchmark (Target)**	**2018-2022 (Baseline)**	**Gap**	**2022**	**2021**	**2020**	**2019**	**2018**
Alarm Handling	Pick-up to Dispatch	Urban	1:04	2:19	**1:15**	N/A	N/A	N/A	2:19	N/A
Turnout Time	Turnout Time 1st Unit	Urban	1:20	0:44	**- 0:36**	N/A	N/A	N/A	0:44	N/A
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	3:37	**- 0:23**	N/A	N/A	N/A	3:37	N/A
	Travel Time ERF **Concentration**	Urban	8:00	N/A	**N/A**	N/A	N/A	N/A	N/A	N/A
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	6:40	**0:16**	N/A	N/A	N/A	6:40	N/A
				n= 1		n=0	n=0	n=0	n=1	n=0
	Total Response Time ERF **Concentration**	Urban	12:34	N/A	**N/A**	N/A	N/A	N/A	N/A	N/A
				n=0		n=0	n=0	n=0	n=0	n=0

Figure 207: Airport Response Maximum -Risk Performance Table 2018-2022

Deployment Strategies to Other Types of Incidents

In addition to the already defined risk classifications in the community (Fire, EMS, Technical Rescue, Hazardous Materials and Aircraft), the TFD also has identified hazards or incident type threats that are not easily classified in the above groups. These other identified hazards or incident type threats include traffic collisions, wires down, water problems, and gas leaks inside a structure.

TFD deployment to reported traffic collisions includes the closest engine or truck, a paramedic rescue, and an ambulance. (Traffic collisions that include an overturned vehicle, entrapment, or a vehicle into a building receive an enhanced response and are categorized as Technical Rescue – Moderate Risk incidents).

Reports of a gas leak inside a structure receive a 1st alarm structure fire response.

TFD deployment to a reported wires down includes the closest engine company. TFD deployment to a report of an outside water problem includes the closest truck company. Deployment to a report of an inside water problem includes the closest engine company, truck company and rescue. Water problems are typically considered less urgent, however, based upon situational awareness and dispatch notes, the first-in officer may choose to respond Code-3. Only Code-3 responses are included in the below performance table below.

Other Incident Types Benchmark Statement:

For 90 percent of other identified hazards (including traffic collisions, water problems, wires down and gas leak in a structure), the total response time for the arrival of the first-arriving company, with a minimum of 3 personnel, shall be 6 minutes and 24 seconds. The first-due unit shall be staffed with a minimum of 3 firefighters and be capable of conducting a 360 size-up, establishing command, evaluating the need for additional resources, and controlling immediate hazards.

Other Incident Types Baseline Statement:

For 90 percent of other identified hazards (including traffic collisions, water problems, wires down and gas leak in a structure), the total response time for the arrival of the first-arriving company, with a minimum of 3 personnel, was 8 minutes and 53 seconds. The first-due unit was staffed with a minimum of 3 firefighters and was capable of conducting a 360 size-up, establishing command, evaluating the need for additional resources, and controlling immediate hazards.

Other Incidents Code 3 (Law/Fire) - 90th Percentile Times Performance			Benchmark (Target)	2018-2022 (Baseline)	Gap	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	1:04	2:22	**1:18**	2:38	2:18	2:21	2:23	2:15
Turnout Time	Turnout Time 1st Unit	Urban	1:20	1:50	**0:30**	1:30	1:18	1:36	1:52	2:21
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:00	5:37	**1:37**	5:53	5:38	5:29	5:25	5:38
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:24	8:53	**2:29**	9:07	8:55	8:26	8:45	9:04
				n= 5,931		n= 1,205	n= 1,088	n= 926	n= 1,351	n= 1,361

Figure 208: Other Incidents Code 3 Performance Table 2018-2022

Evaluation of Current Deployment and Performance

Agency Resiliency

Resiliency as defined by the CPSE's 10th edition CFAI accreditation model as "an organization's ability to quickly recover from an incident or events, or to adjust easily to changing needs or requirements."

Resiliency focuses on three key components:

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

The TFD addresses resiliency in the following manner.

Resistance:

- The Torrance Fire Department utilizes an automatic vehicle locator (AVL) system, on all operational apparatus, to assist the City of Torrance Public Safety Dispatch Center with computer aided dispatch (CAD) recommendations that assign the most appropriate and closest resource to an incident. In addition, a "closest route" computer server identifies the closest unit according to road network and traffic data.
- The Department is in the process of transitioning to a tiered dispatch model that will send only the appropriate TFD resources to identified EMS call natures. The first step in moving towards tiered dispatch was the implementation, in October of 2022, of Emergency Medical Dispatch (EMD). LA County EMS Agency requires the full implementation of EMD prior to adjusting an agency's resource deployment to EMS incidents. Tiered dispatch is anticipated to be fully implemented in the first quarter of 2024.
- Fire Alarm incidents receive only the closest engine or truck for response. In 2018, the Department analyzed fire alarm incident data and reduced the initial dispatch assignment from a full structure fire assignment to only a single engine or truck company, unless there was information indicating the presence of a fire. The intent is to only send the appropriate units to a fire alarm, reduce unnecessary code 3 driving and maintain distribution and concentration of resources throughout the City.

Absorption:

- During scheduled training events, TFD resources may be shifted by the on-duty Platoon Commander in order to provide station coverage and maintain distribution of resources. If needed, apparatus providing coverage during the training event are listed on the Department's daily activity schedule.
- During second alarm structure fires, or incidents that require the commitment of multiple resources, TFD resources are re-distributed throughout the City, if needed, by the Assistant Chief providing additional coverage for the City (B92). B92 manages TFD and mutual aid resources that

are providing station coverage while the regularly assigned Platoon Commander (B91) manages the incident.

- During third alarm structure fires, or periods of extended resource depletion, TFD station coverage is obtained from mutual aid partners. The mutual aid resources cover TFD station 3, station 1 and station 4 in order to provide for appropriate distribution of resources in the City.
- In the event of a significant incident or disaster that requires the emergency recall of personnel, a mass notification page can be sent to Department personnel to notify them of the need to report to their stations and provide additional coverage.
- In 2021, the TFD implemented an EMS Patient Transportation Program to provide BLS ambulance service to the City. In addition to four (4) 24-hour ambulances, two (2) BLS ambulances are staffed during times of historically higher call volume. The Department has monitored call volume and BLS Unit Hours of Utilization and made adjustments to the program, since its inception, to better maintain service levels.

Restoration:

- Mutual aid units providing station coverage not only assist with absorption by providing the Department the ability to maintain service coverage, but they also provide restoration because their presence allows for the return to a state of normalcy.
- Additionally, in response to increasing ambulance patient offload times (APOT) at local hospitals, the TFD also staffs an APOT unit (24 hours a day), that consists of 1 EMT Ambulance Operator. The role of this EMT is to assume care of up to 4 BLS patients at the hospital so that TFD ambulances, that are waiting to offload patients, can be made available to respond to calls. This specialty unit increases the capacity of the Department to not only absorb greater service demand but also restores BLS Ambulance availability to a state of normalcy more quickly.

The Department's resilience will continue to be tested in the future as the community's demands for service increase. The Department is committed to regularly analyzing performance, identifying gaps, enhancing programs, strengthening partnerships with outside agencies and external stakeholders, and adjusting resource deployment in an effort to maintain and improve resilience.

UHU

Unit Hour Utilization (UHU) refers to the amount of time a unit spends on emergency incidents in a 24-hour period. It is a factor in determining "how busy is busy?" UHU data can be used in conjunction with travel time performance to evaluate the distribution and concentration of resources required to meet the community's response time and effective response force goals. Information obtained from monitoring UHU helps optimize resource allocation, manage workloads, plan for peak demand periods, evaluate performance, and make informed decisions about budgeting and resource planning. Using UHU can assist fire departments in developing strategies to enhance the ability to quickly recover from incidents / events and to easily adjust to changing needs or requirements.

No national standard is available as a benchmark; however, many trade journals and professional articles indicate that less than 10% UHU is desirable. At 10%, the community has a 90% chance of timely emergency service. "Many industry professionals believe 30% is the "line in the sand" for UHU. At 30% the community has less than a 70 percent chance of timely emergency service. Personnel assigned to units at or exceeding

30% demonstrate signs of fatigue and burnout resulting in an increased risk of errors. Additionally, at 30% required training and physical fitness sessions are not consistently completed" (Fire Engineering, May 2016). Fortunately, no TFD units are approaching the 30% threshold value. The table below includes the average percentage of time a unit is committed to an emergency incident.

TFD Unit Hour Utilization (UHU)					
	2018	**2019**	**2020**	**2021**	**2022**
B91	0.87%	0.84%	0.68%	0.58%	0.85%
E91	5.56%	5.46%	3.87%	4.41%	5.28%
E92	6.41%	6.96%	5.95%	7.18%	6.28%
E93	6.30%	6.79%	5.01%	5.04%	5.97%
E94	4.11%	3.89%	3.19%	3.58%	5.08%
E95	7.22%	6.80%	5.91%	6.76%	7.03%
E96	7.81%	7.55%	6.07%	5.97%	8.42%
E97	6.82%	6.26%	4.99%	5.68%	6.56%
R91	16.15%	14.67%	13.26%	12.98%	13.91%
R93	12.24%	11.55%	10.54%	10.87%	11.10%
R94	10.60%	9.17%	8.82%	9.15%	10.59%
R95	12.88%	12.32%	11.12%	11.35%	12.50%
R96	12.65%	12.32%	10.23%	10.31%	12.05%
T91	2.25%	2.28%	1.63%	1.90%	2.30%
T96	2.52%	2.18%	1.86%	2.11%	2.82%
			BLS91	17.86%	21.18%
			BLS92	1.28%	20.20%
			BLS93	11.61%	16.40%
			BLS94	N/A	15.20%
			BLS95	14.70%	20.20%
			BLS96	19.13%	21.54%

Figure 209: TFD UHU (Unit Hour Utilization) 2018-2022

It is important to understand that UHU is only measuring time assigned on an emergency. The TFD's overarching goal is to reduce emergencies through risks reduction efforts. All of the above units are involved in a wide variety of risk reduction efforts on a daily basis.

Findings and Recommendations

The below findings and recommendations are the result of the CRA-SOC development and the Department's commitment to continuous improvement through the Commission of Fire Accreditation International (CFAI) accreditation process. These findings and recommendations, in conjunction with the 2023-2028 TFD Strategic Plan and Self-Assessment Manual, place the TFD leadership and City Management in a position to make data informed decisions regarding funding, deployment, program development, staffing and strategic initiatives.

Findings

Finding #1

Overall call volume for the Department has continued in an upward trend. The Department has seen a 10.7% overall increase in the number of incidents from 2018-2022. 2020 saw an overall drop in call volume due to the COVID pandemic, however, by 2021, call volume was almost back to pre-pandemic levels. 2022 saw the highest call volume in the Departments history with a total of 16,672 incidents. (1,629 more incidents than in 2021).

Finding #2

Call volume increases significantly from 0800 – 2000 hours. The increased call demand during the day presents a challenge to TFD when meeting response time criteria and maintaining distribution of resources in the City.

Finding #3

Weekends are slightly less impacted by call volume, with Sundays experiencing the lowest service demands.

Finding #4

Requests for Emergency Medical Services (EMS) are the most frequent type of service provided by the Torrance Fire Department. In 2022, EMS incidents account for 77% of emergency activities and correspondingly have the greatest impact on the concentration and distribution of TFD resources within the community.

Finding #5

A heat map analysis of ALS patient transports revealed the highest concentration of ALS transports in Planning Zone 95. Additionally, the areas with a higher concentration of ALS transports correspond to known facilities or address that include skilled nursing facilities, assisted living facilities, urgent care centers, doctor offices or senior living communities.

Finding #6

The main response time challenges, for the arrival of the first unit, are on the borders of the City. This is particularly noticeable in the northeast section of Planning Zone 93, the eastern border on Planning Zone 91 and 97, and the far southeast section of the City (in Planning Zone 97).

Finding #7

For Code-3 responses, TFD's overall performance, at the 90th percentile, for first unit total response time, over a five-year period, was 7 minutes and 32 seconds. This time is not in compliance with the established benchmarks. The components of the total response time that have the greatest gap in performance are alarm handling time and travel time.

Finding #8

The Department uses the Torrance Public Safety Dispatch Center to dispatch TFD resources. The dispatch center's overall performance, at the 90th percentile, for alarm handling, over a five-year period, was 1 minute and 59 seconds. This time is 55 seconds over the stated benchmark established by the Department. Alarm handling time has been trending up over the past few years.

Finding #9

The TFD's overall performance, at the 90th percentile, for first unit travel time, over a five-year period, was 4 minutes and 57 seconds. This time is 57 seconds over the stated benchmark established by the Department. Travel times have been trending up and were at a high point in 2022, which corresponded to the year with the highest call volume.

Finding #10

TFD is not meeting all of the established performance benchmarks for response times. However, the Department is confident that the established time targets, which are reflective of NFPA 1710 and LA County EMS Agency standards, are still applicable and they assist the TFD with striving for improvement.

Finding #11

In April of 2021, the TFD implemented an EMS Patient Transportation Program in response to the budgetary impacts from the COVID-19 pandemic. The main response challenge for the arrival of the first BLS unit on scene is along the southern border of the City in Planning Zones 92 and 94. This area corresponds to portions of the City that are typically covered by peak-staffed units.

Finding #12

TFD unit hour of utilization (UHU), for the five years from 2018-2022, ranged from just under 1% to over 16%, for TFD operations resources. This included an approximate range of 1%-3% for truck companies, 5%-8% for engine companies, and 9% - 16% for paramedic rescues. These values provide good response reliability and resiliency capabilities.

Finding #13

TFD unit hour of utilization (UHU) for BLS ambulances in 2022, for the 24 hour units, ranged from 14% to 21.5%. The BLS ambulances have some of the highest UHU percentages of all TFD resources.

Finding #14

The TFD documented 127 building or structure fires during the 5-year period from 2018-2022. 65% of the building fires were contained to the object or room of origin. 99% of all building fires were contained to the building of origin. The fires resulted in the loss of an estimated $10.1 million of property. TFD actions were able to save over $283 million in property value.

Finding #15

The City of Torrance is anticipating an increase in the development of residential and commercial occupancies over the next 5 years. The proposed developments, once complete, could result in an additional 525 incidents per year. An analysis of the proposed projects concluded that TFD will be able to absorb approximately 525 additional incidents without a noticeable impact to current response standards. The Department should perform ongoing analysis and data collection to verify the actual impacts. The Planning Zone with the greatest potential impact is PZ96.

Recommendations

Recommendation #1

The TFD should continue to monitor and evaluate community risks and consider the use of additional data and/or tools to categorize risk. The three primary components of categorizing risks are an analysis of probability, consequence, and impact on the agency. Currently, the Department utilizes a two-axis parabolic curve methodology to categorize risks in the community. Typically, the higher consequence of an incident, the higher the impact on TFD resources needed to mitigate the emergency. The Department considers the impact of an event on the Department's resources, however, the impact is not quantified in the current methodology. The Department should consider moving to a 3-axis risk categorization model to further enhance the community risk assessment and also incorporate new data sources, such as Emergency Medical Dispatch (EMD) determinant codes, to assist with the process.

Recommendation #2

The Department should identify, obtain, and utilize new technologies and record management systems to improve Department efficiencies and data analytics. The current tools available to the Department are useful, however, the ability to analyze data in near real time and adapt quickly to identified trends or gaps would benefit the organization. In addition, improved IT resources would allow for better communication with City leaders and the community.

Recommendation #3

The TFD should develop strategies to maintain and/or improve performance while call volume continues to increase. Strategies should include, but not be limited to:

- The implementation of a tiered dispatch model for EMS incidents.
    - The TFD took the first step towards tiered dispatching with the on-boarding of Emergency Medical Dispatching (EMD) at the end of 2022. The full implementation of tiered dispatching will allow TFD to respond to the most appropriate level of care to calls for medical service rather than the highest level of care, improve UHU and provide for increased resiliency.
- Explore, adopt, and embrace alternative EMS delivery models such as community-based paramedicine and alternative destination transportation programs.
    - A community-based paramedicine program will allow for the engagement and treatment of patients without the need to strain the 911 system.
    - Alternative destination transportation programs would reduce the number of patients transported to area emergency rooms and hopefully reduce ambulance patient offload times.
    - At this time, new EMS delivery models still require legislative changes in order to fully implement the programs.
- Actively participate in the City's homelessness outreach initiative to provide services and reduce impact of homeless related incidents on emergency response.

Recommendation #4

The Department should re-implement E92 as a paramedic engine company to enhance paramedic services in Planning Zone 92. In 2018, the TFD upgraded E92 from a paramedic assessment engine to a paramedic engine company. However, at the beginning of 2022, several firefighter/paramedics left to other agencies, forcing the Department to downgrade E92 from a paramedic engine to an assessment engine. With the training of additional firefighters as paramedics and the implementation of a Paramedic in Rank program, which utilizes Engineers and Captains as part of the staffing for paramedic engines, the Department should consider re-implementing E92 as a paramedic engine company to enhance paramedic services in the only planning zone that does not have a paramedic rescue assigned to it.

Recommendation #5

The Department should enhance the current patient transportation program to build resiliency within the system. BLS ambulances have the highest UHU of all TFD resources. The Department should develop a plan to increase ambulance availability in response to extended ambulance patient offload times, determine alternatives for ALS patient transport and enhance BLS staffing to ensure adequate coverage. Building resiliency within the system will allow for better absorption of call surges and a quicker restoration of services.

Recommendation #6

The Department should remain engaged with other City Departments and City Management to forecast and develop strategies to respond to emerging trends that impact the community. The TFD has already partnered with other stakeholders to quantify and analyze the potential impacts of future developments within the City. The Department should maintain relationships that will allow for the continued monitoring of new trends.

Recommendation #7

The Department should seek opportunities to improve response time performance to the eastern boundary of the City. While the current location of TFD stations and remains fixed, recent discussions of City land re-development and potential changes to City properties may provide an opportunity for the Department to provide insight, conduct predictive analytic modeling, and relocate TFD resources to close performance gaps.

Recommendation #8

The Department should consider the use of virtual platforms to conduct remote training, when feasible, to maintain distribution of units within the City. The use of software platforms such as Microsoft Teams and Zoom can be beneficial, in some instances, to deliver training while also allowing for the City to maintain coverage. This strategy may assist with lowering travel times, and subsequently total response times, by decreasing the reliance on units from outside the planning zone to respond to incidents.

Recommendation #9

The Department should increase community engagement efforts with the intent of reducing risks and measuring the impact on community outcomes. The community has a high expectation for the TFD to educate and engage with the community. The identification and measurement of TFD's efforts on outcomes in the community is essential to positively impacting the citizens within the City.

Recommendation #10

The Department should remain focused on continuous improvement through the CFAI accreditation model. The accreditation process has resulted in many improvements within the organization as well as additional benefits provided to the community. The process has shown the TFD how to become a more professional, better organized, and more resilient all-risk emergency services provider. The community has also expressed its expectation that the TFD maintain its focus on striving towards industry excellence and innovation. The Department should seek to better align performance reporting with program appraisals and subsequent program improvements in an effort to gain organizational efficiency.

Section 5 - Plan for Maintaining and Improving Response Capabilities

The graphic below illustrates the compliance methodology cycle that the Department utilizes. The CRA/SOC is reviewed annually and republished every 5 years.

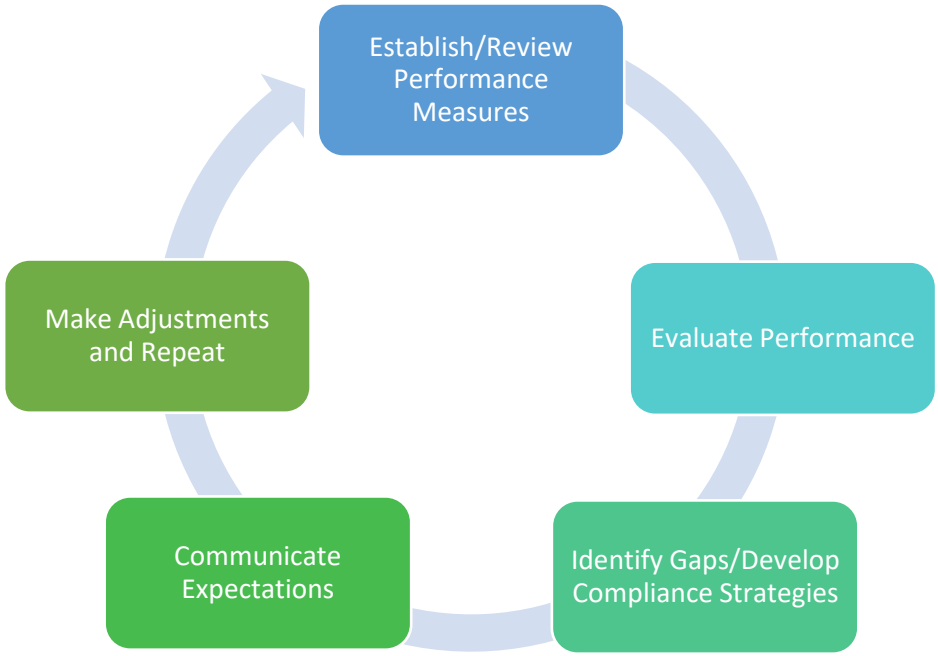


Figure 210: TFD Compliance Methodology Cycle

The Department reports call volume and nature to the City management and City Council on a weekly basis. The weekly report includes the narratives from any significant incidents that may come up at Tuesday Council meetings. In addition, the Department monitors and evaluates its performance and compliance quarterly and annually. The quarterly review, at a minimum, includes the following Code- 3 performance measurements:

- Call Handling Time
- Turnout Time
- Travel Time
- Total Response Time

Quarterly reports are posted for all operations personnel and public safety dispatch employees to review. In addition, the Chief Officers review the report at a bi-monthly Company Officer's meeting and seek opportunities for improvement.

The Department's annual report includes all CRA-SOC benchmark and baseline reporting criteria. The annual report is distributed to all operations personnel and public safety dispatch employees for review. Chief Officers review the report at the first months Company Officer's meeting and seek opportunities for improvement. In addition, the annual report is presented to the Employee Relations and Public Safety

Committee (a sub-committee of the City Council). The annual report is reviewed to identify trends call volume trends, total response time gaps in services, negative trends, development trends and changing risks that affect the response area, and any recommendations for improvement.

The above reports are considered minimums. If at any time the Planning Division or Accreditation Manager determines the need, a detailed analysis can be conducted. The analysis will be presented to the Fire Chief for any potential action. Analysis may also be completed when requested by City Council or City Management.

The continuous improvement strategy will be accomplished through the review of the data as provided by the Planning Division to the command staff and public safety dispatch center through the quarterly and annual reports. While any member of the organization may make suggestions for improvement, it is the responsibility of the command staff to make final recommendations to the Fire Chief. The Fire Chief will review the recommendations for consideration and implementation based on the Standards of Cover, Community Risk Assessment, Strategic Plan, and Self-Assessment Manual.

Subsequently, the Fire Chief will determine the most appropriate actions to be implemented based upon these documents, labor group considerations, the values, vision and mission of the Department. When significant changes or actions are needed that may drastically change the level of service, the Fire Chief will provide this information to the City Manager and, as necessary, City Council, for review, consideration, and approval. Through regular evaluation of our response capabilities and constant communication, the TFD believes this process strengthens our service delivery to our community.

Section 6 - Correlation of CRA/SOC Document to CFAI Accreditation Model

The following table serves as a reference that links performance indicators from the CFAI Accreditation Model to where they correlate in the 2023 TFD CRA / SOC.

The correlation is shown for the below listed Criterions in Category 2 (Assessment and Planning) of the CFAI Accreditation Model:

Criterion 2A – Documentation of Area Characteristic
Criterion 2B – All-Hazard Risk Assessment and Response Strategies
Criterion 2C – Current Deployment and Performance

PI/ CC	PI/CC TEXT	CRA-SOC LOCATION - SECTION/Header (Hyperlinked)
Category 2 - Assessment and Planning		
2A.1	Service area boundaries for the agency are identified, documented, and legally adopted by the authority having jurisdiction.	Physical Setting
2A.2	Boundaries for other service responsibility areas, such as automatic aid, mutual aid, and contract areas, are identified, documented and appropriately approved by the authority having jurisdiction.	Physical Setting
CC 2A.3	The agency has a documented and adopted methodology for organizing the response area(s) into geographical planning zones.	Geographical Planning Zones (First-in Districts)
CC 2A.4	The agency assesses the community by planning zone and considers the population density within planning zones and population areas, as applicable, for the purpose of developing total response time standards.	Risk Assessment by Geographical Planning Zones
2A.5	Data that include property, life, injury, environmental and other associated losses, as well as the human and physical assets preserved and/or saved, are recorded for a minimum of three (initial accreditation agencies) to five (currently accredited agencies) immediately previous years.	Fire Risks Emergency Medical Risks
2A.6	The agency utilizes its adopted planning zone methodology to identify response area characteristics such as population, transportation systems, area land use, topography, geography, geology, physiography, climate, hazards, risks, and service provision capability demands.	Risk Assessment by Geographical Planning Zones

2A.7	Significant socioeconomic and demographic characteristics for the response area are identified, such as key employment types and centers, assessed values, blighted areas, and population earning characteristics.	Human and Human-Related Characteristics
2A.8	The agency identifies and documents all safety and remediation programs, such as fire prevention, public education, injury prevention, public health, and other similar programs, currently active within the response area.	Section 2 - Fire Department Overview (See Department Programs and Services Section)
2A.9	The agency defines and identifies infrastructure that is considered critical within each planning zone.	Risk Assessment by Geographical Planning Zones Human-Made Characteristics Critical Facilities Assessment Hazardous Materials Emergency Risks
CC 2B.1	The agency has a documented and adopted methodology for identifying, assessing, categorizing, and classifying all risks (fire and non-fire) throughout the community or area of responsibility.	Section 3 - All-Hazard Risk Assessment of the Community
2B.2	The historical emergency and nonemergency service demands frequency for a minimum of three immediately previous years and the future probability of emergency and nonemergency service demands, by service type, have been identified and documented by planning zone.	Community Service Demands Risk Assessment by Geographical Planning Zones Risk Classification by Hazard Type and Risk Event
2B.3	Event outputs and outcomes are assessed for three (initial accrediting agencies) to five (currently accredited agencies) immediately previous years.	Fire Risks Emergency Medical Risks Community Risk Reduction Program
CC 2B.4	The agency's risk identification, analysis, categorization, and classification methodology has been utilized to determine and document the different categories and classes of risks within each planning zone.	Risk Categorization Methodology
2B.5	Fire protection and detection systems are incorporated into the risk analysis.	Fire Risks (See Fire Sprinkler Systems)

2B.6	The agency assesses critical infrastructure within the planning zones for capabilities and capacities to meet the demands posed by the risks.	Risk Assessment by Geographical Planning Zones
2B.7	The agency engages other disciplines or groups within its community to compare and contrast risk assessments in order to identify gaps or future threats and risks.	Community Feedback
CC 2C.1	Given the levels of risks, area of responsibility, demographics, and socioeconomic factors, the agency has determined, documented, and adopted a methodology for the consistent provision of service levels in all service program areas through response coverage strategies.	Section 4 - Current Deployment Strategies and Coverage Performance
CC 2C.2	The agency has a documented and adopted methodology for monitoring its quality of emergency response performance for each service type within each planning zone and the total response area.	Methodology for Measuring Coverage Performance
2C.3	Fire protection systems and detection systems are identified and considered in the development of appropriate response strategies.	Fire Risks (See Fire Sprinkler Systems)
CC 2C.4	A critical task analysis of each risk category and risk class has been conducted to determine the first due and effective response force capabilities and a process is in place to validate and document the results.	TFD Response Plan Strategy and Deployment Structure (See EMS, Fire, Hazmat, Tech Rescue, Aircraft Deployment Strategies and Coverage Deployment Sections)
CC 2C.5	The agency has identified the total response time components for delivery of services in each service program area and found those services consistent and reliable within the entire response area.	Total Response Time and Components Benchmark Time ChartOverall Code 3 (Emergency) Response Time Performance Maps (and following sections for EMS, Fire, Hazmat, Tech Rescue, Airport) Emergency Medical Services Deployment Strategies and Coverage Performance
2C.6	The agency identifies outcomes for its programs and ties them to the community risk assessment during updates and adjustments of its programs, as needed.	Fire Risks Emergency Medical Risks

		Community Risk Reduction Program
2C.7	The agency has identified the total response time components for delivery of services in each service program area and assessed those services in each planning zone.	Figure 158: Upper Threshold Limits Overall Code 3 (Emergency) Response Time Performance Maps (and following sections for EMS, Fire, Hazmat, Tech Rescue, Airport)
CC 2C.8	The agency has identified efforts to maintain and improve its performance in the delivery of its emergency services for the past three (initial accreditation agencies) to five (currently accredited agencies) immediately previous years.	TFD Response Plan Strategy and Deployment Structure (See EMS, Fire, Tech Rescue, Hazmat, Airport performance tables) Emergency Medical Risks
2C.9	The agency's resiliency has been assessed through its deployment policies, procedures, and practices.	Agency Resiliency

Section 7 – Table of Figures and References