Town of Castine
Fire Department Study
08/31/2020

Town of Castine Fire Department Study

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Executive Summary

Realizing the need to address the shortcomings of the Castine Fire Rescue station, the municipal leaders of the community have initiated the first steps towards correcting those insufficiencies. The current facility does not meet the needs of a modern fire protection and emergency medical service delivery system, even in a small community such as Castine that is served by a cadre of volunteer personnel.

Scope of the Study

The scope of this project is to determine the adequacy of the level of service the fire rescue department is delivering in accordance with the associated town-wide risks. The study will evaluate the current staffing, apparatus, and fire station facility and outline any impediments that may negatively impact the department in carrying out its mission. The project will configure a preliminary space program that should suit the needs of the department for the foreseeable future. The project will investigate the potential of renovating the existing station. If renovation proves infeasible, we will identity, in broad terms, an optimal area in which a new facility should be constructed.

Team

Port City Architecture, Public Safety Facility Design specialist
Neil Courtney, Fire Protection Consultant

Findings and Recommendations

1. The existing station and existing site are inadequate for the future needs of the community.
2. Castine has a unique and beneficial relationship with Maine Maritime Academy who supplies a host of fire fighter and EMS volunteers which contributes to the Town's Class 4/4Y ISO rating within the water district.
3. Castine should seek ways to strengthen and expand this relationship with MMA and their cadet population for the benefit of both entities.
4. Continue with the replacement schedule for the four pieces of apparatus. Consider space to house an ambulance from Peninsula Ambulance Corps.
5. A station of approximately 11,700 gsf is needed to comply with modern firefighting procedures and provide a safe environment for personnel.
6. The town should seek an adequately sized site in the near vicinity of Maine Maritime for the proposed fire station.

Other Recommendations

1. Provide an alternative water supply system to service areas outside of the Town's water supply.
2. Develop an automatic aid program with Orland and Penobscot.

Section 1 – Current Fire Department Operations

INTRODUCTION

In the beginning of 2020, Port City Architecture was hired by the Town of Castine, Maine to study the Town's Fire Department. The purpose of the Castine Fire Station Study is to begin the discussion on how to provide a future facility renovation or relocation and an operations plan for the town that will allow the fire department to offer the best firefighting and first responder EMS services to the people of Castine in the most cost effective manner for the foreseeable future.

The study has examined the current state of emergency services in Castine including incident data, response times, apparatus, and staffing. We have provided an independent assessment of the fire department's physical space needs required to provide robust emergency services into the future that will comply with modern firefighting/rescue practices, provide a safe working environment, and provide a facility which complies with all state and national codes.

This study provides our professional recommendations for staffing, geographical location requirements of the station, recommended features of the station, the type and quantity of apparatus, and other general service improvements. It also provides recommendations for the next steps in the process.

OVERVIEW OF CASTINE

The town of Castine is located in Hancock County Maine and is bordered by the land-based town of Penobscot, and Brooksville and Islesboro by water. Castine is home to the Maine Maritime Academy, which was established in 1941, and is one of only six non-federal maritime academies in the United States. The town encompasses 20 square miles, with approximately eight square miles covering land and the remainder water. There are approximately 20 total miles of collector, local and private roads throughout town.

According to the United States Census of 2010, Castine has a year-round population 1,366 residents. Town officials indicate this figure includes approximately 600-domiciled students at Maine Maritime Academy. There is an influx of seasonal residents and a transient summer population that fills the void left by departing academy students as summer gets underway.

Castine is managed by a three-member board of selectmen, town manger form of government, and operates on a fiscal year budget platform.

According to the 2017-18 Castine Town Report, the town's assessed real estate value for 2018 was $250,234,500, and the assessed personal property was $1,271,900, for a total of $251,506,400. Of this figure, $90,897,200 of real property is owned either by the town of Castine, the Federal Government, the State of Maine, and other entities, all of which are classified as tax exempt. The current mil rate is $11.40.

The State of Maine valuation for Castine in 2020 is $274,650,000. This figure includes both real property and personal property combined. This 2020 figure exceeds the state's 2019 valuation for Castine by more than $11.5 million.

FIRE PROTECTION SERVICES IN CASTINE

The Castine Fire Rescue is a volunteer department organized under the authority of the town. The department has a roster of approximately 24, which fluctuates throughout the year. Approximately one-half of the department is comprised of year-round, long-term residents, whereas the other members are four-year matriculated students enrolled at Maine Maritime Academy. As in most volunteer departments, the level of qualifications, age, abilities and availability among the year-round, long-term residents is varied. Those students who choose to join the department partake in continuous training programs achieving levels of compliance allowing them to perform fire suppression, rescue evolutions, and emergency medical treatment. The contingent of students is typically available only during the semester when school is in session.

Castine Fire Rescue is classified as a volunteer department meaning personnel are not paid a wage for their services. They are, however, reimbursed for incurred expenses through town appropriation. The position of fire chief and the two assistant chiefs are stipend. The fiscal 2020 operating fire rescue department budget is $94,720. Not included in the department's budget are any insurance premiums. Those costs are assigned the "Miscellaneous Account" within the town's budget, which covers an assortment of insurance policies town wide.

Although the town does not have a formal Capital Improvement Program (CIP), it has established and funded a "Capital Equipment Account" for the fire rescue department. This account was funded at $6,517 in fiscal 2019 and $3,500 in fiscal 2020. The account was not funded in 2018 as the previous year a cardiac monitor/defibrillator was purchased for approximately $30,000. This fund currently has a balance of $5,995.

The town of Castine also sets aside money dedicated to the fire rescue department in two reserve accounts; the "Fire Truck Reserve Account," which has been allocated $10,000 each year for a number of years, and a new account entitled "Fire

Station Reserve Account" that was established in 2017 with an initial $10,000. Since then, this account has had $20,000 added each subsequent fiscal year. The current balance for the fire truck account is $160,000, and the fire station account stands at $69,000.

To further the financial and benevolent need of the fire rescue service, the non-profit Castine Fire Rescue Volunteer Association's (CVFRA) mission is to "support, represent and promote the needs and interests of Castine's volunteer firefighters, emergency medical first-responders and the community they serve." The Association conducts annual fund-raising campaigns and typically receives about $9,000 to $12,000 in donations each year. These funds are used to purchase necessary items for the department that are not otherwise funded by town appropriation. The Association also holds an annual recognition event, sponsors volunteer recruitment and retention activities, and supports various public safety and educational initiatives.

Much of Castine's core village area, known as "on-neck," is served by a municipal water system. The system consists of approximately five miles of underground piping and supplies 45 pressurized fire hydrants. The town's water system has undergone a major enhancement project that began in 2006, with additional phases scheduled for the future. The annual fire hydrant rental fee for fiscal 2020 is $185,500. The water system is managed by a private contract service.

PUBLIC PROTECTION CLASIFICATION FOR CASTINE

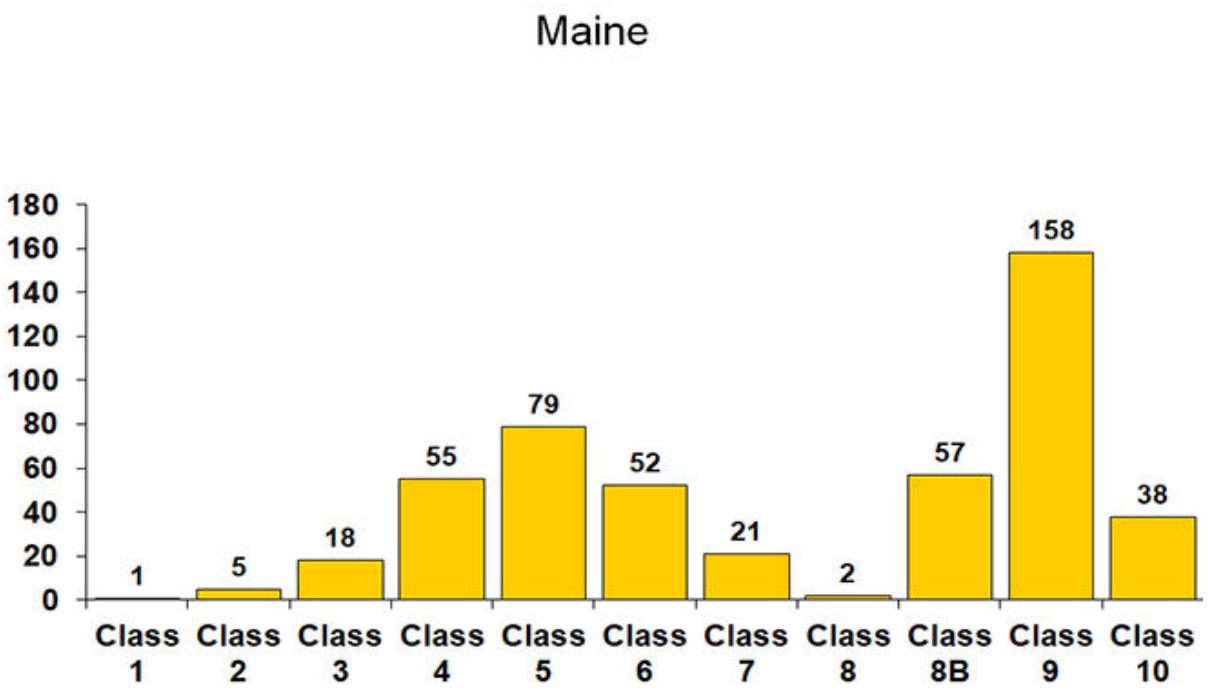
Castine's Public Protection Classification (PPC) was assigned a split classification 4/4Y after its scheduled assessment was completed in 2018. The Insurance Services Office (ISO) PPC program measures and evaluates the effectiveness of fire mitigation services in communities throughout the country. For each fire protection area, the ISO assigns a PPC code—a number from 1 to 10. Class 1 represents exemplary fire protection, and Class 10 indicates that the area's fire-suppression program does not meet ISO's minimum criteria. This grading system is utilized by the insurance industry to set fire insurance premiums. Castine's PPC puts the town in the top 16% of Maine's 486 fire departments and fire districts. *(See chart below)*

The Class 4 rating applies to those areas of Castine that are within five miles of a fire station, and within 1,000 feet of a credible water supply, such as a pressurized fire hydrant, suction point, or dry hydrant. The second number in the split classification, 4Y, applies to those areas of town that within five miles of a fire station but beyond 1,000 feet of a credible water supply.

This current rating represents a significant improvement over the previous ISO assessment where the town was rated a split classification of 7/9. When considering

ISO's PPC, it must be noted that any region within a community that is beyond a five-mile distance from a fire station is deemed unprotected. (Note: The 2018 PPC was carried out by the ISO using the most current Fire Suppression Rating Schedule, which was revised in 2013. Castine's previous PPC utilized the 1980 version.)

This graphic depicts the Public Protection Classification of all 486 fire departments or fire districts in the State of Maine in early 2020. Castine's rating of "4" for those properties on-neck is in the upper quadrant when compared to other communities statewide.



INCIDENT DATA COLLECTION

In 2017, the department began tracking its calls for service using the state of Maine Fire Incident Reporting System (MEFIRS). The MEFIRS program is an information and data gathering system initiated and supported by the Office of State Fire Marshal. The goal of the system is to encourage the use of a standardized incident reporting system as a means of addressing the state's fire problem and related emergency service issues. MEFIRS can play a major role in reducing injuries, fatalities, and economic losses from fire and related emergencies by facilitating the collection, compilation, analysis, and use of data to produce and disseminate the information needed by decision makers. Maine statute, Title 25 MRSA 2395 requires that fire chiefs shall submit to the State Fire Marshal an incident report for each response made, regardless of whether or not an actual fire occurred. (It should be noted that in order to qualify for Federal grant funding through the Department of

Homeland Security, a fire department must participate with that state's Fire Marshal's Office in filing activity reports.)

In calendar year 2019, the fire rescue department responded to 133 documented MEFIRS calls for service (Note: This total is not in sync with another town report indicating there were 141 calls. It is unclear as to the reason for the discrepancy. Only the data from 2019 was used for this project, as it was the most definitive.)

CALL VOLUME AND LOCATION BY DISTRICT

When reviewing the 2019 MEFIRS report compiled by the Castine Fire Rescue Department, the department responded to 133 calls for service. Of those 133 calls, 89 occurred "on neck," while the other 44 where "off neck," two of which were for providing mutual aid to Bucksport and Orland for building fires. The breakdown of calls responded to run the gambit from alarm activations, hazardous conditions, wildland fires, reported building fires, and motor vehicle collisions, however, a majority of the total responses consists of emergency medical aid calls, which is common for most dual-role fire rescue departments. (Note: Only 2019 data was used here as the department had recently begun to utilize a more robust call-tracking system, MEFIRS.)

2019 RESPONSE TIMES

The fire rescue department responded to 133 incidents in 2019. The following chart depicts the time that first responders were alerted of the incident to the time of arrival of the first-due apparatus.

Response Time	Number of Incidents	% Of Total
1-2 Minutes	5	3.76
2-3 Minutes	7	5.26
3-4 Minutes	15	11.28
4-5 Minutes	17	12.78
5-6 Minutes	16	12.03
6-7 Minutes	8	6.02
7-8 Minutes	10	7.52
8-9 Minutes	11	8.27
9-10 Minutes	12	9.02
More than 10 Minutes	32	22.05
	133	100%

Arrival time for 10 minutes and under occurred 101 times, or 75.94% of the time

FIRE DEPARTMENT APPARATUS

The department operates two Class "A" pumpers, a large capacity tanker and a light-duty rescue truck.

	Chassis	Features	
Engine #5	1995 two-door Freightliner	1,250 pump/1,250 water	Class A Pumper
Engine #6	2003 four-door HME	1,250 pump/1,250 water	Class A Pumper
Tanker #1*	1983 Freightliner	4,000 gal. Gravity tank	Department built
Rescue #1	2001 GMC 4WD	Utility body	EMS/Equipment

*In 2019, the town was notified by the Federal Government that the Castine Fire Rescue Department was successful in being awarded a Federal Assistance to Fire Fighters Grant (AFG) in the amount of $285,714.28. These funds have been allocated for the purchase of a new $300,000 tanker. As a requirement, the town must contribute five percent of the total purchase price. The new apparatus will replace the department's oldest vehicle, the 1983 Freightliner, 4,000-gallon tanker. The town has awarded the bid to a fire apparatus manufacturer with an anticipated delivery date in the fall of 2020. The town's share of the purchase price—$15,000 will come from contingency and not the fire truck reserve account

It appears that the configuration of two Class "A" pumpers, a large capacity tanker, and a light-duty rescue truck meet the optimal needs of Castine. The ISO PPC summary report indicates the "Basic Fire Flow" for the town is 2,250 gallons per minute, which correlates with Castine's two engine companies, Engine #5 and Engine #6, which have a combined pumping capacity of 2,500 gallons per minute.

The tanker is integral to the town's firefighting capability regarding the delivery of water to the rural areas of town beyond the hydranted district. Furthermore, the new tanker will have a 750 gpm pump which increases the overall pump capacity for the department and makes it more versatile, as the old tanker does not have a pump. With the delivery of the new 3,000-gallon tanker, the department will carry a total of 5,500 gallons of water between the three apparatus.

The department also has an all-terrain vehicle (ATV). It is intended to be used to access injured hikers located on conserved properties and forestlands throughout town, as well as off-road wildland fire fighting operations. The ATV is currently

stored in a portable structure aside the fire rescue station, as there is no room inside to store it.

Until a few years ago, the fire rescue department operated its own 22' boat powered by an outboard motor. The boat fell into disrepair, was decommissioned and not replaced. Should watercraft be needed for fire and rescue operations, the town's harbormaster vessel can be pressed into service. Additionally, Maine Maritime has a number of small boats that if available and MMA staff can accommodate, can be used for emergency purposes.

EMERGENCY MEDICAL SERVICES

Until eight years ago, Castine had its own transporting volunteer ambulance service, the Bagaduce Ambulance Corps Incorporated. The service operated one ambulance that was housed in a single bay garage on the grounds of the community health center. The service ceased operation on the last day of 2011 due to the lack of personnel needed to keep the organization functioning. The Corps had served Castine for 35 years.

Based in Blue Hill, the Peninsula Ambulance Corps (PAC) was contracted by the town to provide emergency medical transport service for Castine, to include six other member communities across the Blue Hill Peninsula. The Castine Fire Department also took on a new role of delivering emergency medical treatment at the "first responder" level. Not only did this modification in the department's mission necessitate a name change to the "Castine Fire Rescue Department," the transition required training personnel and outfitting the department with requisite equipment. This two-tiered system provides a reasonably quick response from Castine EMS providers to patients in need of medical treatment, as the ambulance, usually staffed at the advanced level, makes its journey to Castine from its base of operation in Blue Hill, a distance of approximately 14 miles to the Penobscot and Castine town-line, plus an additional five miles to the center of town.

PAC responded to 111 calls for service in Castine during calendar year 2019, and 99 calls in 2018. These statistics include non-emergent, inter-facility transfers as well as medical emergencies. PAC's current assessment for each community is based upon a per-capita fee of $22.93. Castine's assessment based on a population of 1,366 is $31,322 for 2020.

The Castine Fire Rescue is a participant in a community paramedicine program sponsored by the Blue Hill Hospital and several other collaborative agencies. This proactive outreach endeavor has EMS personnel conduct onsite visits to check on the welfare and assist in addressing the fundamental medical needs of those enrolled residents.

COLLEGE STUDENT VOLUNTEERS

The Southern Maine Community College System has a unique program where as many as 87 full-time students who are enrolled in any academic course of study have the option of living in one of 30 fire and EMS stations among 16 different municipalities in southern Maine. These students are required to partake in basic fire and emergency medical service training and assist the community in which they reside as a first responder. The program allows students a free place to live—a fire station, and an opportunity to earn money when responding to incidents. Additionally, the Eastern Maine Community College oversees the program among eight host communities in the Bangor region with 14 available positions.

The Kingston Fire District is one of two fire districts in the town of South Kingstown, Rhode Island. The Kingston Volunteer Fire Department, which is under the authority of the Kingston Fire District, is located within the sprawling campus of the University of Rhode Island (URI). The department encourages students to join the department who then undergo extensive training and become qualified fire fighters. The fire station has living quarters that can house as many as 12 live-in students, free of charge. The students can earn internship or community service credit from URI for undertaking fire service-related projects during their tenure.

The fire district recently applied for and was awarded a four-year Homeland Security grant known as a S.A.F.E.R. (Staffing for Adequate Fire and Emergency Response). The purpose of the grant was to attract more students to become volunteer fire fighters. Each student who joins the department and meets the established criteria is awarded $5,000, not as wages, but to offset their college tuition.

To a degree, the collaboration between the Castine Fire Rescue and Maine Maritime Academy is somewhat similar to the community college program. The town welcomes and the academy encourage interested students to join the fire rescue department, and to serve the community during their academic years in Castine. This arrangement requires the fire rescue department to provide continuous training in both firefighting and emergency medical skills as each year brings new students into the academy while others graduate and move on in life. This is a constant mandate on the municipality to ensure those who serve under the auspices of the town are compliant with directives governing emergency service delivery.

The proximity of the campus to the Castine Fire Rescue station provides students with a short route to travel by foot to get to the apparatus bay and respond out to calls in a timely manner. This is of significant value to the response capability of the department. This aspect of emergency response is known as "turnout time." This element is the sequence of time from when first responders are notified of the

incident to the time when the apparatus is departing the station and en-route to the incident. This metric is but one facet of analyzing deployment effectiveness, but in volunteer organizations, can be the biggest factor in elongated responses. For this reason, the location of the fire station has proved invaluable when considering the availability of student first responders and their expeditiousness.

Section 2 – Space Needs and Facility Assessment

INTRODUCTION

Port City Architecture visited the Castine Fire Department multiple times to investigate the existing facility conditions. We also meet with the fire department staff to discuss the physical space needs required for a modern firefighting facility designed for and safe code compliant operations. From these meetings we have provided an independent space programming needs analysis for the department and an impartial assessment of the current building's deficiencies.

SPACE PROGRAMMING NEEDS

On March 13, 2020 Port City Architecture met with the fire department's senior personnel and discussed their operational polices and the realistic spaces necessary to conduct those operations. We discussed their needs room by room as we worked through the administration areas, living and support areas, and apparatus garage needs. The space needs were vetted against other recently renovated or newly constructed fire departments in Maine with similar demographics.

The resulting space program matrix identified thirty individual rooms with a required net square footage of 9,342 square feet. With an added grossing factor of 25% the gross square footage required for the Castine Fire/Rescue department was tabulated at **11,678 square feet**. *(see appendix A for full size chart)*

CASTINE FIRE STATION SPACE PROGRAM Preliminary Program 3/17/20

Room Desc	dimensions	Room Area (SF)	Admin # of Rooms	Admin/Office Area (SF)	Apparatus # of Rooms	Apparatus Area (SF)	Living # of Rooms	Living Area (SF)	Sup # of Rooms	Support Area (SF)	Total # of Rooms	Total Area (SF)	
Fire Station													
Lobby	8 x10	80	1	80							1	80	include small trophy case
Lobby	15x15	225	1	225							1	225	to house historic items with glass cases etc
Airlock	7 x 7	49	1	49							1	49	
House Watch/Dispatch Office	12 x 16	192	1	192							1	192	adjacent to lobby, desk space for two to three, dispatch radio
Chiefs Office	10 x 12	120	1	120							1	120	
Asst Chief Office	10 x 10	100	1	100							1	100	
Ambulance/Police Swing Office	10 x 12	120	1	120							1	120	2 desks with closet, access to bathroom and coffee,
Conference Room	10 x 12	120	1	120							1	120	seating for 6
Meeting/Training/EOC Room	24 x 26	624	1	624							1	624	comfortable seating for 30 in a class
Unisex Bathroom ADA	8 x 8	64	2	128							2	128	
Storage/Jan closet	8 x 8	64	1	64							1	64	
Apparatus Bays	18 x 80	1440			3	4320					3	4320	Drive through optional
Medical Storage	8 x 8	64			1	64					1	64	secure and lockable
Work Room	10 x 20	200			1	200					1	200	repair of equipment w/ work bench
Compressor Room	8 x 8	48			1	48					1	48	sealed for noise
Janitor closet for bays	8 x 8	48			1	48					1	48	in front of compressor room
Equipment/Gear Storage	10 x 20	200			1	200					1	200	Extra Gear, Eqipment, SCBA, spare bottles
Sprinkler Riser Area	6 x 8	48			1	48					1	48	
Radio nook	4 x 8	32			1	32					1	32	Radio nook with I am Responding screen
Apparatus Bay Bathroom	4 x 8	32			1	32					1	32	can use while dirty
Day Room/Kitchen/Dining	20 x 26	520					1	520			1	520	
Fitness Room		0						0			0	0	Use MMA facility
Bunk Rooms	8.5 x 12	102					8	816			8	816	Individual bedrooms with 4 lockable wardrobes summer students
Bathrooms/showers	8 x 10	80					3	240			3	240	for use from bunkrooms
Laundry	6 x 12	72					1	72			1	72	personal linens and clothes
Storage/Jan closet	8 x 10	80					1	80			1	80	
Turn out gear lockers	15 x 18	270					1	270			1	270	30 lockers for turn out gear with power and usb
Decon Room	10 x 16	160					1	160			1	160	connects app bays to living area, 1 extractor, 1 dryer, 1 shower, 3 bay sink
Mechanical room	10 x 15	150							1	150	1	150	
Electrical/Tel/IT Room	10 x 14	140							1	140	1	140	
Life Safety Elec room	8 x 10	80							1	80	1	80	includes ATS for Generator
Totals			12	1,822	11	4,992	16	2,158	3	370	42	9,342	
Circulation and grossing Factor											25%	2,336	
Grand Total											Program:	11,678	80' x 145' building footprint

Notes: 800sf mezzanine not calculated in square footage above
For partial two story option add 850 square feet for vertical circulation, footprint reduced to 9,500sf or 80' x 118'

One story Building Scenario

Our recommendation for a facility of this size is to provide the entire space on one floor instead of multiple floors. This would result in a **footprint of 11,678 sf** with a probable shape of **80' x 146'**. The reasoning for this recommendation is that it is more cost effective to provide the space on one floor, as a second floor would require two stair towers and an elevator adding significant additional cost. Because modern apparatus bays require significant height, a second floor over these areas would produce a flat roof building or a shallow pitched roof to comply with the town's height limit of 35'. A flat roof building was thought to be less desirable than a traditional peaked roof structure in town.

Two Story Building scenario

If a two-story scenario was desired, the only feasible option would be to provide a one-story apparatus bay and a two-story administration/living area. This would provide a facility first floor of 6,250 sf and a second floor of 3,100 sf for a total **footprint of 9,350** and a probable shape of **80' x 117'**.

Site Requirements

In addition to the interior space needs, a modern facility will require outdoor space for apparatus circulation, parking, landscaping, and surface water runoff treatment. We would estimate that for a facility of this size a minimum of ten parking spaces to twenty spaces would be needed and possibly more depending on whether the training room is used for other town events. Our experience with other stations this size is that Castine will require a **usable two acres** of site for the fire station site.

EXISTING FACILITY ASSESSMENT

Castine Fire Station

General Building Description

The Castine Fire Station was constructed around 1960 with a second-floor office/meeting space added sometime in the 1980's. It is a Slab-on-grad, wood framed building on a CMU foundation with steel beams used to support the second floor. It's footprint measures 41'-0" x 50'-4" for a first-floor area of 2,060 square feet. The heated second floor area is smaller than the first floor providing unheated lower ceiling storage on the front and rear eaves. It measures approximately 25'-0" x 50'-4" for a second-floor area of 1,260 square feet.

First Floor	2,060 sf
Second Floor	1,260 sf
Total Gross Square Footage	3,320 sf

The station is located at 13 Court Street. It is a non-sprinkled structure with three single-deep bays. Over the years, the building has been modified in an effort to meet the evolving needs of the fire department. The current fleet of four vehicles is

shoehorned into the apparatus bays, which were originally designed to house just three trucks. Fire apparatus of that previous era was much smaller than today's vehicles, and Castine did not have four trucks when the station was originally constructed. This arrangement requires the largest vehicle, the tanker, to be parked between the two pumpers, negating a direct route of ingress and egress. The tanker driver must skillfully jockey the truck into and out of the building, but only after Engine #5 has been moved out of the way.

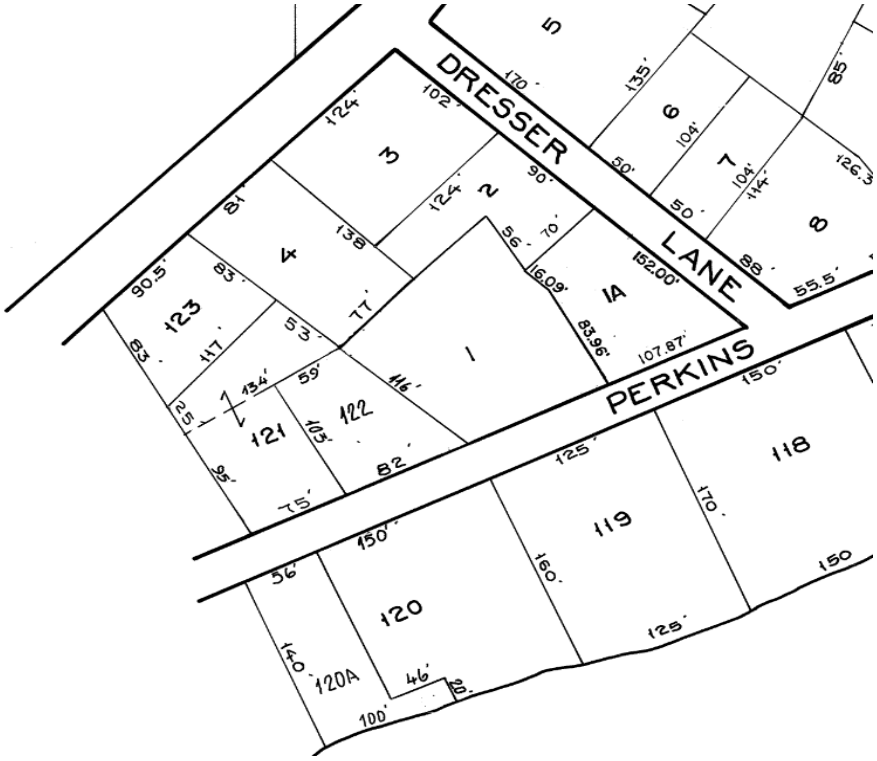
Tanker truck (on right) parked between two overhead doors

The second floor of the building is accessed by an internal stairway where there is a meeting room, storage area and office-like workspace. A second means of egress is by way an exterior wooden stairway. The station does have an emergency propane -fired standby generator.

General Site Description

The building is located on lot 123, map 21. According to town records, the building is assessed at $74,800, and the (.19-acre) parcel of land at $241,600. The lot is Approximately 8,600 square feet with a lot width of 90.5 feet at the street and 117 feet at the rear. The building footprint is approximately 24% of the lot coverage.

The lot is in the VI (Village District I) zoning district. It appears to comply with the dimensional requirements of the V-I zone. The building is located approximately fifteen feet from the rear lot line and twenty-seven feet from the front lot line. Expansion in these directions is not feasible because of the rear setback and the required truck apron in the front. It appears that an approximate 1,000 sf footprint expansion may be possible on the northeast side of the existing building increasing the maximum footprint to approximately 3,060 square feet and the total building square footage to approximately 4,950 square feet. Expansion on this site would require town approvals in a neighborhood with homes spaced very closely together.



Portion of Map 21 showing Lot 123, Castine, Maine

Site Plan Castine Fire Rescue Station, Castine, Maine

DIMENSION ↓ ZONING DISTRICT →	R	V-I	V-II	V-III	MA & C	E
Minimum lot area (sq. ft.) [12]	85,000	8,250	20,000[9]	85,000 [Am 1]	7,500	N/A
Minimum lot width (ft.) [10, 12]	200[1]	90	100	200[1]	85	N/A
Setbacks (ft.) [12]						
Front yard	30[4]	10	15	20	10[2]	15[3]
Rear yard	30[4]	10	15	20	10[2]	15[3]
Side yard	30[4]	10	15	20	10[2]	15[3]
Minimum shore frontage (ft.) [10]	200	100	150	200	100	N/A
Maximum percent lot coverage (%) [12]	20	50	30	20	65	60
Structure height (ft.)[8]	35[5, 6]	35[7]	35[7]	35[7]	35[7]	50[7]

Zoning District V-I Space and bulk restrictions, Castine, Maine

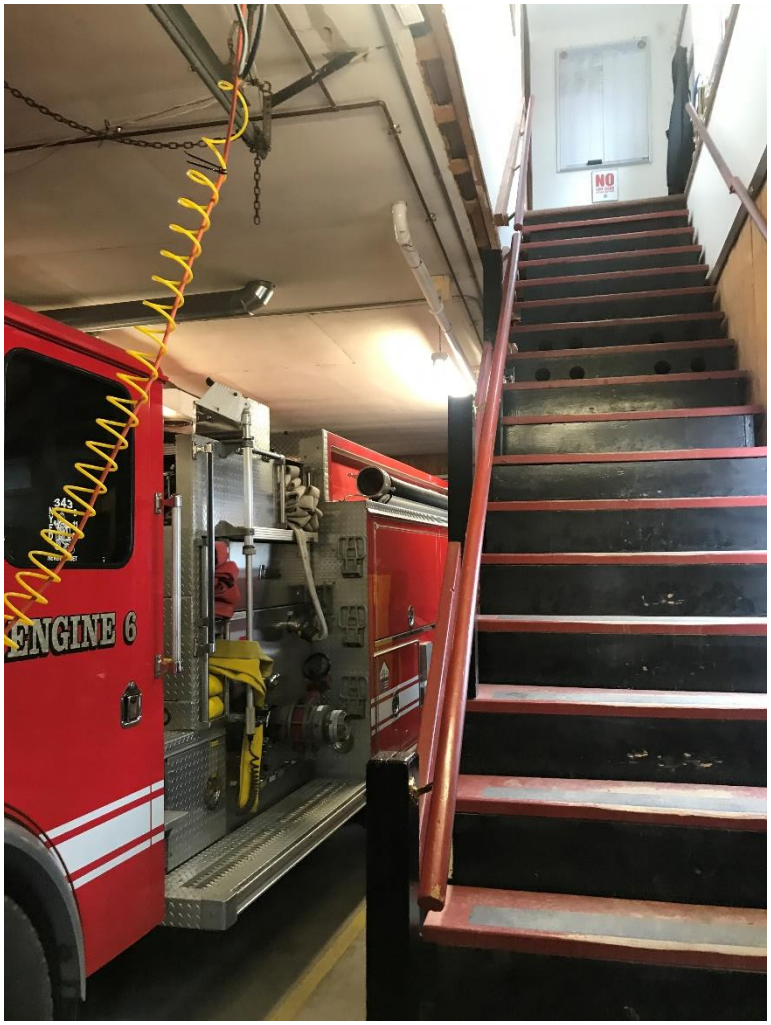
EXISTING FACILITY AND SITE DEFICIENCIES

The current facility is outmoded, constrained, and lacks most of the features required or recommended for 21st century public safety buildings. It is completely insufficient in required square footage for fire department operations. The apparatus bays are too small, and the overhead doors and ceilings are too low to house modern equipment. It has few if any of the features required for a safe working environment. The building does not meet today's building code standards, and the feasibility of renovating the existing building to comply with the more stringent essential facility code standards is unknown. The current site, while in a desirable location, does not offer an adequate amount of room to site an addition or a new building.

Partial List of Deficiencies:

- Does not meet National or State building codes
- Lack of apparatus bay space for current and future equipment and overcrowded vehicle placement
- Lack of an automatic, supervised fire, smoke, and carbon monoxide system.
- Lack of a supervised fire sprinkler system
- Primary egress from the office and meeting room is through the apparatus bay
- Lack of a decontamination area
- Lack of shower facilities
- Lack of definitive office space
- A single restroom for the entire building
- Limited workbench/workspace, storage, and business component of the building
- Low ceiling in apparatus bay unable to raise truck cab, load hose
- Overhead garage doors are undersized
- Unable to install the preferred "source-capture" vehicle exhaust extraction system
- Does not comply with Americans with Disabilities Act (ADA)
- Insufficient space to house the ATV, requiring a temporary storage structure
- Insufficient apron in front of the fire stations
- Lack of adequate parking for emergency responders privately owned vehicles and the public
- Lack of public lobby
- Lack of ADA Bathrooms as required by law
- Lack of any Bunk or overnight stay Areas

- Lack of kitchen and dayroom space for personnel
- Turn Out gear stored in the contaminated apparatus bay
- Lack of adequate storage for Medical Supplies, SCBA Equipment, Medical equipment and various apparatus equipment



Building deficiency-Main egress stair exiting through the apparatus bays

Section 3 – Study Recommendations

The town has recognized the need to address the shortcomings of the fire rescue building having created a reserve account in fiscal year 2017. Since then, the town has set aside money each year at town meeting dedicated to an eventual project. The town should move toward replacing the building with a new facility, which will likely require finding a larger site. A new fire rescue station should be designed to today's standards with enough room to house a progressive; multi-hazards volunteer fire and emergency medical first-responder service.

FUTURE STATION REQUIREMENTS

The department needs space to adequately house no less than four major pieces of apparatus, the all-terrain vehicle, and at the same time, contemplate other associated and future needs that should be incorporated into a new municipal facility. The town should also consider space for Peninsula Ambulance Corps to house one of their ambulances for faster response to Castine.

As this project began, there was some theoretical discussion regarding the option of building a sub-station "off-neck," where a fire truck could be garaged with the idea of allowing for quicker response to the periphery of town. This concept may not have merit. Merely placing a fire truck in a building does not necessarily equate with enhanced service capacity and could convey a false sense of security. At this point in time, the town should focus solely on building a single new fire rescue station "on-neck."

THE CURRENT FACILITY AND SITE ARE INADEQUATE FOR THE FUTURE

The current facility is outmoded, constrained, and lacks most of the features required or recommended for 21st century public safety buildings. It appears highly unlikely the building can be retrofitted to meet even a partial list of needs for the fire, rescue and emergency medical services of Castine's contingent of first responders.

Furthermore, the current site on which the fire rescue building is located does not offer an adequate amount of room to site a new building. The site is grossly undersized as the space needs footprint of even the two-story scenario of 9,350 exceed the entire site size of 8,600 square feet. The maximum allowable footprint per the zoning ordinance would be 4,300 square feet at 50% lot coverage, but this would not provide any required exterior space. We would estimate that the largest conceivable new structure for this site would be about 6,000 square feet with a 3,000 square foot footprint. It would require a flat roof or a very shallowly sloped roof and would most likely overwhelm the neighboring homes in scale.

FIND A NEW SITE IN CLOSE PROXIMITY TO MAINE MARITIME ACADEMY

Take advantage of the pool of volunteer fire fighters

Perhaps the most compelling reason to locate a new public safety facility near the Maine Maritime Academy is the fact the students make up one-half of the Castine Fire Rescue Department during the eight months they are attending school and can respond to emergencies in a reasonable amount of time. To replace this group of volunteers with paid staff would not be fiscally possible for Castine.

A new fire rescue complex should be located close to or perhaps even on the Maine Maritime Academy campus in an effort to capitalize on the pool of students who are engaged in providing a vital safety service to the town as well as the academy. The challenge will be to site a facility so that students, who are attending class or residing in the dormitory, or in their rental home or apartment in the village, can sprint to the station and deploy to the emergency incident. It is understood that not all students have their own automobile on campus during their preliminary years at MMA, which furthers the need to locate the station near the school.

Perhaps the question of whether the fire station could be built on the grounds of the State's Maritime Academy should be broached. As an example, The University of Rhode Island owns the land and much of the building that houses the Kingston, Rhode Island Fire Department. Several years ago this station was enlarged bringing the number of bedrooms to 12, including a commercial kitchen, physical fitness training area, dayroom, and laundry facilities for the live-in students use. It was the

fire district that paid for the expansion project, despite the fact that the university technically owns the original building. This relationship has been fostered over the years and has yielded an affordable volunteer public safety service program that serves both the university and the Kingston Fire District.

Another model is the relationship between the town of Durham, New Hampshire and the University of New Hampshire. The Durham Fire Department, which is a combination full-time and call-company municipal department, is equally funded between the town and the university. The fire station is located on-campus in a university owned building. But before the fire department moved from its previous location—several decades ago—to its present location, the town paid to renovate the current building to accommodate the fire department. With the town paying for the renovation, Durham did not contribute to the operational cost for a set period of time in an agreement that was set to equalize expenditures between the community and the college. Here again, this hybrid, collaborative relation has proven beneficial for all those served.

Locate the Station closest to the highest service call area

Most of the calls for service occur "on neck." This is the highest concentration of buildings, commerce, harbor activity, clustered residential property, and of course the academy. When determining the location for a fire rescue station, typically centralizing a facility within proximity to the area having the heaviest compaction of human activity and grouping of buildings is generally the most plausible choice.

With respect to fire protection, the fire rescue department earned a high mark in the 2018 PPC under the category "Deployment Analysis." This aspect of the PPC takes into account the distribution of apparatus—the adequacy of existing engine companies to cover the built-up area of town. In essence, the centralized "on-neck" location of the fire rescue station is the most advantageous for the town.

PROVIDE LIVING QUARTERS IN THE FACILITY

Should construction of a new station emerge as the apparent best choice, the decision of whether to include living quarters may become a topic. Would the town allow students to live in an aptly designed station as "on-duty" volunteer emergency responders? It has worked for those fire departments in Maine that have aligned with the Maine Community College System Fire Science program where dozens of students are provided housing in fire stations in exchange for their serving as emergency responders. This program has either augmented the staff of a community's fire and rescue service, negated the need to hire full-time or per-diem

staff, and in many cases has bolstered a department with a renewed sense of purpose.

Many of the existing stations in Maine that now house students had to be modified to allow for personnel to live in, but it should be looked at as a modest expenditure in comparison to paying wages and offering a benefit package for career personnel or choosing another model of service delivery, let alone witness the collapse of a community's fire and rescue service—a very real concern these days. The overarching problem here in Maine and throughout the country is the decline of volunteer emergency service personnel. It may behoove communities such as Castine that have unique opportunity at their disposal to craft programs that foster, attract and capitalize on a resource at hand.

When MMA is not in session, the living quarters could be allocated to interns who are enrolled in the state's fire science program and need short-term summer employment. Whether they work for the town or another entity in Castine, and they are credentialed fire fighters and EMS providers, they could fill the gap left when MMA students are away on summer break.

Another scenario could address the workforce-housing conundrum facing many towns. Here again, offering living quarters in exchange for services rendered could be seen as a win-win arrangement of bartering that serves both parties equitably.

RECOMMENDATIONS FOR APPARATUS

The configuration of Castine's apparatus appears to be adequate for the needs of the community. The current arrangement of apparatus gives the department reasonable latitude in fire suppression capabilities, and coincides with the ISO Public Protection Classification awarded Castine in 2018 that indicated the town needed "two in-service engines companies" in order to deliver a Basic Fire Flow of 2,250 gallons per minute.

The department can assist other communities through the mutual-aid network without exhausting all their resources. Should a Castine engine be placed out of service for short-term repairs or maintenance, there are sufficient remaining resources to provide satisfactory coverage. This will be further evidenced when the new tanker is brought online, as it will be equipped with a pump, something the old tanker does not have. Furthermore, Castine's geographic location makes it a community that is somewhat isolated. Other than the town of Penobscot, there are no surrounding communities that can readily augment Castine's fire department. This is an important aspect to consider as many cities and towns are typically ringed by neighboring communities that share a common border and can be counted upon

when additional emergency service resources are needed. Mutual aid to Castine is coming from a fairly long distance away, consequently it is important Castine maintains sufficient resources of its own.

Engine #5 is 25 years old and Engine #6 is 17 years old. The new tanker scheduled for delivery in late 2020 will replace its 37-year old predecessor. The rescue truck is now 19 years old. With the exception of the current tanker, the two pumpers and rescue truck were purchased new.

The fire rescue department has internally generated a scheduled apparatus replacement program. It appears that the program strives to replace the three larger trucks approximately every 30 years.

- 2020 - Tanker #1: This project replaces a 37-year old truck
- 2022 - Rescue #1: This project replaces what will be a 21-year-old truck
- 2026 - Engine #5: This project replaces what will be a 31-year-old truck
- 2030 - Engine #6: This project replaces what will be a 27-year-old truck

This long-term projection would see the entire fleet changed-out over the course of the next decade. Fortunately, the new tanker will only cost Castine $15,000 and those funds are scheduled to come from contingency and not the dedicated apparatus reserve account.

Although the program seems reasonable in its projection, the replacement of Engine #5 in 2026 is closely followed by Engine #6 only four years later. This puts a narrow gap in age between the two pumpers, and funding the two purchases sequentially may be burdensome for the community. The department should attempt to space-out the replacement sequence between the two pumpers so that are not of similar vintage.

PROVIDE AN ALTERNATIVE WATER SUPPLY SYSTEM TO SERVICE AREAS OUTSIDE OF THE TOWN'S WATER SYSTEM

The town has made great strides in improving its fire mitigation service, which is evidenced in its Public Protection Classification rating of 2018. This achieved benchmark could go further if the town and the fire department embark on a project that could improve the PPC for those areas of town not served by the municipal water system. This opportunity does require the assistance of the region's fire departments working collaboratively in meeting the criteria set forth by the Insurance Service Office.

The Fire Suppression Rating Schedule (FSRS) recognizes alternative water supply systems, including dry hydrants, suction points, large-diameter hose relays, and hauled water using tanker shuttles.

The water delivery system must be available 365 days a year and provide 250 gallons per minute (gpm) for a two-hour duration within five minutes of the arrival of the first apparatus. If a community uses a dry hydrant or suction supply point, ISO may need certification of the water capacity available during a 50-year drought cycle — by a state-certified professional — and many state and local governments have geological engineers or hydrologists who can provide that information. A good place to start is with the local department of environmental conservation. ISO treats suction points — with or without dry hydrants — in the same way it treats standard fire hydrants. Any property within 1,000 feet of a creditable suction point may be eligible for a protection class better than Class 9, provided the building is within five road miles of a responding fire station and the community has obtained 20 percent credit or more under the Fire Suppression Rating Schedule.

ISO may extend credit beyond 1,000 feet of a fire hydrant when the company uses large-diameter hose — if the fire department can demonstrate a standard procedure for deployment of hose and establish a relay operation.

To determine the fire department's eligibility for recognition of a tanker shuttle, ISO needs to understand the delivery capability of each apparatus.

ISO considers the following:

- Fire-site pump capacity
- Drop-tank capacities
- Distance of responding apparatus from the fire station to the fire site
- Distance of responding supply pumper to supply site
- Distance from the fire site to the supply site
- Amount of water carried by apparatus
- Discharge rate of water supply apparatus
- Fill rate of water supply apparatus
- Quantity of water available and the rate available from the supply source
- Set-up times

The procedure for determining the system's capability involves running a timeline analysis. ISO considers apparatus arrival times, travel times, discharge rates, fill rates, fire flow at the fire site, wait time for apparatus to fill or discharge their water supply, and supply delivery capability.

As an example, the town of York, Maine which is comprised of 56 square miles, achieved a PPC of "4" across the entire community when it proved to ISO its ability to deliver sufficient fire flow in the non-hydranted areas of town. A number of other Maine communities have also achieved improved PPC with demonstrating a rural water delivery evolution that meets the intent of ISO's alternative water supply criteria.

DEVELOP AN AUTOMATIC AID PROGRAM WITH ORLAND AND PENOBSCOT

In all likelihood, should the fire rescue department endeavor the alternative water supply opportunity, it may ultimately lead to the development of an "automatic-aid" response program with Orland and Penobscot. This procedure would have the firefighting resources from these two communities respond to any reported building fire in Castine at the same time the Castine Fire Rescue is alerted. This prearranged response program could enhance service delivery especially to the outskirts of town.

The long-standing practice of fire departments assisting one another is known as “mutual aid.” It allows for reciprocal, cross-border responses between prescribed fire departments, in order to provide additional resources during moderate to large-scale emergency incidents. These resources are deployed on an “as needed” basis under mutual aid compacts. This is already in place among the Hancock County fire departments.

A well-devised plan that meets the intent of the ISO regarding “automatic aid” should be qualified and fully implemented. That process would require a predetermined deployment strategy that the dispatch center would be responsible for following. The program would take the guesswork out of trying to figure out what resources should be sent to an incident as it unfolds.

NEXT STEPS

This study has laid the groundwork for the town of Castine to begin the process of upgrading their current Fire Rescue Department into a modern facility that is commensurate with a reasonable level of service for its size and call volume. If the town wishes to continue pursuit of this goal, we recommend the following steps:

Site Identification

Consistent with our recommendations for site location in our findings, the town should look to identify a suitable site. If there is existing town owned land within or very near the target location, that would be preferred for obvious reasons. The town should also engage with Maine Maritime Academy, not necessarily concerning land,

but to investigate furthering their existing symbiotic relationship with their cadets to pursue additional benefits for both parties.

Conceptual Site and Floor Plans and 3D Model

Once a site (or sites) has been identified, the town should develop conceptual floor plans and a site plan for the facility to further determine the site's feasibility and any potential additional constraints associated with the site. In addition to the floor plans, a 3D model of the building will provide the town with a visual conception of the project, help identify building systems and exterior materials, and provide a useful tool to estimate the total project cost of the project.

Conceptual Cost Estimate and Funding Sources

With the conceptual plans and 3D model, a fairly detailed estimate of construction costs, development and design costs, and costs of fixtures, furnishings, and equipment can be developed to provide a very accurate picture of the total project cost and schedule. The town can decide how the project could be funded including municipal bonds, possible donations, or other sources. While there is occasionally grant money for public safety facilities, it is our experience that Castine would most likely not qualify for this type of facility grant, as they are usually reserved for communities with very low median incomes. Municipal bonding is the most typical method we see for public safety projects. Although we are currently experiencing major financial uncertainty, we hope that bond rates will continue to be historically favorable when your project comes to fruition.

Appendix A

Full Scale Space Programming Matrix

CASTINE FIRE STATION SPACE PROGRAM

Preliminary Program 3/17/20

Room Desc	dimensions	Room Area (SF)	Admin # of Rooms	Admin/Office Area (SF)	Apparatus # of Rooms	Apparatus Area (SF)	Living # of Rooms	Living Area (SF)	Sup # of Rooms	Support Area (SF)	Total # of Rooms	Total Area (SF)	
Fire Station													
Lobby	8 x10	80	1	80							1	80	include small trophy case
Lobby	15x15	225	1	225							1	225	to house historic items with glass cases etc
Airlock	7 x 7	49	1	49							1	49	
House Watch/Dispatch Office	12 x 16	192	1	192							1	192	adjacent to lobby, desk space for two to three, dispatch radio
Chiefs Office	10 x 12	120	1	120							1	120	
Asst Chief Office	10 x 10	100	1	100							1	100	
Ambulance/Police Swing Office	10 x 12	120	1	120							1	120	2 desks with closet, access to bathroom and coffee,
Conference Room	10 x 12	120	1	120							1	120	seating for 6
Meeting/Training/EOC Room	24 x 26	624	1	624							1	624	comfortable seating for 30 in a class
Unisex Bathroom ADA	8 x 8	64	2	128							2	128	
Storage/Jan closet	8 x 8	64	1	64							1	64	
Apparatus Bays	18 x 80	1440			3	4320					3	4320	Drive through optional
Medical Storage	8 x 8	64			1	64					1	64	secure and lockable
Work Room	10 x 20	200			1	200					1	200	repair of equipment w/ work bench
Compressor Room	6 x 8	48			1	48					1	48	sealed for noise
Janitor closet for bays	6 x 8	48			1	48					1	48	in front of compressor room
Equipment/Gear Storage	10 x 20	200			1	200					1	200	Extra Gear, Eqipment, SCBA, spare bottles
Sprinkler Riser Area	6 x 8	48			1	48					1	48	
Radio nook	4 x 8	32			1	32					1	32	Radio nook with I am Responding screen
Apparatus Bay Bathroom	4 x 8	32			1	32					1	32	can use while dirty
Day Room/Kitchen/Dining	20 x 26	520					1	520			1	520	
Fitness Room		0						0			0	0	Use MMA facility
Bunk Rooms	8.5 x 12	102					8	816			8	816	Individual bedrooms with 4 lockable wardrobes summer students
Bathrooms/showers	8 x 10	80					3	240			3	240	for use from bunkrooms
Laundry	6 x 12	72					1	72			1	72	personal linens and clothes
Storage/Jan closet	8 x 10	80					1	80			1	80	
Turn out gear lockers	15 x 18	270					1	270			1	270	30 lockers for turn out gear with power and usb
Decon Room	10 x 16	160					1	160			1	160	connects app bays to living area, 1 extractor, 1 dryer, 1 shower, 3 bay sink
Mechanical room	10 x 15	150							1	150	1	150	
Electrical/Tel/IT Room	10 x 14	140							1	140	1	140	
Life Safety Elec room	8 x 10	80							1	80	1	80	includes ATS for Generator
Totals			**12**	**1,822**	**11**	**4,992**	**16**	**2,158**	**3**	**370**	**42**	**9,342**	
Circulation and grossing Factor											25%	2,336	
Grand Total											Program:	11,678	80' x 145' building footprint

Notes: 800sf mezzanine not calculated in square footage above
For partial two story option add 850 square feet for vertical circulation, footprint reduced to 9,500sf or 80' x 118'

Appendix B

DEFINITIONS

Mutual aid: Outside assistance requested by one community from another after a fire has occurred. Assistance by the outside fire department is rendered upon request. Mutual aid can impact on the grading evaluations of water supply as defined in the ISO grading schedule.

Automatic aid: Outside assistance that responds immediately on the first alarm to building fires beyond their boundaries. Two or more departments that participate in an automatic-aid arrangement operate as one fire department for dispatching fire apparatus.

END