Master Plan

2016

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Acknowledgments

Emergency Services Consulting International (ESCI) would like to acknowledge that without the assistance and support of the Lebanon Fire District Board of Directors, administrative staff and personnel of the district, without whom this project could not have been successfully completed.

Board of Directors

Allen Forster, President

Michael Schrader, Vice President

Robert Taylor, Secretary/Treasurer

Jeff King, Board Member

Jamel Mercado, Board Member

Agency Staff

Gordon Sletmoe, Fire Chief

Ron Sipe, Division Chief of Operations

John Tacy, Division Chief of Training and Safety

Jason Bolen, Division Chief of Planning and Administration

Executive Summary

Emergency Services Consulting International (ESCI) was engaged by the Lebanon Fire District (LFD) to provide a Master Plan for the future delivery of emergency services within the city of Lebanon and the fire district. This Emergency Services Master Plan will assist the district in future planning and provision of comprehensive emergency services to the citizens of the service area. This report evaluates current conditions found to exist in the agency, projects future community growth and service demand, and provides recommendations to sustain or enhance current services over the next 10 to 15 years.

ESCI thanks the Lebanon Fire District Board of Directors, the fire chief, and the staff of the LFD for their outstanding cooperation in the preparation of this report. All involved were candid in their comments and provided a tremendous amount of essential information.

The Master Plan begins with an Evaluation of Current Conditions, which provides a snapshot in time of the organization as it is today, and establishes an informational baseline from which the balance of the Master Plan is developed.

Evaluation of Current Conditions

An analysis of current conditions is documented in seven survey sections, reviewing the LFD organizational composition, financial condition, management components, staffing and personnel management, training and fire prevention programs, service delivery, and capital assets and infrastructure. Each component of the evaluation includes an introductory explanation of the subject area and a discussion of desirable outcomes and identified best practices.

The evaluation of current conditions provides the district with a detailed assessment of existing fire and EMS operations and also provides the ESCI project team with a snapshot in time, the basis from which the balance of the Emergency Services Master Plan is developed.

Criterion used to evaluate the fire district has been developed over many years. These gauges include relevant guidelines from national accreditation criteria, the National Fire Protection Association (NFPA) standards, federal and state mandates for fire and EMS systems, recommendations by various organizations such as the Center for Public Safety Excellence (CPSE), and generally accepted best practices within the fire and EMS industry.

The district is a full service agency, providing an array of services including fire prevention and suppression, technical rescue, hazardous materials, ambulance transportation, advanced life support, and many other services. The district operates from five strategically placed fire stations using a sizeable fleet of fire and specialized response vehicles. Two stations are staffed with career personnel and three with volunteers, with a total complement of 66 personnel.

In completing the evaluation phase, the team members found an exceptionally well-managed fire department that has done an excellent job of keeping pace with its challenges and increasing demands, while also effectively addressing the management, administrative and operational needs of a modern

day fire department. The elected officials and staff of LFD have good reason to be proud of the quality of an organization that they have created.

Service Delivery Analysis

The report also includes an extensive analysis of the district's current ability to provide services to its constituents. The analysis includes the following:

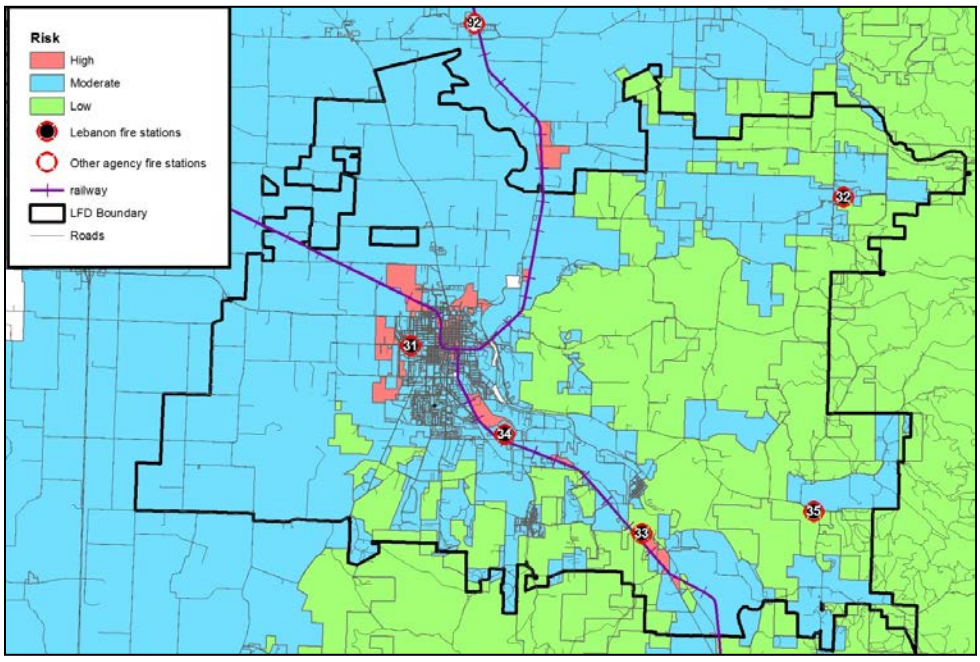
- Community Risk Assessment
- Population Growth Projections
- Historic System Response Workload
- Response Unit Workload Analysis
- Population and Incident Workload Forecast
- Critical Tasking and Alarm Assignments
- Review of Historical System Performance

Community Risk

The community risk assessment is detailed based has on land use criteria, in the context of relative fire and life safety risk, as follows:

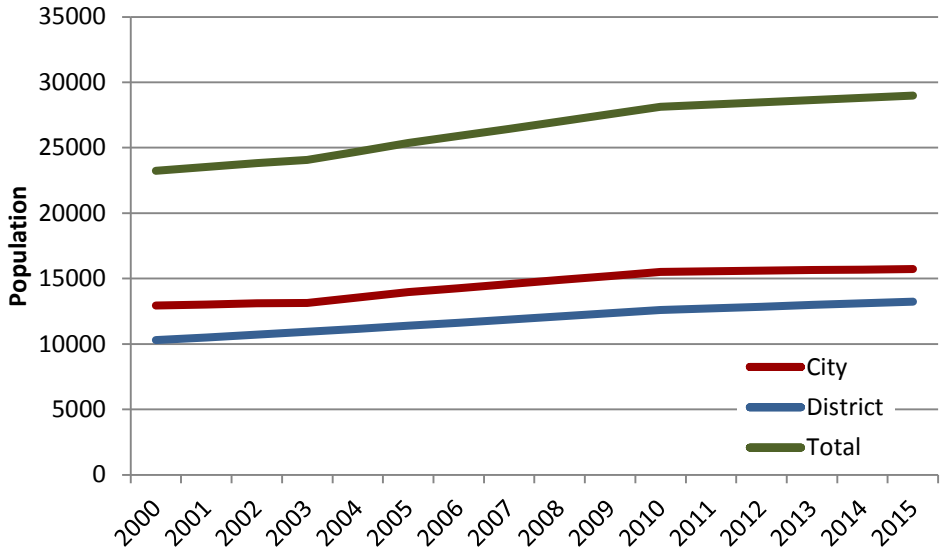
- Low risk – Areas zoned and used for agricultural purposes, open space, and very low-density residential and uses.
- Moderate risk – Areas zoned for medium-density single family properties, small commercial and office uses, low-intensity retail sales, and equivalently sized business activities.
- High risk – Higher-intensity business districts, mixed use areas, high-density residential, industrial, warehousing, and large mercantile centers.

The fire and life safety risk is discussed in detail and also mapped as seen below.



Population

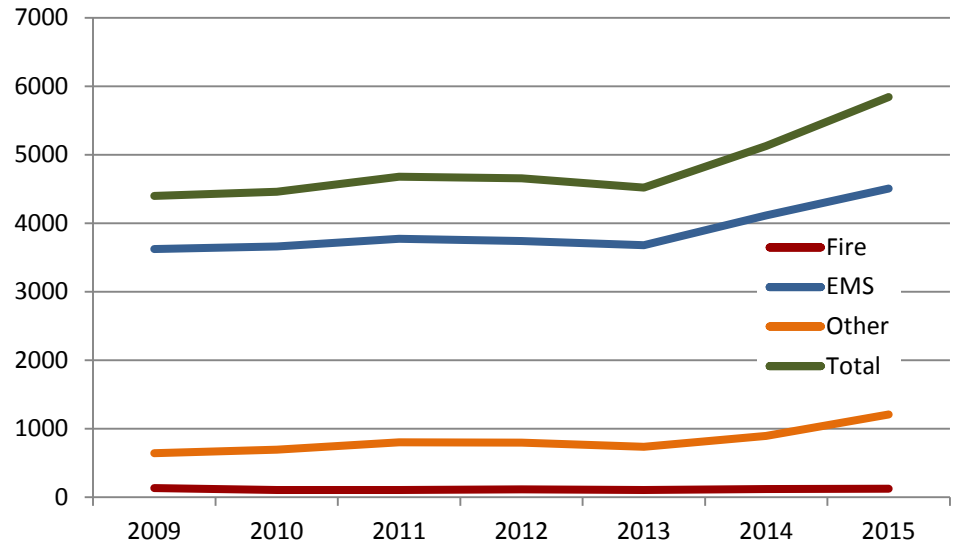
Population growth history is next reviewed and graphed.



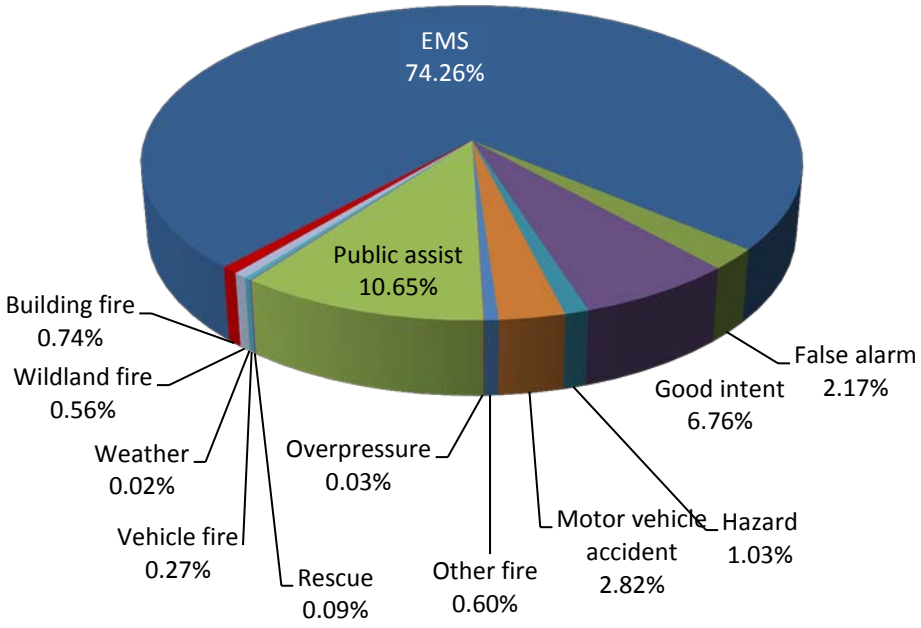
The district's population has grown slowly, with an average annual growth rate of 1.6 percent between 2000 and 2015. At the time of this study, the current service area population is estimated at 28,988.

Workload

Population historical trends are also considered relative to fire district emergency response workload in the following graph.

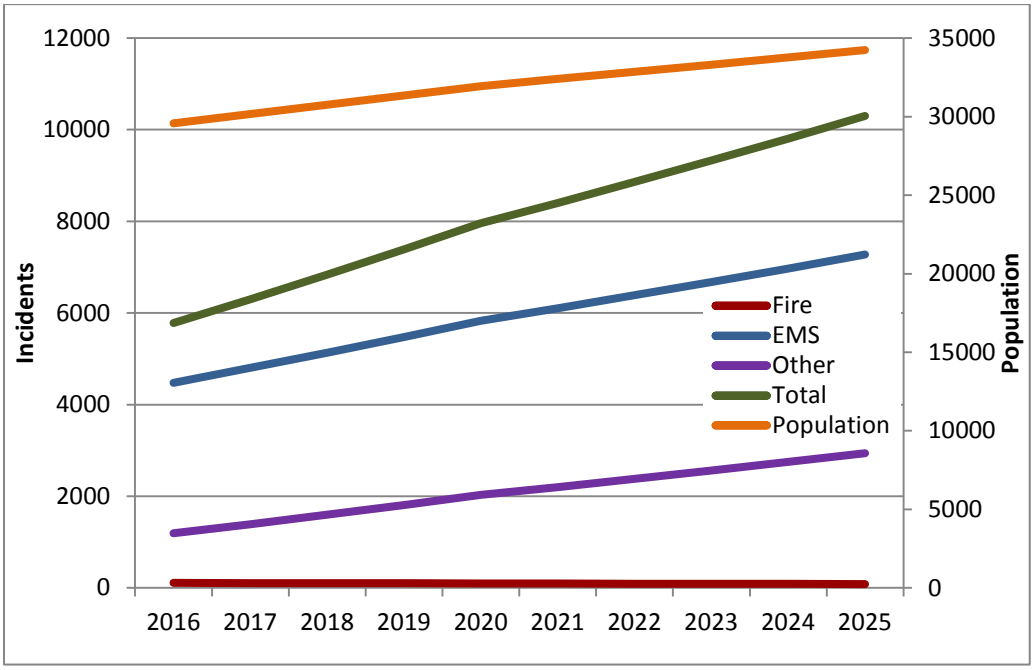


As depicted, total responses have increased 38.2 percent over seven years, primarily driven by the increase in emergency medical responses. Much of the increase in emergency medical response activity has been for inter-facility transfers. Incident types for 2013 – 2015 are shown below.



Future System Demand

With the above information, ESCI projects future population and fire and EMS workload.



The population forecast indicates that the district's service population will grow to 34,200 by the year 2025. Total LFD response workload could reach 10,300 annual calls for service with EMS incidents increasing at a faster pace than fire and other types of incidents due in large part to the aging population. Most of the increased workload will occur within the city of Lebanon.

Staffing and Critical Tasking

The report continues to identify the staffing levels necessary to meet critical tasking at various types of emergencies. That discussion is followed by an analysis of historical response performance in the district. The data indicates that responders are reaching the emergency scene within 6 minutes, 85 percent of the time in the city of Lebanon and within ten minutes, 85 percent of the time, in the district outside of Lebanon. Those response times are discussed in comparison to internally developed response performance goals and are charted as follows:

RESPONSE INTERVAL	CITY OF LEBANON AND UGB (URBAN)	UNINCORPORATED LFD (RURAL)
Dispatch call processing (received to dispatch)	Within 60 seconds, 80% of the time	Within 60 seconds, 80% of the time
Turnout time (dispatch to enroute) 7:00 am to 10:00 pm 10:00 pm to 7:00 am	 Within 95 seconds, 90% of the time Within 170 seconds, 90% of the time	 Within 95 seconds, 90% of the time Within 170 seconds, 90% of the time
Response time (dispatch to arrival)	Within 6 minutes, 85% of the time	Within 10 minutes, 85% of the time
Full effective response force	Within 10 minutes, 80% of the time	Within 15 minutes, 80% of the time

Future Delivery System Models

Armed with the preceding analysis, ESCI is able to identify future needs and workload and offer guidance regarding how the district can best move forward. Initial strategies are listed as short and mid-term initiatives, followed by additional, long term, recommendations.

Short and mid-term strategies recommend that the district:

- Complete a Strategic Plan
- Revise and Re-adopt Response Performance Goals
- Improve the Collection and Use of Incident Data
- Improve Dispatch Center Performance
- Implement Closest Unit Dispatch
- Improve Turnout Time Performance
- Establish a Non-Traditional Volunteer Program
- Conduct Capital Asset Planning
- Develop an Apparatus Replacement Plan

Following the short and mid-term recommendations, ESCI continues to identify strategies that should be considered as long term initiatives. Each is discussed in detail, and implementation guidance is provided. The following elements are discussed as long term future considerations:

- Future Fire Station Locations
- Use of Peak Activity Units
- Addition of Alternate Response Units
- Addressing Frequent System Users
- Implementing Community Risk Reduction

The report cites multiple future system model modifications, included both short term and long term initiatives that are identified in the interest of improving and maintaining future system integrity. Each initiative is discussed in detail and guidance is provided.

Evaluation of Current Conditions

ORGANIZATIONAL OVERVIEW

The Organizational Overview component provides a summary of the agency's composition, discussing its configuration and the services that it provides. Data provided by Lebanon Fire District (LFD) administrative and management staff, as well as both internal and external stakeholders, was combined with information collected in the course of ESCI's fieldwork to develop the following overview.

Governance

The very basis of any service provided by governmental or quasi-governmental agencies lies within the policies that give that agency the responsibility and authority upon which to act. In most governmental agencies, including LFD, those policies lie within the charters, ordinances, and other governing documents adopted by the agency. The following table provides a general overview of LFD's governance and lines of authority elements.

Figure 1: Survey Table – Governance

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
RESPONSIBILITIES & AUTHORITY		
Type of governing body	Five-member Board of Directors	
Head of governing body	Allen Forster, President	
Meeting schedule	Second Tuesday of each month	
Elected official authority defined? Where?	In Board of Directors Policy manual	
Fire chief	Gordon Sletmoe	
Hired by contract?	Yes	
Term of contract	Automatic renewal annually	
Performance evaluations given?	Completed annually	
Fire chief's authority defined?	Employment contract, job description, policies.	
Policy & administration roles defined? Where?	Employment contract, job description, policies.	
ATTRIBUTES OF A SUCCESSFUL ORGANZIATION		
Rules and regulations last reviewed/updated?	Policy and procedure and SOG Manuals in place. CBA and non-represented employee handbook. SOGs reviewed annually, policies as-needed.	
Revision process provided to line	Not defined	
Legal counsel retained?	Speer Hoyt, Local Government	
Consultation available to fire chief?	Yes	
Labor counsel available to fire chief?	Yes	
Governing body minutes maintained?	Yes, at the district office	

Discussion

The Lebanon Fire District is organized as a Rural Fire Protection District. as defined by Oregon State statutes[1], located in the Willamette Valley of Oregon, near the state capital of Salem.

The district's governance configuration is typical of Oregon Rural Fire Protection Districts, operating under the direction of a five-member Board of Directors (board or BOD). The board operates under a Board Policy Manual, which defines board authority and policy.

Board Policy

It is important that the authority and responsibility of a governing body be clearly defined. The role of the BOD is to establish direction for the organization in the form of policy. The authority and responsibility for carrying out policy is then assigned to the fire chief and his/her staff. ESCI reviewed the LFD Board Policy Manual and found it to be complete and inclusive of the appropriate content that is needed to define the role and operations of the BOD. The manual was last updated in September 2014.

Standard Operating Guideline Update and Revision

Standard Operating Guidelines (SOGs) form the foundation upon which the organization's operating direction is established. SOGs must be maintained in a current state and a process for review and updating should be in place. Commendably, the district reviews and updates its SOGs annually. The subject is discussed further in the following report sections.

Organizational Design

The structural design of an emergency services agency is vitally important to its ability to deliver service in an efficient and timely manner while providing the necessary level of safety and security to the members of the organization, whether career, paid-on-call, or volunteer. During an emergency, an individual's ability to supervise multiple personnel is diminished; industry standards recommend a span of control of four to six personnel under stressed situations. This is a recommendation carried forward from military history and has shown to be effective in emergency service situations.

In addition, employees tend to be more efficient when they know to whom they report and have a single point of contact for supervision and direction. A recent research project conducted by the Columbia University, Northwestern University, and University of Queensland, Australia, found that,

> …when there are tasks that require teamwork, people get more done when there are leaders and followers. Without a clear chain of command, members often become sidetracked with grabbing power and lose track of the task at hand.[2]

The following table summarizes the organizational design components of Lebanon Fire District:

[1] *Oregon Revised Statutes* Chapter 478.

[2] "Why Hierarchies are Good for Productivity," *Inc*. September 2012, p 26.

Figure 2: Survey Table – Organizational Design and Formation

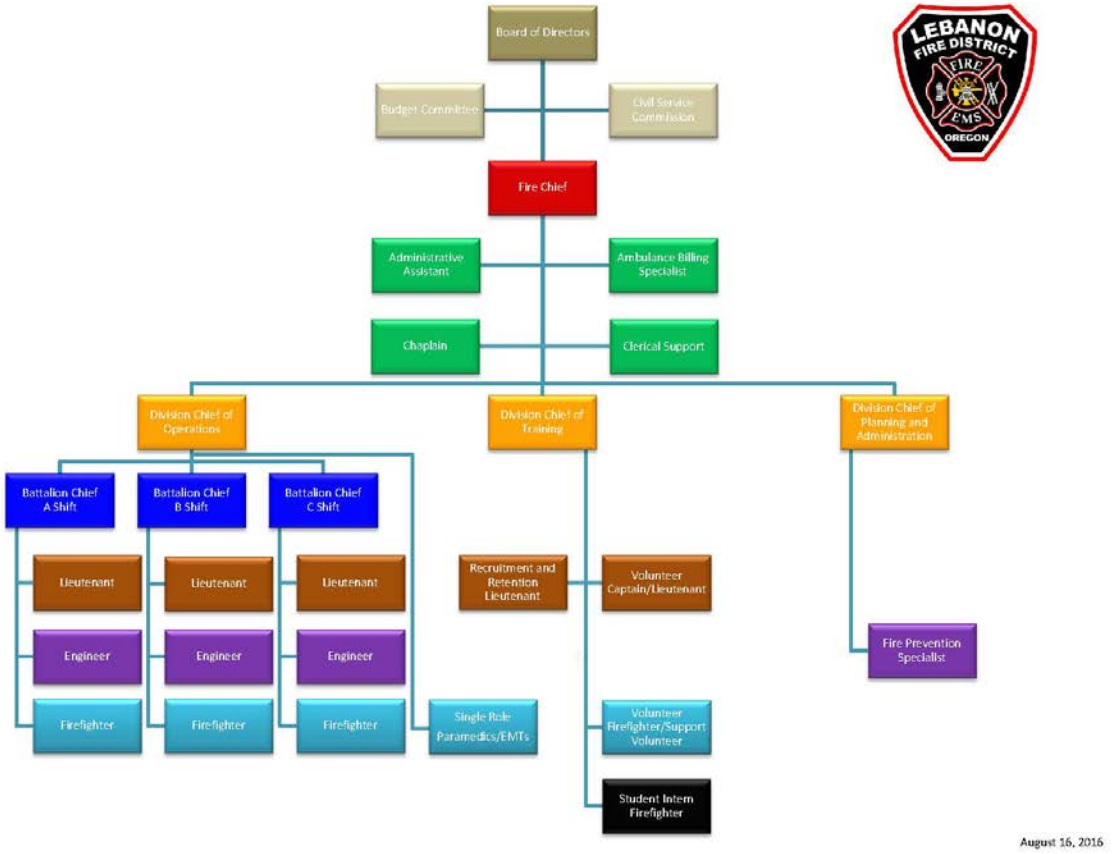
SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
ORGANIZATIONAL STRUCTURE		
Structure type	Elected Officials, Fire Chief, Operational & Supporting staff	
Descriptions of all jobs maintained?	Yes	
Job descriptions last updated	2015/2016	
Positions with employment agreements	Fire Chief	
CHAIN OF COMMAND		
Span of control	1:3 – 3 direct report to the chief	
Hiring/Firing authority	Fire Chief	
FORMATION		
When was organization formed?	1987 (City and Rural districts merged into new special district)	
Is FD history maintained?	Yes	
Individual or group responsible	Unofficial department historian	

Organizational Structure

To operate effectively, the structure of a fire department needs to be clearly defined in the form of an organizational chart. The chart institutionalizes the agency's hierarchy, identifies roles and reporting authority, and helps to assure that communication flows appropriately, as well as limiting opportunities to circumvent the reporting structure.

LFD has developed an appropriate organizational chart that achieves this purpose. The chart was revised subsequent to ESCI's initial data collection to capture some recent modifications. In particular, the fire marshal's position was amended to that of division chief of planning and administration. The most current chart is provided in the following figure.

Figure 3: Lebanon Fire District Organizational Chart



Organization of the district is a traditional, top-down hierarchy, as found in most similar organizations. The fire chief reports to the Board of Directors and subsequently supervises three divisions and administrative staff. The recently updated organizational chart appropriately reflects the reporting structure.

Structural changes have occurred in recent years, including the placement of a new fire chief and the addition of the new division chief of planning and administration, along with other changes made by the new chief. With the changes that have occurred, the current span of control and workload is appropriate and conducive to effective operations. As further future changes are made, monitoring span of control will be important.

A chain of command is designed not only to identify reporting authority, but also to declare how information is to flow as well as how responsibility is assigned. When responsibility is placed, an organization must not only assign but also allow and empower the people filling various positions in the organizational chart to do their jobs. ESCI received indications that the current chain of command is effective.

It is important that job descriptions be developed for personnel at all levels in the organization. It is also important to update job descriptions routinely to assure they address changes that naturally occur in duty assignments. All positions in the LFD have current job descriptions and they are up to date.

Formation and History

The current fire district was created July 1, 1987, by way of a merger of the City of Lebanon Fire Department and the Lebanon Rural Fire Protection District. The city fire department was formed in 1884 as the Lebanon Engine Company #1. On June 4, 1915, Lebanon Engine Company #1 was reorganized and consolidated with the Lebanon Fire Department. Records are not available the identify the date of establishment of the original fire district.

Service Area and Infrastructure

The size and composition of a fire department's service area affects the type and number of personnel, fire stations and vehicles that are needed to provide services efficiently. Sometimes complex decision need to be made regarding the deployment strategies employed to properly position resources based on land area, geography, risk and similar factors. Following is a summary of the LFD service area and service infrastructure resources.

Figure 4: Survey Table – Service Area and Infrastructure

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
AGENCY DESCRIPTION		
Agency type	Fire Protection District	
Area in square miles	134	416 total ASA and District -282 in ASA
Headquarters location	1050 W Oak Street, Lebanon, OR 97355	
Number of fire stations	5,2 by career; 3 by volunteers	
Other facilities	N/A	
Emergency vehicles		
Engine	5	
Engine, reserve	1	
Ladder truck	1	Cross-staffed by engine crew
Rescue	1	
EMS unit (ALS, BLS)	3	
EMS unit, reserve	2	
Command Vehicles	5	
Boat/Water craft	--	
Tenders/Brush	6	
Support Vehicles (not staff vehicles)	2	Conflagration trailer
ISO rating	3, 5, 8B, 10	
Date of most recent rating	2006	Being reviewed currently

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
Total FD personnel, uniformed & civilian	(Only one category per person unless a position is specifically split)	
Admin. & support personnel, full-time	1	
Admin. & support personnel, volunteer	0	
Admin. & support personnel, part time	2	
Operational personnel, full-time	30	
Operational personnel, part time	0	
Operational personnel, volunteer	33	
DEMOGRAPHICS		
Population (year, source)	27,000 (ESRI Business Analyst online)	District only - additional 9,000 in the ASA for a total of 36,000
Total residential units	10,492 housing units	

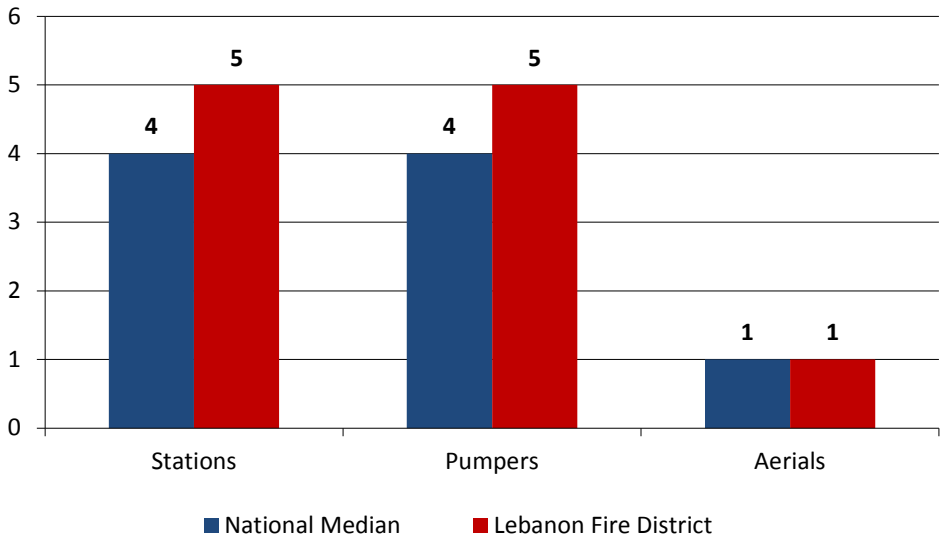
Discussion

LFD has been able to deploy people and apparatus in strategically located fire stations, balancing the needs of providing effective coverage to a widely dispersed geographic area. Placing, equipping and staffing fire stations will be an ongoing challenge for the district as the community grows and changes. With those factors in mind, a detailed assessment of current community risk, service delivery, and effectiveness is provided in the *Service Delivery and Performance* section of this report.

The district's continuing test will be that of making the most prudent staffing and facility placement decisions based on weighing multiple considerations, including risk exposure, response times, access challenges, deployment, community expectations, and fire department capacity. Those decisions are difficult given the financial considerations that must be taken into account.

In the following chart, a comparison of fire stations, pumpers (engines) and aerial trucks is provided mirrored against National Median data.

Figure 5: Capital Asset Comparison



Relative to national comparators, LFD has a slightly higher number of fire stations and pumpers than similar sized organizations, based on population size. The difference is to be expected, however, given the large geographic area that is served by the district. Most national comparators serve smaller, more densely populated areas.

Emergency Response Type and Frequency

LFD responded to 6,074 requests for assistance from the citizens of the district in the 2015 reporting year. As is typically found, the vast majority of incidents are of an emergency medical nature. The district's emergency calls for 2015 are listed in the following table.

Figure 6: Survey Table – Emergency Response Type and Frequency

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
ALARMS		
Fires (most recent complete year)	140	
Property value exposed to fire	$97,275,240	
Property value lost to fire	$3,368,150	
Rupture or explosion	2	
EMS/rescue	4,662	
Number of EMS transports	4,178 of the 4,662	
Hazardous condition	62	
Service call	663	
Good intent call	412	
False call	131	
Severe weather	1	
Other	1	
Total	6,074	

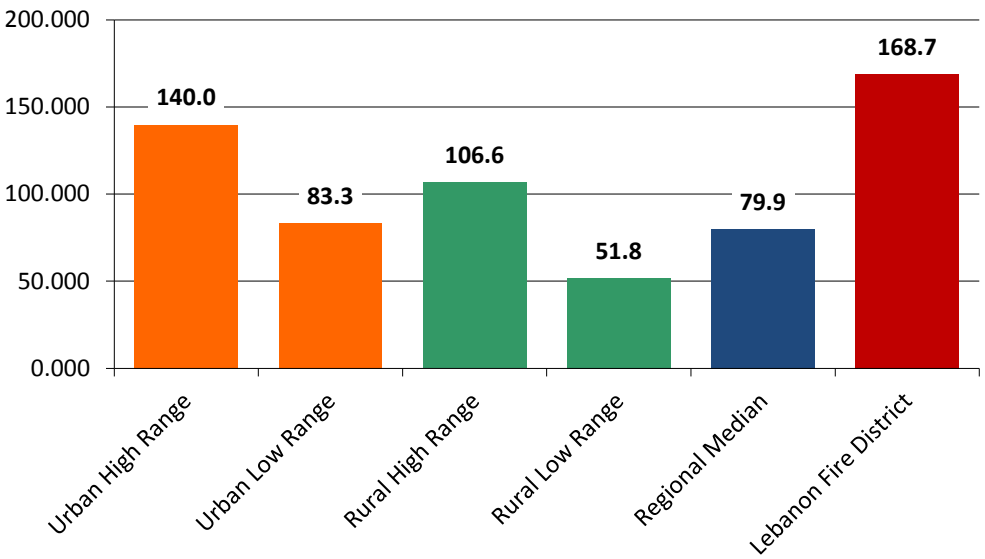
SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
MUTUAL AID		
Given	116	Data includes out of district ambulance responses which creates an imbalance
Received	32	Mainly from Albany and Sweet Home

Discussion

Approximately 77 percent of the district's 2015 incidents involved response to medical emergencies. The percentage is similar to what is generally found in most fire departments. A total of 140 incidents were reported as structural fires in the reporting year, which is consistent with that found in similar sized agencies. Additional detail on emergency response, service delivery effectiveness and response performance is provided in the *Service Delivery and Performance* section of this report.

ESCI compared the number of total emergency incidents to which the district responded in calendar year 2013 to a variety of regional comparators based on data provided by the National Fire Protection Association, as seen in the following figure.

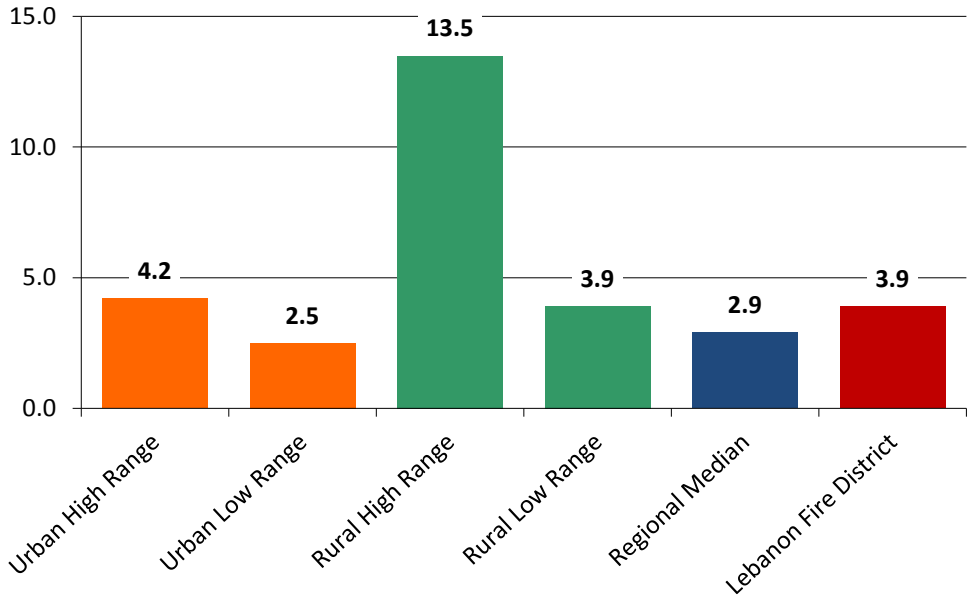
Figure 7: Total Incidents per 1,000 Population



In total, emergency incidents fall above the regional medians. The higher number is due to the inclusion of ambulance transport responses, which is not a service provided by all fire departments, skewing the data set.

A similar comparison is offered in the following figure, referencing only fires that occurred on a per 1,000 population basis.

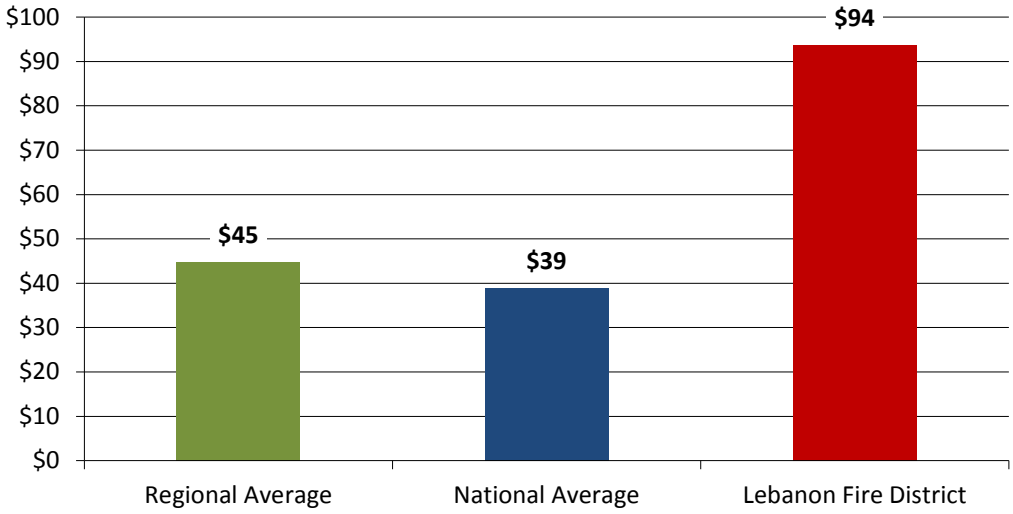
Figure 8: Fires per 1,000 Population



The occurrence of fires in the district's service area is very similar to the applicable medians.

The following provides a comparison of dollar losses to fires on a per-capita basis compared to western regional and national averages:

Figure 9: Fire Loss per Capita



The preceding figure uses 2015 data, indicating that the fire losses fall above the averages. However, it is noted that a one-year data snapshot may not be an accurate representative of overall trends and a single significant loss can readily skew the graph.

Mutual Aid

Mutual aid is typically intended to be reciprocal in nature, roughly balanced between the number of times that assistance is requested with the frequency of which it is provided. In the data available from LFD, an imbalance is found, with 116 occurrences of mutual aid provided compared with 32 receipts of assistance.

However, the imbalance is not reflected accurately in the data because ambulance responses that fall outside of the fire district are recorded as "Mutual Aid Given" incidents. Data was not available with which to separate the out-of-district ambulance calls, so the comparison cannot be validated; however indications from the fire chief are that the actual ratio is generally in balance. ESCI recommends that future data tracking be modified to more accurately account for mutual aid exchange.

FINANCIAL ANALYSIS

The effective acquisition and management of financial capital is essential to ensure the organization's ability to deliver services. Economic challenges, tax reduction measures, and other factors make this job difficult. Maintaining a long-term view of financial resources and requirements is required.

LFD has a solid financial situation. It has good systems in place to manage its financial resources. It has consistently maintained a positive budget position as evidenced by its growing cash reserves.

Overview

Property within the LFD service area has a total assessed valuation of $1,893,397,011. LFD has a permanent property tax rate of $2.26 per $1,000 assessed valuation. In addition, LFD is collecting taxes to repay a general obligation bond in the amount of $387,350 for fiscal year 2015-16. This bond will be fully repaid by 2021.

The city of Lebanon portion of the service area is in compression. Tax collections are limited by state law that sets a maximum amount that can be collected by all local governments within a taxing area. This compression results in a loss to LFD of approximately $47,000. In addition, the city has established three urban renewal districts. This further limits tax revenue to LFD of approximately $449,740.

District finances are overseen by the fire chief. A contract finance manager conducts monthly reconciliations, assists with budget preparation, manages cash flow, and schedules and prepares for the annual audit. District staff conduct general accounting duties including receipt of money, tracking invoices, preparing payments, payroll, and other processes.

A comprehensive financial policy and procedure is in place that provides good direction to staff regarding management of district finances.

Budgeting

LFD budgets funds each fiscal year, which begins on July 1 and ends the following June 30. The budget process generally follows state law and the financial policies adopted by the board. The fire chief, as

budget officer, directs the overall budget development and is responsible for its administration. Staff and volunteers collaborate with the fire chief in overall budget development.

The district's budget is relatively complex when compared to similarly sized fire districts. It is made up of four funds[3], with each fund divided into one or more "departments" (subsets of each fund used to identify the revenues and costs for discrete programs and activities). The funds and departments in the current budget are as follows.

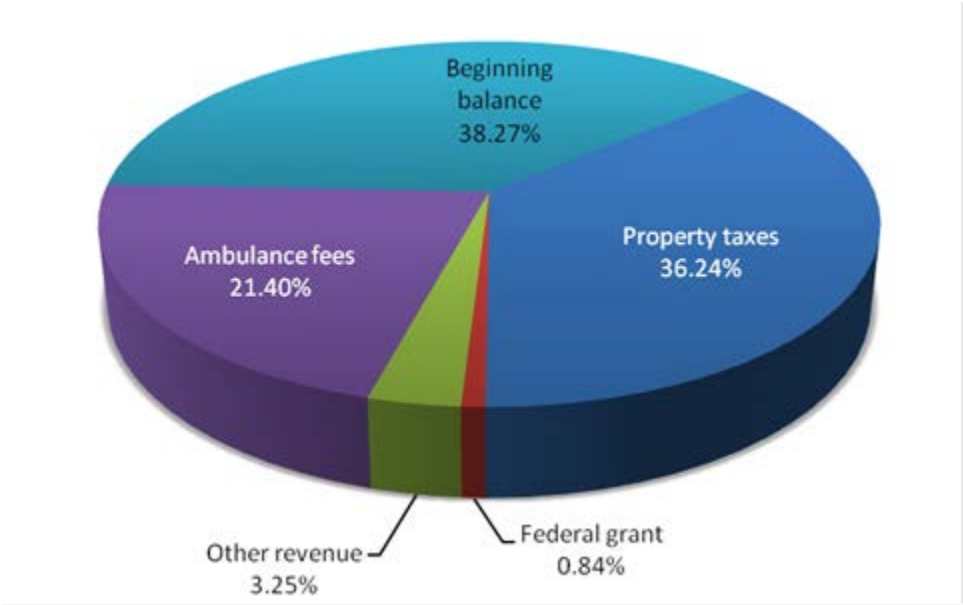
- Fund 020 – General Fund
  - Department 201 – Fire Suppression Department
  - Department 202 – Fire Prevention Department
  - Department 203 – Legislative Department
  - Department 204 – Finance Department
  - Department 205 – Maintenance Department
  - Department 206 – Training Department
  - Department 207 – Volunteers Department
  - Department 210 – Operating Debt and Contingency
- Fund 030 – Debt Service
  - Department 301 – General Obligation Bonds, Series 2007
- Fund 040 – Enterprise Fund
  - Department 410 – Ambulance
- Fund 070 – Non-Departmental Funds
  - Department 701 – Buildings and Facilities
  - Department 703 – Employee Expenses
  - Department 705 – Vehicles and Equipment

Although this level of complexity increases the time and effort required for budgeting and accounting, it does provide valuable management information about the costs of the various services and activities conducted.

Fire districts are empowered to raise revenue by various means, including issuing debt, levying taxes, and imposing fees and charges. The following figure illustrates that LFD's primary resources and revenue sources are property taxes and ambulance service fees, along with a strong beginning cash balance. Total resources for this fiscal year equal $10,419,984.

[3] A budgetary fund, as defined by Oregon Administrative Rule 150-294.352(1)-(A) (implementing ORS 294.388, renumbered from 294.352), is a fiscal and accounting entity of self-balancing accounts to record cash and other financial resources, related liabilities, balances and changes, all segregated for specific, regulated activities and objectives.

Figure 10: Budget Resources – FY 2015-16



Property Tax and Property Tax Revenue

LFD levies property taxes at a rate of $2.26 per $1,000 of assessed valuation throughout the fire district. This rate is fixed by state law and cannot be increased.

There are two opportunities available to fire districts to increase property tax revenue: local option levy and general obligation bond. Local option tax levies must be approved by voters and are limited to five years in duration (up to 10 years if used for capital projects such as land acquisition, building construction, or apparatus and equipment purchases). General obligation bonds can be used for capital projects but not for operating expenses.

LFD passed a general obligation bond in 2007 to build and equip Stations 34 and 35. This 15-year bond will be paid off in 2021.

Property tax collections have been impacted by local economic factors. Typically, property taxes collected should increase at least 3 percent each year or more. Since FY 2011, property tax revenue has increased an average of 3.75 percent per year.

Figure 11: Property Tax Revenue

DESCRIPTION	FY 2010-11 ACTUAL	FY 2011-12 ACTUAL	FY 2012-13 ACTUAL	FY 2013-14 ACTUAL	FY 2014-15 ACTUAL	FY 2015-16 ACTUAL
Property Taxes - General	3,137,877	2,968,525	3,410,494	3,224,005	3,594,076	3,726,400
Property Taxes - Bond			289,577	358,771	318,035	385,802

LFD also receives money from other sources, primarily through the operation of its ambulance service. The following figure shows total operating revenue for the past four years.

Figure 12: Total Operating Revenue

DESCRIPTION	FY 2012-13 ACTUAL	FY 2013-14 ACTUAL	FY 2014-15 ACTUAL	FY 2015-16 ACTUAL
Property taxes	3,410,494	3,224,005	3,594,076	3,726,400
Federal Grant			6,000	95,255
Other general fund revenue	396,661	585,987	271,035	369,014
EMS revenue	1,723,871	1,887,689	2,129,800	2,428,852
Non-departmental revenue	102,115	107,367	103,959	0
Total	**5,633,141**	**5,805,048**	**6,104,870**	**6,619,520**

Operating Expenditures

LFD spends money to provide services to the community. The following figure shows operating expenses for the past four years. This table excludes non-operating expenses such as bond debt service, contingency, transfers, and others. It does reflect the direct costs of services.

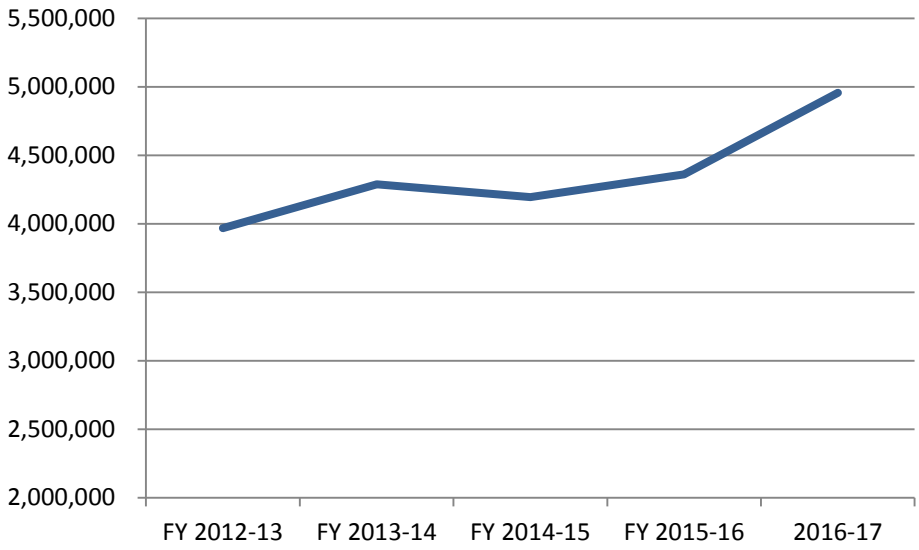
Figure 13: Operating Expenditures

DESCRIPTION	FY 2012-13 ACTUAL	FY 2013-14 ACTUAL	FY 2014-15 ACTUAL	FY 2015-16 ACTUAL
Personnel	3,966,927	4,287,195	4,056,482	4,436,425
Materials and Services	1,281,091	1,224,303	1,105,055	1,266,240
Capital	57,376	20,371	34,516	298,379
Total	**5,305,394**	**5,531,869**	**5,196,053**	**6,001,044**

Personnel Costs

Wages and benefits comprise the largest LFD expenditure categories. Wages include overtime and compensation for all full-time and part-time employees. Benefits include but are not limited to pension, death and dismemberment insurance, medical insurance, Medicare contributions, unemployment insurance, etc. The following figure illustrates personnel expenses for the past four years and the proposed amount for FY 2016-17. The cost of labor has increased at an average of 5 percent per year.

Figure 14: Personnel Expenses



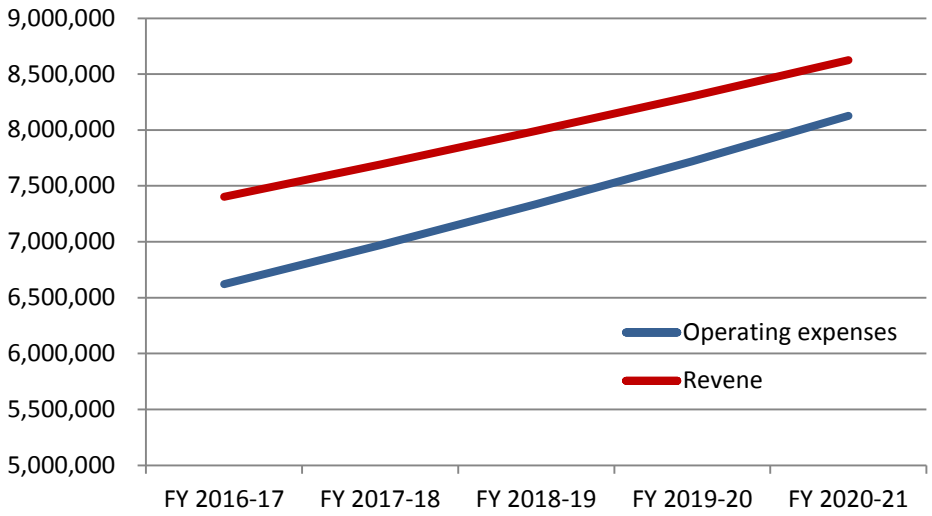
In past years, employees who retired from LFD were provided health insurance until their Medicare eligibility. Though that provision has since been rescinded there are a number of employees who, on retirement, will still be eligible for this benefit. LFD has prepared a cost estimate through the life of the benefit. It assumes all eligible employees will take advantage of the benefit. It also assumes health insurance costs increase at a rate of 5 percent per year.

The projection indicates the total annual cost to the district will reach $301,499 by 2025 and then slowly decrease until the last eligible employee is on Medicare in 2042. The total remaining cost to LFD is estimated at $4,807,392.

Five-Year Operating Budget Forecast

A five-year forecast for LFD has been prepared and is shown in the following figure. It includes an estimate of revenue (not including revenue for bond repayment purposes) and operating expenses. Expenses include personnel, materials and services, and capital outlay. Revenue is projected to increase at an annual rate of 3.9 percent. Expenses are projected to increase an annual rate of 4.5 percent. Projected PERS cost increases could make the annual expense rate somewhat larger.

Figure 15: Revenue and Operating Expense Forecast



For the next five years, LFD is in a stable financial position. However, with expenses growing slightly faster than revenue, good financial planning will be important to ensure the long-term viability of service delivery.

Cash Balances and Reserves

LFD wisely carries cash forward from fiscal year to fiscal year. This is necessary for a couple of reasons. First, although the fiscal year starts July 1 of each year, property tax revenue does not begin to be received until November of the same year. LFD must have cash on hand to pay operating costs during the interim. The alternative is to borrow funds incurring interest and other expenses.

Second, reserving money for future expenditures is also important. Various expenses, such as the purchase of new apparatus, maintenance and construction of facilities, future obligations for retirement costs, and others are normally best addressed by funds reserved for those purposes.

The following figure shows cash balances as of June 30 of each year. As can be seen, these amounts have grown over time.

Figure 16: Cash Balance as of June 30

Fiscal Year	2011	2012	2013	2014	2015	2016
Unrestricted	2,690,089	2,565,711	2,814,388	3,033,851	3,779,204	4,339,780
Debt Service Fund	48,164	48,165	76,827.00	66,319	10,431	3,652

Internal Financial Controls

The security of an organization's funds requires that comprehensive internal controls exist to prevent fraud. Typically, this requires that detailed records are produced and that multiple people review various financial records on a regular basis.

LFD has a comprehensive financial policy and procedure that details internal controls, investment policies, and other topics. This policy provides substantial guidance to the organization.

A review of business practices including purchasing, bank statement reconciliation, petty cash, receipt procedures, credit card use and controls, and payroll did not reveal any concerns.

Observations and Recommendations

LFD has, for a number of years, established a $1 million line of credit the purpose of which was to provide funds for operating expenses between July 1 and November when property taxes began to be received.

LFD pays a fee of $1,500 to establish this line of credit and anticipates $3,500 in interest expense if it is fully utilized. To date, it appears that this line of credit has not been used since 2008 even though LFD incurred the expense of establishing it.

LFD has more than sufficient cash on hand to manage cash flow needs during each fiscal year. The line of credit is an unnecessary expense. LFD should discontinue establishing this line of credit and use its available cash for operating expenses prior to the receipt of property taxes.

LFD prepares a very detailed budget document each year. Even though it does not use standard Department of Revenue budget forms, the document does provide required information in accordance with Oregon budget law.

However, the budget document does not allocate all of the available beginning cash balance. Oregon budget law requires that all sources and uses of money be included in the budget document. This includes cash on hand estimated to be available at the beginning of each fiscal year. Although the annual audit reports the cash reserves, LFD has not fully complied with the local budgeting requirement. It has begun to allocate portions of available cash to both the general fund and the Fund 070 Non-Departmental; however, the entire amount of beginning cash is not budgeted.

Beginning next fiscal year, LFD should fully budget estimated cash on hand. Sufficient cash should be included in the general fund to ensure cash flow prior to tax receipts. The balance should be allocated to the reserve fund in accordance with a capital asset plan. For example, a certain amount should be budgeted to the Equipment Fund (Department 705) for future apparatus replacement. If a certain amount is needed for the purchase of apparatus, the balance should be budgeted in the “reserved for future expenditure” line.

Finally, Fund 070 Non-Departmental, is a reserve fund. All funds in which money will be reserved for future expenditures must be established a resolution. No such resolution could be located. The Board of Directors should adopt a resolution establishing the fund and declaring its purpose at its earliest opportunity.

MANAGEMENT COMPONENTS

Effective fire department management is a common challenge for fire service leaders. Today's fire department must address management complexities that include an effective organizational structure, adequacy of response, maintenance of competencies, a qualified work force, and financial sustainability for the future.

To be effective, the management of a fire department needs to be based on a number of components. The initial elements were accomplished by LFD in completing a Strategic Plan that institutionalized the organization's mission, vision, and values. Unfortunately, this plan was completed over a decade ago and is not a current, living document. Fortunately, LFD plans to adopt a new Strategic Plan in the upcoming fiscal year. That new plan should include a process that can be built upon to ensure that essential foundational elements such as policy and operational documents, development of internal and external communications practices, recordkeeping, and sustainable financial practices are implemented and maintained.

In the following section ESCI examines LFD's current efforts to manage the organization and identifies measures and best practices we are recommending for the future.

Foundational Management Elements

The development of baseline management components in an organization enables it to move forward in an organized and efficient manner. In the absence of foundational management elements, the organization will tend to operate in a random and generally ineffective manner.

Similarly, an organization should establish appropriate documentation, policies, procedures, and identification of internal and external issues that affect the agency. Processes must also be established to address the flow of information and communications within LFD as well as with its constituents.

The following table reviews LFD's baseline management components.

Figure 17: Survey Table – Foundational Elements

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
STRATEGIC PLANNING		
Mission statement adopted?	Yes	
Displayed?	Yes – Strategic Plan Document (June 2003) In station and on website	
Vision established and communicated?	Yes – Same	Year one—enthusiastically embraced—then attention/motivation fell off.
Values of staff established?	Yes – Same	Year one—enthusiastically embraced—then attention/motivation fell off.
Strategic or master plan?	Yes – Strategic only	Year one—enthusiastically embraced—then

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
		attention/motivation fell off.
Adopted by elected officials?	Yes	
Published and available?	Yes	
Periodic review?	No	Complete an updated strategic planning process in the coming year.
Agency goals & objectives established?	Yes – Strategic Plan	
Date developed?	June 2003	
Periodic review?	No	
Code of ethics/conduct established?	Yes, via policy	The Code of Ethics should be reviewed and re-developed in the coming year.

Discussion

For mission statements, visions and values, and strategic planning to be effective in the management of a fire department, they must be part of a "living" process that consciously evolves as the department grows and changes. The strategic plan adopted in 2003 may have been of value at that time, but by failing to update it, addressing changes in the environment and in the organization itself, LFD allowed the plan to become less relevant.

The commitment to creating a new strategic plan in FY 16-17 should be a high priority for the entire organization. By reviewing and possibly modifying the mission, vision, and values statements for LFD, the current work force will take ownership of them. While many of the changes recommended in this master plan should become a part of the strategic plan, it is through the strategic plan that the organization will prioritize the order in which short and medium-term goals should be accomplished.

Key Recommendations:

- Complete a new strategic plan in the coming year.
- Review the organization's Code of Ethics.

Management Documents and Processes

In this section we address both governing rules or Standard Operating Guidelines (SOGs) and the recording and documenting of the district's activities and accomplishments. For any organization, documentation of activities is of paramount concern. This practice is critical both because it is governed by state and federal regulations and because it is the means by which the district can measure its performance in relation to its commitments—to the community and to its own staff.

LFD's current documentation of activities meets industry best practices. The following table reviews the practices that are in place at LFD.

Figure 18: Survey Table – Foundational Documents and Processes

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
REGULATORY DOCUMENTS		
Rules available for review during site visit?	Yes	
Last date reviewed?	Ongoing	Updated as needed
SOGs available for review during site visit?	Yes	
Regularly updated?	Yes	Last completed in FY 2014-15
SOGs used in training evolutions?	Yes	
Policies available for review during site visit?	Yes	
Internally reviewed for consistency?	Yes	The Operations Chief periodically reviews SOGS and directs personnel to review guidelines when appropriate
Internally reviewed for legal mandates?	Yes	
Training on policies provided?	Yes	
INTERNAL ASSESSMENT OF CRITICAL ISSUES		
Critical issues from fire chief's perspective		
First critical issue	Staffing	The district has a significant increase in responses over the last decade (or longer) with no increase in staffing.
Second critical issue	Capital building and equipment	Lack of reserves for needed station repair/building and apparatus replacement.
Third critical issue	Regional collaboration/efficient response modeling	The new Medic 71 collaboration with Albany represents a new challenge (making it work) for the district.

Discussion

LFD maintains its records in accordance with state regulations and recommended best practices. Records are either password protected (if electronic) or under lock and key (if in paper form). The Information Technology (IT) function for LFD is provided through the city of Lebanon's IT department. Electronic records are backed up through the city's data bank system. The city's IT department also provides the district's telephone service and website maintenance. Because of this, LFD is dependent upon the city of Lebanon's decisions regarding the information technology hardware and supporting software. To date, this has not created a problem for the district.

LFD currently reviews SOGs as needed. ESCI recommends setting a standard of reviewing one-third of these guidelines every year so that all are reviewed over a three-year period. This will ensure that some

guidelines do not escape review. The practice at LFD is for the operations chief to assign certain SOGs for training purposes by line and other personnel. This is a good practice and should be continued with an emphasis on those SOGs that cover the most critical issues as determined by management staff.

Internal Assessment of Critical Issues and Future Challenges

The fire chief identified three critical issues facing LFD. They are staffing, capital funding, and regional collaboration.

Although the District has seen an explosion in the number of calls it responds to over the past decade, there has been no increase in the staffing required to meet that growing need. Existing resources are struggling to keep up with service demands.

LFD has significant capital needs and little or no funding reserved to meet them. Front line apparatus purchased at the same time many years ago are reaching the ends of their useful lives concurrently. The main station/administration and training buildings are approaching their useful lives and/or fail to meet current seismic codes.

As this master planning process is being initiated, LFD and its partner, Albany Fire Department, are embarking on an experiment in part time, collaborative staffing. Both are transporting agencies, and both serve an integrated health services complex that relies upon the two departments to provide inter-facility transfers of medical patients. The result has been a draining of energy and resources as both departments transport non-emergent patients to facilities within the county (but outside of their respective jurisdictions) and as far away as Eugene or Portland. In response, the two fire agencies are collaborating in the staffing of a single, non-firefighter staffed ambulance to provide inter-facility transfers during peak times.

The future challenges for LFD will include securing funding to provide services within an environment of "compression" funding, finding a way to better balance the needs of the fire protection mission with the demands of the EMS transport mission, and maintaining the organization's tie to a community that is continuing its transition from a self-contained commercial center to a bedroom/commuter lifestyle.

Discussion

The district has taken a good first step with its experiment in collaborative partnering with Albany Fire Department. If this initiative is successful, LFD will have to proactively look for other opportunities to partner with Albany and other neighboring departments

Key Recommendations:

- Develop a three-year timeline for review of Standard Operating Guidelines.
- Develop a plan for increased staffing (see Staffing section).
- Develop a capital plan for needed improvements (see Capital section).
- Monitor and evaluate joint ambulance staffing initiative for possible improvements.
- Explore other regional cooperative opportunities with neighboring departments.

Internal and External Communications

There are numerous reasons for a fire department maintaining efficient communications both internally and externally. The health and safety of personnel and the citizenry served depend upon the sharing of information. Internal morale and efficiency rely upon the line staff's understanding of the big picture, and if the organization fails to communicate its value and mission to the public it serves, it will likely find itself lacking the support it needs to procure sufficient resources to succeed.

No one wants to participate in meetings that have no value; but in the fire service, staff meetings are how staff share lessons learned, communicate special challenges and risks in a timely way, and maintain a connection to the overall direction that management has set for the department. LFD incorporates command staff and officers meetings as well as station and shift meetings to ensure that all members are informed of hazards, new protocols, and the direction of the district.

Community newsletters, media coverage, and websites are the means most commonly employed by fire departments to communicate with the public. Fire and life safety messages are promulgated in this manner. So is information about upcoming political or fiscal issues that may be timely. LFD administrators have recently concluded that newsletters sent through the mail to taxpayers are ineffective and a waste of both the staff time and energy used to prepare them and the funds used to send them. Instead, LFD staff are working on the redesign of the department's web site which they hope to use as a social media platform to connect with the public.

Figure 19: Survey Table – Internal and External Communications

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
COMMUNICATION		
Internal Communications		
Regularly scheduled FD staff meetings?	Yes – Command Staff Monthly/ Operations Staff Monthly	
Written staff meeting minutes?	Yes	
Memos used?	No	
Member newsletters?	No	
Member forums (all hands meetings)?	Yes (Shift meetings/Volunteer Meetings)	
Open door policy?	Yes	
Vertical communication path clearly identified (Chain of Command)?	Yes	
External Communications		
Community newsletter issued?	Yes until recently	Recently discontinued.
Department website?	Yes	Recently redesigned
Advisory committee(s) used?	No	There is a standing EMS Committee
Formal complaint process in place?	No	Develop a complaint process
Community survey used?	No	

Discussion

LFD used to provide a newsletter to the community, but decision-makers believed that they were not effective. The utility of quarterly newsletters may or may not be in question, but it is understandable that LFD's managers are re-evaluating the process. In its place the district is developing a redesigned web site to use as a social media platform for connecting to its residents. Time will tell if this will be an effective way to replace the newsletter.

It is also true that with 30 volunteers and a paid work force that lives either within or very close to the district's boundaries, LFD enjoys a social penetration of the community it serves that is not always found in today's world.

Two-thirds of LFD's career staff work in the same building that houses the administration. Proximity and regular staff and shift meetings maintain good internal communications within LFD.

While current experience with citizen complaints has been that they are most often about ambulance billing or medical care, LFD should develop a system for tracking and reviewing all complaints in the interest of identifying trends and in avoiding the possibility that a "complaint" may slip through the organization without being addressed.

Key Recommendations:

- Implement and follow a citizen complaint process.
- Assess the performance of the new website for efficacy in conveying LFD messages to the community.

Record Keeping and Document Control

In any organization, documentation of activities is of paramount concern. Sound management decisions cannot be assured without accurate data, and organizational transparency to the public will be impeded if the department cannot explain what it is doing. The documentation of activities must be routine.

Figure 20: Survey Table – Record Keeping and Documentation

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
DOCUMENT CONTROL		
Process for public records access in place?	Yes	
Hard copy files protected?	Locked cabinet/office; electronic backup	
Computer files backed up (on site/off site)?	Off Site (city of Lebanon IT)	
SECURITY		
How are FD buildings secured?	Key/Combo locks; video surveillance	Security of the rural, unstaffed stations is inadequate. New security protocol is being developed.
How are FD offices secured?	Same	

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
How are FD computers secured?	Password	
How are FD vehicles secured?	Inside locked station or locked in parking lot	
Is capital inventory maintained?	Yes	
Asset security system used? (Describe)	No	The district has recently gone to a non-tagged system.
How often is a capital inventory performed?	As needed	
Monetary controls used		
Cash access controls in place?	Yes – By policy, annual audit, division of work	
Credit card controls in place?	Yes – By policy, annual audit, division of work	
Purchasing controls in place?	Yes – By policy, annual audit, division of work	
REPORTING & RECORDS		
Records kept by computer?	Yes	
What operating system?	Windows 7	
Periodic reports to elected officials	Monthly	
Financial reports?	Yes	
Management reports?	Yes	
Operational reports?	Yes	
Annual report produced?	Yes but with limited content	Improve annual report to include useful data
Distributed to others?	Yes	
Analysis of data provided in report?	No	The current report does not include an analysis of the raw data. The district plans to change this to include a level of analysis that will make the data useful.
Required records maintained?	Yes	
Incident reports?	Yes	
Patient care reports?	Yes	
Exposure records?	Yes	
SCBA testing?	Yes – conducted internally	
Hose testing?	Yes – conducted internally	
Ladder testing?	Yes – conducted by contractor	
Pump testing?	Yes – conducted by contractor	
Breathing air testing?	Yes – conducted by contractor	
Vehicle maintenance records?	Maintenance performed and records kept by Benton County Shops	
Gas monitors calibrated	Yes	
PLANNING		
Does LFD have a capital facilities	No	Some reserve funding has been set

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
plan?		aside, but there is no plan developed yet.
Plan period?	N/A	
Periodic review?	N/A	
Specific projects identified? (list)	N/A	
Funding identified or set aside?	Yes/No	Limited funds set aside, waiting for a plan.
Apparatus/equipment replacement plan	No	
Plan period?	N/A	
Periodic review?	N/A	
Specific projects identified?	N/A	
Funding identified or set aside?	N/A	

Discussion

LFD has implemented a sound process for document control. Public records access is provided for in district policy and follows Oregon State law regarding public records request compliance. Hard copy records are secured by lock and key in file cabinets or locked offices. Electronic files are secured by passwords assigned to users with rights to appropriate documents and file server is backed up daily off site. These are sound practices in the fire service industry.

Station security at the two career-staffed stations is good. However, at the un-manned, volunteer stations, adequate security measures have yet to be taken (LFD staff recognize this deficit and plan to address it). The district has also decided to end its "tagged" system for tracking physical inventory and only inventories large capital items at this time. Small capital items—tools and office equipment, for example—are inventoried only on an "as needed" basis.

Petty cash transactions always require receipts and other financial controls are in effect and are audited.

LFD publishes an annual report made available to the public, but it currently lacks any analysis of the reported data. This fact inhibits readers of the report from understanding the implications of various trends that the data shows. LFD staff are aware of this issue and know that it should be addressed.

The district addresses equipment testing on a case by case basis. Some items are tested and certified by qualified employees. Self-contained breathing apparatus (SCBA) and gas monitors are two examples. Other testing and certifications are outsourced. Ladder and pump testing are two examples, ladders by Underwriters laboratory (UL) and pumps by the Benton County shops.

LFD currently lacks a plan for future capital facilities spending even though it is widely understood that the district has significant capital issues to address in the near future. Recently, LFD has begun to set aside funding for these upcoming needs, but it still needs to develop a plan in order to more clearly identify the full scope of these needs.

Key Recommendations:

- Develop and implement security measures for volunteer stations.
- Develop a capital facilities plan for future station development and renewal.
- Redesign the annual report to include data analysis that is useful to the public and to the department.

STAFFING AND PERSONNEL MANAGEMENT

The most valuable asset of any organization is its people. The effective management of human resources requires a balance between the maximum utilization of the overall workforce and the experience of a high level of job satisfaction by individual workers. To achieve this goal consistently, management must combine reliability with a safe working environment, fair treatment, the opportunity to provide input, and recognition of the individual's commitment and sacrifice. Job satisfaction depends upon this combination of factors.

Administrative and Support Staffing

One of the primary responsibilities of a fire department's administration is to ensure that the fiscal, infrastructure, and support elements are in place and functioning smoothly and effectively so that the core mission—responding to and mitigating emergencies—can be accomplished in a safe and efficient manner.

Like any other part of a fire department, administration and support need the appropriate resources to function properly. In this section of the staffing analysis, the ratio of administrative and support positions to total organizational staffing is compared to industry best practices and similar organizations. Too large an emphasis on administrative staffing can have as detrimental an influence on the efficient functioning of an organization as too little. It is important to achieve an appropriate balance between administration and support and the operational sides of a department. Organizational success may depend upon it.

The following table reviews the administration and support organizational structure of the Lebanon Fire District.

Figure 21: Survey Table – Administrative and Support Staffing

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
ADMINISTRATION & OTHER SUPPORT STAFF		
Fire chief	1	
Division chiefs	3	One FTE was unfilled at the start of process; was filled on May 1, 2016.
Retention/Recruitment lieutenant	1	
Fire Prevention Specialist	1	
Administrative assistant/board secretary	1	
Ambulance billing specialist	1	

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
Casual Admin. assistant–(billing asst./firemed clerk)	1 - $13.26/hr $(12,009 – 2015) 20 hrs/week	
Total administrative & support staff	2 part-time, 6-full time listed above	All uniformed admin staff are responders—command staff or company officer
Percent administrative & support to total FD	12.5% or 19% (depending upon volunteer calculation)	The 6 uniformed administrative staff also respond to emergencies

Discussion

The level of administration and support staffing represents between 12.5 percent and 19 percent of LFD's total staff. (This range depends upon whether we count the district's 33 volunteers in total operational numbers or divide their number by one-third, as is sometimes done in calculating the FTE impact of volunteers). This ratio is on the low end of what ESCI sees when studying fire departments in the northwest. Fire districts often have ratios in the 15 to 18 percent range, or higher, but this is because districts must provide all of the support functions that cities are able to provide through other departments within a city's organizational infrastructure. Human resources, information technology, and building and apparatus maintenance are some of those functions.

The district has done a good job of partnering with other agencies in order to capture the efficiencies made available through regional integration. Using the city's IT platform is one example. The utilization of Benton County's mechanical shops for apparatus maintenance is another. This has allowed LFD's administrative support function to remain very lean. In LFD's case only its administrative assistants are not qualified to be in dual roles as administrators and as command staff (or in the case of the volunteer coordinator—company officer).

While the district should be complimented for maintaining an efficient administrative profile, the lack of adequate staffing can create problems in two areas. First, the lack of functional redundancies can result in the crippling of normal operations when the unexpected arises. There should be adequate staffing such that if any member of staff becomes unavailable for work for an extended period of time, someone else can step in to pick up that load. Second, lacking adequate staffing in administrative or managerial functions can lead to lost opportunities. That is because it is personnel at these levels who are likely to recognize potential needs or exposures within the community. Personnel who are over-burdened with current work load are prone to "tunnel vision" when the organization needs them looking out on the horizon.

LFD's administrative functions are physically centralized at the main station. This centralized structure serves to facilitate good communications between divisions; like many smaller departments with a shared fire station and administrative facilities, LFD's is designed in such a way that administrative offices are housed together and separated (if only slightly) from the operations side of the facility. Thus there is an appropriate point of contact at the front of the building when members of the public enter and a space for chief officers who may need to be engaged in confidential conversations. At the same time, the proximity of the operational side of the station creates easy access for chief officers and line

staff who may need to be in contact with one another. Having noted this, it does not take away from the need to update or replace the building that currently houses administration and the main station.

Key Recommendation:

- Develop a back-up plan for all administrative support services.

Emergency Response Staffing

An adequate number of properly trained staff of emergency responders is required for putting the appropriate emergency apparatus and equipment to its best use in mitigating incidents. Insufficient staffing at an operational scene decreases the effectiveness of the response.

The first 15 minutes is the most crucial period in the suppression of a fire. How effectively and efficiently firefighters perform during this period has a significant impact on the overall outcome of the event. This general concept is applicable to fire, rescue, and medical situations. Critical tasks must be performed in a timely manner in order to control a fire or to treat a patient. LFD is responsible for assuring that responding companies are capable of performing all of the described tasks in a prompt, efficient, and safe manner. The following table lists LFD's emergency response staffing.

Figure 22: Survey Table – Emergency Response Staffing

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
EMERGENCY SERVICE STAFF		
Battalion chief	3	
Captain	0	
Lieutenant	7	
Engineer, Paramedic	9	
Firefighter, Paramedic	2	
Firefighter, EMT	4	
Total operational staff	24	
Fire department total	33	Includes 4 Chief Officers, 1 Staff Lt., 1 Fire Prev. Specialist, 3 Admin Assts.
Percent of operational officers to firefighters	18%	
USE OF CAREER & VOLUNTEER PERSONNEL		
Career schedule		
Length of normal duty period (length of shift)	24 hours	
FLSA period	27-day cycle	
Duty hours per week (average)	56	
Normal shift begins (time)	7:00 am	
Call-back requirements?	N/A	
Residency requirements?	Yes	
Standby duty requirements?	No	
Operational career services	List all that apply	

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
Fire suppression	Yes	
EMS/rescue, first response	Yes	
EMS, advanced life support	Yes	
Specialized rescue	Yes	Water rescue team
Fire prevention inspections/code enforcement	Yes	
Emergency management	Yes	District personnel fulfill operations chief function under Linn County's Emergency Management Department.
Public education	Yes	
Hazardous materials response (level)	Yes – Technician level. Participates in OSFM Team 5	Three members are trained to Technician level and are part of the regional Haz-Mat team.
Volunteer services		
Emergency Response Volunteers	Yes	3 non combat; 34 combat volunteers
Chaplain	Yes	
Civilian administrative volunteer	No	
RESPONSIBILITIES & ACTIVITY LEVELS OF PERSONNEL		
Committees and work groups		
EMS quality management	Yes	Under the direction of the operations chief
Chaplain	Yes	
Training		
Safety	Yes	
Standards	Yes	There is no formal committee but this function is addressed by staff.

Discussion

Operations personnel in the fire service in Oregon most commonly work 24-hour shifts. Under federal labor regulations they can work up to 53 hours per week before their employers are obligated to pay them at an overtime rate, and those 53 hour weeks can be averaged over a longer period than one week. Each employer may adopt a period of time for averaging the employees' work week from a maximum of 28 days to a minimum of 7 days. In the fire service in the northwest, these time periods, known as FLSA (Fair Labor Standards Act) cycles, tend to run from 24 to 28 days. Twenty-four hour shifts are broken up by off-duty periods that can be regular or varied. For example, a common schedule is one 24-hour shift on-duty followed by two 24-hour shifts off duty. Another common variation is one shift on, one shift off, one shift on, one shift off, one shift on, four shifts off. Both examples provide 48 hours off duty for every 24 hours on duty. Both also result in a work week that averages 56 hours and therefore requires that the employer pay overtime for the extra hours. LFD operates a traditional 24 hours on followed by 48 hours off schedule under a 27-day FLSA cycle. The District pays overtime for the average 3 hours per week over the 53-hour FLSA maximum.

Volunteer firefighters are trained to the same standards as career personnel before they are permitted to respond to structural and other fire responses. They respond out of all five LFD stations, three of which are staffed only by volunteers, and they usually work in support of or in coordination with the career companies. In addition to 34 combat volunteers, there are currently three support volunteers who can bring apparatus to emergency scenes or help with support functions at an emergency scene (staffing the rehab sector, for example). Volunteer firefighters respond when paged out by county dispatch, forming up at their stations before responding to the emergency scene.

LFD also enlists seven intern firefighters. These are students attending college in the fire sciences who are qualified to respond to emergencies and who receive a tuition stipend in return for provided increased staffing on a 24-hour basis when they are not attending classes and other educational activities.

Morale and cooperation between the volunteer and career staff are good at this time though some volunteers have expressed frustration with the current dispatch system and its inability to transmit alarms to the volunteers in a timely or effective manner. LFD has some influence in this area but is dependent for dispatching on a county-wide system of which the district is a small part.

Considerable ongoing local, regional, and national discussion and debate around large incidents of significant consequence have brought attention to the matter of firefighter staffing. Frequently, this discussion is set in the context of firefighter safety. While there are published standards regarding firefighter staffing, they generally speak in terms of the number of firefighters assigned to a particular apparatus, often characterized as a preferred standard of ”a minimum of four personnel per company.” ESCI notes that the more critical issue is the number of firefighting personnel assembled in a reasonable amount of time at the scene of an emergency that can perform the required critical tasks to mitigate the emergency regardless of the type or number of vehicles upon which they arrive.

Complicating the issue of operational staffing for large incidents is the continued responsibility of the fire service in providing their communities’ first line of emergency medical response. These responses often require fewer personnel resources while occurring in much greater numbers than fires. Whether a fire department provides emergency transport to the hospital or not, medical emergencies have continued to challenge many fire service organizations’ abilities to keep up with service demands. LFD is no exception.

Regarding fires and other major emergencies, the number and types of tasks needing simultaneous action will dictate the minimum number of firefighters required to combat different types of fires. In the absence of adequate personnel to perform concurrent action, the command officer must prioritize the tasks and complete some in chronological order rather than concurrently. LFD has a *Standards of Cover* which assesses community risk, has established response time objectives by component, lists the critical tasks necessary to be performed by incident type, and identifies the “Effective Response Force” necessary to mitigate an incident. The residential structure fire critical task analysis is summarized in the following figure, indicating the number of personnel needed to effectively combat a residential fire. The table below is taken from LFD’s Standard of Cover.

Structure Fire (Moderate Risk)

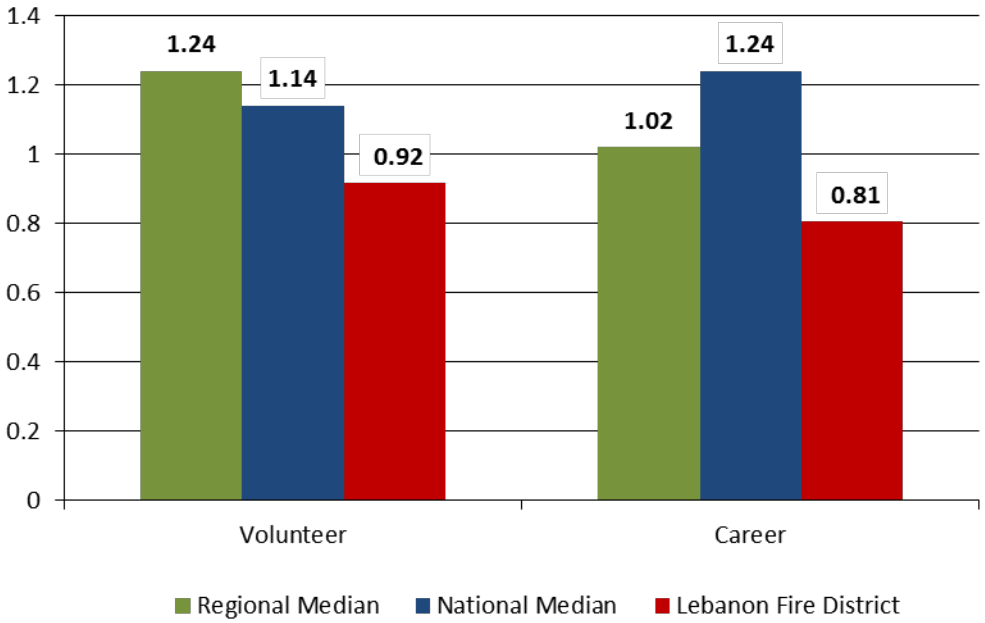
TASK	NUMBER OF PERSONNEL
Command	1
Safety	1
Pump Operations	1
Attack Line	2
Back-up Line	2
Search and Rescue	4
RIT	2
Other (Water Supply)	1
Total	**14**

When looking at the minimum requirements for accomplishing the tasks necessary in responding to a residential house fire, it should be noted that LFD's minimum daily staffing does not provide adequate personnel resources even when all on-duty units are available. The district has addressed this deficit in several ways.

Off-duty firefighters are paged to return to work. LFD's labor agreement has a residency requirement that is intended to ensure that, if available, off-duty personnel live close enough to their stations to respond in a timely manner. LFD has a roster of 34 combat volunteers; that is, volunteer firefighters who are trained to respond to and participate in fighting fires. As noted earlier, LFD also utilizes intern firefighters when available. LFD and its neighboring fire departments rely upon a system of mutual and automatic aid to assist one another in gathering adequate resources to mitigate any emergencies that are too large for one agency's resources to manage.

Another means of comparison, also used on a national basis, is that of measuring the number of firefighters per 1,000 population of the service area. Figure 23 illustrates the current comparison of LFD staffing with both national and western regional norms as reported by the National Fire Protection Association. Note, however, that this analysis takes into account neither the number of hours worked per week by firefighters (which varies from jurisdiction to jurisdiction) nor the issue of whether the fire departments in question provide ambulance transport to their communities.

Figure 23: Firefighters per 1,000 Population



The chart above uses two separate studies of volunteer and career departments. They are shown together in our attempt to use the available NFPA benchmark data for comparing combination (mixed career and volunteer staffed) departments.

Using this comparison, LFD appears to be below both the regional and the national medians for career personnel and for volunteer personnel. The size of the career force is limited by fiscal resources available to the district, and the size of the volunteer force is limited by the number of willing and physically able residents of the district and the district's commitment to training and maintaining a volunteer force. Note that LFD is an ambulance transport agency and it must move some patients from within the community to hospitals as far away as Eugene and Portland. This means that LFD's staffing, compared to regional and national medians is even further below the norm for the industry.

LFD's commitment to supporting its volunteer force is shown by the recent addition of a company officer-level paid employee whose primary responsibility is the recruitment and retention of volunteer firefighters and by the well-organized training program developed for those members of the organization. LFD has also added student firefighters (interns) to its roster. By including opportunities for volunteers who may not be fit enough to actually combat fires to participate in support activities, the district has added to its potential for securing community support in fulfilling its response functions.

Within the limits of its budget, LFD has recognized the need for more career responders through its application for grants to augment staffing and its willingness to explore an experimental strategy of joining with another local fire agency to employ single role medics to take some of the ambulance transport workload off the shoulders of its cross-trained firefighter/medics.

Key Recommendations:

- Continue to explore grant funding for increased staffing.
- Review the Medic 71 project for improvements or enhancements.
- Seek participation from other area health care and emergency response providers in regional partnerships.
- Work to educate other area public agencies and key commercial partners of the need for additional firefighting personnel.

Personnel Management

The following review relates to the baseline personnel management components typically found in an appropriately administered organization.

Figure 24: Survey Table – Personnel Management

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
REPORTS & RECORDS		
Personnel records maintained?		
Application retained?	Yes	According to best practices.
Historical records archived?	Yes	According to State requirements
Performance evaluations retained?	Yes	According to best practices.
Injury and accident records retained?	Yes	According to State requirements
Health & exposure records maintained?	Yes	According to State requirements
DISCIPLINARY PROCESS		
Disciplinary policy established?	Policies, CBA	
Disciplinary process communicated?	Yes	
Appeal process provided?	Yes	
Recent litigation	None	
Pending litigation	None	
COUNSELING SERVICES		
Critical incident stress debriefing?	Yes	Through trained peer support in combination with the EAP.
Employee assistance program?	Yes, career employees through medical plan, volunteers through private contractor. (Calapooia Employee Assistance)	
Intervention program?	No	
APPLICATION & RECRUITMENT PROCESS		
Recruitment program?	Yes, recently received grant for Volunteer Recruitment & Retention Coordinator. Program	

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
	initiated January 2016.	
Application process		
Qualification check?	Yes	
Reference check?	Yes	
Background check?	Yes	
Physical standards established?	Yes	
Knowledge testing?	Yes	
Interview?	Yes	
Medical exam required?	Yes	
Psychological exam required?	No	
TESTING, MEASURING & PROMOTION PROCESS		
Periodic skills testing?	Yes	
Periodic physical competence testing?	Yes	Through annual physical abilities test.
Periodic performance review?	Yes	Observed through company performance evaluations which are not done according to a set schedule.
Promotional testing? (Frequency & process)	Yes, Approximately every 30 months per Civil Service Rules	
HEALTH & SAFETY		
Medical standards established?		
Periodic medical exam?	Yes	According to NFPA standards
Safety committee established?	Yes	Chaired by Training Chief

Discussion

As an organization that falls under a civil service system and is subject the Oregon laws and regulations relating to public sector bargaining, LFD shows a well-organized and up to date human resource policy and record-keeping system. Compensation for a majority of the LFD work force is determined through collective bargaining and is codified in the working agreement between the International Association of Fire Fighters (IAFF) Local 2163 and the Lebanon Fire District. Both the labor agreement and the civil service rules provide for disciplinary and appeals processes. At the current time there are no pending grievances or arbitrations; LFD and its firefighters recently concluded negotiations for a new two-year contract after a short and mutually respectful process.

LFD maintains competitive testing for promotions and a recently developed set of training standards to prepare personnel for promotional opportunities and to ensure that only qualified personnel are allowed to "work up" into positions of higher responsibility when made necessary due to short or long-term vacancies.

The LFD labor agreement (extended to some administrative personnel through policy) contains an unusual provision that should be noted and addressed. That is the promise to about one-half of the

current employee group of partially paid health insurance premiums from the employee's retirement date through his or her eligibility for Medicare. Since firefighters typically retire from active service in their 50's, this obligation will soon become a significant burden for the district's operating budget.

Another issue to note is the fact that in spite of its having adopted a health and wellness program that allows for physical fitness training on duty, LFD employees engaged in ambulance transports and inter-facility transfers sometimes lack adequate "slack time" to engage in fitness regimens. The recent initiation of Medic 71 as a peak activity unit (PAU) may relieve the regularly scheduled shift firefighters from enough responses to alleviate this problem. LFD should continue to monitor its effectiveness.

Key Recommendations:

- Develop a system to track and make mandatory annual performance evaluations.
- Address the short, medium, and long-term needs of the post-retirement health insurance program.
- Develop a plan for adding any staffing necessary to reduce the workload for transport-assigned employees.
- Address the balance of EMS vs. fire and other emergency responses.
- Continue to explore partnering and peak activity unit (PAU) opportunities with neighboring agencies and organizations.

FIRE AND EMS TRAINING DELIVERY

Providing safe and effective fire and emergency services requires a well-trained work force. Training and education of personnel are critical functions for any agency. Without quality, comprehensive training programs, emergency outcomes are compromised and emergency personnel are at risk.

Initial training of newly hired firefighters is essential, requiring a structured recruit training and testing process. Beyond introductory training, personnel need to be actively engaged on a regular basis and tested regularly to ensure skills and knowledge are maintained. To accomplish this task, agencies must either have a sufficient number of instructors within their own organization or be able to tap those resources elsewhere. Training sessions should be formal and follow a prescribed lesson plan that meets specific objectives. In addition, a safety officer should be dedicated to all training sessions that involve manipulative exercises.

In the following section, ESCI reviews each agency's training practices, compares them to national standards and best practices, and recommends modifications where they may be deemed appropriate.

General Training Competencies

For training to be fully effective, it should be based on established standards. There are a variety of sources for training standards. LFD references the National Fire Protection Association (NFPA), uses International Fire Service Training Association (IFSTA) resources, and complies with applicable Oregon OSHA and Department of Public Safety Standards and Training (DPSST) regulations and standards. It also

follows the Oregon Health Department's requirements and standards for Emergency Medical Technicians and Paramedics.

Figure 25: Survey Table – General Training Competencies

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
GENERAL TRAINING COMPETENCY		
Incident command system–cert levels defined?	At the 100, 200, 300, 400, 700, 800 levels	
Accountability procedures in place?	Yes	
Policy and procedures on training in place?	Yes	
Safety procedures in place?	Yes	
Recruit academy?	Yes/yearly	Annual academy in partnership with other fire agencies.
Special rescue (high angle, confined space…)?	Water rescue	
Hazardous materials cert. level?	Operations/Tech	
Wildland firefighter	FF1/ENG Boss/ST leader/ Division Supervisor	
Vehicle extrication?	Yes	Tools carried on E31, R31, E34, and T31
Defensive driving?	EVOC, semi annual	
Use and care of small tools?	Yes	
Radio communications & dispatch protocols?	Yes	
EMS skills & protocols?	Yes/conducted by Dr. McUne, online, and inside and outside instruction	Monthly training with Dr. McUne, recorded for those who cannot attend
TRAINING METHODOLOGY		
Manipulative skills?	Yes	
Task performances/frequency?	NFPA 1410 drills performed annually	
Annual training hours tracked? By individual?	Yes/Yes	
Use of lesson plans?	Yes - IFSTA based	
Night drills?	Yes - weekly	
Multi-agency drills?	Yes, 3 to 4 times a year	With Tangent, Sweet Home, Albany, Corvallis, and Brownsville. Pending with Scio.
Inter-station drills?	Yes - weekly	
Disaster drills conducted?	Command staff does "table top" scenarios	Last disaster drill was in partnership with the hospital—two years ago.
Pre-fire planning included in training?	Company inspections	Pre-planning currently in development. Working on target hazard drills.
TRAINING OPERATION & PERFORMANCE		

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
Attention to safety?	Yes	Safety is stressed during initial training and supervisors are committed to motivating personnel to be safe. A current firefighter with a BA in Health and Safety is the district's safety officer
Post-incident analysis conducted?	Yes, post 1st alarm and significant events	
Training procedures manual developed & used?	Yes	

Discussion

Training is led by a division chief. He organizes and supervises the training program, delivering some of the training himself and directing much of it through other chief officers, company officers, and local and regional subject matter experts (SMEs). A review of the recently adopted Target Solutions program shows that baseline training is being delivered, evaluated, and recorded efficiently and accurately. This is an especially challenging task when managing the training of volunteer personnel (due to their schedules), but LFD's training program appears to be managing this issue effectively.

A significant challenge for career personnel is the number of work hours expended in the ambulance transport function. Crews assigned this responsibility often miss scheduled on-duty training. An immediate challenge for the district is to address the need to balance response activity with mandatory training and support activity.

The training chief is working to incorporate pre-fire planning into LFD's fire prevention and training programs. This should be prioritized for the district. Planning for another community-wide disaster drill, involving private sector partners and public sector agencies should also be addressed.

Training Manual, Methodologies, & Scheduling

LFD, by virtue of its size, has for all practical purposes centralized control of its training standards. (In larger fire agencies sometimes training standards become diffuse and diverse without an official organizational training manual). All internal instruction is carried out by instructors trained to the Fire Instructor 1 (DPSST) level. Outside training is provided by recognized SMEs. LFD maintains a training manual and is developing Acting in Capacity (AIC) manuals for both apparatus operators and company officers. The training chief recently clarified departmental qualifications for acting-in-capacity positions.

The Training Chief has both a one-year and a five-year training plan which provides training hours in excess of state-mandated minimums. Both plans are reviewed annually. More than two night drills are conducted annually due to the fact that many of the volunteer drills (which are coordinated by the paid fire personnel) are conducted at night. Multi-company drills are scheduled weekly, and drills with mutual aid departments occur three or four times per year.

Disaster and greater alarm drills are table-topped with command staff, and after action reviews are conducted after all structure fires and other complex incidents.

The safety culture at LFD is high. Safety is stressed during initial training and on a regular basis at drills and at the operations (and other) chief's regular review of policies and training. All company officers are trained as incident safety officers (ISOs), and the district follows OSHA and HIPPAA guidelines. LFD maintains a Safety Committee that is chaired by the training chief.

Incident scene personnel accountability is performed via a modified form of the Passport Accountability System that incident commanders at LFD find easier to use than the original system. The training chief incorporates policies into LFD's training curriculum where appropriate or where directed to do so by the chief of operations. Live burn training requires *NFPA 1403*[4] compliance for safety.

New Personnel Training

Proper training of new emergency services personnel is essential before they are allowed to become responders. Specific knowledge and skills must be obtained to achieve a basic understanding of the roles and responsibilities of an emergency responder. LFD has addressed this need by conducting an annual volunteer recruit academy in partnership with its neighboring fire agencies, complete with didactic instruction and hands on skills development, followed by a probationary period of continuous evaluation by field personnel.

This training is documented in each individual member's tracking notebook. Upon completion of the training academy and follow up training, members achieve the DPSST Firefighter 1 level of certification. Radio procedures and small tools and equipment skills are included in this training.

Incumbent and Specialized Training

After initial training, subsequent training is focused on the crews. This includes instruction in apparatus and pump operations. Currently, LFD is working in partnership with other area departments to develop and implement a company officer academy to be offered on an annual basis. Career crews lead skills training on a weekly basis for volunteer companies, and these weekly drills form the basis for LFD's night drills compliance.

Each individual firefighter's training progress is well-documented through the Training Solutions program and all personnel have access to their own training records for the purpose of tracking their own progress. Company officers and SMEs are qualified to sign off skills and ongoing training documentation. All personnel are trained to the 100 and 200 levels of the Incident Command System and officers and command staff are trained to the 300, 400, 700, and 800 levels as well as Incident Safety Officer (ISO). All operational personnel at LFD are trained and certified to the hazardous materials Operations level and three career members are trained to the Technician level and are part of the regional Haz-Mat Team in partnership with the Albany and Corvallis Fire Departments. Command staff are all trained to the Hazardous Materials--Incident Command level.

[4] *NFPA 1403: Standard on Live Fire Training Evolutions*

About half of the career firefighters are trained and certified in Water Rescue; due to the significant wild land interface area protected by LFD, all personnel are trained to the FF 2 level, all company officers are trained to the Engine Boss level, and chief officers are trained to the Strike Team Leader level.

Emergency medical technician (EMT) training and recertification is provided through scheduled ongoing training administered by the training chief using a combination of internal and external training sources. The two-year recertification schedule required by the Oregon's Health Division is used as a template. Monthly case reviews are conducted by the district's medical director, and these sessions are videotaped for viewing by personnel who may miss the live presentation. Paramedics are also able to participate in additional training outside of the district. EMS Protocols are shared countywide and coordinated among the various fire departments who share the same medical director.

Professional Development

Beyond the regular training offered to staff, individuals should be offered specific, officer development training in order to prepare them for more responsibility as they progress through the agency's command structure. This is especially important in the case of a department with limited human resources and which anticipates employee turnover (due to retirement) in the near future. Placing individuals in positions of authority without first giving them the tools to succeed often ends in failure and discouragement for both the officer and their subordinates. It is to LFD's credit that it has already developed manuals aimed at this goal and that it is working to create a regional officer academy.

Defensive Driving

One of the more significant liability exposures that a fire agency can experience is that of motor vehicle accidents, a risk that is compounded when vehicles respond in emergency circumstances. LFD offers the Emergency Vehicle Operators Course (EVOC) program semi-annually and it is a required element of all employees during their initial training.

Key Recommendations:

- Adjust work or training schedules in order to assure that line employees receive all mandatory training.
- Follow through on plans to provide a regional officer academy.
- Recently added AIC training manuals should be assessed for effectiveness.
- Include pre-fire planning as part of ongoing training.
- Develop plans for an area-wide disaster drill.

Training Program Management and Administration

To function effectively, a training program needs to be managed appropriately. Administrative program support is important, along with program guidance in the form of training planning, goals, and defined objectives. The next figure reviews the LFD Training Program administration and management practices.

Figure 26: Survey Table – Training Program Administration and Management

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
TRAINING ADMINISTRATION & BUDGET		
Director of training program	Division Chief of Training and Safety	
Goals & objectives identified?	Yes	There is a one-year plan and a five-year plan. Reset annually.
Certified instructors used?	Yes/Fire Instructor 1	
Annual training report produced?	Yes	According to NFPA levels using Target Solutions program
Priority by management toward training?	Yes	
Budget allocated to training?	$46,900 Fire/EMS in 2015	
Condition of capital facilities for training admin.?	Current four-story tower and burn room are at the end of their life span	Need more props. Also make use of DPSST props when available.
Adequate office space, equipment, supplies?	Yes	In need of a digital fire simulator
Clerical staff support assigned to training admin?	Yes	Admin support is not dedicated to Training; it is shared. New position of Lieutenant for Retention and Recruiting will create new workload for current Admin support.

Discussion

The LFD training program operates under the supervision of a division chief. The training chief is motivated and dedicated to providing the highest quality of training within the limitations of the fiscal realities faced by the district. As in any combination department, providing and tracking training to volunteer firefighters is a significant challenge. Fortunately, LFD has recently procured through SAFER (Staffing for Adequate Fire and Emergency Response) grant funding a volunteer recruitment and retention officer who is assigned to work with the training chief in support of the district's volunteer program.

This additional support will strengthen both the volunteer program and the training program. However, it is also possible that there will be an increase in the need for administrative support for these two programs. (The alternative is for chief and officer level personnel to be performing functions that might be handled more efficiently by administrative personnel.) As LFD addresses its numerous training priorities, it should be mindful of the value of reviewing and evaluating its programs and processes.

LFD's training program is IFSTA[5] based. Lesson plans are utilized and training is scheduled on a weekly and monthly basis throughout the year. The district regularly drills with other departments in the area so that crews are familiar with one another. All of these agencies depend upon one another and a

[5] International Fire Service Training Association.

combination of career and volunteer responders to assemble an effective response to larger incidents. LFD should always be looking for opportunities to strengthen this kind of cooperation.

Training Program Planning

The training chief coordinates his training planning with the division chief of operations and other executive staff. Emergency response personnel—career and volunteer—have easy access to recommending and assisting in the creation of training curricula, according to their interests and expertise.

Training Records and Support

LFD has developed a computerized and personalized approach to training records retention that makes it easy for career and volunteer staff to access their own records and to keep themselves apprised of their training status and needs—both for compliance and for promotion.

As noted, administrative support at LFD is effective but is shared among all chief officers. The training function could benefit from the certainty of assigned administrative support.

Key Recommendations:

- Develop a plan for replacing worn burn props.
- Budget for a new digital fire simulator.
- Develop a plan to financially support ongoing training needs.
- Assess work flow to identify administrative support needs for the Training Division.

Training Resources, Scheduling, and Methodology

To be able to deliver effective training to fire and EMS personnel, some resources are necessary to arm the trainer with the tools needed to provide adequate educational content. These include both tools and facilities.

Figure 27: Survey Table – Training Resources, Scheduling and Methodology

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
TRAINING FACILITIES & RESOURCES		
Adequate training ground space/equipment?	Yes	There is a need for more props.
Training facilities (tower, props, pits)	Yes	The district needs to plan for tower and burn room replacement.
Live fire props?	Yes	Additional training props are needed.
Fire and driving grounds?	Yes	Limited.
Maintenance of training facilities adequate?	Yes	By in-house personnel.
Classroom facilities adequate?	Yes	In the two career-staffed stations only.
Video, computer simulations available?	Yes	Need to upgrade.

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
Instructional materials available?	Yes	
RECORDKEEPING		
Individual training files maintained?	Yes, to DPSST standard	
Records & files computerized?	Yes	
Daily training records kept?	Yes	
Company training records kept?	Yes	
Training equipment inventoried?	No	Due to a recent department-wide policy about what should and should not be inventoried.
PERSONNEL TRAINED		
Number of personnel trained (latest full year)?	65	
Total training hours delivered (latest full year)?	9,363.11	Training is delivered as part of an annual planning process to assure that the appropriate subjects are being offered.
Fire-related training hours?	7,583.76	
EMS-related training hours?	1,006	
Other training hours?	773.35	

Discussion

LFD has made a strong commitment to training in all regards. The organization has focused on safety and has a culture of safe practices. Stressing safety from members' first exposure to fire training through regular reminders during training exercises and while on scene at emergency incidents keeps both paid and volunteer personnel focused on safety. The area that has been ignored is in the planning for facilities and the upgrade of training equipment.

Key Recommendations:

- Replace the out-of-date computerized training module.
- Develop a plan and reserve funding to replace the aging training buildings and props.

FIRE PREVENTION AND PUBLIC EDUCATION PROGRAMS

An aggressive risk management program, through active fire and life safety services, is a fire department's best opportunity to minimize the losses and human trauma associated with fires and other community risks.

> The National Fire Protection Association recommends a multifaceted, coordinated risk reduction process at the community level to address local risks. This requires engaging all segments of the community, identifying the highest priority risks, and then developing and implementing strategies designed to mitigate the risks. [6]

[6] Kirtley, Edward, *Fire Protection Handbook*, 20th Edition, 2008, NFPA, Quincy, MA.

A fire department needs to review and understand the importance of fire prevention and public education, appreciating their role in the planning process of a community with diversified zoning including residential, commercial, and industrial properties. The fundamental components of an effective fire prevention program are listed in the following table, accompanied by the elements needed to address each component.

Figure 28: Fire Prevention Program Components

FIRE PREVENTION PROGRAM COMPONENTS	ELEMENTS NEEDED TO ADDRESS PROGRAM COMPONENTS
Fire Code Enforcement	Proposed construction and plans review New construction inspections Existing structure/occupancy inspections Internal protection systems design review Storage and handling of hazardous materials
Public Fire and Life Safety Education	Public education Specialized education Juvenile fire setter intervention Prevention information dissemination
Fire Cause Investigation	Fire cause and origin determination Fire death investigation Arson investigation and prosecution

Fire and Life Safety Code Enforcement

The most effective way to combat fires is to prevent them. A strong fire prevention program, based on locally identified risk and relevant codes and ordinances, reduces loss of property, life, and the personal and community-wide disruption that accompanies a catastrophic fire.

Figure 29: Survey Table - Fire Prevention Code Enforcement

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
CODE ENFORCEMENT		
Fire codes adopted?	Yes	
Code used–year/edition/version?	2014 Oregon Fire Code	2014 is the most current edition.
Local codes/ordinances adopted, amendments?	No local amendments; adopted raw Oregon Code only	
Sprinkler ordinance in place?	No	

Discussion

LFD has adopted the 2014 edition of the Oregon Fire Code and has not supplemented the code with local code amendments or ordinances. Fire code enforcement and administration in the district is the responsibility of a newly appointed division chief of planning and administration, who also serves as the district's lead fire prevention officer, charged with responsibility for management of the Fire and Life Safety Division. However, the division chief's certifications do not technically qualify him to act as the district's fire marshal by statute. As a result, the fire chief is currently serving as the acting fire marshal on a temporary basis. In addition to the division chief, a full-time fire prevention specialist position is in place, primarily serving as an inspector.

The adopted code is the most up to date available and appropriate. The district should work with the city and Linn County to ensure consistent adoption and application of the 2014 code that is standardized as appropriate within the jurisdiction. The district may also want to consider adoption of the Wildland Urban Interface Code, given the considerable wildland risk and exposure that is present.

New Construction Plan Review and Inspection

An essential component of a fire prevention program is new construction plan reviews. When a new building is proposed within the fire district's boundary, the LFD will have the responsibility to protect the structure for the life of the building. The district has a fundamental interest and duty to ensure all buildings within its jurisdiction are properly constructed.

Figure 30: Survey Table - New Construction Plan Review and Inspection

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
NEW CONSTRUCTION INSPECTIONS & INVOLVEMENT		
FD consulted in proposed new construction?	Within the city of Lebanon only, Very rare within the county	
Perform fire and life-safety plan review?	Yes, but only within the city of Lebanon	Seek a higher degree of involvement in the new construction plan review process outside of the city
Sign-off on new construction?	Perform final walk through and give approval for sign off by building official in city only	Seek a sign-off on new construction building permits issued outside of the city
Charges for inspections or reviews?	IGA with city for plans review. Inspection fee only after 2nd re-inspection.	
Perform existing occupancy inspections?	Yes	
Special risk inspections?	Yes	
Storage tank inspections?	No	
Key-box entry program in place?	Yes, Knox Box	
Hydrant flow records maintained?	City of Lebanon and in Firehouse software®.	

Discussion

LFD new construction code enforcement activities consist of regular review of submitted commercial plans within the city of Lebanon. When submitted, the fire district is provided with the plans for review and district sign-off is required prior to the city issuing a building permit. The division chief of planning and administration, and/or fire prevention specialist complete a variety of inspections that are related to the new construction permitting process.

The new construction plan review process is appropriate and properly established for building permits within the city. However, the same practice does not apply in areas within the fire district but outside of the city. The Linn County building official processes new construction building permits and the fire district is not adequately included in the process. The county may or may not contact the district; at best

the district may have the opportunity to comment on access and water supply concerns but does not complete a proper fire and life safety review of the submitted plans or sign off on the authorization for issuance of the building permit.

It is recommended that the district seek to pursue at least some degree of involvement in the process of commercial plan review in the areas for which it has fire protection responsibility that fall outside of the city of Lebanon. At a minimum, consistent review of fire department access and available water supply should be conducted. To be fully effective, however, either the district should complete a fire and life safety plan review, or assure that an acceptable review is completed via the county's permitting system.

Key Recommendations:

- Increase the level of involvement in the new construction plan review process for permitting that falls outside of the city limits.
- Seek a sign-off on new construction building permits issued outside of the city.

Existing Occupancy Inspection Program

Existing property inspections to find and eliminate potential life hazards are an essential part of the overall fire protection system. These efforts are most effective when completed by individuals having the proper combination of training and experience, and when completed with appropriate frequency.

Figure 31: Survey Table - Existing Occupancy Inspection Program

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
GENERAL INSPECTION PROGRAM		
Self-inspection program used?	No	
Frequency of inspections?	High risk annually, otherwise about every three years	Increase and prioritize existing occupancy inspections based on hazard and risk exposure.
Inspection program	Division chief and fire prevention specialist complete most inspections in existing occupancies. Company inspections are being initiated.	Evaluate the concept of supplementing the existing occupancy inspection program with company level inspections.
Citation process in place & formally documented/adopted?	No	
Court cited to?	N/A	
Inspections computerized?	In Firehouse® software	
Number of personnel devoted to program?	1 division chief of planning and administration and 1 fire prevention specialist (inspector)	
Fees for specialty inspections?	Fireworks permits (retail)	

Discussion

LFD provides existing occupancy inspections for assembly, schools, businesses and identified high-risk facilities on an annual basis. However, other commercial occupancies are not on a consistent or firmly established inspection schedule and, in general terms only, are subject to inspection approximately every three years.

The Division chief of planning and administration and/or the fire prevention specialist currently conduct all existing occupancy inspections for the LFD. Workload considerations have impacted the schedule and frequency of existing occupancy inspections. To mitigate the situation, ESCI understands that LFD is in the process of establishing an engine company inspection program to increase inspection frequency, and that the program is planned for implementation as this report is being written. Information provided indicates that each on-duty crew is being assigned five inspections monthly. The three shifts achieve completion of 15 inspections each month, combined.

Utilizing fire suppression personnel who are adequately trained in basic fire inspection practices is an appropriate and effective practice in some instances and doing so has the benefit of increasing inspection capabilities and frequency. However, there are differing opinions with regard to whether doing so is the best use of limited operational personnel resources. In some respects, line crews are more appropriately committed to pre-incident planning, building familiarization and similar tasks. ESCI recommends that LFD monitor the program closely and re-evaluate its effectiveness and its impact on operational staffing as the program moves forward.

Key Recommendations:

- Increase existing occupancy inspection practices and prioritize based on hazard and risk exposure.
- Monitor and evaluate the effectiveness of supplementing the existing occupancy inspection program with company level inspections.

Fire and Life Safety Public Education Program

Providing fire and life safety education to the public to minimize the number of emergencies while training the community to take appropriate actions when an emergency occurs is essential to a fire and life safety program. Life and fire safety education provides the best chance for minimizing the effects of fire, injury, and illness to the community. Public education outreach in the LFD is discussed in the following table.

Figure 32: Survey Table - Fire and Life Safety Public Education Program

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
FIRE SAFETY & PUBLIC EDUCATION		
Public education/information officer in place?	Division Chief of Planning and Administration, Fire Prevention	

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
	Specialist, Engineer/Medic (PIO only)	
Public education in the following areas:	Conducted on a request basis only, absent a fully developed program	Increase public education outreach
Calling 9-1-1?	Yes	
EDITH (exit drills in the home)?	Yes	
Smoke alarm program?	Yes	
Fire safety (heating equipment, chimney, electrical equipment, kitchen/cooking, etc.)? (Describe)	Yes, via community talks and chimney brush loan program	
Injury prevention (falls, burns, bike helmets, drowning, etc.) ? (Describe)	Yes, presentations and bike helmet and child safety seat program	
Fire extinguisher use? (Describe)	Yes, fire extinguisher classes available with use of props	
Fire brigade training? (Describe)	No fire brigades	
Elderly care and safety? (Describe)	Yes, upon request	
Curriculum used in schools? (Describe)	OSFM Fire Safety Skills curriculum available to all educators in district	
Babysitting classes offered?	No	
CPR courses, BP checks offered?	Yes	
Publications available to public?	Brochures online and in stations	
Bilingual info available?	No	
Annual report distributed to community?	No	
Juvenile fire-setter program offered?	Yes, three in-house personnel are trained in intervention	
Wildland interface education offered?	Yes	

Discussion

Public education and outreach is prioritized in the organization; however, staffing limitations compromise the level of attention that can be paid to the program. Generally, public education outreach is conducted only on upon request and is not an element of a fully developed or structured program.

Despite limited career and dedicated public outreach staffing, the majority of fundamental community outreach elements are being addressed.

Public education and outreach is assigned to the fire prevention specialist with some additional support from line personnel. ESCI recommends LFD expand and enhance its fire and life safety public education outreach by developing a more effectively structured program. In doing so, the district should also consider establishing a volunteer community outreach coordinator who can work with the fire prevention staff to ensure the necessary program elements are implemented and maintained.

Key Recommendations:

- Place a higher priority on public education outreach.
- Develop a structured public education program with defined goals and objectives.
- Consider the use of community based, non-combat, volunteers in public education outreach.

Fire Cause and Origin Investigation

Accurately determining the cause of a fire is an essential element of a fire prevention program. When fires are set intentionally, identification and/or prosecution of the responsible offender is critical in preventing additional fires and potential loss of life. Further, if the cause of fires is accidental, it is also of great importance because of knowing and understanding how accidental fires start is the most effective way to identify appropriate fire prevention and public education measures to prevent a reoccurrence.

Figure 33: Survey Table - Fire Cause and Origin Determination

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
FIRE INVESTIGATION		
Fire origin and cause determination?	Initially by division chief of planning and administration or prevention specialist. In house investigation team, can also call Linn-Benton FIT[7] team.	
Arson investigation and prosecution?	Criminal activity referred to Law Enforcement	
Arson investigation training provided?	Yes	
Persons responsible for investigations?	Division chief of planning and administration or prevention specialist. There is also a 15-member internal FIT[8]. A regional Linn-Benton FIT is also available.	
Local FIT membership (fire investigation team)?	Linn-Benton FIT, all local team members belong to LBFIT	
Process for handling juvenile suspects	Referred to county juvenile authorities	
Liaison with law enforcement?	Assigned as needed	
Scene control practices in place?	Yes	
Photographer available?	Assigned to team member	
Adequate & appropriate equipment issued to investigators?	Available for use	
Evidence collection process in place?	Not by fire district. Evidence collection is left up to law enforcement	

[7] FIT – Fire Investigation Team.

[8] FIT – Fire Investigation Team.

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
Release required for entry?	Yes	
Reports & records of all incidents made?	Yes	
File, record, & evidence security?	Yes, except for evidence. Part of Firehouse Software®	

Discussion

The results of fire investigations, if used accordingly, identify public education focus areas, the need for code modifications and adjustment of fire deployment and training. Definition and mitigation of a community's fire problem can be achieved via an effective fire cause and determination program.

Fire Investigation

Fire cause and origin determination in LFD starts with the company officer on the scene of a fire. At a small incident, a company officer may determine whether a fire has an obvious cause or is suspicious. If on-scene personnel view the fire as questionable or are unsure about the fire's cause, they will request assistance from the by Division Chief of Planning and Administration or Prevention Specialist to conduct the cause and origin investigation, or additional assistance is available from an internal investigation team and the Linn-Benton Fire Investigation Team. Suspected arson cases are referred to local law enforcement for processing and criminal charges.

Statistical Collection and Analysis

Collecting and maintaining data relative to fire prevention efforts and the results of fire cause and origin determination is an essential element of an effective program. Information regarding how and why fires are occurring provided the basis for decisions about where prevention efforts are focused.

Survey Table 34: Statistical Collection and Analysis

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
STATISTICAL COLLECTION & ANALYSIS		
Records kept by computer?	Yes	
Information collected in following areas:		
Fire incidents by cause/location?	Yes	
Time-of-day & day-of-week?	Yes	
Method of alarm (how received)?	Yes	
Dispatch times?	Yes	
Response times?	Yes	
Information analyzed & used for planning?	Standards of Cover, strategic planning, prevention efforts	
Reports made & distributed?	As requested	
FTEs used in data collection & analysis?	No dedicated data collection staff. Division Chief of planning and administration or prevention	

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
	specialist manage the information internally.	

Discussion

The division chief of planning and administration or prevention specialist collect and maintain statistical data regarding fire prevention efforts and the results of cause and origin investigations at LFD. The information is documented manually and hard copy reports are forwarded for entry into the district's Firehouse® software suite. The division chief submits National Fire Incident Response data from the Firehouse® software program.

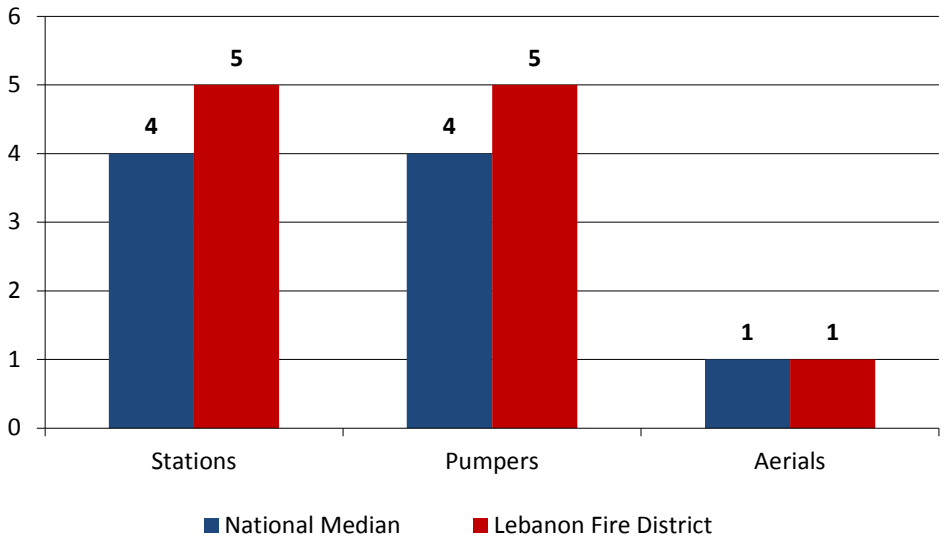
CAPITAL ASSETS AND ASSESSMENT OF CURRENT INFRASTRUCTURE

Regardless of an emergency service agency's financing, if appropriate capital equipment is not available for the use by responders, it is impossible for a fire department to deliver services effectively. Two primary capital assets that are essential to the provision of emergency response are facilities and apparatus (response vehicles).

LFD maintains a balance of three basic resources that are needed to carry out its emergency mission: people, equipment, and facilities. Because firefighting is an extremely physical pursuit, the adequacy of personnel resources is a primary concern; but no matter how competent or numerous the firefighters are, the district will fail to execute its mission if it lacks sufficient fire apparatus distributed in an efficient manner.

The district maintains five fire stations and millions of dollars' worth of capital assets. These assets are necessary to provide service and must be maintained and replaced as needed. A comparison of major capital assets, including fire engines, aerial ladder trucks, and fire stations is provided in the following figure.

Figure 35: Capital Assets per 1,000 Population



LFD's major capital asset inventory falls slightly above national medians for the region, which is to be expected given the large geographic area served.

Facilities

Appropriately designed and maintained facilities are critical to a fire department's ability to provide services in a timely manner and with appropriate deployment of assets. ESCI observed and reviewed the fire stations operated by LFD. The findings are summarized in the following pages and any areas of concern observed are identified.

Figure 36: Lebanon Fire District Station 31

Station 31 is the district's main fire station and includes its administrative offices. It is a larger, 12,000 square foot facility with six, double depth apparatus bays of drive through configuration. Build in 1975, the station is in generally good condition but is aging.

SURVEY COMPONENT	OBSERVATIONS
STRUCTURE	
Construction type	Single story wood frame and concrete block
Date	1975
Seismic protection/energy audits	Seismic study scheduled in 2016
Auxiliary power	Yes
Condition	Good
Special considerations (ADA, mixed gender appropriate, storage, etc.)	ADA, mixed gender, administration
Square footage	12,500
FACILITIES AVAILABLE	
Exercise/workout	Yes
Kitchen/dormitory	Yes
Lockers/showers	Yes
Training/meetings	Yes
Washer/dryer	Yes
PROTECTION SYSTEMS	
Sprinkler system	No
Smoke detection	Yes
Security	Yes, cameras
Apparatus exhaust system	Yes

Figure 37: Lebanon Fire District Station 32

	The Lacomb Station, Station 32, is a small, volunteer-staffed facility consisting of three, single depth apparatus bays. It was constructed in 1977 and, while older, is in fair to good condition overall. The building has limited facilities other than the bays and a meeting room
SURVEY COMPONENT	**OBSERVATIONS**
STRUCTURE	
Construction type	Wood frame/metal skin
Date	1977
Seismic protection/energy audits	No
Auxiliary power	No
Condition	Good
Special considerations (ADA, mixed gender appropriate, storage, etc.)	Volunteer substation
Square footage	2,800
FACILITIES AVAILABLE	
Exercise/workout	No
Kitchen/dormitory	No
Lockers/showers	No
Training/meetings	Yes
Washer/dryer	No
PROTECTION SYSTEMS	
Sprinkler system	No
Smoke detection	Yes
Security	Yes, intrusion, security cameras
Apparatus exhaust system	Yes

Figure 38: Lebanon Fire District Station 33

Station 33, in Fairview, is a smaller, volunteer substation with no residential quarters. There are three, single, apparatus bays. It was constructed in 1977.

SURVEY COMPONENT	OBSERVATIONS
STRUCTURE	
Construction type	Wood frame/metal skin
Date	1977
Seismic protection/energy audits	No
Auxiliary power	No
Condition	Good
Special considerations (ADA, mixed gender appropriate, storage, etc.)	Volunteer substation
Square footage	2,640
FACILITIES AVAILABLE	
Exercise/workout	No
Kitchen/dormitory	No
Lockers/showers	No
Training/meetings	Yes
Washer/dryer	No
PROTECTION SYSTEMS	
Sprinkler system	No
Smoke detection	Yes
Security	Yes, intrusion, security cameras
Apparatus exhaust system	Yes

Figure 39: Lebanon Fire District Station 34

	Constructed in 2007, Station 34 is one of the district's newer facilities and is staffed with full time personnel. It has three, double depth apparatus bays, all of drive-through configuration and houses one engine, a medic unit, and a reserve medic unit. The station is in very good condition and will serve the district for some time.
SURVEY COMPONENT	**OBSERVATIONS**
STRUCTURE	
Construction type	Single story wood frame
Date	2007
Seismic protection/energy audits	No
Auxiliary power	Yes
Condition	Very good
Special considerations (ADA, mixed gender appropriate, storage, etc.)	ADA and mixed gender
Square footage	9,432
FACILITIES AVAILABLE	
Exercise/workout	Yes
Kitchen/dormitory	Yes
Lockers/showers	Yes
Training/meetings	Yes
Washer/dryer	Yes
PROTECTION SYSTEMS	
Sprinkler system	Yes
Smoke detection	Yes
Security	Yes, cameras
Apparatus exhaust system	Yes

Figure 40: Lebanon Fire District Station 35

The Berlin Station, Station 35, is another volunteer-staffed facility, constructed in 2008. It has two, single depth apparatus bays and a meeting space in the bays. There is room for addition of a third bay in the future, if needed.

SURVEY COMPONENT	OBSERVATIONS
STRUCTURE	
Construction type	Single story metal frame
Date	2008
Seismic protection/energy audits	No
Auxiliary power	No
Condition	Good
Special considerations (ADA, mixed gender appropriate, storage, etc.)	Volunteer substation
Square footage	2,057
FACILITIES AVAILABLE	
Exercise/workout	No
Kitchen/dormitory	No
Lockers/showers	No
Training/meetings	No
Washer/dryer	No
PROTECTION SYSTEMS	
Sprinkler system	No
Smoke detection	Yes
Security	Yes, intrusion and cameras
Apparatus exhaust system	Yes

Figure 41: Lebanon Fire District Station 31 Shop Building

The district's shop building is adjacent to Station 31. It is a large, 9,600-square foot structure that is used for storage as well as vehicle repair and maintenance services. Half of the building is leased to Benton County as a maintenance facility, where only minor repairs are completed.

SURVEY COMPONENT	OBSERVATIONS
STRUCTURE	
Construction type	Wood frame / metal skin
Date	1988
Seismic protection/energy audits	No
Auxiliary power	Yes
Condition	Good
Special considerations (ADA, mixed gender appropriate, storage, etc.)	Storage, repair, half leased to Benton County Shops
Square footage	9,600
FACILITIES AVAILABLE	
Exercise/workout	No
Kitchen/dormitory	No
Lockers/showers	No
Training/meetings	No
Washer/dryer	No
PROTECTION SYSTEMS	
Sprinkler system	Yes
Smoke detection	Yes
Security	Yes, intrusion
Apparatus exhaust system	None

Apparatus

LFD maintains a sizeable fleet of response vehicles that are generally newer and clearly well maintained. The overall condition of the fleet was found to be very good to excellent generally. An inventory of fire apparatus, configuration, and condition is provided in the following figures.

Figure 42: LFD Apparatus Inventory

STATION 31							
Apparatus Designation	Type	Year	Make/Model	Condition	Seating Capacity	Pump Capacity GPM	Tank Capacity Gallons
Brush 31	6	2009	Ford F550	Good	2	150	400
Engine 31	1	2008	Pierce/Impel	Good	6	1,750	750
Medic 30	3	2011	Ford E 450	Good	3	N/A	N/A
Reserve Eng. 31	1	1999	Pierce/Lance	Fair	6	1,250	750
Pumper/ Tender 31	1	2008	Pierce/Impel	Good	4	1,750	2500
Truck 31	1	1986	E-one	Fair	4	1,500	300
Medic 31	1	2009	Kodiak	Good	2	N/A	N/A
Rescue 31		1996	GMC/Topkick	Good	7	N/A	N/A
Brush 34	3	1989	International	Good	2	400	1,000
Reserve Medic 31	3	2015	Ford E 450	Good	2	N/A	N/A
Staff #17	SUV	2003	Chevrolet Tahoe	Good	4	N/A	N/A
Staff #20	SUV	2007	Dodge Durango	Good	4	N/A	N/A
Staff #27	SUV	2011	Ford Expedition	Excellent	4	N/A	N/A
Staff #33	Car	1999	Ford Crown Vic.	Fair	4	N/A	N/A
Staff #34	Pickup	2013	Chevrolet1500	Excellent	4	N/A	N/A
Staff #36	SUV	2016	Ford Explorer	Excellent	4	N/A	N/A

STATION 32							
Apparatus Designation	Type	Year	Make/Model	Condition	Seating Capacity	Pump Capacity GPM	Tank Capacity Gallons
Engine 32	1	1996	Pierce/ Freightliner	Fair	5	1,000	750
Water Tender 32	1	2012	KME/ Freightliner	Good	2	750	2,000

STATION 33							
Apparatus Designation	Type	Year	Make/Model	Condition	Seating Capacity	Pump Capacity GPM	Tank Capacity Gallons
Engine 33	1	1996	Pierce/Freightliner	Fair	5	1,000	750
Water Tender 33	1	2012	KME/Freightliner	Good	2	750	2000

STATION 34

Apparatus Designation	Type	Year	Make/Model	Condition	Seating Capacity	Pump Capacity GPM	Tank Capacity Gallons
Engine 34	1	2008	Pierce/Impel	Good	6	1,750	750
Reserve Medic 34	3	1998	Ford E350	Fair	2	N/A	N/A
Medic 34	3	2003	Lifeline/E450	Fair	2	N/A	N/A

STATION 35							
Apparatus Designation	Type	Year	Make/Model	Condition	Seating Capacity	Pump Capacity GPM	Tank Capacity Gallons
Engine 35	1	2006	Pierce/international	Good	4	1,000	750
Brush 35	6	1994	Ford/F-350	Fair	2	150	300

Discussion

As noted, ESCI observed the district's vehicles to be well maintained and in good to excellent condition generally. LFD is fortunate to have a dedicated shop that services all of the emergency apparatus from a well-equipped shop at Station 31.

Apparatus Replacement Planning

Fire apparatus are typically unique pieces of equipment, often very customized to operate efficiently in a narrowly defined mission. A pumper may be designed such that the compartments fit specific equipment and tools, with virtually every space on the truck designated in advance for functionality. This same vehicle, with its specialized design, cannot be expected to function in a completely different capacity, such as a hazardous materials unit or a rescue squad. For this reason, fire apparatus is very expensive and offers little flexibility in use and reassignment. As a result, communities across the country have sought to achieve the longest life span possible for these vehicles.

Unfortunately, no mechanical piece of equipment can be expected to last forever. As a vehicle ages, repairs tend to become more frequent, parts more difficult to obtain, and downtime for repair increases. Given the emergency mission that is so critical to the community, this factor of downtime is one of the most frequently identified reasons for apparatus replacement.

Because of the large expense of fire apparatus, most communities find the need to plan ahead for the cost of replacement. To properly do so, agencies often turn to the long-accepted practice of establishing a life cycle for the apparatus that results in a replacement date being anticipated well in advance. Organizations then set aside incremental funds during the life of the vehicle so replacement dollars are ready when needed.

Figure 43: Capital Assets, Capital Improvement and Replacement Programs

SURVEY COMPONENT	LEBANON FIRE DISTRICT OBSERVATIONS	COMMENTS AND RECOMMENDATIONS
FIRE STATIONS/STRUCTURES		
Capital Improvement Plan maintained?	No	Develop a long-range facility replacement plan
Period of plan (from–to)	N/A	
Funding mechanism identified?	N/A	
APPARATUS		
Apparatus Replacement Plan maintained?	No	Develop a funded apparatus replacement schedule
Period of plan (from–to)	N/A	
Funding mechanism identified?	N/A	
SUPPORT EQUIPMENT		
Equipment Replacement Plan maintained?	No	Include support equipment in capital replacement planning
Period of plan (from–to)	N/A	
Funding mechanism identified?	N/A	

Discussion

Planning for the long-range replacement of fixed facilities, like fire stations, is important. The facilities are expensive to build, replace, and maintain and their service lives are difficult to predict. Even so, the district is encouraged to carefully evaluate its long-range needs for fixed facilities and plan accordingly.

LFD does not maintain a formal schedule that places all apparatus on any specified replacement cycle from date of primary service. ESCI recommends that the district make an effort to develop a vehicle replacement schedule, including a funding strategy that will fully meet future needs. The schedule should be developed to include provision for purchasing support equipment, as needed, for new apparatus. Additional detail on replacement planning is provided later in this report.

Key Recommendations:

- Develop a funded replacement schedule for major apparatus.
- Include support equipment in capital replacement planning.
- Develop a long-range facility replacement plan.

Service Delivery and Future System Demand Projections

Community Risk Assessment

This section analyzes risks that are present within the LFD service area that potentially threaten the people and property within the community and can create response workload for the LFD. These risks are identified to assist the LFD in identifying where to locate response resources in the types and numbers needed to effectively respond to likely emergencies.

Overall Geospatial Characteristics

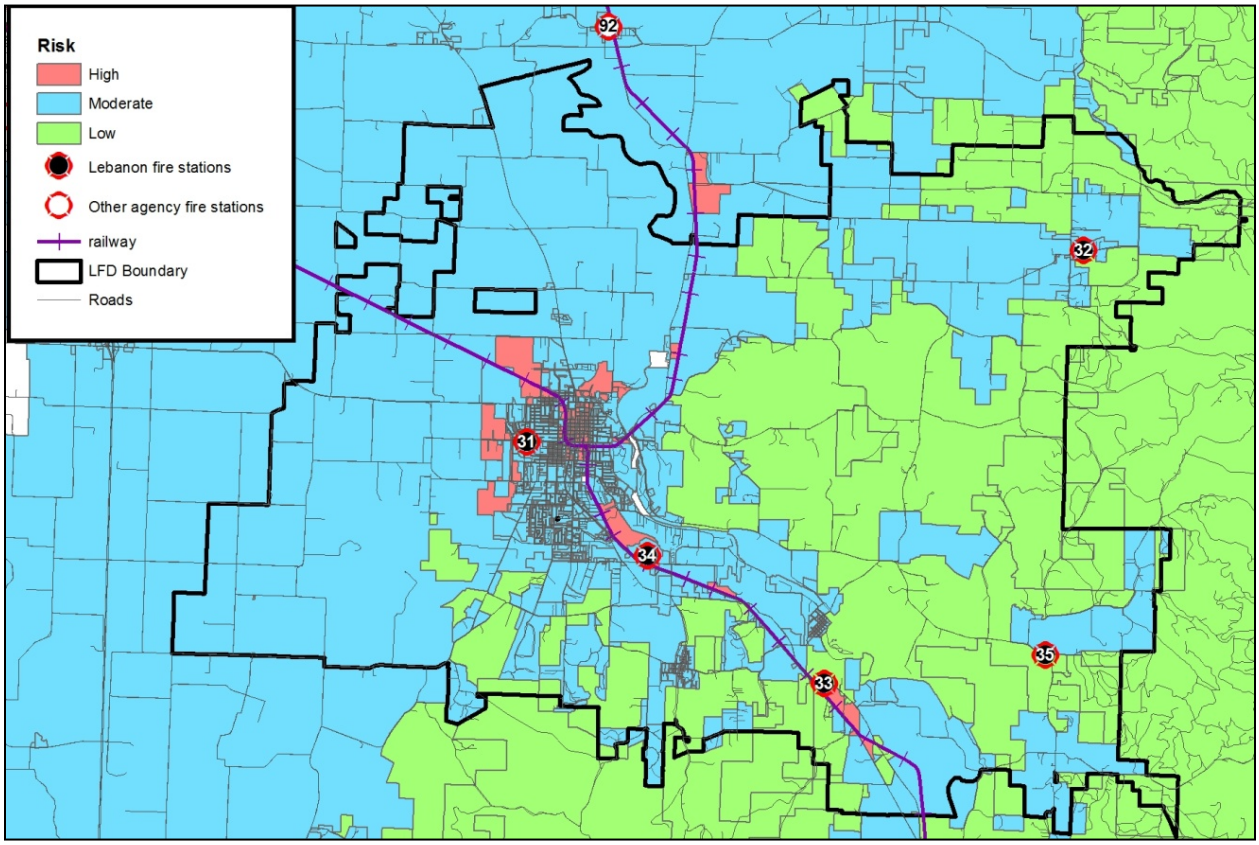
The fire service assesses the relative risk of properties based on a number of factors. Properties with high fire and life risk often require greater numbers of personnel and apparatus to effectively mitigate a fire emergency. Staffing and deployment decisions should be made with consideration to the level of risk within geographic sub-areas of a community.

The following community risk assessment has been developed based on intended land uses as described in the city of Lebanon and Linn County zoning designations. The following figure translates zoning to categories of relative fire and life risk.

- Low risk – Areas zoned and used for agricultural purposes, open space, and very low-density residential and uses.
- Moderate risk – Areas zoned for medium-density single family properties, small commercial and office uses, low-intensity retail sales, and equivalently sized business activities.
- High risk – Higher-intensity business districts, mixed use areas, high-density residential, industrial, warehousing, and large mercantile centers.

The following figures depict fire and life safety risk based on proposed land uses for the LFD service area.

Figure 44: Fire and Life Safety Risk Based on Zoning – LFD Service Area



Geographic and Weather-Related Risks

Weather Risk

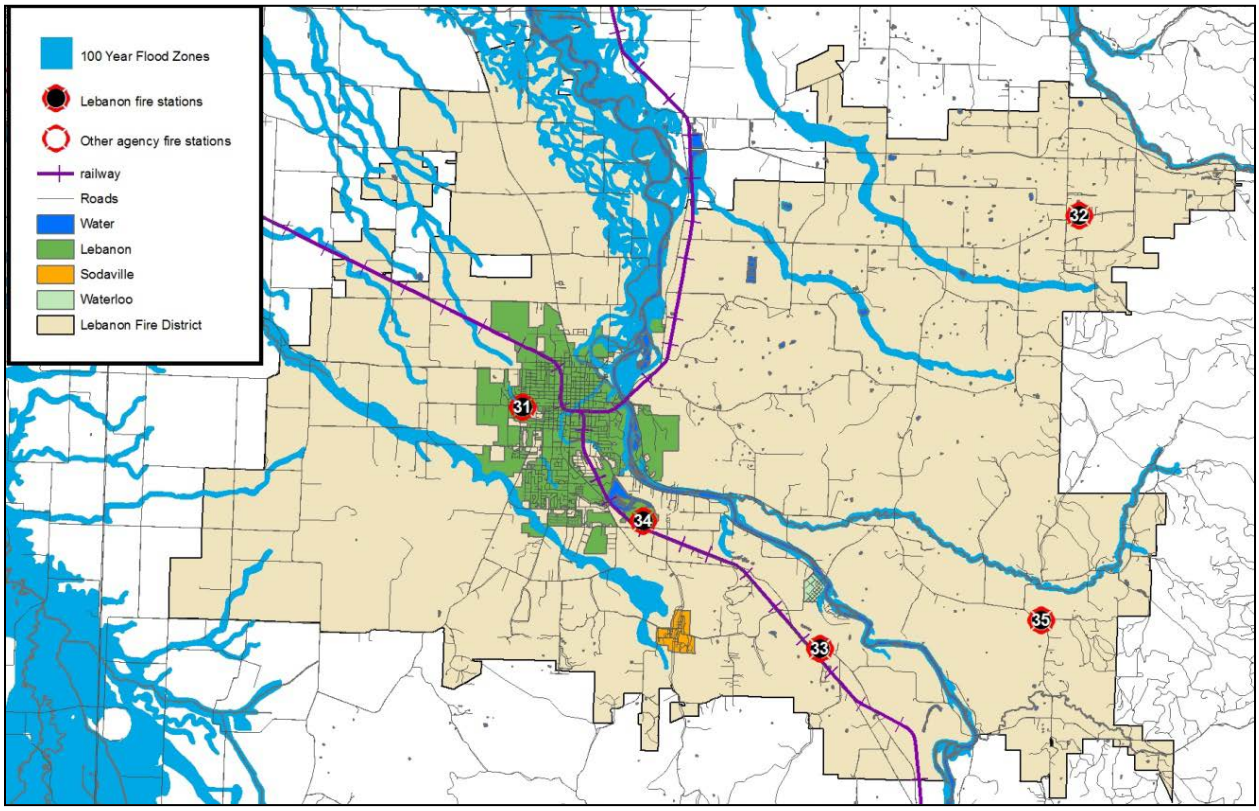
The Lebanon region's climate is influenced by the currents of the Pacific Ocean, producing cool, wet winters and warm, dry summers. Rainfall averages about 40 inches per year. In the winter, the area can get light to moderate snowfall averaging about five to ten inches per year.

Mean high temperatures range from the low 80s in the summer to about 40° F in the winter. Extreme temperatures are rare. 90° F or more temperatures occur only five to 15 times per year. Temperatures below 0° F occur only once every 25 years or so. Extreme weather, though rare, does occur. Thunderstorms, high wind storms, and significant rain events happen infrequently. Recently a tornado passed through the town of Aumsville, just to the east of Salem, causing significant damage.

Flood Risk

Waterway flooding is a risk within the community. During heavy rains, local streams can overfill causing local area flooding. The last significant flood event was in 1996, the result of a tropical rain system causing a rapid melt of the Cascades snowpack. The following figure illustrates the area designated by FEMA as 100-year flood zones. Several fire stations are near the 100-year flood zone.

Figure 45: FEMA 100-Year Flood Zones

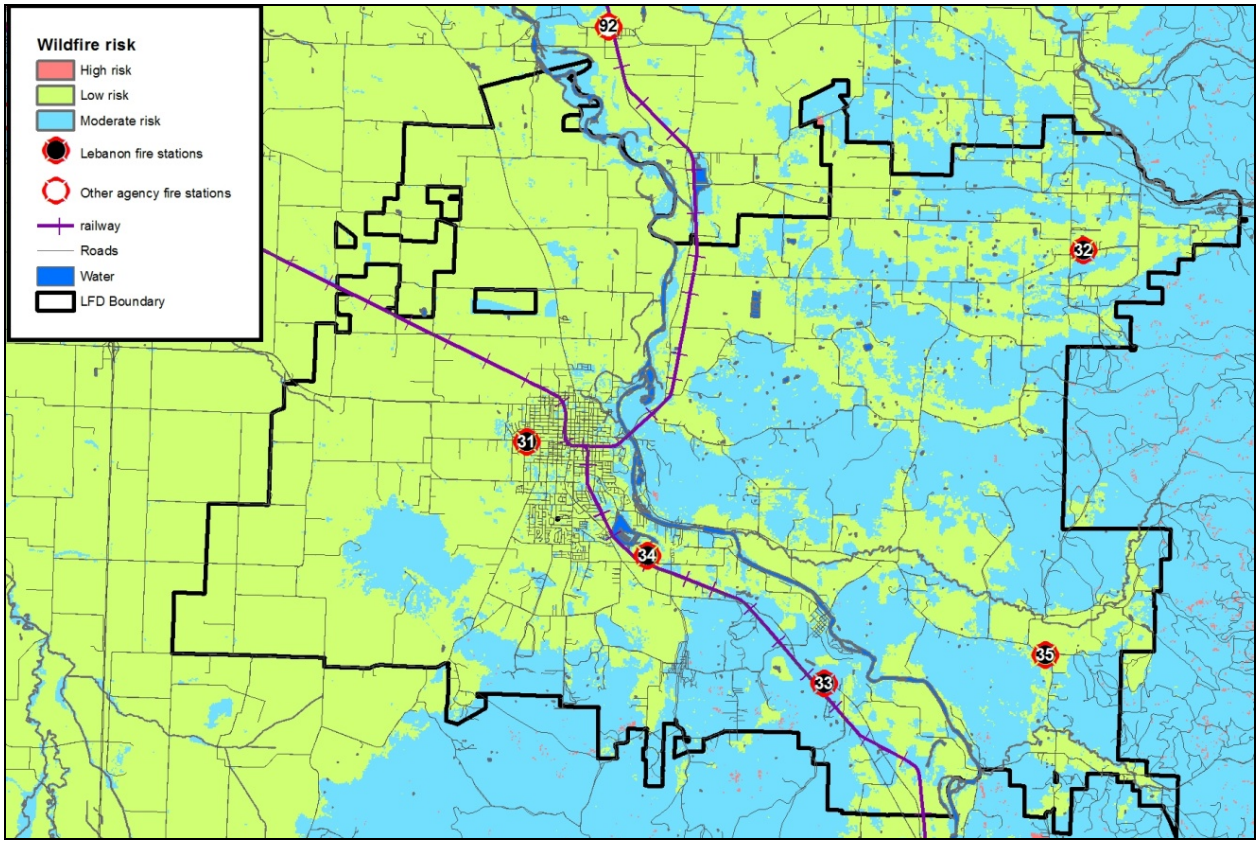


Wildfire Risk

The Lebanon area climate, vegetation, and topography make wildland fire a regular but moderate risk to the community. Parts of the LFD service area have homes interspersed with large areas of natural vegetation. Many of these homes are located at the top of moderate to steep slopes, increasing the risk.

LFD experiences small to moderate, slow moving wildland fires on a regular basis. Warm summer temperatures and strong winds can carry wildland fires into homes. However, fuel types found in this region do not support aggressive fire behavior. The following map illustrates higher risk areas in and near the LFD service area. This information was developed from the Oregon Department of Forestry wildfire risk classification data.

Figure 46: Wildland Fire Hazard



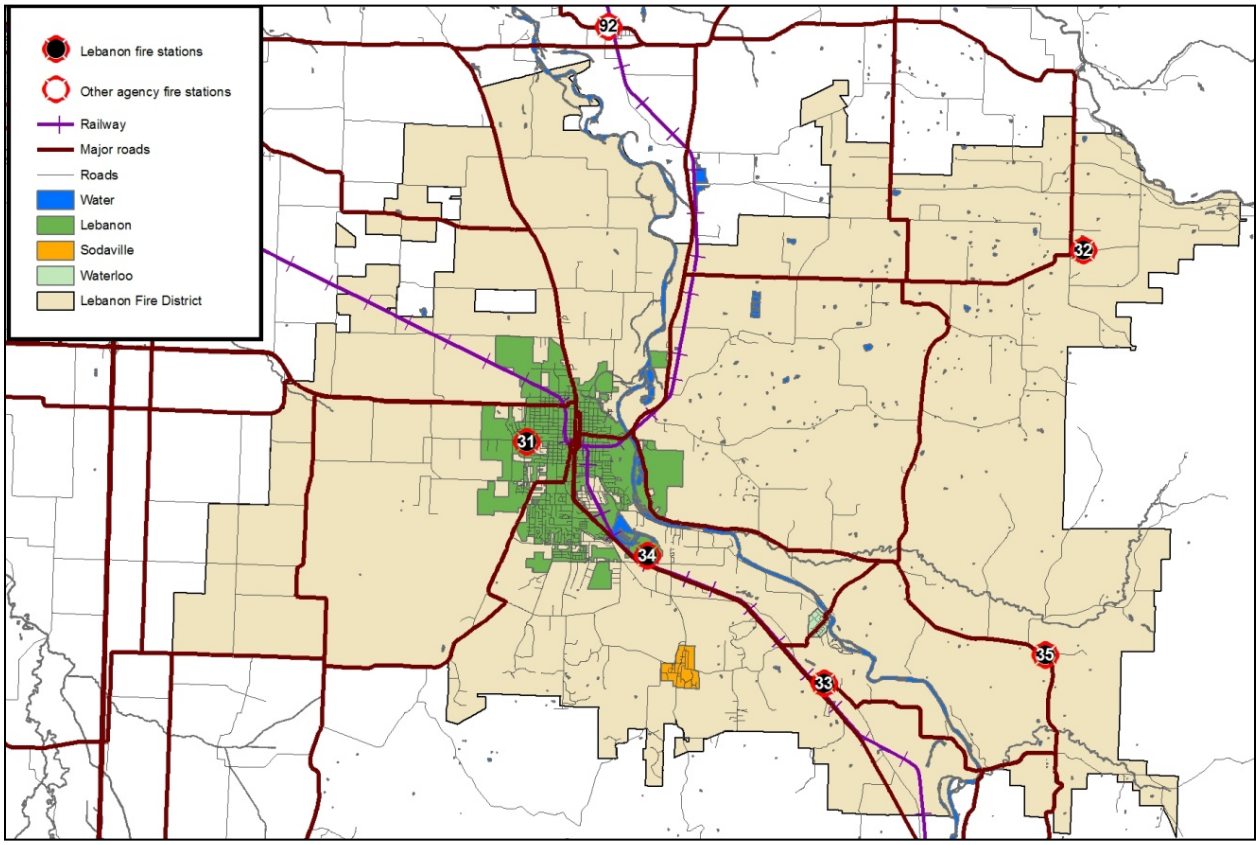
Transportation Risks

Transportation corridors provide necessary access and egress for the district. The configuration of transportation systems can also affect the response capability of emergency services. Limited access freeways and rail lines can interrupt street connectivity, forcing apparatus to negotiate a circuitous route to reach an emergency scene.

Roads

Surface streets dominate the LFD service area. A number of state highways and other major roads provide collector and arterial level traffic circulation. The balance of the district's service has a mix of relatively well interconnected street networks, neighborhoods characterized by cul-de-sacs and other dead end street systems, and rural roadways. Traffic signals within the service area are equipped with signal pre-emption equipment. This provides a significant response time performance advantage as well as better safety for motorists.

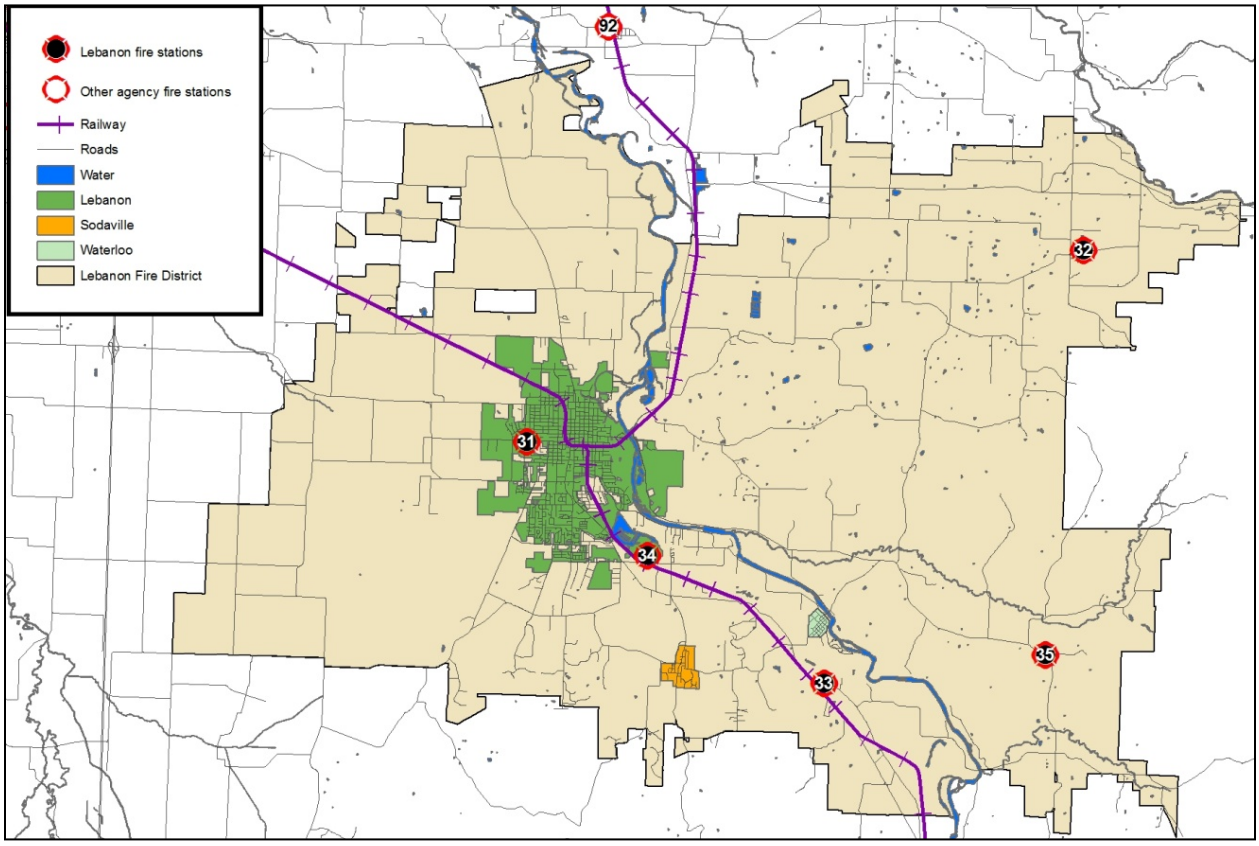
Figure 47: Street System



Railroads

Southern Pacific Railroad operates a rail line in the northern portion of LFD's service area. Oregon Electric Railroad operates a line in the southern portion.

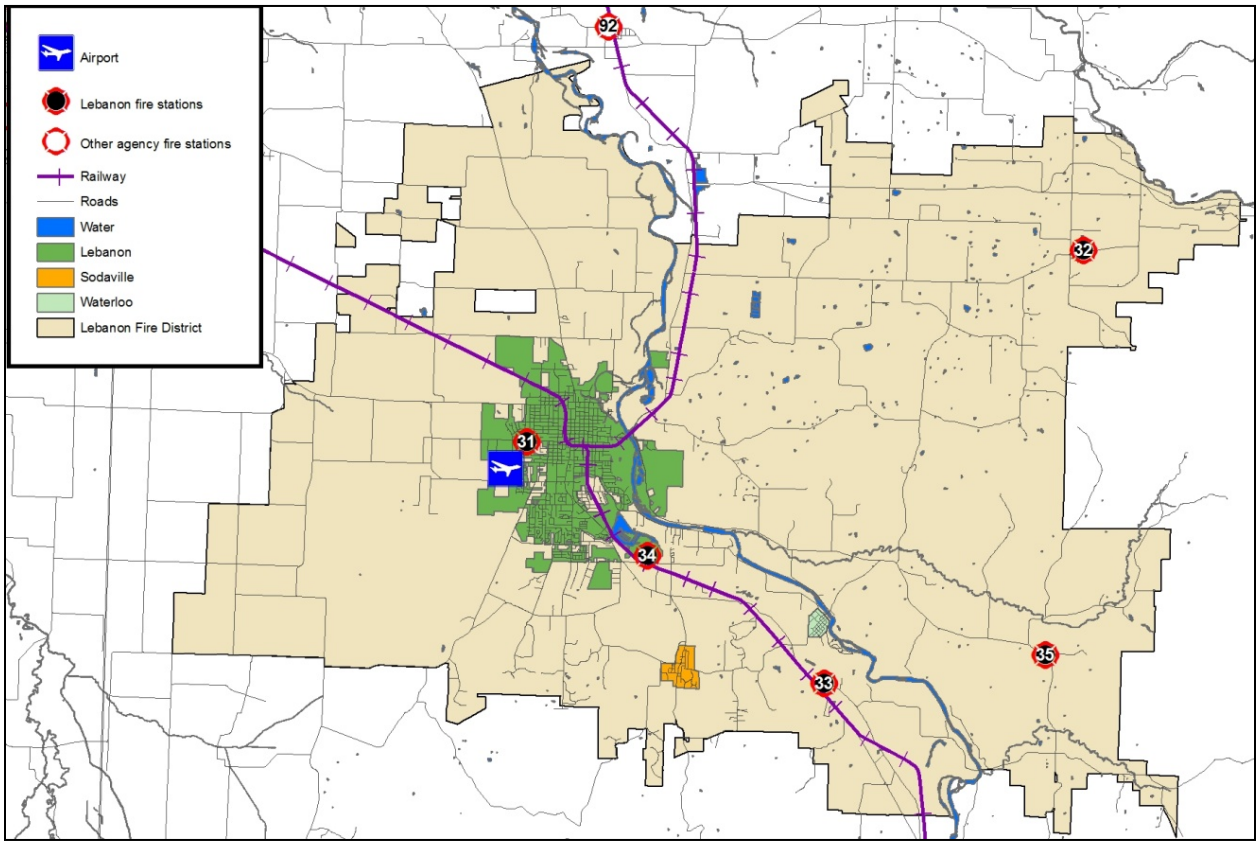
Figure 48: Railroads



Airport

There is one airport in the LFD service area located in the western portion of the city. This is a general aviation airport. No scheduled service operations are offered. The 2,877 feet runway limits aircraft size to smaller single engine and twin engine models. Several businesses operate at the airport offering maintenance, fueling, aircraft rental, and the like. Several non-aviation businesses are located there as well.

Figure 49: Lebanon State Airport



Physical Assets Protected

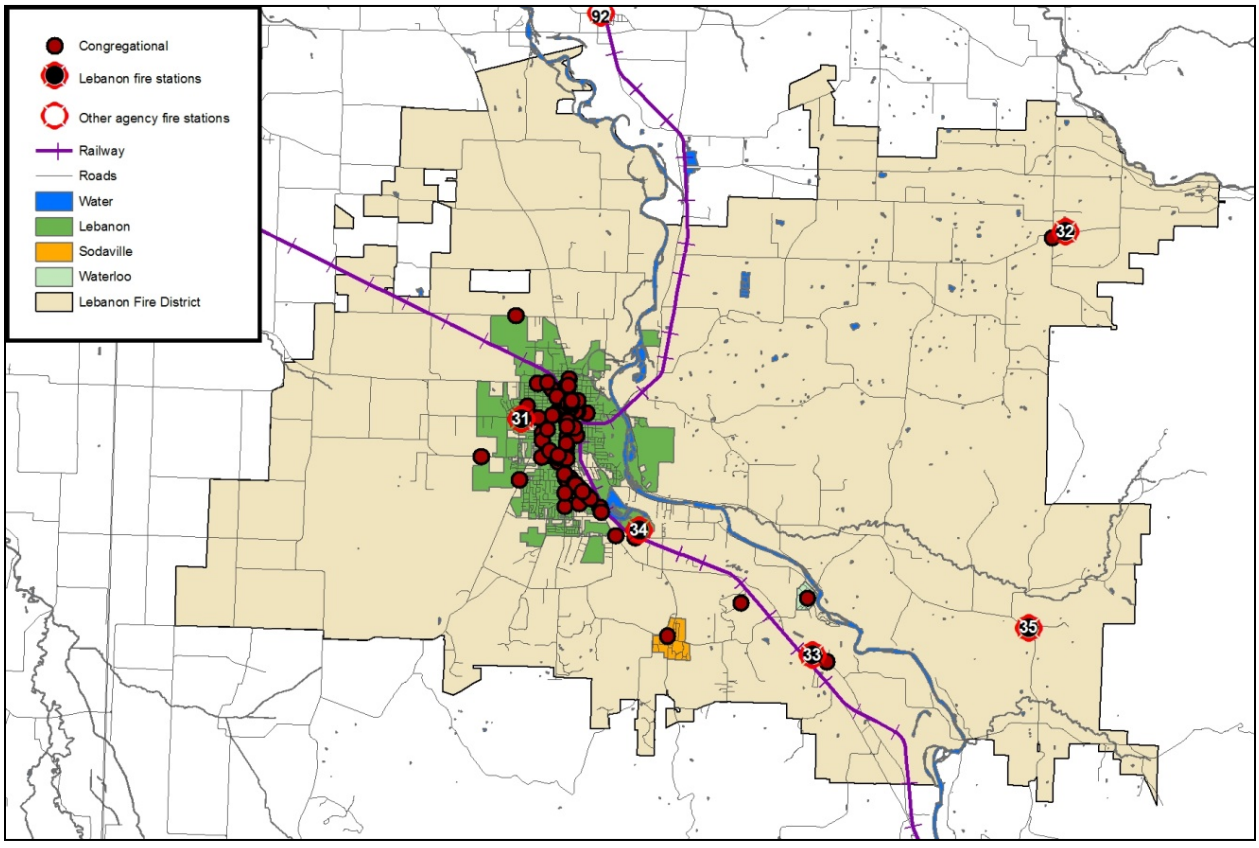
Many buildings in the city are used for purposes that create more significant risk than others. High occupancy buildings, facilities providing care to vulnerable populations, and others may require greater numbers of emergency response resources during an emergency. This section draws on information from LFD records and other sources.

Congregational

Numerous buildings lie within the LFD service area in which large numbers of people gather for entertainment, worship, and other similar events. A variety of nightclubs, theaters, and other entertainment venues exist primarily in the downtown area.

These facilities present additional risk, primarily for mass casualty incidents. Fire, criminal mischief, and potentially terrorism could cause a major medical emergency requiring significant emergency service resources. The following figure shows the locations of buildings identified as congregational facilities.

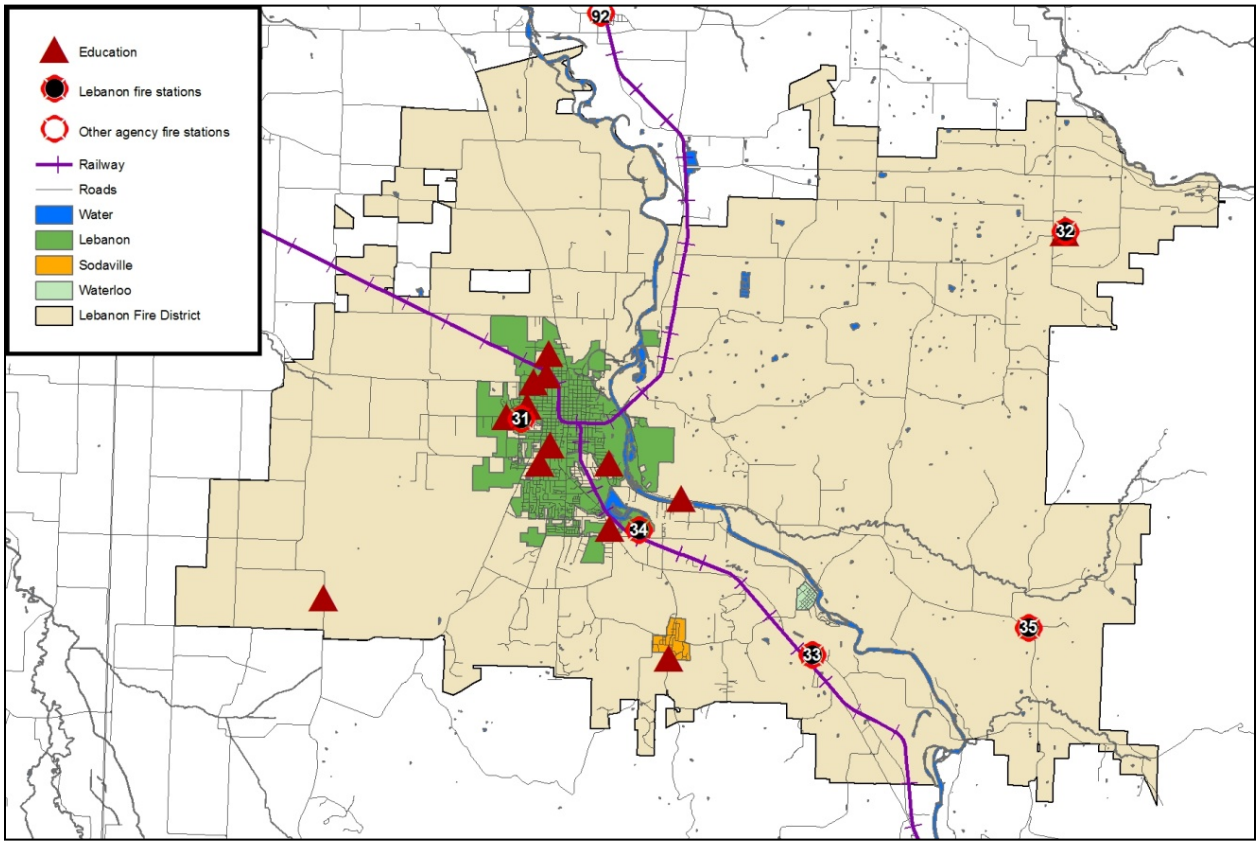
Figure 50: Congregational Facilities



Schools/Day Care

The Lebanon Community School District serves most of the community. There are also private education facilities serving Lebanon and surrounding areas. The following figure shows the locations of the educational facilities within LFD.

Figure 51: Public School Facilities

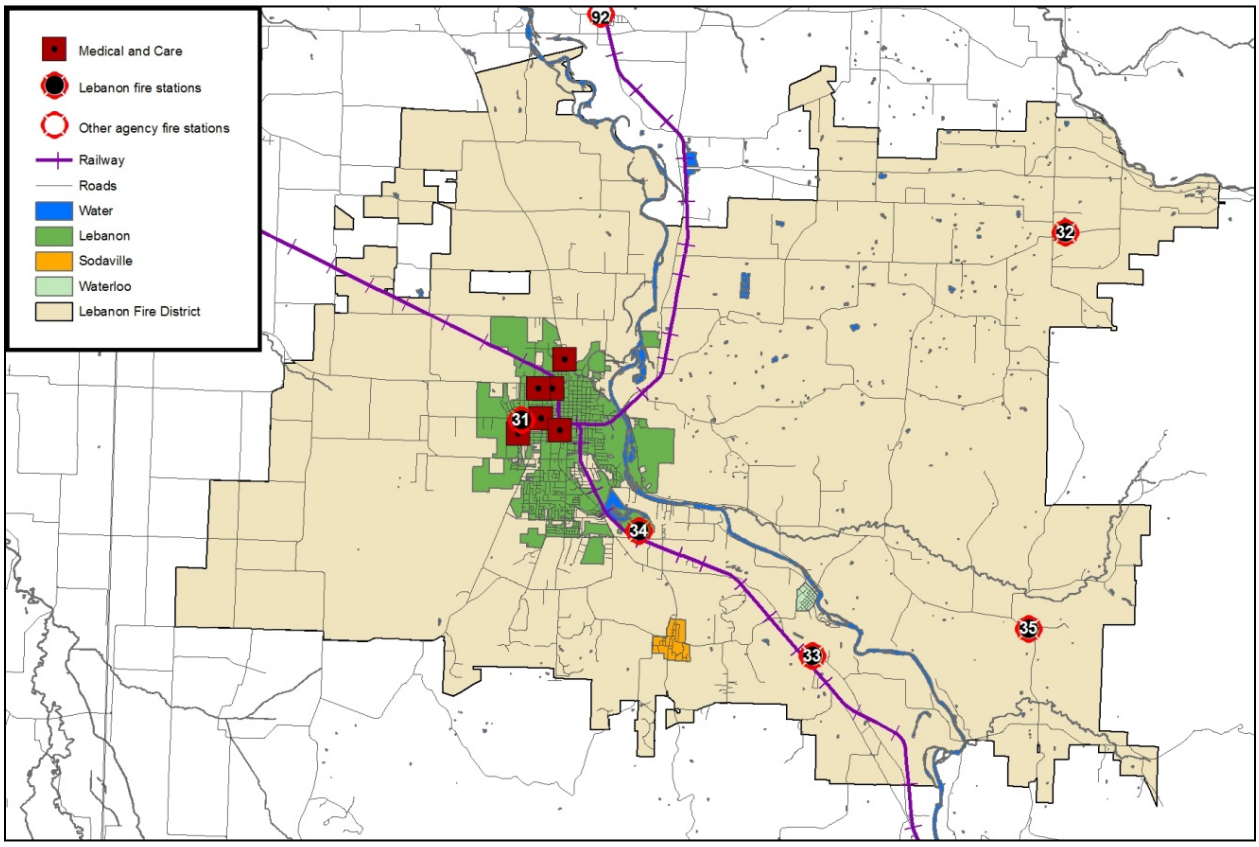


Medical and Congregate Care Facilities

Medical and congregate care facilities, particularly hospitals and nursing homes, house vulnerable populations. Although these facilities are generally built of highly fire resistive construction with built-in fire suppression, emergencies can occur that require the quick movement of patients away from the hazard.

The following figure shows the location of the one hospital and the congregate care and assisted living facilities. All are located within the city of Lebanon.

Figure 52: Medical and Care Facilities



Other Critical Infrastructure

In this section, other types of infrastructure critical to a community are discussed in general terms. Though LFD does not have any unusual critical community infrastructure, it is important the fire district plan for emergencies at any of these facilities.

Water Distribution

The most obvious concern to the fire department is the water reservoir, water main, and fire hydrant system. Providing sufficient storage, distribution, and access to this valuable firefighting resource through well-distributed fire hydrants is very important. The city of Lebanon is well served by fire hydrants. The rural areas of the district depend on water delivered by tenders.

Communications

Emergency communication centers and the associated transmitting and receiving equipment are essential facilities for emergency response. The Linn County Sheriff's Office provides call receipt and dispatch service to a number of regional fire agencies. Though not located within the LFD service area, this center provides for the answering of 9-1-1 calls for help, dispatching of fire and other emergency responders, and important support to the incident management function.

There are other communication facilities and equipment that are equally important to the community and government operations within the LFD service area. These are the telephone company central offices and the transmission lines of local telephone service providers. Internet service providers, along with wireless cellular communication providers, provide essential communication capabilities for the community as well as emergency personnel through their facilities and equipment.

Energy

Previously discussed community services, from communications to traffic signals to normal operations, require the use of energy. Whether it is electricity generation and transmission systems, fuel distribution and storage tanks, or natural gas pipelines and regulator stations, the community is dependent upon energy sources.

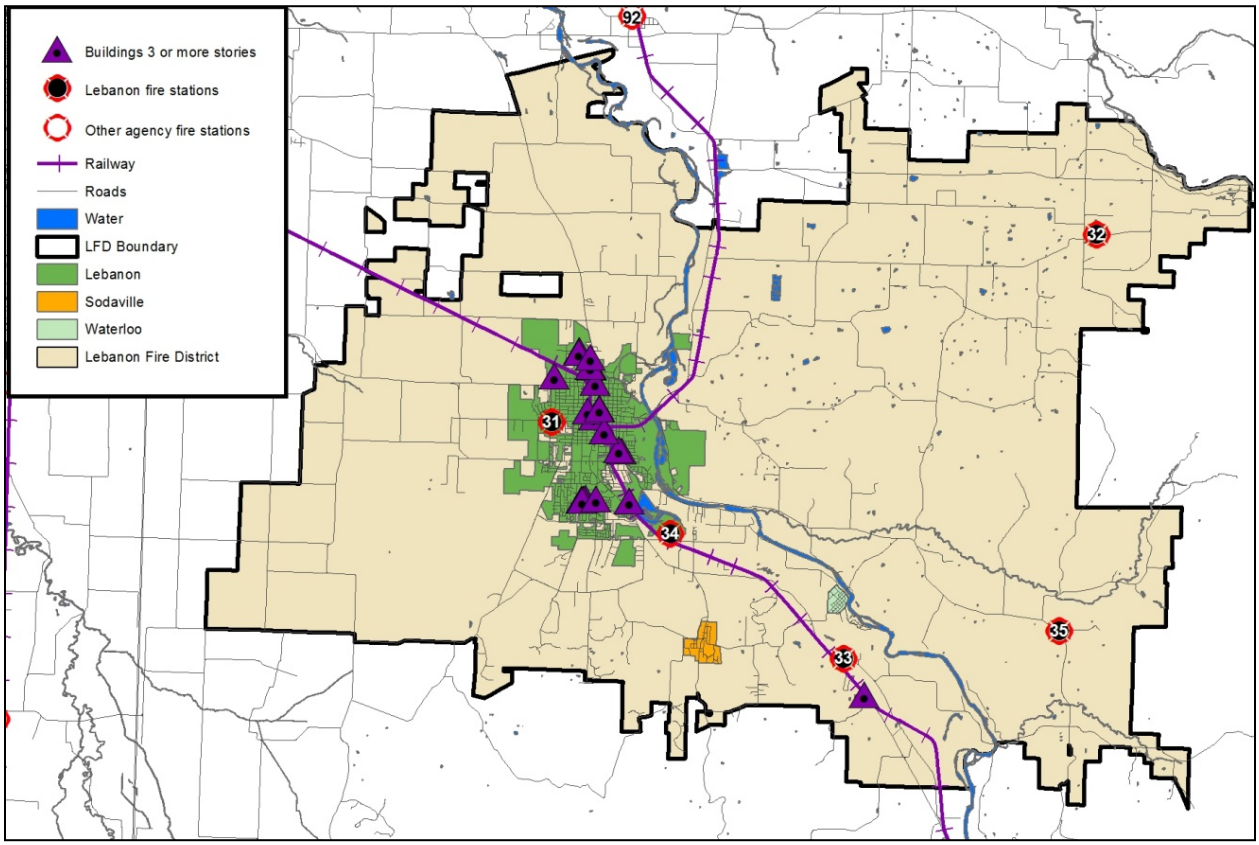
Structural Risks

Certain buildings, their contents, functions, and size present a greater firefighting challenge and require special equipment, operations, and training. Information for this section has been drawn from LFD records and the Insurance Services Office (ISO) database.

Buildings Three or More Stories in Height

The Insurance Services Office calls for a ladder truck within 2.5 miles of developed areas containing buildings three or more stories in height. Accessing the upper floors and roofs of buildings this tall typically requires ladder truck capability as ground ladders may not provide access. The following figure shows the locations of the buildings in LFD service area three or more stories in height as listed in the ISO database and LFD records.

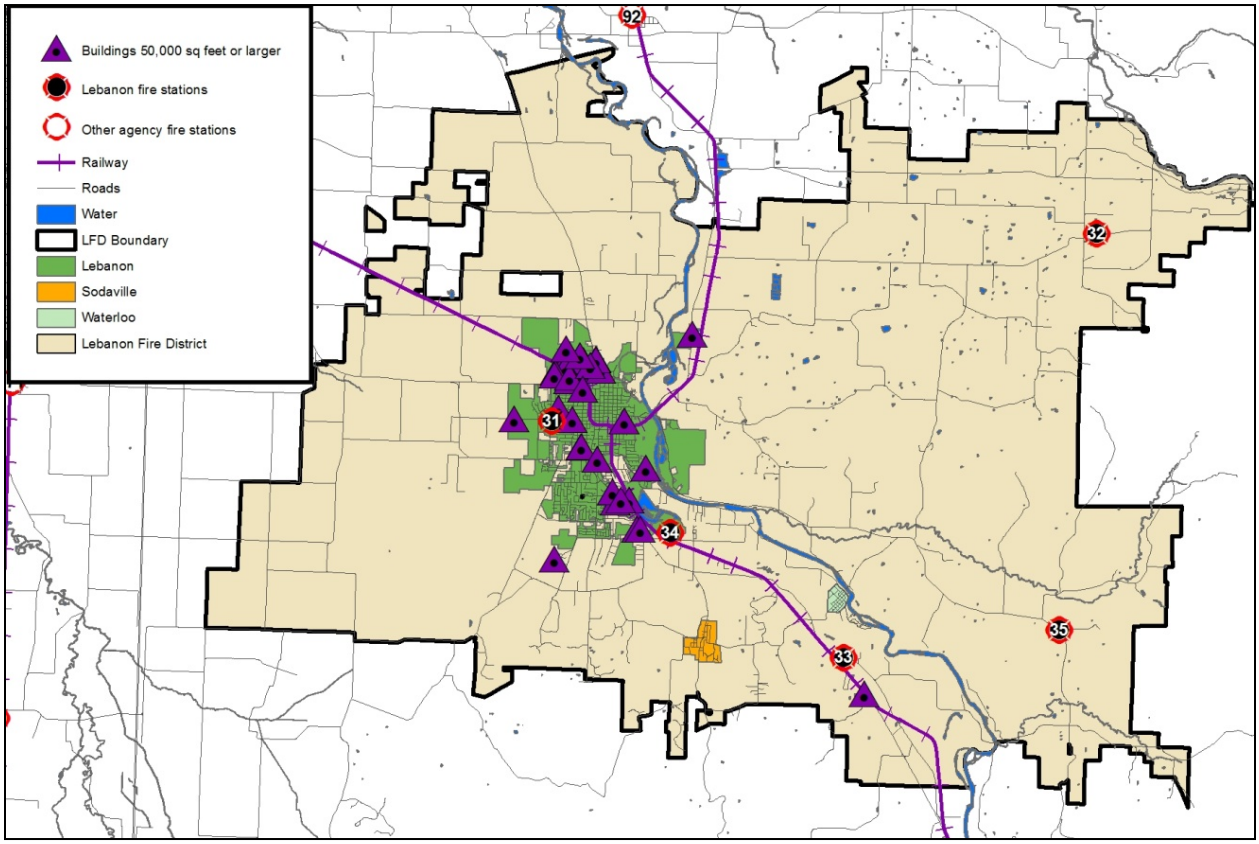
Figure 53: Buildings Three or More Stories in Height



Large Square Footage Buildings

Large buildings, such as warehouses, malls, and large "box" stores require greater volumes of water for firefighting and require more firefighters to advance hose lines long distances into the building. The following figure shows the locations of buildings 50,000 square feet and larger according to the ISO database and LFD records.

Figure 54: Buildings – 50,000 Square Feet and Larger

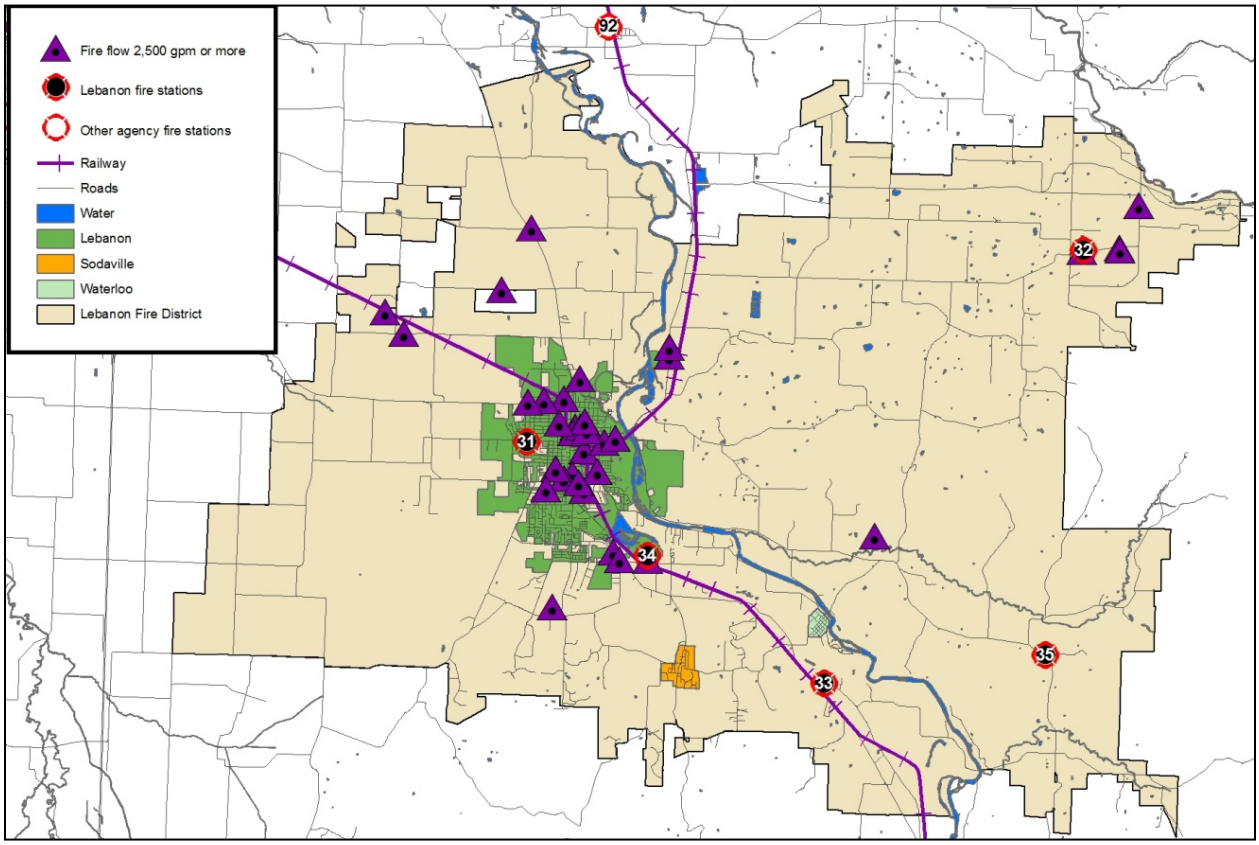


Needed Fire Flow

The Insurance Services Office inspects buildings within a community to develop an estimate of "needed fire flow" (NFF or the amount of water flow in gallons per minute [gpm]) that a fire department would need to produce in order to suppress the fire in a building based on its height, square footage, construction material, and roof type, among other factors.

The following map shows the locations of buildings identified by the ISO as having a needed fire flow in excess of 2,500 gallons per minute.

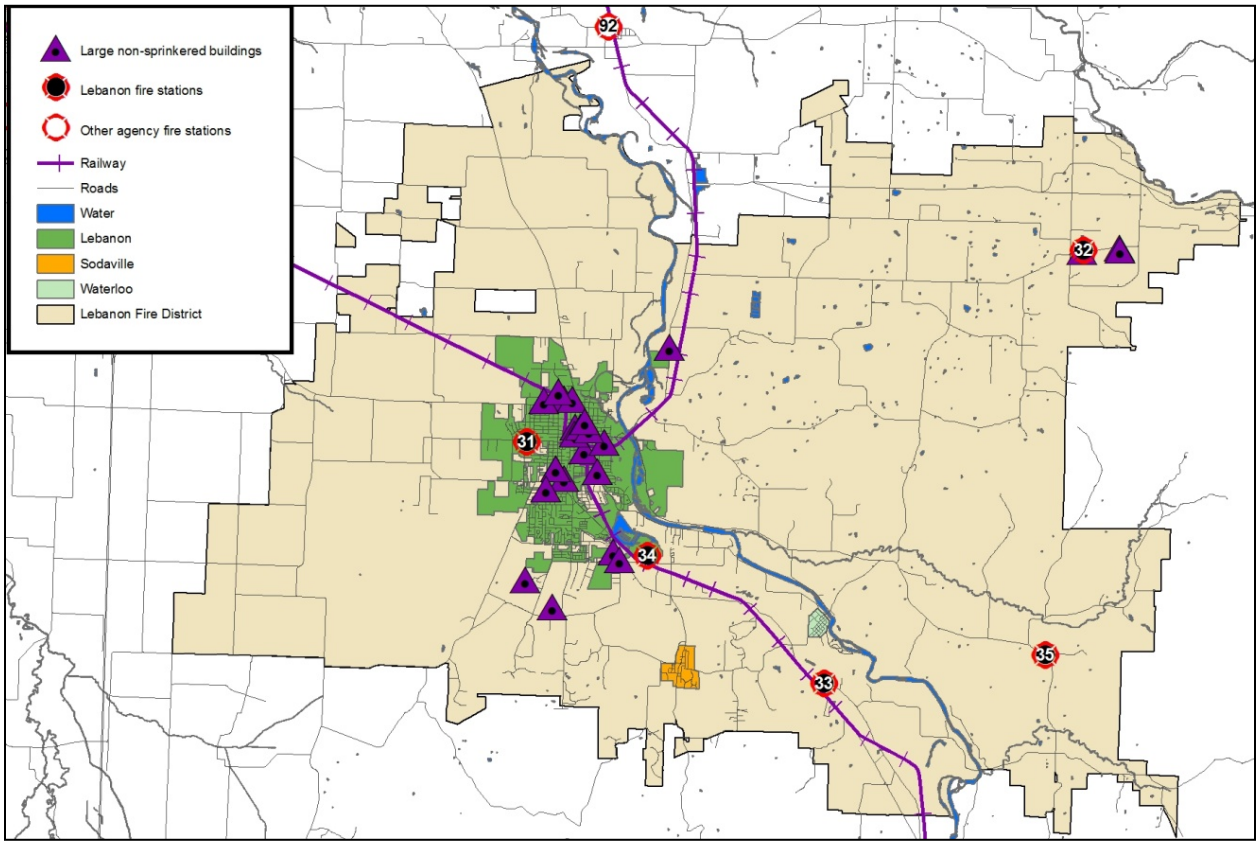
Figure 55: Buildings – Needed Fire Flow 2,500 GPM or more



Unprotected Large Buildings

Buildings that are protected by automatic fire sprinkler systems are much safer from fire than others. While modern building codes now require fire sprinklers in most large buildings, the LFD service area contains a number of large buildings that are not protected. The following figure shows the locations of non-sprinklered buildings 20,000 square feet and larger according to the ISO database.

Figure 56: Large Buildings not Protected by Fire Sprinkler Systems



Terrorism

Lebanon is a potential target for terrorism. Most of the previous categorized risks in the community are targets for such activity. In addition, the city hosts public gathering events during the year.

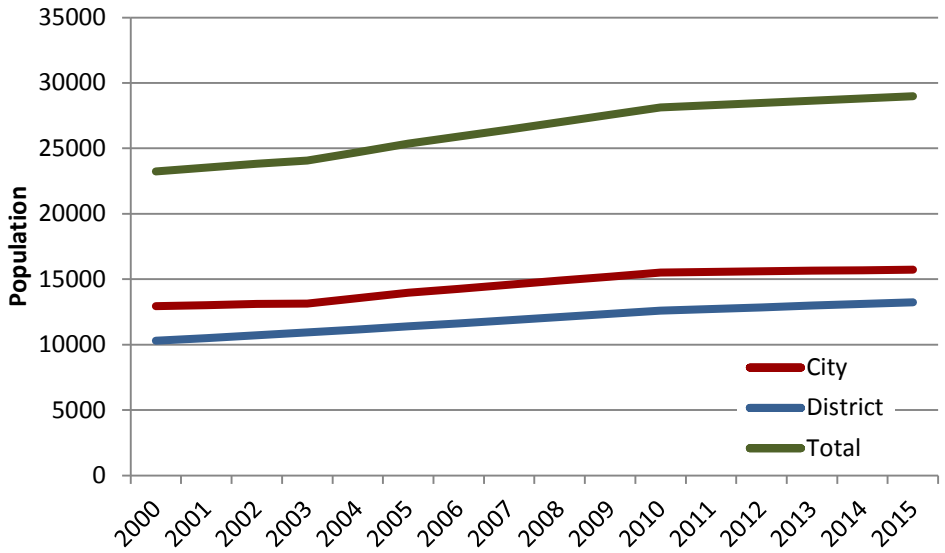
Lebanon is also in close proximity to the cities of Albany, Corvallis, and Salem, that also have a terrorism risk. LFD may either be impacted by the consequence of a terrorist act in these cities or be asked to support them in the aftermath of such an event. The fire district needs to be vigilant in its training and preparedness in the event one or more coordinated acts of terror occur in the region.

Population Growth

Current Population Information

LFD's population has grown slowly, with an average annual growth rate of 1.6 percent between 2000 and 2015. At the time of this study, the current service area population is estimated at 28,988. This is based on the latest information from the Portland State University Center for Population Research estimates and estimated population for the district's unincorporated area based on U.S. Census Bureau data. The following figure illustrates resident population growth over the past 15 years.

Figure 57: Population History



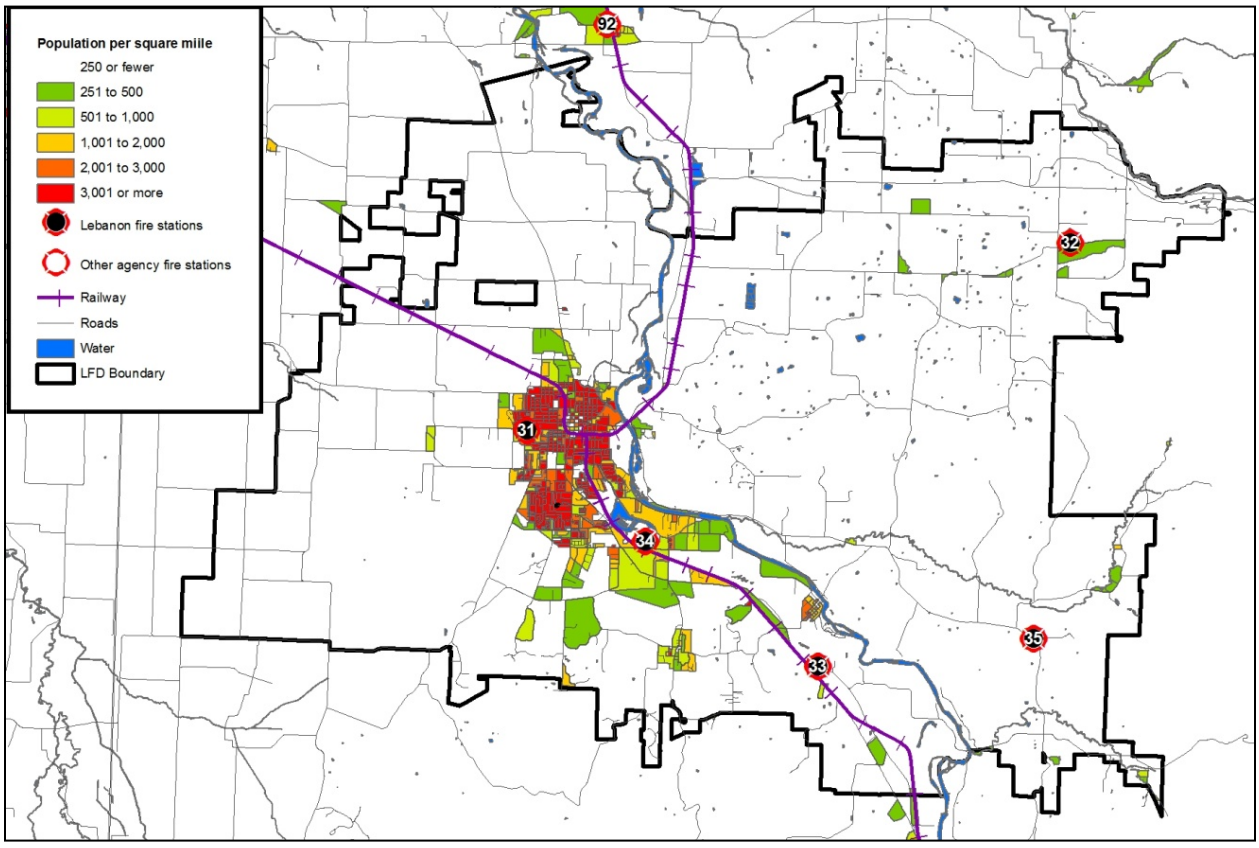
Most communities contain areas with different population densities and property risk allowing the community's policy makers to specify different response performance objectives by geographic area. The classifications are identified as:

- **Metropolitan**—Geography with populations of over 200,000 people in total and a population density predominately over 3,000 people per square mile. These areas are distinguished by inner city neighborhoods, numerous mid-rise and high-rise buildings, often interspersed with smaller structures.
- **Urban**—Geography with a population of over 30,000 people and/or a population density predominately over 2,000 people per square mile. These areas are characterized by significant commercial and industrial development, dense neighborhoods, and some mid-rise or high-rise buildings.
- **Suburban**—Geography with a population of 10,000 to 29,999 and/or a population density predominately between 1,000 and 2,000 people per square mile. These areas are characterized by single and multifamily neighborhoods, and smaller commercial developments.
- **Rural**—Geography with a total population of less than 10,000 people or with a population density of less than 1,000 people per square mile. These areas are characterized by low density residential, little commercial development, and significant farm or open space uses.

- **Wilderness/Frontier/Undeveloped**—Geography that is both rural and not readily accessible by a publicly or privately maintained road.

The following figure displays the LFD service area population density by classification based on Census 2010 data. Census data only includes people who live full-time in their home. It does not include people who visit or reside temporarily in a community.

Figure 58: Population Density, 2010

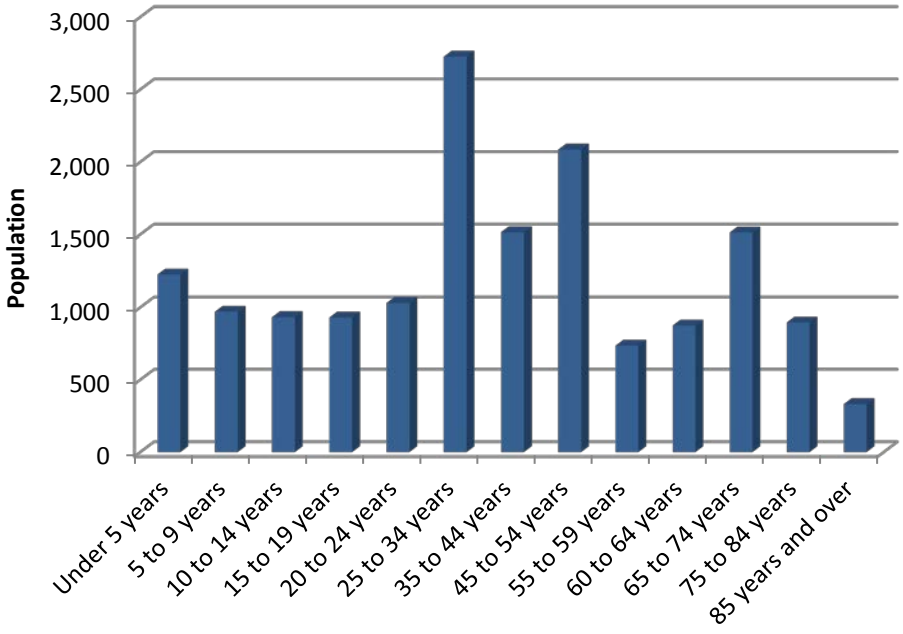


Areas of higher fire and life risk require greater numbers of personnel and apparatus to effectively mitigate emergencies. Areas with a higher incident activity require additional response units to ensure reliable response. Staffing and deployment decisions for different regions of the city should be made in consideration of the level of risk in each.

LFD's service area, based on population density, is of two classifications: urban and rural. The community's risk classifications should influence how response resources are distributed now and in the future.

One of the factors that can influence emergency service demand, particularly emergency medical services, is the population's age. The following figure examines population segmented by age groups. This data is based on 2014 American Community Survey estimates and is only available for the population of the city of Lebanon.

Figure 59: Estimated Population by Age



Based on the preceding figure, 17.4 percent of the population is 65 years of age or older and 7.8 percent of the population is under five years of age. This places a total of 25.2 percent of the city's population within the age groups that are at highest risk in residential fire incidents and account for some of the highest use of emergency medical services. Senior citizens can have difficulty escaping from fire due to physical limitations. Seniors also tend to use emergency medical services more frequently than younger persons. As the population ages, this will create an increase in service demand for emergency medical services.

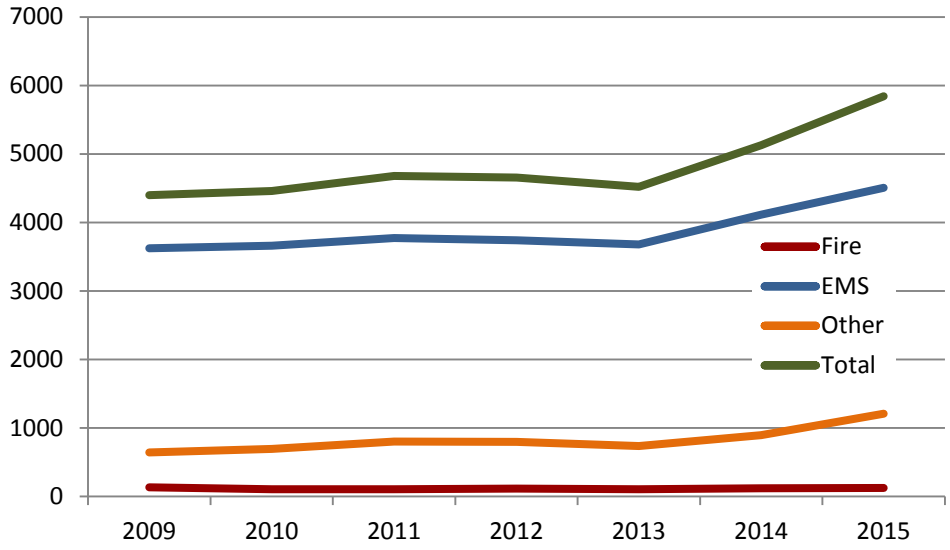
The very young also represent a vulnerable population, both in regard to their ability to escape a structure fire as well as their susceptibility to serious medical ailments such as asthma, traumatic events, choking, or injury from vehicular accidents.

Historic System Response Workload

Before a full response time analysis is conducted, it is important to first examine the level of workload (service demand) that a fire department experiences. Higher service demands can strain the resources of a department and may result in a negative effect on response time performance.

The following figure illustrates how the district's response workload has changed over time. Total responses have increased 38.2 percent over seven years, primarily driven by the increase in emergency medical responses. Much of the increase in emergency medical response activity has been for inter-facility transfers.

Figure 60: Response Workload History, 2009 – 2015



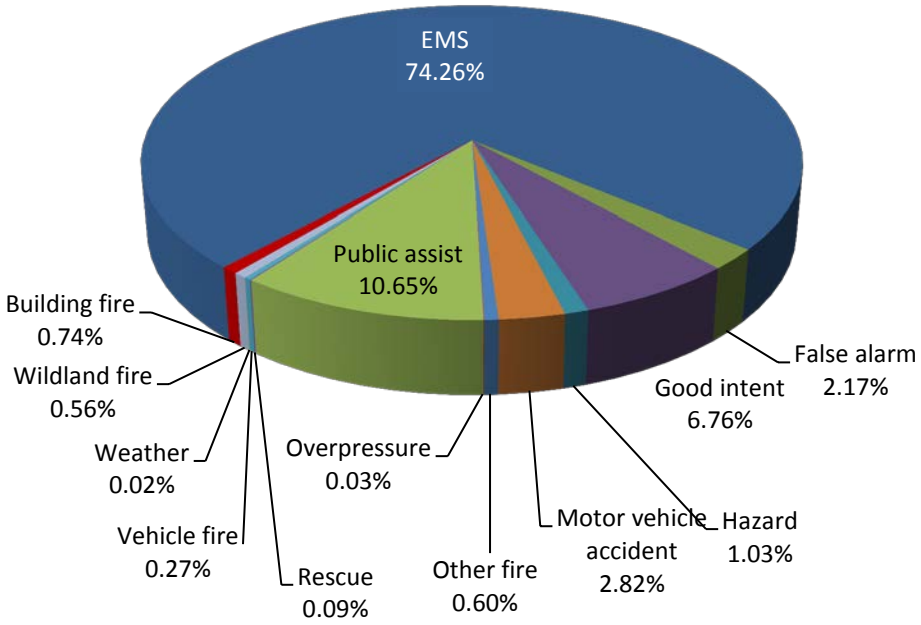
Incident data used for the evaluation of current performance was all responses made between January 1, 2013, and December 31, 2015. The following figure lists total responses for each year and details the number of times LFD either provided or received mutual aid.

Figure 61: Responses by Year, 2013-2015

	2013	2014	2015	TOTAL
Mutual aid given	307	337	395	1,039
Mutual aid received	15	26	33	74
Incidents without mutual aid	4,200	4,763	5,414	14,376
Total incidents	4,522	5,126	5,842	15,489

The next figure shows responses by type of incident for the combined study period. Emergency medical type responses (EMS and motor vehicle accidents) are the most common at 77 percent of total responses.

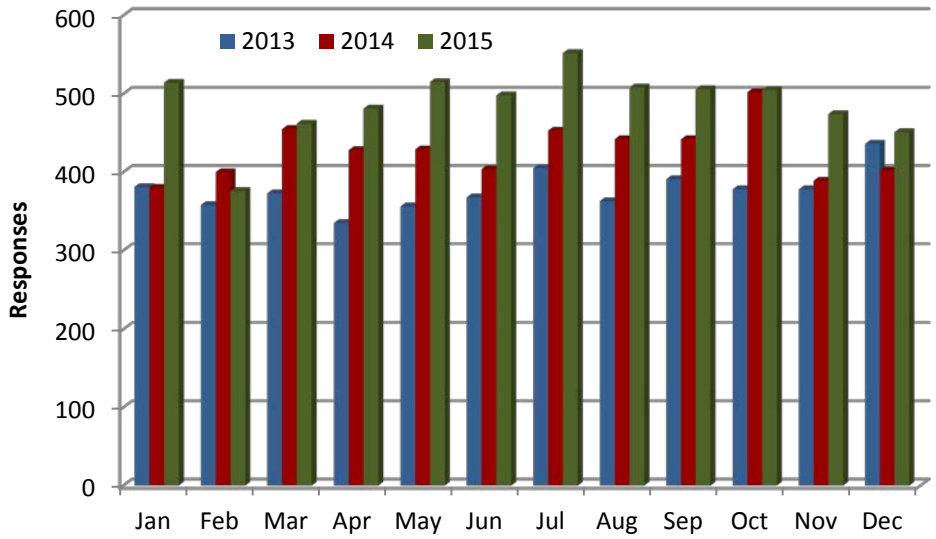
Figure 62: Responses by Type of Incident, 2013-2015



Temporal Analysis

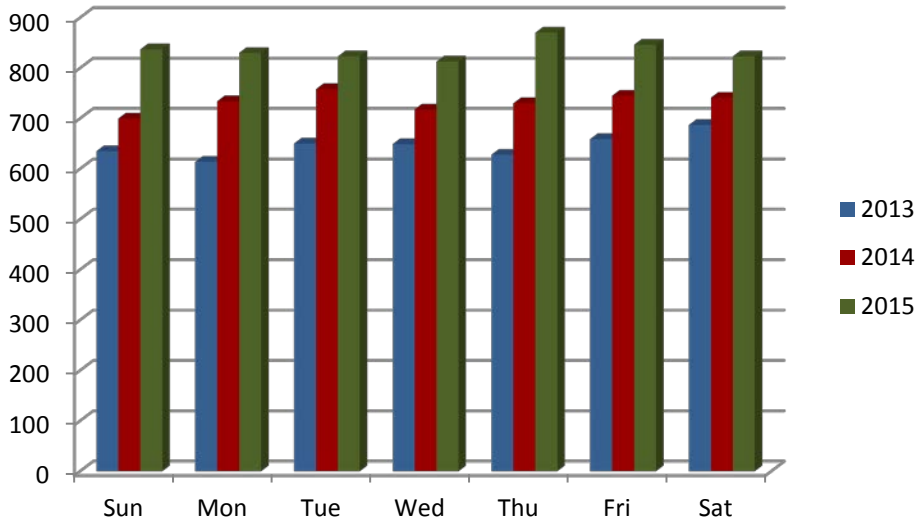
A review of incidents by time of occurrence also reveals when the greatest response demand is occurring. The following figures show how activity and demand changes for LFD based on various measures of time. The following figure shows response activity during the study period by month. Summer months tend to be the busiest.

Figure 63: Monthly Response Workload, 2013-2015



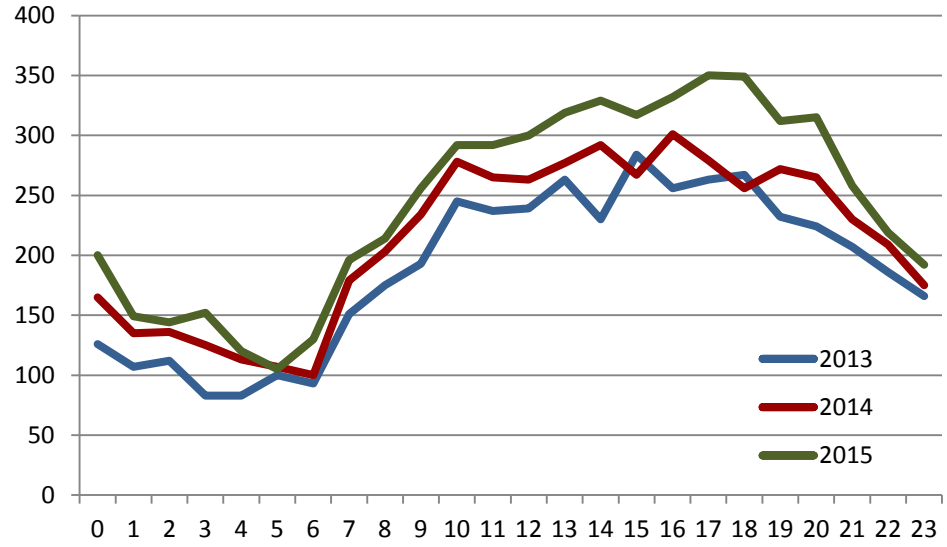
Next, response workload is compared by day of week. Activity by day of week varied considerably between 2014 and 2015.

Figure 64: Daily Response Workload, 2013-2015



The time analysis that always shows significant variation is response activity by hour of day. Response workload directly correlates with the activity of people, with workload increasing during daytime hours and decreasing during nighttime hours as shown in the following figure. Incident activity is at its highest between 10:00 AM and 10:00 PM.

Figure 65: Hourly Response Workload, 2013-2015

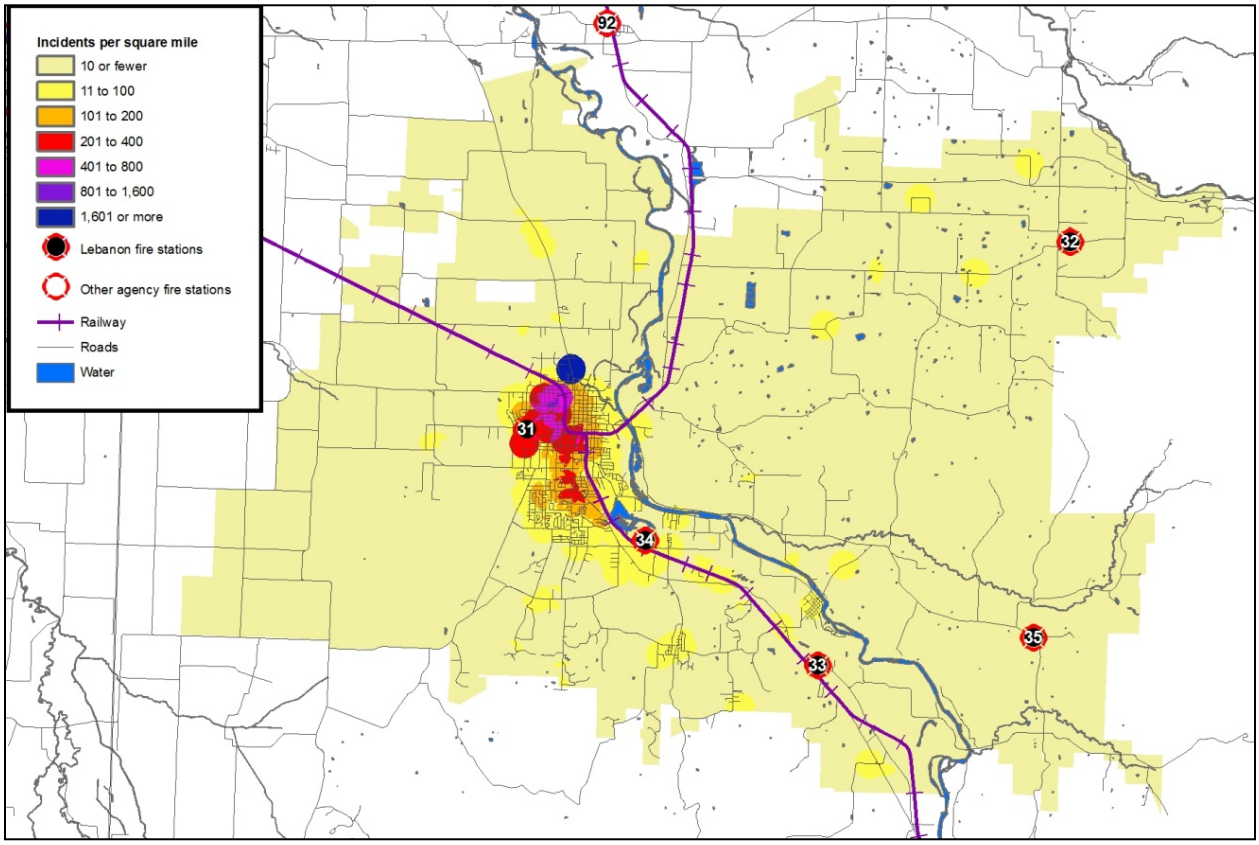


Spatial Analysis

In addition to the temporal analysis of the current service demand, it is useful to examine geographic distribution of service demand. The following figure series indicates the distribution of emergency incidents in the LFD service area during the study period.

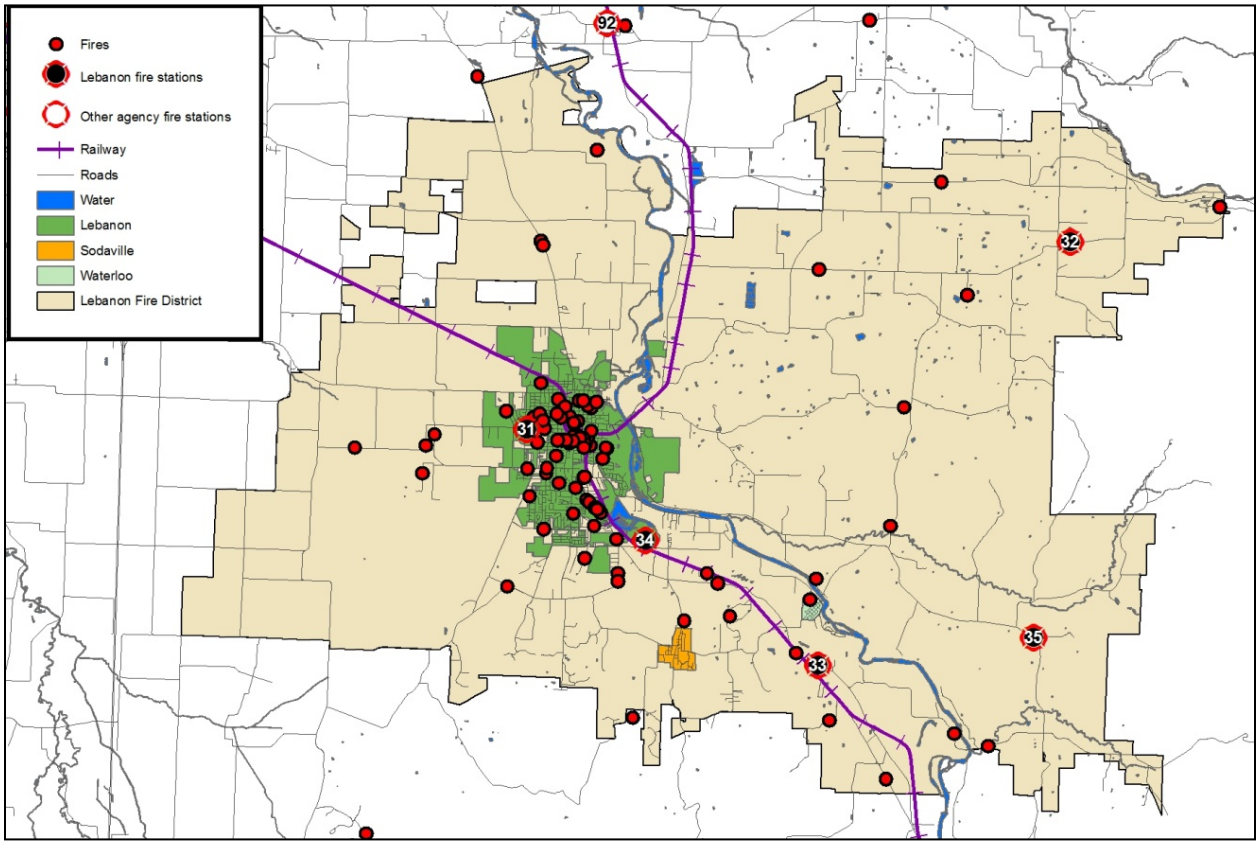
The first figure displays the number of incidents per square mile within various parts of the service area for calendar year 2015. The area of greatest service demand is within the Lebanon city limits.

Figure 66: Service Demand Density, 2015



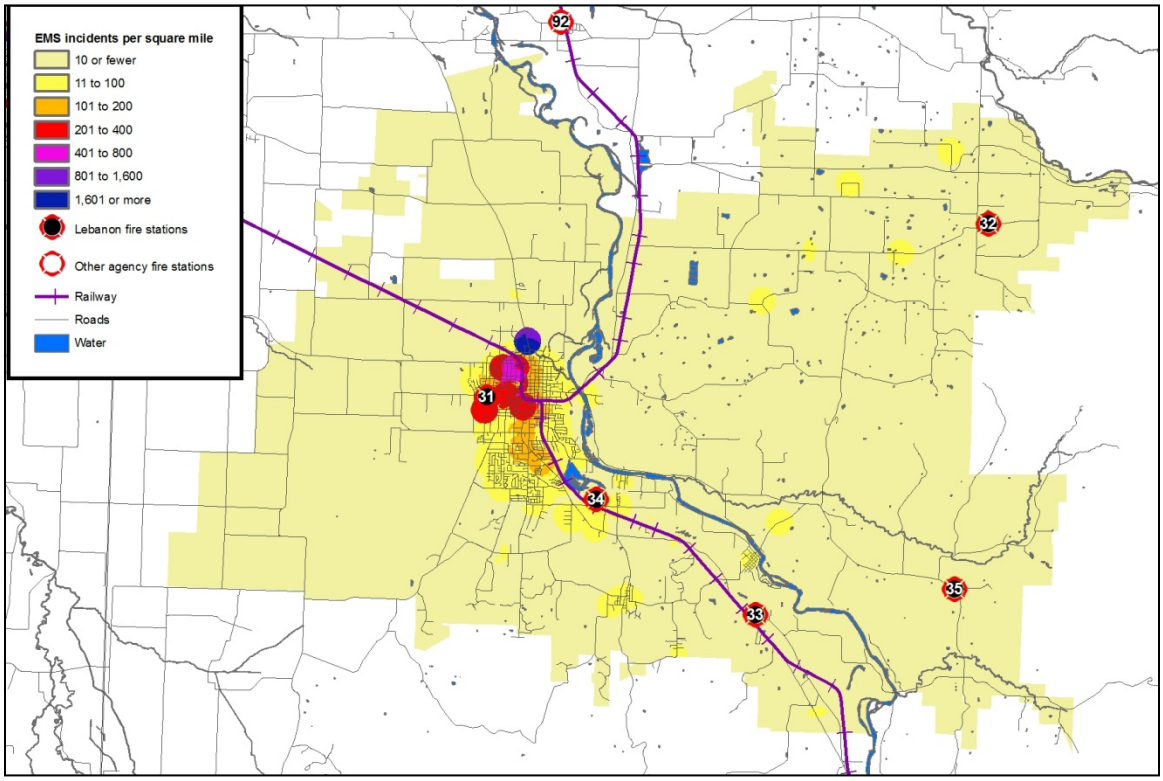
The preceding figure reflects all calls served by LFD. Service demand can vary by area based on incident type. The following figure displays the location of the fires in the service area during calendar year 2015. This illustrates that fire incidents are most concentrated in the city.

Figure 67: Fires Incidents, 2015



Similarly, emergency medical incidents also occur in greater concentration in areas of higher population density. The following figure displays emergency medical incidents per square mile during calendar year 2015. Again, the greatest demand for service occurs in the city limits.

Figure 68: Emergency Medical Incidents per Square Mile, 2015



Response Unit Workload Analysis

A review of workload by response unit can reveal much about response time performance. Although fire stations and response units may be distributed in a manner to provide quick response, that level of performance can only be obtained when the response unit is available in its primary service area. If a response unit is already on an incident and a concurrent request for service is received, a more distant response unit will need to be dispatched. This will increase response times.

Response Unit Workload

The workload on individual response units is shown in the following figure and table. Individual response unit workload can be greater than the workload in its home station area. Many incidents, such as structure fires, require more than one response unit.

Figure 69: Response Unit Workload, 2013-2015 (Graph)

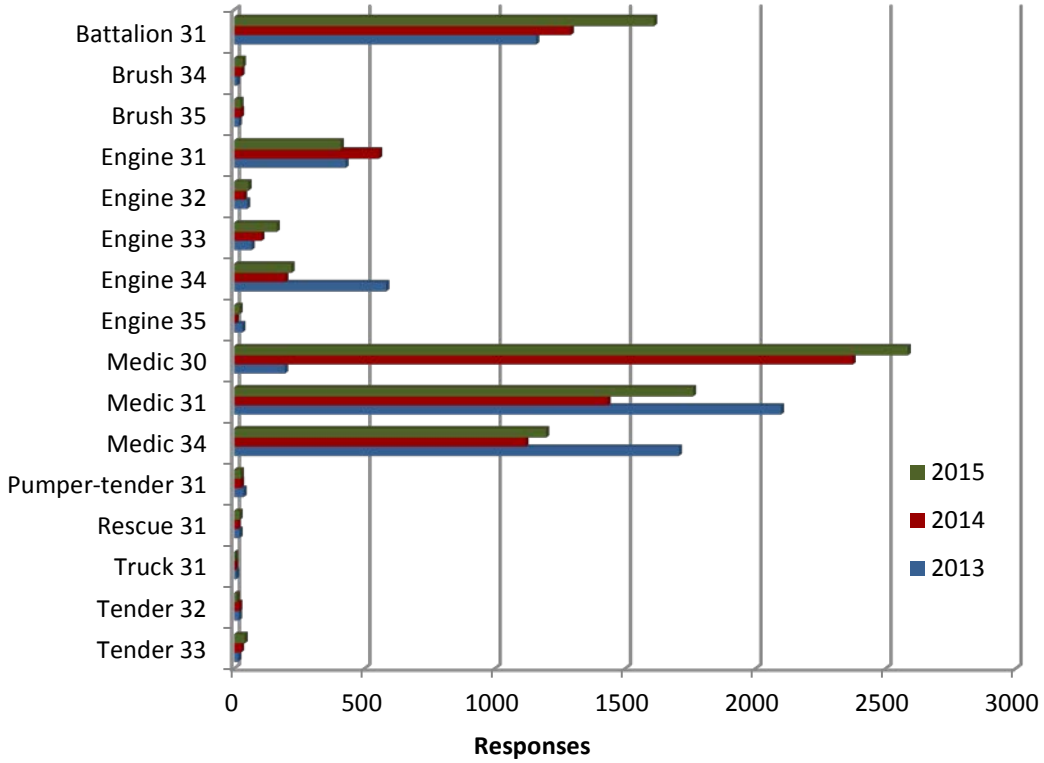


Figure 70: Response Unit Workload, 2013-2015 (Table)

UNIT	2013	2014	2015
Battalion 31	1,159	1,291	1,611
Brush 34	12	29	34
Brush 35	18	27	25
Engine 31	428	556	410
Engine 32	50	39	55
Engine 33	67	105	164
Engine 34	584	197	220

UNIT	2013	2014	2015
Engine 35	32	7	22
Medic 30	195	2374	2586
Medic 31	2097	1433	1760
Medic 34	1706	1118	1197
Pumper-tender 31	37	27	26
Rescue 31	21	15	22
Truck 31	8	4	4
Tender 32	19	20	11
Tender 33	16	27	41

The amount of time a given unit is committed to an incident is also an important workload factor. The following table illustrates the average time each unit was committed to an incident, from initial dispatch until it cleared the scene.

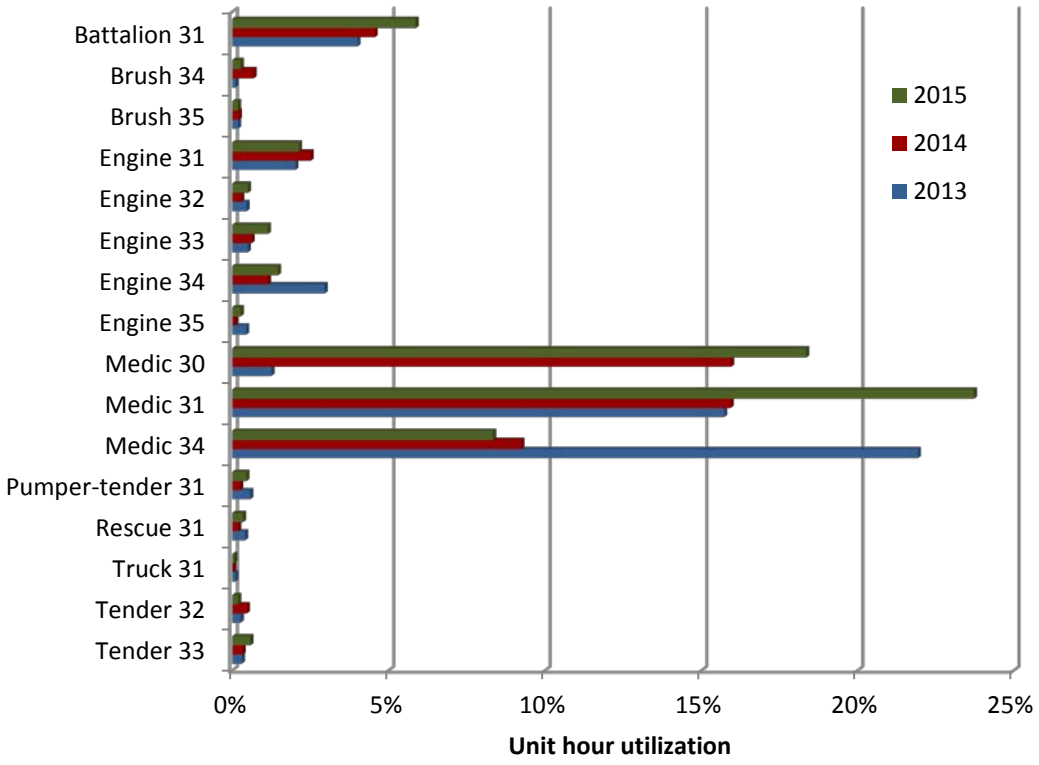
Figure 71: Average Minutes Committed to an Incident by Unit

UNIT	2013	2014	2015
Battalion 31	18.19	18.59	19.16
Brush 34	51.71	125.25	42.31
Brush 35	55.32	43.32	40.24
Engine 31	24.87	23.76	27.38
Engine 32	49.18	39.34	48.97
Engine 33	39.33	31.36	36.76
Engine 34	26.62	30.67	35.13
Engine 35	74.03	72.38	65.89
Medic 30	33.92	35.32	37.30
Medic 31	39.42	58.45	70.87
Medic 34	67.56	43.49	36.66
Pumper-tender 31	82.15	51.47	92.30
Rescue 31	103.88	69.23	84.20
Truck 31	73.35	41.99	94.09
Tender 32	77.35	124.37	94.58
Tender 33	102.55	66.56	74.81

Unit hour utilization is an important workload indicator. It is calculated by dividing the total time a unit is committed to all incidents during a year divided by the total time in a year. Expressed as a percentage, it describes the amount of time a unit is not available for response since it is already committed to an incident. The larger the percentage, the greater a unit's utilization, and the less available it is for assignment to an incident.

Unit hour utilization is an important statistic to monitor for those fire agencies using percentile-based performance standards, as does LFD. In LFD's case, where performance is measured at the 85th percentile, unit hour utilization greater than 15 percent means that the response unit may not be able to provide on-time response to its 85 percent target even if response is its only activity. Only Medic 30 and 31 currently exceed 15 percent unit hour utilization. However, since both are located in the same station, this should not in itself impact response time performance.

Figure 72: Unit Hour Utilization, 2013-2015

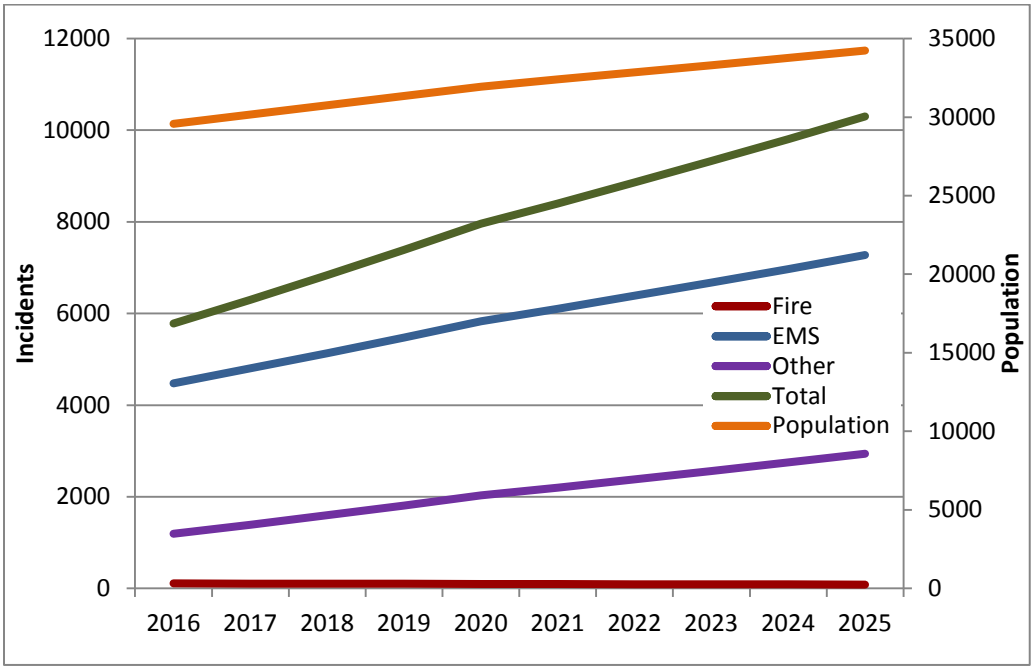


Population and Incident Workload Forecast

A population forecast for the city of Lebanon is included in the 2004 Comprehensive Plan (table 6-4). Population growth for the city was at the time forecast to reach 19,597 by the year 2025. Very modest growth was forecast for unincorporated Linn County.

Using the population forecast and utilization rates for the various emergency services requested of LFD, the following population and workload forecast was prepared.

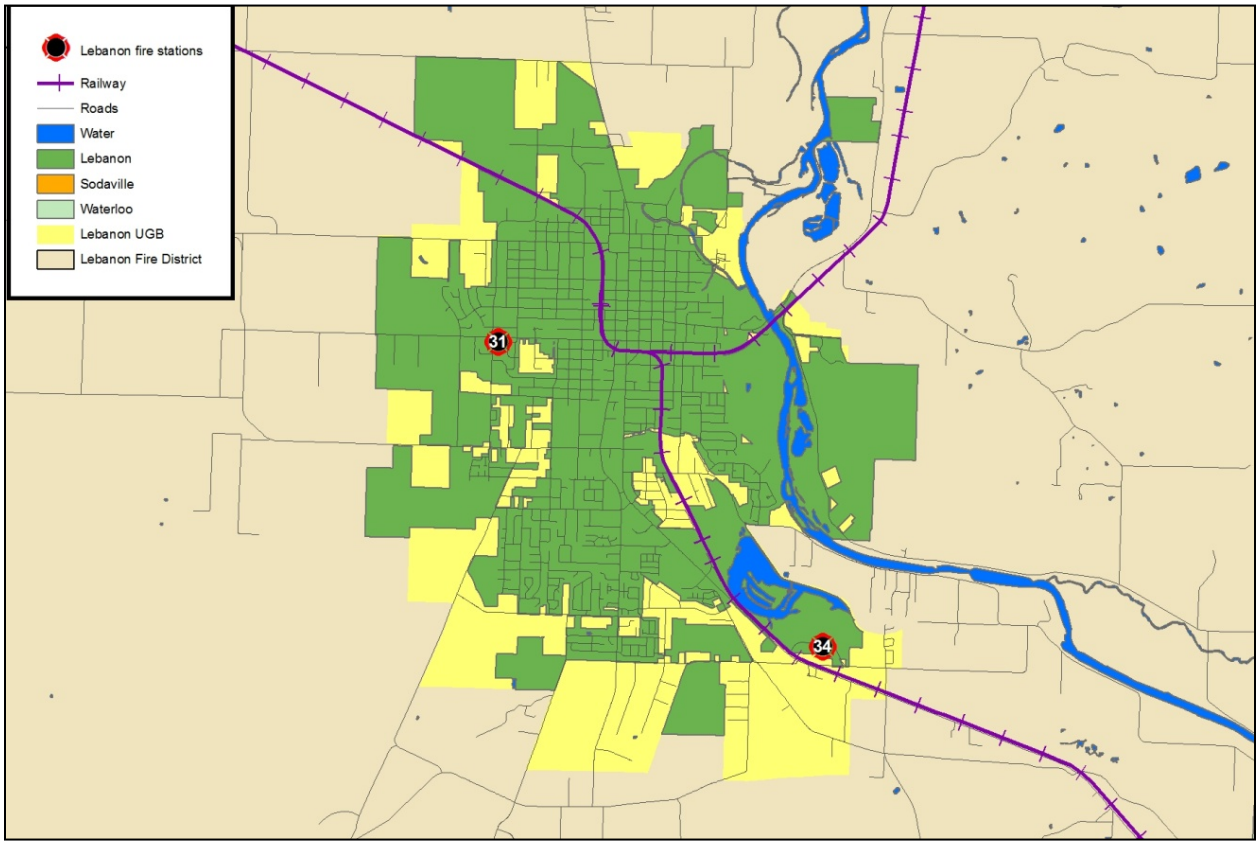
Figure 73: Population and Workload Forecast



The revised population forecast suggests that the district's service population will grow to 34,200 by the year 2025. Total LFD response workload could reach 10,300 annual calls for service with EMS incidents increasing at a faster pace than fire and other types of incidents due in large part to the aging population. Most of the increased workload will occur within the city of Lebanon.

The city of Lebanon does have the opportunity to increase its boundaries through annexation. The city's urban growth boundary is depicted in the following figure. Annexation of these areas would allow more intense development than currently exists. There is no current plan or timeline for when these areas might be annexed.

Figure 74: City of Lebanon Urban Growth Boundary



Critical Tasking and Alarm Assignments

The LFD service area has both a densely populated urban environment and a sparsely populated rural environment. As such, it contains an elevated number, density, and distribution of risk. Its rural areas present unique challenges such as wildland fires. The fire district should have the resources needed to effectively mitigate the incidents that have the highest potential to negatively impact the community. As the actual or potential risk increases, the need for higher numbers of personnel and apparatus also increases. With each type of incident and corresponding risk, specific critical tasks need to be accomplished and certain numbers and types of apparatus should be dispatched. This section considers the community's identified risks and illustrates the number of personnel that are necessary to accomplish the critical tasks at an emergency.

Tasks that must be performed at a fire can be broken down into two key components: life safety and fire flow. Life safety tasks are determined by the number of building occupants, their location, status, and ability to take self-preservation action. Life safety-related tasks involve the search, rescue, and evacuation of victims. The fire flow component involves delivering sufficient water to extinguish the fire and create an environment within the building that allows entry by firefighters.

The number and types of tasks needing simultaneous action will dictate the minimum number of firefighters required to combat different types of fires. In the absence of adequate personnel to perform

concurrent action, the command officer must prioritize the tasks and complete some in chronological order rather than concurrently. These tasks include:

- Command
- Scene safety
- Search and rescue
- Fire attack
- Water supply
- Pump operation
- Ventilation
- Backup/rapid intervention

Critical task analysis also applies to non-fire type emergencies including medical, technical rescue, and hazardous materials emergencies. Numerous simultaneous tasks must be completed to effectively control an emergency. The department's ability to muster needed numbers of trained personnel quickly enough to make a difference is critical to successful incident outcomes.

The following figure illustrates the minimum emergency incident staffing recommendations of the Commission on Fire Accreditation, International, a private organization that, upon request, evaluates fire departments and provides accreditation to those meeting minimum standards. The following definitions apply to the figure:

Low Risk—Minor incidents involving small fires (fire flow less than 250 gallons per minute), single patient non-life threatening medical incidents, minor rescues, small fuel spills, and small wildland fires without unusual weather or fire behavior.

Moderate Risk—Moderate risk incidents involving fires in single-family dwellings and equivalently sized commercial office properties (fire flow between 250 gallons per minute to 1,000 gallons per minute), life threatening medical emergencies, hazardous materials emergencies requiring specialized skills and equipment, rescues involving specialized skills and equipment, and larger wildland fires.

High Risk—High risk incidents involving fires in larger commercial properties with sustained attack (fire flows more than 1,000 gallons per minute), multiple patient medical incidents, major releases of hazardous materials, high risk rescues, and wildland fires with extreme weather or fire behavior.

Figure 75: Staffing Recommendations Based on Risk

INCIDENT TYPE	HIGH RISK	MODERATE RISK	LOW RISK
Structure Fire	29	15	6
Emergency Medical Service	12	4	2
Rescue	15	8	3
Hazardous Materials	39	20	3
Wildland Fire	41 (Red Flag level)	20	7

Lebanon Fire District has developed the following critical task analyses for various incident types. It has defined, based on current unit staffing levels, the number and type of apparatus needed to deliver sufficient numbers of personnel to meet the critical tasking identified. ESCI's review of the critical task analyses concludes that all are generally in keeping with industry standards and provide the minimum number of personnel needed for effective incident operations.

Establishing resource levels needed for various types of emergencies is a uniquely local decision. Factors influencing local decisions for incident staffing include the type of equipment operated, training levels of responders, operating procedures, geography, traffic, and the nature of building and other risks being protected.

Critical Tasking

Critical tasks are those activities that must be conducted early on and in a timely manner by firefighters at emergency incidents in order to control the situation, stop loss, and to perform necessary tasks required for a medical emergency. LFD is responsible for assuring that responding companies are capable of performing all of the described tasks in a prompt, efficient, and safe manner. These are the minimum number of personnel needed by incident type. More personnel will be needed for incidents of increased complexity or size.

Figure 76: Critical Task Analysis Conducted by LFD

Structure Fire (Moderate Risk)

TASK	NUMBER OF PERSONNEL
Command	1
Safety	1
Pump Operations	1
Attack Line	2
Back-up Line	2
Search and Rescue	4
RIT	2
Other(Water Supply)	1
Total	**14**

Structure Fire (High Risk)

TASK	NUMBER OF PERSONNEL
Command	1
Safety	1
Pump Operations	2
Attack Line	4
Back-up Line	4
Search and Rescue	4
Ventilation	4
RIT	2
Water Supply	1
Total	**23**

Alarm Activation (Smoke Investigation)

TASK	NUMBER OF PERSONNEL
Command	1
Pump Operations	1
Investigation	2
Total	**4**

Misc. Small Fire (Dumpster, Car)

TASK	NUMBER OF PERSONNEL
Command	1
Pump Operations	1
Fire Attack	2
Total	**4**

Wildland Fire (High Risk [WUI])

TASK	NUMBER OF PERSONNEL
Command	1
Safety	1
Pump Operations	4
Attack Line	3
Exposure Lines	2
Water Supply	2
Other (Mop-up, Overhaul, Line)	2
Total	**15**

Wildland Fire (Low Risk)

TASK	NUMBER OF PERSONNEL
Command/Safety	1
Pump Operations	2
Attack Line	2
Other (Overhaul etc.)	1
Water Supply	1
Total	**7**

Hazardous Materials (High Risk)

TASK	NUMBER OF PERSONNEL
Command	1
Safety	1
Liaison	1
Decontamination/Recon	5
Medical	2
Team leader, safety, entry team, and backup team	6 (Haz Mat Team 5)
Total	**10 + Haz Mat Team 5**

Hazardous Materials (Low Risk)

TASK	NUMBER OF PERSONNEL
Command	1
Liaison	1
Decontamination/ Recon	3
Medical	2
Entry team, and backup team	4 (Haz Mat Team 5)
Total	**7 + Haz Mat Team 5**

Emergency Medical Aid (Minor - Fall, Back Pain, Laceration)

TASK	NUMBER OF PERSONNEL
Patient Management	1
Patient Care	1
Total	**2**

Emergency Medical Aid (Major - Cardiac Arrest, Gunshot/Stabbing)

TASK	NUMBER OF PERSONNEL
Patient Management	1
Patient Care	4
Incident Command/Safety	1
Total	**6**

Major Medical Response (5+ Patients)

TASK	NUMBER OF PERSONNEL
Incident Command	1
Safety	1
Triage	2
Treatment Manager	1
Patient Care/Transportation	6
Transportation Manager	1
Documentation/Accountability	1
Other	3
Total	**16**

Motor Vehicle Accident (Non Trapped)

TASK	NUMBER OF PERSONNEL
Scene Management/ Documentation	1
Patient Care/Extrication	4
Scene Safety/Blocking	1
Total	**6**

Motor Vehicle Accident (Trapped)

TASK	NUMBER OF PERSONNEL
Command	1
Safety/ Blocking	2
Patient Care	3
Extrication	6
Pump Operator/Suppression Line	2
Total	**14**

Technical Rescue – Water

TASK	NUMBER OF PERSONNEL
Command	1
Safety	1
Operations	1
Rescue Team	2
Backup Team	2
Patient Care	2
Upstream Spotter	1
Downstream Safety	2
Total	**12**

Alarm Assignments

In order to ensure sufficient personnel and apparatus are dispatched to an emergency event the following first alarm response assignments have been established. "Total Staffing Needed" is the number identified in the critical tasking analysis above. The number of personnel and apparatus required to mitigate an active and complex working incident will require additional resources above and beyond the numbers listed below.

Figure 77: First Alarm Response Assignments Established by LFD

Structure Fire (Moderate Risk)

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Engine	2	6
Truck	1	3
Medic Unit	1	2
Battalion Chief	1	1
Other (Water Supply, Command Staff)	2	2
Total Staffing Needed		**14**
Total Staffing Provided		**14**

Structure Fire (High Risk)

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Engine	3	9
Rescue	1	3
Truck	1	3
Battalion Chief	1	1
Command Staff	3	3
Medic Unit	1	2
Other (Water Supply, Rehab)	2	2
Total Staffing Needed		**23**
Total Staffing Provided		**23**

Alarm Activation (Smoke Investigation)

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Engine	1	3
Battalion Chief	1	1
Total Staffing Needed		**4**
Total Staffing Provided		**4**

Misc. Small Fire (Dumpster, Car)

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Engine	1	3
Battalion Chief	1	1
Total Staffing Needed		**4**
Total Staffing Provided		**4**

Wildland Fire (High Risk [WUI])

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Engine	2	6
Brush Unit	2	4
Tender	2	2
Battalion Chief	1	1
Command Staff	2	2
Total Staffing Needed		**15**
Total Staffing Needed		**15**

Wildland Fire (Low Risk)

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Engine	1	3
Brush Unit	1	2
Battalion Chief	1	1
Water Tender	1	1
Total Staffing Needed		**7**
Total Staffing Provided		**7**

Hazardous Materials – High Risk

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Engine	2	6
Medic Unit	1	2
Battalion Chief	1	1
Command Staff	1	1
Haz Mat Team 5		**6**
Total Staffing Needed		**10 + Haz Mat Team 5**
Total Staffing Provided		**10 + Haz Mat Team 5**

Hazardous Materials (Low Risk)

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Engine	1	3
Medic Unit	1	2
Battalion Chief	1	1
Command Staff	1	1
Haz Mat Team 5	**1**	**4**
Total Staffing Needed		**7 + Haz Mat Team 5**
Total Staffing Provided		**7+ Haz Mat Team 5**

Emergency Medical Service (Minor - Fall, Back Pain, Laceration)

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Medic Unit	1	2
Total Staffing Needed		**2**
Total Staffing Provided		**2**

Emergency Medical Service (Major - Cardiac Arrest, Gunshot/Stabbing)

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Engine	1	3
Medic Unit	1	2
Battalion Chief	1	1
Total Staffing Needed		**6**
Total Staffing Provided		**6**

Major Medical (5+ Patients)

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Engine	2	6
Medic Unit	3	6
Command Staff	3	3
Battalion Chief	1	1
Total Staffing Needed		**16**
Total Staffing Provided		**16**

Motor Vehicle Accident (Non Trapped)

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Engine	1	3
Medic Unit	1	2
Battalion Chief	1	1
Total Staffing Needed		**6**
Total Staffing Provided		**6**

Motor Vehicle Accident (Trapped)

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Engine	2	6
Rescue	1	3
Medic Unit	1	2
Battalion Chief	1	1
Command Staff	2	2
Total Staffing Needed		**14**
Total Staffing Provided		**14**

Technical Rescue – Water

UNIT TYPE	NUMBER OF UNITS	TOTAL PERSONNEL
Engine	2	6
Medic Unit	1	2
Battalion Chief	1	1
Rescue	1	3
Total Staffing Needed		**12**
Total Staffing Provided		**12**

Review of Historical System Performance

Incident data for calendar years 2013, 2014, and 2015 (study period) was evaluated in detail to determine LFD's current performance. Data was obtained from LFD incident reports and the dispatch center's computer-aided dispatch system.

LFD's current Standards of Coverage defines three performance zones for the purpose of response performance analysis: urban, rural, and frontier. By agreement for this report, the city of Lebanon and its urban growth boundary is considered "urban". The remainder of the LFD service area will be evaluated as "rural".

Only incidents occurring within the LFD service area that were dispatched as a "priority" are included in the analysis. Priority incidents are emergencies to which the fire district initiated a "Code 3" (using warning lights and sirens) response. There were 5,221 such incidents identified as within the city and its urban growth boundary. There were 1,036 such incidents within the district's unincorporated rural area during the study period. Incidents initially dispatched as non-emergency responses were excluded.

Each phase of the incident response sequence was evaluated to determine current performance. This allows an analysis of each individual phase to determine where opportunities might exist for improvement. Though not included in the LFD Standards of Cover, dispatch center performance was also evaluated.

The total incident response time continuum consists of several steps, beginning with initiation of the incident and concluding with the appropriate mitigation of the incident. The time required for each of the components varies. The policies and practices of the fire district directly influence some of the steps.

LFD's response performance was compared to its internally identified response performance goals as defined in its Standards of Coverage.

Figure 78: Summary of LFD Performance Goals

RESPONSE INTERVAL	CITY OF LEBANON AND UGB (URBAN)	UNINCORPORATED LFD (RURAL)
Dispatch call processing (received to dispatch)	Within 60 seconds, 80% of the time	Within 60 seconds, 80% of the time
Turnout time (dispatch to enroute) 7:00 am to 10:00 pm 10:00 pm to 7:00 am	 Within 95 seconds, 90% of the time Within 170 seconds, 90% of the time	 Within 95 seconds, 90% of the time Within 170 seconds, 90% of the time
Response time (dispatch to arrival)	Within 6 minutes, 85% of the time	Within 10 minutes, 85% of the time
Full effective response force	Within 10 minutes, 80% of the time	Within 15 minutes, 80% of the time

In keeping with industry standards, all response time elements are reported at a given percentile. Percentile reporting is a methodology by which response times are sorted from least to greatest, and a "line" is drawn at a certain percentage of the calls to determine the percentile. The point at which the

"line" crosses the 90th percentile, for example, is the percentile time performance. Thus, 90 percent of times were at or less than the result. Only 10 percent were longer.

Percentile differs greatly from average. Averaging calculates response times by adding all response times together and then dividing the total number of minutes by the total number of responses (mean average). Measuring and reporting average response times is not recommended. Using averages does not give a clear picture of response performance because it does not clearly identify the number and extent of events with times beyond the stated performance objective.

What follows is a detailed description and review of each phase of the response time continuum. All phases will be compared to the LFD response performance objectives.

Detection

The detection of a fire (or medical incident) may occur immediately if someone happens to be present or if an automatic system is functioning. Otherwise, detection may be delayed, sometimes for a considerable period. The time period for this phase begins with the inception of the emergency and ends when the emergency is detected. It is largely outside the control of the fire department and not a part of the event sequence that is reliably measurable.

Call Processing

Most emergency incidents are reported by telephone to the 9-1-1 center. Call takers must quickly elicit accurate information about the nature and location of the incident from persons who are apt to be excited. A citizen well trained in how to report emergencies can reduce the time required for this phase. The dispatcher must identify the correct units based on incident type and location, dispatch them to the emergency, and continue to update information about the emergency while the units respond. This phase typically begins when the 9-1-1 call is answered at the primary safety answer point (PSAP) and ends when response personnel are notified of the emergency.

The Linn County Sheriff's Office (LCSO) is the PSAP and dispatch center for the district. All 9-1-1 calls are answered at LCSO. A call taker questions the caller and transfers that information to a dispatcher who notifies appropriate response units of the incident, tracks unit response, and provides additional support.

Call processing time begins when the call is received at the dispatch center (LCSO) and ends when response units are notified of the incident. Industry standards suggest that this phase should occur within 60 seconds 80 percent of the time. The following figures list the call processing time for all priority incidents during the study period within the urban and rural areas, as well as by specific incident types.

Overall, the time from first notification to LCSO until notification of response personnel is within 2 minutes 10 seconds 80 percent of the time for incidents that occurred within the urban area and within 2 minutes 23 seconds 80 percent of the time for incidents that occurred within the rural area.

Figure 79: Call Processing Performance at the 80th Percentile – Urban

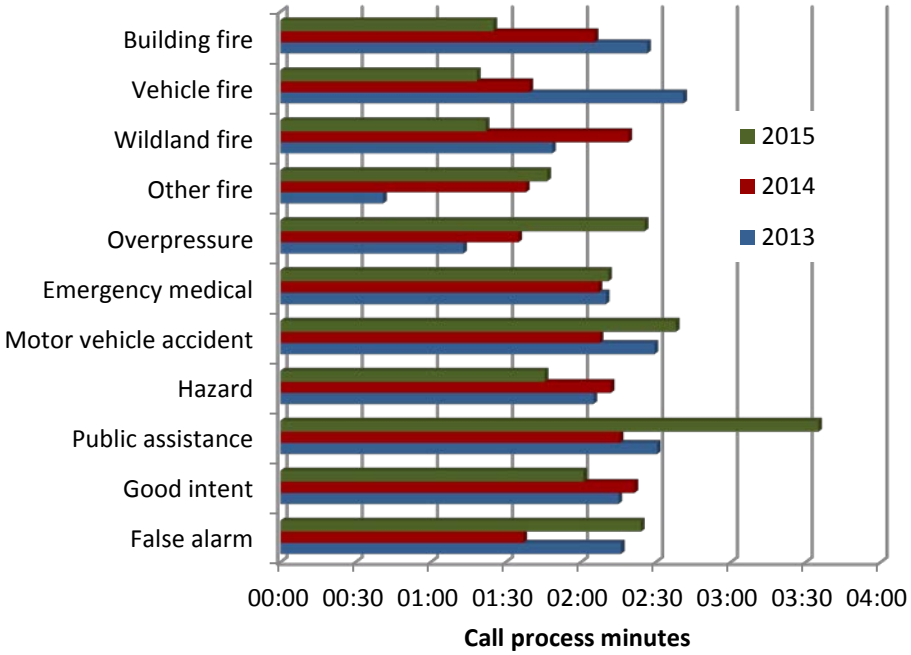
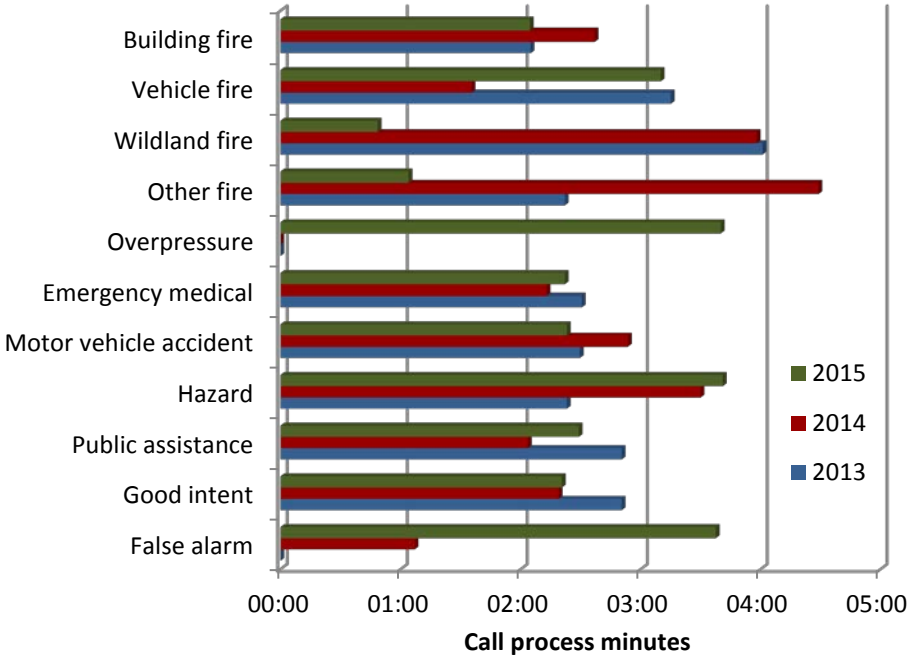


Figure 80: Call Processing Performance at the 80th Percentile - Rural



Activity levels at the dispatch center can affect the time it takes to receive, process, and dispatch a request for service. The following figures shows call processing time at the 80th percentile during the study period by hour of day. Urban data is for calendar year 2015. Rural data for all three years of the

study period was used due to the limited number of incidents. Call processing times are variable throughout the day. The variation does not appear to be related to incident activity.

Figure 81: Call Processing Time by Hour of Day – Urban

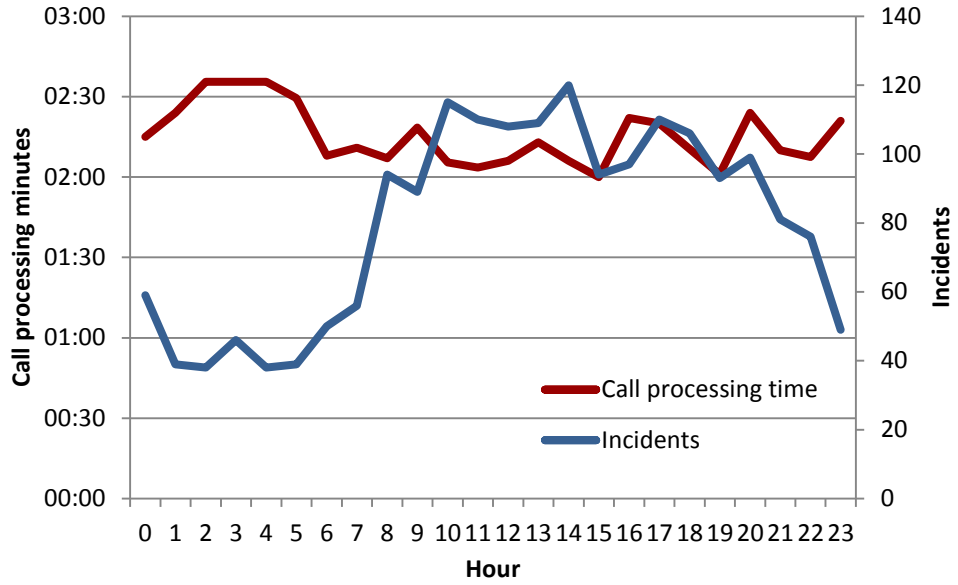
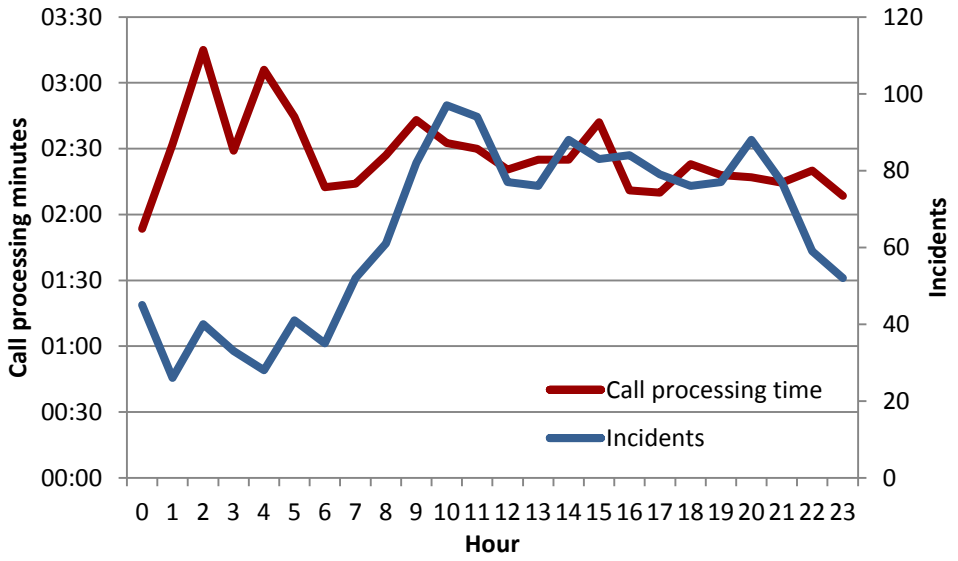


Figure 82: Call Processing Time by Hour of Day – Rural



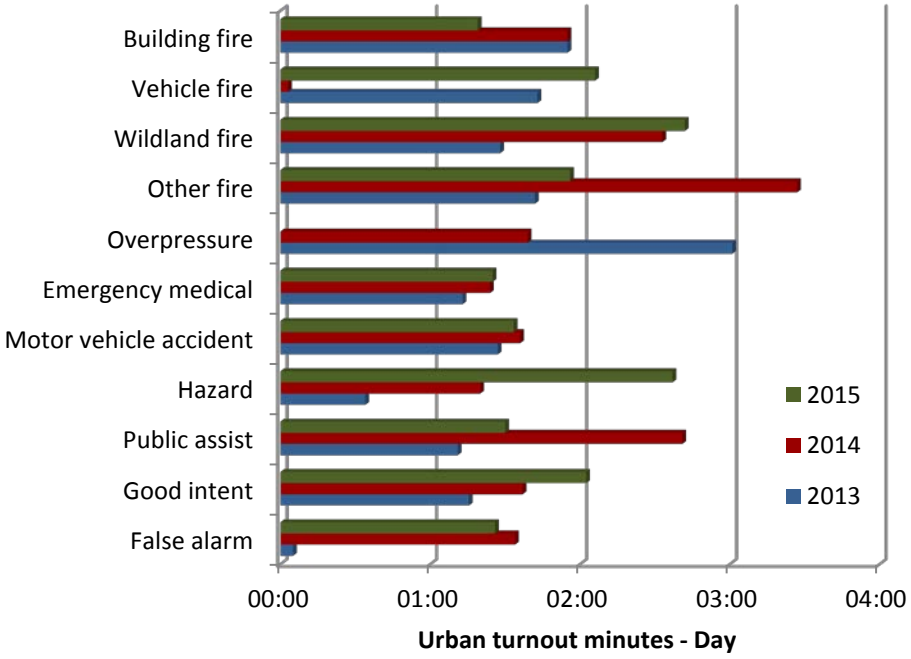
Turnout Time

Turnout time is a response phase controllable by the fire district. This phase begins at notification of an emergency in progress by the dispatch center and ends when personnel and apparatus begin movement towards the incident location. Personnel must don appropriate equipment, assemble on the response vehicle, and begin travel to the incident. Good training and proper fire station design can minimize the time required for this step.

The following figures illustrate turnout time for incidents within the urban and rural areas for the first response unit to begin the response to incidents during the study period. Turnout time for all incidents was:

- Daytime – within 1 minutes 23 seconds, 90 percent of the time
- Nighttime – within 2 minutes 49 seconds, 90 percent of the time

Figure 83: Turnout Time Performance – Urban



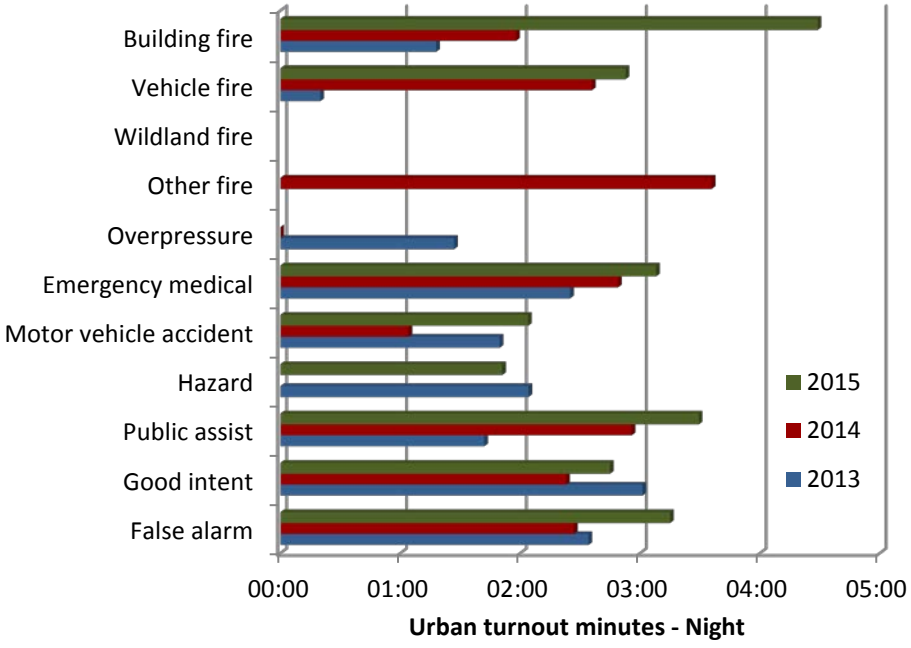
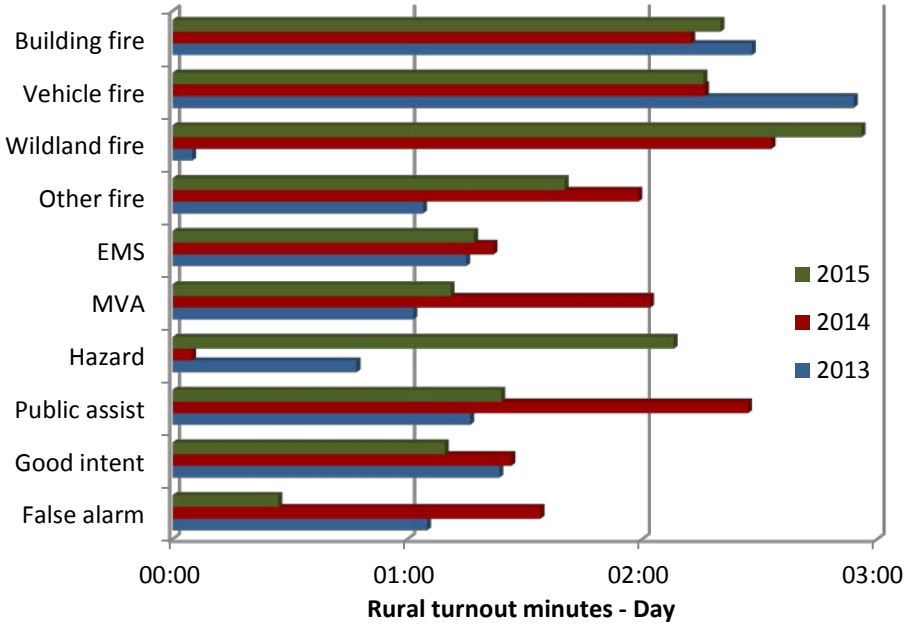
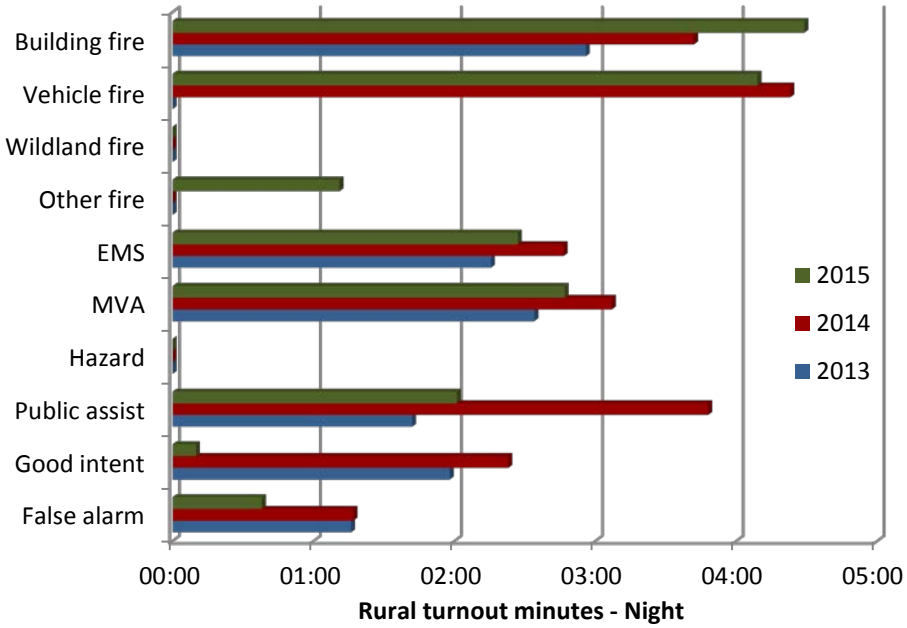


Figure 84: Turnout Time Performance – Rural





To further illustrate turnout times, the following figure lists turnout time by each response unt. Those units staffed by volunteers tend to have longer turnout times than career staffed units as would be expected. Volunteers must travel to the fire station in order to staff a response unit. Career staff are usually already in the station. Note that until recently Truck 31 was a second out, cross staffed unit accounting for its longer turnout time.

Figure 85: Unit Turnout Times by Unit – 90th Percentile

UNIT	STAFFING TYPE	TURNOUT TIME
Battalion 31	Career	02:39
Brush 34	Career	14:33
Brush 35	Volunteer	13:30
Engine 31	Career	03:21
Engine 32	Volunteer	10:08
Engine 33	Volunteer	09:52
Engine 34	Career	03:33
Engine 35	Volunteer	17:31
Medic 30	Career	02:25
Medic 31	Career	02:40
Medic 34	Career	02:24
Pumper-tender 31	Volunteer	12:56
Rescue 31	Volunteer	17:29
Truck 31	Career	10:13
Tender 32	Volunteer	16:49
Tender 33	Volunteer	10:45

Turnout time can vary by hour of day. In this case, turnout time varied by 3 minutes 12 seconds between the early morning hours and daytime hours. The following figures illustrate turnout time for the first unit to respond. Urban data is for calendar year 2015. Rural data for all three years of the study period was used due to the limited number of incidents.

Figure 86: Turnout Time by Hour of Day – Urban

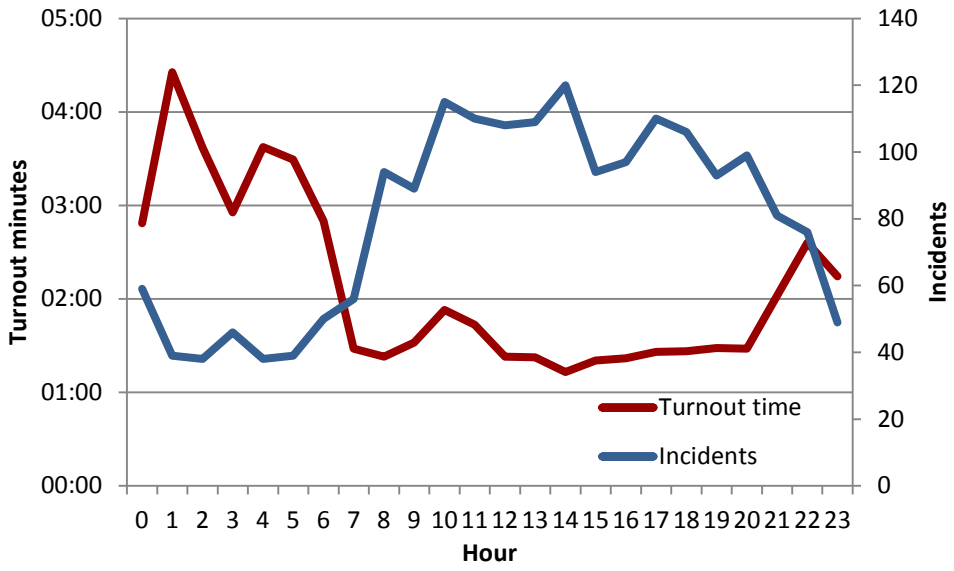
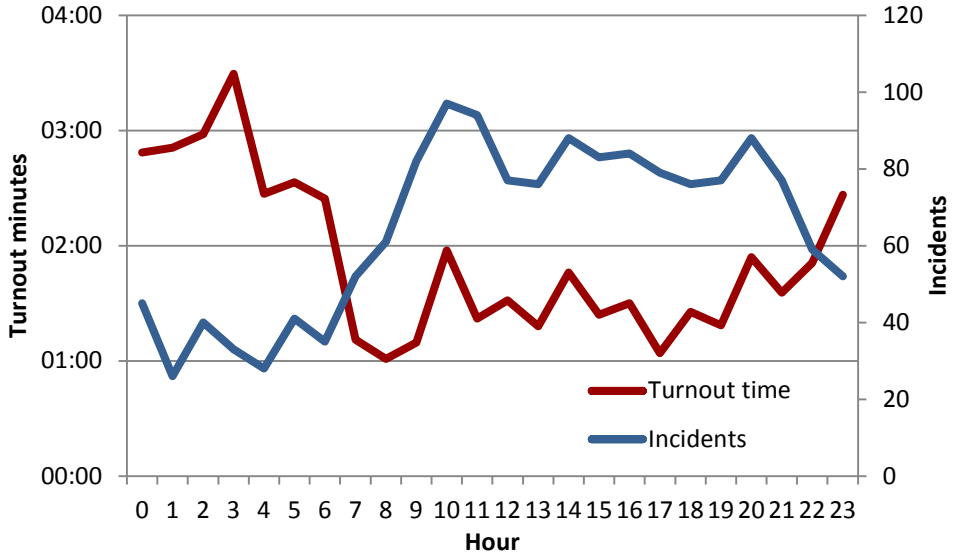


Figure 87: Turnout Time by Hour of Day – Rural



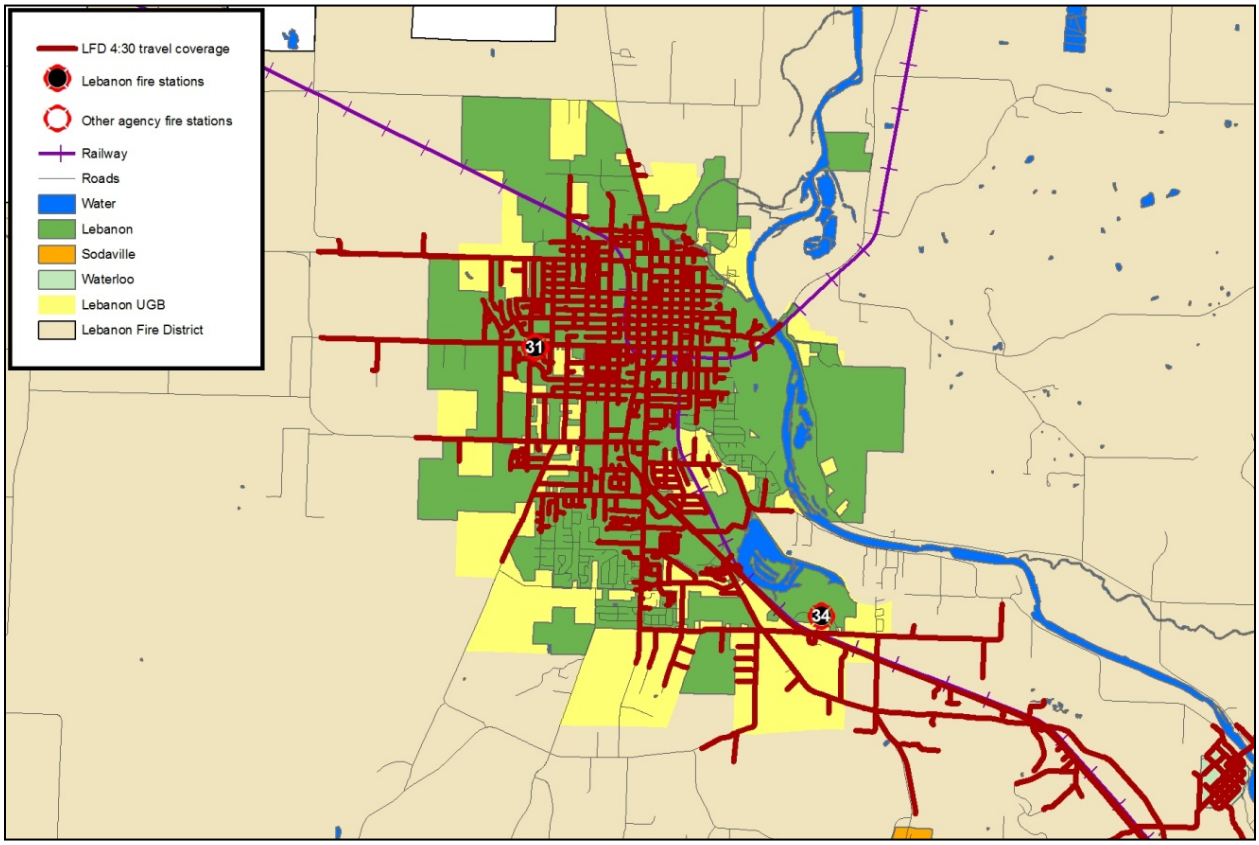
Distribution and Initial Arriving Unit Travel Time

Travel time is potentially the longest of the response phases. The distance between the fire station and the location of the emergency influences response time the most. The quality and connectivity of streets, traffic, driver training, geography, and environmental conditions are also factors. This phase begins with initial apparatus movement towards the incident location and ends when response personnel and apparatus arrive at the emergency's location.

LFD's response performance goals are flawed in regard to travel time. Although turnout time is different depending on time of day, response time is not. Thus, the urban travel time allowed during the day is 4 minutes 25 seconds; but at night, because turnout time is longer, travel time is only 3 minutes 10 seconds. Likewise the rural travel time allowed during the day is 8 minutes 25 seconds but at night is only 7 minutes 10 seconds. For this travel time analysis, the daytime allowance will be used, rounded to 4 minutes 30 seconds for urban and 8 minutes 30 seconds for rural.

The following figure illustrates the urban area street sections that can be reached from all LFD fire stations in 4 minutes 30 seconds of travel time. It is based on actual road travel speeds adjusted to account for turning, stops, and acceleration.

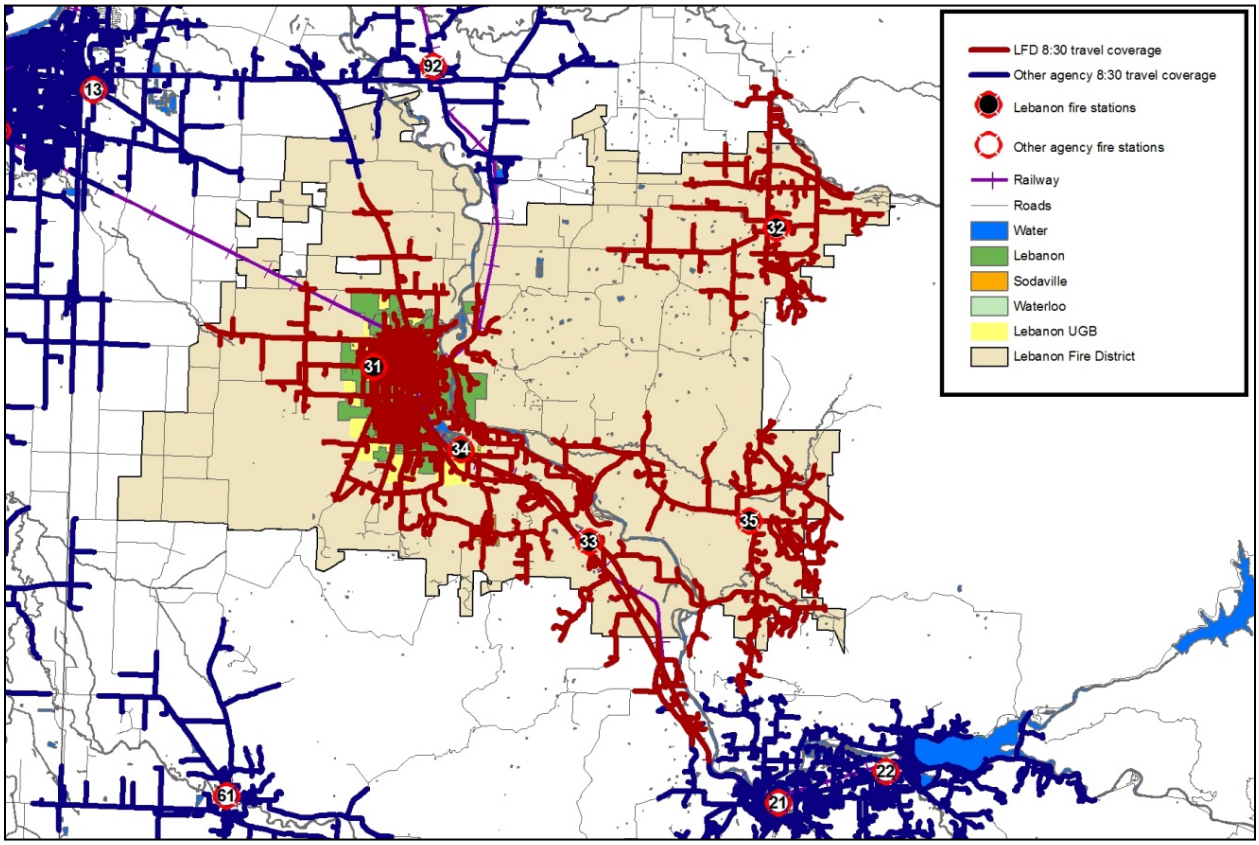
Figure 88: Initial Unit Travel Time Capability – Urban



Not all of the urban area is within 4 minutes 30 seconds travel minutes of a fire station. Areas in the southwest, east, and north are beyond the capability of current station locations. Automatic aid agencies provide no urban travel coverage.

The next figure illustrates the street sections that can be reached from all LFD fire stations and adjacent agency stations in 8 minutes 30 seconds of travel time. It is based on actual road travel speeds adjusted to account for turning, stops, and acceleration.

Figure 89: Initial Unit Travel Time Capability – Rural



There are many areas of the district that are not within 8 minutes 30 seconds travel of a fire station. Only Scio Fire District Station 92 provides any coverage within the district.

The following figures list travel time for all priority incidents as well as specific incident types. Overall, travel time for priority incidents within the urban area is within 4 minutes 58 seconds, 85 percent of the time. Travel time for rural incidents was 10 minutes 32 seconds, 85 percent of the time.

Figure 90: Travel Time Performance – First Arriving Unit – Urban

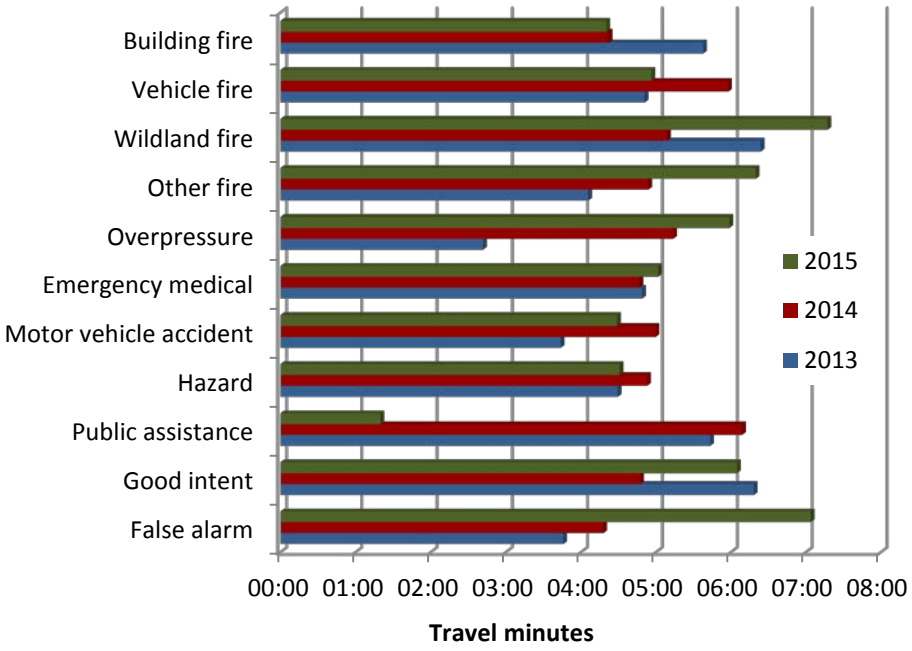
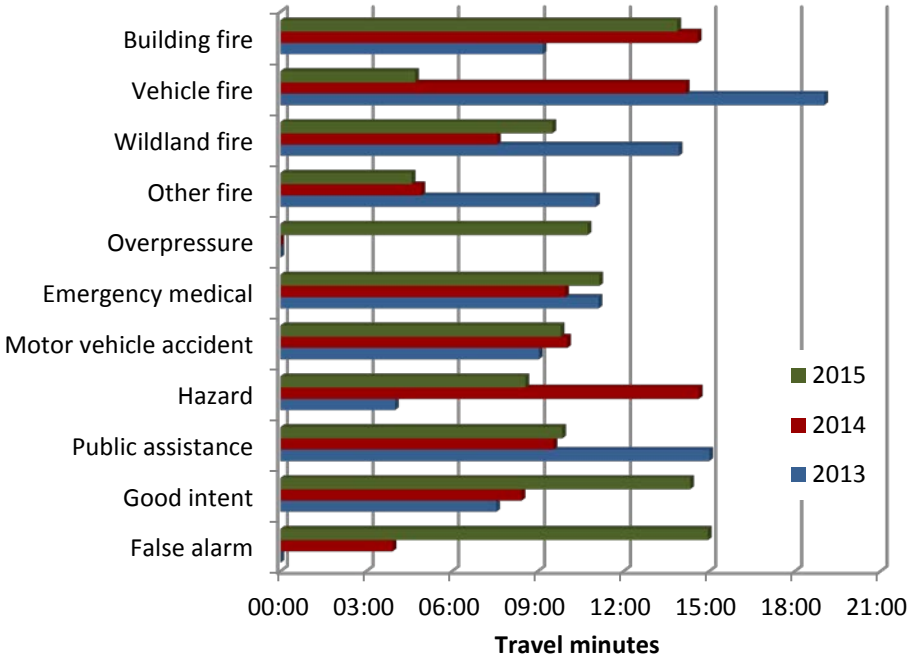


Figure 91: Travel Time Performance – First Arriving Unit - Rural



In some situations, travel time can vary considerably by time of day. Heavy traffic at morning and evening rush hour can slow fire department response. Concurrent incidents can also increase travel time since units from more distant stations would need to respond. The following figures show travel time

for the first arriving unit. Urban data is for calendar year 2015. Rural data for all three years of the study period was used due to the limited number of incidents.

Figure 92: Overall Travel Time and Incidents by Hour of Day – First Arriving Unit – Urban

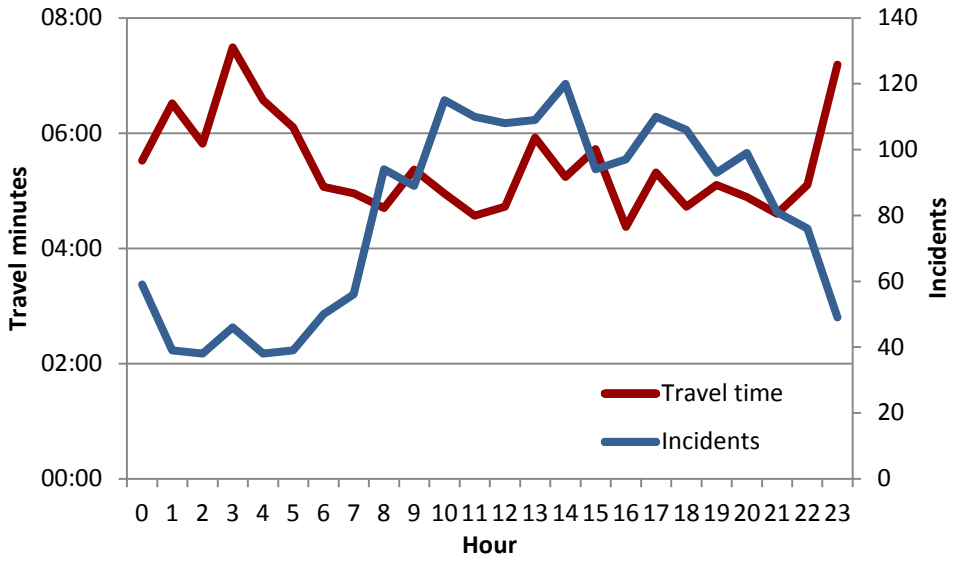
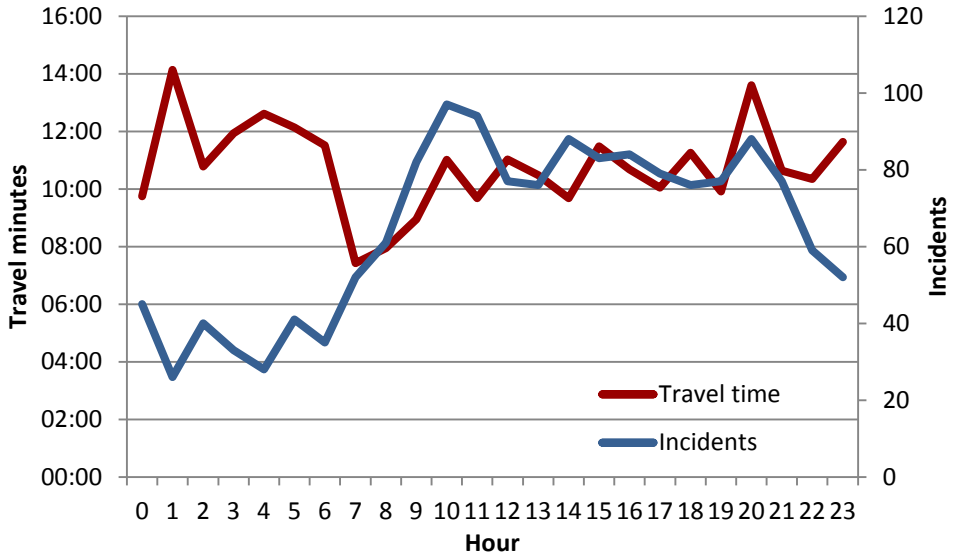


Figure 93: Overall Travel Time and Incidents by Hour of Day – First Arriving Unit – Rural



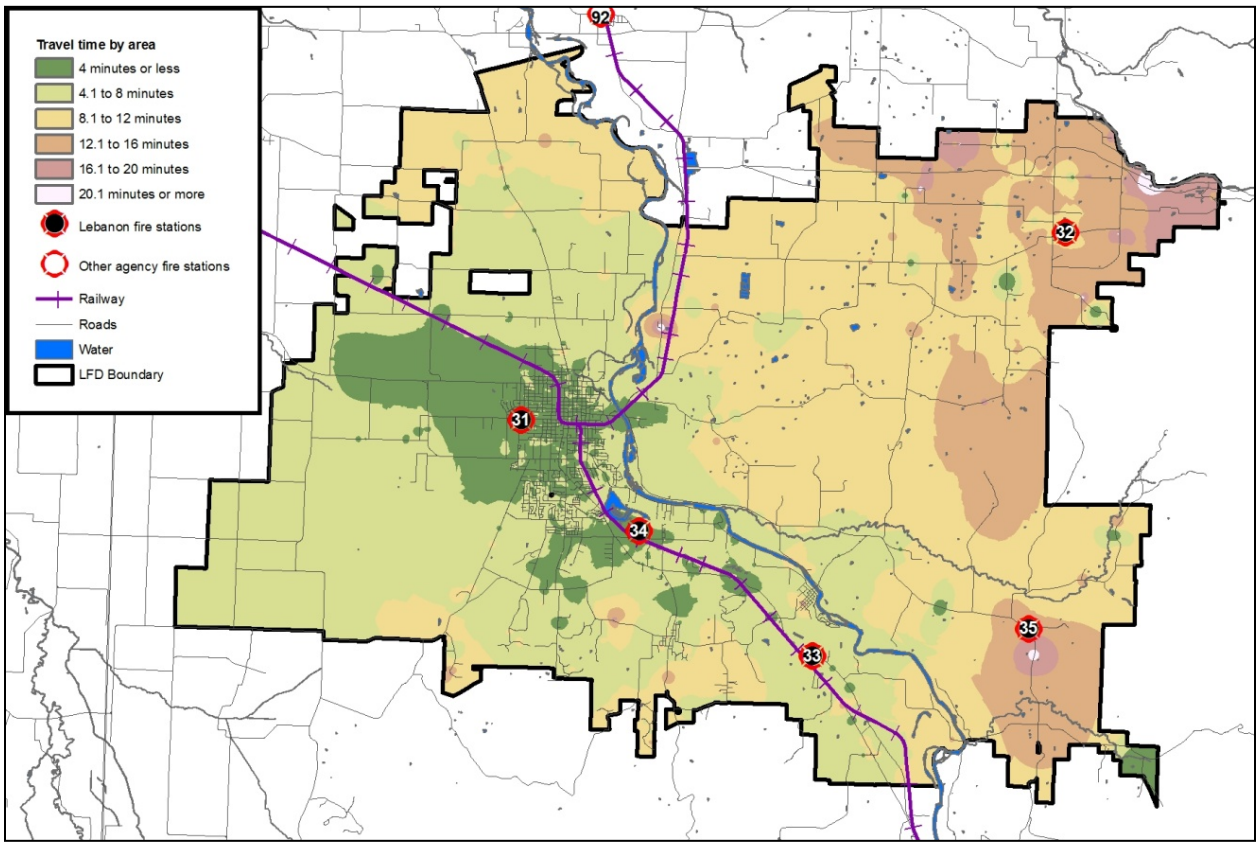
In order to provide on-time response, a response unit must be within 4 minutes 30 seconds travel of the incident in the urban area and within 8 minutes 30 seconds travel of an incident in rural area. Incidents were reviewed to identify how many were within the target travel minutes of a fire station. During the study period 4,814 of the 5,221 priority incidents within the urban area (92.2 percent) occurred within the target travel minutes of a fire station. During the same period, 786 of the 1,036 priority incidents within rural area (75.9 percent) occurred within target travel minutes of a fire station.

Travel Time Performance by Region

Travel time performance by region is variable and influenced by a number of factors such as individual station workload. Additional factors include the size of the station area and the street system serving it. More highly connected, grid patterned, street systems contribute to faster response times than do areas with meandering streets with numerous dead-ends.

The following figure evaluates travel time performance by sub-area using inverse distance weighting analysis (IDW). This process uses travel time for known points (actual incidents) to predict travel time for the area surrounding actual incidents. Better performance is generally noted near fire stations with progressively longer response times for those incidents more distant from the stations.

Figure 94: Travel Time Performance by Region



First Arriving Unit Response Time

Response time is defined as that period between notification of response personnel by the dispatch center that an emergency is in progress until arrival of the first fire department response unit at the emergency.

Response time for urban incidents during the study period was within 5 minutes 53 seconds, 85 percent of the time. Response time for rural incidents during the study period was within 11 minutes 10 seconds, 85 percent of the time.

The following figures illustrate response time for incidents within the urban and rural areas for the first response unit to arrive at the incident during the study period following notification.

Figure 95: Response Time Performance – First Arriving Appropriate Unit – Urban

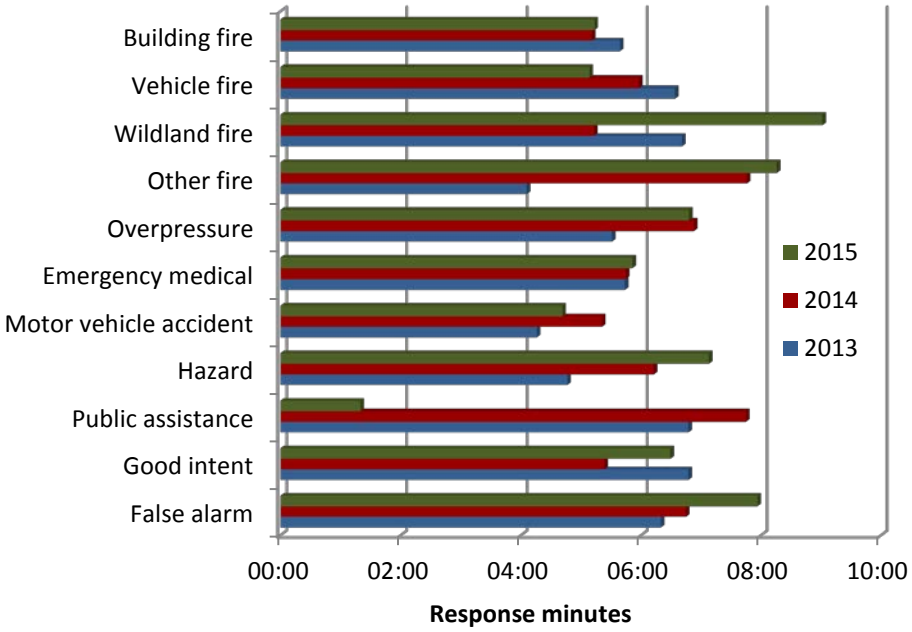
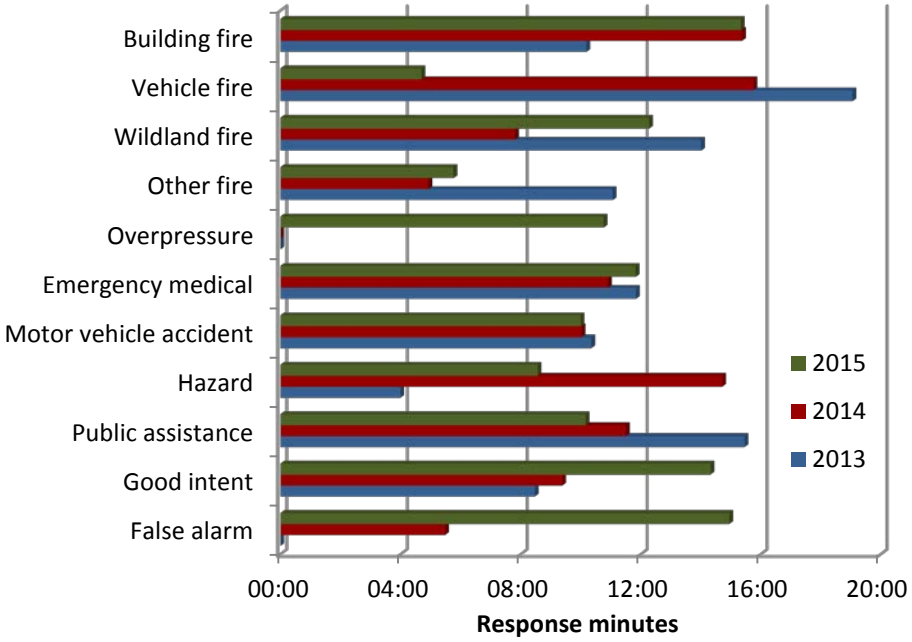


Figure 96: Response Time Performance – First Arriving Appropriate Unit – Rural



The next figures show response time and number of incidents by hour of day for all incidents. Urban data is for calendar year 2015. Rural data for all three years of the study period was used due to the limited number of incidents. Response time is slowest during the night-time hours and fastest during the

day. Generally, LFD's best response times occur during the period of the day when response activity is at its highest.

Figure 97: Hourly Response Time Performance – First Arriving Unit – Urban

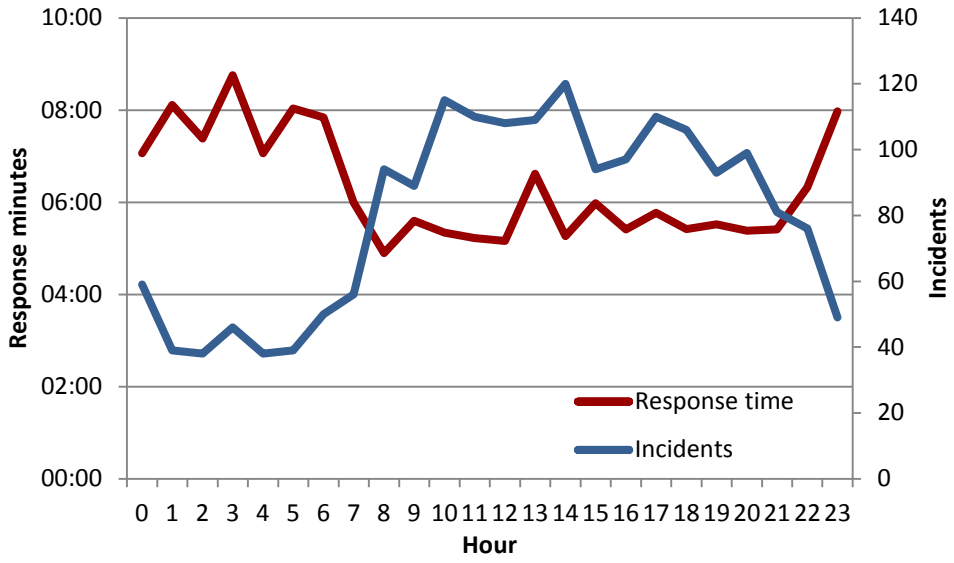
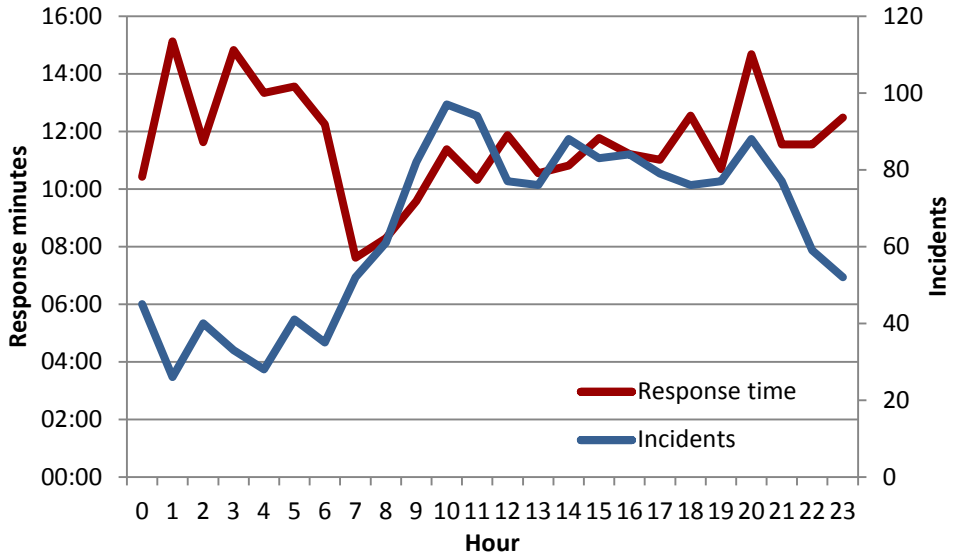


Figure 98: Hourly Response Time Performance – First Arriving Unit – Rural



First Arriving Unit Received to Arrival Time

From the customer's standpoint, response time begins when the emergency occurs. Their first contact with emergency services is when they call for help, usually by dialing 9-1-1. Received to arrival time combines call processing, turnout, and travel time. Combining the LFD standard for response time with call processing time, the received to arrival time standard would be as follows:

1) Received to arrival time for arrival of the first response unit in the urban area – within 7 minutes, 85 percent of the time

2) Received to arrival time of the first arriving response unit in the rural area – within 11 minutes, 85 percent of the time

Received to arrival time within the urban area during the study period was within 7 minutes 31 seconds, 85 percent of the time. Received to arrival time within the rural area was within 13 minutes 14 seconds, 85 percent of the time.

The next figures shows received to arrival performance during the study period at the 85th percentile for priority incidents within the urban area and within the rural area from the time the call is received at LCSO until the first unit arrives at the incident location.

Figure 99: Received to Arrival Time – First Arriving Appropriate Unit – Urban

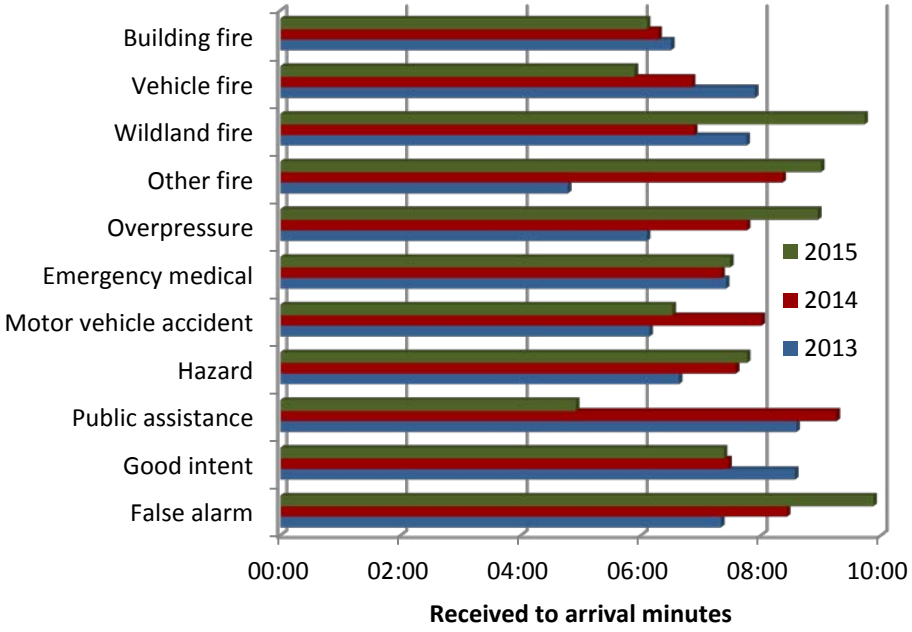
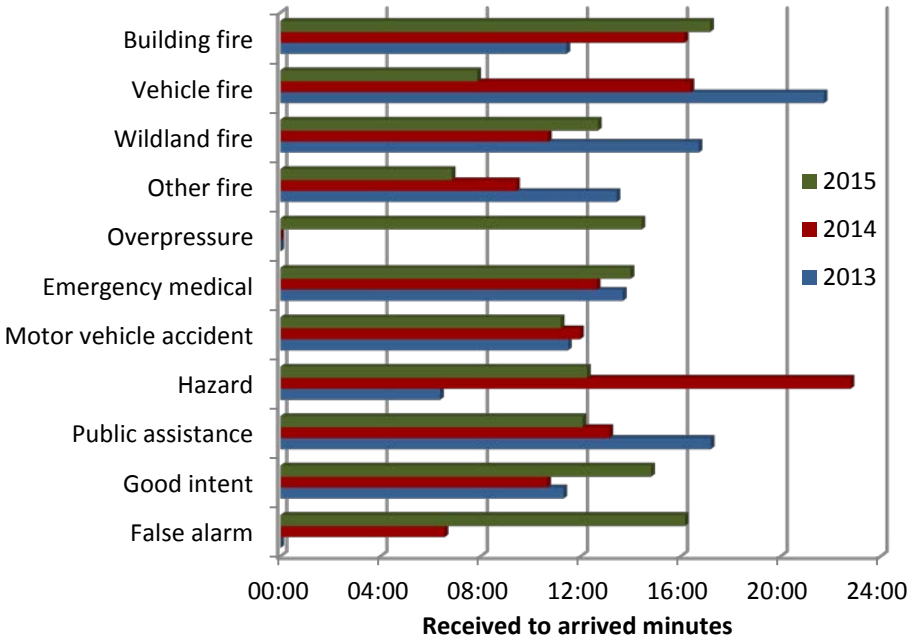


Figure 100: Received to Arrival Time – First Arriving Appropriate Unit – Rural



The next figures show received to arrival performance by time of day also compared to incident activity by time of day. Urban data is for calendar year 2015. Rural data for all three years of the study period was used due to the limited number of incidents. Total response time, from the customer's standpoint, is quickest during the day and slowest during the early morning hours.

Figure 101: Hourly Received to Arrival Performance – First Arriving Unit – Urban

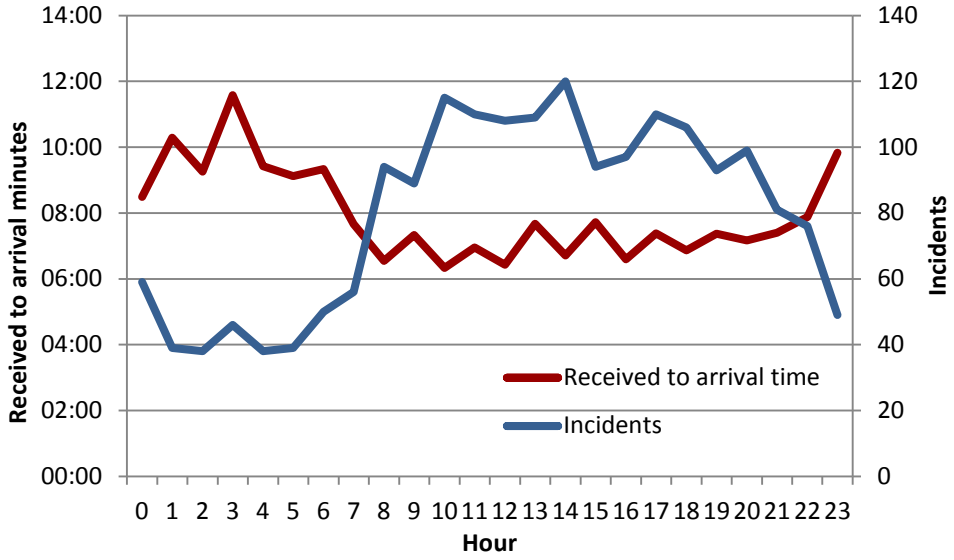
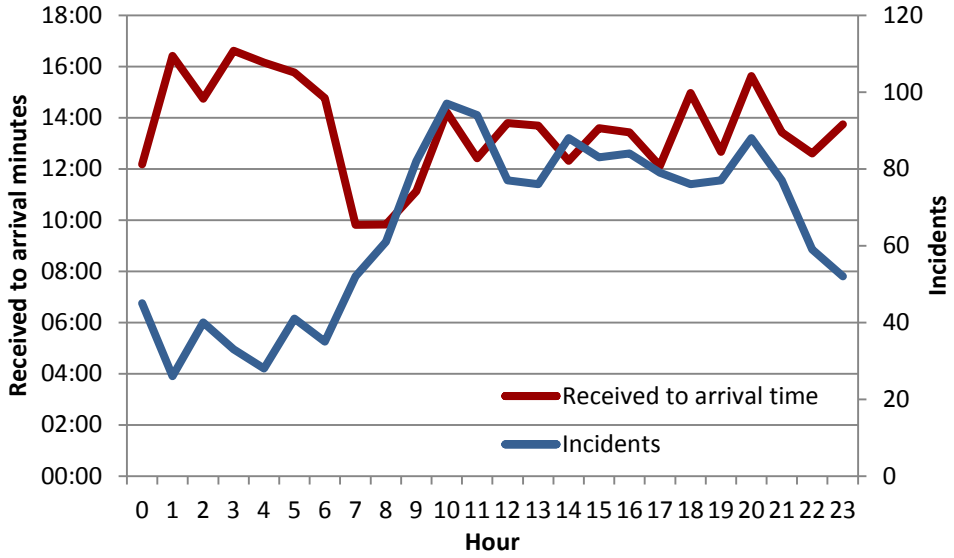


Figure 102: Hourly Received to Arrival Performance – First Arriving Unit – Rural



Concentration and Effective Response Force Capability Analysis

Effective Response Force (ERF) is the number of personnel and apparatus required to be present on the scene of an emergency incident to perform the critical tasks in such a manner to effectively mitigate the incident without unnecessary loss of life and/or property. The ERF is specific to each individual type of incident and is based on the critical tasks that must be performed. In accordance with LFD goals, a moderate risk building fire is modeled for this analysis.

LFD has defined the minimum full effective response force for moderate risk building fires as two fire engines and one ladder truck, or three fire engines and no ladder truck, along with a medic unit and a battalion chief with a total of 14 firefighters. In areas without fire hydrants, water tenders are also dispatched.

The response time goal for the delivery of the full ERF within the urban area is within 10 minutes, 80 percent of the time. The response time performance goal for the delivery of the full ERF the rural area is within 15 minutes, 80 percent of the time.

During the three-year study period effective response force performance was as follows:

- Urban area – Within 24 minutes 3 seconds, 80 percent of the time
- Rural area – Within 36 minutes 4 seconds, 80 percent of the time

These results were computed using the data provided by LFD. Unfortunately, the data did not include response units provided by other adjacent agencies. That data could not be provided for this study. However, if other agency response data was available it would not likely have greatly influenced the results.

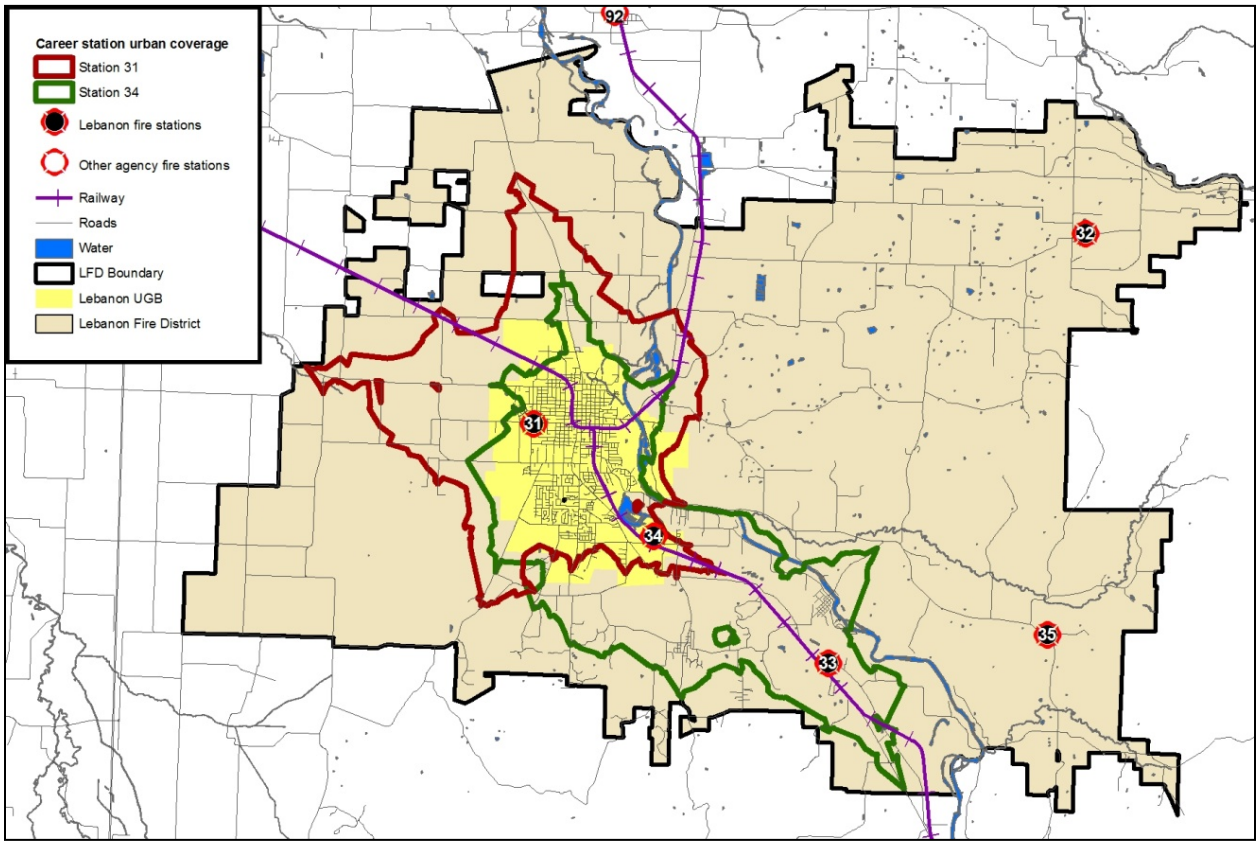
Apparatus staffing levels contributed to the long ERF performance. In order to meet the 14 firefighter standard, more than the minimum apparatus complement was required.

The ability of current station locations, including adjacent agency stations, was evaluated to determine whether LFD could meet its ERF performance goals. This evaluation was based on travel time capability from each station.

When turnout time is subtracted from the ERF response time goal, career staffed stations are able to provide 8-minute 30-second travel time coverage in the urban area and 13-minute 30-second coverage in the rural area. Since volunteer response units typically have turnout times at or above 10 minutes, those units' travel time was reduced accordingly.

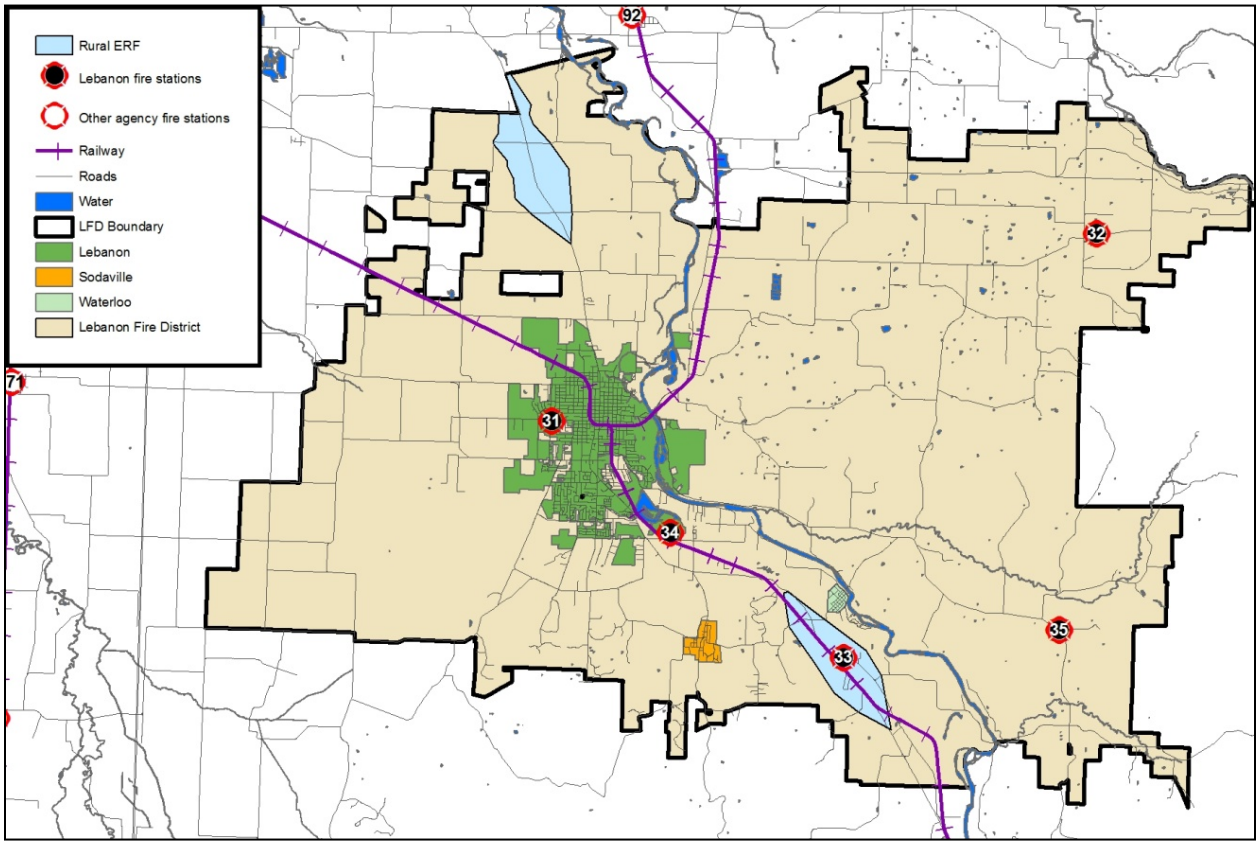
The first figure shows current ERF travel coverage in the urban area. Only Stations 31 and 34 provide coverage within the goal. Volunteer stations provide no coverage since their turnout time exceeds the urban response time goal. Both 31 and 34 provide coverage to virtually all of the urban area. However, only two engines, one medic unit, and one battalion chief (seven personnel total) can serve this area within the goal. The third engine or the ladder truck and seven additional personnel must come from a volunteer response. Current resources cannot meet the ERF response time goal in the urban area.

Figure 103: Urban ERF Coverage



The next figure shows the two small areas to which at least three stations provide overlapping coverage within the rural area travel time allowance. There are large areas of the district that have no coverage within the target travel time. Further, current staffing levels do not provide the needed 14 personnel to any rural area within the rural area ERF response time goal.

Figure 104: Rural ERF Coverage



Two-in, Two-out Compliant Arrival Time

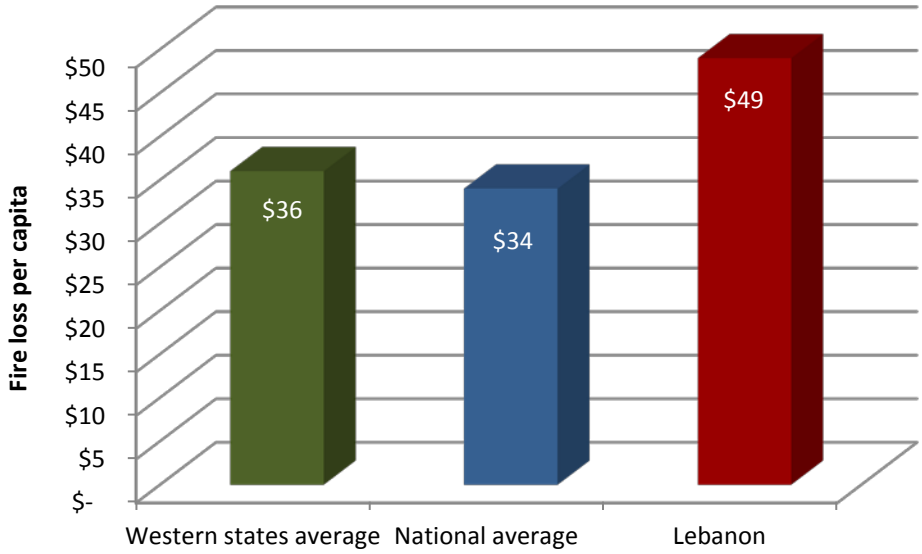
All LFD fire engines and ladder trucks are normally staffed by at least two personnel before it initiates response. Safety regulations require that at least four firefighters be on scene before firefighters can enter a burning building. The only exception is if it is known that a person is inside the building and needs rescue. Current staffing levels on engines generally require the arrival of a second response unit before non-rescue interior firefighting activities can be initiated.

Incident data for building fires during the study period was reviewed to determine the amount of time for the second unit to arrive, completing the four-person staffing requirement. According to the data, the second unit arrived within 2 minutes 43 seconds of the first unit 80 percent of the time.

Fire Loss Experience

Since response time is an output rather than an outcome measure, it is useful to review actual fire loss experience to determine if current response time performance having a negative impact. The following figure shows fire loss per capita for the LFD service area. Also included is data for similar sized communities nationally and within the western states. It indicates that LFD's fire losses are greater than those for fire departments serving similar sized communities. The fire loss rate in the Lebanon Fire District was $49 per capita averaged over the past three years. The higher rate when compared to the identified averages is likely to have been the result of a single high dollar loss incident that occurred during the time period.

Figure 105: Fire Loss Per Capita



Call Concurrency

When evaluating the effectiveness of any resource deployment plan, it is necessary to evaluate the workload of the individual response units to determine to what extent their availability for dispatch is affecting the response time performance. In simplest terms, a response unit cannot make it to an incident across the street from its own station in a reasonable time if it is unavailable to be dispatched to that incident because it is committed to another call.

Concurrency

One way to look at resource workload is to examine the number of times multiple incidents happen within the same timeframe in each station area. Incidents during the study period were examined to determine the frequency of concurrent incidents within each station's response area. This is important because concurrent incidents can stretch available resources and extend response times. The following figure shows the number of times during the study period that one or more incidents occurred concurrently. This shows that in most cases (3,515) only one incident was in progress at a time. However, 1,952 times there were two incidents in progress at the same time, 498 times there were three incidents in progress at the same time, and once there were seven incidents in progress at the same time.

Figure 106: Incident Concurrency

NUMBER OF CONCURRENT INCIDENTS	NUMBER OF OCCURRENCES
1	3,515
2	1,952
3	498
4	55
5	12
6	4
7	1

Future Delivery System Models

Although the foregoing sections of this report focused primarily on the conditions that currently exist within the Lebanon Fire Protection District, the intent of this study is to combine that evaluation with a look into the future and provide policy makers with information necessary to carry the system forward over the next 10 to 20 years. This portion of the report provides recommendations related to the deployment of facilities, apparatus and personnel with a focus on future service delivery and an improvement in overall efficiency within the system.

SHORT AND MID-TERM STRATEGIES

The previous sections of this report detail a considerable volume of observations and recommendations relating to LFD management and operations. The process of understanding, prioritizing and implementing the recommended enhancements can be daunting, simply due to the amount of work that may be involved. To help the organization navigate through the process, the following discussion further defines the short and mid-term priorities that ESCI has identified as the most important initially.

Strategic Planning

Upon completion of this Master Planning process, it is important that the district assure that the plan will be put to effective use. The first step in doing so is for the Board of Directors to formally adopt the Master Plan, with modifications if necessary, to institutionalize it as the organization's intended course of action.

The Master Plan includes a great deal of recommendations that translate into work that needs to be done. The list can be daunting and needs to be prioritized and planned for. The most effective way to do so is by completing a Strategic Planning process. The resulting Strategic Plan will identify and prioritize goals associated with the Master Plan recommendations, establish defined objectives for achieving the goals, assign responsibility for achieving the objectives, and identify means by which to measure progress.

Completing a Strategic Plan to follow upon this Master Planning process is strongly recommended.

Revise and Re-adopt Response Performance Goals

As was noted earlier, there is a flaw in LFD's adopted response performance goals. Expectations for turnout time are different at night versus during the day. However, response time (the combination of turnout time and travel time) is not different by time of day. This means that travel time is expected to be faster at night than during the day. LFD should either set one turnout time goal or establish two response time goals based on time of day.

LFD's goal for the delivery of the full effective response force should also be reviewed. As demonstrated earlier in this report, actual effective response force arrival is significantly longer than the goal. Further, there is no way with current resources to achieve the adopted goal. A more achievable goal should be adopted.

Improve the Collection and Use of Incident Data

Although LFD was able to provide most of the data needed to conduct an analysis of response performance, not all could be provided. LFD only captures unit response times for its own apparatus. Times for outside agency response units were not available. LCSO also could not provide this information. LFD should begin capturing outside agency unit times in its own records management system.

In addition, LFD should regularly conduct response performance analysis of the type completed in this report. This will allow the district to make adjustments as needed to ensure it is providing the best level of service with its available resources.

Improve Dispatch Center Performance

Current call processing times by the dispatch center exceed national standards. Shortening the dispatch sequence will improve overall response time. LCSO is acquiring a new computer-aided dispatch system. This in itself may help shorten dispatch times.

LFD should explore implementing a pre-alert process. This process has the call taker sending information to the dispatch as soon as incident location and basic nature (EMS, fire, etc.) have been determined. This allows the dispatcher to notify response personnel much sooner that waiting for all of the questions to be asked of the caller by the call taker.

Closest Unit Dispatch

The Linn County Sheriff's Office provides dispatch service to LFD. It is in the process of upgrading its computer aided dispatch system (CAD). This system is projected to have the capability to identify the closest response unit based on travel time. Agencies that have implemented this system have realized significant response time improvements.

The system works through a GPS-based connection between response vehicles and the CAD. When an incident is entered into CAD, the software identifies the locations of all appropriate response units, calculates the travel time between each unit and the incident, and then selects the response unit that will have the shortest travel time.

This is a substantial improvement over the current practice of selecting the response unit based on station assignment. When the LCSO CAD capability for this system is available, LFD should implement it as soon as practical.

Improve Turnout Time Performance

LFD has set its turnout time performance goal at within 1 minute 35 seconds, 90 percent of the time during the day and within 2 minutes 50 seconds, 90 percent of the time at night. It is meeting these goals currently.

However, national standards for career-staffed stations recommend faster turnout time performance. *NFPA 1710* sets the turnout time standard as within 60 seconds, 90 percent of the time at all hours for

incidents other than fires or special operations (those requiring full protective equipment). It sets the standard for fire and special operations incidents at 80 seconds, 90 percent of the time at all hours.

LFD should consider shortening its turnout time goal. The standard recommended in *NFPA 1710* is challenging but achievable as evidenced by the performance of some agencies. Reducing turnout time will reduce overall response time and offer the opportunity to improve emergency incident outcomes.

LFD should review fire station configurations to determine if there are obstacles to prompt turnout. The distance between living spaces and apparatus can impact turnout time. Ensuring that an alarm can be heard in all station locations is also important. Use of technology such as in-cab routing display can also reduce turnout time. Finally, crew performance must be monitored, reported, and standards enforced.

Non-Traditional Volunteer Program

Historically, fire departments have recruited and trained volunteer personnel to be fully capable emergency responders. However, as the time demands for training have increased and as societal changes have decreased people's available time to volunteer, maintaining volunteers as fully capable (or "combat" volunteers) responders has become a challenge.

Many fire agencies have taken a different approach to increase the number of volunteers available for response. Volunteers are becoming specialized to a particular function such as EMS only responders, driver-operator only responders, wildland fire only responders, outside scene support, and the like. These agencies have recognized that not everyone wants to or is fully able to fight fires. They also recognize that many people simply do not have the time to commit to the training required to reach and maintain that level of capability.

Implementing this approach will require several actions:

1. Create job descriptions for each type of responder.
2. Create training curriculum for each type of responder.
3. Develop a recruit and ongoing training program that will adequately prepare and maintain each responder's skills.
4. Advertise the program to the community through an aggressive recruitment effort.

The benefits of such a program will be to increase the number of personnel on an incident. There are challenges, however. More volunteers will be needed due to this specialization. Further, LFD may not have assurance that personnel with the needed skill sets will arrive at an incident. Regardless, LFD should consider implementing this approach.

Capital Asset Planning

LFD owns and manages a large amount of capital assets including fire stations, apparatus, and major equipment. Though it is reserving some money for future replacement, LFD has not prepared comprehensive capital asset plans.

A capital asset plan identifies facilities, apparatus, and equipment that will require expensive maintenance or replacement. It projects the date when maintenance or replacement is needed and identifies the expected cost. This allows the agency to begin setting aside enough money to that sufficient funds are available when maintenance or replacement is needed.

A facilities plan should include predictable significant maintenance needs. Examples include:

- Roof replacement
- HVAC replacement
- Parking lot asphalt replacement
- Painting

If it is expected that a facility would need to be rebuilt, funds for that effort may also be included.

Apparatus plans should identify the expected replacement date and cost. This plan may also identify the need to replace a particular apparatus with a different type and the costs associated with that.

Equipment plans should include all expensive equipment (greater than $10,000 for example) that will need to be replaced in the future. This could include single items such as heart monitor/defibrillators or groups of items such as self-contained breathing apparatus and radios. The plan should identify the expected replacement date and costs.

LFD should prepare all three plans in the near future. Doing so will clearly identify replacement fund requirements and give clear guidance on how to allocate cash reserves. Additional, specific information relative to apparatus replacement is provided in the next discussion.

Apparatus Replacement Planning

Any agency engaged in the delivery of emergency service is reliant on specialized tools that are both dependable and safe. Even highly trained professional firefighters are powerless to protect life and property from fire without a complex set of tools, including a variety of high-value vehicles. Medics minus dependable transport and reliable lifesaving tools revert to another century of care.

LFD maintains a fleet of emergency apparatus including engines (pumpers), ambulances, trucks (aerials), rescue, tenders, and command vehicles. Each unit has a predictable expected useful service life, determined by the agency as a practical balance of use, maintenance, and replacement versus refurbishment cost. Some fire departments are able to extend service life by moving aging equipment to areas of low service demand.

LFD does not maintain a funded apparatus replacement schedule for its emergency fleet, which ESCI views as an essential need. The accepted best practice for fire apparatus replacement planning is to identify a vehicle's projected service life, calculate its anticipated replacement cost, and fund a replacement plan accordingly. Incrementally, funds are then set aside so that when the vehicle becomes due for replacement the funds are available without the need to finance the purchase or ask the voters for supplemental financial support.

The following figure provides an example vehicle replacement schedule for the district, projecting the useful life of vehicles and scheduling the replacement date for these vehicles based on the remaining useful life. Actual planned service lives and apparatus purchase prices may differ from those used here. Should the district wish to update this schedule, ESCI will do so if provided with updated information, or will provide a spreadsheet tool to the department with which to make future calculations.

Figure 107: Apparatus Replacement Lives

VEHICLE DESCRIPTION	USEFUL LIFE (YEARS)
Engine	20
Truck	25
Ambulance	15
Tender	20
Rescue	20
Brush	20

Utilizing vehicle estimated lives and replacement cost, the following example vehicle replacement plan was developed for LFD. The replacement date assumes that vehicles will be placed in reserve status for five years prior to disposal.

Figure 108: Example LFD Apparatus Replacement Schedule

VEHICLE NUMBER	MODEL YEAR	SERVICE LIFE	REPLACEMENT YEAR	REPLACEMENT COST	CURRENT RESERVE REQUIRED	ANNUAL RESERVE REQUIREMENT
Brush 31	2009	15	2024	$218,115	$101,787	$14,541
Engine 31	2008	15	2023	$498,550	$265,893	$33,237
Medic 30	2011	10	2021	$208,307	$104,154	$20,831
Reserve Eng. 31	1999	15	OVERDUE	$498,550	$498,550	NA
Pumper/ Tender 31	2008	15	2023	$498,550	$265,893	$33,237
Truck 31	1986	20	OVERDUE	$1,625,500	$1,625,500	NA
Medic 31	2009	10	2019	$208,307	$145,815	$20,831
Rescue 31	1996	15	OVERDUE	$545,289	$545,289	NA
Brush 34	1989	15	OVERDUE	$218,115	$218,115	NA
Reserve Medic 31	2015	10	2025	$208,307	$20,831	$20,831
Reserve Medic 34	1998	10	OVERDUE	$208,307	$208,307	NA
Engine 32	1996	15	OVERDUE	$498,550	$498,550	NA
Water Tender 32	2012	15	2027	$529,709	$141,256	$35,314
Engine 33	1996	15	OVERDUE	$498,550	$498,550	NA
Water Tender 33	2012	15	2027	$529,709	$141,256	$35,314

VEHICLE NUMBER	MODEL YEAR	SERVICE LIFE	REPLACEMENT YEAR	REPLACEMENT COST	CURRENT RESERVE REQUIRED	ANNUAL RESERVE REQUIREMENT
Engine 34	2008	15	2023	$498,550	$265,893	$33,237
Medic 34	2003	10	OVERDUE	$208,307	$208,307	NA
Engine 35	2006	15	2021	$498,550	$332,366	$33,237
Brush 35	1994	15	OVERDUE	$218,115	$218,115	NA
TOTAL/Avg.	**2003**			**$8,415,935**	**$6,304,426**	
Total Annual Funding Requirement						**$280,608**

The preceding figure provides an example of how apparatus replacement funding may be calculated. Service lives and actual equipment costs in the study area may differ from the numbers used in the example and the district may want to adjust them accordingly.

What the example reveals is that, were LFD to *fully fund* an apparatus replacement schedule, an amount of $6,304,426 would need to have already been reserved and the district would need to make an annual contribution of $280,608 (adjusted for inflation) to a reserve fund dedicated to the funding schedule. It is pointed out that these amounts are representative examples only and do include a 3 percent inflation factor.

This is not to suggest that the district immediately allocate funds based on the chart and it is understood that doing so would be cost prohibitive. The purpose of providing the example replacement schedule is to underscore the considerable expense that is presented by the need to replace this kind of equipment and the importance of doing all that is possible to plan for apparatus needs in advance.

Apparatus service lives and replacement costs are readily predictable. ESCI advises clients that the day that delivery is taken on a new piece of fire apparatus is the day that the agency should start putting funds aside for its replacement.

RECOMMENDED LONG-TERM STRATEGIES

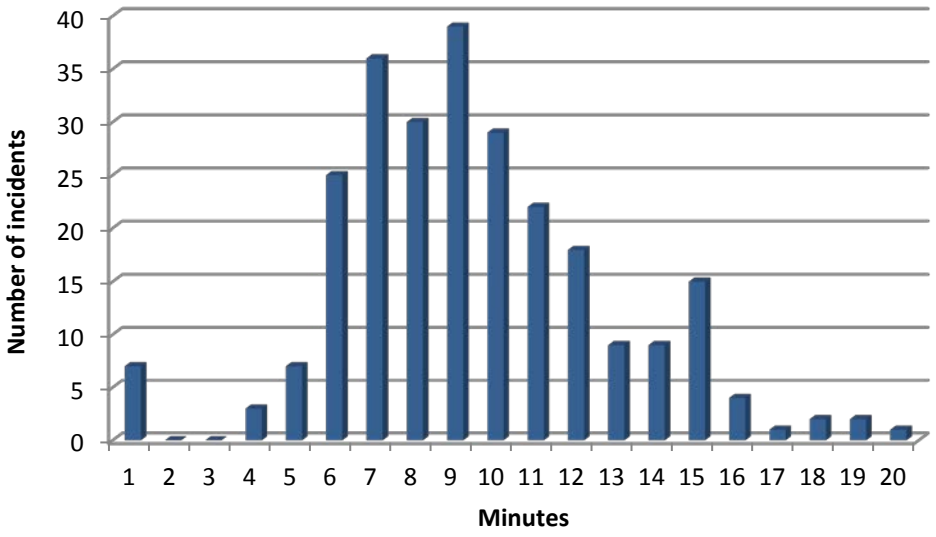
The short and mid-term strategies discussed will move the organization forward substantially. A longer-term, high-level view of future needs is also important to provide a "big picture" view of how the organization needs to continue with future initiatives. Primarily, long-term strategies are centered around community growth and related workload and how both impact the future deployment of fire stations and personnel.

Future Fire Station Locations

LFD's current fire station locations work well for the urban area (city of Lebanon and its urban growth boundary). However, there are significant amounts of territory outside the 8-minute 30-second travel time goal. Analysis was conducted to determine the degree to which this might be significant.

During the three-year study period there were 6,257 priority incidents. Only 259 incidents (4.1 percent) occurred in areas beyond 8 minutes 30 seconds from a fire station. This is an average of 86 incidents per year. These incidents were evaluated for their actual travel times. Overall, travel time to these incidents was within 14 minutes, 90 percent of the time. The figure below illustrates the number of incidents with travel times of between 1 and 20 minutes. A total of 199 incidents had travel times of between 6 and 12 minutes.

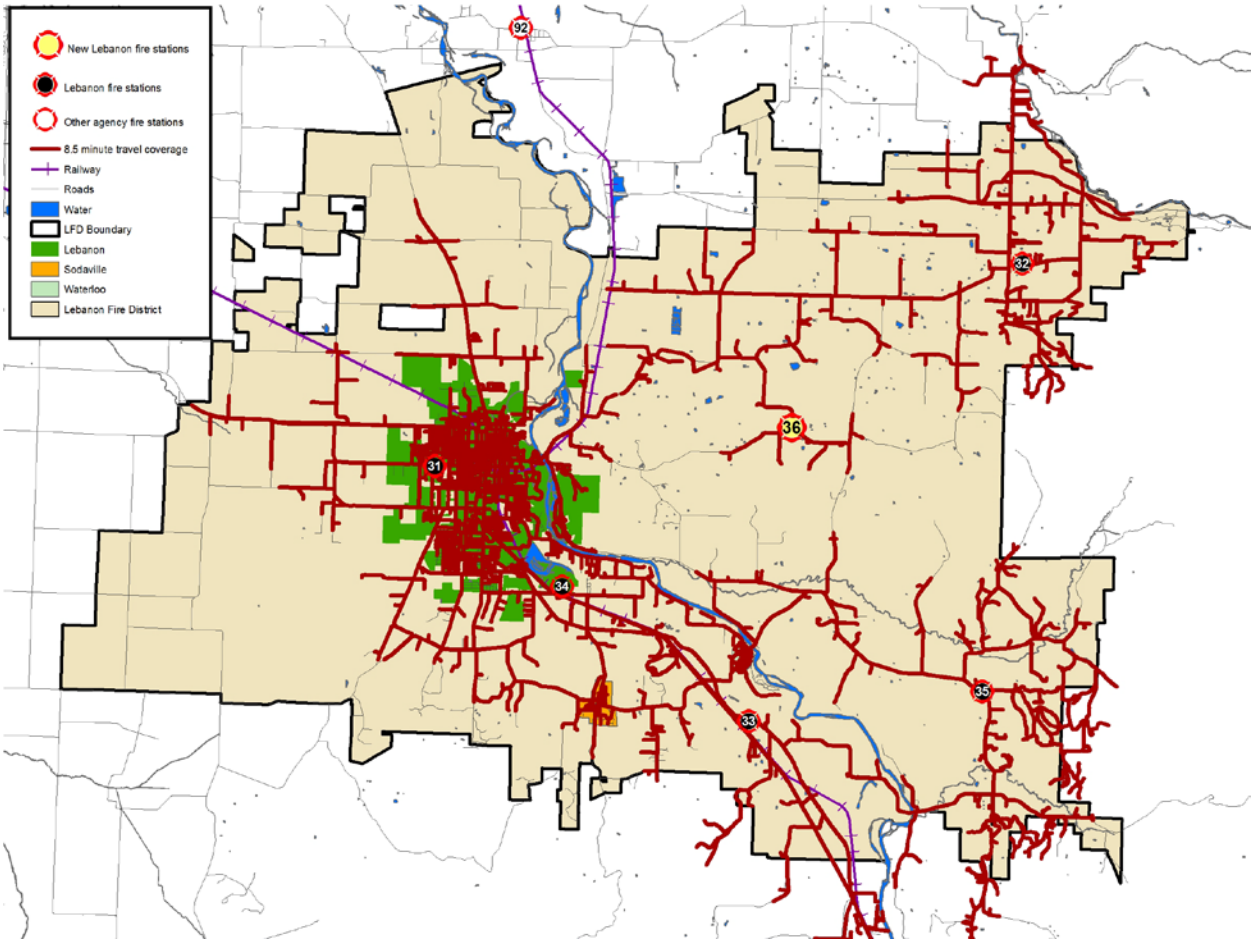
Figure 109: Travel Time Frequency



Various station relocation scenarios were modeled using GIS software. None improved overall coverage of the rural area within the travel time goal. Moving one station provided better coverage in underserved areas but created new areas outside the travel time goal.

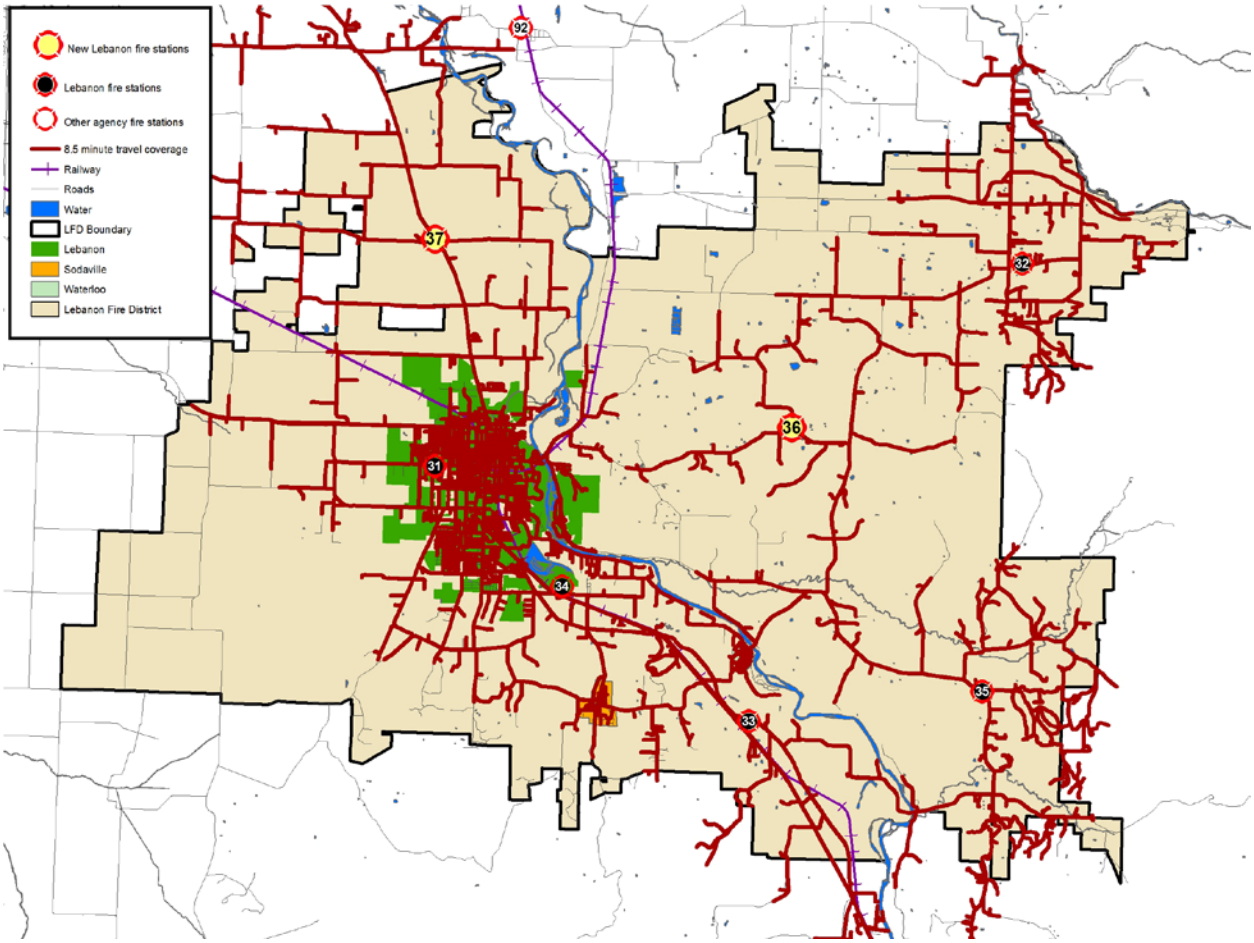
Adding fire stations was also modeled. The first new station was located at Mt. Hope Road and Golden Valley Road. This new station decreased the number of priority incidents that were beyond the travel time goal by 43 incidents, an average of 16 per year. The location and new travel time coverage is shown in the following figure.

Figure 110: One Additional Fire Station



A second new station was added at Spicer Road and Santiam Highway as shown in the following figure. This additional station decreased the number of priority incidents that were beyond the travel time goal by an additional 44 incidents, an average of 15 per year.

Figure 111: Two Additional Fire Stations



LFD will need to determine if constructing, equipping, and staffing one or two additional fire stations has sufficient value to justify its cost. There is little value for the delivery of the first due response unit to the system's overall workload. However, this would improve effective response force capability assuming a reliable response from each of the new stations.

Peak Activity Units

Staffing is typically a fire agency's single most expensive resource. Two significant factors that drive cost is the 24-hour nature of the demand for fire and EMS service and that for many typical urban fire departments firefighters typically travel in teams of three or four. (It is recognized that for LFD, engines are often staffed with a complement of two firefighters).

Staffing a unit 24 hours per day, 365 days a year with a team of three or four firefighters to maintain a full response capability drives up cost. The rationale for staffing and deploying in this manner is the seemingly unpredictable nature of emergencies. However, data analysis identifies predictable patterns where risk can be managed more efficiently.

Once a base emergency response capability is achieved throughout the 24-hour cycle, additional capacity can be gained with a more efficient, flexibly staffed and deployed model. This efficient and effective model includes resources which augment the traditional deployment of response resources. This flexible unit follows the observable trends in emergency calls for service (demand) which dictates to a significant degree the distribution of that flexible resource. Implementing this flexible unit reduces response times where demand is high.

These flexible resources are referred to as Peak Activity Units (PAUs) and they are deployed in a manner that mirrors the ebb and flow of emergency demand. A PAU has four major configuration variables: the unit itself, the crew make-up/size, the deployment purpose/philosophy, and deployment hours/geography.

In an innovative step, LFD has recently deployed, staffed jointly with the City of Albany, a PAU ambulance (Medic 71) in response to the large number of inter-facility transports that both agencies experience on a daily basis. The shared PAUs are typically staffed and deployed during the most statistically busy times of the day and week, which make the unit less costly and more flexibly deployed, both by time of day and geographically. ESCI commends the district for implementing this creative and effective shared initiative and encourages the district to expand on the concept

PAUs can be a fire engine (structural or brush) configuration, a medical rescue unit, or a multi-purpose squad vehicle. Regardless of the type of vehicle, what makes it unique is the way it is deployed and staffed. PAUs can be staffed with a medical crew if that is its primary purpose, with a fire suppression crew, or both. It can be deployed during wildland fire season with a wildland fire crew. Staffing can be obtained by hiring new personnel, by using callback crews on overtime, or converting a regularly assigned crew to a PAU. These concepts normally require bargaining the hours and working conditions under which the unit is staffed when a collective bargaining unit is affected.

PAUs are not only assigned as an additional resource based on statistically busy times and locations. They can also be used to manage gaps in coverage for units participating in training and can even be cooperatively staffed with a neighboring agency, as LFD is currently doing with Albany Fire. A PAU could be only occasionally staffed for activities such as a scheduled event or routinely staffed for periods of peak demand.

Adding PAUs as an adjunct to the base staffing patterns adds flexibility to emergency operations. The advantages of these units are that they typically reduce maintenance cost of the apparatus, may be less expensive to purchase and to operate, and are faster and more maneuverable. Also, the cost for staffing is approximately one-third to one-half the cost of staffing a traditional fire engine for 24 hours (depending on the staffing configuration of the PAU and its intended purpose), and can move from area to area to provide coverage, shedding the limitations of traditional fire station-based deployment.

For the purpose of illustration, we assume a PAU is staffed by two personnel to handle peak demand for EMS responses. The unit would be made available for response 10 hours per day, four days per week, although it can be placed into service in any one of numerous work period configurations. We also

assume the PAU is staffed with regularly assigned personnel who work a different schedule than the hours worked by shift firefighters. Medic 71's deployment is similar to this example.

Other possible configurations for staffing PAUs include but are not limited to:

- Staff a light rescue or type 6 engine (i.e., a brush fire unit) as a PAU with a firefighter/medic and a firefighter available 10 hours per day, seven days a week to focus on EMS responses and minor fires, reducing wear and tear on larger apparatus during busy hours of the week statistically.
- Staff a type I engine (a structure fire engine) as a PAU with a crew of two or three available for those hours when regular on-duty crews are participating in training activities that might take them out of service for some part of the day.
- Staff a medical rescue unit (an ambulance style vehicle or utility vehicle) as a PAU with two firefighters available 12 hours per day, four days a week. The staffed hours would reflect the time of the day when the greatest number of calls for service typically occurs. The unit shifts by time of day to the geographic areas that reflect statistically high demand for service. The fire station that serves that area becomes the base for the PAU during those hours. The unit shifts when demand shifts. Depending upon LFD's experience with Medic 71, an analysis of response and unit utilization may reveal the need for a more flexible deployment of that Medic or the best use of a future PAU, should funding become available for added staff.
- Staff a PAU of any type that addresses the PAUs primary mission with the appropriate complement of personnel needed eight hours per day, five days a week.

There are numerous key issues involved when considering the concept of operating a PAU. Discussions involving any changes to work schedules or working conditions for career personnel must be bargained with the appropriate firefighter union(s). The staff assigned to a PAU will also need to be included in ongoing training activities. The agency must clearly define roles and responsibilities of the personnel on PAUs, whether regularly assigned to a PAU or rotated onto a PAU as part of a system-wide cycle. ESCI recommends rotating personnel on the PAU to maintain the FLSA 7k exemption for hours of work and to maintain firefighting skills. The roles and responsibilities should be clearly communicated to all personnel and not limited to just those assigned to a PAU. In the event that a PAU is cooperatively staffed (partnership with a neighboring agency), the personnel on the PAUs must be cross-trained to understand the operational structures and expectations of each host agency. LFD is already experienced in this area and can use lessons learned when negotiating any future partnership.

Alternate Response Units

Alternative Response Units (ARUs) are a different model than the Peak Activity Units (PAUs), whose primary mission is responding flexibly to peak demand for emergency services. The Alternative Response Unit is focused on non-emergency, lower acuity emergency medical calls. Its purpose is to keep the primary fleet of emergency response vehicles and crews in service and available for the higher acuity, true emergency calls. Tualatin Valley Fire & Rescue (TVF&R) in Washington County, Oregon, implemented a 12-month pilot of this program in 2011; and the Spokane Fire Department (SFD) in Washington State implemented a six-month pilot of this program in 2013 and then extended it an additional 18 months. Both agencies have experienced positive results, with TVF&R permanently incorporating the units into its daily operation and SFD poised to adopt the model permanently.

The premise behind the unit is to reduce the expensive staffing and vehicle responses to likely non-life-threatening calls for service. The units are sport utility vehicles, staffed by one firefighter/paramedic in both SFD's and TVF&R's models. The units are dispatched according to a protocol used by the dispatch centers, which medically triages the calling party. In SFD's case, the communication specialists at the Spokane Combined Communication Center are trained to Emergency Medical Technician/Emergency Medical Dispatch (EMT/EMD) certification. In TVF&R's case, the communication specialists at Washington County Communications Center are not necessarily EMTs, but are trained to the EMD certification.

In both cases, the dispatcher triages and categorizes a patient over the phone using a series of questions following an EMD algorithm. The calls are placed into one of typically five categories: Alpha, Bravo, Charlie, Delta, and Echo responses. Alpha is lowest on the severity/acuity scale and is not a life-threatening call type. Echo is the highest severity/acuity and the most urgent, immediate life-threatening call type. ARUs respond to Alpha and Bravo calls routinely but may also respond to higher acuity calls if the unit happens to be closer than emergency response units to improve response time. It is important to note that both agencies recognize that a single paramedic in an ARU cannot effectively deal with a higher acuity call type alone, thus they focus on lower acuity call types. It is also important to note that since these calls are lower acuity, the response time is de-emphasized since the call is not a true emergency.

In TVF&R, the ARUs also respond to minor non-medical calls such as lockouts, smoke detector problems, fire alarms, and burning complaint investigations. The four TVF&R ARUs are deployed Tuesdays through Fridays 7:00 a.m. to 5:00 p.m. based on analysis of system demand of low acuity calls. They responded to 2,134 incidents in 12 months, which represented 7.2 percent of the agency's total call volume for that year.

Spokane's ARU pilot included three units deployed strategically within the SFD service area. Initially, they were deployed Tuesdays through Fridays from 8:00 a.m. to 6:00 p.m. using peak activity to drive deployment times. The deployment model was later modified to provide increased employee flexibility. In the six-month pilot, the units handled 1,193 incidents that would have been handled by an engine company, medic unit, or ladder truck.

A unique feature of the SFD ARUs is that assignment/recruitment of staff on these units emphasized paramedic assertiveness as a desirable trait, since the unit lends itself to "jumping" calls to provide a fast response, assessment, and potential cancellation of more traditional response units where the ARU is closer and available. In fact, each unit's call load was made up of at least 40 percent of calls that were "jumped" versus dispatched initially. In over 72 percent of the incidents responded to, the incident was handled alone by a single ARU. This compares favorably to the TVF&R experience of 70 percent. For Spokane, in over 29 percent of the calls where other units also responded, those additional units were cancelled, keeping them available for higher acuity calls which might occur simultaneously. In 204 incidents, the ARU requested additional units either while responding or once on scene. During an initial response by an ARU, a second simultaneous response was requested in the same area 370 times, improving those units' response time reliability.

The call types which were removed from traditional responses to the ARU for TVF&R include:

- Abdominal Pain
- Allergic Reaction
- Bleeding Problem
- Burn Complaint
- Confirm Death on Scene
- Diabetic
- Fall (less than 10 feet)
- Commercial Fire Alarm
- Residential Fire Alarm
- Headache
- Landing Zone
- Lockout
- Medical Alarm
- Mental/Emotional/Psychological
- Miscellaneous
- Odor Investigation
- Sick Person
- Smoke Detector Problem
- Smoke Investigation
- Traffic Accident Unknown Injury
- Trauma – Minor
- Wires Down

ESCI notes that the ARUs do not provide recognized credit through the Insurance Services Organization (ISO). Emergency medical services response capability is not evaluated by ISO since it is focused on property conservation and property risk. However, response time and unit reliability are improved by the use of ARUs; SFD states that, "…the public perception of the program has been overwhelmingly supportive and accepted throughout the community as simply, 'smart government.'"

ESCI does not have sufficient data to predict whether an ARU would be beneficial to LFD's specific situation; but because one of the district's challenges is to reduce the number of multiple calls at one time being experienced by each of its career stations (thus reducing unit reliability), a strategically deployed ARU might have a positive effect on station/unit reliability, reduce wear and tear on heavy apparatus, reduce incremental unit cost, and contribute to a positive public perception similar to what both SFD and TVF&R have experienced.

Frequent System Users

Most fire service agencies have known patients and facilities who routinely call multiple times for a response from the local fire department. While some of these patients are undoubtedly having acute medical challenges that require a response and assessment, many others have chronic illnesses that have become reliant upon first responders as their primary care provider. Still others are living alone but struggling to live independently, relying instead on first responders to address their routine challenges.

A smaller subset may be relying upon first responders for social needs or may have mental health challenges that cause them to call inappropriately for first responders.

In many cases, fire agencies also have significant call volume at single facilities, such as nursing homes and assisted living and mobility-impaired resident facilities. Many calls for service are legitimate medical emergencies for a variety of residents/patients, while some are lift-assists where a mobility-impaired residents fall from bed and need assistance getting back into bed. First responders in these cases perform a quick assessment of the latter group and place them back into bed. While this may seem to be an appropriate service to provide to the residents of such facilities, in many cases it is a liability shift and/or a staffing shift from a fee-for-service facility to the taxpayer-provided emergency responders. Further, it misuses critical emergency response resources to address decidedly non-emergent problems.

There are different approaches available to fire departments that experience the high frequency individual and the high frequency facility. These approaches are explained more fully in the two following subsections.

Responses to High Frequency Patients

A growing concept nationally is the Community Assistance Response (CARES) Program. The concept of this approach is to address the high frequency individual. CARES is intended to decrease 9-1-1 over-users or abusers, decrease on-scene time for engine companies for social service calls, decrease the level of frustration with front line crews, and at the same time provide a higher level of service to customers.

A CARES program is made up of student interns from local universities majoring in social work degree programs working together with the fire department. These students meet their academic practicum requirements by serving the CARES Team as student Interns. The combined team addresses the needs of vulnerable populations who have received a response from fire personnel and are identified as needing social service or other support system assistance. Generally, the citizen needs help that is available through existing social services programs, but the individual is either unaware of how to access them or is not able to access them through traditional means. In most cases, responders find these individuals feeling isolated or are in some type of crisis and do not know where to turn for help. Often, these citizens generate many 9-1-1 calls for assistance.

CARES Team members normally serve an entire school year (September through June) but may work through the summer as well. They undergo orientation and training that helps them to become knowledgeable about local community agencies, diversity issues, and mental health issues. Team members are also trained in crisis intervention and experience ride along time with fire department response units to experience firsthand the circumstances faced in the field.

CARES Team members work in collaboration with the fire department to assist vulnerable populations who face barriers in identifying and utilizing appropriate community resources. The CARES Team visits individuals in their home, works with them to identify their needs, advocates with them, and connects them to appropriate resources. CARES Team responsibilities include:

- In-home visits
- Client assessments
- Contacting and brokering with other social service agencies
- Advocating, brokering and empowering on behalf of the client
- Program development
- Internal and external marketing of the program
- Participate in local coalitions
- Grant writing

Without a CARES style program, a minimum of one and sometimes two LFD units arrive on scene and are unavailable for other calls while they assess and address the patient's needs. With a CARES program implemented, emergency demand is reduced and service is increased. Agencies which have successfully implemented a CARES type program include Mesa, Arizona, which developed the concept; Spokane, Washington; and Bellevue, Washington. In the latter case, Bellevue has reduced its frequent 9-1-1 user calls by 50 percent since starting the program in 2012. As a much smaller agency, LFD may not find such a program to be cost-effective; however, it already maintains a more traditional fire service internship program whose recipients may have or can be trained to develop skills that can be utilized for a modified version of the CARES program described above.

Responses to High Frequency Facilities

The first step in identifying whether a problem exists in responses to high frequency facilities is to define high frequency. As an agency, LFD must determine a reasonable number of separate responses in a given period of time that places a facility into the high frequency category. Such definitions can vary from a set number (e.g., greater than six responses in a given 30-day period) to benchmarking the frequency of responses to an LFD facility against comparable facilities in other jurisdictions (preferably with different ownership).

Once a "high frequency facility" is defined, the agency must then determine whether the problem is several individual facilities or all facilities in an entire industry (e.g., all nursing homes). If the problem is with individual facilities, there may not be a need to develop a system. Instead, direct assessment and intervention with those facilities may be all that is necessary. If the problem is an entire industry, a system must be developed.

If the industry is problematic, the next step is to develop an alternative to the current manner in which these mostly non-emergent calls are handled. Partnering with a private ambulance provider to handle these call types is one way to shift that demand to an agency that provides non-emergent services for a fee. Another approach is to develop a consortium consisting of all of the facilities in that industry. The purpose of the consortium is to acknowledge that the current system use is overly burdensome to the fire department and reduces its availability to respond to true life-threatening emergencies and that it is the responsibility of the industry to self-regulate. The consortium could agree to fund and staff an ARU to offset the negative impact to first response units in the system.

In LFD's instance, the issue is the growing health care provider in Lebanon and the surrounding area. Because this company has the option of developing its own privately funded option for inter-facility

transports and non-emergent assistance within its facilities, it is important that LFD understand the price limitations to any changes in the current system (in which LFD is the provider of all such transports originating within its Ambulance Service Area). Unless LFD decides that the loss of revenue from such services is less onerous than continuing to provide that service, it will not want to jeopardize its current good relationship with this community partner.

Community Risk Reduction

An emerging trend in the fire service nationally is a concept called Integrated Community Risk Reduction (CRR). CRR is an integrated approach to risk management that marries emergency operations and prevention strategies into a more cohesive approach to reducing risks in any community. It includes the fire department partnering with the community, non-profit organizations, and any private sector agencies with a nexus to an identified community risk.

The concept starts with the fire department mining data to quantify community risk. Once the community risks have been identified, they are prioritized based on frequency of emergency service demand or consequence (to the victim, to the community, to the local economy). Upon prioritizing the risks, strategies are developed to mitigate the risks. These strategies are incorporated into a CRR plan, which integrates resources across the fire department, partner agencies, and the community to implement the various strategies in a cohesive manner. After plan implementation, the results are reviewed to determine the impact on the risks. Adjustments are made as necessary based on the results and the process is refined and continuously re-implemented.

The risks are not limited to structure fires. They can include falls, drowning, interface exposure, disasters, or any risk requiring fire department response. Risk can also be localized by station area. Station staff, in collaboration with fire prevention staff and community groups, can develop and manage a station area-specific CRR plan as a subset of the fire department's plan. CRR lends itself well to a volunteer supported effort, led by competent professional leadership. CRR also includes public education for risk reduction. A prepared and informed community is a safer community.

In this case, LFD may be able to combine its fire prevention program with city or county emergency managers, leveraging the skills of each staff member for fire prevention, emergency management, and community risk reduction strategies. Even if such a partnership is not feasible, the emphasis for the district should be on training its citizens in prevention, preparedness, and self-help strategies. If the community members are better prepared, they will need to rely less on local government.

Conclusion

The ESCI project team began collecting information concerning the Lebanon Fire District in April 2016. The team members recognize this report contains a large amount of information and ESCI would like to thank LFD elected officials, administration, and staff members for their tireless efforts in bringing this project to fruition. ESCI would also like to thank the various individuals and external organizations for their input, opinions, and candid conversations throughout this process. It is ESCI's sincere hope the information contained in this report is used to its fullest extent and the emergency services provided to the citizens of Lebanon and the surrounding area will be improved by its implementation.

Appendix A: Table of Figures