JKA
jeff katz
ARCHITECTURE

Table of Contents

Tab 1 - General
Executive Summary
Purpose
Approach

Tab 2 - Fire Station 13
Conditions Narrative
Observations / Deficiencies
Conclusions

Tab 3 - Fire Station 14
Conditions Narrative
Observations / Deficiencies
Conclusions

Tab 4 - Fire Station 15
Conditions Narrative
Observations / Deficiencies
Conclusions

Tab 5 - Fire Station 16
Conditions Narrative
Observations / Deficiencies
Conclusions

Tab 6 - General Deficiencies

Revised: 10-27-21

Executive Summary

General

Introduction:

JKA was contracted to perform a conditions assessment for each of the Central Marin Fire Stations, Station 13 (Paradise Drive), Station 14 (Corte Madera), Station 15 (Downtown Larkspur) and Station 16 (Greenbrae). The Site assessments were performed on March 31st and April 9th 2021. Additionally, we reviewed the documents provided by City staff. The station reviews included general observation of site, exterior skin, windows, doors, interior walls, doors, finishes, brief review of easily observable mechanical, plumbing, and electrical, and obvious ADA accessibility issues.

The conclusions for each fire station are listed in summary on this page, and in further depth in the balance of this report. A discussion of the General Deficiencies is also included at the end of this report.

Station 13:

Station 13 is currently marginally functional and has staff safety concerns with no separation between apparatus hot zone and the living quarters. This, coupled with an awkward site layout, proximity to a tidal wetlands and flood zone, and lack of growth potential, suggests this station should be planned for future replacement. A replacement building designed to today's standards with flexibility for future fire service trends on a more suitable site will better serve the needs of the Central Marin Fire Department and the community it serves.

Station 14:

The age and condition of Station 14 does not lend itself to a successful renovation. This is largely due to its original design and use as a joint Public Safety Building with both fire and police functions with built-in security/ privacy separation. Our recommendation for this building is to demolish and rebuild taking into consideration future growth, better site orientation and providing a complete station designed to accommodate an engine or truck company, ambulance and administration functions.

Station 15:

The age and condition of Station 15 does not lend itself to a successful renovation. Built in 1939, this station is beyond its useful life as a modern fire station. Our recommendation for this building is to re-purpose the building, maintaining its historical character and significance. The building could be reimagined as a combination community space, and museum featuring the rich history of fire service in the community. The functional aspects of the station could be combined with either Station 14 or Station 13, most likely Station 14 as a new headquarters facility.

Station 16:

Station 16 is reasonably functional with adequately sized apparatus bays and support spaces. There are several code and functional issues that could be addressed by renovation and could extend the useful life of this station for another ten-plus years, or perhaps longer. Ultimately there will come a time that this station too will require replacement whether on the same site or an alternate site, and the soils conditions will need to be addressed more robustly.

Purpose

JKA was contracted by the Town of Corte Madera to prepare a report which addresses the current condition and operational effectiveness of the Central Marin Fire Department Fire Stations 13, 14, 15, and 16.

The intent of this report is to assess the current conditions, operational deficiencies and potential for improvements to the existing stations. The goal of the report is to develop a high-level overview to determine how best to modify the existing stations to bring them into compliance with current code and operational requirements, meet today's department needs and extend the useful life of the stations for 30-50 years (if possible), or to recommend new facilities to replace existing where warranted. Additionally, if it is determined to not be feasible to modify existing facilities, establish what the program should be for a replacement station at the current (or more likely another) location. Actually identifying alternate site locations and determining their feasibility for use as a fire station site is not a part of this study.

Approach

Our team met on site with department representatives on March 31, 2021. On this day we discussed the department's goals for the study and long-term vision for the stations. We then toured Stations 14 (Corte Madera - headquarters) and 13 (Paradise Drive) to evaluate the as-built conditions, take photographic documentation, and complete an evaluation of the condition of the building elements and systems. Items reviewed included, but are not limited to, site paving and drainage, landscape and irrigation, structural systems, exterior skin, windows, doors, interior walls, finishes, mechanical, plumbing, and electrical, and obvious ADA accessibility issues.

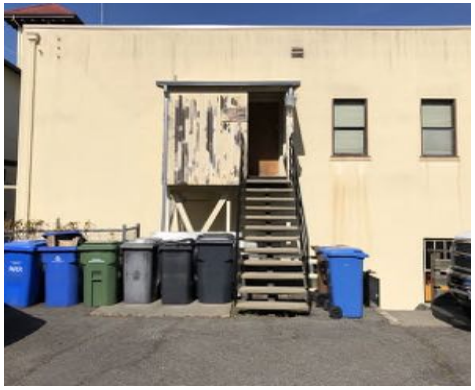
We met again on site with department representatives on April 9, 2021. On this day we toured Stations 16 (Greenbrae) and 15 (Downtown Larkspur) to evaluate the as-built conditions, take photographic documentation, and complete an evaluation of the condition of the building elements and systems. Items reviewed included, but are not limited to, site paving and drainage, landscape, structural systems, exterior skin, windows, doors, interior walls, finishes, mechanical, plumbing, and electrical, and obvious ADA accessibility issues.

During our site visits, no destructive testing or probing was performed. The assessment was visual and made from the ground, no observation of roofs or roof conditions was included. All internal areas of the building were reviewed, but no furniture or other fixtures on the interior were moved. The following categories were considered in the condition assessments:

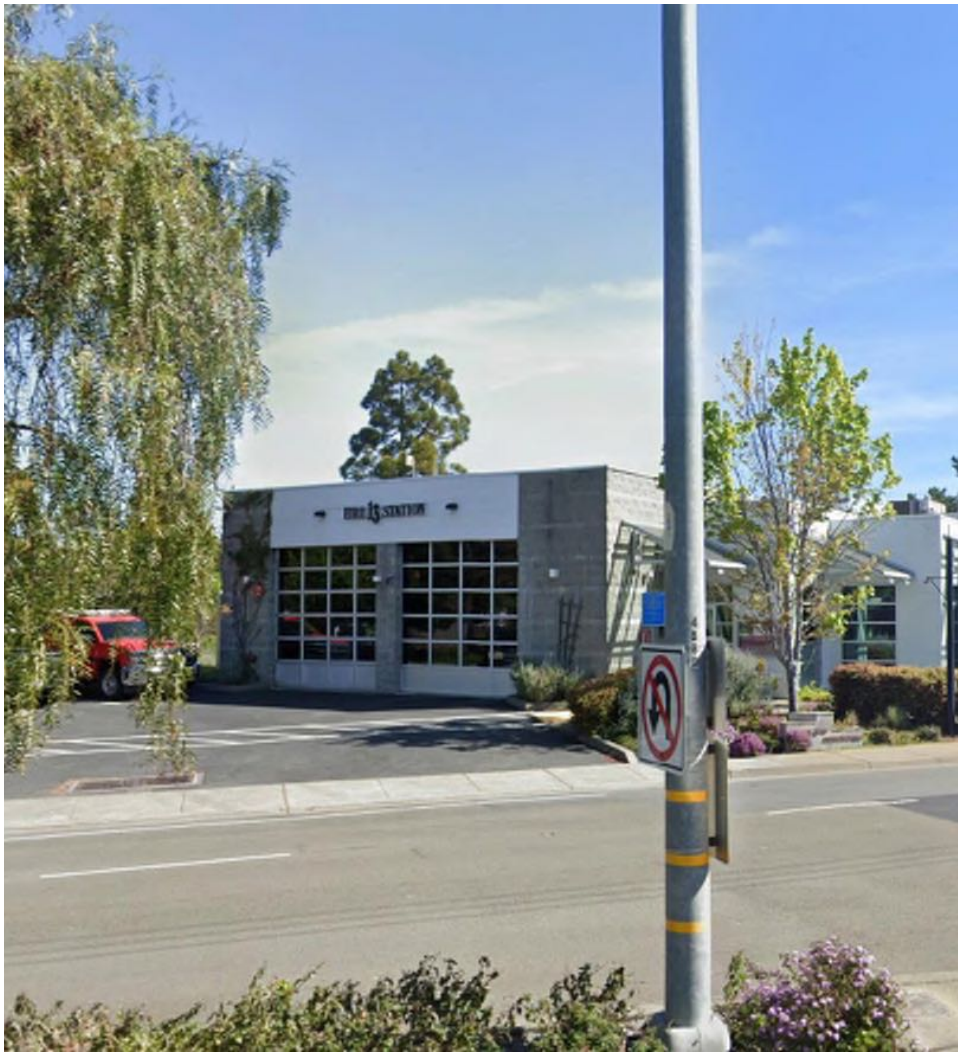
Life Safety - Items requiring immediate attention that could be dangerous or life threatening, equipment or finishes that are past their useful life and should be replaced immediately and significant operational constraints.

Necessary Repair - Items requiring attention relative to stabilization and protection of the building elements, i.e., failure to undertake a task could lead to accelerated deterioration of other building components. These finishes or equipment should be replaced within the next 2-4 years, or sooner, if funding becomes available.

Non-Critical Repairs - Functional considerations and aesthetics. These are items requiring attention relative to restoration or improvement of building elements as well as landscaping. Bringing the Mechanical, Plumbing, and Electrical components up to current code will not only extend the life of the buildings an additional 30-50 years, it will help them to function more effectively and efficiently. This translates into reduced energy costs for the Department and healthier living conditions for the inhabitants and employees.




GREENBRAE
Central Marin Fire Station 16
Larkspur
Central Marin Fire Station 15
Corte Madera
Central Marin Fire Station 14
MEADOWSWEET
Central Marin Fire Station 13

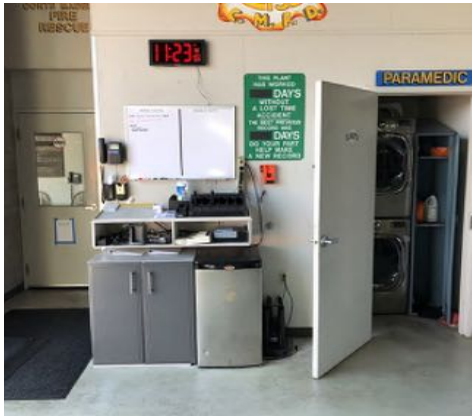


Conditions Narrative

Fire Station 13, built in 1999, is a single-story, wood framed structure, consisting of approximately 3,045 sf. The Apparatus Bay has two drive-thru bays and currently houses 1 Type 3 Engine, electrical room, decontamination area, laundry closet and a restroom with shower area. The station also houses living quarters to support a 3-shift squad of 3 people, in 48-hour shifts. There is little storage in the station and an 8' by 30' storage container adjacent to the station provides storage for hoses, flammable liquids cabinet, equipment and supplies. The existing facility consists of a variety of spaces with approximate square footages shown below:

First Floor:

Apparatus Bay	1,400 SF
Kitchen/Dining	210 SF
Day Room	180 SF
Office	90 SF
Sleeping Quarters	464 SF
Restrooms	155 SF
Decon/Electrical/Laundry	110 SF
Storage Container	240 SF

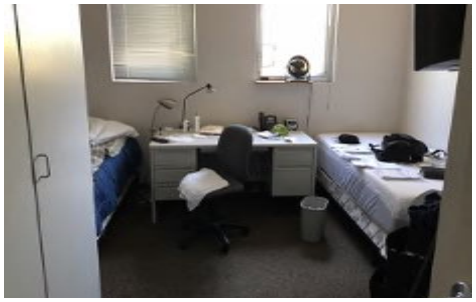


Observations / Deficiencies

- The building site is adjacent to an apparent tidal wetlands area, and sits within FEMA Special Flood Hazard Area AE, the base flood or 100-year flood, giving some concern with rising sea water levels.
- The Fire Station lacks proper separation between the apparatus bay and the kitchen, dining, dayroom and dormitory sleeping quarters which is a health concern by modern standards.
- The office area is small but functional.
- The dormitory area consists of three bedrooms, 9 lockers in the adjacent hallway and one restroom/shower. Two of the bedrooms each have two bunks, three lockers and a desk.
- Current building code requires each sleeping quarters to have 2 means of egress. The bedrooms all have windows that appear to have sill heights that do not meet the code requirement for emergency egress windows.
- The apparatus floor contains two drive-thru 40-ft deep bays, one of the bays has a small tool area and work bench. The bay depth will barely accommodate current Type 1 engines.
- HVAC systems & Lighting throughout the station are serviceable although not up to current energy efficiency standards.
- In general, the current layout of spaces, while tight, does function fairly efficiently.
- Although the Fire Station has 3 shifts of personnel, the kitchen layout does not provide adequate cabinet/pantry space for each of the three shifts.
- The fire station's close proximity to a main road and odd shaped site makes the ingress and egress from the site awkward and site circulation poor.
- The site does not provide a secure parking area for staff separate from the public. This is a security concern.
- The current site and building layout cannot accommodate any size increase or potential for future growth.
- The current station does not accommodate fitness equipment and workout space on site. Although the Department has, in the past, utilized local Fitness Clubs for this function, having space within the station should be a goal of a new facility.

Conclusions

This station is small and marginally functional however the main deficiencies are lack of separation between the hot zone (apparatus floor) and living quarters which will be difficult if not impossible to resolve owing to the tightness of every space in the building. The layout of the building on this site makes it virtually impossible to accommodate any growth or expansion. In the short term the station can, with some modifications, continue to operate relatively efficiently, but in the longer term, replacement of the station on a more suitable site should be planned for.



Photos

Fire Station 13

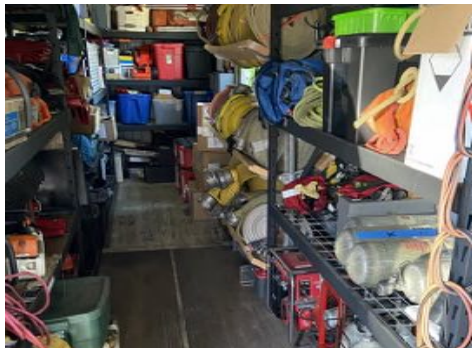
Apparatus Bay

Patio

Apparatus Bay / Tool Area

Apparatus Bay / Lockers / Exercise Space

Decon

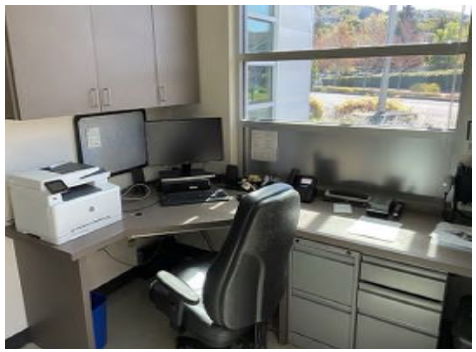


Storage

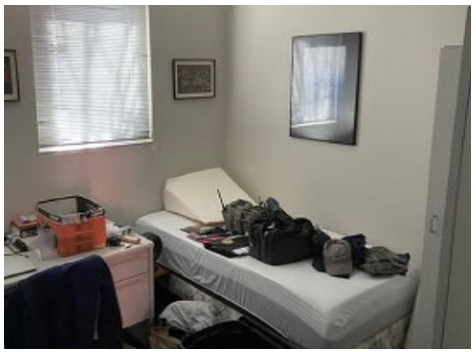
Tool Area / Work Bench

Kitchen / Dining

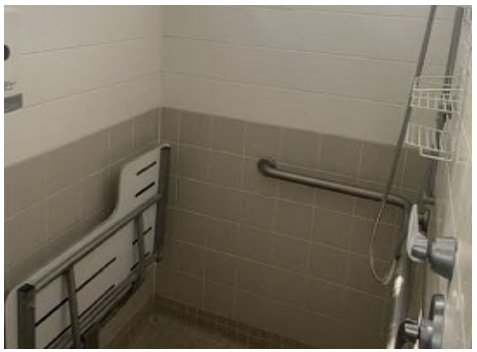
Day Room



Office Space



Dorm Room

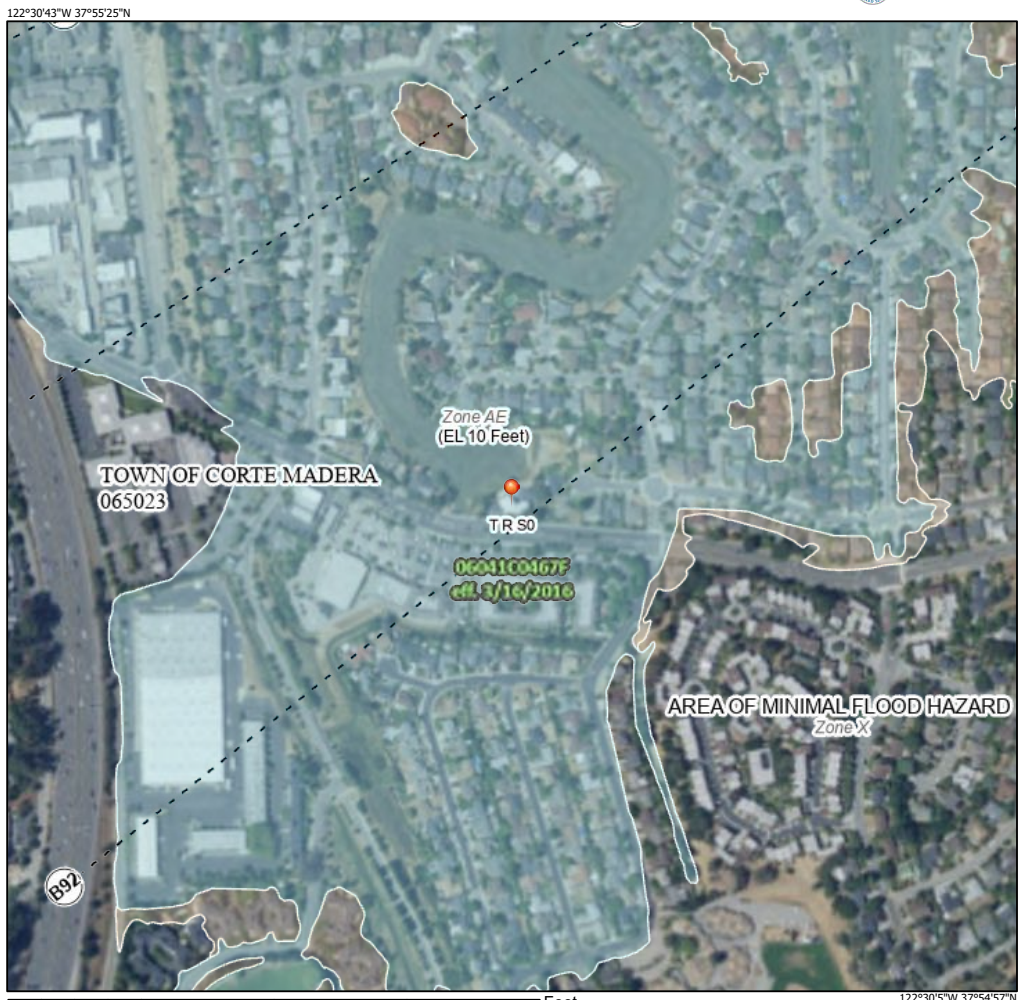


Restroom + Shower

Aerial

Fire Station 13

National Flood Hazard Layer FIRMette



Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/3/2021 at 2:45 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.


GREENBRAE
Central Marin Fire Station 16
Larkspur
Central Marin Fire Station 15
Corte Madera
Central Marin Fire Station 14
MEADOWSWEET
Central Marin Fire Station 13


CENTRAL MARIN FIRE
HEADQUARTERS
14

Conditions Narrative

Originally constructed in 1965 as a combined police and fire public safety building, Fire Station 14 is ready for replacement. It is a two-story, wood framed, brick-clad building with a combination of built-up roofing and metal mansard roofing. The building currently houses only the fire department and is the headquarters station for the Central Marin Fire Department. This station supports a 4-person crew and has three single-deep apparatus bays.

The building is approximately 7,100 square feet and includes the following spaces:

First Floor:

Apparatus Bay
Kitchen
Dayroom/Dining
Restrooms
Common Areas
Storage
Office Space

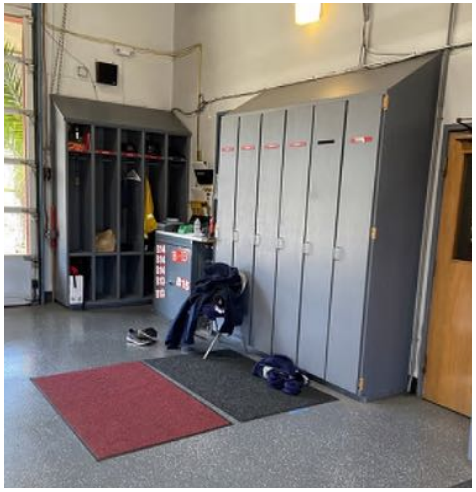
Second Floor:
Three Dorm Rooms
Two Restrooms

Observations / Deficiencies

- The building layout is compromised due to its original use as a combined Public Safety Building where the police and fire functions were separated for privacy and security reasons. The resulting arrangement of spaces is inefficient for daily activities and compromises the building's overall functionality.
- The upper floor is limited in area housing only sleeping quarters and restrooms. It is served by two stairways and a single slide pole. The station currently lacks an elevator for ADA access to the second floor.
- Current building code requires each sleeping quarters to have 2 means of egress. The existing windows do not meet the code requirement for emergency egress windows.
- There are no accessible restrooms.
- The Apparatus Bay is shallow in depth (~42 feet) and is not sufficient for a planned future truck company.
- One of the bays has been converted to an exercise space as there is no actual exercise room in the station. This is no longer allowed by current NFPA recommendations due to the potential for contamination.
- Turnout lockers are located on the Apparatus Bay floor, which is also no longer allowed by current NFPA recommendations due to the potential for contamination.
- A residential style washer and dryer is located in a storage room off of the apparatus bay floor. The storage room and adjacent tool room are undersized and cluttered.
- There is not proper separation between the Apparatus Bay and the living quarters which is a health concern by modern standards. There is no decontamination area.
- The kitchen area is small, congested and does not provide adequate cabinet/pantry space for each of the three shifts.
- The existing generator does not provide proper running time per current codes for essential facilities and needs to be replaced.
- HVAC systems & Lighting throughout the station are old and outdated technology leading to excessive energy consumption. The interior spaces experience a lot of thermal stratification, leading to excess energy usage.
- The facility does not have fencing securing it from the public.
- There is currently inadequate lighting in the parking area.

Conclusions

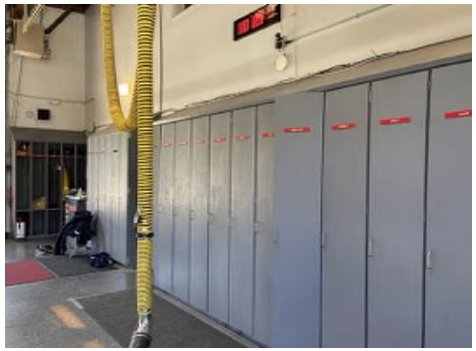
In general, the age and condition of the current structure and materials does not lend itself to renovation. In this case, it makes more logical sense to demolish the station and rebuild taking into consideration future growth, better site orientation and providing a complete station designed to accommodate an engine and/or truck company, ambulance and administration functions.



Photos

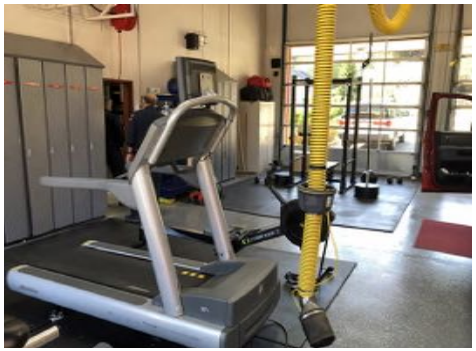
Fire Station 14

Apparatus Driveway

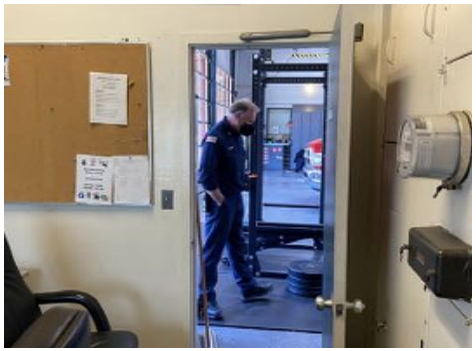


Apparatus Bay / Lockers

Apparatus Bay / Lockers



Apparatus Bay / Lockers / Exercise Space



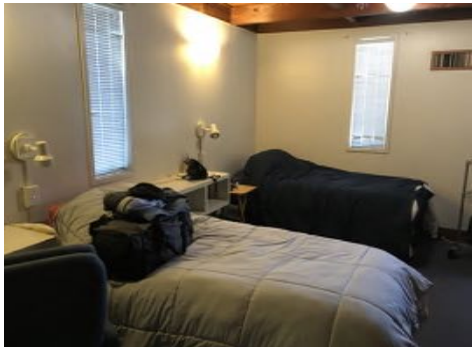
Office Space / Apparatus Bay

Conference / Day Room / Emergency Bunk

Conference

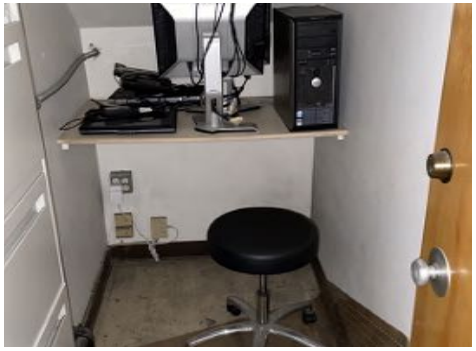
Laundry / Storage

Dorm Room



Dorm Room

Office Space



I.T.

Aerial

Fire Station 14


GREENBRAE
Central Marin Fire Station 16
Larkspur
Central Marin Fire Station 15
Corte Madera
Central Marin Fire Station 14
MEADOWSWEET
Central Marin Fire Station 13

Conditions Narrative

The Larkspur Fire Station, now known as Central Marin Fire Station 15, was built in 1939 with proceeds from the Rosebowl dances fundraisers put on by the Volunteer Fire Department firefighters. At that time the fire chief lived on the second floor, consequently the building was designed with a mix of residential and commercial Mission style details. The station ties in architecturally with City Hall next door with its Mission style false red tiled roof, the stucco exterior, and the medallion and arches.

The building is a two-story, wood framed, stucco-clad building with a combination of built-up roofing and red tile mansard roofing. The station is beyond its useful life as a modern fire station. The apparatus bay doors are extremely narrow by today's standards and provide a mere inch-and-a-half clearance on either side of the two, Type 1 Engines housed there. The two-wide, two-deep apparatus bays also accommodate a utility pick-up truck in one bay and an exercise area in the other. Adjacent to this bay is a good-sized tool and storage room.

The building is approximately 6,100 square feet and includes the following spaces:

First Floor:
Office Space
Apparatus Bay
Tool Room
Restrooms
Storage

Second Floor:
Kitchen
Dayroom/Dining
Dorm Rooms
Restrooms
Common Areas
Museum Space

Observations / Deficiencies

- Current building code requires each sleeping quarters to have 2 means of egress. The existing windows do not appear to meet the code requirement for emergency egress windows.
- There are no accessible restrooms.
- The Apparatus Bay doors are extremely narrow and insufficient for today's apparatus. The apparatus bays are double-deep, back-in only, compounding the clearance issues.
- One of the rear bays has been converted to an exercise space as there is no actual exercise room in the station. This is no longer allowed by current NFPA recommendations due to the potential for contamination.
- Turnout lockers are located on the Apparatus Bay floor, which is also no longer allowed by current NFPA recommendations due to the potential for contamination. There is no decontamination area.
- The existing generator is shared with the adjacent City Hall and does not provide proper running time per current codes for essential facilities.
- HVAC systems & Lighting throughout the station are old and outdated technology leading to excessive energy consumption. The single pane windows appear to be original and the building is far from energy efficient by today's standards.
- The upper floor houses sleeping quarters, restrooms, kitchen, dining and dayroom, offices and a room containing the department's museum collection. The restrooms are residential in nature given the area was originally the fire chief's residence and appear to be original.
- The kitchen is modest in size, contains a large commercial 6-burner range with a flat top and double ovens, but pantry storage seems small for 3 shifts.
- The upper floor is served by two exterior stairways, one interior stairway and a single slide pole. One of the exterior wooden stairways houses a BBQ which effectively blocks that stairway as an exit and is a fire hazard concern.
- The station currently lacks an elevator for ADA access to the second floor.
- The current parking area, shared with the adjacent City Hall, is undersized, unsecured from the public with inadequate lighting in the parking area.
- The current site and building layout cannot accommodate any size increase or potential for future growth.

Conclusions

The age and condition of Station 15 does not lend itself to a successful renovation. Built in 1939, this station is beyond its useful life as a modern fire station. Our recommendation for this building is to re-purpose this building, maintaining its historical character and significance. The building could be reimagined as a combination community space, and museum featuring the rich history of fire service in the community. The functional aspects of the station could be combined with either Station 14 or Station 13, most likely Station 14 as a new headquarters facility.

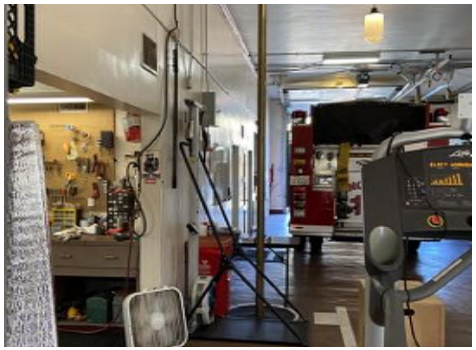
Photos

Fire Station 15

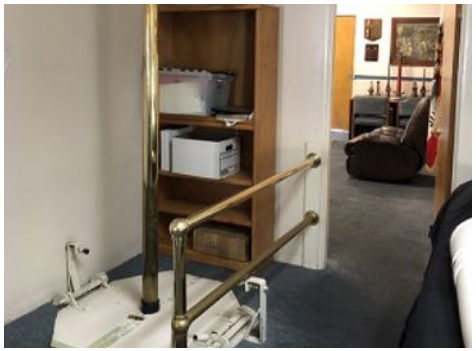
Parking Shared with City Hall

Apparatus Bay / Storage

Apparatus Bay / Storage



Tool Area / Slide Pole / Apparatus Bay / Exercise



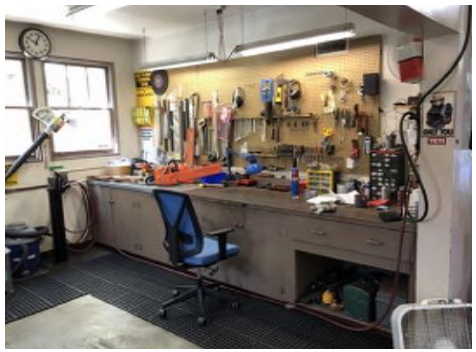
Slide Pole 2nd Floor

Dorm Room

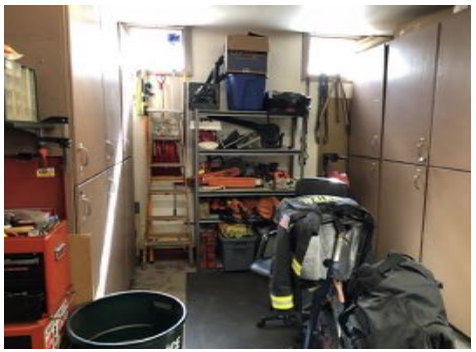
Kitchen

2nd Floor Exterior Stairway

Entrance / Office Space



Tool Area



Storage / Lockers

Museum Space

Aerial

Fire Station 15


GREENBRAE
Central Marin Fire Station 16
Larkspur
Central Marin Fire Station 15
Corte Madera
Central Marin Fire Station 14
MEADOWSWEET
Central Marin Fire Station 13

Conditions Narrative

Originally constructed in 1992, Fire Station 16 is a two-story building. The apparatus bay is constructed of concrete masonry units (CMU) and steel roof trusses; the living quarters is wood framed with CMU or plaster veneer and built-up roofing. A steel framed, curtain walled 'tower' connects these two wings and houses a single slide pole. This station supports a 4-person crew and has two drive-thru double-deep apparatus bays.

The building is approximately 7,100 square feet and includes the following spaces:

First Floor:
Apparatus Bay
Kitchen
Dayroom/Dining
Restroom
Common Areas
Storage
Office Space

Second Floor
Three Dorm Rooms
Two Restrooms
Locker Room

Observations / Deficiencies

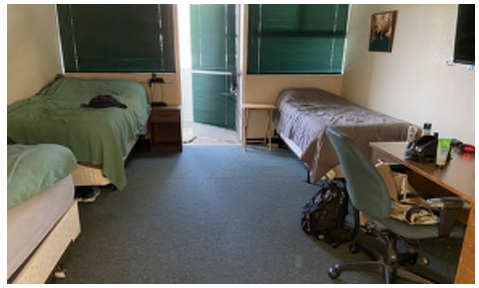
- The site paving is asphaltic concrete and is in very poor condition.
- The facility does not have fencing securing the rear parking area from the public.
- The existing generator does not appear to be connected to the above ground fuel storage and dispensing system and consequently may not provide proper running time per current codes for essential facilities.
- There is a small separate modular-appearing building that houses antique fire equipment. This building does not appear to be accessible.
- The station is built on concrete pilings due to the poor soil conditions and the site is experiencing subsidence of the adjacent patios and walkways, causing many (most) door thresholds to be non-compliant with current ADA accessibility requirements.

Observations / Deficiencies

- The Apparatus Bay slab has apparent extensive cracking that should be further investigated.
- One of the rear bays has been converted to an exercise space as there is no actual exercise room in the station. This is no longer allowed by current NFPA recommendations due to the potential for contamination.
- Hose Racks in the Apparatus Bay reduce clearance around equipment to less than optimal dimensions.
- The Tool Room is small and crowded to overflowing with tools machinery and equipment.
- The "Safety Room" is crowded with mop buckets equipment and supplies and is blocking access to the emergency shower/ eyewash and intended decontamination area.
- The Turn-Out Gear Room is open to the Apparatus Bay which is also no longer allowed by current NFPA recommendations due to the potential for contamination.
- There was no apparent washer extractor for turn-out gear, nor a gear drier or hose drier which is inconsistent with modern fire station design.
- The Lobby has a customer reception counter and is open to a staff office. The reception counter is not accessible from either the lobby side or the office side.
- The combined Kitchen, Dining and Day Room is adequately sized and opens out to an adjacent patio with a BBQ and tables. The Kitchen has two refrigerator freezers, two pantries (not three) and a small broom closet. The Kitchen cabinets and sink do not meet current accessibility standards.
- The one first floor restroom appears to meet current ADA accessibility standards however no actual dimensions were checked.
- The upper floor is served by two stairways and a single slide pole. The station currently lacks an elevator for ADA access to the second floor.
- The dorms each contain three bunks and a desk.
- Current building code requires each sleeping quarters to have 2 means of egress. The existing dorm rooms have doors that exit to a once exterior balcony that has now been closed in. This area is now without the requisite emergency egress window(s).
- There are no accessible restrooms at the upper level.
- There is a residential washer and drier on the upper floor balcony overlooking, and open to, the Apparatus Bay which is a health concern by modern standards.

Conclusions

In general, the current station does lend itself to renovation for continued use. In this case, additional study is warranted to ensure there are no underlying major structural deficiencies. If none are found it seems renovation could extend the useful life of this station for another ten-plus years, or perhaps longer. Some things, like adding an elevator and reconfiguring the dorm area restrooms, will be somewhat difficult but are not insurmountable. Addressing the site subsidence issues will also be difficult given the site soils conditions and may only be a short-term fix that will require ongoing maintenance and repairs. Ultimately there will come a time that this station too will require replacement whether on the same site or an alternate site, and the soils conditions will need to be addressed more robustly.



Photos

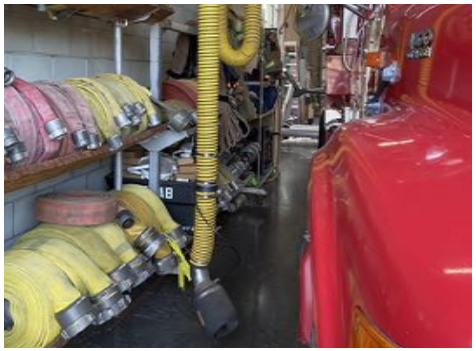
Fire Station 16

Generator

Fire Equipment Storage Building

Apparatus Bay

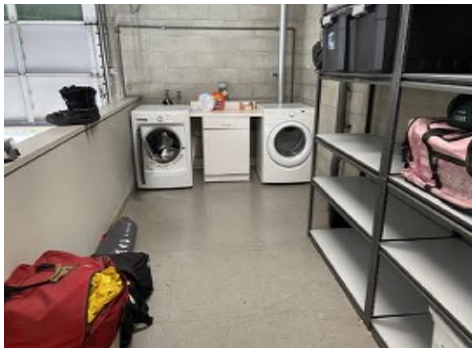
Apparatus Bay / Storage



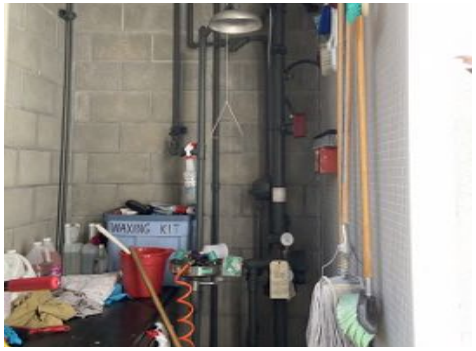
Apparatus Bay / Hose Racks

Apparatus Bay / Turn-Out Gear

Tool Area / Work Bench

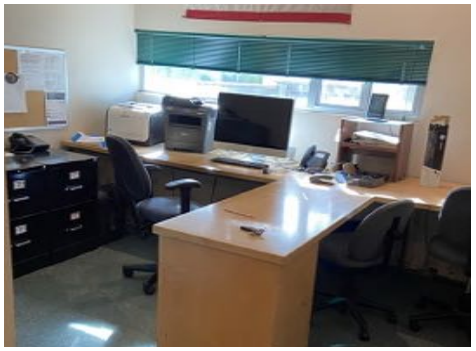


Laundry



Safety Room

Kitchen

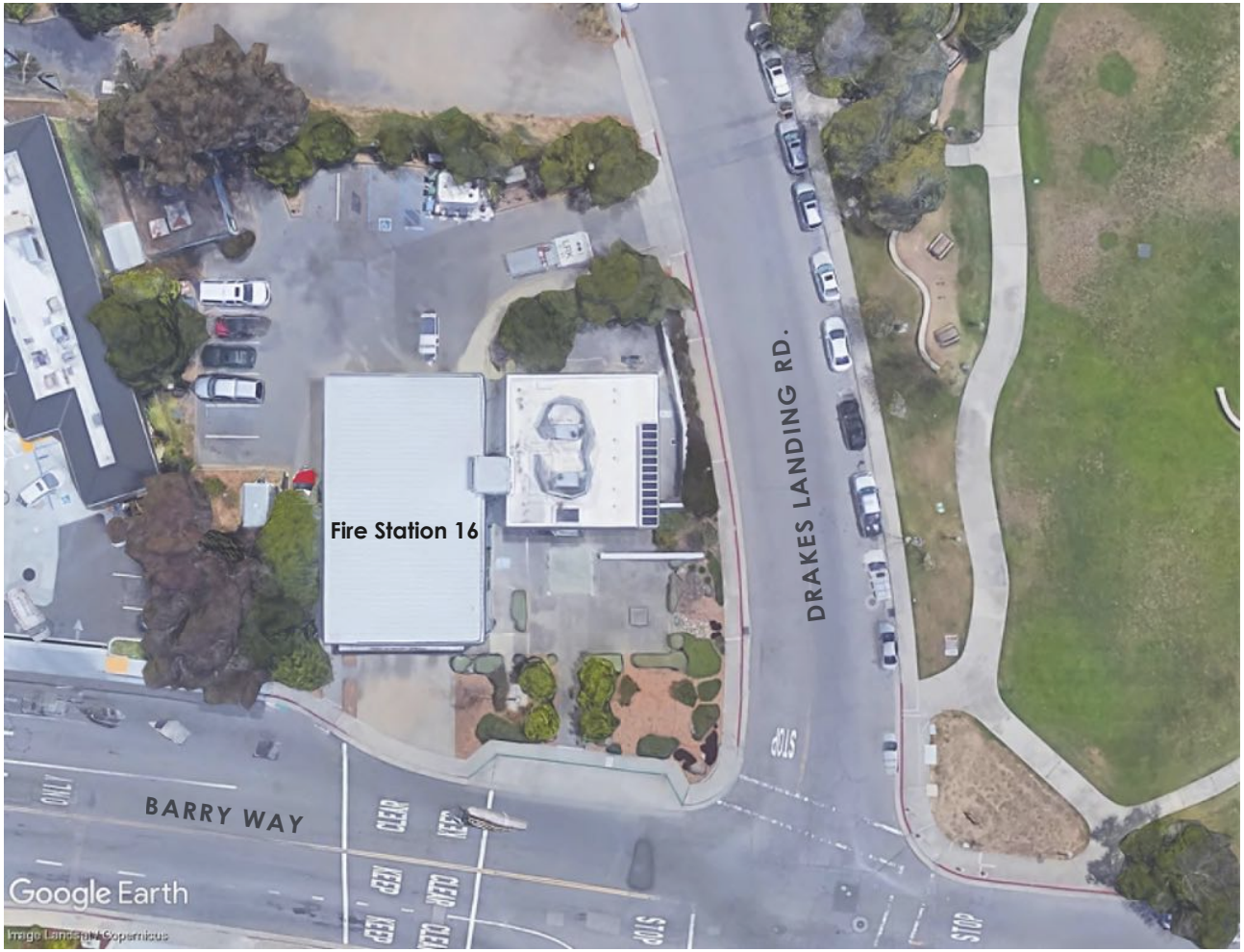


Office Space

Restroom

Aerial

Fire Station 16



In general, there are some functionality and code issues that we observed in all four facilities that will need to be addressed when the buildings are remodeled or rebuilt.

The first major issue is accessibility. Fire Stations, just as any non-residential type of building, need to be universally accessible in the public facing areas and for employees that require accommodation. Current federal and state codes require that space requirements in common areas such as restrooms, locker rooms, clear floor space at doorways and pathways around the station. Current fire station design assumes that all areas of the station are to be fully accessible unless the local building official says otherwise. Code requirements and thoughtful design will drive the location and size of the spaces in the redesign of the spaces.

Operable windows are a requirement within R-occupancies, which are the sleeping areas within the station. Most Dorms / sleeping areas do not have the required exterior operable windows for a means of egress during a fire event.

We did not observe a fire separation between occupancies R (dorm areas) and the Apparatus Bay (S occupancy) or B (office areas). This separation is required by current fire life safety code and will need to be incorporated into each facility by specified wall construction details and doors that are meant to keep a fire in progress contained within that area without jumping to the separated area.

Generally, poor circulation and inefficient layout plague all stations, these are easily remedied in a newly designed station by review of the existing program, code required minimum dimensions, and incorporation of desired items as described by the crew and Fire Chief. Generally, it is preferable to keep the dorm rooms in an area that is on the same side as the common areas such as the kitchen, dining room, and day room. Ancillary functions such as laundry, workshop, fitness areas, and the like can easily be separated by the Apparatus Bay because of either noise, mess, or both.

Currently at Station 16 there is no separation between the apparatus bays/turnout room and residential washer/dryer. Based on current NFPA code, best practices, and to reduce the possibility of contamination, it is best to place these appliances in a separate room open only to the residential areas. In addition, the turnouts themselves should be stored in a room separate from the Fire Apparatus to avoid contamination with particulates.

Reducing energy usage is on everyone's mind, including recent changes to Title-24 California Building Code. The mix of incandescent and fluorescent lighting in the current stations should be replaced with more efficient LED lighting in order to reduce energy usage. In the same vein, more efficient mechanical systems are available that will further reduce the draw on the system. Continuous rigid insulation combined with batt insulation between studs in the exterior walls and roof will further lessen the need to heat and cool the spaces translating to reduced energy bills for the stations.

Reducing water use goes hand in hand with reduced energy use and can be addressed with more efficient drip systems and drought tolerant planting materials at all locations. This could double as an educational tool for children and adults alike, as a model for landscaping yards efficiently.

None of the sites are secured by fencing, which could become problematic in an emergency situation where the apparatus would be exiting quickly. Securing the site could be accomplished in a variety of ways, ranging from concrete masonry walls, to galvanized metal fencing to the least expensive chain link fencing. At the very minimum, the generator and fueling areas should be secured from the public to avoid potential injury or vandalism.

As Essential facilities, Fire Stations are expected to withstand earthquakes and similar natural disasters so that they can continue to function as gathering spaces in an emergency situation. As such, seismically, they are built to a higher standard.

Not having complete as-builts on any of the stations, or performing destructive testing, we have to assume that they were not built to current seismic codes and would either require upgrades or a completely new structural frame to comply.

Generator replacement would likely be required at most, if not all, facilities. 72 hour run time is the current requirement for essential facilities, and none of the stations appear to meet this requirement.

Vehicle exhaust system upgrades at all stations are suggested for safety reasons. Obviously, safety is of utmost concern in a fire station, and having the latest, safest exhaust system goes along with these values.

Station alerting was not observed but was assumed to be working sufficiently having not heard otherwise from the fire staff.

Size of Apparatus Bay doors seems to be an issue at most stations. At Stations 13, 14 and 15 a ladder truck would not fit in the existing Apparatus Bay. Station 16 might work depending on site maneuvering space. We suggest that the doors be replaced to accommodate the largest size apparatus the Fire Chief anticipates.

Standards Needing to be Addressed and Incorporated into Station Renovations or New Construction:

- NFPA 1500, Standard on Fire Department Occupational Safety, Health, and Wellness Program
- NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments
- NFPA 1851, Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting
- NFPA 1221, Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems
- ADA - Americans with Disabilities Act
- California State Building Code
- Local Code and Zoning Ordinances
- Best practices for current Fire Station Design