

Fire Services Study

MERCER ISLAND, WASHINGTON

FINAL REPORT



September 2020

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1 Introduction and Executive Summary

The Matrix Consulting Group was retained by the City of Mercer Island to conduct a staffing and services study of the Mercer Island Fire Department (MIFD). This report represents the project team's final work product.

1 | Approaches Utilized in This Project

The principal approaches utilized by the project team in this study included, but were not limited to, the following:

- **Internal Interviews** – Members of the project team individually and collectively interviewed several executives, management, and supervisory staff of Mercer Island, fire department leadership, and command staff.
- **Data Collection** – The project team collected a wide variety of external and internal data documenting the structure, operations, and organization including:
 - Department staffing and scheduling
 - Documentation reflecting operations management
 - Numerous output data reflecting services provided
 - Various other performance information

This data was summarized in a 'descriptive profile' of the fire department, which was reviewed by the staff of the fire department.

- **Analysis** – The project team analyzed the collected data and reviewed interview notes to provide the basis for the final recommendations.

Throughout the study, the project team reviewed facts, issues, and initial findings with fire department staff.

2 | Executive Summary

The fire department in Mercer Island provides emergency services to a city of approximately 24,600 residents over a 6.2 square mile area. The services include, but are not limited to fire suppression, fire prevention, public education, fire investigation, and emergency medical services.

The city is an island located in between Seattle and Bellevue and connected by I-90 in the northern sections of the city. Being an island limits the growth of the city, which is reasonably well built-out. There are no areas available for annexation or future growth outside the current boundaries. This also limits the available sources of tax revenues – property taxes are the largest revenue source for the City. However, property taxes are limited to a 1% increase or the rate of inflation as measured by the Implicit Price Deflator (IPD), whichever is less. This is not the same as the Consumer Price Index for Urban Wage and Clerical Workers (CPI-W), which is used as a basis for cost of living adjustments.

Based on the 2012 Buildable Lands Report, there is potential for additional residential growth. The Town Center is an area that is available for redevelopment that could include multi-story buildings. The rate of growth will be influenced by the housing market, job growth, and interest rates. The regional light rail system is currently being expanded through Mercer Island.

The MIFD has Response Standards and a Standard of Cover that identifies the way the department will respond to calls for service. This document further identifies response time performance objectives for the responses to calls for service. A review of response to the calls for service largely found that the MIFD is meeting the established community standards. Fire prevention activities are also meeting the needs of the community.

Based on the analysis, future service demands are expected to remain relatively flat. Calls for service have remained about the same in recent years, with an average annual call volume of 2,431 calls. Fire prevention activity has also remained the same in terms of plan reviews, project reviews, and inspections. There is no expectation of increasing demands in the five-year planning period beyond those recommended in this report.

Future service delivery options can take two forms: maintaining the current fire department structure or contracting for services from another service provider. Maintaining the current structure allows the City to:

- Retain operational and financial control of the fire department.

- Maintain control of the delivery system and the ancillary duties such as fire prevention and public education.

Contracting for services provides the following:

- Allows cost sharing and sharing of equipment.
- Provides a deeper pool of personnel for operations and ancillary duties such as training and prevention.

Three service providers (City of Seattle, City of Bellevue, and Eastside Fire and Rescue) provided cost estimates and potential service delivery options as part of this study. Service levels were assumed to remain the same as the current operation.

3 | Summary of Recommendations

The following table provides a summary of recommendations included in this report.

RECOMMENDATIONS

OPTION 1 – RETAIN THE FIRE DEPARTMENT IN THE CITY

The Mercer Island Fire Department should review the current overtime policy to ensure it contains appropriate risk management practices, ensuring the required personnel are always available to serve the community.

Continue to monitor the response metrics against the established community response standards for any trends that indicate the need for additional resources or changes to the operations of the fire department.

Have the Fire Marshal review and recommend updates to strengthen the false alarm ordinance.

Continue to use shift personnel on an overtime basis to manage and deliver training programs to the fire department.

Invest in an online training program to deliver some of the training classes at a cost of approximately \$20,000, which is less than the cost of in-person training.

Utilize other venues such as the National Fire Academy online programming to boost the availability of training and reduce the dependence on an instructor.

Move the D-Shift firefighter to a permanent 24-hour shift.

Hire two additional personnel at a first-year cost of \$227,858 to increase the shift staffing from 9 per shift to 10 per shift and to reduce the 5-year average overtime budget by approximately \$188,766 annually.

Continue the practice of scheduling Kelly day and vacation leave on each shift.

OPTION 2 – CONTRACT FOR SERVICES

If the option of contracting for services is desired, the recommendation would be to issue a Request for Proposals to solicit the best potential partner. The consulting team believes the City of Bellevue may be the best option to possibly reduce current and future costs and to install a regional approach to service delivery.

2 Organization and Area Overview

This chapter provides an overview of the fire department's organization and governance, and general characteristics of the City of Mercer Island.

1 Background and Overview

1. Area Characteristics

Mercer Island is located in the southern portion of Lake Washington in King County. The island sits between the cities of Seattle and Bellevue, with bridges on Interstate 90 connecting it to the two cities. The City was incorporated in 1960 and is approximately five miles long and two miles wide. The current population is approximately 24,690, according to Washington State's Office of Financial Management's (OFM) 2020 estimates. The population density is 3,947 residents per square mile, which classifies Mercer Island as "urban" according to the National Fire Protection Association (NFPA) Standard 1710. This standard defines a suburban area as one with a population between 500 and 1,000 residents per square mile, while an urban area has a population of over 30,000 and/or a population of over 1,000 residents per square mile.

2. Demographic Profile

The following table illustrates some of Mercer Island's demographics according to the 2010 centennial census and the US Census's more frequent American Communities Survey (2018 iteration). Note that the OFM population estimate is the most commonly used and required.

United States Census Bureau	2010	2018
Estimated Mercer Island Population	22,699	25,492
Median Age	46	Not available
Children Under Age 5	4.4%	3.5%
Children Ages 5 to 19 years	22.0%	21.9%
Persons Age 20 to 59 years	47.5%	47.9%
Persons Age 60 and Over	25.4%	26.6%
Families in Poverty	3.2%%	Not available
Median Household Income	\$121,948	142,413
Population Density	3,592	3,914

The following map provides population density by census tract, based on 2010 census data.



The areas on the northern portion of the island along I-90 have the highest density. The remaining areas of the island have a relatively even density.

2 | Financial Resources

The financial resources of the City include, but are not limited to, property taxes, licenses and permits, and charges for services. Property taxes represent approximately 38% of the total revenue sources.

1. Revenue

The following revenues are directly attributable to the Mercer Island Fire Department (MIFD).

Mercer Island Fire Revenue 2015 - 2019

Line Item	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Budget	4 Yr. Change
Single Family Alteration	\$142,084	\$200,503	\$149,450	\$140,752	\$100,528	-29.2%
Permit Review/Inspection	\$1,241	\$0	\$210	\$0	\$0	-100.0%
State Trauma Care Fund	\$0	\$1,290	\$0	\$0	\$0	
Grants	\$1,341	\$0	\$1,270	\$1,222	\$1,266	-5.6%
King County EMS Levy	\$425,735	\$474,321	\$468,466	\$484,979	\$510,283	19.9%
Seafair	\$0	\$4,000	\$0	\$0	\$0	0.0%
Emergency Aid Services	\$529,848	\$536,366	\$565,702	\$582,853	\$596,794	12.6%
Ambulance Transport Fee	\$296,957	\$278,563	\$246,818	\$248,733	\$306,398	3.2%
CPR Class Fee	\$1,076	\$1,377	\$1,178	\$280	\$0	-100.0%
First Aid Class Fee	\$2,131	\$2,522	\$2,662	\$3,110	\$1,039	-51.2%
Private Contributions	\$6,971	\$2,061	\$1,431	\$1,311	\$22,666	225.1%
Other	\$5,100	\$3,326	\$1,081	\$226	\$1,850	-63.7%
Total Revenue	\$1,412,484	\$1,504,330	\$1,438,267	\$1,463,465	\$1,540,824	9.1%

As illustrated, emergency aid services, King County EMS Levy, and ambulance transport fees represent approximately 92% of the direct revenues attributable to the fire department. Revenue increased 9.1% from 2015 to 2019.

2. Expenditures

The table that follows includes the expenditures for the MIFD from 2015 - 2019.

Mercer Island Fire Department Expenditures

Line Item	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Actual	4 Yr. Change
Administration Total	\$558,645	\$519,567	\$677,313	\$584,071	\$514,745	-7.9%
Operations Total	\$5,145,675	\$5,184,124	\$5,291,740	\$5,392,226	\$5,947,807	15.6%
Suppression Total	\$13,282	\$17,760	\$21,757	\$21,458	\$24,022	80.9%
EMS Total	\$15,094	\$14,033	\$12,183	\$15,407	\$14,733	-2.4%
Training Total	\$163,397	\$146,484	\$143,004	\$188,612	\$128,937	-21.1%
Community Risk Reduction Total	\$198,819	\$249,850	\$245,019	\$266,982	\$11,773	-94.1%
Fire Marshal Total	\$0	\$0	\$0	\$0	\$250,069	0.0%
Total Expenditures	\$6,094,912	\$6,131,818	\$6,391,016	\$6,468,756	\$6,892,086	13.1%

As illustrated above, the fire department's actual expenditures have steadily increased over the past five years, increasing 13.1% since 2015 or an average of 3.28% annually. The Fire Marshal's Office was a newly separated divisional budget starting in 2019, which had previously been a part of the Community Risk Reduction budget. The largest increase occurred between 2018 and 2019 when actual expenditures increased 6.5%. This was largely due to retroactively applying salary and overtime wage increases that were agreed upon through collective bargaining (totaling \$122,000).

The tables that follow illustrate each division's expenditures in a more detailed way.

Mercer Island Fire Department Expenditures – Administration Detail

Line Item	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Actual	4 Yr. Change
Salaries	\$331,836	\$296,311	\$448,119	\$352,458	\$296,806	-10.6%
Overtime	\$21,298	\$22,767	\$20,923	\$26,781	\$19,862	-6.7%
Salary Cost Reimbursement	-\$303	\$0	\$0	\$0	\$0	-100.0%
Uniforms	\$1,295	\$1,788	\$3,426	\$2,212	\$5,337	312.1%
Benefits	\$111,857	\$115,938	\$127,822	\$117,848	\$113,017	1.0%
Office Supplies	\$1,198	\$652	\$866	\$562	\$433	-63.9%
Computer Supplies	\$5,989	\$1,798	\$1,998	\$1,369	\$968	-83.8%
Printer Supplies	\$664	\$633	\$625	\$522	\$0	-100.0%
Computer Network Supplies	\$0	\$0	\$187	\$0	\$0	
Operating Supplies	\$2,628	\$2,999	\$1,649	\$1,145	\$975	-62.9%
Employee Recognition	\$1,310	\$644	\$1,147	\$442	\$0	-100.0%
Fire Daily Uniforms	\$297	\$0	\$452	\$0	\$998	236.0%
Household Supplies	\$18,418	\$16,515	\$15,687	\$20,272	\$19,690	6.9%
Supplies AV	\$0	\$0	\$0	\$225	\$1,604	
Supplies Apparatus	\$60	\$0	\$0	\$1,178	\$91	51.7%
Small Tools & Equipment	\$811	\$733	\$2,554	\$3,100	\$3,515	333.4%
Professional Services	\$38,577	\$32,341	\$29,266	\$31,108	\$26,753	-30.7%
Telephone/Pagers	\$6,889	\$5,409	\$5,663	\$6,531	\$10,067	46.1%
Travel	\$1,460	\$4,500	\$3,835	\$3,027	\$1,257	-13.9%
Copier Rental	\$5,775	\$5,406	\$5,334	\$5,145	\$4,823	-16.5%
Repair and Maintenance Services	\$0	\$504	\$0	\$0	\$0	
Computer Repair	\$0	\$0	\$0	\$0	\$0	
Equipment Maintenance	\$1,657	\$996	\$1,541	\$1,925	\$286	-82.7%
Household Maintenance	\$665	\$2,627	\$285	\$2,458	\$2,376	257.3%
Internet	\$48	\$62	\$0	\$0	\$0	-100.0%
Dues & Subscriptions	\$3,851	\$5,146	\$3,014	\$3,346	\$3,151	-18.2%
Printing	\$1,010	\$303	\$0	\$658	\$0	-100.0%
Tuition & Registration	\$1,355	\$1,495	\$2,920	\$1,759	\$2,736	101.9%
Administration Total	\$558,645	\$519,567	\$677,313	\$584,071	\$514,745	-7.9%

Mercer Island Fire Department Expenditures – Operations Detail

Line Item	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Actual	4 Yr. Change
Salaries	\$3,141,320	\$3,192,711	\$3,093,999	\$3,247,701	\$3,555,696	13.2%
Overtime	\$455,950	\$317,518	\$531,407	\$491,160	\$663,979	45.6%
Training Overtime	\$982	\$229	\$4,308	\$880	\$0	-100.0%
Salary Cost Reimbursement	-\$62,700	-\$13,578	-\$18,150	-\$23,128	-\$13,943	-77.8%
Benefits	\$1,037,266	\$1,109,119	\$1,097,527	\$1,086,168	\$1,125,946	8.5%
Personnel Benefits Fire	\$44,351	\$0	\$59,800	\$45,700	\$43,024	-3.0%
Operating Supplies	\$1,753	\$1,987	\$877	\$1,606	\$22,114	1161.5%
Office Supplies	\$0	\$0	\$0	\$0	\$705	
Awards & Recognition	\$598	\$362	\$161	\$0	\$2,213	270.1%
Daily Uniforms	\$17,599	\$12,668	\$3,327	\$15,838	\$16,289	-7.4%
Protective Clothing	\$30,473	\$28,128	\$19,486	\$29,115	\$25,988	-14.7%
Household Supplies	\$0	\$287	\$85	\$160	\$99	
Apparatus Supplies	\$12,995	\$14,056	\$11,701	\$18,268	\$18,898	45.4%
SCBA Supplies	\$5,652	\$8,204	\$4,358	\$4,568	\$5,681	0.5%
Pre-Fire Supplies	\$0	\$548	\$965	\$2,325	\$0	
Radios	\$0	\$0	\$0	\$2,857	\$1,280	
Service Plan Permits	\$178	\$0	\$0	\$0	\$0	-100.0%
Small Tools & Equipment	\$0	\$39,500	\$9,424	\$0	\$0	
Cell Phones	\$10,939	\$12,058	\$11,377	\$11,856	\$13,835	26.5%
Special Lines/Pagers	\$0	\$289	\$0	\$0	\$0	
Travel	\$0	\$202	\$0	\$226	\$1,489	
Equipment Maintenance	\$2,728	\$3,372	\$2,550	\$5,818	\$4,147	52.0%
Radio Maintenance	\$1,028	\$3,219	\$4,120	\$3,331	\$5,422	427.4%
Vehicle Maintenance	\$25,128	\$20,621	\$16,491	\$17,314	\$13,130	-47.7%
Dues and Subscriptions	\$0	\$0	\$0	\$176	\$0	
Printing	\$0	\$171	\$28	\$344	\$0	
Professional Services	\$53,705	\$33,657	\$58,894	\$40,103	\$41,321	-23.1%
EPSCA Access Fees	\$16,120	\$13,332	\$11,586	\$11,004	\$11,114	-31.1%
Fire Dispatch	\$155,750	\$176,256	\$156,072	\$165,277	\$169,409	8.8%
Fleet Replacement	\$50,989	\$65,145	\$51,494	\$51,494	\$48,803	-4.3%
Computer Replacement	\$27,307	\$27,307	\$26,790	\$26,790	\$27,417	0.4%
Radio Replacement	\$9,084	\$9,084	\$9,084	\$9,084	\$9,085	0.0%

Fleet O&M Charge	\$31,852	\$31,852	\$35,470	\$35,470	\$34,535	8.4%
IT O&M Charge	\$74,628	\$75,820	\$88,509	\$90,721	\$100,131	34.2%
Operations Total	\$5,145,675	\$5,184,124	\$5,291,740	\$5,392,226	\$5,947,807	15.6%

Mercer Island Fire Department Expenditures – Suppression Detail

Line Item	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Actual	4 Yr. Change
Operating Supplies	\$7,881	\$10,738	\$12,230	\$12,646	\$12,560	59.4%
Extinguisher Supplies	\$370	\$0	\$412	\$0	\$1,124	203.8%
Fire Inspection Supplies	\$373	\$832	\$0	\$0	\$0	-100.0%
Emergency Response Supplies	\$0	\$0	\$0	\$0	\$741	
Tech Rescue Supplies	\$799	\$1,669	\$3,712	\$4,046	\$2,995	274.8%
Hazmat Supplies	\$3,292	\$3,963	\$4,090	\$3,487	\$5,607	70.3%
Small Tools & Equipment	\$567	\$558	\$1,313	\$262	\$995	75.5%
Repair & Maintenance	\$0	\$0	\$0	\$1,017	\$0	0.0%
Suppression Total	\$13,282	\$17,760	\$21,757	\$21,458	\$24,022	80.9%

Mercer Island Fire Department Expenditures – Emergency Medical Services Detail

Line Item	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Actual	4 Yr. Change
Operating Supplies	\$14,130	\$11,931	\$11,057	\$15,407	\$14,016	-0.8%
Small Tools & Equipment	\$0	\$1,510	\$0	\$0	\$0	0.0%
Repair & Maintenance	\$964	\$592	\$1,126	\$0	\$717	-25.7%
EMS Total	\$15,094	\$14,033	\$12,183	\$15,407	\$14,733	-2.4%

Mercer Island Fire Department Expenditures – Training Detail

Line Item	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Actual	4 Yr. Change
Salaries	\$2,524	\$0	\$0	\$0	\$0	-100.0%
Overtime (Training Officers)	\$31,956	\$39,334	\$31,137	\$43,497	\$39,947	25.0%
Training Overtime (Operations Training)	\$74,185	\$56,343	\$65,914	\$109,606	\$70,809	-4.6%
Salary Cost Reimbursement	-\$1,999	\$0	-\$208	-\$17,682	-\$26,119	1206.6%
Benefits	\$7,001	\$11,287	\$8,840	\$10,898	\$8,684	24.0%
Operating Supplies	\$742	\$1,686	\$6,324	\$3,159	\$352	-52.6%
Professional Services	\$11,856	\$10,269	\$12,116	\$17,528	\$10,460	-11.8%
Travel	\$1,177	\$826	\$117	\$0	\$0	-100.0%
Dues & Subscriptions	\$691	\$342	\$100	\$500	\$0	-100.0%
Printing	\$150	\$0	\$0	\$7,200	\$139	-7.3%
Tuition & Registration	\$5,975	\$8,635	\$18,664	\$4,180	\$6,625	10.9%
Tuition - Recruit School	\$29,139	\$17,762	\$0	\$9,726	\$18,040	-38.1%
Training Total	\$163,397	\$146,484	\$143,004	\$188,612	\$128,937	-21.1%

Mercer Island Fire Department Expenditures – Community Risk Reduction Detail

Line Item	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Actual	4 Yr. Change
Salaries	\$124,521	\$121,715	\$130,207	\$132,833	\$0	-100.0%
Overtime	\$31,055	\$72,172	\$66,593	\$80,641	\$7,169	-76.9%
Salary Cost Reimbursement	-\$111	-\$300	-\$5,450	-\$3,175	-\$1,678	1411.7%
Uniforms	\$0	\$152	\$0	\$85	\$0	
Benefits	\$38,433	\$47,686	\$45,292	\$44,480	\$562	-98.5%
Office Supplies	\$659	\$0	\$25	\$911	\$0	-100.0%
Operating Supplies	\$2,772	\$2,201	\$2,220	\$2,896	\$1,730	-37.6%
Public Education Supplies	\$274	\$608	\$780	\$1,128	\$0	-100.0%
Fire Investigation Supplies	\$0	\$0	\$45	\$2,465	\$0	
Travel	\$0	\$300	\$871	\$724	\$1,193	
Dues & Subscriptions	\$325	\$485	\$1,941	\$1,168	\$1,626	400.3%
Printing	\$686	\$2,596	\$69	\$508	-\$5	-100.7%
Tuition & Registration	\$205	\$2,235	\$2,426	\$2,318	\$1,176	473.7%
Community Risk Reduction Total	\$198,819	\$249,850	\$245,019	\$266,982	\$11,773	-94.1%

Mercer Island Fire Department Expenditures – Fire Marshal Detail

Line Item	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Actual	4 Yr. Change
Salaries & Wages					\$147,345	0.0%
Overtime					\$51,743	0.0%
Benefits Reg FTE					\$44,006	0.0%
Office Supplies					\$32	0.0%
Operating Supplies					\$771	0.0%
Professional Services					\$3,015	0.0%
Travel Expense					\$208	0.0%
Dues & Subscriptions					\$710	0.0%
Printing					\$167	0.0%
Tuition & Registrations					\$2,072	0.0%
Fire Marshal Total					\$250,069	0.0%

3. Overtime

Overtime expenditures are a key focus of this study. The following table illustrates the budgeted versus actual overtime for the fire department from 2015 – 2019.

Budgeted Vs. Actual Overtime 2015 - 2019

Year	Budgeted OT	Actual OT	Reimbursement	Difference	Budgeted Training OT	Actual Training OT	Reimbursement	Difference	Total
2015	\$481,530	\$509,286	\$63,113	(\$35,357)	\$92,182	\$106,141	\$1,999	\$11,960	(\$23,397)
2016	\$572,155	\$412,686	\$13,878	(\$173,347)	\$94,134	\$95,768	\$0	\$1,634	(\$171,713)
2017	\$573,155	\$623,232	\$23,600	\$26,477	\$101,793	\$86,051	\$208	(\$15,949)	\$10,527
2018	\$568,155	\$599,462	\$26,303	\$5,005	\$102,550	\$153,103	\$17,862	\$32,690	\$37,695
2019	\$603,258	\$735,584	\$13,943	\$118,383	\$108,020	\$110,756	\$26,119	(\$23,383)	\$95,000
Total	\$2,798,253	\$2,880,250	\$140,837	(\$58,840)	\$498,678	\$551,819	\$46,188	\$6,952	(\$51,888)

As illustrated above, in 2015 and 2016, the overtime line item was under budget, but in the years since it has been consistently over budget. During the past three years, the over-budget condition has increased each year. For the five-year

period, the overall overtime budget was under-spent by \$51,888 or 1.6%; however, in 2019, actual overtime exceeded the budget by 13.4%.

The following table illustrates overtime costs as a percentage of total salary and benefit costs and as a percentage of the total budgets of both the Operations Division and the department.

Fiscal Year	Actual Expenditures		Overtime as % of		Overtime as % of Overall Actual Expenditures
	Salary + Benefits	Overtime	Salary + Benefits Costs	Overtime as % of Operations Actual Expenditures	
2015	\$4,178,586	\$456,932	10.94%	7.68%	6.63%
2016	\$4,301,830	\$317,747	7.39%	5.34%	4.61%
2017	\$4,191,526	\$535,715	12.78%	9.01%	7.77%
2018	\$4,333,869	\$492,040	11.35%	8.27%	7.14%
2019	\$4,681,642	\$663,979	14.18%	11.16%	9.63%
Five-Year Average:			11.33%	8.29%	7.16%

As illustrated above, overtime costs have been 11.3% on average of the department's total salary and benefits' expenses. Overtime was 8.3% of the Operations Division's expenses and 7.2% of the overall fire department expenses over the past five years. From the experience of the project team, overtime expenditures of 10% of salaries and benefits are typical for fire departments across the country.

3 | Community Growth

The Mercer Island Comprehensive Plan was written in 2015 to provide a long-term vision for the community through 2035. The plan included a growth forecast based on King County's Countywide Planning Policies, and the plan was accepted by the County's Growth Management Planning Council. The growth forecast included employment and commercial capacity, residential growth, housing capacity and targets, and a housing and population forecast.

According to the 2012 Buildable Lands Report, there was capacity for 614 new housing units in single family zones, 143 new housing units in multi-family zones, and 1,247 in the Town Center. The actual number of units developed will be influenced by the housing market, job growth, and interest rates, etc. Residential growth is a factor in evaluating future fire service needs.

The regional light rail system is expanding into the city and that could also impact future fire service needs.

3 Fire Rescue Services

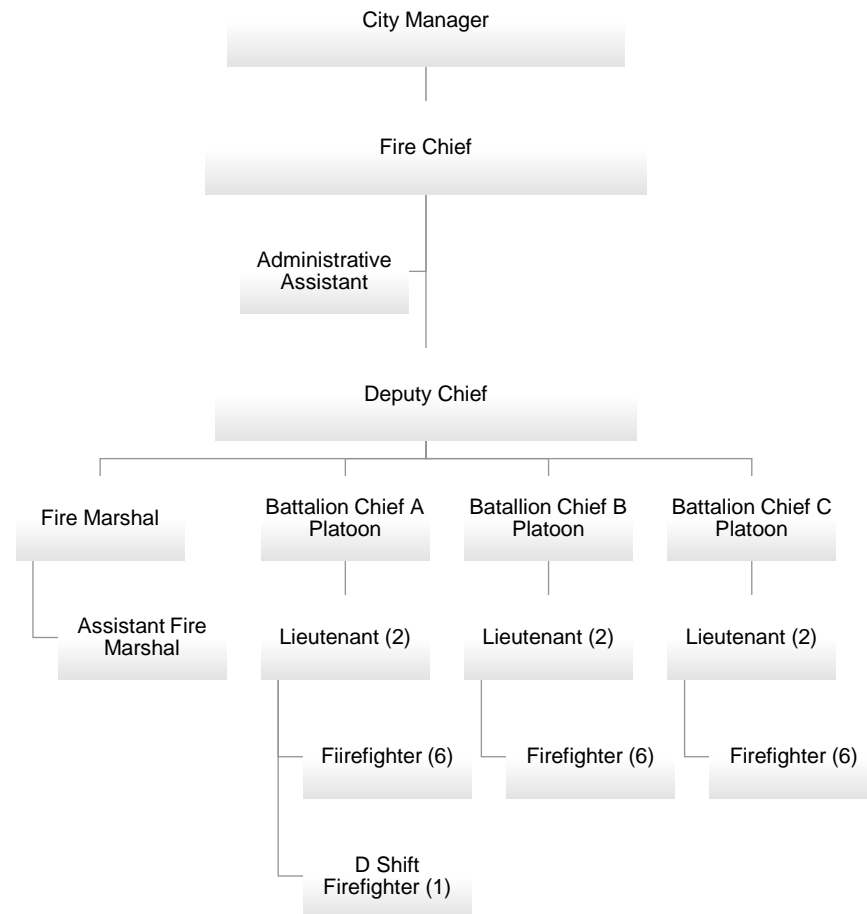
This chapter provides an overview of the fire protection system, including the resources available to the city and a historical review of the workload of the fire department.

1 Organization

The Mercer Island Fire Department (MIFD) is an all-hazard department and provides fire suppression, emergency medical services, fire prevention, hazardous materials response, and specialty technical rescue services to the city.

The MIFD was established in 1962 to provide fire suppression services. The department is part of King County Medic 1 for the provision of Advanced Life Support (ALS) emergency medical transport services. The Mercer Island Fire Department is a Basic Life Support (BLS) transport provider.

Today, the MIFD operates from two fire stations with 32 career staff, including operations and administrative staff. There are 9 personnel assigned to each shift with 7 personnel being the minimum staffing at the stations each day. There is also a floating position, known as D-Shift, used to cover vacancies when personnel are on a “Kelly Day.” The Kelly Day is what allows firefighters to adhere to a 48-hour work week, as per the collective bargaining agreement (CBA). This position rotates and works two days per week (Mon/Wed, Mon/Thu, Mon/Fri). The current fire department organization chart is provided below.

Mercer Island Fire Department Organization Chart

2 | Workload and Activities

The fire department responds to emergency and non-emergency calls for service. The following table illustrates the activities of the department grouped by the type of response to calls for service over the past five (5) years.

Calls for Service by Type

	2015	2016	2017	2018	2019	5 Yr. Total	Pct.
Auto Accidents	92	115	109	96	95	507	4.2%
Medical Calls	1,593	1,612	1,599	1,525	1,598	7,927	65.2%
Total Medical and Auto Accidents	1,685	1,727	1,708	1,621	1,693	8,434	69.4%
Alarm – Activation	370	376	356	403	385	1,890	15.6%
Alarm - False	5	4	1	9	4	23	0.2%
Alarm – Malfunction	2	3	0	5	5	15	0.1%
Other Type Fire	24	9	14	4	5	56	0.5%
Smoke Scare	46	34	47	36	40	203	1.7%
Structure Fire	9	8	20	9	14	60	0.5%
Vegetation/Brush/Debris Fires	26	8	16	22	10	82	0.7%
Vehicle Fire	17	15	18	12	13	75	0.6%
All Fire Calls	499	457	472	500	476	2,404	19.8%
Rescue Calls - Extrication	0	0	0	0	0	0	0.0%
Rescue Calls - Other	0	0	1	2	0	3	0.0%
Rescue Calls - Search	0	0	0	0	0	0	0.0%
Rescue Calls - Water	4	5	6	2	3	20	0.2%
All Rescue Calls	4	5	7	4	3	23	0.2%
Dispatched/Canceled	3	5	17	8	6	39	0.3%
Good Intent Calls	15	9	9	9	3	45	0.4%
Hazardous Condition	42	7	40	21	43	153	1.3%
Hazardous Materials	27	38	37	28	54	184	1.5%
Overpressure Rupture	9	1	4	3	2	19	0.2%
Severe Weather Alerts	40	43	54	35	34	206	1.7%
Service Calls	124	152	148	114	98	646	5.3%
Other Type of Calls	260	255	309	218	240	1,292	10.6%
Total Calls for Service	2,448	2,354	2,496	2,343	2,412	12,143	100%

As illustrated, medical calls and auto accidents account for 69.45% of the total call volume, while fire calls account for approximately 20% of calls, which is typical for the majority of urban fire departments nationwide.

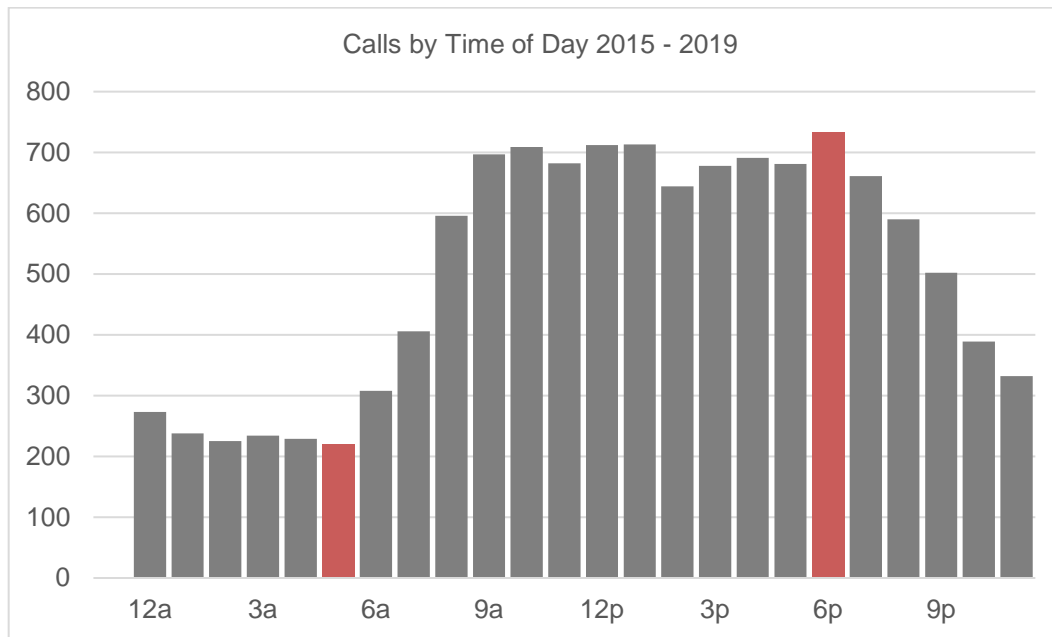
The following table displays the total number of calls for service handled by the fire department by each hour and day of the week over the past five years. Both emergency and non-emergency calls were included to provide an overall view of the service demands on the department.

Calls for Service by Hour and Weekday 2015 - 2019

Hour	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total
12am	54	40	27	30	31	44	47	273
1am	44	36	36	23	26	35	38	238
2am	37	32	30	25	32	29	40	225
3am	34	30	40	30	27	34	39	234
4am	47	27	33	30	28	28	36	229
5am	34	32	44	32	21	37	20	220
6am	37	51	49	45	35	50	41	308
7am	53	70	67	56	57	60	43	406
8am	78	87	99	74	90	103	65	596
9am	106	88	112	98	92	106	95	697
10am	88	107	97	105	100	107	105	709
11am	89	82	106	105	106	105	89	682
12pm	80	108	98	97	114	108	107	712
1pm	102	90	110	102	99	107	103	713
2pm	96	74	97	83	87	119	88	644
3pm	100	88	100	106	97	84	103	678
4pm	101	100	81	90	113	116	90	691
5pm	106	89	117	98	105	89	77	681
6pm	113	103	115	104	102	95	101	733
7pm	93	82	95	100	85	98	108	661
8pm	101	68	81	82	92	84	82	590
9pm	60	72	73	63	57	95	82	502
10pm	62	48	68	35	49	55	72	389
11pm	53	43	45	36	38	58	59	332
Total	1,768	1,647	1,820	1,649	1,683	1,846	1,730	12,143

As illustrated above, calls for service varied by time of day and day of the week. The heavier call volume begins at the 8 am hour and continues through the 8 pm hour. The call volume is also heavier at the end of the week and weekends with Friday being the busiest day of the week. The busiest time of the day is the 6:00 pm hour; the slowest hour is 5:00 am.

The following graph illustrates total calls for service by hour of the day.



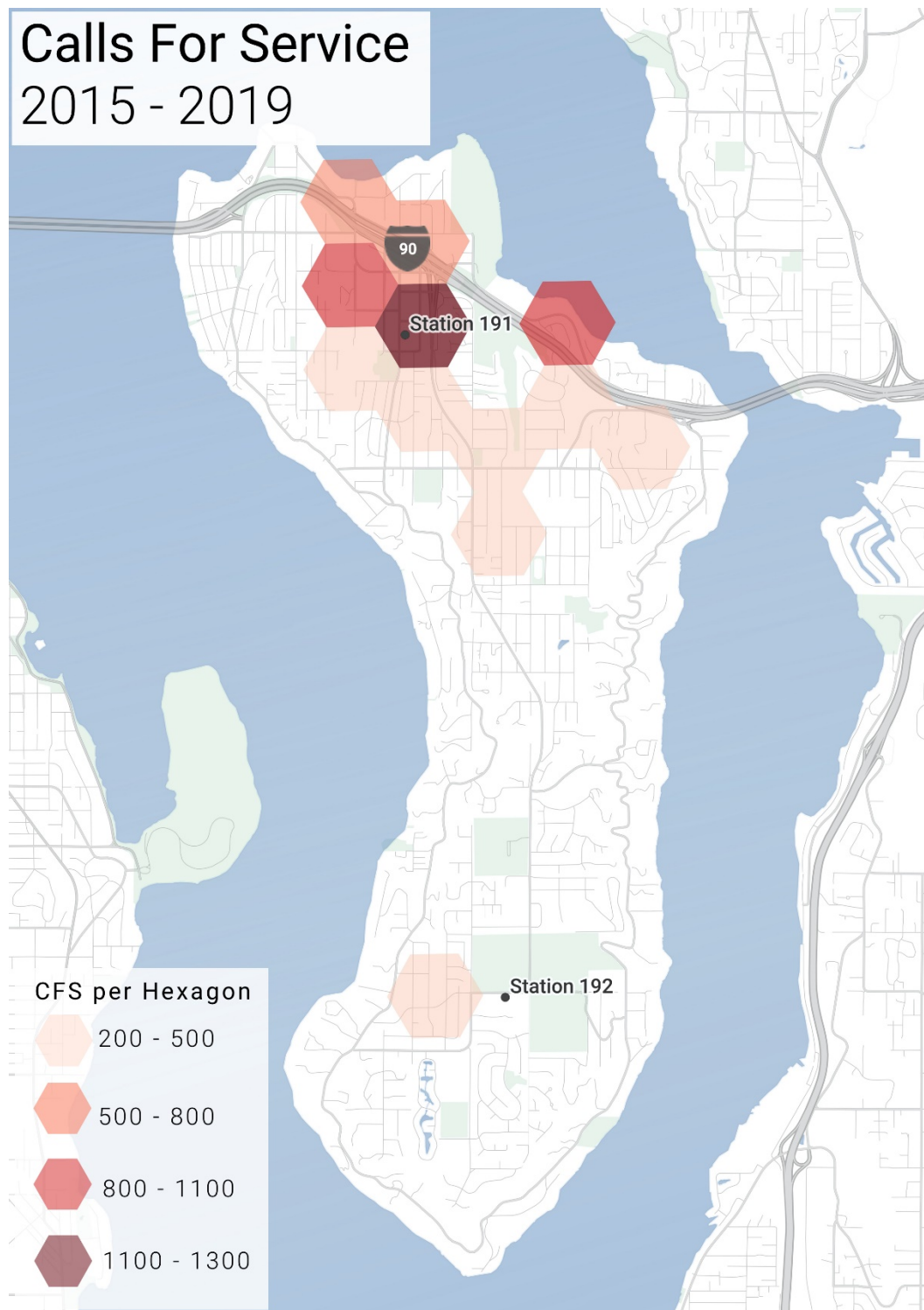
Service calls begin increasing at the 8 am hour, peak at the 6:00 pm hour, and then begin to decline in the evening and overnight hours, with 5:00 am being the slowest hour.

Of the 14,485 emergency responses that occurred from 2015 through 2019 Station 91 units accounted for 61% and Station 92 accounted for 39%. Those responses were split between fire-related and medical-related (EMS) in the following percentages:

- Station 91: EMS 63%; fire 37%
- Station 92: EMS 44%; fire 56%.

Two full-function stations allow the City to ensure effective and timely responses to calls, including concurrent calls. The fact that Station 92 has more fire responses than EMS is a product of that station providing the necessary “second unit due” or back-up for calls in the northern part of the city.

The following map illustrates the call for service demand using GIS technology to outline where many of the calls are occurring.



The higher call volumes follow the population density clusters of the city and run along the I-90 corridor.

3 | Physical Resources

Service to Mercer Island is provided from two fire stations (191 and 192), shown on the map below.



The department operates on a three-platoon system, working 48 hours “on” and 96 hours “off.” Operating from two stations, the minimum staffing is 7 personnel.

The following tables describe the service area, type of building, and current equipment at each station.

Mercer Island Fire Department

Station 191

3030 78th Avenue SE

Description of Use	Provides service to the northern and central core of the city. Serves as the headquarters for the department.				
Apparatus Space	Three Bays				
Assigned Apparatus	Unit ID	Year	Description	Type	Minimum Staffing
	Battalion 191	2016	Chevy	Suburban	1
	Engine 191	2018	Pierce	Enforcer (Type 1)	3
	Midi 191	2008	GMC	Mid-Size Engine	Cross Staffed
	Aid 191	2017	Ford	E350	Cross Staffed
	Rescue 191	2014	Dive/Rescue		Cross Staffed
	Battalion 192	2009	Chevy	Suburban	Reserve
	Engine 193	2008	Pierce	Velocity	Reserve
	Engine 194	2008	Pierce	Velocity	Reserve
	Aid 193	2007	Ford	E350	Reserve
	Utility 191	2017	Chevy	Silverado 2500	Reserve

Mercer Island Fire Department

Station 192

8473 SE 68th Street

Description of Use	Provides service to the southern and south-central sections of the city.				
Apparatus Space	Two Bays				
Assigned Apparatus	Unit ID	Year	Description	Type	Minimum Staffing
	Engine 192	2013	Pierce	Velocity (Type 1)	3
	Aid 192	2012	GMC	3500	Cross Staffed
	Midi 192	2016	International	Mid-Size Engine	Cross Staffed

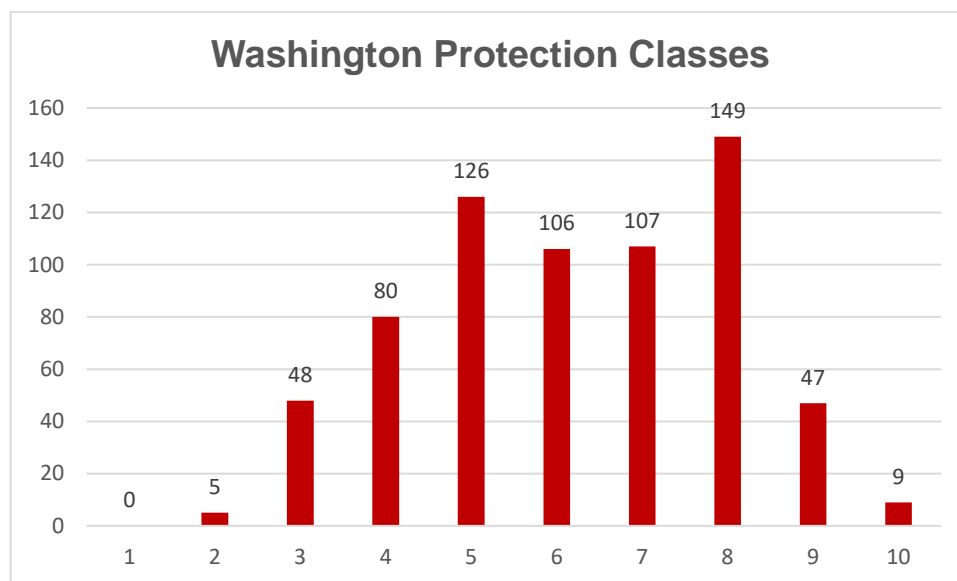
4 Emergency Service System Dynamics

In making decisions about the emergency services system, it is important to consider science and best practices regarding location of resources, deployment strategies, and other critical factors that contribute to an effective emergency services system.

Nationally, for many years, the Insurance Services Office (ISO) established the standard for deployment through their Public Protection Classification system. This system was designed to provide insurers a basis for setting insurance rates and to limit their exposure to large losses and catastrophic events.

In Washington, a similar organization, Washington Surveying and Rating Bureau (WSRB), uses a comparable system to evaluate emergency services systems in the state. In August 2018, the WSRB issued Mercer Island a Community Public Protection Class Grade of 4. This is based on an evaluation of the City's fire protection/suppression capabilities, using a schedule approved by the Washington State Office of the Insurance Commissioner. Communities are evaluated in four major areas: water supply, fire department, emergency communications and fire safety control. Evaluation of the fire department accounts for 40% of the grade.

Currently in Washington State, there are 53 communities that have achieved a higher score than Mercer Island. The following chart illustrates the number of communities scoring at each class, with 1 being the highest possible class and 10 the lowest.



WSRB is currently revising their grading system, which could positively impact Mercer Island's next evaluation. The Fire Marshal's Office is currently taking steps to improve the grade on the next rating evaluation. The department believes a grade of 3 is attainable.

Locally, the City of Bellevue has a rating of 2, Eastside Fire and Rescue's communities are rated between 3 and 4, and Seattle is rated a 2.

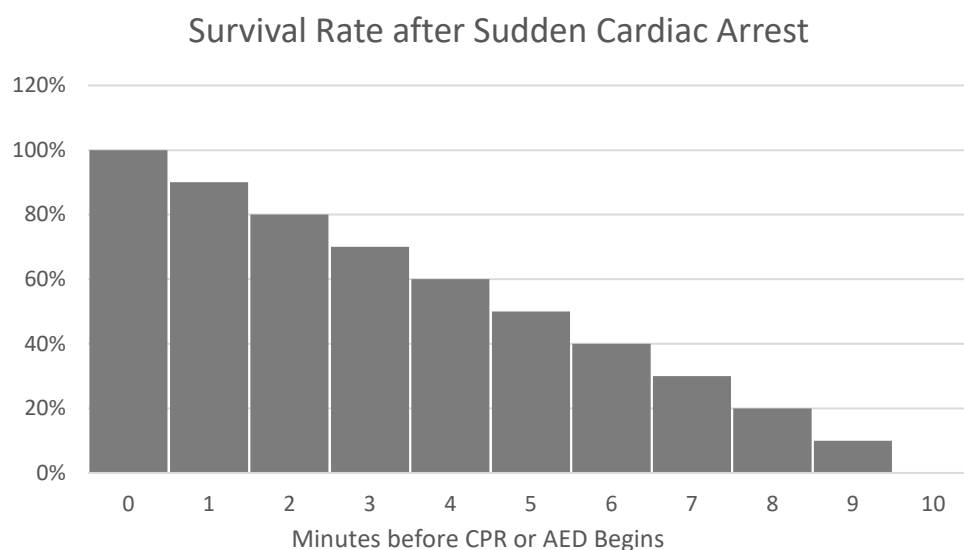
The following sections describe best practices and current research, with comparisons to Mercer Island Fire Department performance where applicable.

1 | Emergency Medical Services

Emergency medical services (EMS) are a significant part of the emergency services system. Not only are these types of calls rising but the types of service calls are wide ranging. Emergency medical response systems must account for this variability and ensure appropriate care is provided in a timely manner.

The American Heart Association states that brain and permanent death starts to occur 4 to 6 minutes following cardiac arrest. Trauma events also demand time sensitive responses. In 2015, a national awareness program was launched called "Stop the Bleed." This program is based on the premise that a person that is bleeding profusely could die within five minutes without intervention.

For perspective, the following graph illustrates the survivability of cardiac patients related to the onset time:



The graph illustrates that the chances of survival of sudden cardiac arrest diminish approximately 10% for each minute that passes before the initiation of CPR and/or defibrillation. These dynamics are the result of extensive studies of the survivability of patients suffering from cardiac arrest.

While the demand for services in EMS is wide ranging, the survival rates for full arrests are often utilized as benchmarks for response time standards. It is easiest to define and track patient outcomes for cardiac arrests (i.e., a patient either survives or does not). Based on extensive research, experts recommend that basic life support be provided within four minutes of emergency dispatch notification and that advanced life support be given within 8 minutes of notification.

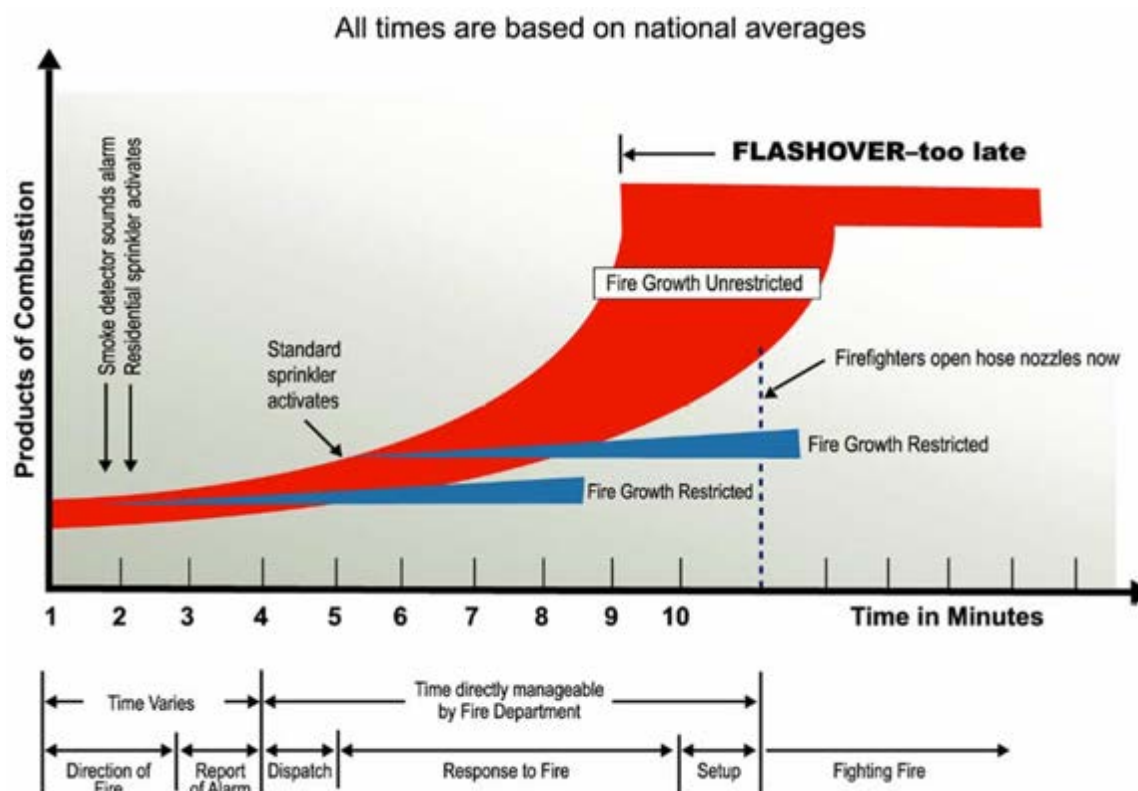
Considering the response time continuum, the goal for emergency medical services is to provide Basic Life Support (BLS) within 6 minutes of the onset of the incident (including detection, dispatch and travel time) and Advanced Life Support (ALS) within 10 minutes. These standards are commonly used in two-tiered EMS systems where fire or other resources (e.g., police) function as first responders for BLS and additional ALS assistance is provided by subsequently responding paramedic units and a Medical Supervisor Officer (MSO). Most communities in the U.S., like Mercer Island, have two-tiered EMS systems of one degree or another.

Locally the two-tiered EMS system ensures rapid arrival of Basic Life Support services from Mercer Island staff and Advanced Life Support units from strategically placed King County Medic One. In 2019, there were 196 incidents where a cardiac arrest victim had a heart rhythm that could be converted using cardiogenic shock treatment. Of these, 83% survived to be admitted to the hospital and 115 (59%) were ultimately discharged. Mercer Island only had one shockable event in 2019 where an individual was admitted to the hospital, but did not survive. The high survival rate of cardiac arrest victims shows the EMS system in the county is functioning at a high level.

2 | Fire Suppression Services

Much like emergency medical services, the goal of fire suppression systems is to save lives and minimize property damage. Every structure fire goes through the same process of development. The growth of the fire is dependent on many factors including fuel loads, the types of materials, the area involved, and other factors. The “flashover point” is a measure used to benchmark response times. “Flashover” is defined as the point at which all of the contents in the room become involved in the fire.

The chart below illustrates the traditional “flashover” curve for interior structure fires. Once “flashover” occurs, the space becomes untenable for firefighters and un-survivable for any occupants. With the rapid expansion of the fire, there is additional risk to other areas of the structure and potentially to any structures or wildland areas surrounding the original location of the fire.



Note that this graph depicts a fire from the moment of inception – not from the moment that a fire is detected or reported. This illustrates the importance of early detection and fast reporting as well as rapid dispatch of responding units. This also shows the critical need for a rapid (and sufficiently staffed) initial response to attack the fire so that “flashover” can be averted.

Not every fire will reach flashover and not every fire will take 8 minutes to reach flashover. In fact, research conducted in 2010 by the Underwriter Laboratories determined that increased use of synthetic materials in homes has created faster flashover times, resulting in flashover in less than 4 minutes in some of their tests. Modern home furnishings made of foam, plastics, or other petroleum-based products have increased the available fuel load for a fire. Additionally, construction techniques and new components have improved emergency efficiency, but have also added a new dimension to fire growth.

3 | Community Standards

Often the ability to perform to national standards is either insensitive to community needs and attributes or is cost prohibitive and fiscally irresponsible based on local service needs and community risks. That is why the Center for Public Safety Excellence, which is an international organization that accredits fire departments, allows the adoption of local community standards for response time performance.

At a minimum, Washington State's RCW 35.103.030 requires that every city and town maintain a written statement that establishes:

- The existence of a fire department
- Services the fire department is required to provide
- The basic organizational structure of the fire department
- The expected number of fire department employees
- The functions the employees are expected to perform

It also requires that cities have a written statement or policy concerning response time objectives such as turnout times, travel times and arrival of a full first alarm assignment.

The Mercer Island Fire Department has established community standards based on best practices, Standards of Cover and community characteristics. The response time standards are as follows for turnout time:

- 90 seconds for daytime EMS incidents 90 percent of the time
- 120 seconds for nighttime EMS incidents 90 percent of the time
- 120 seconds for daytime FIRE incidents 90 percent of the time
- 150 seconds for nighttime FIRE incidents 90 percent of the time

For the first arriving engine company at a fire suppression incident, the travel time is 8 minutes 90 percent of the time. For the first arriving unit with a first responder or higher level of medical capability at an emergency medical incident, the travel time is 8 minutes 90 percent of the time.

For a fire suppression incident, the initial alarm assignment is two engine companies, a command officer and seven personnel in 12 minutes or less, 90 percent of the time. The full first alarm assignment is four engine companies, two ladder companies, a medic unit, a medical services officer, an aid unit and two command officers. There is no travel time

standard for this part of the response.

Advanced life support (ALS) is provided through the King County Medic One system. The most typical response for ALS is from the Bellevue Fire Department located at 2802 148th Avenue SE. If this unit is unavailable, the next unit typically responds from Bellevue Station One, located at 766 Bellevue Way SE. Both of these units are 7 to 12 minutes to the east of Mercer Island.

5 Evaluation of the Emergency Services System

As noted in the previous chapter, there are three models used to measure performance of the emergency services system. This chapter compares and evaluates the deployment and performance of the fire department related to these models.

1 Response Time Data

As part of this study, Computer Aided Dispatch (CAD) data for 2015, 2016, 2017, 2018, and 2019 was examined and evaluated. The data is examined by a project team to ensure there are no issues such as coding problems, transcription errors, and equipment failures. The project team uses the following mechanism to identify and address any data issues to ensure the most accurate portrayal of system performance.

Only qualified data is used to calculate response time and any related components. To be considered the data must meet the following criteria:

- The incident must have been unique
- The incident must have involved at least one fire department unit being dispatched to the call.
- Calls that are missing data are not used in the computations for call processing, turnout time, travel time, or call duration.
- Any call with unusually long times or times sorted incorrectly (arrived before dispatch time) were removed.
- Non-emergency responses are removed; only emergency responses are included.

After filtering the data using the methodology outlined above, the remaining incidents represent the response time for calls for service handled by the fire department.

2 Call Processing

1. Performance Standards

Since the Mercer Island Fire Department is not directly responsible for the call processing and dispatching of emergency calls, no local performance standards have been adopted. National best practices will be used to identify the performance of the emergency communication center.

NFPA 1221 Standard for the Installation, Maintenance and Use of Emergency Services Communications Systems (2019 edition) establishes the call processing benchmark

performance objectives as outlined in the following chart.

NFPA 1221 Time Requirements

Component	Target	Performance
Calls Answered	Within 15 seconds	90%
	Within 20 seconds	95%
Call Processing	Within 60 seconds	90%
Call Processing for:		
* EMD		
* Language Translation		
* TTY/TDD Device Services	Exempt from the call processing time requirements.	
* Hazardous Materials		
* Technical Rescue		
* Text Message		
* Unable to Determine Location		

NFPA 1710 provides the following for call processing benchmark performance objectives, which are slightly different than NFPA 1221.

NFPA 1710 Alarm Handling Time Requirements

Component	Target	Performance
Calls Answered	Within 15 seconds	95%
	Within 40 seconds	99%
Call Processing	Within 64 seconds	90%
	Within 106 seconds	95%
Call Processing for:		
* EMD		
* Language Translation		
* TTY/TDD Device Services	Within 90 seconds (0% of the time and within 120 seconds 99% of the time.	
* Hazardous Materials		
* Technical Rescue		
* Text Message		
* Unable to Determine Location		

CPSE and ISO use the 60 second call processing time benchmark performance objective as outlined in NFPA 1221 for their requirements.

2. System Performance

Northeast King County Regional Communications Center (NORCOM) provides the dispatch services for the fire department and is the primary public safety answering point (PSAP). The following table illustrates NORCOM's baseline performance for the past three years as compared to the benchmark performance objective of 60 seconds.

Mercer Island Fire Department

All Emergency Calls – 90th Percentile Times		2015 - 2019	2015	2016	2017	2018	2019	Benchmark
Call Processing	Pick-up to Dispatch	0:50	0:46	0:50	0:52	0:52	0:52	1:00

The baseline time over the past three years is 50 seconds, which is 10 seconds under the benchmark performance objective. This illustrates that the dispatch center is performing in an efficient manner in terms of processing emergency calls for service.

3 | Turnout Time

1. Performance Standards

The following table illustrates the Mercer Island Fire Department Performance Standards for turnout time.

Turnout Time – Mercer Island Performance Objectives

Call Type	Time of Day	Objective
Emergency Medical Calls	Daytime (7 am to 8 pm)	90 seconds or less 90% of the time
	Nighttime (8 pm to 7 am)	120 seconds or less 90% of the time
Fire or Special Operations Calls	Daytime (7 am to 8 pm)	120 seconds or less 90% of the time
	Nighttime (8 pm to 7 am)	150 seconds or less 90% of the time

2. System Performance

The following table illustrates the performance of the fire department relative to the performance objectives discussed above.

Mercer Island Fire Department

All Emergency Calls – 90th Percentile Times		2015 - 2019	2015	2016	2017	2018	2019	Performance Objective
Turnout Time	1st Unit	Daytime Medical Calls	1:27	1:35	1:29	1:27	1:25	1:30
		Nighttime Medical Calls	2:11	2:19	2:10	2:06	2:07	2:00
		Daytime Fire Calls	2:01	2:07	1:55	1:59	2:03	2:00
		Nighttime Fire Calls	2:26	2:24	2:28	2:26	2:22	2:30

Turnout time for the past five years varies from being just under the performance objective to being just over the performance objective. The nighttime medical calls are 11 seconds over the performance objective, representing the largest deviance from the performance objective.

The table that follows illustrates the performance for each of the two stations measured against the same performance objectives.

Mercer Island Fire Department

All Emergency Calls – 90th Percentile Times		2015 - 2019	2015	2016	2017	2018	2019	Performance Objective
Turnout Time	Station 191	Daytime Medical Calls	1:25	1:29	1:24	1:29	1:23	1:30
		Nighttime Medical Calls	2:09	2:13	2:08	2:06	2:07	2:00
		Daytime Fire Calls	2:03	1:53	1:58	2:07	2:07	2:00
		Nighttime Fire Calls	2:30	2:22	2:33	2:34	2:26	2:30
	Station 192	Daytime Medical Calls	1:32	1:44	1:38	1:26	1:33	1:30
		Nighttime Medical Calls	2:15	2:33	2:14	2:08	2:14	2:00
		Daytime Fire Calls	2:10	2:14	2:14	2:08	2:07	2:00
		Nighttime Fire Calls	2:35	2:35	2:38	2:33	2:38	2:30

As illustrated, each of the stations has similar performance levels related to turnout time performance at the 90th percentile, and are either just above or below established standards.

4 | Distribution of Resources

Distribution of resources measures the time it takes to get initial resources to an emergency to begin mitigation efforts. It has also been described as the speed at which the first resources arrive at the emergency.

The models measure this in a variety of ways including percentage of square miles, percentage of road miles, and travel time. The Insurance Services Office (ISO) has used

road miles for many years advocating for a standard of one and a half miles of travel for an engine company and two and a half miles of travel for a ladder company. With the advent of GIS technology and improved computer aided dispatch (CAD) systems, the use of actual travel time is a more accurate measure for the distribution of resources.

The Mercer Island Fire Department has adopted an organizational statement that outlines the response to emergency calls for service in the city. Within this statement are performance objectives for the various components of the response time continuum. The following are the performance objectives for distribution (first arriving) travel time.

- 8 minutes for the arrival of the first emergency medical unit to an emergency medical incident.
- 8 minutes for the arrival of the first engine company to a fire suppression incident.

The following table illustrates the performance of the fire department relative to the performance objectives described above.

Mercer Island Fire Department

All Emergency Calls – 90th Percentile Times			2015 - 2019	2015	2016	2017	2018	2019	Performance Objectives
Travel Time	1st Unit Distribution	Medical Calls	5:47	5:36	5:47	5:45	5:54	5:49	8:00
		Fire Calls	6:34	5:57	6:18	6:47	7:04	6:31	8:00

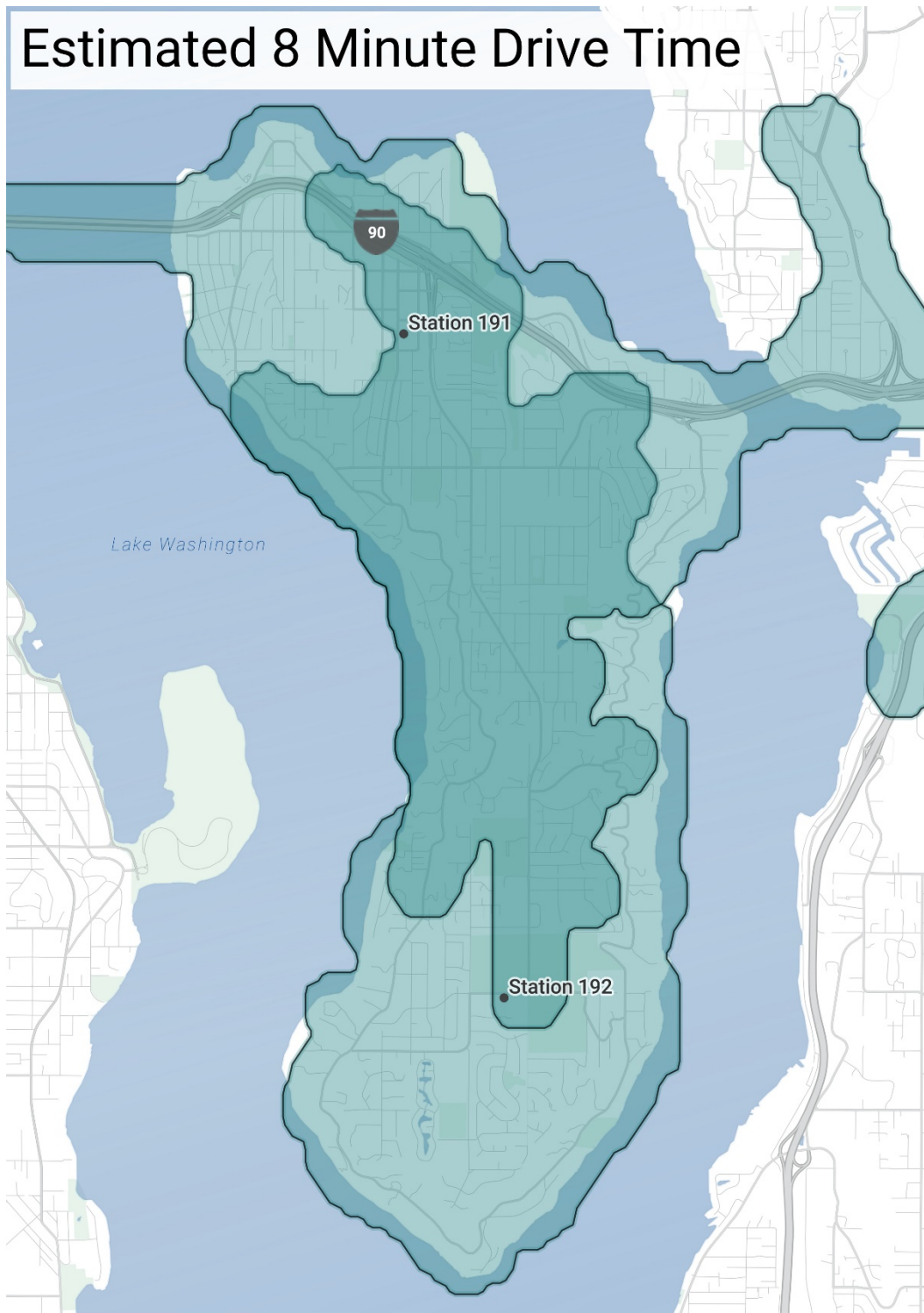
For the past five years, fire department travel times have been shorter than the performance objective for both emergency medical incidents and fire related incidents.

The table that follows illustrates the performance for each of the two stations measured against the same performance objectives.

Mercer Island Fire Department

All Emergency Calls – 90th Percentile Times			2015 - 2019	2015	2016	2017	2018	2019	Benchmark
Travel Time	Station 191	Medical Calls	5:17	5:18	5:15	5:09	5:22	5:17	8:00
		Fire Calls	6:11	4:29	5:52	6:41	6:35	6:42	8:00
	Station 192	Medical Calls	6:47	6:45	6:47	6:50	6:40	6:58	8:00
		Fire Calls	7:17	6:47	6:40	7:33	7:48	7:29	8:00

For a visual perspective, the following map illustrates an 8-minute travel time from both stations in the city.



While there are no gaps in achieving an 8-minute travel time, as illustrated in the previous map, there is a significant area in the center section of the island that has an overlap, as illustrated by the darker shade of green, in the travel time between the two stations.

5 | Concentration of Resources

Concentration is generally described as the ability of the fire protection system to get the appropriate number of personnel and resources to the scene of an emergency within a prescribed time to effectively mitigate the incident. There are two parts to this component: an effective response force (ERF) and the amount of time to get the ERF resources in place.

1. Performance Standards

There are two travel time components included in the concentration segment. The first is the travel time for the second arriving apparatus, and the second is the balance of the first alarm assignment. The table below includes the travel time performance measures for the second arriving unit for the three different models.

Second Arriving Unit - Benchmark Performance Objectives

Demand Zone	Demographics	NFPA 1710	ISO	CPSE
Urban	Greater than 1,000 per sq. mile	6 minutes or less 90% of the time	No time or mileage requirement	8 minutes or less 90% of the time
Suburban	500 - 1,000 per sq. mile	6 minutes or less 90% of the time	No time or mileage requirement	8 minutes or less 90% of the time
Rural Area	Less than 500 per sq. mile	6 minutes or less 90% of the time	No time or mileage requirement	14 minutes or less 90% of the time
Remote Area	Travel Distance greater than / equal to 8 miles	6 minutes or less 90% of the time	No time or mileage requirement	No Requirement

NFPA 1710 and CPSE have requirements for the second arriving apparatus, the other organizations are silent. Additionally, NFPA 1710 uses 6 minutes and the CPSE model uses 8 minutes for this performance objective.

The table below includes the travel time standards for the first alarm assignment for the three different models.

First Alarm Assignment - Benchmark Performance Objectives

Demand Zone	Demographics	NFPA 1710	ISO	CPSE
Urban	Greater than 1,000 per sq. mile	8 minutes or less 90% of the time	No time or mileage requirement	8 minutes or less 90% of the time
Suburban	500 - 1,000 per sq. mile	8 minutes or less 90% of the time	No time or mileage requirement	10 minutes or less 90% of the time
Rural Area	Less than 500 per sq. mile	8 minutes or less 90% of the time	No time or mileage requirement	14 minutes or less 90% of the time
Remote Area	Travel Distance greater than / equal to 8 miles	8 minutes or less 90% of the time	No time or mileage requirement	No Requirement

The second component of the concentration performance measure concerns the number of personnel arriving with the first alarm assignment. The following table provides the performance measures for the number of personnel for a first alarm assignment for a single-family dwelling according to the three models.

First Alarm Assignment - Recommended Personnel

Demand Zone	Demographics	NFPA 1710	ISO	CPSE
Urban	Greater than 1,000 per sq. mile	16 personnel	No specific requirement	16 personnel
Suburban	500 - 1,000 per sq. mile	16 personnel	No specific requirement	16 personnel
Rural	Less than 500 per sq. mile	16 personnel	No specific requirement	16 personnel
Remote	Travel Distance greater than / equal to 8 miles	16 personnel	No specific requirement	16 personnel

ISO does not provide a benchmark based on number of personnel anticipated to arrive, and instead provides a score based on the number of on-duty personnel. The more personnel on duty, the higher the score. NFPA 1710 and CPSE base their personnel requirements on creating an effective response force using critical tasking.

2. Effective Response Force

There are several tasks that must occur simultaneously to adequately combat different types of fires. The absence of adequate personnel to perform these tasks requires each task to be prioritized and completed in chronological order. These fire ground tasks include command, scene safety, search and rescue, water supply, fire attack, pump operations, ventilation, back up, and rapid intervention.

An initial full alarm assignment should be able to provide personnel to accomplish the following tasks:

- Establish incident command outside of the hazard area. This will allow coordination and direction of the incoming emergency response personnel and apparatus. A minimum of one person should be dedicated to this task.
- Establish an uninterrupted water supply of at least 400 gallons per minute for 30 minutes. Once established the supply line can be maintained by the pump operator to ensure uninterrupted water supply. A minimum of one person is assigned to this task who can then assume a support role.
- Establish an effective water flow rate of 300 gallons per minute. This will be supplied to a minimum of two hand lines each operating at a minimum flow of 100 gallons per minute. Each hand line must have two individuals assigned with one serving as the attack line and the other as a back-up line.
- Provision of one support person to handle the hydrant hookup, utility control, forcible entry and assist in deploying fire hose lines.
- Establish a search and rescue team. Each team will consist of a minimum of two.
- Establish a ventilation team. Each team will consist of a minimum of two personnel.
- Establish an initial rapid intervention team (RIT). Each RIT team shall consist of a minimum of two properly trained and equipped personnel.

Critical tasking will vary depending on the size and nature of the incident. CPSE provides a suggestive list of tasks that need to be completed at a fire situation based on the risk. A similar list is provided within the NFPA 1710 document. The CPSE analysis, from the 8th edition, is summarized in the table below showing the minimum required personnel to mitigate the initial emergency response requirements by occupancy risk:

Critical Tasks for the Effective and Efficient Control of Structural Fires

Critical Task	Maximum Risk	High Risk	Moderate Risk	Low Risk
Attack Line	4	4	4	2
Search and Rescue	4	2	2	0
Ventilation	4	2	2	0
Backup Line	2	2	2	2
Rapid Intervention	2	2	2	0
Pump Operator	1	1	1	1
Water Supply	1*	1*	1*	1*
Support (Utilities)	1*	1*	1*	1*
Command	1	1	1	1
Safety Officer	1	1	1	1
Salvage/Overhaul	2	0	0**	0
Command Aid	1	1	0	0
Operations Chief	1	1	0	0
Logistics	1	0	0	0
Planning	1	0	0	0
Staging Officer	1	1	0	0
Rehabilitation	1	1	0	0
Division Supervisors	2	1	0	0
High-rise Evacuation	10	0	0	0
Stairwell Support	10	0	0	0
Total Personnel	50-51	21-22	16 – 17	8-9

*Tasks can be performed by the same individual

**Task can be performed by the attack crew

It is interesting to note that the four-person companies discussed in some areas of NFPA 1710 are not maintained in the description of primary tasks to be accomplished on the fire ground. This indicates a recognition that the requirements of the response in the field are dynamic and do not fit neatly into size and shape of any particular response configuration. These objectives apply to the initial and follow-up response for reported structure fires. The document does not suggest that this response be mounted for all incidents.

A task analysis for emergency medical calls analyzes three different types of calls or patient conditions. These three types of calls usually require the most effort on the part of the response team. Other calls or patient types can generally be handled with two or three personnel. Many times, especially in trauma calls, there are multiple patients. The table below outlines the tasks for handling these critical patients and the number of responders it may require for a successful outcome. It is important to note that some tasks are accomplished by the same personnel.

Critical Tasks for Effective Patient Care

Critical Task	Cardiac Arrest	Stroke	Multi-System Trauma
Patient Assessment	2 per patient	2 per patient	2 per patient
Airway Management/Intubation	2 per patient	2 per patient	2 per patient
Cardiac Defibrillation	1	N/A	N/A
CPR	1	N/A	N/A
EKG Monitoring	1	1	1
IV/Pharmacology	1	1	1
Splint/Bandage/Immobilization	N/A	N/A	1
Patient Lifting/Packaging	2 – 4	2 – 4	2 – 4
Medical Information Collection	1	1	1
Total per Patient	6 - 8	5 - 7	6 - 8

It is incumbent upon the fire department to have a response plan in place to ensure enough personnel are on scene to accomplish the stated critical tasks in a timely fashion. Structure fires are very labor-intensive incidents with any number of factors, such as weather, making the task that much more difficult.

Adding to the critical tasks and staffing issues is the OSHA requirement of two in – two out in 1910.134(g)(4). This regulation states that if entry into an Immediately Dangerous to Life and Health (IDLH) atmosphere is necessary, two firefighters must enter together and remain in contact with each other. In addition, there must be two firefighters located outside the IDLH atmosphere for potential rescue, if needed. This is a mandatory requirement.

The concept of an effective response force carries through for other responses by the fire department. The tables below outline the critical tasks for an effective response force for different types of events.

Critical Tasks for Hazardous Materials

Critical Task	High Risk	Low Risk
Command/Safety	2	1
Liaison	1	1
Decontamination	4	4
Research Support	2	1
Team Leader, Entry Team, Backup Team	6	6
Total Personnel	15	13

Critical Tasks for Initial Wildland Urban Interface Fires

Critical Task	No Hydrants	With Hydrants
Command/Safety	1	1
Pump Operations	1	1
Attack Line	2	2
Structure Protection	3	2
Water Supply	1	0
Tender Operator	2	0
Exposure Lines	2	0
Total Personnel	12	6

Critical Tasks for Technical Rescue Incidents

Critical Task	Swift Water	High/Low Angle	Confined Space	Trench
Command/Safety	1	1	2	2
Rescue Team	3	2	2	2
Backup Team	2	2	2	2
Patient Care	2	2	2	3
Rope Tender	2	0	0	0
Upstream Spotter	2	0	0	0
Downstream Safety	2	0	0	0
Rigger	0	1	1	0
Attendant	0	1	1	0
Ground Support	0	4	4	0
Edge Person	0	1	0	0
Shoring	0	0	0	5
Total Personnel	14	14	14	14

3. System Performance

Computer Aided Dispatch (CAD) data was used for the evaluation of resource concentration. To be considered for inclusion in the analysis, the following conditions were required to be met:

- Incidents in the CAD data were denoted as a structure fire and had a minimum of 16 suppression personnel arriving on the scene.
- All the units dispatched had an arrival time recorded. It was assumed if the unit did not arrive on scene that it was cancelled while enroute.

To be considered as meeting the concentration performance measure, the apparatus had to have an arrival time recorded and the minimum number of personnel had to arrive on the scene. For purposes of this evaluation, all fire apparatus was assigned three

personnel except the Ladder Company from Bellevue, which was assigned 5 personnel. Aid units from Mercer Island were assigned three personnel and any command officer responses were assigned one personnel.

NFPA 1710 and CPSE have benchmark travel time performance objectives established for the second arriving unit. NFPA 1710 uses 6 minutes and CPSE uses 8 minutes for the urban setting.

The table below provides the second unit response times.

Mercer Island Fire Department

Second Apparatus	Travel Time Objective	2015 - 2019	2015	Percent Met			
				2016	2017	2018	2019
NFPA 1710	6:00	66.7%	100.0%	57.1%	50.0%	100.0%	66.7%
CPSE	8:00	81.0%	100.0%	85.7%	66.7%	100.0%	66.7%

*Statistically the ERF Concentration response times use a small data set and therefore should be viewed with a certain amount of skepticism.

The second unit travel time standard was met 66.7% of the time in 6 minutes or less, meaning there were at least two fire apparatus at the scene in this time. In the same urban setting, there were two fire apparatus on the scene 81% of the time in 8 minutes or less.

The following table provides the travel time data for the full first alarm assignment to meet the 16 personnel on scene standard.

Mercer Island Fire Department

Structure Fires – 90th Percentile Times		2017 - 2019	2015	2016	2017	2018	2019	Benchmark
Travel Time	1st Unit Distribution	5:29	2:57	6:51	4:43	3:31	4:59	4:00
	ERF Concentration	15:17	8:09	15:07	16:56	10:35	14:57	8:00
	Number of Calls	21	3	7	6	2	3	

*Statistically the ERF Concentration response times use a small data set and therefore should be viewed with a certain amount of skepticism.

In the case of building fires for the past five years, the first arriving unit was at the scene in 5 minutes 29 seconds for 90% of the calls examined. This is 1 minute and 29 seconds over the benchmark travel time of 4 minutes.

The arrival of effective response force was 15 minutes and 17 seconds, which is over the benchmark travel time of 8 minutes. The fact that automatic aid partners are required to meet the ERF of 16 personnel is reflected in the travel time for the first alarm assignment.

4. Mercer Island Fire Department Community Standards

Due to the unique features of Mercer Island, the concentration (full alarm response) of resources for a structure fire response is also unique. The fire department has tiered performance objectives. The first tier is 12 minutes for the arrival of the full complement of an initial fire suppression incident to include two (2) engine companies, one command officer, and seven (7) personnel for 90% of the time.

The second tier or full alarm response to a structure fire is four (4) engine companies, two (2) ladder companies, one (1) medic unit, one (1) medical services officer, one (1) aid unit, and two (2) command officers. There is no travel time component, as the additional resources must respond from an area outside the island. Access to the island by these resources is limited to the I-90 corridor from either side of the island.

The following table illustrates the performance of the fire department relative to the performance objectives stated above.

Mercer Island Fire Department

	Travel Time Objective	2015 - 2019	2015	2016	2017	2018	2019
Initial Alarm	12:00	10:50 n = 43	11:13 n = 8	8:58 n = 11	10:59 n = 10	10:04 n = 4	12:41 n = 10

*Statistically the ERF Concentration response times use a small data set and therefore should be viewed with a certain amount of skepticism.

The fire department met the performance standards in all years except 2019.

6 | System Reliability

The concept of distribution and concentration of resources can be influenced by other contributing factors, including unit hour utilization and concurrent calls for service.

1. Unit Hour Utilization

There are different ways to calculate unit hour utilization. The private sector uses the number of transports, an indication of profit, as their utilization rate. For purposes of this report, unit hour utilization is calculated by taking the total hours the unit is committed to an incident divided by the total available hours. This measurement is focused more on the delivery of service and availability for the call volume. Expressed as a percentage, this measure identifies the amount of time the unit is committed, but more importantly the amount of time the unit is available. The amount of available time can affect attaining 80th and 90th percentile performance standards. If utilization rates are too high, the units are often unavailable for immediate response. The following table illustrates the unit hour utilization for the past two years.

Unit Hour Utilization

Unit	2017			2018			2019		
	Duration	Pct. of Time	Avg.	Duration	Pct. of Time	Avg.	Duration	Pct. of Time	Avg.
Aid 191	1318:59:18	15.1%	1:12:48	1413:58:02	16.1%	1:19:22	1444:37:28	16.5%	1:15:07
Aid 192	631:50:34	7.2%	1:10:52	607:30:28	6.9%	1:15:00	597:50:16	6.8%	1:13:12
Engine 191	530:27:48	6.1%	46:08	432:07:00	4.9%	42:34	462:45:54	5.3%	45:40
Engine 192	491:51:02	5.6%	43:51	421:39:20	4.8%	40:09	407:30:58	4.7%	42:09
Station 191	1849:27:06	21.1%	1:04:44	1846:05:02	21.1%	1:07:32	1907:23:22	21.8%	1:06:37
Station 192	1123:41:36	12.8%	59:27	1029:09:48	11.7%	58:12	1005:21:14	11.5%	58:51

As expected, Station 191 is slightly more utilized than Station 192, as most of the calls for service are in the northern section of the island. The utilization rates for Aid 191 are the highest in the department, but still do not exceed generally acceptable industry standards of 25% to 30% utilization.

2. Concurrent Calls

It is common for a fire protection system to have multiple requests for service occurring simultaneously. The larger the system, the more frequently this will occur. With the appropriate resources this can be handled efficiently. The table that follows illustrates the concurrent calls for the fire protection system for the past five years.

Concurrent Calls for Service

Calls	2015	2016	2017	2018	2019	Total	%
1	1,706	1,663	1,627	1,656	1,724	8,376	69.3%
2	557	619	643	544	570	2,933	24.3%
3	130	132	154	113	90	619	5.1%
4	27	24	44	16	16	127	1.1%
5	3	4	4	4	1	16	0.1%
6+	0	1	6	0	2	9	0.1%
Total	2,423	2,443	2,478	2,333	2,403	12,080	100%

The emergency services system averages 2,416 calls for service during the year; that translates to an average of 6.6 calls per day. As illustrated above, approximately 94% of calls occur as either a single call at a time or two calls simultaneously.

It should be noted that what is not shown or illustrated are the calls that occur back-to-back. For example, Engine 191 could respond to a call in their district and clear that call, only to receive a second call in another section of their district. This would not show up as a concurrent call, but it could extend the travel time for the second call. As well, a single call for service may require a significant amount of resources that could impact the delivery of services.

6 Strategic Recommendations

The delivery of effective and efficient emergency services to the city is a primary focus of this study. This chapter provides recommendations to improve performance and/or reduce costs.

1 | Community Standards

The fire department has established standards for responses to calls for service in the community. These standards provide performance objectives that adhere to best practices and are currently meeting community needs.

There is a potential for additional calls and service needs in the future. The East Link of the light rail system is scheduled to begin operations in 2023 with a station in Mercer Island that has a projected daily ridership between 43,000 – 52,000 by 2026. The impact to Mercer Island will likely be more visitors and potentially more calls for service. Typically, fire services in cities with light rail do not experience a significant change in call volume or type, but Mercer Island may see more requests for services due to medical emergencies as riders are waiting to board, are disembarking, or are in transit.

Continuing to monitor all the department's metrics will help the City identify trends and allow the Fire Department to adapt resources and responses, as needed.

The following table illustrates a decision-making matrix from the Center for Public Safety Excellence, which can be used to assess if a jurisdiction needs to further evaluate changes to resources or service delivery, and how to possibly respond to those needs for change.

THRESHOLD	POSSIBLE SOLUTIONS
<ul style="list-style-type: none"> First due unit availability less than 82% of the time Appropriate response reliability under 82% Response time performance gap rate of 1 - 2% 	<ul style="list-style-type: none"> Change cover status/dynamic deployment Decrease first-due area Redeploy adjacent resources Reconfigure station resources Eliminate planned out of service time
<ul style="list-style-type: none"> First unit availability under 80% Appropriate response reliability under 80% Response time performance gap rate of 3 – 5% 	<ul style="list-style-type: none"> Increase capacity of adjacent units Increase/decrease mutual aid Implement peak staffed units Redeploy resources to problem areas Relocate existing fire stations
<ul style="list-style-type: none"> First unit availability under 78% Appropriate response reliability under 78% Response time performance gap rate over 5% 	<ul style="list-style-type: none"> Add new resources to station Add new resources to adjacent stations Add new station(s)

Recommendation: Continue to monitor the response metrics against the established community response standards to identify trends that indicate the need for additional resources or changes to the operations of the fire department.

2 | Operations

The primary mission of the fire department is to respond to and mitigate emergency calls for service. These services are delivered from two fire stations along with automatic aid partners in Bellevue, Kirkland, Eastside Fire and Rescue, Redmond, and Seattle. As noted in the previous section, the City has established a community standard for the response to emergency calls for service and the fire department is meeting those established standards.

1. Staffing

For career firefighters there is scheduled and unscheduled overtime. Scheduled overtime is derived from the 24-hour schedules that are typically worked. A firefighter that works a typical “24 hours on-duty and 48 hours off-duty” schedule will work an average of 56 hours a week, which equates to 2,912 hours worked over a year.

Fair Labor Standards Act (FLSA) regulations allow a firefighter to work 53 hours each week before overtime is earned, which results in 159 hours of scheduled overtime each year. Other schedules such as a “24 on-duty and 96 off-duty” will reduce the scheduled overtime, but will require additional personnel to staff the shifts.

Fire departments have a set minimum staffing for each shift to provide a certain level of service. When the shift falls below that minimum, other personnel must be utilized to fill the vacancy, which creates an unscheduled overtime situation.

The City of Mercer Island has negotiated and established a 24-day work cycle and a 48-hour work week. With the “48 hours on-duty and 96 hours off-duty” schedule, providing a day off in that work cycle (Kelly Day) keeps the total work hours below the FLSA overtime threshold. There are approximately fifteen 24-hour day work cycles during the year; however, there may be one or two more depending on how the 24-day cycle falls within the calendar from one year to the next. This means each employee receives at least 15 Kelly Days per year.

The staffing model used by the Fire Department assigns nine (9) personnel to each of the three shifts. This allows for two personnel to be off-duty and still maintain the seven (7) personnel minimum staffing. Off-duty time includes paid time off for vacation, sick leave, bereavement leave, and Kelly Days. The typical shift schedule allows for one person off for vacation and another off for the Kelly Day. On Mondays, there is a second person off on a Kelly Day and, depending on the week, a second person off on a Kelly Day on either Wednesday, Thursday or Friday of that week. To not go below minimum staffing levels on these days, a fourth shift is staffed with one person filling in for the Kelly Days who works M/W, M/Th and M/F on a rotating basis. Overtime is then used for any other vacancies that occur as a result of training or leaves for jury duty, military service or bereavement to maintain the minimum staffing of seven (7) personnel.

2. Overtime

In nearly every industry, the primary causes of overtime have common characteristics irrespective of the kind of industry in which overtime occurs. As overtime is discussed here, it is helpful to keep these key causes in mind as they have short- and long-term effects. These key causes are noted in the sub-sections below.

(1) To Provide Baseline Staff to Meet Work Demands.

In every industry a certain minimum staffing level is formally or informally identified to meet work demands. These work demands can vary widely, from developing a product within recurring deadlines, to meeting specific customer service goals, to ensuring safe

practices. If the industry/agency does not have sufficient initial staff resources to meet these baseline (minimum) staffing requirements, overtime will be required unless the agency chooses to allow work demand outputs and outcomes to decline/suffer. In general, overtime dedicated consistently to this category will result in long-term negative consequences, such as a decrease in productivity, reduced quality of work, increased safety risks increased stress and increased turnover rates.

(2) To Address Variations and Fluctuations in Baseline Staff.

An agency that has hired employees to a baseline minimum standard (or above) will require overtime for planned and unplanned absenteeism that can be the result of numerous factors such as scheduled and unscheduled leave (e.g., vacation and sick time), turnover, military leave, injury, etc. Unless overtime is used to meet the minimum staffing levels as a consequence of these variations, work demand outputs and outcomes will also decline/suffer.

(3) To Address Actual or Potential Fluctuating Workload.

In many industries, workload can fluctuate in both a planned and unplanned fashion. Unexpected events (for example, natural disasters) can lead to significant overtime in numerous agencies. Conversely, infrequently occurring events such as once-per-year special events or seasonal spikes in work are opportunities to use overtime effectively. Stand-by pay is provided in a variety of industries to provide coverage for potential fluctuating workloads. Overtime use for meeting the demands of fluctuating workload that is not “long-term” is considered a best practice.

Fluctuating workload overtime is also used to provide coverage for tasks that are persistent but of generally “short duration.” These fluctuating workloads usually include weekly, bi-weekly or monthly activities that must be performed, but these tasks have special characteristics that do not allow them to be accomplished during regular work time. Examples include financial reconciliations, inventory counts, etc.

(4) To Complete Work That Has a Deadline.

One could argue that the other key causes noted above are the root cause, but deadline-driven work is of sufficient magnitude to be noted separately. Here, overtime is used to complete projects or tasks that have a definitive and unalterable deadline. These include a huge variety of possibilities from building an asset to developing a product.

With little exception, overtime can be broadly categorized into one of these key five causes that each address various work demand issues. Moreover, “excessive” overtime use in these categories can reflect broader symptoms of organizational difficulties that

should be addressed. Overtime is an industry management tool and can be a benefit to workers if effectively used. However, overtime has the potential to be overused or inappropriately used at all organizational levels, resulting in unintended consequences and additional costs and / or risks.

3. The Key Positive and Negative Characteristics of Overtime

The use of overtime has significant potential benefits as well as disadvantages, and balancing these requires close management, best practice protocols and thoughtful consideration of a variety of other factors related to staff and operations. There are key positive and negative characteristics of overtime, as discussed in the following sub-sections. These are the flexibility overtime brings to staffing, employees' desire to use overtime to increase income, and potential negative impacts on health and productivity.

(1) The Primary Benefit to an Organization for Overtime Use is the Ability to Flexibly Use Staff Resources Without the Cost of Hiring Additional Personnel.

As is well known, the primary benefit an organization derives from using overtime is the cost avoidance of hiring additional personnel. Indeed, proper management of overtime can avoid many undesirable outcomes such as missed deadlines, poorer customer service, cost overruns, staff lay-offs, and a variety of other consequences detrimental to both the organization and employee. Furthermore, overtime to a certain degree is perceived by most to be a desirable benefit, thereby allowing an organization to attract and retain personnel if a moderate amount of overtime is a regular part of the operational culture.

While overtime is fiscally advantageous to an organization based on the avoidance of paying for additional fixed costs such as insurance, sick leave earning, vacation earning, etc., it is only beneficial to a point. There is a "break-even" point where the variable costs (time and-one-half payment, retirement costs, employment taxes, etc.) do not compensate for fixed cost savings. While every agency's break-even point would be

different dependent upon their unique compensation structures, a general rule of thumb is:

As a guideline, 54 work hours per employee per week represents the fiscal benchmark break-even point for paying (14-hours weekly) overtime.¹

The above benchmark is a guideline only and based on a 40-hour employee, not the 48-hour average work week the personnel in Mercer Island Fire Operations work. Using the same percentage basis, the break-even point on the 48-hour schedule would be 17 hours of overtime weekly and a total work week of 65 hours. It is important to note that almost all fire personnel were below that mark in 2019 (a high overtime year); only two individuals barely exceeded an average of a work week greater than 65 hours.

Every unique position in any different agency will have its own “fiscal benchmark outcome” based on the salary, benefit, retirement, and taxing structure that influences overtime costs. The noted benchmark provides guidance that once overtime approaches this benchmark “ceiling,” from a fiscal standpoint exclusively, a new position should be hired in the vast majority of instances. As discussed subsequently, the fiscal reasons to hire personnel instead of using overtime should be considered of secondary importance.

(2) Many Organizational Employees Look Positively on the Opportunity to Earn a Moderate Amount of Overtime.

Research data suggest that many employees appreciate the opportunity to earn a moderate amount of overtime over the course of a year. According to *Shiftwork Solutions LLC*, “Employers that offer modest amounts of overtime will not only satisfy a majority of their employees, but also will improve their competitive position in the local market.” A majority of employees who responded to Shiftwork’s surveys stated they would like some level of weekly overtime (averaging 7.3 hours per week), but with more than 4-in-10 desiring less than 6 hours per week²:

When the desired level of weekly overtime by employee is compared against the fiscal benchmark break-even point for overtime, a clear difference emerges. On average employees would desire approximately one-half the fiscal benchmark with only one-in-six employees having a willingness to work that much overtime on a weekly basis. This

¹ *Municipal Solid Waste Professionals* article:
http://www.mswmanagement.com/MSW/Articles/Overtime_The_Effect_on_Cost_4174.aspx

² Why Overtime? *Shift Schedule Design*: www.shift-schedule-design.com

differential helps frame the potential negative characteristics of overtime, as discussed further below.

(3) Research Suggests There Are Negative Mental, Physical and Productivity Impacts Associated with Working Longer-term Overtime.

A wealth of research data suggests there are various negative consequences for working extended hours over the longer-term. These include:

- According to a 2005 article by *Occupational and Environmental Medicine*, working in jobs with overtime schedules was associated with a 61% higher injury hazard rate compared to jobs without overtime. Working at least 12 hours per day was associated with a 37% increased hazard rate and working at least 60 hours per week was associated with a 23% increased hazard rate.³
- A large amount of research has been accomplished in the nursing field, which was one of the earliest adopters of extended shifts that also required subsequent overtime. According to studies, “Working overtime, whether at the end of a regularly scheduled shift (even an 8-hour shift) or working more than 40 hours in a week, was associated with a statistically significant increase in the risk of making an error.”⁴
- The following abstract, regarding extended work shifts is from the *Texas Law Enforcement Management and Administrative Statistics Program*.
Work fatigue has become so great a concern that the federal government now controls the amount of work hours for locomotive engineers, truckers, commercial pilots, and nuclear power plant operators, for example. Police officers, however, are not on this list (Vila, 2000). With lawsuits increasingly prevalent, it is important that police administrators provide pertinent information to their officers about coping with fatigue. With evidence that sleep deprivation has the same capability to impair an individual as alcohol, it is vital that departments acknowledge and implement policies that do not overload its officers.

In sum, the evidence for long hours worked in short daily periods or over an extended period is overwhelming with respect to the negative possible outcomes with such work

³ <http://oem.bmj.com/content/62/9/588.full>

⁴ US Department of Health and Human Services, “Patient Safety and Quality: An Evidence-Based Handbook for Nurses” Chapter 40, page 3-4.

behaviors. In effect, management of overtime is a serious risk management endeavor, and as such, should be approached with the greatest due diligence.

While these studies do not specifically describe issues associated with excessive overtime by fire personnel, the evidence is clear with respect to the long-term effects of working extensive weekly hours as a consequence of overtime or other requirements mandating long hours over a period of time. Therefore, Mercer Island Fire Department should employ some risk management to the use of overtime to ensure there is a balance of the required need for overtime with adequate periods of rest for personnel.

Recommendation:

The Mercer Island Fire Department should review the current overtime policy for appropriate risk management practices to ensure personnel are able to effectively serve the community.

4. Staffing Options

The following table illustrates the overtime budget and actual expenditures for the past five years.

Fire Operations Overtime 2015 - 2019

Year	Budgeted OT	Actual OT	Reimbursement	Difference
2015	\$450,120	\$456,932	\$62,700	(\$55,888)
2016	\$461,335	\$317,747	\$13,578	(\$157,166)
2017	\$461,335	\$535,715	\$18,150	\$56,230
2018	\$461,335	\$492,041	\$23,128	\$7,578
2019	\$505,555	\$663,979	\$13,943	\$144,481
Total	\$2,339,680	\$2,466,413	\$131,499	(\$4,766)

With the exception of 2015 and 2016, overtime has been over budget each year over the past five years and has averaged an expenditure of \$493,000 per year.

The use of sick leave and vacation has been increasing in the past five years, as noted in the table below. These figures include both sick and vacation leave that were used for Family Medical Leave Act (FMLA) purposes.

Fire Operations Sick and Vacation Leave Usage

	2015	2016	2017	2018	2019
Sick Leave	2,051.75	3,745.25	4,665.25	5,343.00	4,731.65
Average Sick Leave (27 personnel)	75.99	138.71	172.79	197.89	175.25
Vacation Leave	5,931.50	5,807.25	7,484.00	7,437.53	8,617.20
Average Vacation Leave (27 personnel)	219.69	215.08	277.19	275.46	319.16

In 2015, the average sick leave usage was 75.9 hours per employee. In 2018, the average sick leave usage was 197.9 hours per employee; this represents an increase of 160%. As the workforce ages in terms of seniority, the vacation hours will also increase. Higher vacation hour accrual as employees gain seniority is a common practice in most industries as it is one tool for retaining long-term and experienced employees. In 2015, the average vacation leave was 219.6 hours per employee and in 2019 the average vacation leave was 319.2 hours per employee. This is an increase of approximately 45% over the past five years. Like many other employers, the Mercer Island Fire Department is not only seeing increased vacation hour accrual and higher potential use of vacation among more senior employees, but a new trend of younger employees using all of their vacation allocation in a year rather than letting it accumulate.

The following table illustrates the vacation and sick leave benefits for a Firefighter with 15 years' experience. The table illustrates the benefit levels for the Mercer Island Fire Department and three potential contract agencies. Please note that these are not the typical comparative agencies used by the City for wage and benefit comparison in collective bargaining.

	Mercer Island	Bellevue	Eastside
Annual Scheduled Hours	2,496	2,505.4	2,552
Annual Sick Leave	240	192	144
Annual Vacation	222	240	372
Annual Holiday Hours	120	48	0
Total Leave	582	480	516

As illustrated above, Mercer Island firefighters are eligible for a total of 582 hours of leave annually which is higher than both Bellevue and Eastside Fire and Rescue. Each of the three (3) departments cap sick leave accrual at 1,440 hours. Bellevue offers a cash-out option each year for unused sick leave.

The following table illustrates the use of vacation and sick leave related to the Family Medical Leave Act (FMLA) over the past three-years.

Year	FMLA – Sick Leave	FMLA – Vacation Leave	Total
2017	1,320	696	2,016
2018	312	0	312
2019	1,104	648	1,752
Total	2,736	1,344	4,074

As illustrated above, FMLA varies considerably each year and is difficult to predict. While some catalysts for this leave can be predicted when situations are known, such as the pending birth of a child, others are not, such as a sudden illness that requires the staff member to care for a family member. (When the employee utilizes FMLA to care for another family member, the leave is marked as “FMLA Vacation Leave.”) In the past three years, the number of employees who have been off work on FMLA leave has ranged from 1 to 5. The following table illustrates the “unfunded leave” (i.e., leave that is not accrued and anticipated to be expended by each employee) taken by fire department employees in 2019.

Unfunded Leave - 2019				
Leave Type	Shifts	Avg. OT Rate	Estimated Cost	Total Hours
FMLA	73	64.91	113,722	1,752
Duty Related Disability	80	64.91	124,627	1,920
ML (military leave)	35	64.91	54,524	840
Jury Duty	17.5	64.91	27,262	420
Total			320,135	4,932

The increased overtime cost is primarily attributable to the increased use of FMLA-related sick and vacation leave. Shift staffing allows for two personnel to be off duty without using overtime to cover the anticipated weekly absences for planned vacation and Kelly Days. The extra person on the weekly schedule can provide limited relief for two days a week and is not enough to handle the extra paid time off for all fire department personnel. The total hours of unfunded leave in 2019 were nearly two full-time equivalent (FTE) positions.

The table that follows illustrates the typical hours scheduled for a fire department to provide twenty-four coverage seven days a week.

Working Days in the Year	365
Hours of Work	24
Total Annual Hours of Work	8,760
Annual Hours of Work	8,760
Number of Shifts	3
Annual Hours of Work per Shift	2,920
Average Workweek (hours)	56

In the previous table, the average work week for fire personnel is 56 hours. In many cities, including Mercer Island, the work week is reduced by using a Kelly Day.

The following table illustrates the effects of the Kelly Day and the staffing of the fire department.

Shift Staffing

Annual Hours of Work (Scheduled)	2,920
Kelly Days	408
Annual Hours of Work (with Kelly Days)	2,512
MIFD Average Workweek (hours)	48.3
Average Annual Sick Leave	152
Average Vacation Leave	257
Average Hours Available to Work	2,103
Annual Hours of Work	8,760
Hours Actually Worked	2,103
Staff to Cover One Position Department Wide	4.2
Staff to Cover One Position per Shift	1.4
Number of Shifts to Staff	3
Minimum Staffing per Shift	7
Total Required Positions	21
Total Needed to Staff Operations	29
Total Needed to Staff One Shift	9.7

Starting with the same 2,920 annual hours per shift from the previous table, the annual hours of work is reduced by 408 hours, the equivalent of 17 shifts at 24 hours each. Using the five-year average sick and vacation leave data from the fire department, the average available hours to work is established.

Based on this analysis, a recommendation would be to add personnel to the shifts to alleviate the use of overtime. Moving the floating employee (D-Shift) to a regular 24-hour shift and adding two additional personnel would result in staffing levels of 10 personnel for each shift. The cost estimate for the additional personnel is summarized in the table below.

Cost to Increase Staffing

Firefighter	Salary	Benefits	Academy/ Gear	Total Cost	Number of Personnel	Total First Year Cost
Personnel Cost	\$78,074	\$21,555	\$0	\$99,629	2	\$199,258
One-Time Equipment/Training	\$0	\$0	\$12,000	\$32,000	2	\$28,600
Total Cost						\$227,858

The cost of benefits is expressed as a percentage of salaries. In 2019, the benefits were 27.6% of the salaries in the operations section. Moving the D-shift employee from the Monday through Friday shift and adding two personnel to increase the shift staffing will result in a first-year estimated cost of \$227,858 of which \$28,600 is a one-time cost. It is important to note that this staffing change will likely require negotiation with the fire union. The table that follows compares the FY2019 salary cost in the fire operations section of the budget and the addition of two new firefighters. To calculate the operational overtime, the project team used the five-year average overtime expenditure of \$491,000 because 2019's overtime expenditure was well-above the average experienced in the last five years.

Salary and Overtime Comparison

FY 2019 Operational Salaries	\$3,555,696
Five-Year Avg. Operational Overtime	\$491,000
Total Salaries and Overtime	\$4,046,696
FY 2019 Operational Salaries	\$3,555,696
Two Additional Personnel	\$156,148
FY 2019 Operational Salaries – Adjusted (Subtotal)	\$3,711,844
Operational Overtime at 8.5% of Salaries	\$302,234
Total Adjusted Salaries and Overtime	\$4,014,078
Potential Savings	\$32,618

Not all overtime would be eliminated as there are situations that occur where additional staff resources may still be needed. To account for those instances, an 8.5% overtime estimate was included in the analysis.

The estimated cost savings of adding two additional personnel and reducing overtime to 8.5% is \$32,618 in Year 1.

The additional employees would receive salary increases each year based on the current collective bargaining agreement. The following table illustrates the five-year impact of these increases on overtime savings using the same criteria as above. It is important to note that the salary increases are only shown for the two newly added employees and do not reflect any other changes in salaries for other department personnel.

	2019	2020	2021	2022	2023
Salaries	\$3,711,844	3,720,660	3,729,321	3,745,314	3,745,314
Overtime	\$302,234	316,256	316,992	318,352	318,352
Total	\$4,014,078	4,036,916	4,046,313	4,063,666	4,063,666
Savings / (Cost)	\$32,618	9,780	383	(16,970)	(16,970)

As illustrated above, there is a declining return on investment with a cost increase occurring in year 4 after the addition of the two new firefighter positions.

Using the same minimum staffing, work week hours, and paid time off, the following table illustrates the cost associated with adding an additional firefighter to each shift. This is in addition to moving the floating employee (D-shift) to a regular 24-hour shift and the two additional personnel previously described.

Cost to Increase Staffing with 5 new Personnel

Firefighter	Salary	Benefits	Turnout Gear	Total Cost	Number of Personnel	Total First Year Cost
Personnel Cost	\$78,074	\$21,555	\$0	\$99,629	5	\$498,145
One-Time Equipment/Training	\$0	\$0	\$12,000	\$32,000	5	\$160,000
Total Cost						\$658,145

Moving the D-shift employee and adding five personnel to increase the shift staffing will result in a first-year estimated cost of \$658,145, of which \$160,000 is a one-time cost. The table that follows compares the FY2019 salary cost in the fire operations section of the budget and the addition of five new firefighters.

Salary and Overtime Comparison

FY 2019 Operational Salaries	\$3,555,696
Five Year Avg. Operational Overtime	\$491,000
Total Salary and Overtime	\$4,046,675
FY 2019 Operational Salaries	\$3,555,696
Five Additional Personnel	\$390,370
FY 2019 Operational Salaries – Plus 5 New	\$3,946,066
Operational Overtime at 6% of Salaries	\$236,764
Total Adjusted Salaries and Overtime	\$4,182,830
Cost Increase	\$136,155

Once again, not all overtime would be eliminated as there are situations that occur where additional staff resources may still be needed. However, with the additional staffing and the minimum staffing remaining the same, 6% of the adjusted operational salaries was used to account for those instances requiring overtime. The 6% overtime level allocation and the addition of 5 personnel may or may not reduce overtime this drastically. This illustration is likely a best-case scenario.

The estimated cost increase of adding five additional personnel and reducing overtime to 6% is \$136,155 (first year).

5. Overtime Process

The Mercer Island Fire Department has a written process for filling overtime slots. The department uses an automated computer software program to ensure minimum staffing levels are maintained. This program, “Telestaff”, automatically calls employees based on preconstructed lists and rules to fill overtime slots caused by vacancies.

There are two lists for callback: the long list is for overtime 12 hours or greater and the short list is for overtime under 12 hours. The lists are maintained separately and callback occurs based on the number of hours an employee has worked at the time of the call. For the long list, the employee with the least amount of overtime hours is called first and given the opportunity to accept the overtime. For the short list, the position the employee is on the list is based on the date they last worked a short overtime shift, with the person who worked a short shift most recently being on the bottom of the list. Telestaff continues to contact employees in order on the list until the overtime is accepted and then the list positioning is adjusted.

The following rules are in place for filling overtime opportunities:

- Two Battalion Chiefs (BCs) cannot be on operations duty at the same time (BCs cannot fill overtime (OT) for a fire fighter or Lieutenant (Lt) if another BC is already on-duty).
- At least one officer, Lt. or BC, must be on-duty each day.
- Once a short OT has been accepted, it cannot be turned back in for an exchange in favor of a longer OT, such as a 24-hour.
- Short OTs will be posted as soon as they become available for maximum notification to employees.
- Employees who accept a short OT of 6 hours or less via Telestaff will have 3 hours deducted from their long OT list accrual.
- Sign-up sheets will be used to allow employees to volunteer for short OTs for special events, and these do not impact their short OT accrual.
- Long OT vacancies will be called for before short OT vacancies.
- OT accrual bucket lists will 0 out each Sept 1.
- Once the long or short OT list has been gone through twice, the Watch Commander will manually call all eligible members. The member who accepts the OT on the third time through the list will not have those hours counted against their overall accrual.
- All employees can manually assign themselves as “do not contact for OT” or “automatic acceptance of OT” for any day of the year they are not currently scheduled to work.

The fact that personnel have the ability to decline overtime will result in personnel having varied overtime hours worked. Employees desiring overtime will work more overtime hours. Also, due to the fact that a supervisor is required on each shift and there are fewer employees eligible to fill these positions, higher cost employees will often have the most overtime hours worked. The following table illustrates the distribution of overtime by position for employees who worked the entire calendar year.

	Minimum OT Hours Worked	Maximum OT Hours Worked	Average OT Hours Worked	Total OT Hours Worked
Battalion Chief	392.75	1,296.00	844.08	2,532.25*
Lieutenant	328.25	940.75	593.75	3,562.50
Firefighter	221.75	745.25	414.78	7,051.25

* A significant portion of the Battalion Chief overtime was related to backfilling the Assistant Fire Marshal position.

Recommendations:

Move the D-Shift firefighter to a permanent 24-hour shift.

Hire two additional personnel at a first-year cost of \$227,858 to increase the shift staffing from 9 per shift to 10 per shift to reduce the 5-year average overtime budget by approximately \$188,766 annually.

Continue to the practice of scheduling Kelly Day vacation leave on each shift.

6 Dedicated Aid Car

A previous study of the Mercer Island Fire Department indicated that the deployment of a dedicated aid car on Mercer Island would improve the efficiency of the fire department and reduce costs. The basis for this recommendation was to staff the aid car with two dedicated non-firefighter emergency medical personnel to allow a reduction in cost by eliminating six firefighter positions.

The project team does not recommend this approach as the current staffing and deployment plan for the MIFD is to staff each engine company with three personnel daily and cross-staff the aid car with those personnel when a basic life support emergency medical is received. This is the most efficient approach for staffing aid cars as the firefighters are serving a dual role and are immediately available to respond to BLS and ALS calls in the city to begin patient care.

The recognized industry standard for staffing a fire engine is a 3-person minimum. Any staffing level below this will not allow arrival of enough personnel on a structure fire to adhere the 2 in 2 out mandate that requires for every two personnel operating inside a structure fire there are two personnel outside in a position to affect an immediate rescue effort. Reducing engine staffing to two personnel would mean a total of 5 MIFD would make up the initial response. Two personnel would be available for firefighting operations assigned to the hose line, 1 person would act as a company officer, 1 person would operate and pump the truck and the Battalion Chief would serve as the incident commander. Therefore, there would be no personnel to staff the required rapid entry team line until a mutual aid unit from off of the island arrived to staff this function.

Therefore, adding a dedicated aid car by decreasing/relocating fire personnel would reduce the efficiency and effectiveness of fire scene operations and is not recommended.

Using additional personnel to staff the aid car would increase overall costs for providing aid services in the city due to the cost of salaries and benefits of the newly hired employees.

According to the Economic Research Institute, the average salary for an Emergency Medical Technician in the Seattle area is \$45,586 per year. Assuming the civilian employees are scheduled to work 2,080 hours per year results in a salary cost of approximately \$403,000 to staff the aid car. Benefits for the employees would be approximately an additional \$111,217 based on current benefit rates. This equates to an increase of approximately \$514,217 to staff the aid car. There are also the ongoing costs of apparatus, equipment and supplies. This unit would also incur overtime as it requires a constant staffing level of 2 personnel, so overtime or additional part-time personnel would be needed to cover during leave usage. In fact, King County EMS reports that it costs them approximately \$2.4 million annually to operate each ALS unit in the county.

3 | Fire Prevention and Community Risk Reduction

Fire prevention and community risk reduction is the first defense against unwanted fires. The goal of any fire prevention program is to prevent the fire from occurring, prevent the loss of life, reduce the severity of a fire if one does occur, and if a fire does occur, to enable the fire suppression forces to perform their tasks more effectively. These goals are accomplished through building inspections, public education activities and the planning before a building is built.

1. Workloads

For Mercer Island, the fire prevention activity of plan reviews, fire safety inspections, fire investigations and public education is managed by a Fire Marshal. In addition to the Fire Marshal, a part-time Assistant Fire Marshal is assigned to the fire prevention function. The workload for the past five years for the fire prevention function is illustrated in the following table.

Fire Prevention Activity

	2015	2016	2017	2018	2019
Permit Reviews	605	866	649	499	494
Project Reviews	79	31	50	96	113
Construction Inspections	323	604	608	662	448
Plan Reviews	684	897	699	595	607
Public Education	28	27	31	34	27
Total	1,719	2,425	2,037	1,886	1,689

There is a total of two (2) personnel assigned to the office including a Fire Marshal (full-time) and Assistant Fire Marshal (part-time). One of the shift Battalion Chiefs oversees Community Risk Reduction efforts for the department. Shift personnel are also responsible for conducting company inspections and pre-fire planning of commercial occupancies. Fire investigations are conducted by the Fire Marshal, Assistant Fire Marshal, and a Firefighter who is certified as an investigator.

Company inspections are assigned to each shift and company. Records related to company inspections were provided for 2018. The following table illustrates the breakdown of commercial occupancy and multi-family inspections in 2018.

Ongoing Inspections by Group

	A Shift	B Shift	C shift	Prevention	Training
2018	131	139	153	37	33

As shown above, the shift company inspections are evenly distributed between the shifts. Fire Prevention personnel conducted 37 ongoing inspections, while training personnel conducted 33.

The current system appears to be working well for the Fire Department. Plan reviews are primarily renovations and remodels with an average of 575 reviews during the year. A company inspection program is in place that allows for Engine Companies to perform the inspection and then become familiar with the various structures in the area. Public education is provided to the community using overtime crews to deliver the programming. Education events include CPR, first aid classes, and fire extinguisher classes.

2. Overtime

The overtime budget for Community Risk Reduction services was integrated into the Fire Marshal budget in 2019. The tables that follow illustrate the budget and actual expenditures for these two sections.

Community Risk Reduction Overtime 2015 - 2019

Year	Budgeted OT	Actual OT	Reimbursement	Difference
2015	\$15,000	\$31,055	\$111	\$15,944
2016	\$94,000	\$72,172	\$300	(\$22,128)
2017	\$95,000	\$66,593	\$5,450	(\$33,857)
2018	\$90,000	\$80,641	\$3,175	(\$12,534)
2019	\$0	\$0	\$0	\$0
Total	\$294,000	\$250,462	\$9,036	(\$52,574)

Fire Marshal Overtime 2015 - 2019

Year	Budgeted OT	Actual OT	Reimbursement	Difference
2015	\$0	\$0	\$0	\$0
2016	\$0	\$0	\$0	\$0
2017	\$0	\$0	\$0	\$0
2018	\$0	\$0	\$0	\$0
2019	\$80,000	\$51,743	\$0	(\$28,257)
Total	\$80,000	\$51,743	\$0	(\$28,257)

The various public education events are staffed utilizing overtime, so the on-duty crews are available to respond to calls for service and the public education event continues uninterrupted. The Community Risk Reduction efforts are accomplished using a shift Battalion Chief and a part-time Assistant Fire Marshal, on overtime.

Revenue generated from the permit and inspection fees is used to provide the funding for the overtime in this division. In fact, in FY 2018, \$140,752 was generated and only \$51,743 was used in overtime compensation. Additional use of overtime may occur if new renovations and developments in the Town Center area occur simultaneously.

In terms of workload, it appears that any redevelopment and new construction in the Town Center would be short-lived based on the available space. Overall, the workload appears to manageable with the current staffing and an average overtime usage of approximately \$51,000 per year.

Over the course of the past year, the Fire Marshal's Office has taken several steps to streamline their processes. This has allowed a reduction in the number of hours the Assistant Fire Marshal is needed to work, resulting a \$30,000 annual reduction in overtime.

There is also an opportunity for the Fire Marshal's Office to review and strengthen the false alarm ordinance. Strengthening this ordinance would have two impacts on the department. First, it could reduce calls by ensuring alarm systems used by residents and business are maintained and operating properly. Secondly, it would provide revenue when the department responds to numerous false calls to a single location where the property owner is not properly maintaining the alarm system.

Recommendation:

Have the Fire Marshal review and recommend updates to strengthen the false alarm ordinance.

4 | Training

The training function is considered a major function in a fire department, as it is critical for personnel to maintain skills and improve proficiency in handling low frequency – high consequence events. In larger organizations, this function is managed by a full-time training officer or division. In small to medium sized organizations, this function is typically assigned to an officer to manage as an ancillary duty.

Training is overseen by a Shift Battalion Chief, who oversees and coordinates the training and education for all personnel in the fire department. Two shift personnel are assigned through a selection process as Training Officers (TO) for a 4-year period. The TO selection process is held every two years to fill one of the positions so that each vacancy is offset and an experienced TO is always assigned. These personnel conduct training for the department while off-duty and are paid overtime for these services.

Multi Company evolutions are conducted with the East Metro Training Group. This cost-effective approach is focused on improving the integration and scene operations between the departments on an initial response. Currently, Mercer Island, Bellevue, and Redmond participate as part of this group.

The following table illustrates the training hours for 2015 – 2019:

Training Hours by Category 2015 – 2019

Categories	2015	2016	2017	2018	2019	2015-2019 Total
Administrative	230	228	207	78	73	815
Disaster Preparedness	218	26	12	44	50	349
Emergency Vehicle Operator	220	307	202	168	197	1,094
EMS	745	744	564	601	806	3,459
Fire Prevention	527	549	174	431	151	1,832
Hazardous Materials	167	122	227	233	117	865
Health & Safety	238	194	367	298	100	1,196
Officer Development	194	310	283	250	178	1,215
Structural Suppression	1,367	1,211	875	723	572	4,749
Technical Rescue	858	868	644	904	809	4,083
Vehicle Extrication	97	96	110	40	122	464
Wildland	0	0	0	0	89	89
Total Hours	4,859	4,654	3,662	3,770	3,263	20,209

As illustrated above, structural suppression, technical rescue, and emergency medical services were the areas with the most training hours over the previous five (5) years.

In Mercer Island, the training function is handled through the use of two Training Officers that are also shift personnel. These two individuals are each allotted 250 overtime hours per year to manage and instruct the various classes. These positions also conduct quality assurance reviews for the emergency medical services. The table that follows displays the Training Officers' overtime budget compared to actual expenditures.

Training Officer Overtime 2015 - 2019

Year	Budgeted OT	Actual OT	Reimbursement	Difference
2015	\$22,082	\$31,956	\$1,999	\$7,875
2016	\$22,634	\$39,334	\$0	\$16,700
2017	\$30,293	\$31,137	\$208	\$637
2018	\$31,050	\$43,497	\$17,862	(\$5,416)
2019	\$32,786	\$39,947	\$26,119	(\$18,958)
Total	\$138,845	\$185,871	\$46,188	\$838

The Training Officers change every two years and, therefore, the overtime rate paid changes. However, it remains advantageous to the City to utilize the overtime for this function in lieu of hiring a full-time Training Officer, as the salary and benefits' costs would well-exceed the current budget.

For the past five years, this line item has been over budget. The overage is generally reimbursed by the King County Emergency Medical Services to cover the cost of the quality assurance program for emergency medical calls.

Recommendation:

Continue to use shift personnel on an overtime basis to manage and deliver training programs to the fire department.

Another part of the training budget includes overtime paid to shift personnel that are off-duty and attending a training or other educational event. There are training sessions with the response partners in which an overtime crew is used to cover the station while the on-duty crew participates in the combined training. The following table illustrates the budget and actual expenditures for the past five years.

Training Overtime 2015 - 2019

Year	Budgeted OT	Actual OT	Reimbursement	Difference
2015	\$70,100	\$75,167	\$0	\$5,067
2016	\$71,500	\$56,663	\$0	(\$14,837)
2017	\$71,500	\$70,222	\$0	(\$1,278)

2018	\$71,500	\$110,486	\$0	\$38,986
2019	\$75,234	\$70,809	\$0	(\$4,425)
Total	\$359,834	\$383,347	\$0	\$23,513

Other trainings included in this item are special teams' training such as hazardous materials, rope rescue, confined space, and trench rescue.

For the past five years, this line item has consistently been under budget. Educational and training opportunities occur that may not be consistent with budgets that are drafted months ahead of the event. Overall, the Fire Department has performed well in the utilization of the funding in this line item.

To further reduce or maintain the budget, the fire department should look to other technologies to deliver the training programs. There are several online training programs that can be custom tailored to the fire department to meet the needs and reduce the number of hours needed for an instructor working overtime. Records management is typically a part of these programs. The cost for these types of systems will vary depending on the features and systems that are desired. Video conferencing between stations currently allows the delivery of training classes while all crews remain in their stations. This would also help to improve the response time should a call for service occur during the training session. Other avenues, such as the National Fire Academy, offer both self-study and online facilitated programs.

Recommendations:

The fire department should invest in an online training program to deliver some of the training classes (at a cost of \$20,000 depending on the features of the system).

Utilize other avenues such as the National Fire Academy online programming to boost the availability of training and reduce the dependence on an instructor.

7 Contracting for Service

Another mechanism some municipalities use to provide fire suppression and emergency medical services is to contract with another municipality or provider for services.

The King County area has a somewhat unique system for the delivery of fire suppression and emergency medical services. The county is separated into three zones to manage fire services. Seattle is its own zone. The other two zones include multiple cities. Using the zones, the response to calls for service ensures the entire county maintains adequate resources and allows for those cities in each of the zones to establish various regionalized services such as hiring, apparatus replacement, and training.

The location of Mercer Island allows for the City to review potential contracts for service from three other service providers. To the west is the City of Seattle, to the east is the City of Bellevue, and further east is Eastside Fire and Rescue. Each of these service providers submitted a preliminary cost estimate to provide fire emergency services to the City of Mercer Island. The figures provided were based on their 2019 fiscal years. Multi-year cost projections have been updated to reflect their average budget increases over the past five years. It is also important to note that many factors impact the accuracy of these projections, including upcoming labor negotiations and the budgetary impacts of Covid 19. As such, all of the figures below should be regarded as ballpark estimates; true costs may swing positively or negatively to a great degree.

1 | Seattle Fire Department

The potential contract with Seattle Fire Department (SFD) has an operations and maintenance annual cost of \$7,153,005 and an additional one-time cost of \$2,911,997. The one-time costs include training and transfer of existing employees, information systems, and other equipment and supplies.

The proposed contract includes 45 full-time equivalents (FTE) and assumes the Mercer Island fire stations meet the Seattle requirements and are ready to occupy. The current fire department staffing is 31 FTEs and the potential contract with Seattle increases the FTEs to 45, a 45% increase in the number of staff. The increase in staffing is related to Seattle's minimum staffing requirement for an engine company of four (4) personnel.

Based on the 2019 budget, this represents an increase of \$527,609 in annual costs for Mercer Island to contract with Seattle to provide fire and EMS services. In addition to the assumption that the existing Mercer Island fire stations meet the Seattle requirements, there are other assumptions:

- The SFD will utilize the existing apparatus and will replace that apparatus in accordance with their replacement program.
- The training costs are for transfers from Mercer Island who will staff the engine companies and fill other assignments.
- One-time costs of transferring benefits of the 31 existing employees to the Seattle system. Some of these costs are unlikely to be immediate costs and will be payable in the future when employees retire from duty.
- Equipment and supplies are for the new fire personnel and apparatus.
- Information systems cost will connect the new stations and new staff to the Seattle systems.

The SFD proposal includes the need to complete an assessment of the Mercer Island fire stations to determine if the stations meet the Seattle requirements. There is a potential for additional costs once this assessment has been completed.

Operationally, the only improvement is the increase in staffing for the engine companies from a minimum of three (3) personnel to a minimum of four (4) personnel. Additional resources for a structure fire will continue to come from off-island stations.

The benefits of contracting with the City of Seattle for fire and EMS Services are as follows:

- Existing staff will be absorbed and become employees of the City of Seattle Fire Department.
- Engine company staffing levels will increase, which improves the number of personnel arriving to a structure fire on the initial response.
- There is a potential to lower the WSRB rating due to increases in Fire Prevention, Training and engine company staffing levels.
- Increased promotional opportunities for staff.
- Increased Fire Marshal capacity.

The potential downsides to contracting with the City of Seattle are as follows:

- Estimated costs for providing fire and EMS services are over \$500,000 higher annually than the current cost of providing services locally.
- The culture of a metropolitan fire department is different than a small department in terms of customer service.
- The City will have limited control over future cost increases related to employee salary and benefit packages.

- There is a time and distance issue related to receiving additional response components on major incidents.
- Seattle is a party to King County EMS, but is in a separate coverage area than Medic One, which serves the City of Mercer Island.
- There may be an increase in apparatus maintenance costs due to shop rates.
- There will be costs involved in the contracting process.
- The City would lose a dedicated Fire Chief.
- The Fire Department would be dispatched by the Seattle Fire Department emergency communications center, which would mean there would be a separate primary and secondary Public Safety Answering Point, possibly resulting in longer call processing times.

Seattle currently does not provide contracted fire services to other jurisdictions. The following table illustrates the expected first year and subsequent year costs based on the estimate provided by Seattle and the average actual expenditure increase of 3% experienced since 2017. In comparison, the MIFD has averaged 3.92% over the same period.

	2021	2022	2023	2024	2025
One Time	2,911,997				
Operating	7,588,623	7,816,282	8,050,770	8,292,293	8,541,062
Total	\$10,500,620	\$7,816,282	\$8,050,770	\$8,292,293	\$8,541,062

As illustrated above, the operating costs are expected to increase from \$7.589 million in 2021 to \$8.541 million in 2025.

2 | Eastside Fire and Rescue

Eastside Fire and Rescue provided an estimate to deliver fire and EMS services to Mercer Island. This estimate included three service delivery options – one contract scenario and two partnership scenarios.

Eastside Fire and Rescue currently serves an area to the east of Bellevue that includes Issaquah, Sammamish, Preston, North Bend and May Valley (unincorporated King County). Mercer Island could choose to contract for services, similar to the approach with Bellevue or Seattle. Or, Mercer Island could become a partner, where the City would have representatives serving on the Board of Directors.

The table that follows highlights the preliminary cost estimates provided by Eastside Fire and Rescue for the three different scenarios.

Eastside Fire and Rescue Estimated Contracts

Partnership	\$5,539,490	2 Engine Companies and BC in existing EFR response area
Equipment	\$250,000	
Facility	\$75,000	
Revenue Transfer	\$720,000	KCEMS BLS Allocation and Transport Revenue
Total	\$6,614,490	
Contract Scenario #1	\$6,693,394	2 Engine Companies and 1 Battalion Chief
Equipment	Maintenance included	replacements not included
Facility	Maintenance included	improvements not included
Total	\$6,693,394	
Contract Scenario #2	\$6,279,011	2 Engine Companies and BC in existing EFR response area
Equipment	Maintenance included	replacements not included
Facility	Maintenance included	replacements not included
Total	\$6,279,011	
One Time Liability Fund	\$202,564	This in addition to all options above

Under the partnership model, the ownership of all equipment and facilities would be maintained by the City. This means the City would be responsible for the replacement of these items.

Depending on the scenario, the City could save as much \$346,385 in Year 1 compared to the current costs of providing services.

Operationally, there would not be any changes to the existing staffing and operations of the Mercer Island Fire Department under this scenario (other than the possibility of the Battalion Chief not being located in Mercer Island). Additional resources for a structure fire will continue to come from stations off the island and most likely from other Eastside Fire and Rescue stations unless other arrangements are made with Bellevue and Seattle.

The benefits of contracting or partnering with Eastside Fire and Rescue for Fire and EMS services are as follows:

- There are opportunities to reduce costs for providing fire and EMS services by as much as \$346,000 annually if contract scenario # 2 is chosen, although this does not factor in equipment or facility maintenance and replacement.
- Eastside Fire and Rescue has experience providing fire and EMS services for a number of communities on the East Side of Seattle.

- Eastside Fire and Rescue is part of the Medic One service area in the King County EMS system.
- Eastside Fire and Rescue has similar performance standards and strives for high levels of customer service.
- All scenarios provide employment for existing Mercer Island line personnel.
- There is a potential to lower the WSRB rating due to improvements in training and fire prevention staffing.
- There would be increased promotional opportunities for staff.
- Increased Fire Marshal capacity.

The potential downsides to partnering with Eastside Fire and Rescue are as follows:

- The option that provides the most cost savings does not include a full Battalion Chief for Mercer Island, and the distance between Eastside Fire Rescue and Mercer Island makes a timely response of a Battalion Chief impossible.
- There is no opportunity for other Eastside Fire and Rescue assets to respond in a timely manner to assist on critical incidents. Mutual and/or automatic aid agreements with Seattle and Bellevue would still be needed to provide a timely effective response force.
- Each scenario eliminates the current Deputy Chief position.
- The City of Mercer Island will lose local control of future cost increases related to employee salary and benefit packages negotiated unless they join as a partner agency and have a seat on the Board of Directors.
- There will be costs associated with the contracting process.
- The City will lose a dedicated Fire Chief position.
- There would be no operational efficiencies gained and, possibly, some lost with the closest 3rd engine company being 8 miles from the island.

The following tables illustrate the expected first year and subsequent year costs based on the estimate provided by Eastside Fire and Rescue and the average actual expenditure increase of 2.25% experienced by their contract agencies since 2017. In comparison MIFD have averaged 3.92% over the same period.

		Partnership			
	2021	2022	2023	2024	2025
One Time	1,247,564				
Operating	5,908,840	6,056,561	6,207,975	6,363,174	6,522,254
Total	\$7,156,404	\$6,056,561	\$6,207,975	\$6,363,174	\$6,522,254

	Contract #1				
	2021	2022	2023	2024	2025
One Time	202,564				
Operating	7,139,682	7,318,174	7,501,128	7,688,657	7,880,873
Total	\$7,342,246	\$7,318,174	\$7,501,128	\$7,688,657	\$7,880,873

	Contract #2				
	2021	2022	2023	2024	2025
One Time	202,564				
Operating	6,697,669	6,865,111	7,036,738	7,212,657	7,392,973
Total	\$6,900,233	\$6,865,111	\$7,036,738	\$7,212,657	\$7,392,973

As illustrated above, the operating costs are expected to increase from \$5.909 - \$7.140 million in 2021 to \$6.522 to \$7.881 million in 2025 depending on the chosen contracting option.

3 | City of Bellevue

The Bellevue Fire Department provided an estimate for the cost of delivering fire and EMS services to the City of Mercer Island. The City of Bellevue is an automatic aid partner with Mercer Island and currently provides additional resources for structure fires. The preliminary cost estimate is \$6,261,010 for ongoing operations and maintenance, with a one-time cost of \$1,617,132. Similar to the Seattle contract the one-time costs are associated with the vacation and sick leave liabilities, training of the transferred employees and information systems. The Bellevue contract proposal includes the following assumptions:

- There would need to be additional verification and validation of line item details in the budget.
- Completion of an assessment of facilities, apparatus, and equipment.
- The one-time costs are payouts upon the retirement of the personnel.

Based on the 2019 budget, this contract would potentially save the City of Mercer Island approximately \$364,385 in Year 1. It should also be noted, Bellevue currently provides services to six other cities through contracts.

The City of Bellevue currently supports Mercer Island with the response of a ladder company. This response is a part of the King County Fire Resource Plan. Bellevue sends their fire resources to Mercer Island more often than Mercer Island sends resources to Bellevue. Through an Interlocal Agreement, Mercer Island provides marine patrol and other services to Bellevue, which offsets the imbalance in fire service calls.

Operationally, there would not be any changes to the Mercer Island response. The proposal uses the same number of FTEs as the current staffing for the Mercer Island Fire Department. Additional resources for a structure fire would continue to come from Bellevue under this scenario proposal.

The benefits associated of contracting with Bellevue to provide fire and EMS services to the City of Mercer Island are as follows:

- The proposed contract provides savings of approximately \$364,000 annually.
- The proposed contract provides employment for existing Mercer Island line personnel.
- Bellevue is a current aid partner with Mercer Island and provides a ladder truck on all working fires.
- Bellevue is part of the Medic One EMS service area within the King County EMS.
- There are opportunities to regionalize the Battalion Chiefs as Bellevue has a gap in Battalion Chief coverage adjacent to Mercer Island.
- The Bellevue Fire Department has similar performance and customer service expectations to those of Mercer Island.
- There are opportunities to improve the regionalization of services and realize operational efficiencies as Bellevue is immediately adjacent to Mercer Island.
- There is a potential for a lower WSRB rating due to improvements in fire prevention and training staffing, as well as regionalization of services,
- Savings on hiring costs moving forward.
- Increased promotional opportunities for staff.
- Increased Fire Marshal capacity.
- Increased public education staffing.
- Access to the FD CARES (Mobile Integrated Health) Program.

Some efficiencies that would be gained by contracting with Bellevue include the following.

- Combined suppression training, night drills, firefighter evaluations and company evaluations.
- The ability of the Bellevue fire company to move up personnel to cover the island for training events, which would reduce overtime costs.

The potential downsides to contracting with the City of Bellevue for fire and EMS services are as follows:

- The City of Mercer Island will lose local control of future cost increases related to employee salary and benefit packages negotiated.
- There will be costs associated with the contracting process.
- There may be increased apparatus maintenance costs due to shop rates.
- The City will lose a dedicated Fire Chief position.
- Salaries tend to be higher in Bellevue.

The following table illustrates the expected first year and subsequent year costs based on the estimate provided by the Bellevue Fire Department and the actual average expenditure increase of 3.4% experienced by their contract agencies since 2017. It is important to note that the actual cost to contract agencies decreased in 2020 and is projected to increase in 2021. An increase of 12.32% occurred in 2019 following collective bargaining establishing retroactive pay. In comparison MIFD actual expenditure increases have averaged 3.92% over the same period.

	2021	2022	2023	2024	2025
One Time	1,617,132				
Operating	6,693,996	6,921,592	7,156,926	7,400,261	7,651,870
Total	\$8,311,128	\$6,921,592	\$7,156,926	\$7,400,261	\$7,651,870

As illustrated above, the operating costs are expected to increase from \$6.694 million in 2021 to \$7.651 million in 2025.

4 | Partial Contract Services

Beyond fully contracting for all fire services, there may be opportunities for contracting solely for particular services. The costs of partial consolidation options have not been vetted out and would have to be negotiated if desired. Some potential areas for contracting services may include:

- Administrative services
- Training
- Fleet maintenance (currently done with Eastside Fire Rescue)
- Fire prevention
- * Fire investigation

5 | Summary

There are advantages to contracting for services that include sharing costs and equipment. For example, two communities need a ladder truck, so it makes sense for the two communities to share the resource. The same holds true for some of the essential functions of a fire department. Training is a necessary function to maintain skills and knowledge. Sharing this resource between two or more communities allows for each community to receive appropriate training with a shared cost. Operationally, there may be a deeper pool of personnel to handle paid time off absences, depending on the size of the department. For the administration, there could be a reduction in the need for information technology support, human resources, and financial services support as these functions would likely be handled through the contract.

Primary disadvantages to contracting for service is the loss of direct control over fire department operations. Depending on the contract and how that contract is established, there may be little control over the operation of the department. The contract could stipulate the services to be provided, but not allow for the control of how those services are provided. For example, the fire prevention function could be centralized, meaning the Office of the Fire Marshal could be located in another community with no presence in the other contracted area.

The cost of the contract is another area that is a concern in these types of systems. With the cost of the fire service largely being personnel costs, this can become an issue. Contracting agencies must pay according to the contract obligations and have little recourse other than to demand a bigger seat at the governance table, to agree to a reduction in service commiserate with a reduction in cost, or to execute contract termination processes.

As an option to provide fire and emergency medical services, Mercer Island could contract for fire services. Based on the analysis, the City of Bellevue appears to be the leading contender for several reasons.

- There is a strong automatic aid relationship between Mercer Island and Bellevue Fire Departments.
- Bellevue is the only potential partner agency that brings operational and organizational efficiencies to Mercer Island.
- Current Bellevue resources are closer to Mercer Island than Seattle and Eastside Fire and Rescue.

- Bellevue has experience with providing services through contracts with six other cities in the area.

Should the City of Mercer Island decide to provide services through a contract, there are some issues that should be considered:

- Identify the ownership of apparatus and facilities and account for maintenance and replacement costs.
- Consider the future of the contracts and how they would be managed and the mechanism for addressing issues that arise.
- Understand how the negotiations with labor will be handled and what, if any, opportunities there may be to participate.
- While a relief staffing factor is provided in the estimates, actual leave or turnover may cause higher overtime staffing needs, which will result in an annual true-up for overtime needs that exceed the projected staffing needs. In Bellevue, these are smoothed over a five-year period to avoid large one-time swings.

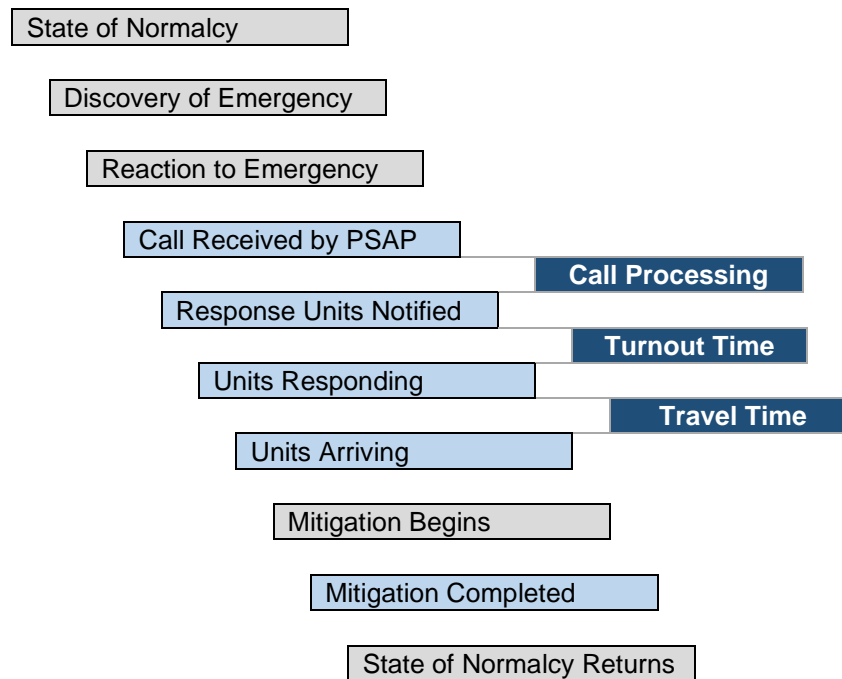
Recommendation: If the option of contracting for services is desired, the City of Mercer Island should issue a Request for Proposals and encourage the City of Bellevue to respond.

Appendix 1 National Standards

In years past, response time measurement was expressed as an average of time. This essentially represents how the system or department is performing 50% of the time and is not a true reflection of how a department is performing. More recently, fractal time has become the best practice in the measurement and presentation of response time components.

Fractal response time measures how often (as a percent of calls) a department meets each response time component. The National Fire Protection Association (NFPA) and the Center for Public Safety Excellence (CPSE) use the 90th percentile as the standard to meet for benchmark and baseline criteria.

The following chart outlines the cascade of events that occurs once an emergency starts or is recognized. Those highlighted points represent response data that can be quantified.

Response Time Continuum

There are three segments of a response, as described in the previous chart, that can be used for evaluation: call processing, turnout time, and travel time. Each of these components represents a different point in the response time continuum that can be measured and evaluated. Definitions for the three components are provided below:

- “Call Processing” begins when the call taker answers the call and ends with dispatch of appropriate emergency services.
- “Turnout Time” is defined as when the emergency service receives the call and is on the apparatus responding (wheels rolling) to the call.
- “Travel Time” is defined as when the apparatus and personnel begin the response (wheels rolling) and ends once on location of the emergency (wheels stopped).

There are three models used to measure performance of the emergency services system and each have their own set of performance measurements based on different aspects of the community served.

- 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 last published in 2020.
- Center for Public Safety Excellence (CPSE) Fire and Emergency Service Self-

Assessment Manual last published in 2015 and Community Risk Assessment and Standard of Cover last published in 2016.

- Insurance Services Office (ISO) updated their Fire Suppression Rating Schedule in 2012 to allow the systematic performance evaluation of responses for their distribution and concentration ratings.

Benchmark measurements are described as the industry best practice. Baseline measurements are described as the actual performance of the organization. Baseline performance is generally based on three to five years of data.

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 was last published in 2020. NFPA 1710 defines a career fire department as one that utilizes full-time or full-time equivalent (FTE) station-based personnel immediately available to comprise at least 50 percent of an initial full alarm assignment

ISO continues to use their standard 1.5-mile and 2.5-mile criteria for engine company and ladder company placement and station locations. The criteria indicate that engine companies should be located in 1.5-mile increments and ladder companies in 2.5-mile increments. Although they now accept a systematic performance evaluation that demonstrates the department can meet the time constraints outlined in NFPA 1710.

CPSE had previously defined benchmark and baseline response times for each of the three response time components (call processing, turnout time and travel time). They have since determined they are not a standard making organization and decided to leave the establishment of benchmark performance standards to others. However, their body of work is significant and has been and continues to be used by numerous communities across the country. Their performance objectives were based on population density demographics.

Appendix A contained in the NFPA 1710 document provides additional information and background as it pertains to service delivery objectives for the jurisdiction as follows:

“There can be incidents or areas where the response criteria are affected by circumstances such as response personnel who are not on duty, unstaffed fire station facilities, natural barriers, traffic congestion, insufficient water supply, and density of population or property. The reduced level of service should be documented in the written organizational statement by the percentage of incidents and geographical areas for which the total response time criteria are achieved.

Additional service delivery performance objectives should be established by the AHJ for occupancies other than those identified within the standard for benchmark single-family dwellings. Factors to be considered include specific response areas (i.e., suburban, rural, and wilderness) and occupancy hazards.”

This excerpt acknowledges that the authority having jurisdiction (AHJ), in this case the City of Mercer Island, is responsible for determining the level of service to be provided by its fire department. Considerations for the level of service include, but are not limited to, the manner in which the fire department responds, travel time, staffing, emergency calls versus non-emergency calls, roadways, financial resources, and those calls involving different occupancies.

1. Turnout Time

Turnout time is a measurable time segment that begins when the emergency service receives the call and the apparatus is responding (wheels rolling) to the call. The following table provides a comparison between the three models for benchmark performance objectives.

Turnout Time – Benchmark Performance Objectives

Call Type	NFPA 1710	ISO	CPSE
Emergency Medical Calls	60 seconds or less 90% of the time	No Requirement	60 seconds or less 90% of the time
Fire or Special Operations Calls	80 seconds or less 90% of the time	No Requirement	80 seconds or less 90% of the time

Travel time is a measurable time segment that begins when the apparatus and personnel begin the response (wheels rolling) and ends once on location of the emergency (wheels stopped). It is the most appropriate measurement available for the distribution of resources. The table that follows illustrates the differing viewpoints based on the three performance models for the travel time of the initial arriving unit.

The following table illustrates the baseline performance for the past three years as compared to the benchmark performance objective of 60 seconds for medical calls and 80 seconds for fire or special operations calls as outlined in nationally recognized best practices.

Mercer Island Fire Department

All Emergency Calls – 90th Percentile Times			2015 - 2019	2015	2016	2017	2018	2019	Benchmark
Turnout Time	1st Unit	Medical Calls	1:50	1:56	1:51	1:49	1:45	1:46	1:00
		Fire Calls	1:58	1:53	1:51	1:57	2:02	2:02	1:20

The baseline time shown is the 90th fractal time for all emergency calls. For medical calls, the baseline time over the past three years is 50 seconds over the benchmark performance objective of 1 minute and fire calls are 38 seconds over the benchmark performance objective of 1 minute and 20 seconds.

The table that follows illustrates the baseline performance for each station using the same benchmark performance objectives. The stations were consolidated as the apparatus in the stations are cross staffed.

Mercer Island Fire Department

All Emergency Calls – 90th Percentile Times			2015 - 2019	2015	2016	2017	2018	2019	Benchmark
Turnout Time	Station 191	Medical Calls	1:52	1:57	1:53	1:51	1:49	1:47	1:00
		Fire Calls	2:06	2:02	2:12	2:05	2:07	2:05	1:20
	Station 192	Medical Calls	1:57	2:07	2:00	1:51	1:57	1:57	1:00
		Fire Calls	2:18	2:22	2:21	2:15	2:17	2:12	1:20

2. Travel Time

The City of Mercer Island has a population density of 3,947 people per square mile. Based on the 2010 Census Tract data, the population densities are spread relatively evenly across the city, indicating that urban performance objectives are the most appropriate to be used. The following table illustrates the national standards for travel time.

First Arriving Unit - Benchmark Performance Objectives

Demand Zone	Demographics	NFPA 1710	ISO	CPSE
Urban	Greater than 1,000 per sq. mile	4 minutes or less 90% of the time	1.5 road miles in the built-upon area	4 minutes or less 90% of the time
Suburban	500 - 1,000 per sq. mile	4 minutes or less 90% of the time	1.5 road miles in the built-upon area	5 minutes or less 90% of the time
Rural Area	Less than 500 per sq. mile	4 minutes or less 90% of the time	1.5 road miles in the built-upon area	10 minutes or less 90% of the time
Remote Area	Travel Distance greater than / equal to 8 miles	4 minutes or less 90% of the time	1.5 road miles in the built-upon area	No Requirement

The following table illustrates the travel time component for the past three years.

Mercer Island Fire Department

All Emergency Calls - 90th Percentile Times		2015 - 2019	2015	2016	2017	2018	2019	Benchmark
Travel Time	1st Unit Distribution	6:15	5:57	5:58	6:15	6:18	6:34	4:00

The baseline is the 90th fractal time for emergency calls. The fire department is exceeding the benchmark performance objective by 2 minutes and 15 seconds over the past three years.

The following table includes the travel time for each station as the apparatus is cross staffed.

Mercer Island Fire Department

All Emergency Calls – 90th Percentile Times		2017 - 2019	2015	2016	2017	2018	2019	Benchmark
Travel Time	Station 191	6:05	5:24	6:00	6:09	6:17	6:19	4:00
	Station 192	7:31	7:15	7:04	7:43	7:38	7:53	4:00

The baseline illustrated for each unit is the 90th fractal time for emergency calls.