April 2016

Executive Summary

FIRE AND EMERGENCY MEDICAL SERVICES EFFICIENCY ASSESSMENT

EDMONDS, WASHINGTON

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CONSULTANT FINAL REPORT

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Executive Summary

In 2010, the City of Edmonds' city council elected to transition from a municipal fire service provided by the City to a contracted service with the Snohomish County Fire District 1. The parties expressed mutual interest in reopening contract negotiations after the first five years of the contract. To prepare for those negotiations and to better understand the various service delivery options, the City of Edmonds contracted with Fitch & Associates, LLC (*FITCH)* to conduct a review of the fire and emergency medical services within the City of Edmonds and to explore options that maintain or improve services, contain costs, and provide for long-term sustainability.

This report is a culmination of information developed from onsite-structured interviews with key stakeholders, budget analyses, staffing analyses, quantitative and temporal analyses, and Geographic Information System (GIS) analyses. The *FITCH* team met with elected officials from the City of Edmonds, City Staff, and Fire District 1's administrative team early in the project and then near the conclusion of the project to ensure a transparent and collaborative process.

The *FITCH* team found Snohomish County Fire District 1 to be a high quality, innovative, and professional fire and emergency service organization. The management team was well versed in modern management and operational practices in the provision of emergency services and has generally provided exemplary service to the City of Edmonds. Fire District 1 has received multiple awards for innovative practices in emergency medical services and is providing efficient and effective services as prescribed at the inception of the current agreement between the City and the District.

Recommendations contained herein are intended to assist in guiding future discussions and negotiations between the City of Edmonds and Fire District 1 by providing an objective and data-driven analysis of the current performance and identifying future opportunities.

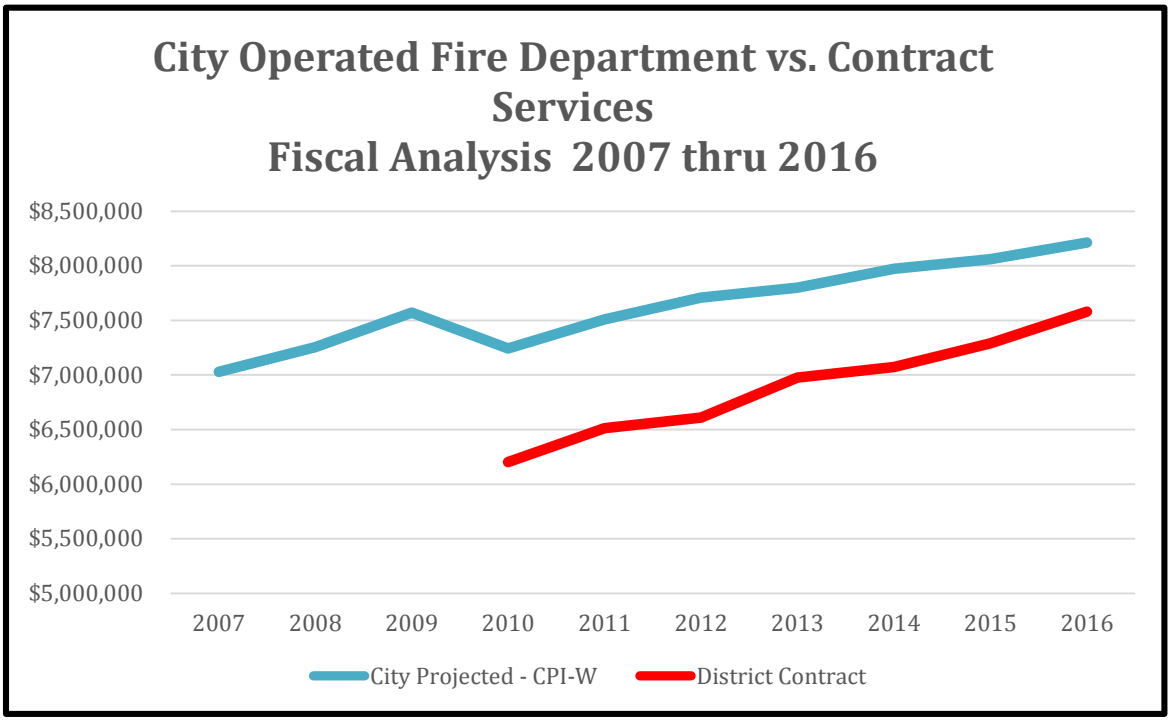
This report is the culmination of three separate reports consisting of an executive summary report, a presentation slide deck, and a data report.

General Observations – Fiscal Analysis

The process utilized by the *FITCH* team was to first examine whether the City's decision to contract with Fire District 1 was a good decision fiscally. Findings suggest that the City has realized savings that are generally aligned with the original costs projections. The performance for the first five years of the contractual relationship has been financially beneficial to the City as compared to the estimated costs of continuing to operate its own municipal fire department.

Fiscal analyses from 2007 through 2016 are presented as Figure 1 below.

Figure 1: Fiscal Analysis 2007 - 2016



Finding

The City has benefited fiscally from its relationship with Snohomish County Fire District 1.

General Observations – Contractual Structure

Early in this project it was evident that the City did not retain the institutional knowledge associated with the decision to migrate to a contracted service provider. For example, all of the current elected officials and budgeted staff were not in place when the decision process occurred. The historical perspective of how the inception agreement was defined and established is therefore not codified within the institutional memory.

What is available is the understanding that the City elected to maintain all of the current services, stations, and number of personnel through the transition to the District. While it would not be uncommon for the elected body to maintain the status quo in services while realizing fiscal benefits, the unintended consequence five years later, is that the contract language may be overly prescriptive for both the City and the District.

It is suggested that the City consider a performance-based contract with the District that defines the intended performance rather than prescribing the resources allocated to the performance.

The District currently has other Interlocal agreements (ILA) that are less prescriptive and more performance driven.

Recommendation #1:
The City and the District is encouraged to change from a prescriptive contract to a performance-based contract.

General Observations – Operations

The next approach that the *FITCH* team utilized was to examine what opportunities existed operationally that may add value for the City. Value is loosely defined as operational improvements to the service delivery model that have fiscal benefits to the City, while remaining within an acceptable risk tolerance. This value-based analysis is designed to assist the City and the District to maintain a long-term sustainable relationship. This analysis also recognizes that risk cannot be eliminated, even with a huge increase in resource allocation to readiness. Because there will always be risk, policy-makers should focus on finding the right risk-readiness balance for the City of Edmonds.

The Edmonds Data Report and Presentation has considerable data describing the system's historical demand and current performance. In this executive summary, only pertinent data elements will be provided that support the substantive recommendations.

Community Service Demands

The demands for service, or risks, that the City of Edmonds residents and visitors require is overwhelming for Emergency Medical Services (EMS). In total, the EMS category, which contains Basic Life Support (BLS) calls, and EMS-ALS category, which includes Advanced Life Support (ALS) calls, account for 85% of the total requests for service.

Conversely, in 2014, fire-related incidents accounted for 450 responses or 9.8% of the total responses at just over 1 call per day.

A summary of the demands for service within Edmonds is provided below.

Figure 2: Number of Edmonds Incidents by Call Type in 2014

Call Category	Number of Calls	Calls per Day	Call Percentage
EMS	2,547	7.0	55.2
EMS-ALS	1,398	3.8	30.3
Fire Related	450	1.2	9.8
Special Ops	8	0.0	0.2
Service	210	0.6	4.6
Total	**4,613**	**12.6**	**100.0**

Fire related incidents are a broad category that encompasses many call types in addition to structural fires. In total over 83% of all of the fire related incidents are encapsulated in the first four call types of single engine responses, fire alarms (commercial and residential), and carbon monoxide alarms. Fire alarms are a result of the alarm system activating, not an indication of an actual fire as generally a fire alarm that was an actual fire would be appropriately classified as a structure fire. In 2014, 23 structure fires (shown as Fire Residential and Fire Commercial in the figure below) were recorded at just over 5% of the fire related incidents, which is 0.5% of the total system response. Data is presented below.

Figure 3: Percentage of Fire Related CAD Incident Types

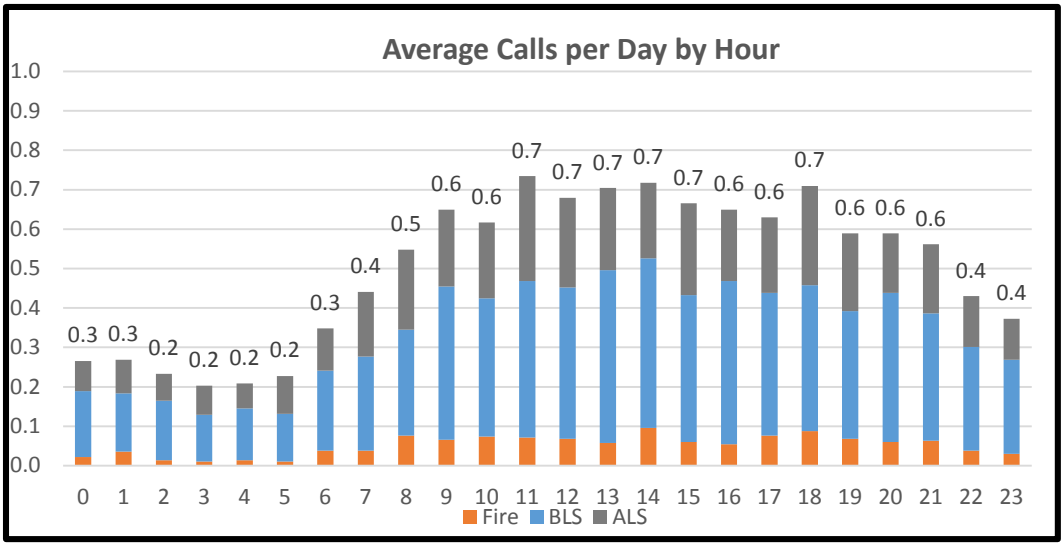
Final Type	Final Type Description	Number of Calls	Percentage of Total Fire Service Demands
FS	Fire Single Engine response	148	32.9
FAC	Fire Alarm Commercial	136	30.2
FAR	Fire Alarm Residential	63	14.0
COA	Carbon Monoxide Alarm	27	6.0
MU	Move Up	20	4.4
GLO	Gas Leak Outside	18	4.0
FC	Fire Commercial	12	2.7
FR	Fire Residential	11	2.4
GLI	Gas Leak Inside	8	1.8
FAS	Fire Alarm Sprinkler Water flow	4	0.9
FB	Fire Brush	2	0.4
MVCE	Motor Vehicle Collision with Entrapment	1	0.2

Structural fires (FC/FR), are a broad category of building fires that could include small fires such as food on the stove or a small kitchen fire up to a large warehouse or hotel fire that is heavily involved in fire. However, an evaluation of the time on task of all fire related incidents may provide context to the average severity of incidents as the time on task for fire related events was 256.5 hours, or 21 minutes per responding unit, in 2014.

The relationship of fires to the total demand for services is not unique to the City of Edmonds. Nationally, a downward trend has existed since the late 70s.

Finally, the average total demand for all services within Edmonds is less than one call per hour at the peak of the day. A temporal distribution of all fire and EMS calls is presented below.

Figure 4: Average Calls by Hour of Day



System Performance

A response time continuum was utilized to examine the individual time elements of turnout time, travel time, and total response time. Turnout time is defined as the time interval from when the stations or units are dispatched to an incident until the unit is responding to the incident. Travel time is defined as the time interval from when the unit first began responding until arrival at the scene of the incident. Response time is defined as the time interval from dispatch until arrival.

At the 90th percentile, the turnout time is 2.6 minutes, or 2:36 for all call types. The travel time ranges from 5.1 minutes to 7.4 minutes and has an aggregate value of 5.7 minutes, or 5:42. The total response time is approximately 7.5 minutes or 7:30.

Two notable national recommendations for response time performance are noted in NFPA 1710[1] (4 minutes) and the Commission on Fire Accreditation International[2] (5 minutes and 21 seconds) for an urban population density. The current performance for travel time is outside of these national recommendations, but within the general national experience of six to eight minutes. A very small percentage of departments are able to meet the national best practice for

[1] National Fire Protection Association. (2016). 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*. Boston, MA: National Fire Protection Association.

[2] CFAI. (2009). Fire & Emergency Service Self-Assessment Manual, 8th (ed.). Chantilly, Virginia: Author. (p. 71)

travel time recommendations due to the costs associated with a higher concentration of fire stations and resources. Furthermore, unlike turnout time (discussed below), there are several variables outside the District's control that can have a negative impact on travel time.

However, a no-cost option for improvement does exist that could improve system performance by up to one minute. The NFPA recommends a 60 second turnout time for all EMS incidents and 80 seconds for fire and special operations incidents.[3] The Commission on Fire Accreditation International (CFAI) follows the same recommendations for optimal performance but will allow up to 90 seconds for turnout time.[4]

Currently, the District's adopted performance standard is 2 minutes and 45 seconds at the 90th percentile, or nearly double the most lenient national recommendation. The District developed this standard internally; therefore, the District has the flexibility to develop a new standard for turnout performance. For example, a brief search of existing standards of coverage documents demonstrate that the following agencies' actual performance is closely approximating or exceeding the CFAI recommendation of 90 seconds for turnout time:

- City of Clovis, CA – 84 seconds for non-ems and 65 seconds for EMS at the 90th percentile (2015)
- City of Olathe, KS – 100 seconds for Fire and 94 seconds for EMS incidents at the 90th percentile (2011)
- City of Colorado Springs, CO – 99 seconds for all first arriving units at the 90th percentile (2011)
- City of Salem, OR – 64 seconds for all incidents at the 85 percentile. (Under 90 seconds for 90th percentile) (2011)

Seizing the opportunity to hold the system accountable and to manage turnout time performance may provide an equivalent value of over a million dollars in service enhancements at no cost. In other words, if the system chose to purchase a minute improvement in overall response time, it would require considerable investment in new stations, equipment, and personnel to achieve such an improvement through a travel time improvement. But a similar overall response time improvement could be achieved cost-free by establishing a performance-based contract requiring that the District meet best practices for turnout time.

System performance for the City of Edmonds is presented below.

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[3] National Fire Protection Association. (2016). 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*. Boston, MA: National Fire Protection Association.

[4] CFAI. (2009). Fire & Emergency Service Self-Assessment Manual, 8th (ed.). Chantilly, Virginia: Author. (p. 71)

Figure 5: 90th Percentile Performance by Call Type

Call Category	Turnout Time	Travel Time	Response Time	Sample Size
EMS	2.5	5.9	7.5	2,471
EMS-ALS	2.4	5.1	6.9	1,376
Fire	2.9	6.6	8.5	422
Special Ops	2.3	7.4	9.4	8
Total	**2.6**	**5.7**	**7.5**	**4,277**

Recommendation #2

The City and the District is encouraged to enter into a performance based contract where the District is expected to meet best practice on turnout time (90 seconds 90% of the time) within a reasonable improvement period.

System Performance Standards

The Snohomish County Fire District 1's services within the City of Edmonds are appropriately resourced for the contractual requirements. In addition, the District has internally developed and adopted response standards by call type for travel time for the entire district. However, as reported by the District's 2015 annual report some of the adopted standards are not currently being met within the City and in some instances have never been met.[5]

The District is a progressive and professional agency that has taken the first step in adopting performance standards to guide their efforts to meet community expectations for service. In larger systems, such as the entirety of District 1, it is not uncommon to have an aggregate performance standard that is being met at the organizational level and yet have specific areas that are challenged to meet those same standards.

The City Council for the City of Edmonds is a partner with all of District 1 as a service provider, but also retains the responsibility to participate in a fluid standard setting process for the contracted services within the City, as occurred at the inception of the relationship. In other words, the City should have an expectation that they have input into the development of service expectations within the City and the flexibility to adjust said performance standards. For example, there may be greater value in adopting achievable performance standards within the City, rather than acknowledging continued deficiencies without the associated active planning efforts to improve service to meet the current standards.

To be clear, the District is providing high quality services to the City and has established themselves as a leader in the fire and emergency service industry by adopting performance

[5] Snohomish County Fire District 1. (2015). *2015 Annual Report to the City of Edmonds.* Everett, Washington: Author.

standards. In addition, the District should be commended for their transparency and accountability in reporting performance to the City. However, improving travel time downward (faster) typically requires a greater distribution of stations, a costly endeavor. It is assumed that the firefighters are driving at the most efficient and safe speeds while responding.

The two areas that are under the greatest control of management, are minimal to no cost options to improve, and provide the greatest return on investment are the time it takes to dispatch the calls and the time it takes it the crews to turnout for the call. Since travel time is difficult to adjust without substantial redistribution of resources or new resource allocation, the City and the District may benefit from setting performance standards for "total response time" that encompasses dispatch time, turnout time, and the travel time. From this perspective, the standard is more reflective of the customers' actual experience from the time that 911 is initiated until the arrival of resources.

Recommendation #3:
The City and the District are encouraged to collaboratively define and adopt service standards for services within the City of Edmonds. Specifically, adjust performance standards that historically have not been obtainable and are not expected to be obtainable or, where possible, develop a plan to meet the current standards.

Recommendation #4:
The City and the District are encouraged to establish performance standards for total response time that includes all time elements of dispatch, turnout, and travel time.

Alternatives for Consideration

The data suggests that there are several potential opportunities for service adjustments that may be either more efficient, effective, and/or contain costs within acceptable risk tolerance. Once again, under the current contract and conditions, the District is providing high quality services and generally commensurate with the City's own services prior to entering into a contractual relationship with the District.

Therefore, the identified alternatives specifically are generated to explore fiscal efficiencies that are either within an acceptable risk envelope or better align resources to actual community demands for service. It does not appear that this system was originally designed with the benefit of a data-driven analysis like this one. So, rather than assuming that the status quo provides the optimal balance between risk and readiness, policy-makers may want to consider what they would want the system to look like if they were designing the system from scratch today.

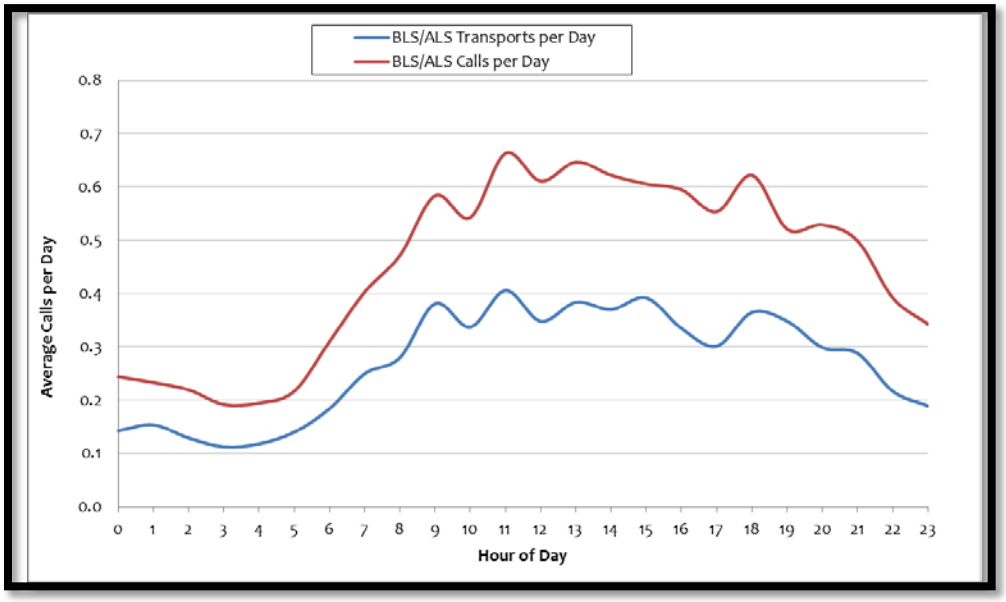
Each alternative is briefly summarized.

Alternative 1

Alternative number one achieves improved ALS services throughout the community and realizes operational and fiscal efficiencies by better aligning resource allocation to actual demands for service.

The peak of the day between 8 am and 8 pm are the busiest time of day for all calls including EMS incidents. A temporal distribution of hourly call demand for all calls 2014 was presented as above. Similarly, a temporal distribution of hourly call demand for EMS incidents and transports is provided below.

Figure 6: Average EMS Calls/Transports by Hour of Day



The City is adequately resourced for both the geographic limitations and the demand for services with four (4) full time units. However, during the non-peak hours, the City and the District could agree to adjust resource allocation as the demand for services declines. Similarly, the City and District could agree to upgrade all of the first response engines and trucks to ALS capability and cross staff Medic units at each station.

With ALS capability at each fire station location, the City would enjoy an improved response time performance for ALS incidents and maintain advanced capability for all calls for the occasions when the actual call is more severe than originally believed at the time of dispatch.

The 24-hour dedicated Medic unit (Medic 17) is necessary through the peak of the day, however, during the non-peak times the data suggests that cross-staffed Medic units could handle the demand for services at less than 0.5 calls per hour. In other words during the day, there would be two cross-staffed Medic Units, three ALS capable first response fire apparatus,

and a fully staffed Medic unit. In the non-peak hours, there would be three cross-staffed Medic units and three ALS capable first response fire apparatus. In total, there are between 6 and 7 transports per day in the City of Edmonds, or approximately two to three transports per unit per day if evenly distributed under this system design.

This more efficient allocation of services will improve services for ALS incidents, reduce the demand of external Medic units to respond into Edmonds, and provide for approximately a $500,000 reduction in expenditures.

Alternative 2

Alternative 2 is an incremental adjustment to Alternative 1. With this alternative, all stations and first response apparatus would be upgraded to ALS capability and cross-staff Medic units at each station. The most significant difference with this alternative is that the full-time Medic unit would transition to a cross-staffed unit in a commensurate manner that District one addresses EMS services. The City of Edmonds has the only dedicated full-time 24 hours staffed Medic unit in the District.

However, it is important to acknowledge that as the demand for EMS services continues to increase, adopting this alternative may have limited sustainability as resources will need to be repurchased and placed into the system. For example, while this deployment strategy has worked well for District 1, the District has instituted three peak-load Medic units to better handle the growing demand for services.

The operational benefits of this alternative are that ALS capable units will have an improved response time for ALS incidents and there should be a reduction in the demand for external Medic responses. The fiscal benefit is approximately a $1,000,000 annual reduction in expenditures. The operational impact to the system's performance is that at peak times, without the surge capacity of the fourth unit, the overall response times may vary between six and eight minutes as resources are drawn down. Our analyses demonstrate that 98% of all calls can be handled within an eight-minute travel time. In other words, if one of the three Medic units were on a call at all times, the system would still maintain a nationally accepted performance standard of eight minutes for ALS incidents.[6]

To better articulate the limited risk associated with this alternative, analyses for both station reliability and call concurrency were completed. First, reliability is a measure of how often the station was available and able to respond to a request for service within the assigned station area. Overall, the system is highly reliable at greater than 80% in all station jurisdictions. In other

[6] National Fire Protection Association. (2016). 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*. Boston, MA: National Fire Protection Association.

words, greater than eight out of every 10 requests for service, the closest unit is available and able to respond to the incident. The current station reliability is presented in the figure below.

Another lens to examine the system performance is to determine how often calls occur simultaneously or overlap. An analysis was completed to determine the probability of this occurring under the assumption of the system design in Alternative 2. Results found that with each station cross-staffing a Medic unit, approximately 84% all requests for service will be handled by the closest unit and returned to service without a second or greater request for service within the same district. Conversely, approximately 15% to 16% of the time, a second or greater call will occur simultaneous requiring the next closest unit to respond. When this occurs, the designed response time will vary since the closest unit is no longer handling the incident. The probability of concurrent or overlapping calls is presented below.

Figure 7: Station Demand Zone Reliability

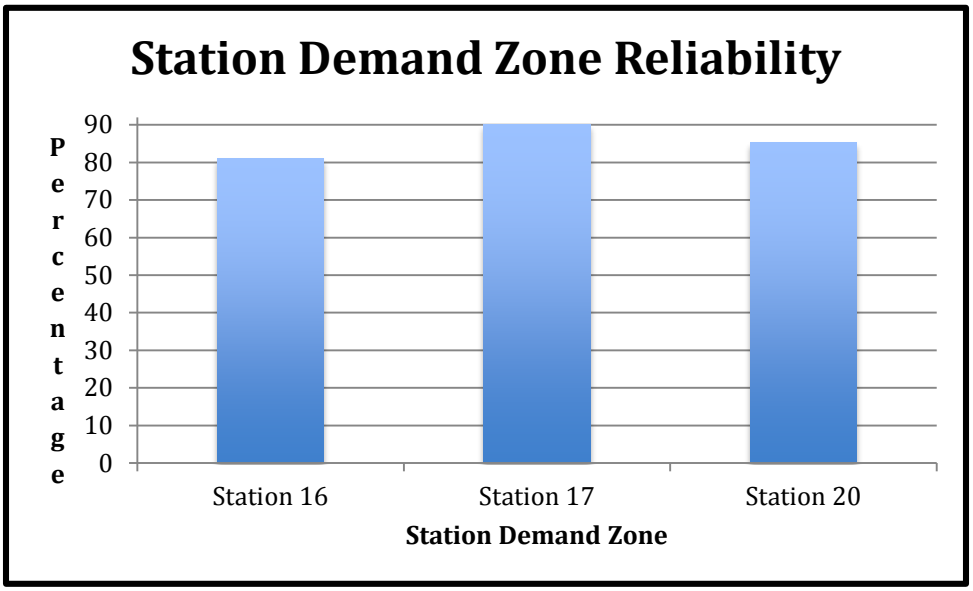
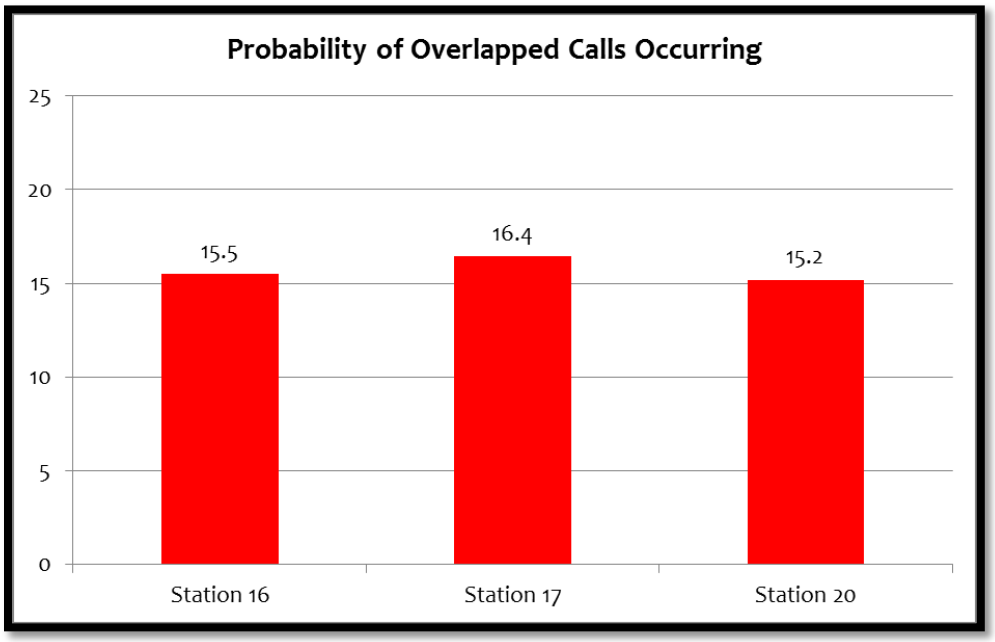


Figure 8: Probability of Overlapped Calls Occurring in Alternative 2



Alternative 3

Alternative three considers the relative risk associated with the incidence of fire both nationally and specifically within the City of Edmonds. As previously, discussed in this executive summary, the overwhelming majority of the community's demands for services are for EMS. In 2014, for the City of Edmonds, 9.8% of the total demands for service were for fire related calls. There were approximately 23 actual structure fire incidents accounting for approximately 5% of the fire related incidents and less than 0.5% of the community's demand for all services. Data was previously presented above.

Edmonds' fire experience is not unique. Nationally, the trends in the number of structural fires and civilian fire death rates have been in decline since 1977. Data from the National Fire Protection Association is presented in the figures below.[7]

[7] NFPA. (2016). *Trends and Patterns of U.S. Fire Loss.* Quincy, Massachusetts: Author.

Figure 9: Structural Fires and Home Structure Fires by Year

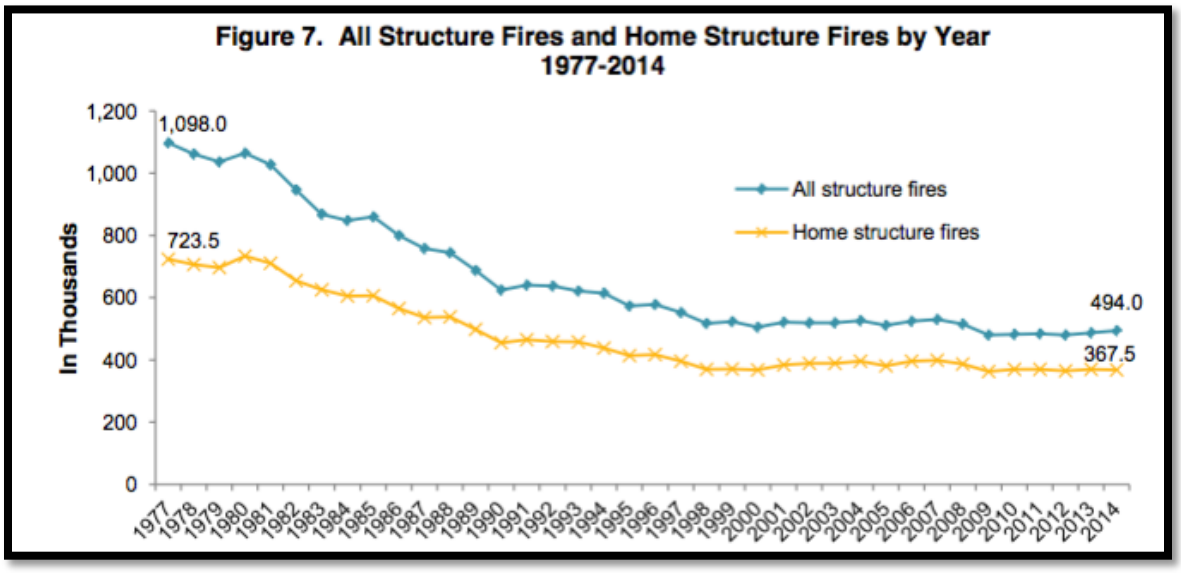
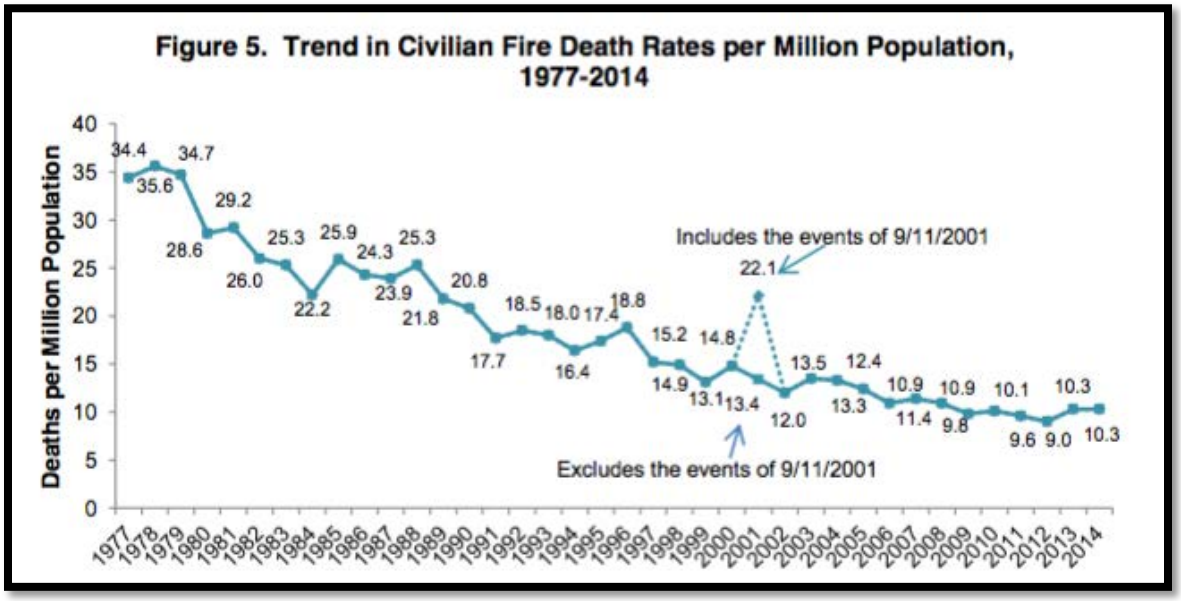


Figure 10: Trend in Civilian ire Death Rates per Million Population 1977-2014



The community's risk profile forms the predicate for this alternative along with the understanding that risk cannot be eliminated at any resource level. Because structure fires amount to 0.5% of the community's total demand for services, the policy-makers could find that this alternative, which preferences ALS readiness over fire readiness, best aligns allocated resources to actual community demands for service. In other words, as the community's risk exposure in frequency, property damage, and civilian fatalities continues to fall, there are opportunities to re-evaluate the risk tolerance and resource allocation associated with fire incidents.

However, it is important to acknowledge that at the individual incident level, fire is no less dangerous today than it has ever been. For example, the rate of home fire deaths per thousand fires has not reduced significantly since 1977.[8] What has changed is the frequency of occurrence. The reduction in frequency has significantly reduced community risk and exposure by reducing overall civilian fire deaths and property loss.

The data suggests that the City could assume minimal risk on fire related risks and receive significant fiscal benefits. The fiscal advantage is from shifting expenditures away from readiness costs that are misaligned with actual community demands for service. It is within the City's capability to adjust the readiness level for these services based on willingness to assume risk and the community's overall risk exposure.

Therefore, Alternative 3 includes adjusting the travel time performance for fire related incidents from six minutes to eight minutes. The net effect is that the City would be covered for fire peril with two fire suppression apparatus rather than three. The District's desire to assemble 19 personnel on-scene of a structural fire incident would not change, but may include additional time for the next closest replacement unit to arrive on the small percentage of the incidents when this is required, or approximately 1% of the total requests for services.

Since the City of Edmonds is a partner in the greater District and have adjacent agencies that provide automatic aid response into Edmonds, an analysis was conducted to evaluate the potential impact or "ripple effect" of requiring a third fire suppression apparatus in Edmonds. The analyses revealed that out of all 450 fire related requests for service in 2014, 80% of the incidents were handled by one apparatus and no more than two apparatus handled 90%. Therefore, with consideration of the relatively high reliability of station performance, the low demand for fire related services, and the relatively low rate of concurrent calls, the frequency of drawing in additional resources from either the District or neighboring communities should be reasonable. In addition, the reconfiguration of Medic units will reintroduce ALS capacity back to the District and neighboring communities at an equal or higher rate.

Data is presented below.

[8] Ibid.

Figure 11: Number of Units Responding to Fire Related Incidents

Number of Responding Units	Number of Calls	Percent of Total	Cumulative Percent
1	361	80.2%	80.2%
2	45	10.0%	90.2%
3	13	2.9%	93.1%
4	5	1.1%	94.2%
5	1	0.2%	94.4%
6	2	0.4%	94.9%
7	3	0.7%	95.6%
8	6	1.3%	96.9%
9	10	2.2%	99.1%
10 or more	4	0.9%	100.0%
Total	**450**		

As previously discussed, the City and the District have an opportunity to mitigate the travel time impact associated with this alternative by embracing the opportunity to improve the turnout time. For example, the current travel time performance for fire related incidents is 6.6 minutes. The proposed elongation of fire related travel time is therefore, 1.4 minutes. The current turnout time for fire related incidents is 2.9 minutes or six seconds less than double the recommendation. For fire related incidents alone, if the turnout time was managed (reduced) from 2.9 minutes to 1.5 minutes it would eliminate most of the assumption of new risk because the customers' experience from the time 911 is initiated until arrival may be commensurate with current service.

Please see the summary provided below.

Figure 12: Opportunity to Consume the Risk at No Cost

Fire Related	Turnout Time	Travel
Current	2.9	6.6
Proposed	1.5	8.0
Differential	-1.4	+1.4

Alternative 3 would also maintain the 24-hour staffed and dedicated Medic unit for Edmonds at Station 17, upgrade all first response fire suppression apparatus to ALS capability, and cross-staff 2 additional Medic units, while responding from all three current fire stations.

The net benefits for this alternative is that ALS response time performance and capacity will be improved, there should be a reduction in demand for external Medic unit resources, and minimal risk assumed associated with less than 0.5% of the overall demand for services. The fiscal benefit is a reduction of nearly $1,500,000 in annual expenditures.

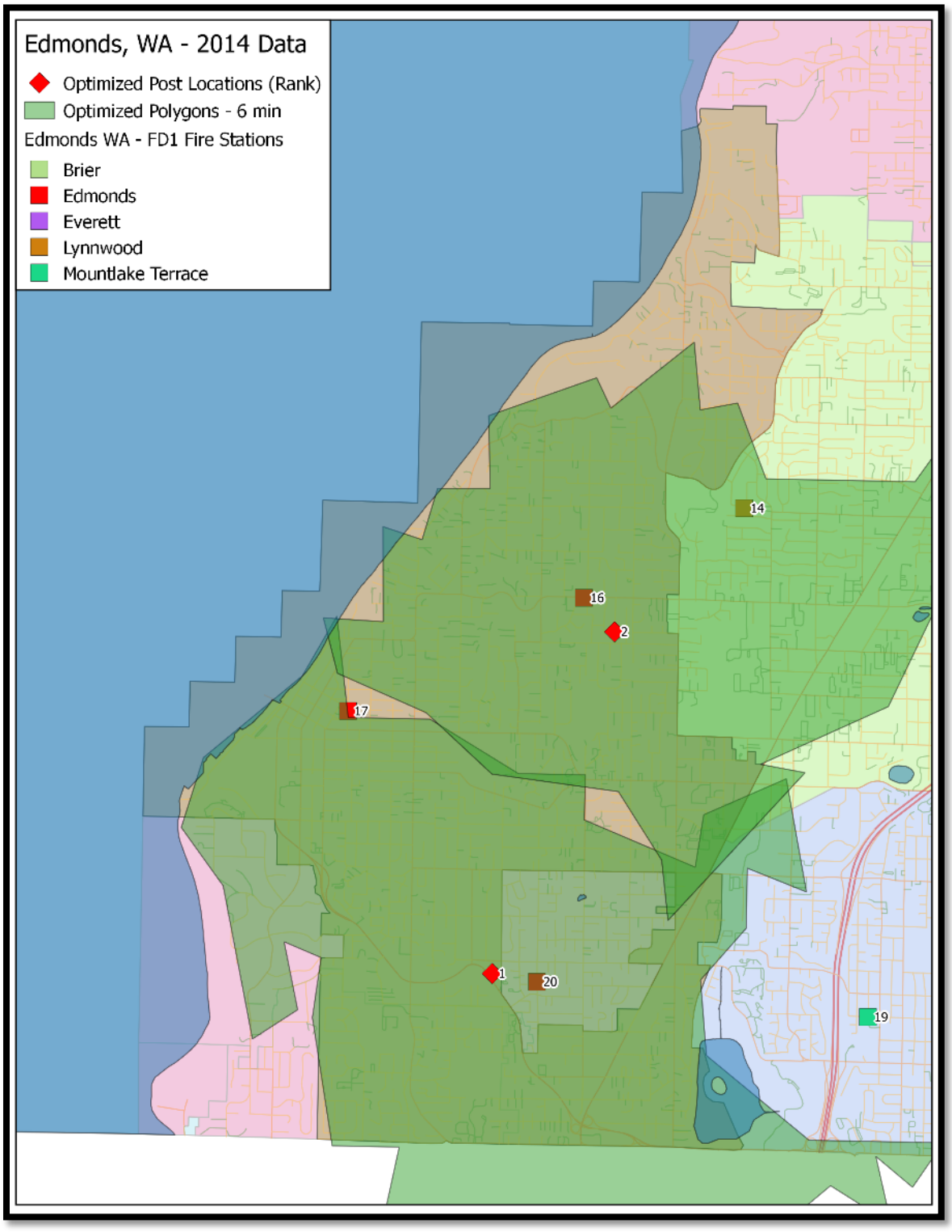
Consideration for Long-term Planning and Sustainability

Finally, GIS analyses suggest that Edmonds could maintain current service capacity defined as a 6-minute travel time with two stations if they were more strategically placed. It is understood that reconfiguring a system would consume considerable capital outlay and would require a long planning horizon. However, these analyses are provided as a resource for the City's long-term planning and/or for when capital infrastructure is to be replaced. Optimizing the station locations would provide a similar reduction in expenditures as Alternative 3 but maintain current travel time performance.

Figure 13: Optimized Station Locations with 6-Minute Travel Time

Rank	Latitude	Longitude	Station Capture	Total Capture	Percent Capture
1	47.791328	-122.357129	2904	2904	66.36%
2	47.81875	-122.343426	1215	4119	94.13%
3	47.846172	-122.316018	130	4249	97.10%
4	47.809609	-122.357129	65	4314	98.58%
5	47.837031	-122.357129	40	4354	99.50%
6	47.855312	-122.329722	3	4357	99.57%
7	47.837031	-122.329722	3	4360	99.63%
8	47.846172	-122.329722	1	4361	99.66%

Figure 14: Optimized Station Locations for 6-Minute Travel Time



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