Platte Valley Fire Protection District

Kersey, Colorado

FIRE DEPARTMENT MASTER PLAN

December 2018

Emergency Services Consulting International
Providing Expertise and Guidance that Enhances Community Safety
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ACKNOWLEDGEMENTS

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

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Also, ESCI would like to recognize other individuals from agencies external to the District. The Town of Kersey and the Weld County Sheriff's Office sacrificed time and provided much knowledge during our interviews. The insight of neighboring Fire Chiefs was also valuable to gathering a complete picture of the District; we appreciate their willingness to participate.

EXECUTIVE SUMMARY

Platte Valley Fire Protection District (PVFPD or District) serves 240 square miles of Weld County with a full spectrum of fire and emergency services. The District serves both an urban and suburban population density within the Town of Kersey, and the remainder of the service area is primarily rural density. When compared to other departments of similar populations, the service demand for the District is markedly higher. Emergency medical services constitutes nearly 60 percent of the service demand. The jurisdiction is primarily a rural agricultural area with a great deal of oil and gas activity. State Highway 34 bisects the District and provides the normal traffic related challenges with 17 percent of the overall responses related to motor vehicle accidents.

The District is a special district organized under Colorado State Statutes. It is governed by a five-member Board of Directors and is funded by property taxes. It has an Insurance Services Office (ISO) classification of 3 where there is a recognized water supply and within 5 road miles of the station located in the Town of Kersey. The response time performance for both the urban area and rural areas are better than suggested by the NFPA standard. While the response times are met, the ability to assemble an effective response force for fires in the urban areas or other involved incidents is not possible without mutual aid. The time for mutual aid to arrive exceeds the standard for developing the effective response force. The department experiences about 20 percent or more simultaneous calls for service which stretches the District resources further.

The District is well managed and demonstrates good leadership. The management and staff work to achieve a very professional operation. With few recommendations for improvement, the District is performing well. There is a strong working relationship with the Town of Kersey, the County Sheriff, and surrounding fire departments.

There are challenges that the District needs to attempt to solve. One is the financial dependence on oil and gas tax revenues. Due to the volatility of these revenues, the District needs to use caution in depending on these for general operations. Analyses of two different levels of declines in revenues are examined. Strategies for minimizing the dependence on the funds are presented.

There are two staffing challenges present to the District. One is having sufficient staffing for a moderate risk fire and the other is the ability to recruit and retain personnel. The staffing level is compared to national standard in the report. Staffing levels are difficult to meet due to the financial demands on the budget and there are suggestions to try to reach an acceptable level. ESCI presents some ideas for using the unique position of PVFPD in a rural environment close to urban areas to attract and retaining candidates.

The District faces challenges in providing EMS transport capability on a continuous basis. Solutions for EMS recruitment and training are discussed. Potential for the District to provide this service is presented as a possible solution.

The future service demand is predicted based on two assumptions for growth. At the minimum growth assumption, the calls will increase by 10 percent in 20 years; and at the higher rate of growth, the calls will be up 80 percent in 20 years. The percentage of population over 65 years within the District will increase nearly 93 percent in 10 years. This will impact EMS provision as the service demand of this group will be disproportionately higher than the rest of the population. EMS service demand will increase due to this impact and will become a larger portion of the total demand. Growth is likely to steadily increase as pressure from nearby urban centers will push residential growth into the District. Any future station locations will be determined by the area of growth but will likely be on the west side of the District first.

The District and surrounding fire departments share strong cooperation with one another. This cooperative attitude and respect can be the basis for future shared services or full consolidations. It is recommended that this be explored further for the possibilities of greater level of service or decreased overall cost.

This master plan study is the basis for future planning and monitoring growth patterns and response time performances. Additional planning should be developed beginning with a strategic planning process and an effective pre-incident planning process. Emergency operation plans with the County and Town need to be kept current.

A good EMS program can be improved with some changes to data collection and review, strengthening training, and a retrospective quality assurance program. Fire and life safety can be bolstered with company inspections, aligning fire codes with adopted building codes, and conducting a formal community risk assessment. A risk assessment can focus limited resources for the most effective use. Adding training resources and looking at sharing the training function regionally is recommended.

Overall, Platte Valley Fire Protection District is functioning well and is in an excellent position to prepare for future demand.

ORGANIZATION OVERVIEW

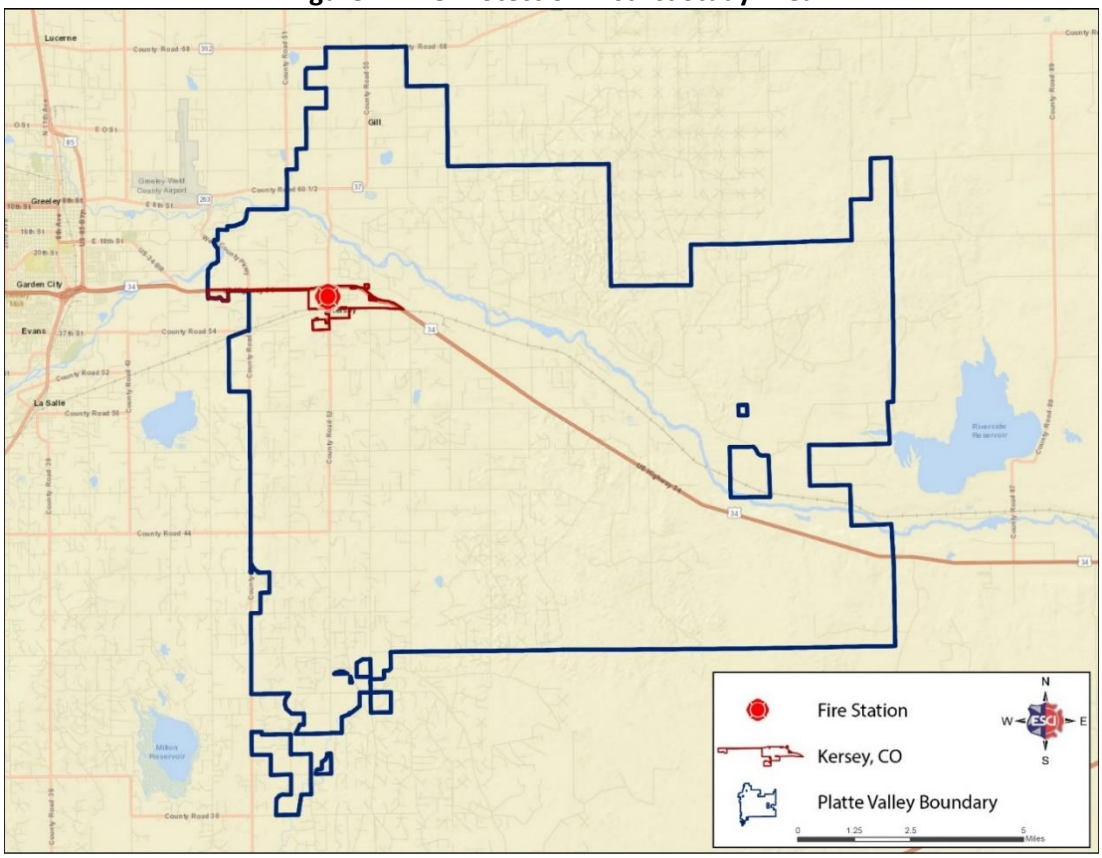
The Organizational Overview component provides a summary of the agency's composition, discussing its configuration and the services that it provides. ESCI combined data provided by Platte Valley Fire Protection District (PVFPD or District) management staff, as well as both internal and external stakeholders, with information collected during fieldwork to develop the following overview.

The purpose of this section is two-fold. First, it verifies the accuracy of baseline information along with ESCI's understanding of the District's composition. This provides the foundation from which the Master Plan is developed. Secondly, the overview serves as a reference for the reader who may not be fully familiar with the details of the District's operations. Where appropriate, ESCI includes recommended modifications to current observations based on industry standards and best practices.

The fire district was formed in 1956, but the earliest known fire protection to the area was 1909. The District's service area encompasses approximately 240 square miles of which the current population is approximately 4,406. The District is located in Weld County east of the City of Greeley. Colorado Highway 34 bisects the District from east to west and County Road 49 (WCR 49) forms the western edge of the District.

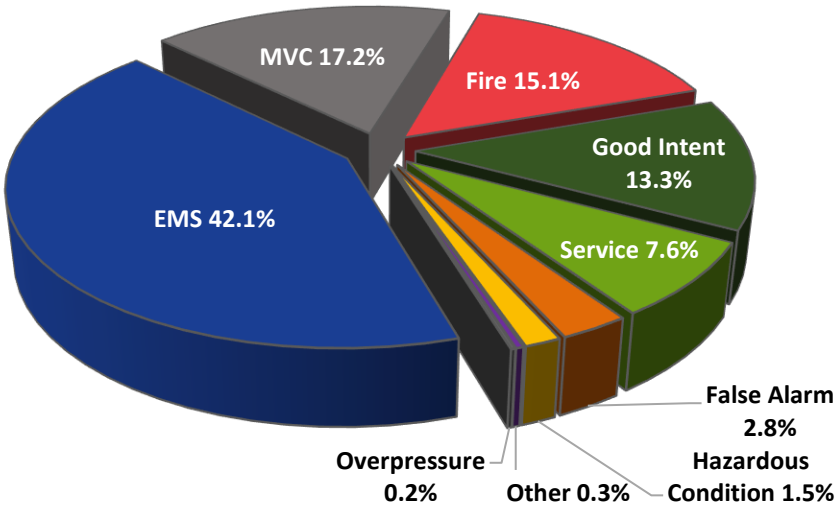
The following figure reflects the study area.

Figure 1: Fire Protection District Study Area



PVPFD service demand shown in the next figure is based on the type of calls reported by the agency during the years of 2015–2017.

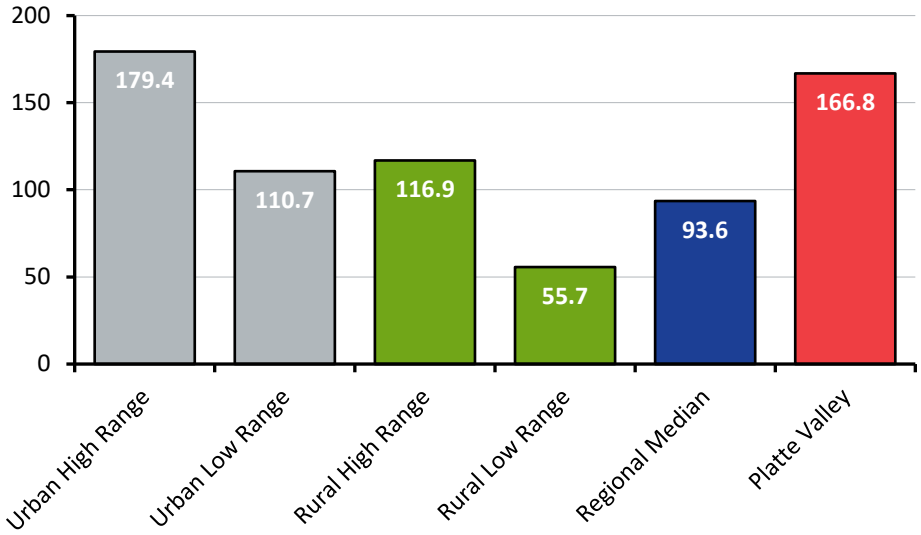
Figure 2: Service Demand by NFIRS Incident Type, 2017



The percentages of calls are typical for a fire agency. Total emergency medical calls comprise both the EMS (Emergency Medical Service) and MVC (Motor Vehicle Collisions), or 59.3 percent. This is on the lower end of the typical fire agency EMS response which can range into 70–80 percent of total calls. Total fires are in range of what is typically seen in fire agencies. Good intent calls are those in which someone reports what they believe to be an emergency situation but turns out to not to be. Calls for service are requests for some type of help from the fire department, but that do not fall into other response categories.

A comparison of PVFPD service demand to other similar-sized departments is shown in the next figure. The figure shows the calls for service per 1,000 population. The upper and lower ranges for both urban and rural areas are compared to PVFPD. It also shows the District compared against other departments within the western region. This data is derived from the National Fire Protection Association statistics. Benchmark data available through National Fire Protection Association (NFPA) is based primarily on population and does not consider geographical size or population density of the particular area.

Figure 3: Calls for Service per 1,000 Population Comparison[1]



Comparison data should be used with caution, but it is instructive to have an idea of how a community of this population would compare on various parameters. In this case, PVFPD has a larger service demand than nationwide rural departments of similar size. The service demand is within the range of an urban comparison city. It also has more demand than a similar department in the western region of the United States.

Governance

The 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 PVFPD, those policies lie within the service plan and other governing documents adopted by the agency.

The agency is formally identified as the Platte Valley Fire Protection District (PVFPD). The agency is organized and titled as a *Fire Protection District*, established under Colorado Revised Statute, Title 32, as a Special District. The District was organized under a service plan submitted in 1984 and a Statement of Purpose which was recorded with the County in January 2015. The District is operating within the statutory functions that it is authorized to provide.

[1] National Fire Protection Association, 2016 NFPA Fire Department Profile Report. 1 Batterymarch Park, Quincy, Massachusetts, USA.

Board of Directors

The PVFPD governance configuration is typical of Colorado fire districts, operating under the direction of a five-member Board of Directors (BOD or Board). The Board hires the Fire Chief, who is charged with managing the day-to-day operation of the District. The Board is responsible to set policies relating to guidance of the CEO or Fire Chief. They are ultimately responsible for the fiscal aspects and effectiveness of the District's operation. The Board retains legal counsel and the attorney is made available to the Fire Chief as necessary. Board minutes are kept by the Executive Assistant and are available for public review. ESCI recommends posting the minutes on the District website for easy accessibility for the community.

Board Governance Documents

ESCI found that the District possesses a Statement of Purpose and Board of Director Bylaws. Those documents are appropriate and necessary to effective governance of the District. None of the foundational documents are subject to regularly scheduled examination and revision. Because they lay the foundation upon which the fire District operates, it is essential that those fundamental documents be current.

Fire Chief Position

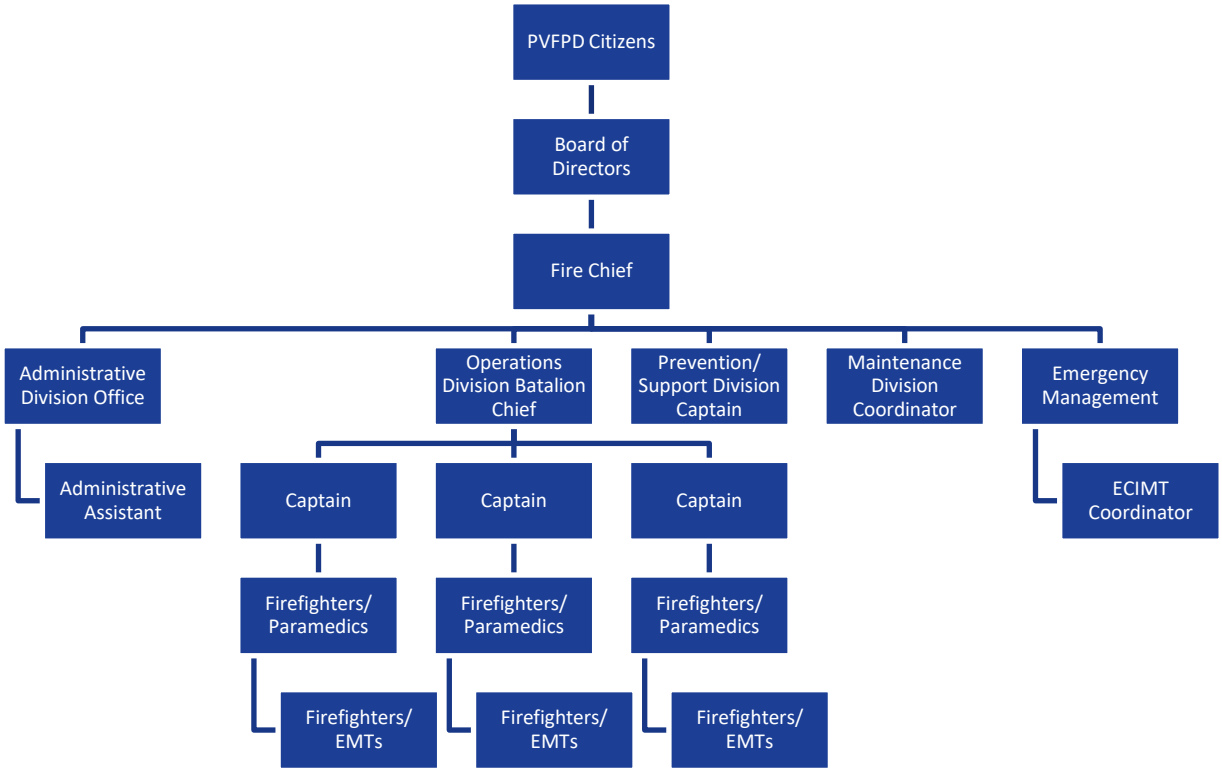
Like most fire protection districts, PVFPD employs a Fire Chief to act as the chief executive officer of the District. The chief is hired under an employment contract which renewed in June 2018. The Fire Chief's roles and responsibilities are defined under the job description. The chief's job performance is informally reviewed by the Board annually. The chief has been delegated the responsibility to hire and terminate employees.

The responsibilities of the Fire Chief are varied, and they encompass both Board-designated and state statute requirements. Currently, the Fire Chief is managing within the maximum span of command that ESCI recommends.

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. PVFPD is organized as a relatively typical fire department hierarchy. The following figure displays the organizational chart as the District currently operates.

Figure 4: Organizational Chart



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, most importantly, limits opportunities to circumvent the reporting structure.

Span of control is also visualized in an organizational chart. At PVFPD, the Fire Chief is indicated to have five direct reports. ESCI considers six as the maximum desired number of direct reports.

During an emergency, an individual's ability to supervise multiple personnel is reduced, thus 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. Larger incidents with callback or mutual aid resources will require division of responsibilities based on the Incident Command System.

Service Area and Infrastructure

The size and composition of a fire district's service area affects the type and number of personnel, fire stations, and vehicles that are needed to provide services efficiently. Sometimes complex decisions need to be made regarding deployment strategies to properly position resources based on land area, geography, risk, cost, and similar factors. The District staffs one fire station (Station 1). ESCI will provide a detailed assessment of current service delivery and effectiveness in both the Staffing and Service Delivery and Performance sections of this report.

The District serves an area of 240 square miles from one fire station. Station 1 is staffed with personnel on a full-time basis. The agency has two structural engines, one Type 3 engine, and two Type 6 engines for wildland fires. The engines are staffed with a paramedic or ALS (Advanced Life Support) level. On two of the three shifts, the paramedics will staff the ambulance and respond with it to EMS emergencies. This transport capability is provided by an agreement with Banner Health. All three shifts provide ALS response, but only two have the immediate ability to transport. This will be discussed further in the Staffing and EMS sections. PVFPD has two members on the Regional Hazardous Material Team.

Insurance Services Office (ISO) is a body that evaluates communities for fire protection capabilities. Many insurance companies use ISO information to determine the rates that they will charge their subscribers. The evaluation focuses on three primary areas: fire department (50%), water supply (40%), and alarm handling (10%). Under the new evaluation framework, additional credit of 5.5 points can be obtained for Community Risk Reduction efforts. ISO classifies communities on a 1 to 10 scale. Class 10 is considered no protection. PVFPD provides an ISO rating of 3 throughout the District where there is water supply available and the structure is within five miles of a fire station. Structures beyond five miles are considered a classification 10.

RECOMMENDATIONS

- Post minutes on fire department website.
- Periodically review the district's foundational documents for currency.

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, a qualified work force, maintenance of personnel competencies, adequacy of emergency response, and financial sustainability for the future. In this section, the components of management will be discussed, however, it must be noted that good management alone will not guarantee a successful and effective organization.

Warren Bennis, in defining the difference between leadership and management made this observation, "Managers are people who do things right; leaders are people who do the right thing." Both leadership and management are critical for the effective operation of a fire department. It is important to do things right and to do the right things. Having effective management ensures the procedures and appropriate functions are in place to operate successfully. Leadership is the skill to know how to implement these procedures and functions as they interface with people.

During interviews with both internal and external stakeholders, we heard about the leadership at PVFPD. Internally, there is an emphasis on allowing everyone in the organization to be able to voice their opinion. Each member is valued for his or her thoughts and contributions to the successful operation of the District. Externally, it was referenced as a factor for the District's success and how the District interacts with other agencies. ESCI believes not only good management but good leadership exists in the department.

Foundational Management Elements

The development of baseline management components in an organization enables it to move forward in an organized and effective manner. In the absence of foundational management elements, the organization will tend to operate in a random and generally ineffective manner. PVFPD has the foundational management elements: a mission statement, a vision statement in form of goals and objectives, and a values statement in the form of their RULE statement.

Mission Statement

The mission statement should tell why the department exists and perhaps how the mission will be executed. PVFPD's mission is:

> *To make a difference every day to improve the community while protecting life and property within the Platte Valley Fire Protection District.*

This mission statement has a community focus and how the District can improve it while it performs the protection of life and property. The mission is reflective of the attitude and culture of the organization, and it does not limit the District to only the life and property safety functions in improving the community.

Vision Statement

Rather than a vision statement, the District has created goals and objectives for the department to describe the desired way to operate.

Department Goals and Objectives:

To provide superior customer service
Objective 1: Treat everyone like they are family
Objective 2: Actively seek feedback at every opportunity
Objective 3: Continue to improve services to achieve a lower ISO rating

Actively progress the department through training
Objective 1: Provide staff with current and progressive training
Objective 2: Maintain certification levels
Objective 3: Actively seek advanced training

Be involved in the community
Objective 1: Create departmental projects that appeals to all age groups in our community
Objective 2: Enhance visibility by building relationships within the community

Provide mutual aid regionally
Objective 1: Actively seek and maintain auto and mutual aid agreements
Objective 2: Actively seek and maintain interdepartmental training
Objective 3: Actively support interdepartmental functions

All members of staff are held accountable for attitude, job, and professionalism
Objective 1: Maintain positive and encouraging attitude
Objective 2: Routinely evaluate competency
Objective 3: Maintain professionalism

Always be prepared for any situation that arises
Objective 1: Maintain a constant state of personal readiness
Objective 2: Maintain personnel levels to respond to any incident
Objective 3: Ensure current and future equipment is adequate

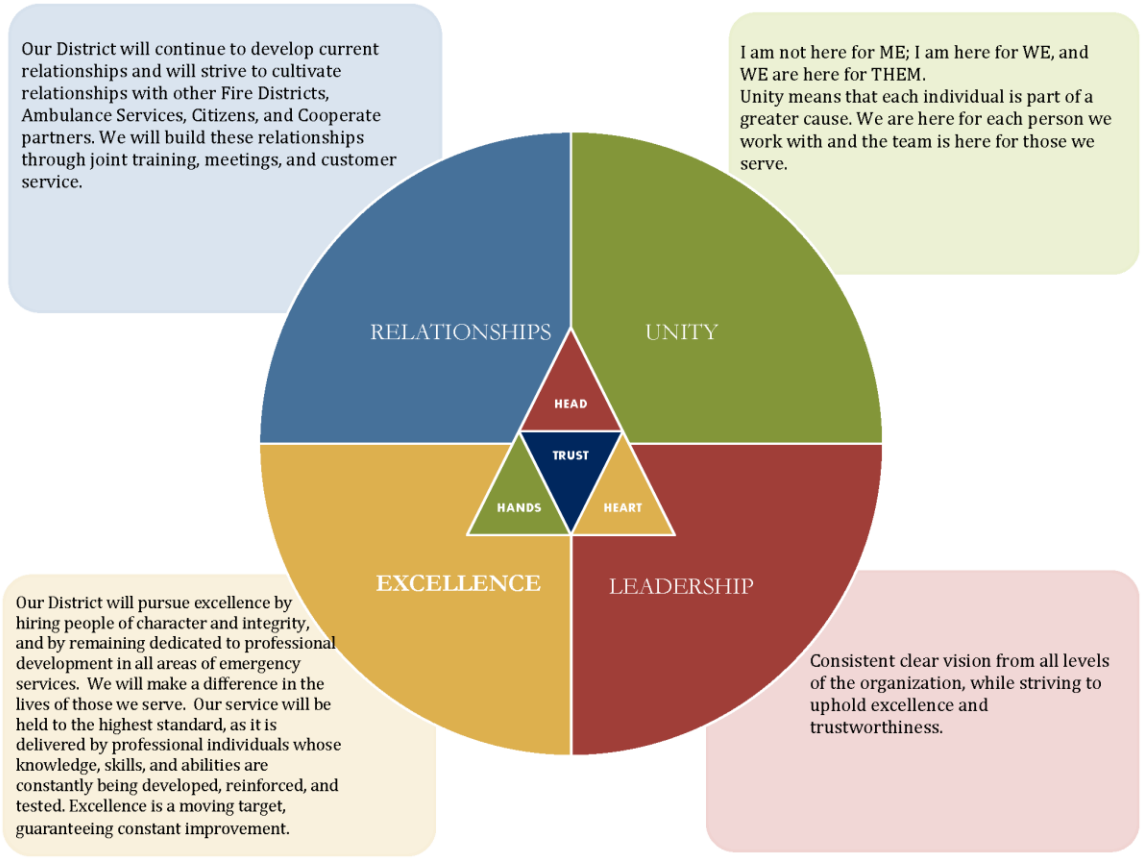
Typically, the vision statement is a declaration of what the organization wants to become in the future. It is not always reachable within the resources and abilities that are available today. The goals and objectives produce the same end. It recognizes that the department is not necessarily where the members would like it to be, but sets goals that are reachable by accomplishing the objectives.

Values Statement

The values of the organization were reached through a consensus process that engendered sometimes high emotions in the discussion to arrive at the four values. This is the perfect process to engage everyone at a deep level and allow the sharing of concerns and misgivings. Surfacing these concerns allows the group to reach the core values on which everyone can agree. The resulting values should be those that the organization can live by and be governed by in the future. In the following figure the "RULE" is expanded showing what each value means to the organization.

- Relationships
- Unity
- Leadership
- Excellence

Figure 5: RULE—PVFPD Values



The District exceeds the minimal requirements of foundational documentation with its current foundational documents.

Management Documents and Processes

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 communication within the District, as well as with its constituents.

Regulatory documents consist of policies and procedures, employee handbooks, and standard operating procedures or guidelines. These documents may be called different things and may be divided up differently in different departments. PVFPD has a Policy Manual and a Procedures Manual to fulfill these roles. Both manuals are reviewed and checked for legal compliance by Lexipol. This is a good way to assure compliance with new laws that may impact the District's policy or implementation of a policy. The manuals should routinely be reviewed to assure that policies and procedures are current.

Internal and External Communications

Communication within the organization and to the external world are both very important. The following discussion describes internal and external communications in the District.

Internal Communications

There are multiple avenues of communication within the District. The formal chain of command is structured to facilitate information transfer. Staff meetings are scheduled regularly, and bi-annually there are all-member meetings to keep everyone apprised of where the District is headed. Emails and memos are used to disseminate information to all personnel as well. Likewise, the chief has an open-door policy for informal conversations with personnel.

External Communications

Communications with citizens outside of the District are accomplished in several ways. The District's website and Facebook page are used to communicate with the public. The District uses several forms of social media to stay connected with the community. It appears that social media platforms and the District website are kept up to date. Community advisory committees and community surveys are not used at this time.

Record Keeping and Documentation

In any organization, documentation of activities is critical for legal and operational reasons. PVFPD does a good job collecting information regarding incidents and other activities. The District uses Emergency Reporting Systems (ERS) as their records management system. Computer files are password protected. Personnel records are kept in locked and secured files. Personnel exposure occurrences are documented and stored in the personnel files. Records for hose testing, gas monitors, and vehicle maintenance are completed internally. Pump testing, SCBA maintenance and testing, breathing air testing, and ladder testing are all done by outside vendors and these records are also maintained.

Reports are generated for the Board of Directors for finance, management, and operational areas of the district monthly. Annual reports are not generated each year but data on operations is analyzed monthly.

Security

District facilities and department vehicles are locked by key. Computers are protected by passwords. Assets are tracked in the ERS system but there is no periodic inventory to account for the location of the assets.

FINANCIAL MANAGEMENT ANALYSIS

Considerable financial information and background data was provided to ESCI by staff of the PVFPD, which was reviewed in detail along with various Annual Audited Financial Reports and annual budgets. This data enabled ESCI to develop the following discussion, providing key stakeholders with historical, current, and future viewpoints of PVFPD's financial picture.

Current Conditions

The District operates on a modified accrual basis for the General Fund. The District has two outstanding leases for a fire station and a custom pumper and heavy rescue in the amount of $ 8,524,000 at December 31, 2017.

PVFPD operates on a calendar year basis. PVFPD had $692,283,240 of taxable assessed value for the 2018 budget year. A mill levy of 5.171 was charged on this taxable value resulting in revenue of $3,579,797 for the 2018 budget. The total budgeted revenue for 2018 is $3,794,797. Expenditures are budgeted at $3,676,836 increasing the fund balance by $117,961.

The preliminary assessed values are received from the County in late August. The budget is prepared by the Chief and Office Manager and presented to the Board in early November. The budget is reviewed by the Board and staff; and in early December, the final assessed values are received from the County and the Board approves the final budget and the certification of mill levies is presented to the County.

Local Economic Profile

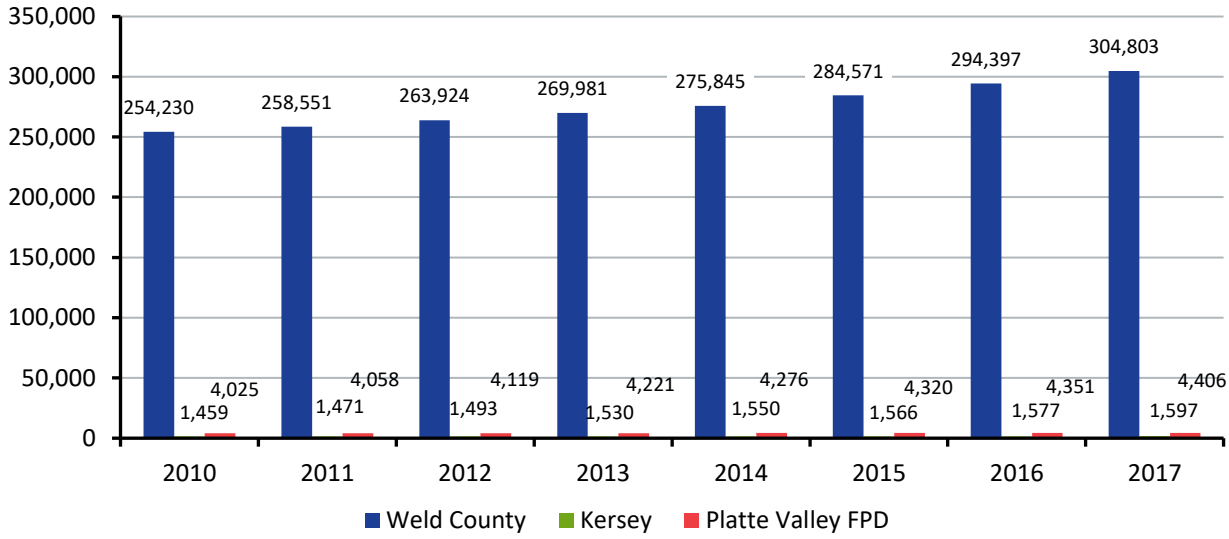
The local economy in Weld County is growing by double digit percentages. Oil and gas are booming and Weld County production for 2017 through November was 105 million barrels. The highest production for Weld County of 109 million barrels occurred in 2015 at the worst of the downturn. The U.S. Energy Information Administration (EIA) stated that they expected production across the County to average 10.3 million barrels a day in 2018.

Population

The population in Weld County increased a little over fifteen percent since 2010. The 2017 population of Weld County was projected to be 304,803 per data from the Colorado Division of Local Government, State Demography Office, November 2014. The population of Kersey, which is completely within the District, was 1,574 in 2016 per the State Demography Office. The estimated population for the District is 4,406.

The following figure shows the population growth for the County, Kersey, and the Platte Valley FPD over the last 7 years. The District is a small portion of Weld County population and area.

Figure 6: Population Trends

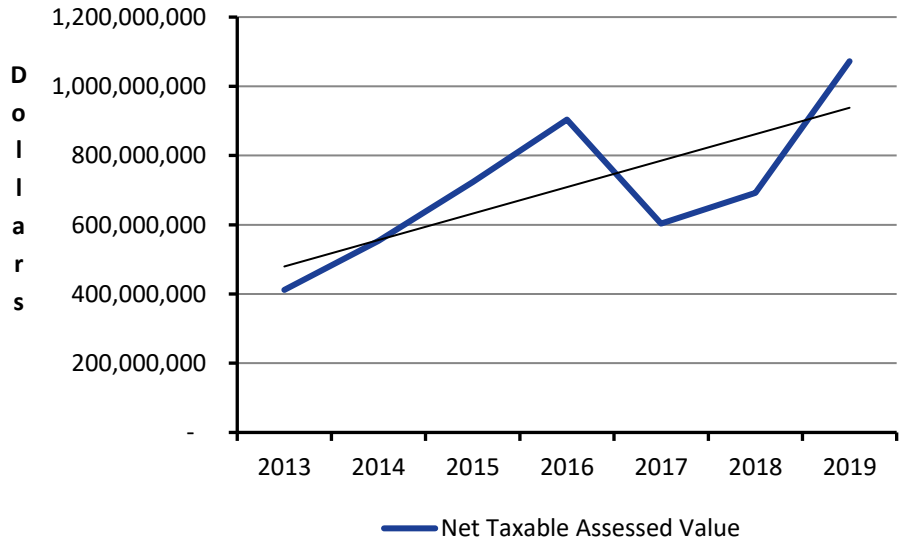


Housing and Property Values

The average price of a home in Weld County was $242,742 in 2018. The increase in actual residential property values in the metro area has been 4 percent monthly. There has been some leveling in the last month or so. The change in residential actual values for PVFPD which includes new construction has averaged 9 percent annually since 2013.

The *Total Assessed Value (TAV)* figures display certified total assessed property values for PVFPD from 2013 to 2018, with the 2019 preliminary numbers from the County. The change in total assessed values from 2013 to 2019 is 160.437 percent of which oil and gas is 155.834 percent. The following figure shows the Total Taxable Assessed Values for PVFPD.

Figure 7: Taxable Assessed Value for PVFPD with Trendline



In Colorado, properties are re-evaluated and reassessed every two years. The latest values were evaluated as of June 30, 2016. Those values will be used in the estimations and assessments for the years 2018 and 2019. Colorado's governing law for residential assessment is located in the Colorado Constitution.

The Gallagher amendment, passed by voters in 1982, states that Colorado residential properties will contribute 45 percent of the total property tax revenue of the state. Commercial properties contribute 55 percent. Commercial properties are always assessed at 29 percent of the current fair market value.

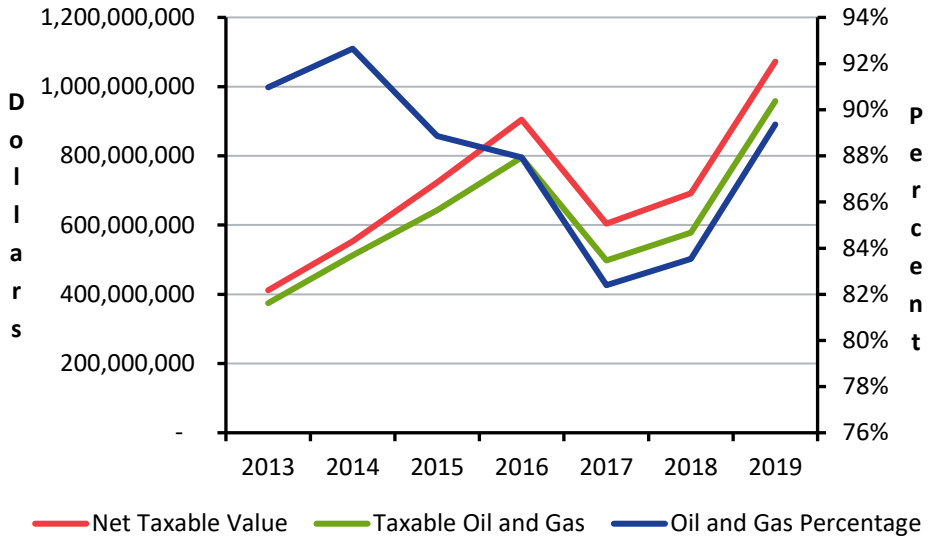
In 1992 Colorado voters also passed the Colorado Taxpayer Bill of Rights, also known as the TABOR amendment. That amendment prohibits tax increases without a vote of the people living or owning property within a specific jurisdiction. Currently, when the residential assessment rate needs to go down, the state property tax administrator—along with the State Board of Equalization—makes the adjustment without a vote of the people. Conversely, if the residential assessment needs to go up, then a vote of Colorado taxpayers is required.

Colorado's residential assessment rate has not been adjusted since 2003 when it was lowered to 7.96 percent of the assessed value of the property. In 2017, the residential assessment rate was lowered to 7.2 percent. Between 2013 and 2017, some two-year periods required an upward adjustment on the residential assessment rate. Those rate increases did not occur, so the 2017 assessment rate adjustment is the first one in over a decade. The difference between 7.96 percent and 7.2 percent is slightly over a 10 percent decrease in taxable assessment. The preliminary estimate for the 2020 year for the residential assessment rate is 6.11 percent. The difference between the 7.20 percent and the 6.11 percent is slightly over a 15 percent decrease in the taxable assessment.

Colorado's fire protection districts are dependent on property taxes. PVFPD is no different. The percent of PVFPD assessed value that is residential ranges from 3.8 percent in 2013, to a low of 2.05 percent in 2016. The amount of assessed value due to residential property taxes is 2.1 percent in 2019. The effect of the reduction in the ratio for residential property from 7.20 to 6.11 percent is projected to be $121,384 over the next 5 years.

The problem that PVFPD has is the amount of assessed value that is from oil and gas. The value of oil and gas property is valued at 87.5 percent of the selling price of the oil or gas sold from each wellhead, after excluding the selling price of all oil and gas delivered to the United States government or any agency thereof, the state of Colorado or any agency thereof, or any political subdivision of the state as royalty during the preceding calendar year. The following figure shows the percentage of oil and gas taxable assessed value to the total taxable assessed value for PVFPD.

Figure 8: Taxable Oil and Gas Assessed Value as Compared to Total Taxable Assessed Value for PVPFD



As can be seen, the taxable oil and gas is as high as 92.6 percent of the total assessed value for PVPFD. There can also be large swings in the assessed values due to changes in production and the price of a barrel of oil.

Revenues

An analysis of departmental historical revenues and expenses for the District was completed to help identify relevant financial trends, strengths and weaknesses, and to lay the groundwork for the financial scenarios presented later in this section of the report.

The historical analysis helps illustrate how the District funds its services—where the money comes from and where it goes. Historical budget data for the District was provided by staff and was supplemented with a review of past audits and historical budget records. The historical analysis should provide administration and elected officials with a solid basis upon which to evaluate recommendations and develop sustainable future policy.

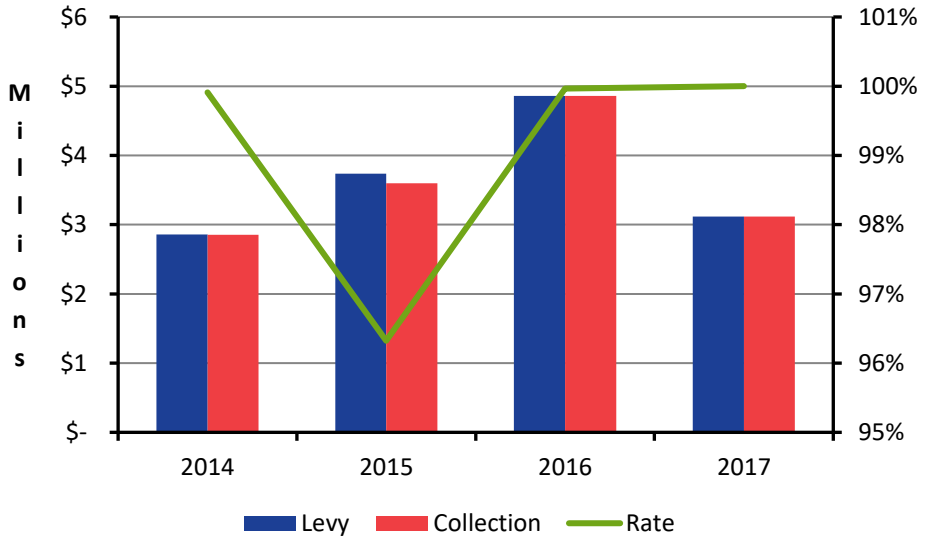
The following figure is a tabular short version of the financial resources of the general fund. The line item types include property taxes, specific ownership taxes, wildland, misc. revenue, interest, sale of assets, and proceeds from financing.

Figure 9: Platte Valley Fire Protection District, Fiscal Years 2013 to 2018

Financial Resources By Type	2013 Actual	2014 Actual	2015 Actual	2016 Actual	2017 Est.	2018 Budget
AV	411,759,970	533,368,547	723,564,830	904,149,890	603,766,050	692,283,240
Levied $	2,126,740	2,754,849	3,737,212	4,669,934	3,118,452	3,579,797
Collection Rate	99.980%	103.657%	96.323%	104.059%	100.001%	100.000%
Mill Rate	5.165	5.165	5.165	5.165	5.165	5.171
Beginning Reserve Balance General Fund	3,672,018	3,164,969	3,508,473	4,629,362	6,510,675	7,104,834
Property Taxes	2,126,317	2,855,603	3,599,797	4,859,495	3,118,481	3,579,797
Specific Ownership Tax	144,108	240,627	249,326	302,620	205,174	200,000
Wildland Revenues				145,766	218,845	
Miscellaneous	31,264	185,152	45,231	41,967	47,122	
Interest	18,895	11,226	14,976	15,954	16,708	15,000
Sale of Assets	372,618					
Proceeds from Debt Financing		1,040,000				
Total General Fund Revenue	**2,693,202**	**4,332,608**	**3,909,330**	**5,365,802**	**3,606,330**	**3,794,797**

The following figure graphically compares actual property taxes versus levied taxes and the collection rate for the District. As displayed, there was only one year (2015) where the collection rate was significantly below 100 percent. The variations are mainly due to assessor adjustments. Oil and gas revenues also took a significant downturn in 2015.

Figure 10: General Fund Property Tax Collection, Levied Amount and Collection Rate, 2014–2017

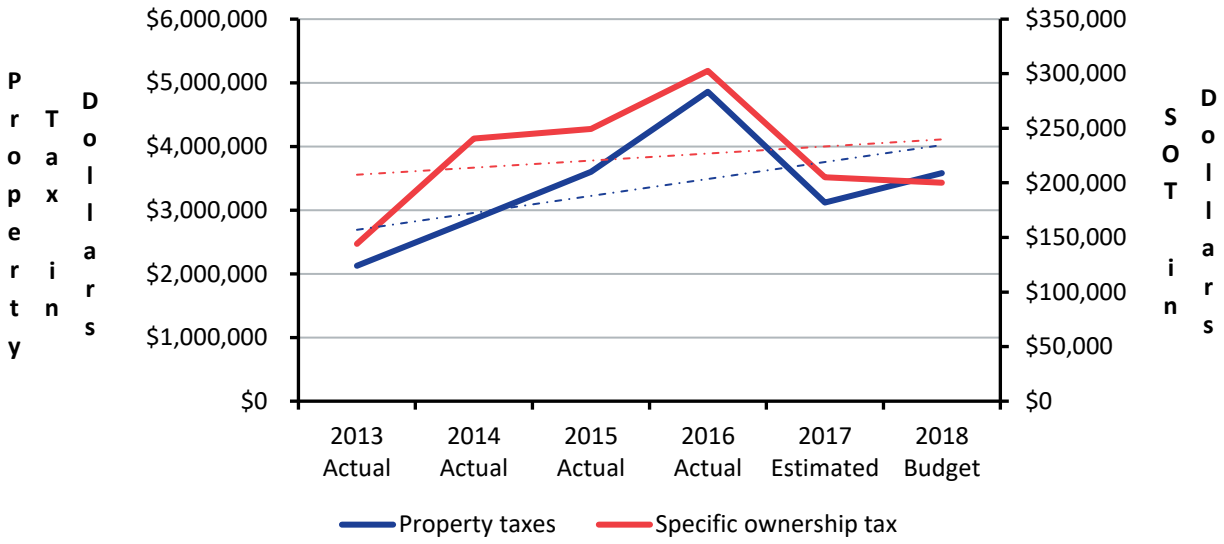


As shown, the District levied approximately $1.6 million more in 2016 than in 2017. This is due to a decrease in assessed value from 2016 to 2017, and 2018 was still lower than the 2016 level. The assessed values have recovered to above 2016 levels with the 2019 preliminary assessment.

Property and Specific Ownership Taxes. Property and specific ownership taxes comprise anywhere from 71 to 99 percent of the District's 2013–2018 budgets. The District has experienced an overall increase in property tax revenues since 2013, mostly from industrial and oil and gas property assessments. From 2013 to 2018, the District realized a $1.5 million increase (or 68% change) in property tax revenues; while Specific Ownership taxes increased $61,066 from 2013 to 2017 (42% change).

The following figure shows (graphically) increases along with the linear trend lines.

Figure 11: Property and Specific Ownership Taxes, 2013–2018



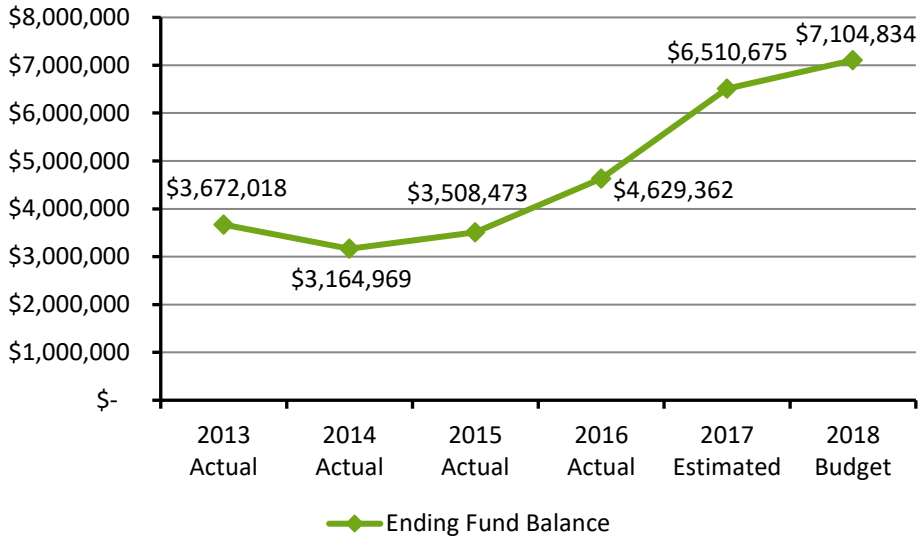
Wildland Revenues. Wildland revenues comprises anywhere from 0 to 6 percent of the District's 2013–2017 actual revenues. Wildland revenues have been very volatile as they range from nothing to $218,845 over the last 5 years.

Misc., Interest, and Sale of Assets. Combined, these comprise anywhere from 1 to 15 percent of the District's 2013–2017 budgets, and is $15,000 of the 2018 budget.

Sources for Capital. At this time the District does not have a separate Capital Reserve Fund or a Debt Service Fund for the two leases which are outstanding. These items are paid out of the general operating funds. ESCI believes this could be a weakness of the District due to the volatility of the oil and gas assessed values.

One last financial resource available to the District is the beginning fund balance. The following figure shows the beginning fund balances for 2013 to 2018.

Figure 12: Beginning General Fund Balance, 2013–2018



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Between FY 2013 and FY 2018, beginning fund balance increased $3,432,816 (93 percent change). With the volatility of the oil and gas assessed values and the District's high percentage of revenue from this source of revenue, planning for the future needs to include a look at this volatility and its effect on fund balance and revenues.

Expenditures

All of the District's expenditures are budgeted in the general fund. This includes operating, capital, and debt service expenditures. The following figure shows, in tabular format, the respective expenses for FY 2013 through FY 2018.

Figure 13: Platte Valley Fire Protection District Expenditures, 2013–2018

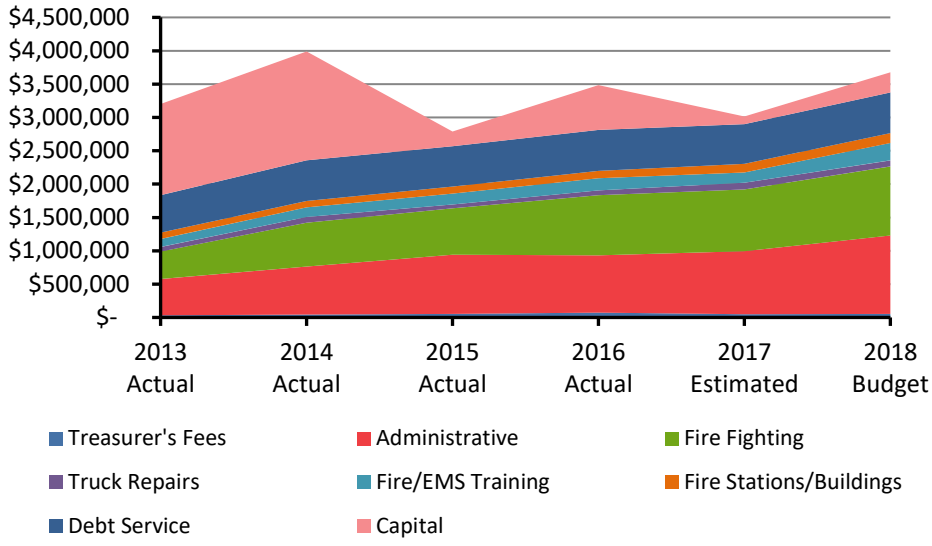
Financial Expenditures By Category	2013 Actual	2014 Actual	2015 Actual	2016 Actual	2017 Est.	2018 Budget
Treasurers Fees	31,843	42,842	54,029	72,952	46,789	55,000
Total Administrative	545,208	718,245	886,774	860,125	947,385	1,174,604
Total Firefighting	410,633	660,363	694,972	899,681	927,131	1,034,903
Total Fire Apparatus/Truck Repair	70,406	84,913	60,456	70,990	98,417	90,000
Total Fire and EMS Training	118,995	145,693	160,024	185,942	153,913	262,529
Total Fire Station and Buildings	94,935	92,775	104,741	110,312	127,990	148,500
Total Operating Expenditures	1,272,020	1,744,831	1,960,996	2,200,002	2,301,625	2,765,536
Lease Interest	402,532	393,517	389,818	385,990	372,746	380,000
Lease Principal	110,000	110,000	115,000	115,000	120,000	125,000
Brush Three Truck Lease	49,632					
Note Payable		109,413	104,335	114,000	104,000	104,000
Total Debt Service	562,164	612,930	609,153	614,990	596,746	609,000
Total Capital Expenditures	1,366,067	1,631,343	218,292	669,497	113,800	302,300
Grand Total Expenditures	3,200,251	3,989,104	2,788,441	3,484,489	3,012,171	3,676,836
Revenues	**2,693,202**	**4,332,608**	**3,909,330**	**5,365,802**	**3,606,330**	**3,794,797**
Ending Fund Balance	**3,164,969**	**3,508,473**	**4,629,362**	**6,510,675**	**7,104,834**	**7,222,795**

The previous figure shows total expenditures for PVFPD from 2013 through 2018.

- The total expenditures increased $476,585 from 2013 to 2018, an increase of 13 percent.
- The fund balance increased $4,057,826 from 2013 to 2018, an increase of 128 percent.

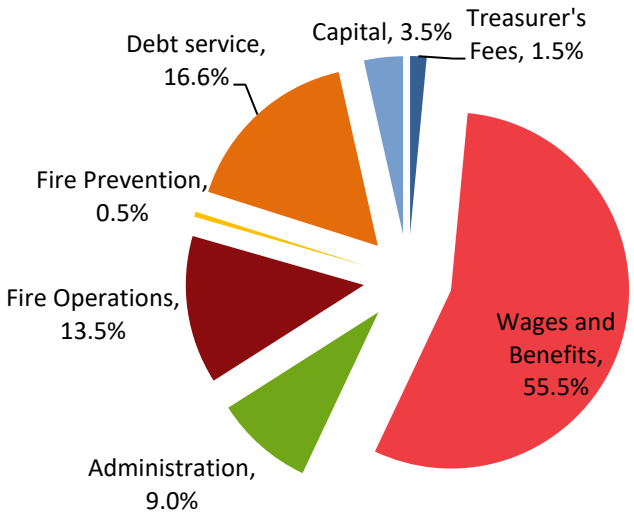
The following figure graphically displays all of the expenditures of the District for the entire period. The bulk of the District cost each year is for firefighting, truck repairs, and fire/EMS training. This is the green, purple, and medium blue area. Debt service is relative stable for the two lease purchases. The capital expenditures vary widely. In 2014, an engine and heavy rescue was purchased by a lease/purchase with the Poudre Valley Rural Electric Association. Capital purchases include uniforms, bunker gear, equipment, vehicles, and buildings.

Figure 14: General Fund Expenditures By Type



The next figure breaks down the major areas of total District expenditures, as budgeted for FY 2018, and shows percentage for each major category of expense. Clearly, at almost 55.5 percent, personnel services are the largest cost to the District. This is low for mostly career-staffed fire districts around the country. Generally, the number is in the 70 to the 80 percent range.

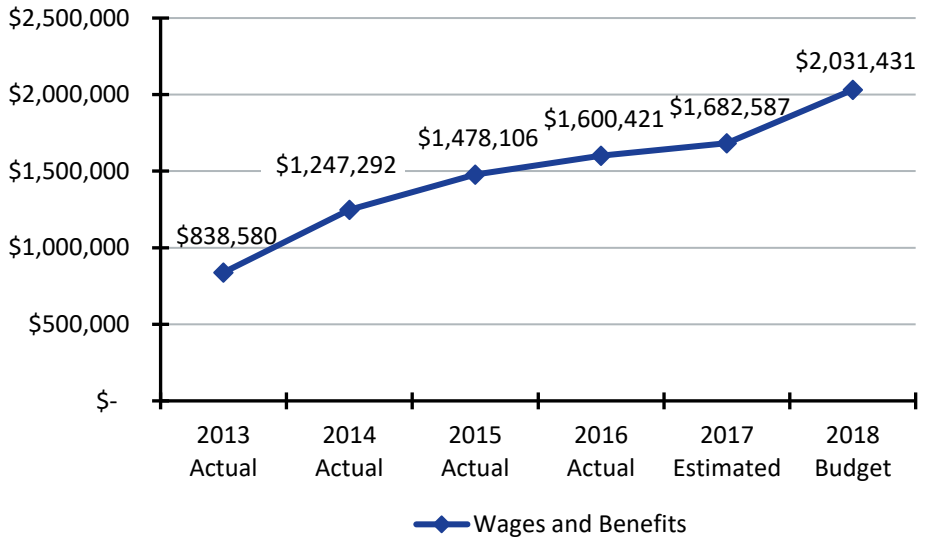
Figure 15: General Fund Budgeted Expenditures, 2018



Wages and Benefits

Wages and benefits comprise the largest portion of the budget for most fire districts. The wages and benefits vary from 26 to 56 percent from 2013 to 2018, depending on the number of capital projects each year. The percentage of wages and benefits to the rest of the budget has increased as the District has transitioned from volunteers and part-time paid to career firefighters. Like many districts of comparison, PVFPD has experienced an increase in wages and benefits (personnel services) of about 142 percent from 2013 to 2018. The majority of this increase is for bringing the apparatus up to full staffing by additions to staff and increases in benefit costs.

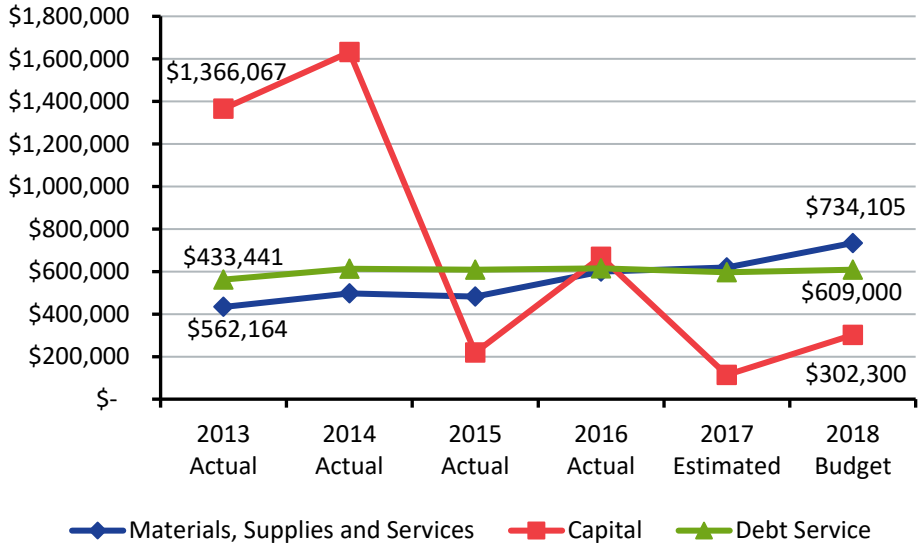
Figure 16: General Fund Wages and Benefits Totals



Materials, Supplies and Services for Administration, Fire Operations, and Fire Prevention

These charges encompass 15 to 17 percent of the expenditure budget. Capital expenditures vary from 4 to 19 percent depending on the year, excluding the financed building purchase in 2013 and the financed apparatus purchase in 2014. The debt service payments are between 15 and 22 percent of expenditures.

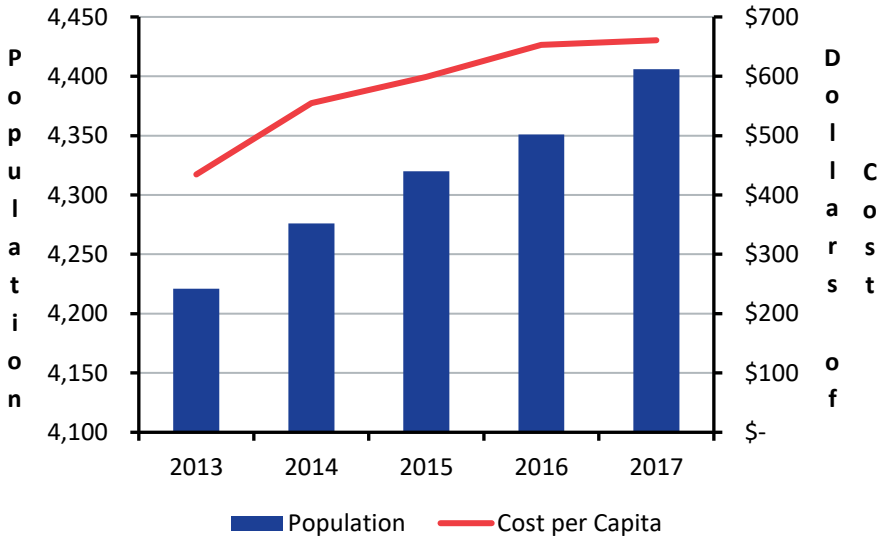
Figure 17: General Fund Materials/Supplies and Services, Capital and Debt Service



Cost per Capita

The following figure displays per capita cost, from 2013 through 2017. Fundamentally, per capita costs are derived by taking the operating budget and distributing it over the estimated population of the District to arrive at a dollar value per capita. The population for the District was estimated at 4,406 in 2017, which is about 1.4 percent of the Weld County population. The District population was derived from comparing the population of the Town of Kersey. The District encompasses all of the Town of Kersey and some areas outside in the County. The District's population for the years of 2012 to 2016 was estimated by extrapolating from the population of the Town of Kersey during those years. The data suggests that per capita costs have ranged from $435 (2013) to $661 (2017). However, the average over this period is $580 per capita. Based on this average, two of the years were below the average.

Figure 18: Cost per Capita

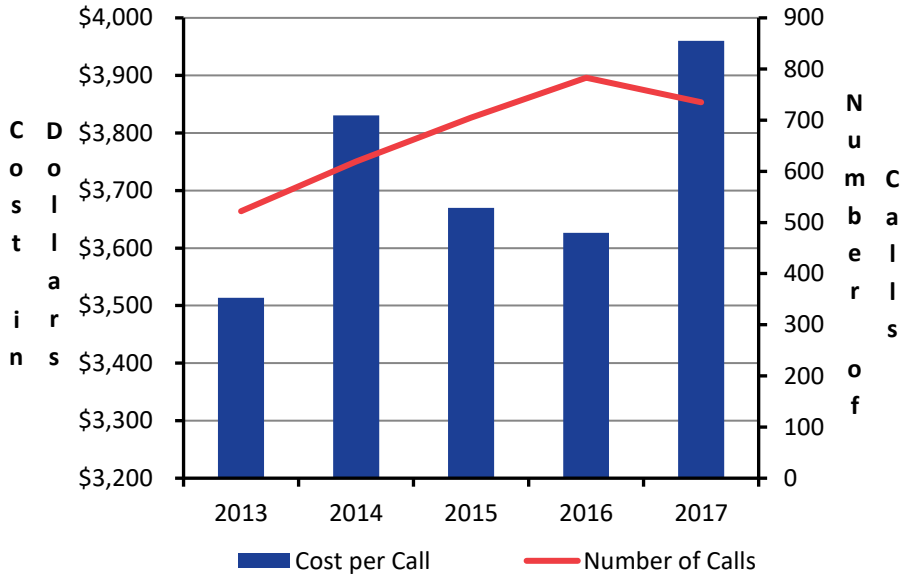


Cost per capita is offered for reference as a common measure of cost, however, comparing departments of different demographics, i.e., commercial and residential percentages and total population can result in wide variance in cost per capita. This number is higher than most departments in the metro area which have higher populations. Also, districts have higher costs for operation than does municipal departments in that services like human resources, legal, finance, and maintenance are often not reflected in the fire department budget, but are in a fire district. It is also important to note that this is not necessarily what citizens pay as a larger portion of the District revenues come from oil and gas revenues.

Cost per Call

A similar methodology was utilized for cost per call, but instead we replaced population with calls for service. For 2017, the average cost per call was $3,960 compared to $3,514 in 2013. The average cost per call for service over the five years was $3,729. Three of the five years were below the average cost per call for service. The cost per call is not only affected by the expenditures but also the number of calls. The number of calls varied from 522 in 20,136 to 783 in 2016.

Figure 19: Cost per Call



Again, while this is a measure of cost, the number of calls has a significant impact on the cost. The cost will be lower if there were more calls for service. Obviously in emergency services, increased demand is not desirable. To wish for additional emergency situations just to lower the cost per call would be perverse. Used as a factor of comparison between comparable agencies, however, is reasonable.

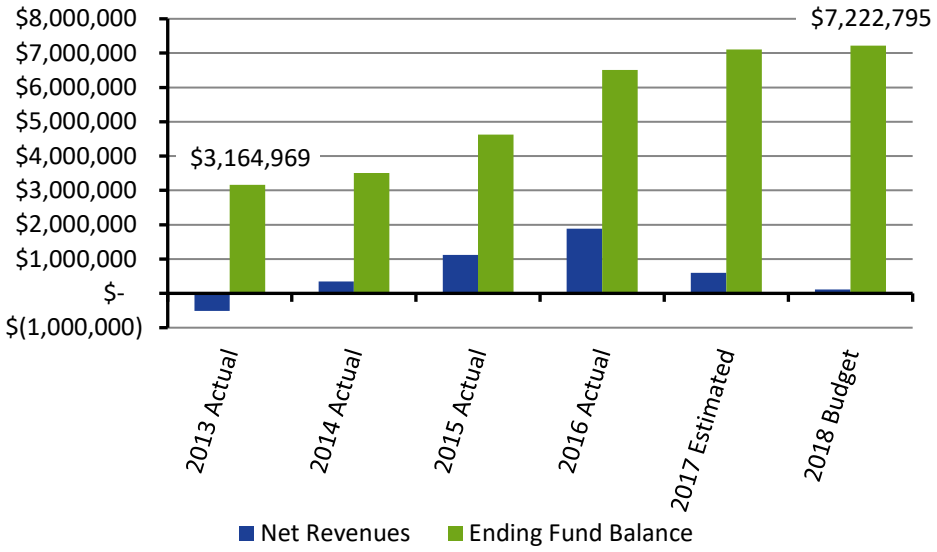
Net Revenue/Deficit and Fund Balance

The following figures display net revenue gains/deficits and reserve balances for the period of 2013 actuals through 2018 budgeted for the General Fund.

When revenues are less than expenditures, such as in FY 2013 in the General Fund figure that follows, then the fund shows an operating loss (blue bars) and fund balance is reduced (green bars). Conversely, when the revenue exceeds expense, such as in FY 2014, then the fund shows an operating gain and fund balance is increased.

General Fund. The District's General Fund revenues have been more than District expenditures over most of the study period. The result of this gain can be seen in the following figure (red bars), which shows the effect of the net gain or loss on fund balance each fiscal year. As revenues have increased over time, the fund balance has also, in general terms, increased considerably. The ending fund balance (end balances roll over to the next years' beginning fund balance) have grown from $3,164,969 in FY 2013 to $7,222,795, as budgeted in FY 2018.

Figure 20: Revenue, Expense, Net/Deficit, and End Reserve Balance—General Fund



Maintaining high fund balances can be regarded as negative or positive. It is positive in that the agency is saving money rather than spending all that is available each year. It can provide a rainy-day fund when revenues decrease, and it can be used to fund capital replacement and improvements. On the other hand, it can be perceived as a negative in that the District is holding funds that there does not appear to be necessary for operations. Many taxpayers would rather see a tax reduction. ESCI recommends that a capital replacement fund be established based on actual need (see the capital asset section of the report). The money is designated so it can be shown that there is a need for larger amounts to replace the apparatus or facilities as they age. This will be discussed further in the Future Strategies section of the report.

Financial Forecasts

ESCI developed three forecasts of revenues and expenditures for the next five years. These are: 1) Assessed Values continue as per trend analysis; 2) a 50 percent drop in the assessed values for the oil and gas category; and 3) a 75 percent drop in assessed values for the oil and gas category. The assumptions for expenditures are the same for all three. The expenditures remain status quo with assumptions for normal inflation and apparatus replacements per the ESCI recommended schedule.

The first Revenue Trend Analysis is to assess the financial sustainability of projecting revenues based on trend analysis. The forecast is based upon historical actual revenues and expenditures, and informed assumptions about how those revenues and expenditures will change in the future. The key assumptions used in the forecast are presented in the next figure followed by the forecast results and selected metrics.

This scenario has been prepared for stakeholder consideration. This is considered a *status quo* service level scenario, with no new positions to add and comparative year over year growth assumptions in revenues and expenses with anticipated future needs in capital improvements.

Revenue/Resource Inputs

Figure 21: Financial Revenue Assumptions

Financial Resources By Type	Assumptions
Assessed Value (AV)	Trend Analysis of Actual Value for 2014 to 2019 Times AV Rate 29%, 7.20%, or 6.11%, as per State
Levied $	Mill Levy times AV
Collection Rate	100%
Oil and Gas Assessed Values	Reduced 50% and 75% from AVs calculated using the Trend Analysis
Mill Levy Rate	Mill Levy Increased 3 Mills at 50% Reduction in Oil and Gas AV
	Mill Levy Increased 8.25 Mills at 75% Reduction in Oil and Gas AV
General Fund Beginning Reserve Balance	Prior Year Ending Fund Balance
Capital Reserve Beginning Balance	Prior Year Ending Reserve Fund Balance
Property Taxes	AV/1000 times Mill Rate
Specific Ownership Tax	Constant $225,000
Wildland	Not Projected—Income Would be Offset by Expenditures
Interest	Calculated as 0.5% Times Average Annual Balance for each Year
Grants	Not Projected—Income Would be Offset by Expenditures
Miscellaneous	Constant $48,000 for All Other Revenues
General Revenue Total	Sum of all Projected Revenues for each Year
Capital Reserve Revenue Total	Contribution plus 0.5% Interest on Average Balance
Grand Total all Revenues	Sum of all Projected Revenues for each Year

- Property and specific ownership taxes:
  - Property taxes. Assessed values have been projected using the Trend Analysis The calculation uses the historical data of 2014 to 2018 to create a projection for each year. This calculation was applied to the actual values of each category of property (i.e., Commercial, Residential, Agricultural, etc.), then the values of each category were multiplied by the ratio for that category of property to calculate the assessed values (i.e.,29%, 7.20%, or 6.11%). The property tax income is subject to the current mill rate and a collection rate of 100.00 percent.
  - Specific ownership taxes have been forecast at a constant rate of $225,000.
- Wildland revenue:
  - Wildland revenue has not been projected. It is very sporadic and would be offset by expenditures.

- Other Revenue Sources:
  - Forecast assumes that Miscellaneous revenue will be a constant of $48,000.
  - The forecast does not anticipate any grant funding.
  - Interest is calculated based on the average of the Beginning and Ending Reserves divided by 2 times the assumed interest rate of 0.5%.
- Capital Reserve:
  - General Fund transfers into a Capital Reserve have not been made in the past years. Based on the Capital Replacement Schedule developed by ESCI; a contribution of $481,933 per year is projected in later scenarios.

Expenditure Inputs

Figure 22: Financial Expenditure Assumptions

Financial Expenditures By Type	Assumptions
Treasurers Fees	1.5% of Property Tax Revenues
Total Administration	Increased 10% as it includes all employee benefits and Admin Salaries
Total Fire Fighting	Increased 5% as it includes firefighter and EMS salaries
Paramedics Hired in 2018	Added Salaries and Benefits and other costs of 2 Paramedics hired in 2018
Addition to Staff of 1 BC	Added Salaries and Benefits and other costs of proposed addition to Staff of 1 BC—5% per annual increase for Salary and 10% for Benefits
Other Expenditures	Increased 2% for all other operating expenditures
Grant Expenditures	Not Projected—Expenditures Offset by Revenues
Debt Service Interest & Principal and Note Payable	Per Debt Service Documents provided by Platte Valley FPD
Transfer to Capital Reserve	Calculate based on ESCI Replacement Schedule with 3.22% Inflation—Constant $481,933 Annually
Capital Replacement—Apparatus	In 2022, $677,280 (3.22% Inflation) to replace Unit 3702 Custom Pumper.
	Other replacements are outside of schedule.
Capital Other Than Apparatus	$160,000 per year Inflated at 2% per year
General Fund Net Revenue (Loss)	Revenues - Expenditures
Capital Reserve Net Revenues	Capital Transfers plus Interest - Capital Expenditures
General Fund Ending Reserves	Beginning Balance + Revenues - Expenditures
Capital Reserve Ending Reserve	Beginning Reserve Balance + Revenues - Expenditures
All Fund Ending Balances	Total of all Ending Balances

- Salaries/Wages:
  - For purposes of this forecast, it is assumed that the wages will increase by 5 percent per year.
  - In the scenarios with additions to staff; the wages and benefits are calculated based on the proposed positions: Battalion Chief in later scenarios.
- Benefits:
  - Forecast uses a 10 percent increase each year for benefits.

- Other Services/Charges:
  - The forecast assumes an average annual increase of 2 percent.
- Materials and Supplies:
  - The forecast uses an annual increase of 2 percent for materials and supplies.
- Transfer into Capital Fund:
  - Transfers to the Capital Reserve are projected at $481,933 per year to cover the cost of scheduled replacements (see Capital Asset section of this report).
- General Fund Capital Outlay:
  - Forecast for all scenarios is from the ESCI projected replacement schedule (see Capital Asset section of this report) and the Other Capital equipment an estimate of $160,000 per year, with an annual inflation rate of 2 percent.
- Debt Service:
  - The forecast continues the lease payments on the current outstanding leases and no new leases are projected.

Status Quo Forecast

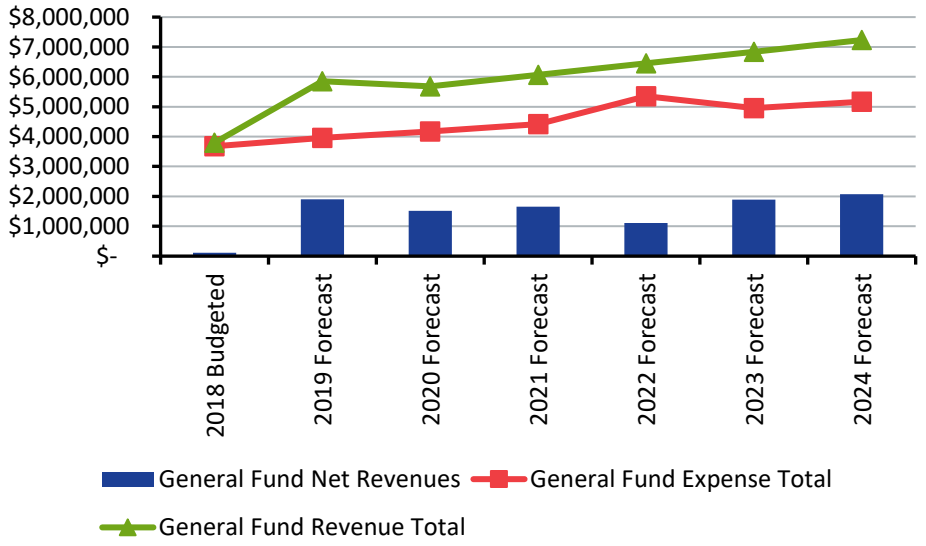
The Status Quo projection is a fantastic picture. The fund balance grows and more than doubles from 2018 to 2024. If the increase in oil and gas assessed values continued to grow as projected, no changes would need to be made. The assessed value increases by 92 percent from 2018 to 2024. The reality of this continuing into the future is slim. The Weld County Finance and Assessor's offices advise districts not to include the oil and gas revenues in their operating budgets because of the volatility of the revenues.

Figure 23: Scenario—Status Quo Forecast, No Additions to Revenue, other than Trend Analysis AV Projections, Expenditures

Financial Resources By Type	2018 Budgeted	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast
Taxable Assessed Values	692,283,240	1,072,374,950	1,038,181,250	1,111,536,764	1,184,892,278	1,258,247,792	1,331,603,306
Levied $	3,579,797	5,538,817	5,362,206	5,741,087	6,119,969	6,498,850	6,877,731
Collection Rate	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Mill Rate	5.171	5.165	5.165	5.165	5.165	5.165	5.165
General Fund Beginning Reserve Balance	7,104,834	7,222,795	9,121,905	10,637,947	12,294,685	13,399,944	15,286,518
Property Taxes	3,579,797	5,538,817	5,362,206	5,741,087	6,119,969	6,498,850	6,877,731
Specific Ownership Tax	200,000	225,000	225,000	225,000	225,000	225,000	225,000
Wildland							
Interest	15,000	40,862	49,400	57,332	64,237	71,716	81,606
Grants							
Miscellaneous		48,000	48,000	48,000	48,000	48,000	48,000
General Revenue Total	**3,794,797**	**5,852,679**	**5,684,606**	**6,071,419**	**6,457,206**	**6,843,566**	**7,232,337**

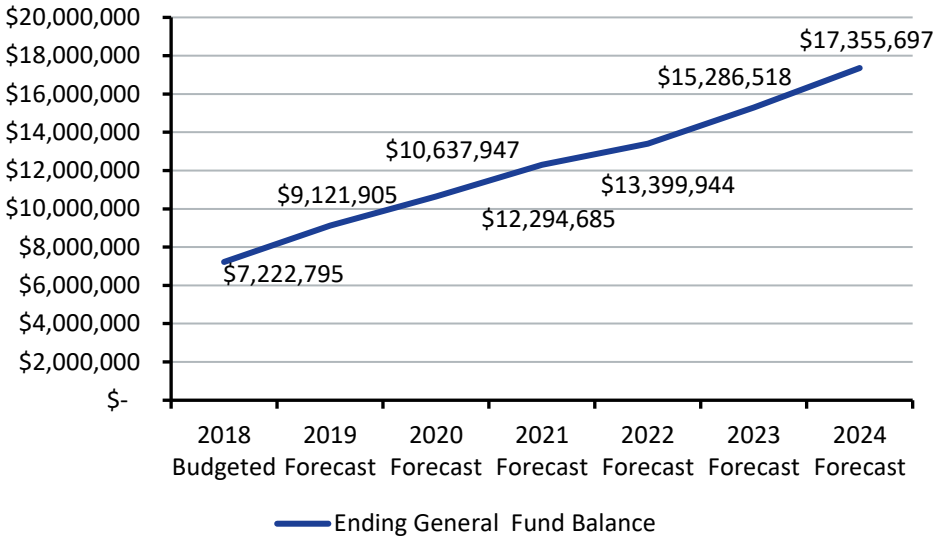
Financial Expenditures By Type	2018 Budgeted	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast
Treasurers Fees	55,000	83,082	80,433	86,116	91,800	97,483	103,166
Total Administration	1,174,604	1,292,064	1,421,271	1,563,398	1,719,738	1,891,711	2,080,883
Total Fire Fighting	1,034,903	1,294,859	1,370,013	1,449,965	1,535,060	1,625,670	1,722,195
Total Fire Apparatus and Truck Repair	90,000	91,800	93,636	95,509	97,419	99,367	101,355
Total Fire and EMS Training	262,529	267,780	273,135	278,598	284,170	289,853	295,650
Total Fire Stations and Buildings	148,500	151,470	154,499	157,589	160,741	163,956	167,235
Debt Interest & Principal	609,000	609,313	609,113	613,713	612,550	612,300	512,488
Other Capital Expenditures	302,300	163,200	166,464	169,793	173,189	176,653	180,186
Capital Apparatus Replacement					677,280		
Grand Total Expenditures	3,676,836	3,953,568	4,168,564	4,414,681	5,351,947	4,956,993	5,163,158
General Fund Net Revenue (Loss)	**117,961**	**1,899,110**	**1,516,042**	**1,656,738**	**1,105,259**	**1,886,573**	**2,069,179**
General Fund Ending Reserves	**7,222,795**	**9,121,905**	**10,637,947**	**12,294,685**	**13,399,944**	**15,286,517**	**17,355,697**

Figure 24: Status Quo Scenario—Forecast, General Fund Forecast



Employing the assumptions presented, General Fund revenues are expected to increase from $3,794,797 in FY 2018, to $ $7,232,337 in FY 2024, at an average annual rate of 15 percent for the forecast period. Expenditures are expected to increase from $3,676,836 in FY 2018, to $5,163,158 in FY 2024, at an average annual rate of 0.67 percent for the forecast period. As shown in Figure 24, revenue exceeds expenditures resulting in an annual operating income (blue bars), which raises fund balance as shown in the following figure:

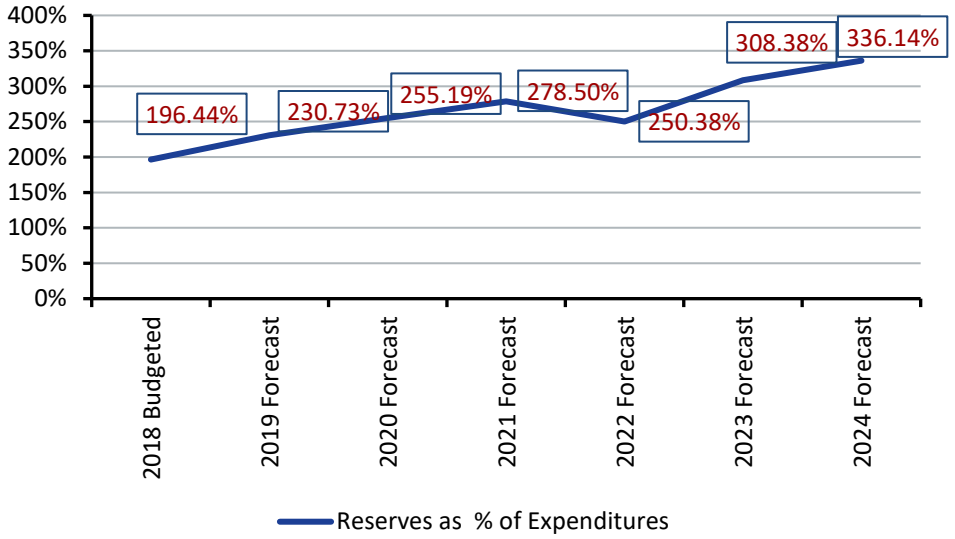
Figure 25: Status Quo Scenario—General Fund Ending Balance



The following figure shows more clearly the relationship between the ending fund balance and expenditures. The District is in great shape with the continued increases that have occurred over the last 5 years. The issue PVFPD is concerned with is the volatility of the oil and gas category. The figure shows the ending fund balance as a percent of General Fund expenditures. The requirement for a three percent emergency reserve can easily be met under this scenario. From a policy standpoint, 25 percent is considered an ideal percentage when developing a reserve policy. In fact, the GFOA considers 16 percent to be the minimum baseline level that a government should maintain.[2] This is no problem under this scenario but becomes a problem in later scenarios.

[2] See GFOA Best Practice, "Appropriate Level of Unrestricted Fund Balance in the General Fund," (2009), www.gfoa.org. The Best Practice states that reserves equal to about 16 percent of revenues or expenditures is the minimum a government should consider for its policy and that the actual target that a government adopts should be based on an analysis of the salient risks that a government faces (which in many cases may call for a higher reserve level than 16 percent).

Figure 26: Scenario—General Fund Reserves as a % of General Fund Expenditures



In the next two scenarios the picture changes dramatically.

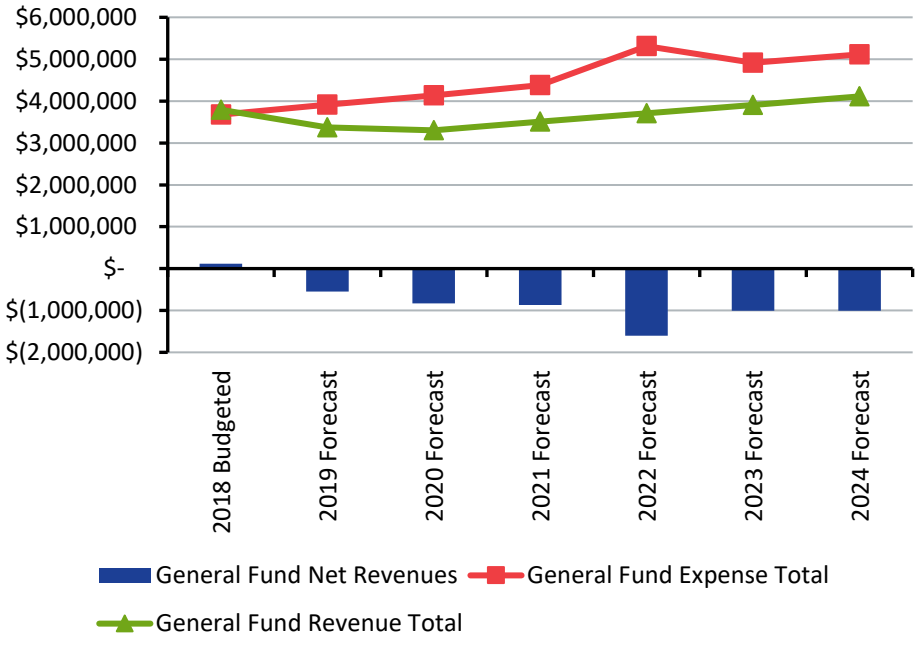
Forecast—50% Reduction in the Trend Analysis of Oil and Gas AV, Status Quo Expenditures.

Figure 27: Scenario—Forecast, Reduce Oil and Gas AV by 50%, Expenditures are Status Quo

Financial Resources By Type	2018 Budgeted	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast
Assessed Value (AV)	692,283,240	1,072,374,950	1,038,181,250	1,111,536,764	1,184,892,278	1,258,247,792	1,331,603,306
50% Reduction in Oil and Gas AV		479,113,380	457,876,808	490,952,042	524,027,277	557,102,512	590,177,747
Levied $	3,579,797	3,064,196	2,997,272	3,205,320	3,413,368	3,621,415	3,829,463
Collection Rate	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Mill Rate	5.171	5.165	5.165	5.165	5.165	5.165	5.165
General Fund Beginning Reserve Balance	7,104,834	7,222,795	6,678,295	5,846,790	4,975,521	3,371,409	2,366,337
Property Taxes	3,579,797	3,064,196	2,997,272	3,205,320	3,413,368	3,621,415	3,829,463
Specific Ownership Tax	200,000	225,000	225,000	225,000	225,000	225,000	225,000
Wildland							
Interest	15,000	34,753	31,313	27,056	20,867	14,344	9,318
Grants							
Miscellaneous		48,000	48,000	48,000	48,000	48,000	48,000
General Revenue Total	**3,794,797**	**3,371,949**	**3,301,585**	**3,505,376**	**3,707,235**	**3,908,759**	**4,111,781**

Financial Expenditures By Type	2018 Budgeted	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast
Treasurers Fees	55,000	45,963	44,959	48,080	51,201	54,321	57,442
Total Administrative	1,174,604	1,292,064	1,421,271	1,563,398	1,719,738	1,891,711	2,080,883
Total Fire Fighting	1,034,903	1,294,859	1,370,013	1,449,965	1,535,060	1,625,670	1,722,195
Total Fire Apparatus/Truck Repair	90,000	91,800	93,636	95,509	97,419	99,367	101,355
Total Fire and EMS training	262,529	267,780	273,135	278,598	284,170	289,853	295,650
Total Fire Stations and Buildings	148,500	151,470	154,499	157,589	160,741	163,956	167,235
Debt Interest & Principal	609,000	609,313	609,113	613,713	612,550	612,300	512,488
Other Capital than Apparatus Replacement	302,300	163,200	166,464	169,793	173,189	176,653	180,186
Capital Apparatus Replacement					677,280		
Grand Total Expenditures	,676,836	3,916,449	4,133,090	4,376,645	5,311,348	4,913,831	5,117,434
General Fund Net Revenue (Loss)	117,961	(544,500)	(831,505)	(871,269)	(1,604,113)	(1,005,072)	(1,005,653)
General Fund Ending Reserves	7,222,795	6,678,295	5,846,790	4,975,522	3,371,409	2,366,337	1,360,684

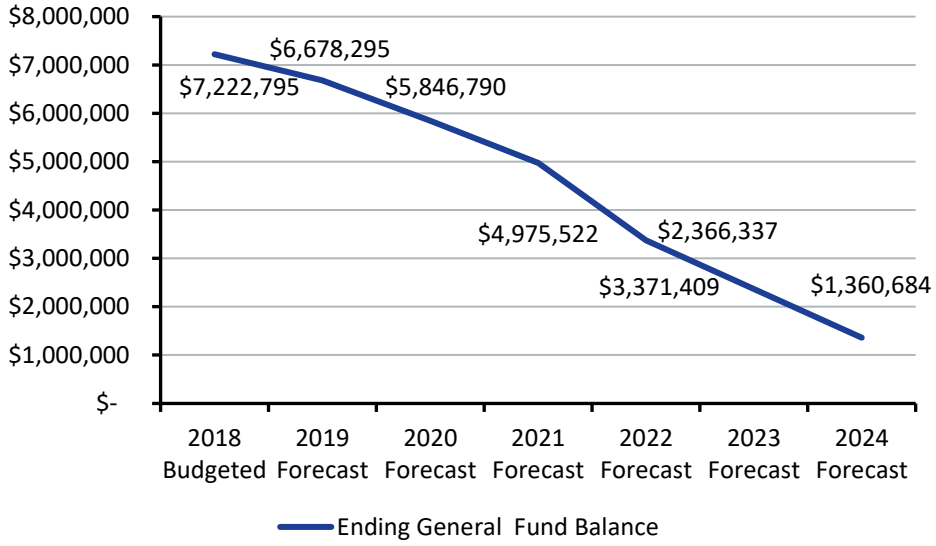
Figure 28: Scenario—Forecast, General Fund Forecast 50% Reduction Oil and Gas AV, Expenditures Status Quo



In Figure 28, with the 50 percent reduction in oil and gas AV, the revenues decrease and fall below expenditures and there is now a deficit in revenues over expenditures. There is no change in expenditures other than those affected by the decrease in revenue.

The following figure shows the effect on the ending fund balance of this reduction.

Figure 29: Scenario—General Fund Ending Balance with 50% Reduction in the Oil and Gas AV



As can be seen in this figure, the 50 percent drop in the oil and gas AV has a dramatic effect on the fund balance. The decrease reduces the balance by 81 percent over the next 6 years to $1,360,684, which is below the minimum balance recommended by GFOA (See discussion on page 30). The District has some capital replacements that need to be considered, as well as a staffing issue. These will be considered later in this section.

Forecast—75% Reduction in Oil and Gas AV

The reduction of the oil and gas AV by 75 percent is another possibility. The following figure projects the revenues under this scenario with status quo on the expenditures other than changes related to property tax.

Figure 30: Scenario—Forecast 75% Reduction in Oil and Gas AV, Expenditures are Status Quo

Financial Resources By Type	2018 Budgeted	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast
Assessed Value (AV)	692,283,240	1,072,374,950	1,038,181,250	1,111,536,764	1,184,892,278	1,258,247,792	1,331,603,306
75% Reduction in Oil and Gas AV		718,670,070	686,815,211	736,428,064	786,040,916	835,653,768	885,266,620
Levied $	3,579,797	1,826,886	1,814,806	1,937,436	2,060,067	2,182,698	2,305,329
Collection Rate	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Mill Rate	5.171	5.165	5.165	5.165	5.165	5.165	5.165
General Fund Beginning Reserve Balance	7,104,834	7,222,795	5,456,489	3,451,211	1,315,938	-1,642,042	-4,078,594
Property Taxes	3,579,797	1,826,886	1,814,806	1,937,436	2,060,067	2,182,698	2,305,329
Specific Ownership Tax	200,000	225,000	225,000	225,000	225,000	225,000	225,000
Interest	15,000	31,698	22,269	11,918	-	-	-
Miscellaneous		48,000	48,000	48,000	48,000	48,000	48,000
General Revenue Total	**3,794,797**	**2,131,584**	**2,110,075**	**2,222,354**	**2,333,067**	**2,455,698**	**2,578,329**

Financial Expenditures By Type	2018 Budgeted	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast
Treasurers Fees	55,000	27,403	27,222	29,062	30,901	32,740	34,580
Total Administrative	1,174,604	1,292,064	1,421,271	1,563,398	1,719,738	1,891,711	2,080,883
Total Fire Fighting	1,034,903	1,294,859	1,370,013	1,449,965	1,535,060	1,625,670	1,722,195
Total Apparatus/Truck Repair	90,000	91,800	93,636	95,509	97,419	99,367	101,355
Total Fire and EMS training	262,529	267,780	273,135	278,598	284,170	289,853	295,650
Total Fire Stations and Buildings	148,500	151,470	154,499	157,589	160,741	163,956	167,235
Debt Interest & Principal	609,000	609,313	609,113	613,713	612,550	612,300	512,488
Other Capital than Apparatus Replacement	302,300	163,200	166,464	169,793	173,189	176,653	180,186
Capital Apparatus Replacement					677,280		
Grand Total Expenditures	**3,676,836**	**3,897,889**	**4,115,353**	**4,357,627**	**5,291,048**	**4,892,250**	**5,094,572**

General Fund Net Revenue (Loss)	**117,961**	**-1,766,306**	**-2,005,278**	**-2,135,272**	**-2,957,981**	**-2,436,552**	**-2,516,243**
General Fund Ending Reserves	**7,222,795**	**5,456,489**	**3,451,211**	**1,315,939**	**-1,642,042**	**-4,078,594**	**-6,594,837**

Figure 31: Scenario—Forecast, 75% Reduction in Oil and Gas AV, Status Quo for Expenditures

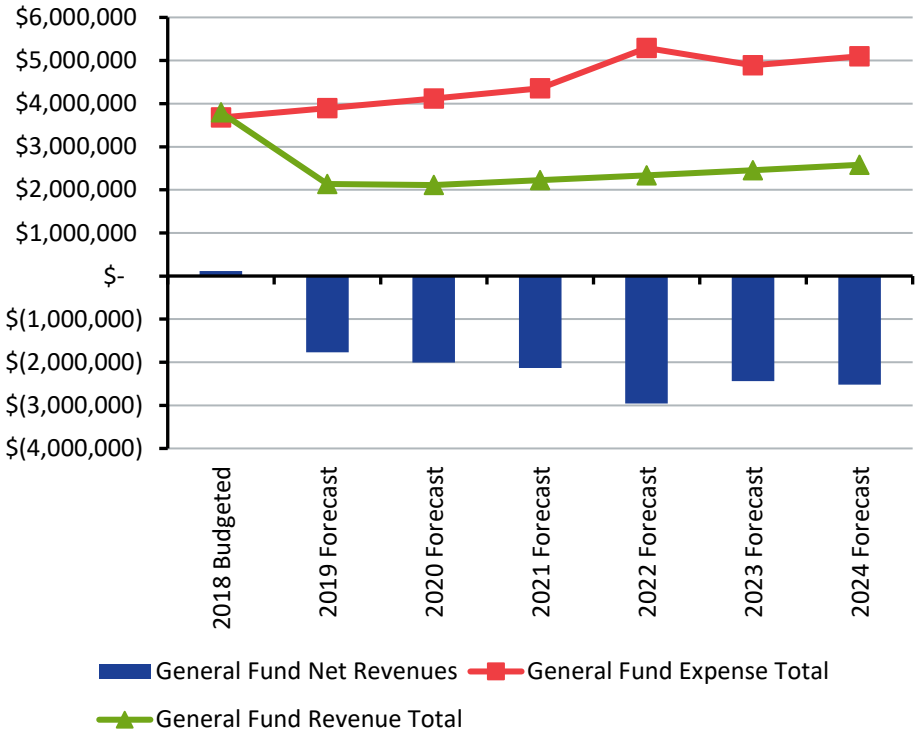


Figure 37 shows that the change in Net Revenues, Total General Fund Expense, and Total General Fund Revenues under the 75 percent reduction in oil and gas AV is similar to the previous forecast only worse. Either scenario produces a grim picture of the effect of a significant reduction in the oil and gas AV to PVFPD's financial picture. In order to mitigate the effects of this reduction, a mill levy increase was analyzed by ESCI for each of the reduction scenarios.

Revenue Options

Two options for increasing revenues and meeting the recommendations of this report are discussed by using mill levy increases for each of the reductions in revenues that were analyzed, and the addition of a Capital Reserve Fund to cover future costs of apparatus replacement and the hiring of one Battalion Chief. The following figures demonstrate two options showing the implementation of the expenditures that the District needs to consider for the future. These two options explore the volatility of the revenues when oil and gas taxes reduce due to decreases in production.

Revenue Scenario One

The first scenario is used if the assumption of a 50 percent drop in oil and gas AV is expected to occur. Both of the scenarios assume a Capital Reserve Fund begins funding in 2019 per the recommended apparatus replacement schedule proposed by ESCI in this report. The required contribution is $481,933 annually. Also included in the expenditures is the hiring of a Battalion Chief in 2019 per a staffing recommendation of this study.

The recommendation for the 50 percent reduction in AV is a 3.00 mill levy increase. The mill levy increase does not occur until 2020 due to the timing necessary for voter approval.

Figure 32: Revenue Scenario 1—50% Reduction with a 3.00 Mill Increase

Financial Resources By Type	2018 Budgeted	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast
Assessed Value (AV)	692,283,240	1,072,374,950	1,038,181,250	1,111,536,764	1,184,892,278	1,258,247,792	1,331,603,306
50% Reduction in Oil and gas AV		479,113,380	457,876,808	490,952,042	524,027,277	557,102,512	590,177,747
Levied $	3,579,797	3,064,196	4,738,186	5,067,074	5,395,963	5,724,851	6,053,740
Collection Rate	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Mill Rate	5.171	5.165	8.165	8.165	8.165	8.165	8.165
General Fund Beginning Reserve Balance	7,104,834	7,222,795	6,059,760	6,321,742	6,659,990	7,060,510	7,499,704
Property Taxes	3,579,797	3,064,196	4,738,186	5,067,074	5,395,963	5,724,851	6,053,740
Specific Ownership Tax	200,000	225,000	225,000	225,000	225,000	225,000	225,000
Interest	15,000	33,206	30,954	32,454	34,301	36,401	38,874
Miscellaneous		48,000	48,000	48,000	48,000	48,000	48,000
General Revenue Total	**3,794,797**	**3,370,402**	**5,042,140**	**5,372,528**	**5,703,264**	**6,034,252**	**6,365,614**

Financial Expenditures By Type	2018 Budgeted	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast
Treasurers Fees	55,000	45,963	71,073	76,006	80,939	85,873	90,806
Total Administrative	1,174,604	1,292,064	1,421,271	1,563,398	1,719,738	1,891,711	2,080,883
Total Fire Fighting	1,034,903	1,294,859	1,370,013	1,449,965	1,535,060	1,625,670	1,722,195
Add: 1 BC to Staffing		135,055	139,021	147,775	157,005	167,742	182,783
Total Apparatus/Truck Repair	90,000	91,800	93,636	95,509	97,419	99,367	101,355
Total Fire and EMS training	262,529	267,780	273,135	278,598	284,170	289,853	295,650
Total Fire Stations and Buildings	148,500	151,470	154,499	157,589	160,741	163,956	167,235
Debt Interest & Principal	609,000	609,313	609,113	613,713	612,550	612,300	512,488
Other Capital than Apparatus Replacement	302,300	163,200	166,464	169,793	173,189	176,653	180,186
Capital Reserve Contribution		481,933	481,933	481,933	481,933	481,933	481,933
Capital Apparatus Replacement					677,280		
Grand Total Expenditures	**3,676,836**	**4,533,437**	**4,780,158**	**5,034,279**	**5,302,744**	**5,595,058**	**5,815,514**

General Fund Net Revenue (Loss)	117,961	(1,163,035)	261,982	338,249	400,520	439,194	550,100
Capital Reserve Net Revenues		483,138	485,554	487,981	(188,552)	489,478	491,926
General Fund Ending Reserves	7,222,795	6,059,760	6,321,742	6,659,991	7,060,510	7,499,704	8,049,804
Capital Reserve Ending Reserve	-	483,138	968,691	1,456,673	1,268,121	1,757,599	2,249,525
All Fund Ending Balances	7,222,795	6,542,898	7,290,433	8,116,664	8,328,631	9,257,303	10,299,329

Figure 33: Revenue Scenario 1—Revenues and Expenditures Graphed

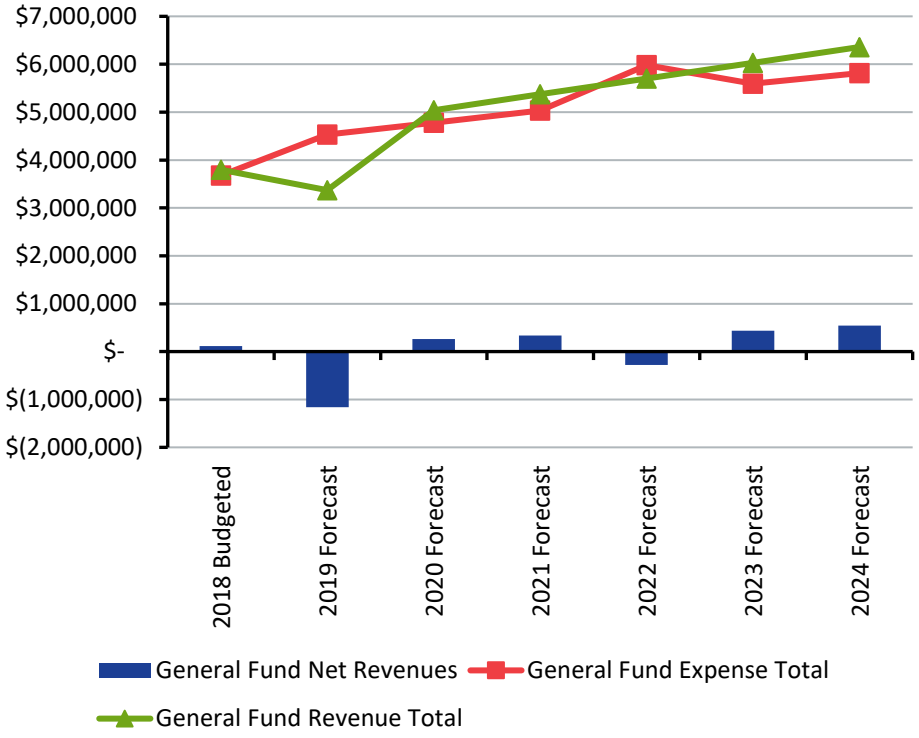


Figure 33 shows that the deficits have been minimized and revenues are now above expenditures.

Revenue Scenario Two

This scenario is a 75 percent reduction in oil and gas AV with an 8.25 mill levy increase. The expenditures include the Capital Reserve Fund and the hiring of one Battalion Chief. The mill levy increase does not occur until 2020 due to the timing for voter approval. The total mill levy is 13.415.

Figure 34: Revenue Scenario 2—75% Reduction in Oil and Gas AV with an 8.25 Mill Levy Increase

Financial Resources By Type	2018 Budgeted	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast
Assessed Value (AV)	692,283,240	1,072,374,950	1,038,181,250	1,111,536,764	1,184,892,278	1,258,247,792	1,331,603,306
75% Reduction in Oil and Gas AV		718,670,070	686,815,211	736,428,064	786,040,916	835,653,768	885,266,620
Levied $	3,579,797	1,826,886	4,713,575	5,032,083	5,350,591	5,669,099	5,987,607
Collection Rate	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Mill Rate	5.171	5.165	13.415	13.415	13.415	13.415	13.415
General Fund Beginning Reserve Balance	7,104,834	7,222,795	4,837,955	5,069,511	5,512,294	5,862,258	6,240,392
Property Taxes	3,579,797	1,826,886	4,713,575	5,032,083	5,350,591	5,669,099	5,987,607
Specific Ownership Tax	200,000	225,000	225,000	225,000	225,000	225,000	225,000
Wildland							
Interest	15,000	30,152	24,769	26,455	28,436	30,257	32,398
Grants							
Miscellaneous		48,000	48,000	48,000	48,000	48,000	48,000
General Revenue Total	**3,794,797**	**2,130,038**	**5,011,344**	**5,331,538**	**5,652,027**	**5,972,356**	**6,293,005**

Financial Expenditures By Type	2018 Budgeted	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast
Treasurers Fees	55,000	27,403	70,704	75,481	80,259	85,036	89,814
Total Administrative	1,174,604	1,292,064	1,421,271	1,563,398	1,719,738	1,891,711	2,080,883
Total Fire Fighting	1,034,903	1,294,859	1,370,013	1,449,965	1,535,060	1,625,670	1,722,195
Add: 1 BC to Staffing		135,055	139,021	147,775	157,005	167,742	182,783
Total Apparatus/Truck Repair	90,000	91,800	93,636	95,509	97,419	99,367	101,355
Total Fire and EMS training	262,529	267,780	273,135	278,598	284,170	289,853	295,650
Total Fire Stations and Buildings	148,500	151,470	154,499	157,589	160,741	163,956	167,235
Debt Interest & Principal	609,000	609,313	609,113	613,713	612,550	612,300	512,488
Other Capital than Apparatus Replacement	302,300	163,200	166,464	169,793	173,189	176,653	180,186
Capital Reserve Contribution		481,933	481,933	481,933	481,933	481,933	481,933
Capital Apparatus Replacement					677,280		
Grand Total Expenditures	**3,676,836**	**4,514,877**	**4,779,789**	**5,033,754**	**5,302,064**	**5,594,221**	**5,814,522**

General Fund Net Revenue (Loss)	117,961	(2,384,840)	231,556	297,784	349,963	378,134	478,483
Capital Reserve Net Revenues		483,138	485,554	487,981	(188,552)	489,478	491,926
General Fund Ending Reserves	7,222,795	4,837,955	5,069,511	5,367,295	5,862,258	6,240,392	6,718,875
Capital Reserve Ending Reserve	-	483,138	968,691	1,456,673	1,268,121	1,757,599	2,249,525
All Fund Ending Balances	7,222,795	5,321,093	6,038,202	6,823,968	7,130,379	7,997,991	8,968,400

Figure 35: Revenue Scenario Two—Revenues and Expenditures Graphed

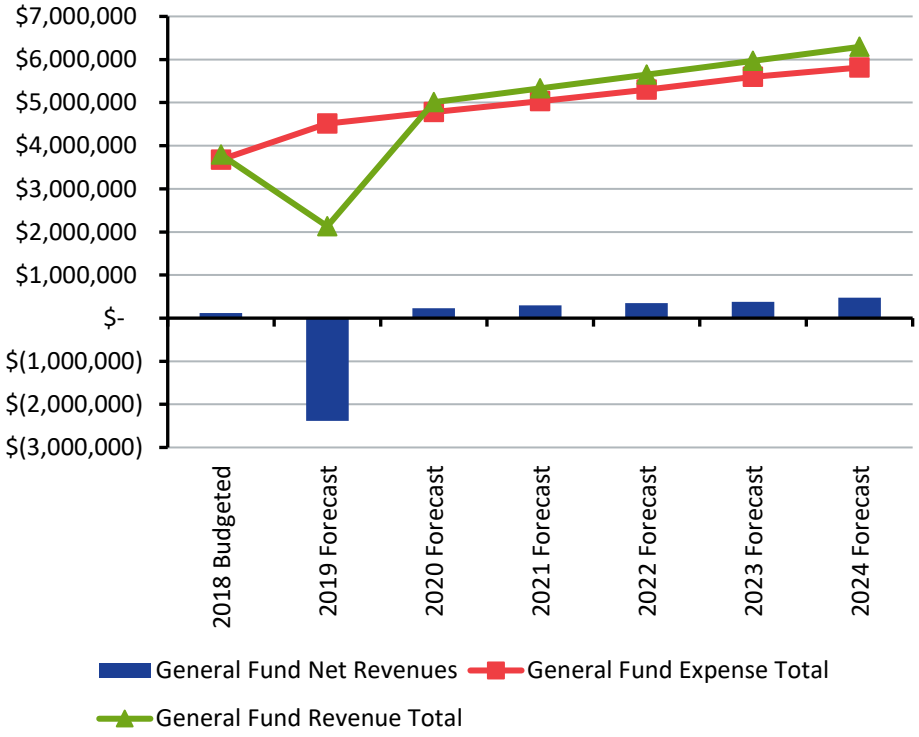


Figure 35 shows that with a 75 percent reduction in oil and gas AV and an 8.25 mill levy increase PVFPD can maintain a favorable General Fund Balance and have reserves for apparatus replacement.

The following two figures show the General Fund Balance and the Capital Reserve Fund Balance under the two revenue scenarios.

Figure 36: General Fund and Capital Reserve Fund Balances
50% Reduction in Oil and Gas AV and 3.0 Mill Increase

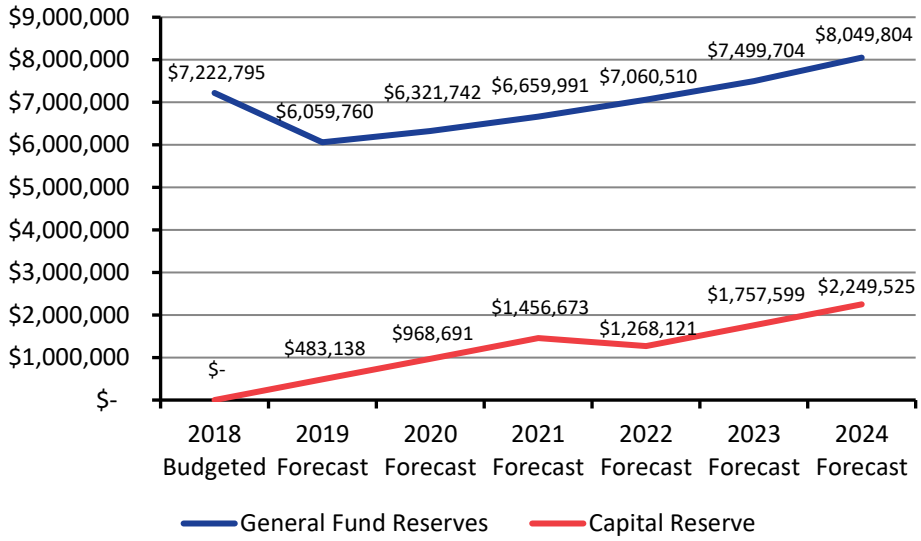
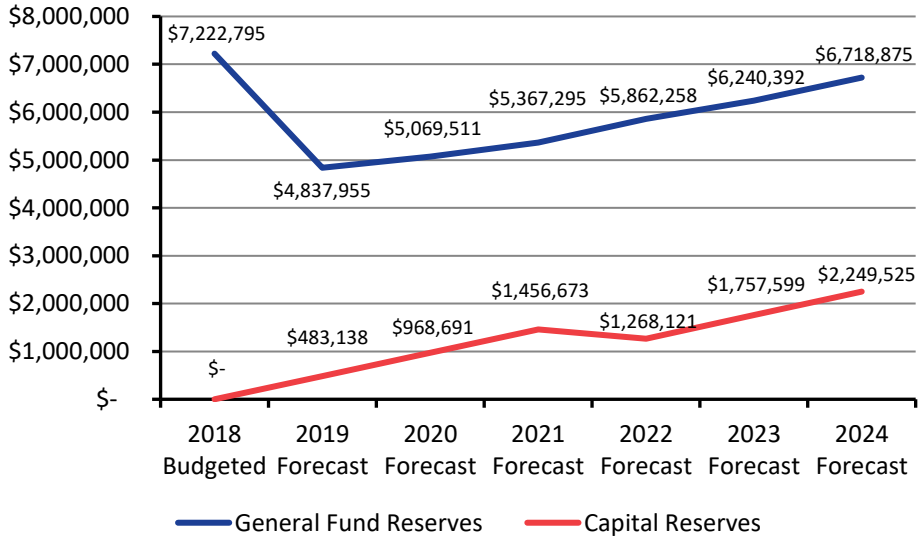


Figure 37: General Fund and Capital Reserve Fund Balances
75% Reduction in Oil and Gas AV and 8.25 Mill Increase



The decision must be made as what the reduction in oil and gas may be and how much of an increase in mill levy might be needed to maintain reserve funds in the future. The discussed revenue scenarios are two possible options. They give an idea of the effect of reserves with projected mill levy increases paired with the projected reduction in revenues. Adjustments can be made as the Board desires. If the District begins transporting, that is another factor that would need to be considered. The Future Strategies section will contain a discussion on insulating against an oil and gas downturn.

Best Practices in Financial Management

As part of the fiscal analysis, our project team explored various data collection and site visit notes to examine measures of effective organizational performance in comparison to industry standards. The following figure includes select industry best practices and methods for performance improvement. The practices listed do not encompass every facet of the finance function, rather key targets for the District should/continue to monitor as a performance measurement.

Figure 38: Best Practices in Financial Management

Best Practices in Finance
Budgeting
Procedures are in place to monitor, adopt, and amend budgets.
The budget process includes performance measures, goals, objectives, etc.
The government body is recognized by the GFOA for its budget (FROA Distinguished Presentation Award).
A five-year financial plan is in place.
Written policies and procedures have been developed and updated.
Finance Department monitors actuals versus budgeted expenditures.
A fund reserve policy is in place.
New hires, reclassifications, and position changes are signed off (budget sign off).
Financial reports are provided to key stakeholders, such as Fire Chief and the Board of Directors.
Purchasing and Risk
Written policy is in place for purchasing good, services, etc.
Reasonable purchase limits and levels are in place.
Policies exist for excessive equipment and vehicles.
Training is provided regarding purchases.
Accounting
Finance functions are cross-trained.
Accounting policies are in place and enforced.
Accounts payable disbursements include proper documentation.
Invoices are approved/reviewed prior to payment.
AP is processed in a timely manner.
Monthly reconciliation, financial reports, and audits are handled in a timely manner.
Payroll is distributed in a timely manner.
Debt management policy is in place.

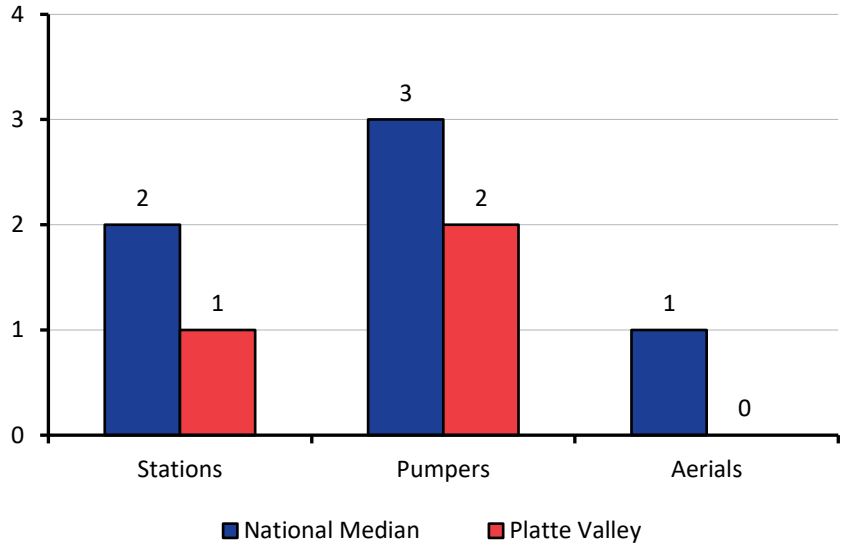
CAPITAL ASSETS AND CAPITAL IMPROVEMENT PROGRAMS

Regardless of an emergency service agency's financing, if appropriate capital equipment are 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).

PVFPD 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 owns a fire station, 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 fixed facilities is provided in the following figure.

Figure 39: Capital Assets per 1,000 Population[3]



PVFPD's major capital asset inventory falls somewhat below national medians for the region, based on per 1,000 population data.

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 station operated by PVFPD.

[3] National Fire Protection Association, 2016 NFPA Fire Department Profile Report. 1 Batterymarch Park, Quincy, Massachusetts, USA.

The findings are summarized in the following discussion and any areas of concern are identified.

Figure 40: Station 1

Name/Number:	**Station 37 (Station 1)**
Address:	27128 CR 53 Kersey, CO 80644
	**General Description:** Station 1 was constructed in 2013, and consists of seven, double-depth apparatus bays, all of drive through configuration. The facility is contemporary in design and is in excellent condition. Housing is included for as many as 17 responders in a well-designed dorm and day room area. A large community room is available for training as well as an additional training room in the basement. A large drill ground is on the property which includes a three-story live fire training building and multiple props.
Structure	
Construction Type	Ordinary frame and masonry
Date of Construction	Completed in 2013
Seismic Protection	When originally designed
Auxiliary Power	Yes, full site is backed up
General Condition	Excellent
Apparatus Bays	7 double-depth, drive-through bays
Special considerations (ADA, etc.)	Station is fully ADA compliant
Square Footage	32,000
Facilities Available	
Separate Rooms/Dormitory/Other	8 bedrooms with two beds each. Additional single dorm room for the station Captain.
Maximum Station Staffing Capability	17
Exercise/Workout Facilities	Extensive, well-equipped workout room and wave pool.
Kitchen/Dormitory	Yes (2)
Individual Lockers/Storage Assigned	Yes
Shower Facilities	Yes
Training/Meeting Rooms	A large, well-equipped training room is on the main floor and another in the basement. There is also a good-sized drill ground with a three story, live fire, training building.
Washer/Dryer	Yes, plus turnout extractor
Safety & Security	
Sprinklers and/or Smoke Detection	Building is fully protected by fire sprinklers
Decon/Biohazard Disposal	Yes
Security	All doors and the property perimeter are well secured
Apparatus Exhaust System	Exhaust removal systems are on all diesel apparatus

PVFPD's station is in excellent condition and will serve the District well into the future. The station was designed with an eye toward the future, so the space is adequate both for equipment and personnel. While there is sufficient space for the fire apparatus that is currently on hand, there is not a great deal of room to add units in the future.

Apparatus

PVFPD maintains a fleet of response vehicles that are generally newer and appear to be well maintained. The overall condition of the fleet was found to be fair to good overall, with a number of units that are aging. An inventory of apparatus, configuration, and condition is provided in the following figure.

Figure 41: Apparatus by Inventory

Radio Call Sign	Type	Chassis Manufacturer	Apparatus Manufacturer	Year	Condition	Status (Frontline, reserve)	Mileage	Capacities
3701	Engine	Spartan	Rosenbauer	2007	Good	Frontline	64,544	1,000 gallon, 1,500 GPM
3702	Engine	Spartan	Smeal	2002	Fair	Reserve	51,734	1,000 gallon, 1,250 GPM
3703	Engine	Rosenbauer	Rosenbauer	2014	Very good	Frontline	29,629	750 gallon, 1,500 GPM
3731	Type 6 Brush	Ford	Rosenbauer	2009	Good	Frontline	15,163	300 gallon
3732	Type 6 Brush	Ford		2005	Good	Frontline	23,268	300 gallon
3733	Type 3 Engine	International	Rosenbauer	2016	Good	Frontline	11,692	750 gallon, 1,000 GPM
3741	Tender	Freightliner		1998	Poor	Frontline	52,135	3,300 gallon, 300 GPM
3742	Tender	Kenworth	Rosenbauer	2011	Good	Frontline	12,426	3,000 gallon, 200 GPM
3751	Heavy Rescue	Rosenbauer	Rosenbauer	2014	Good	Frontline	7,423	N/A

The District's fire apparatus is in generally good condition and appears to be well maintained, demonstrating a high level of pride in ownership. Vehicle maintenance is accomplished by taking all chassis related work to a local truck repair facility. However, it is essential that repair and maintenance of pumps and fire-specific apparatus components be completed by certified fire apparatus mechanics. For this reason, PVFPD contracts that work to the Mountain View Fire Protection District. Mountain View has a staff of mechanics that are Emergency Vehicle Technician (EVT) certified.

In total, the District's units range in age from four to 20 years; with 9.5 years the average age of apparatus.

Two pieces of equipment have reached or are approaching their acceptable service lives. Specifically, 3702, the engine listed with a 2002 manufacture date, actually consists of an older body that was refurbished and transferred to a 2002 vintage chassis. The unit is aging and will soon be due for replacement.

Water Tender 3741 is 20 years of age, purchased in 1998. While the unit is not used frequently, it is approaching a point that it is due for replacement, and should be closely evaluated to determine its current condition and serviceability for continued use.

Capital 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 engineered 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 lifespan possible for these vehicles.

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 for the cost of replacement. To properly do so, agencies often turn to the long-accepted practice of establishing a lifecycle for the apparatus that results in a replacement date anticipated well in advance. Forward thinking organizations then set aside incremental funds during the life of the vehicle, so replacement dollars are ready when needed.

The same holds true for fire stations, training grounds, and other fixed facilities. And, as support equipment becomes costlier, particularly EMS equipment, planning for the replacement of these items is of equal importance.

ESCI surveyed capital replacement planning efforts at PVFPD, with the findings as follows:

Facility Replacement

The District does not have a replacement schedule in place for fixed facilities.

Apparatus Replacement

Fire apparatus and staff vehicles are typically funded from annual PVFPD budget revenues. However, they are not scheduled out in advance by way of an apparatus replacement plan. Replacing apparatus on a regular basis is important in maintaining a reliable and cost-effective response system. Since the District has not established a structured apparatus replacement schedule, ESCI provides the following information to assist with future planning efforts, as well as to quantify and forecast the future financial impacts of apparatus replacement.

Fire apparatus has a predictable lifespan and replacement date, and a readily forecast replacement cost. For this reason, ESCI advises clients that, upon taking delivery of a new vehicle, funds be dedicated in reserve based on a replacement schedule, to finance the new unit's replacement. Apparatus planning is discussed in the next section.

Apparatus Replacement Planning

For the purposes of service life and replacement cost calculation, ESCI uses the following values:

Figure 42: Apparatus Life Expectancy and Replacement Cost

Vehicle	Life Expectancy	Replacement Cost
Squad/Utility	15	$75,000
Med Rescue Truck	15	$210,000
Heavy Rescue Truck	20	$500,000
Commercial Pumper	20	$500,000
Custom Pumper	20	$600,000
Water Tender	20	$375,000
Ladder	25	$1,200,000
Brush	20	$160,000
Type 3 Engine	15	$310,000

The values listed are subject to modification base on each vehicle's age, condition, current use, and multiple other factors, so they should be viewed as a general guideline only.

The following figure identifies each unit in front-line operation in the District. The schedule identifies each unit by its identifier number, provides its model year and manufacturer. The schedule further identifies each unit's expected front-line use, calculates its projected replacement year, and its remaining years in front-line use. An estimate of the unit's replacement cost, had the unit been replaced in 2018, is identified. Using this estimated 2018 amount as a base cost, an annual inflation factor of 3.22 percent is applied for each year, on a compounded basis, of remaining front-line use to arrive at an estimated replacement cost in the anticipated year the unit is to be removed from front-line service. This estimated replacement cost is then divided by the anticipated front-line service life of the new unit to arrive at a monthly amount to be contributed to the replacement fund on an annual basis. In order to establish the fund, the amount of years each unit has been in front-line service is multiplied by the annual contribution amount to arrive at a total that should be in the fund for 2018. These calculations assume no salvage value for apparatus after each unit has served its front-line and reserve terms.

Figure 43: Front Line Apparatus Replacement Schedule

Unit	Year	Base Replacement Cost	Replacement Cost w/ Inflation	Current Cash Requirements	Annual Cash Requirements	Current Age	Life Expectancy	Replacement Year
3701	2007	$600,000	$773,880	$425,634	$85,987	11	20	2027
3702	2002	$600,000	$677,280	$541,824	$169,320	16	20	2022
3703	2014	$600,000	$909,120	$181,824	$56,820	4	20	2034
3731	2009	$160,000	$216,672	$97,502	$19,697	9	20	2029
3732	2005	$160,000	$196,064	$127,442	$28,009	13	20	2025
3733	2016	$310,000	$439,766	$58,635	$33,828	2	15	2031
3741	1998	$375,000	$375,000	$375,000	N/A	20	20	2018
3742	2011	$375,000	$531,975	$186,191	$40,921	7	20	2031
3751	2014	$500,000	$757,600	$151,520	$47,350	4	20	2034
Total			**$4,877,357**	**$2,145,573**	**$481,933**			

The initial amount necessary to supply the replacement fund to its current required amount is $4,877,357. These calculations result in an annual contribution to the replacement fund of $481,933, based on the current fleet and front-line useful lives. These amounts will be necessary to meet the needs of the District in funding its apparatus replacement program.

ESCI recommends that PVFPD identify a funding strategy to anticipate and prepare for the projected replacement costs. Creating a funding program to accomplish the goal of a replacement can be a difficult challenge, especially in time of reduced budgets. Fire apparatus can be replaced by use of borrowed, bonded, reserved, or budget funds. Regardless of the strategy employed, the cost must be planned for. While grant funding may mitigate this challenge, grant funds may not always be available to purchase apparatus on the replacement schedule timeline. ESCI recommends clients begin setting aside replacements funds, including an inflation factor, at the time the new apparatus is placed into service. This method allows funds to be accumulated on an incremental basis without placing a major burden on annual operating budgets.

An alternative to the use of an apparatus replacement fund is the use of a capital lease program. This program uses a financing mechanism with low effective interest rates that are available to fire districts and municipalities. A financing term is selected based on the any number of variables to be considered by the District. These variables include length of the capital lease, monthly or annual payments, and ultimate ownership of the apparatus. The length of a capital lease is typically driven by the expected useful life of the apparatus. For example, a ladder truck with an expected front-line use of 20 years may be financed on a capital lease with a 10 year-term. The downside of the lease purchase approach is that this practice incurs the cost of interest that is not sustained when a vehicle is purchased outright from reserved funds. Setting aside funding in reserve also means that those dollars are not available to the District for other uses, so a balanced plan is essential. There will be more discussion of this in the Future Strategies section of this report.

Support Equipment Replacement

Support equipment including Self Contained Breathing Apparatus and related equipment are not scheduled for replacement. Instead, the cost of support equipment is funded via the annual operating budget. ESCI advises developing a replacement schedule for support equipment along with apparatus.

RECOMMENDATIONS

- Assess the condition and consider replacement of Engine 3702.
- Assess the condition and consider replacement of Water Tender 3741.
- Set up an apparatus replacement schedule and fund it.

STAFFING

An organization's most valuable asset is arguably the people that work there. Therefore, it is important that special attention be paid to managing the human resource aspect in a manner that achieves not only maximum productivity but ensures a high level of job satisfaction for the individual employee. Consistent management practices coupled with a safe working environment, fair treatment, and opportunities for input and recognition by the workforce are key components impacting job satisfaction. This section provides an overview of PVFPD staffing configuration and management practices.

Administrative and Support Staffing

A primary responsibility of the fire department's administration is to ensure that the infrastructure and support elements are in place and functioning effectively to ensure the core mission can be accomplished; i.e., responding to and mitigating emergencies in a safe and efficient manner.

Like the rest of the fire department, administration and the support staff need the appropriate resources to function properly. In this section of staffing analysis, the ratio of administrative and support positions to total organizational staffing are compared to industry best practices and similar organizations. An appropriate balance of administration and support staff compared to operational resources and service levels is an important consideration to achieving a successful organizational.

Figure 44: PVFPD Staffing Configuration

Administrative & Support Staff	
Fire Chief	1
Battalion Chief	1
Prevention & Safety Captain	1
Officer Manager	1
Human Resources Personnel	1
Maintenance Coordinator	1
Total Uniformed Admin/Support Staff:	**6**
Percent administrative & support to total FD:	**22.2%**
Operations Staff	
Captains	3
Engineers/Apparatus Operators	3
Firefighter/Paramedics	3
Firefighter I and II	9
Reserves/Volunteers	3
Total Operations Staff:	**21**
Percent of operations officers to firefighters:	**14.3%**

The level of administration and support staffing is 22.2 percent of the total PVFPD staff. ESCI's experience in evaluating fire departments of comparable size to PVFPD shows that the effective administrative/support staffing totals typically range from 15 to 18 percent of department totals. However, fire districts tend toward the high end of the range because a district needs to provide support system infrastructure not required in municipal fire departments. A review of the PVFPD staffing model indicates that the Fire Chief, Office Manager, Human Resources personnel, Battalion Chief, Prevention Captain, and Maintenance Coordinator make up the administrative and support staff.

A review of this administrative staffing model indicates that for PVFPD the number of people at the administrative and support staffing level are able to effectively meet the demands placed upon them and should be able to sustain this number as the department grows larger. The Battalion Chief who is tasked with overseeing and directing the operational needs and training facets of the department is challenged to do the operational functions and may not be able to devote as much time as may be necessary to training aspects of his responsibilities. As discussed later in this document, providing an Assistant Training Officer to handle the day-to-day training needs may increase his effectiveness.

PVFPD is a defining example of the balance between top-down and bottom-up innovation. During stakeholder interviews, it was clear firefighters and officers were committed to the vision and direction established by Chief Schaefer. The executive staff recognized the benefit of empowering each firefighter to improve on the system and services provided. An example of empowerment is the delegation of a budget line item for each firefighter to develop and manage. Additionally, the Board of Directors were very clear that their role was not to micromanage routine operations, but rather to support the system needs communicated by Chief Schaefer. This is the basis of a very productive staff.

Emergency Response Staffing

An adequate number and properly trained staff of emergency responders is required in order to put the appropriate emergency apparatus and equipment to its best use in mitigating incidents. Insufficient staffing at the incident scene decreases the effectiveness of the response and increases the risk of injury to all those involved.

The first 15 minutes of any working fire is the most crucial period in the suppression of any fire. How effective and efficient the fire personnel perform during this period will have a significant impact on the overall outcome of the event. This general concept is applicable to not only fires but rescue operations and medical situations as well. Critical tasks must be conducted in a timely manner in order to effectively control a fire or complete a rescue and/or treat a patient.

Best practice in the fire service is to assess the relative risk of properties and occurrences, based on several factors. Properties with high fire risk often require greater numbers of personnel and apparatus to effectively mitigate the fire emergency. Staffing and deployment decisions should be made with consideration of the level of risk involved. There are two ways to compensate for staffing levels below the necessary levels. One is to depend on mutual aid responses which will be discussed further in this report; or to reduce risk through property-based fire suppression systems.

The level of risk categories used in the fire service industry are as follows:

- Low risk—Areas and properties used for agricultural purposes, open space, low-density residential, and other low intensity uses.
- Moderate risk—Areas and properties used for medium-density single-family residences, small commercial and offices uses, low intensity retail sales, and equivalently-sized business activities.
- High risk—Higher density businesses and structures, mixed-use areas, high-density residential, industrial, warehousing, and large mercantile structures.

Here is a sample of critical tasking analysis for the number of personnel required on scene for various levels of risk. This information is shown in the following chart, illustrating an example of critical tasking only and is not intended to conclusively define the actual personnel necessary at PVFPD based on risk:

Figure 45: Sample of Critical Task Staffing by Risk

Firefighter Personnel Needed Based On Level of Risk				
	Structural Maximum Risk	**Structure Significant Risk**	**Structure Moderate Risk**	**Non-Structure Low Risk**
Attack Line	4	4	2	2
Back-Up Line	4	2	2	(2)
Support for Hose Lines	4	3	2	
Search and Rescue	4	4	2	
Ventilation	4	2	2	
Rapid Intervention Team	4	4	2	
Pump Operator	2	1	1	1
2nd Apparatus/Ladder Operator	1	1	(1)	
Command	2	1	1	1#
Safety	2	1	1#	
Salvage	4			
Rehabilitation	2			
Division/Group Supervisors	(2)			
Total	**37–39**	**23**	**14–16**	**3–6**

() indicates tasks may not be required at all such incidents
 # indicates task may, at times, be completed concurrently with other position

Staffing the number of personnel to conduct all of the tasks is often beyond the capability of a fire department. Ultimately, staffing is often controlled by budget which is determined by the citizens through the governing Board/Council. Reduced numbers of emergency staffing will result in longer time to accomplish the necessary tasks and may result in larger fire losses. Conducting a critical task analysis for the types of responses that PVFPD has is recommended as a best practice. Information on this can be found in Appendix B. As an alternative to conducting a critical task analysis some departments utilize NFPA Standards to determine the minimum required staffing. This will be discussed in the following section.

Effective Response Force

An *effective response force* (ERF) is defined as "the minimum amount of staffing and equipment that must reach a specific emergency zone location within a maximum prescribed travel or driving time."[4] No community can reduce its fire risk to zero. Therefore, the objective of any fire department must be to determine (usually through a Standards of Coverage study) a proper balance between efficiency, effectiveness, and reliability, which will keep fire risk at acceptable levels, while at the same time achieving the maximum ability to save lives and property at a reasonable cost.

There are nationally recognized standards that determine the recommended minimum staffing numbers and maximum response times: NFPA 1710 for career departments, and NFPA 1720 for volunteer and combination departments. NFPA 1720 states that the following figure "be used by the *Authority Having Jurisdiction* (AHJ) to determine staffing and response time objectives for structural firefighting, based on a low-hazard occupancy such as a 2,000-square foot, two-story, single-family home without basement and exposures."[5] Neither NFPA 1710 or 1720 are mandatory requirements, but recommended guidelines based on a consensus of fire service experts.

Figure 46: NFPA 1720 Staffing & Response Time Standards

Demand Zone	Population/Demographics	Minimum Response Staff	Response Time (minutes)	Meets Objective
Urban Area	> 1,000 persons/sq. mile	15	9	90%
Suburban Area	500–1,000 persons/sq. mile	10	10	80%
Rural Area	< 500 persons/sq. mile	6	14	80%
Remote Area	Travel distance ≥ 8 miles	4	Depends on distance	90%
Special Risks	Determined by AHJ	AHJ decision	AHJ decision	90%

PVFPD firefighters respond from one station with a minimum staffing of four personnel plus one staff person in a command position in a fire situation. Of the minimum staffing of four personnel, one of the on-duty crew is assigned to the ambulance. When staffing is at full strength, there is a response force of six with one officer for command from the District.

Based on information from performance analysis section of this report, PVFPD is meeting NFPA 1720 for response time but not staffing on structure fires in some areas of the District.[6] It appears that 60 percent of the first alarm response or effective response force is required to be provided by neighboring departments, and 100 percent of the second alarm comes for outside agencies. PVPFD has excellent auto aid agreements in place. Additionally, stakeholder interviews indicated strong working relationships, especially with La Salle and Evans Fire Protection Districts.

[4] Fire & Emergency Service Self-Assessment Manual, 8th edition; Commission on Fire Accreditation International.
[5] NFPA 1720 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments, Article 4.3.2.
[6] NFPA 1720 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments.

Even with mutual and automatic aid responses, the number of personnel for an effective response force cannot be gathered within the time required by the standard. A more complete analysis of the available personnel through mutual aid is discussed in the Concentration section of this report. ESCI would recommend that PVFPD assess bolstering the number of firefighters available. This can be accomplished by hiring personnel, creating a volunteer staffing, or increasing the hours worked by the reserves.

Alternate Staffing

PVFPD uses reserves to staff additional firefighting positions. The process is to schedule them based on need. Reserve firefighters have expressed a desire to have a set number of hours each month as opposed to being called only when needed. This is an understandable request and yet the service demand is more seasonal and having reserves on duty when not needed is not very efficient. There may be some avenues to increase staffing on a routine basis when there is a need for them. The administrative staff might review those time periods that have the potential for the highest call volume, or look at known scheduled vacations by the regular staff and then set the reserve schedule to meet those time frames. PVFPD should consider the full-time firefighters vacation schedule and accordingly schedule the reserve firefighters to increase staffing. Having an additional reserve firefighter to bolster the daily minimum staffing number could possibly be an advantage without being excessive in cost. However, this bears further consideration and additional options will be addressed in the Emergency Medical Services section of this document.

Most rural fire departments face the challenge of maintaining the necessary level of command staff, 24 hours a day, seven days a week. Too often command staff are limited in time off, negatively impacting their personal lives. PVFPD senior staff is not immune to these challenges. A specific area for consideration is the single Battalion Chief. This individual serves as the Operations Chief, Training Chief, and Battalion Chief. PVFPD Battalion Chief currently works a four-day schedule, leaving a gap for command staff on the fireground Friday through Sunday. The system supplements Captains and neighboring Chiefs for events during this period. ESCI recommends the creation of an additional Battalion Chief position. The individual would serve as a command officer during the three-day gap, and assume the responsibilities of Training Officer. Based on the strong working relationship with neighboring districts, there is an opportunity to create a shared position that can benefit multiple agencies in a cost-effective manner. On several occasions, PVFPD has informally re-assigned crews to neighboring districts during staffing shortages. This demonstrates exceptional cooperation and supports the development of cross staffing between fire protection districts.

EMS Staffing Models

Recruitment and retention were a consistent concern during all of the internal/external stakeholder interviews. The focus was the need for paramedics, and the issues involving larger departments pulling trained staff from the system. Paramedic shortages are prevalent throughout the state. ESCI recommends a dynamic recruitment program that redefines the challenges of staffing a rural EMS system into a benefit.

Based on previous discussions in this document, purchase of an ALS ambulance affords the department the opportunity to pursue numerous staffing models. The models could help transition from short to long term staffing goals. Following are potential solutions for consideration:

- Civilian Paramedic/EMT Staffing—This would be a temporary solution, hiring paramedics and EMTs without fire training. Payroll obligations would be less than career firefighter, and the pool to select from would become significantly larger. Turnover would have less of a training impact and if the selection process was comprehensive, the performance of new employees would meet early expectations. Long term goals would be to transition these individuals to career firefighters which will be discussed later in this section.
- Tiered Response—Based on the percentage of BLS transports (42%), it is conceivable for PVFPD to staff their ambulance with two EMT-Basics. When the department encountered an ALS patient, the paramedic on the engine would move to the ambulance, provide ALS care, and transport to the appropriate facility. Specific protocols have to be written for BLS response and transport. ESCI recommends active participation with the Medical Director during the development of the program.
- Full Fire-Based EMS—This would be a long-term goal where PVFPD hires and staffs career paramedic/EMTs on the ambulance who are cross-trained as firefighters. Consideration for this plan should be in concert with potential unifications with neighboring fire districts.

Recruitment

After selecting a staffing model, the next step would be a dynamic recruitment process. PVFPD is located in prime location that combines the benefits of a rural community with proximity of urban resources. This combination provides affordable housing, state of the art medical care, and a major university. PVFPD should consider a recruitment process that begins with social media. Numerous companies can help with search engine optimization so PVFPD can target markets, where candidates are looking for opportunities in communities like those found in Weld County.[7]

As mentioned in the introduction to this section, PVFPD can use the challenges of recruiting for a rural system into an opportunity for growth. Consider embracing the concept of individuals using PVFPD as a transition to larger urban departments. This system would create two career paths. The first being a long-term member of department who will progress into future leadership, and the second a transitional firefighter who takes the training and experience to another organization. Individuals who commit two-to-four years to PVFPD will fill necessary positions and provide stability during the transition years, while the District considers consolidations or manages growth. In return, the new firefighter gains exposure to all aspects of the fire service from EMS to special teams. The reputation of PVFPD training program will reflect in the hiring practices in urban departments. This concept could become a strong marketing tool and significantly reduce the challenges of staffing.

[7] https://www.capterra.com/p/151962/SEMrush/ http://brandtech360.com/

Possible options could include the following:

- Revitalize the Reserve Firefighter Program
- Civilian EMT/Paramedic Program
- Modified Residency Program
- Affiliation Programs with Urban Departments
- Enhanced EMS Training Program
- Affiliation with Aims Community College/University of Northern Colorado (UNC)

Focusing specifically on UNC, the opportunity to work for a progressive fire department while getting a four-year degree would be very desirable. This would fit well if PVFPD utilized a civilian staffing program or tiered response system.

A third option for recruitment would be participation at the local, regional, and state EMS conferences. Begin the process by evaluating markets that have similarities to the communities within Weld County. The EMSAC conference is an excellent example where firefighters would have an opportunity to share the success of PVFPD and connect with potential candidates.[8]

Staff Allocation to Functions and Divisions

Due to limited resources, PVFPD staff are all expected to function in different capacities. Based on stakeholder interviews and the survey process, firefighters have demonstrated best practices when providing service. Numerous crew members described the challenges of having to switch seating positions on a routine basis. ESCI recognizes the necessity of this type of allocation in the rural setting. An area for improvement would be the completion of Standard Operating Guidelines (SOGs) for each riding position and activities on the fireground. These documents would make the transitions easier and promote consistency. PVFPD is currently developing SOGs for special team response, and likewise, ESCI recommends completion of fireground SOGs. The development of comprehensive SOGs will contribute to the success of training and staffing models.

To further validate the analysis process, results are compared with records from actual working fires and similar incidents from previous years. Overall results are reviewed to determine if the actions taken within the early minutes of an incident resulted in a stop-loss or not, and if additional resources were required. The critical task analysis process demonstrates the rate in which the current deployment plan results in stopping loss a high percentage of time within initial critical time goals.

Currently, PVFPD lacks operating procedures that would ensure a standard method of operating at the various types of incidents, e.g., a residential structure fire. ESCI would recommend that Standard Operating Guidelines (SOGs) be developed for the types of emergency calls to which PVFPD responds.

[8] 2018 Colorado State EMS Conference. November 8–11, 2018. Keystone Resort & Conference Center, Keystone, CO.

Besides responding to fire and medical emergencies, PVFPD personnel also respond to special type emergencies such as confined space rescues, high/low angle rescues, and hazardous materials incidents, to name a few. There are specialized regional teams that are assigned to handle these types of emergencies and PVFPD has a large number of its line firefighters assigned to these teams. While it is a critical need, when one of these types of specialized calls occurs, it draws from the current daily staffing level in order to meet the personnel needed to handle the incident. This has the potential to strain the maintenance of minimum staffing levels, at least until such time as an overtime person may arrive to fill that seat on the engine. It may be necessary for PVFPD to assess how often overtime personnel are needed for a special team's incident, and/or how many of its line personnel may actual become a member of these specialized teams. This also factors into the daily scheduling of reserves as previously mentioned.

RECOMMENDATIONS

- Consider collaborative hiring of Battalion Chief/Training Chief position.
- Consider alternate EMS staffing models.
  - Civilian EMT/Paramedic Staffing
  - Tiered Response System
    - Require active involvement of Medical Director during development of the program.
  - Full Fire Based EMS
- Develop dynamic recruitment program.
  - Utilize Social Media with Search Engine Optimization
  - Consider Duel Career Path Program
  - Recruitment at Local, Regional, State EMS Conferences
- Evaluate increasing the number of firefighters available on-duty.
- Complete Standard Operating Guidelines (SOGs) for each riding position and activities on the fireground.

CRITICAL ISSUES

ESCI conducted interviews with stakeholders, both internal and external to the organization. Through this process the critical issues are identified. Comparing information gained through these different interviews, ESCI has identified common issues.

The main issue identified by the Fire Chief is knowing what items need to be considered for the future of the District. This master planning study should provide a basis for moving forward and planning appropriately for the future. The plan will become a dynamic document as challenges and opportunities change in the future. The different planning processes will be discussed in length in the Planning for Fire and EMS section.

One expressed concern was the continuing loss of personnel to larger agencies where salaries are higher. The inability to compete with the compensation is not an unusual problem for smaller agencies, especially if the level of training is high. This is a two-edged sword in that the District will gain a reputation for excellent preparation for those looking to start in the fire service. This will allow PVFPD to recruit the best candidates. The downside is that there will be a number of personnel that will move on. In the Staffing section there is a discussion regarding maximizing the attributes that PVPFD has to recruit personnel.

PVPFD operates with a large portion of revenue from oil and gas production. This is used to provide protection to the many sites and personnel related to that industry. The concern is the volatility of gas and oil prices and the potential for budgetary issues. In the Financial section of this report, projections are made for various future possibilities. One of the models examines the drop of oil and gas revenue and the impact on the budget. This is an issue that must be examined and mitigated by maintaining higher reserves than other districts may maintain.

Both internal and external organizations identified that there is a certain probability that a large incident will occur. The concern is whether there will be the sufficient staffing to handle these incidents. This is not an unusual problem for smaller or even medium-sized departments. Most departments cannot staff for the worst-case scenario or the low frequency, high acuity incident. Departments in both urban and rural settings depend on mutual or automatic aid to increase the staffing on the large incident. The difficulty in the rural setting is that the response from the aid-giving department may be a considerable distance away, extending the time for arrival. The issue is examined in some detail in both the Staffing and Concentration sections of this report.

A pressing issue is the concern over the current EMS transport system used by the District. Currently, the issue is not being able to operate on all three shifts due to the lack of qualified paramedics on each shift. Also, there is a concern that the current operation with Banner Health may be short-lived. There is a sense that the operation will not continue. A full discussion of this potential failure and possible opportunities can be found in the EMS section.

SERVICE DELIVERY AND PERFORMANCE

Service delivery is the foundation of any service-oriented organization. Without an understanding of how services are organized, deployed, and managed, efficiency and effectiveness cannot be quantified. This section of the report will analyze multiple facets of the current delivery of fire services for the Platte Valley Fire Protection District, including the identification of incidents by type and frequency, population demographics, deployment analysis, system reliability, and a summary of performance. By understanding current performance and how the system functions, goals and objectives for future performance improvements can be established and implemented.

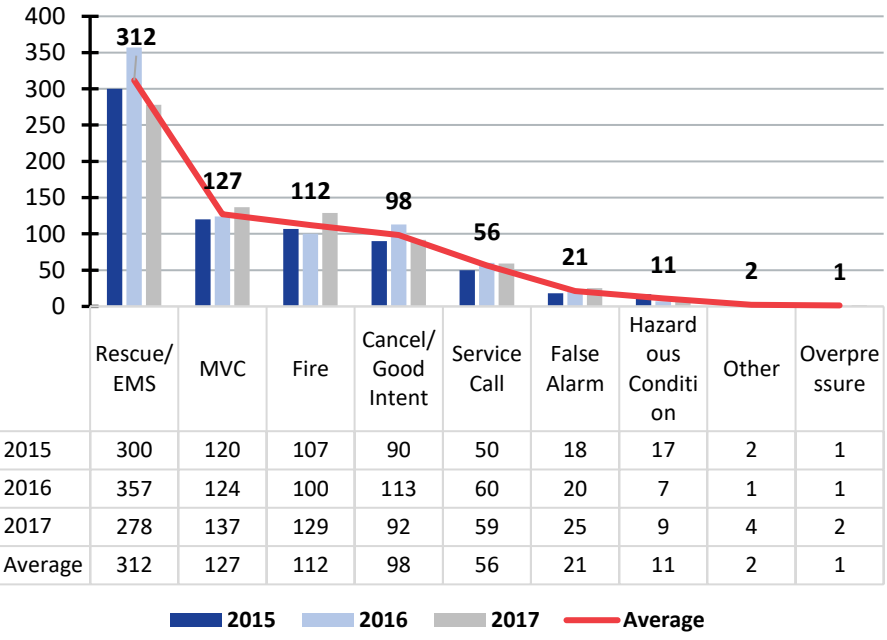
Service Demand Analysis

Incidents by Type

The ways in which demand for service occur often follow predictable patterns over time. To identify those patterns occurring in Platte Valley, an analysis and geographic display of current service demand by incident type and temporal variation using data obtained from the PVFPD Records Management System (RMS), Emergency Reporting. Incident types were selected based on the classification system established by the National Fire Incident Reporting System (NFIRS) and temporal variation, or the way service demand changes over time, were analyzed by month, day, and by hour.

In the following figure, incidents were categorized by type to provide a global comparison of the nature of service demand in PVFPD. The red line illustrates the average number of calls in each category and how these totals compare with each other.

Figure 47: Incidents by Type, 2015–2017

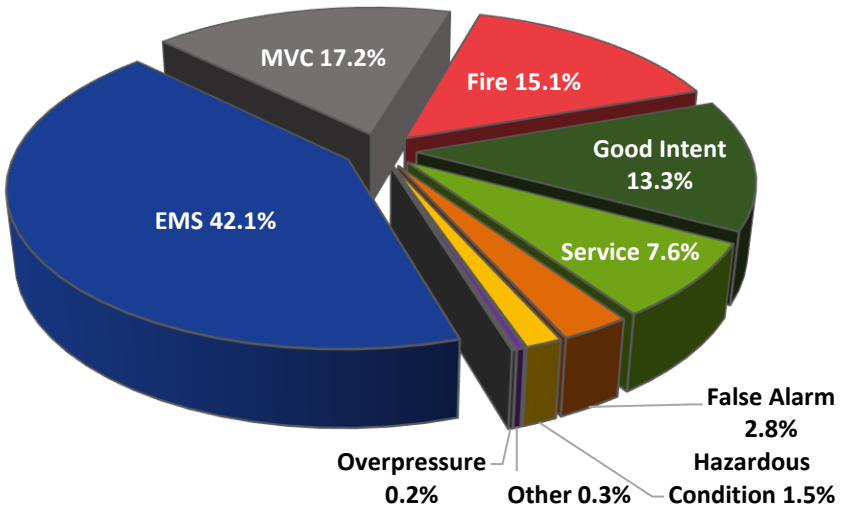


	Rescue/ EMS	MVC	Fire	Cancel/ Good Intent	Service Call	False Alarm	Hazardous Condition	Other	Overpressure
2015	300	120	107	90	50	18	17	2	1
2016	357	124	100	113	60	20	7	1	1
2017	278	137	129	92	59	25	9	4	2
Average	312	127	112	98	56	21	11	2	1

As illustrated in the previous figure, EMS/Rescue represents the greatest impact to service demand, followed by Motor Vehicle Collisions (MVCs), then Fires. The remaining 25.6 percent of service demand is composed of Good Intent calls, Service Calls, False Alarms, Hazardous Condition responses, Other, and Overpressure responses.

Another way to examine service demand by type is with a pie chart. Shown in Figure 48 are incidents by type with their relative frequency provided for each segment. By examining the figure, demand for EMS, MVCs, and Fires are major contributors to Platte Valley's overall response characteristics.

Figure 48: Incident Type by Frequency

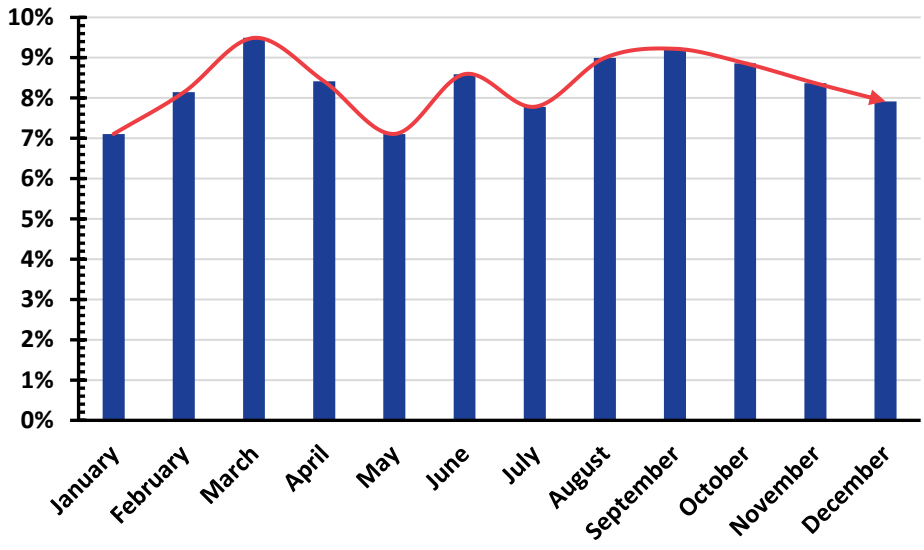


Temporal Variation

In addition to understanding the types and frequency of service demand, an understanding of when these events occur is critical to knowing when system demand will most likely be at its greatest. Understanding when high demand periods occur will assist administrators in determining whether staffing levels are sufficient for the demand, and also in scheduling additional duties such as training, fire safety inspections, and vehicle maintenance.

The following figure presents the temporal variation of Platte Valley's service demand by month. Each month is represented by the number of incidents occurring in that month compared to the total number of incidents that occurred from January 1, 2015 through December 31, 2017. These are presented as percentages relative to total service demand that occurred during the period of analysis.

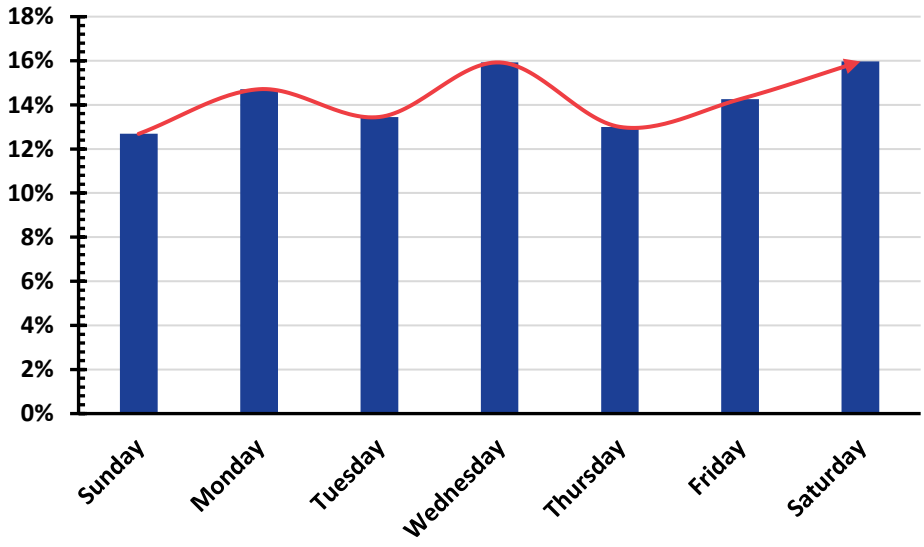
Figure 49: Service Demand by Month, 2015–2017



When service demand by month is examined, the pattern of demand is relatively stable with January and May presenting the lowest periods of demand, and March having the greatest period of demand. However, when taken in context, the average annual difference in this volume was 13.7 calls and represents an approximate 0.5 calls per day difference.

Next, demand for service is examined by day of the week. Each day is presented as its relative frequency of occurrence.

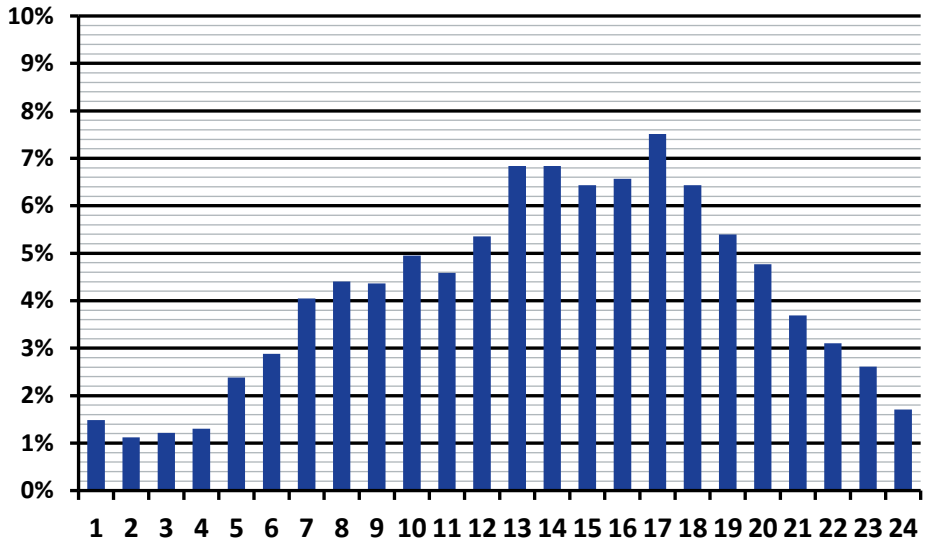
Figure 50: Service Demand by Day, 2015–2017



This figure provides a similar pattern of relatively stable service demand across the week with Wednesday and Saturday representing the greatest levels of demand and Sunday the lowest. But, as previously mentioned, the actual count of incidents and impact experienced by on-duty crews is negligible due to low call volumes.

Finally, demand by hour of day is examined during the three-year period, 2015–2017.

Figure 51: Service Demand by Hour, 2015–2017



The pattern of service demand by hour of day reveals a common pattern of activity with demand peaking from midday through the afternoon and dramatically tapering off during the evening and night hours. This suggests that service demand is dependent upon when people are most active. Thus, staffing available from 8:00 a.m. through 8 p.m. is the most effective use of personnel, as 70 percent of service demand occurs during this time.

Service Demand Distribution

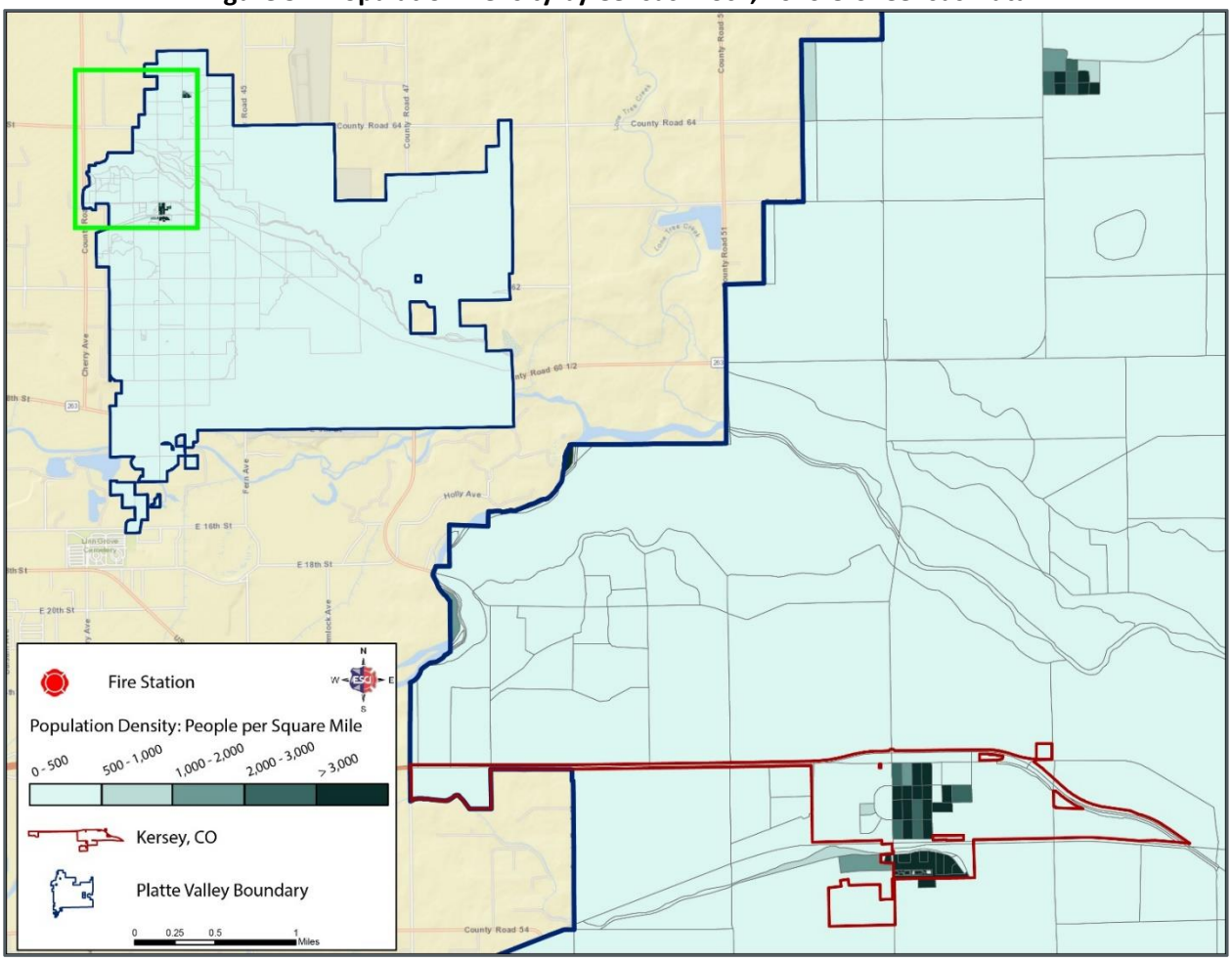
The location and distribution of where emergencies tend to occur, the location of resources, and where people live can dramatically affect a fire department's ability to provide quick and effective services. In this section, several attributes of the geographic distribution of Platte Valley's population and service demand are examined.

Population Distribution

As previously discussed, increases and decreases in the activity of the population within the District appears to affect the levels of service demand experienced by the organization. To provide a foundation for this observation, the distribution of the population was examined and presented in the following figure.

In the next figure, population is presented as densities per individual U.S. Census block. The use of blocks was selected as census blocks are the smallest level of division used by the U.S. Census Bureau. Although block data is updated only once every 10 years, individual blocks with population information based on the 2010 U.S. Census provide a greater level of detail for analysis.

Figure 52: Population Density by Census Block, 2010 U.S. Census Data

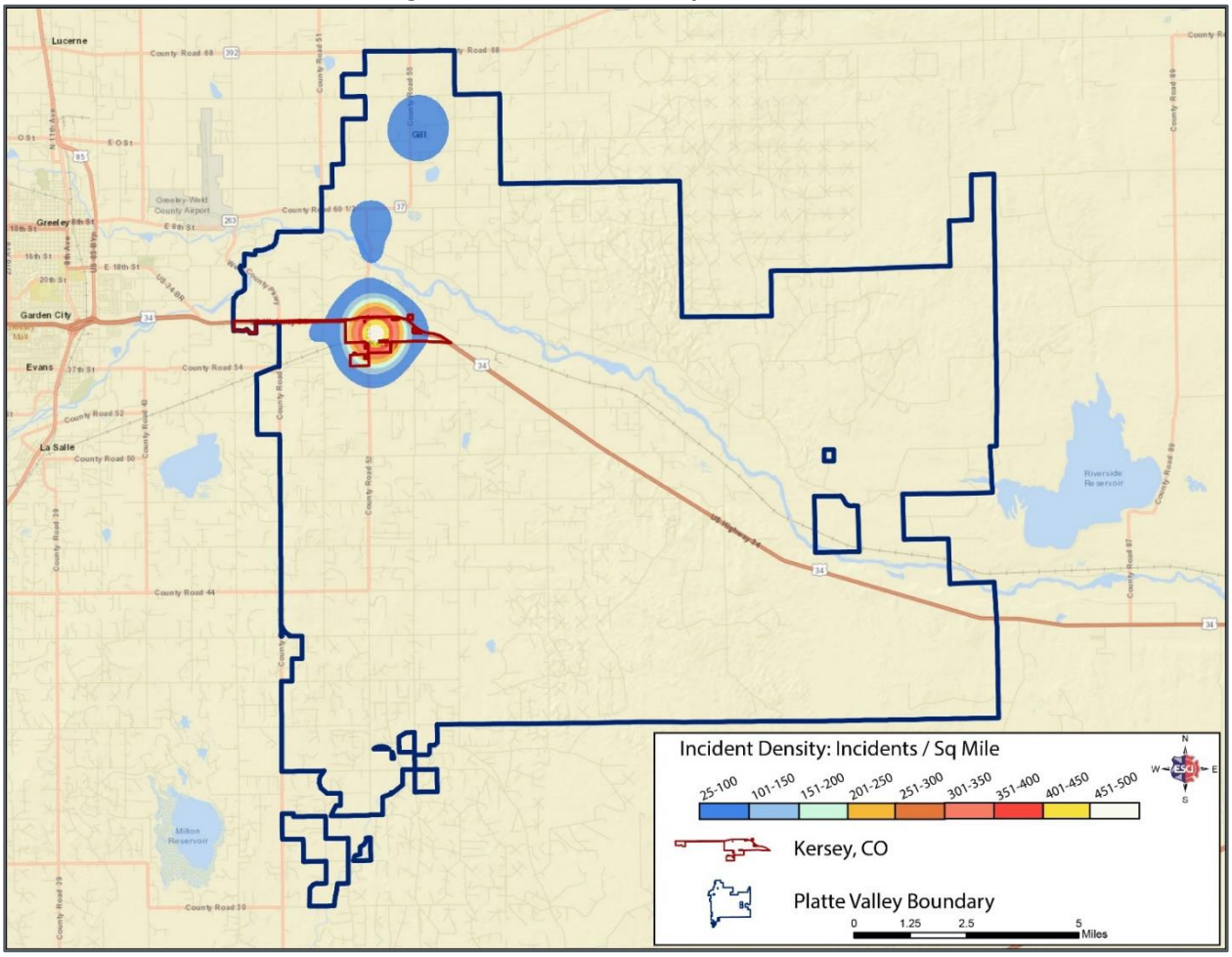


In this figure, it is apparent that most of the District is rural in nature with population densities of less than 500 people per square mile with higher density areas located within the Town of Kersey and the community of Gill. A more detailed view of this area is also displayed and illustrates more highly dense census blocks in the center of Kersey and Gill. Although the centers of dense population are relatively compact, the overall population of the District, approximately 4,406, spread over a large geographic area means that many could experience extended travel times while awaiting emergency service's arrival.

Service Demand Distribution

Although an emergency could happen anywhere, they tend to occur in groups or clusters near populated areas. In the following figure, the calculated incident density, or Hot Spot map, is displayed. This figure displays the calculated incident densities based on each incident's auto-spatial correlation, or closeness, to one another, and provides a scale of intensity if these incident densities were to occur across a square mile area. The data used to create this figure are based on emergency calls occurring within the PVFPD service area from January 2015 through December 2017.

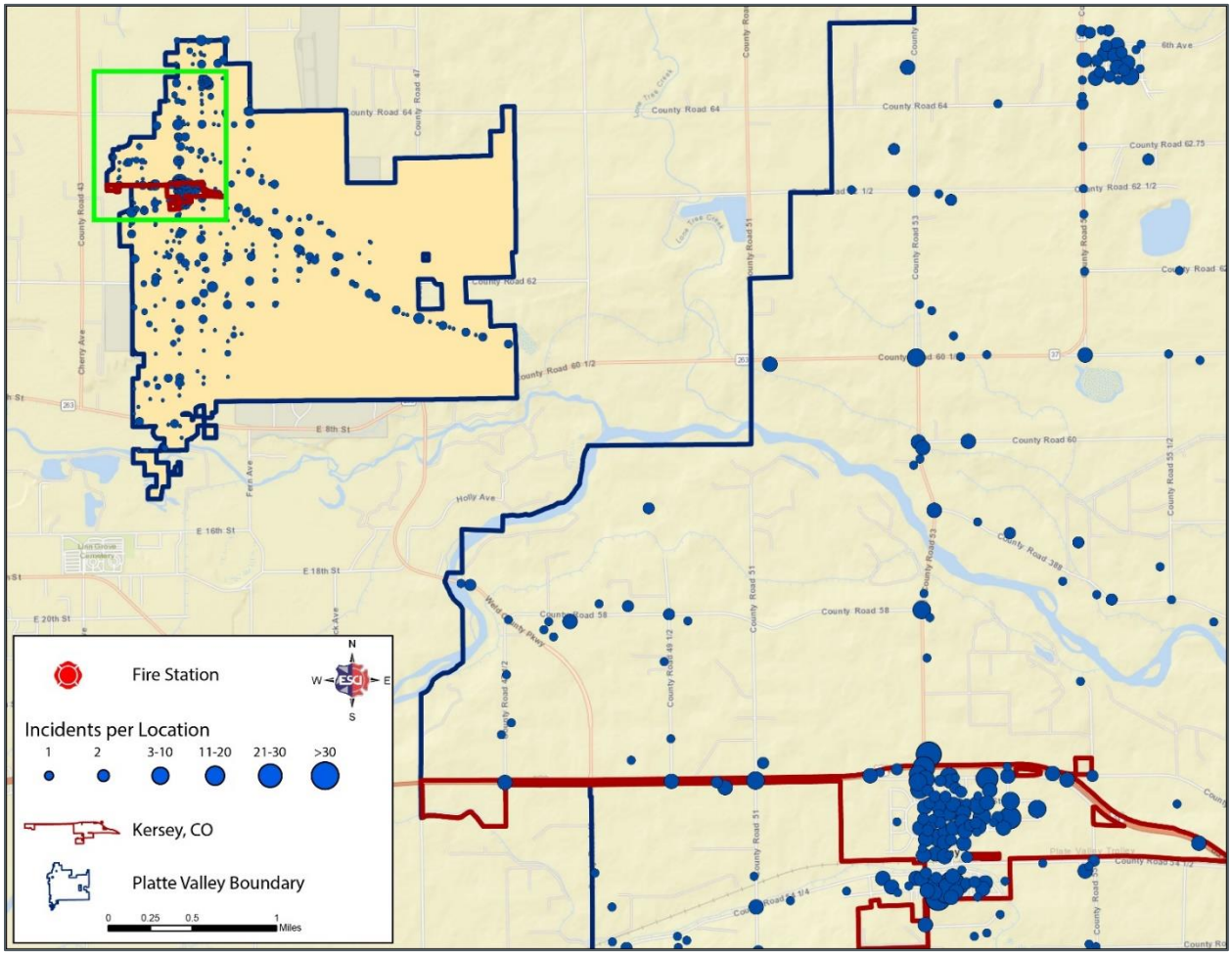
Figure 53: Incident Density, 2015–2017



As seen in this figure, the greatest levels of incident density occurred in densely populated areas of the District, primarily in Kersey. However, this does not necessarily mean that the majority of calls occurred in the areas displayed. From 2015–2017, approximately 42 percent of incidents occurred within the Town of Kersey, with 58 percent occurring in the District. The important consideration from this figure is that a large percentage of service demand, 42percent, occurred in a relatedly small geographic area in close proximity to the fire station.

Next, the actual locations of incidents and their relative frequency of occurrence by location are illustrated. An understanding of how often the fire department responds to the same location and how this distribution is spread across the District is important because locations of high incident occurrence may require further examination by the District to identify potential methodologies of reducing risk in the community.

Figure 54: Incident Frequency, 2015–2017



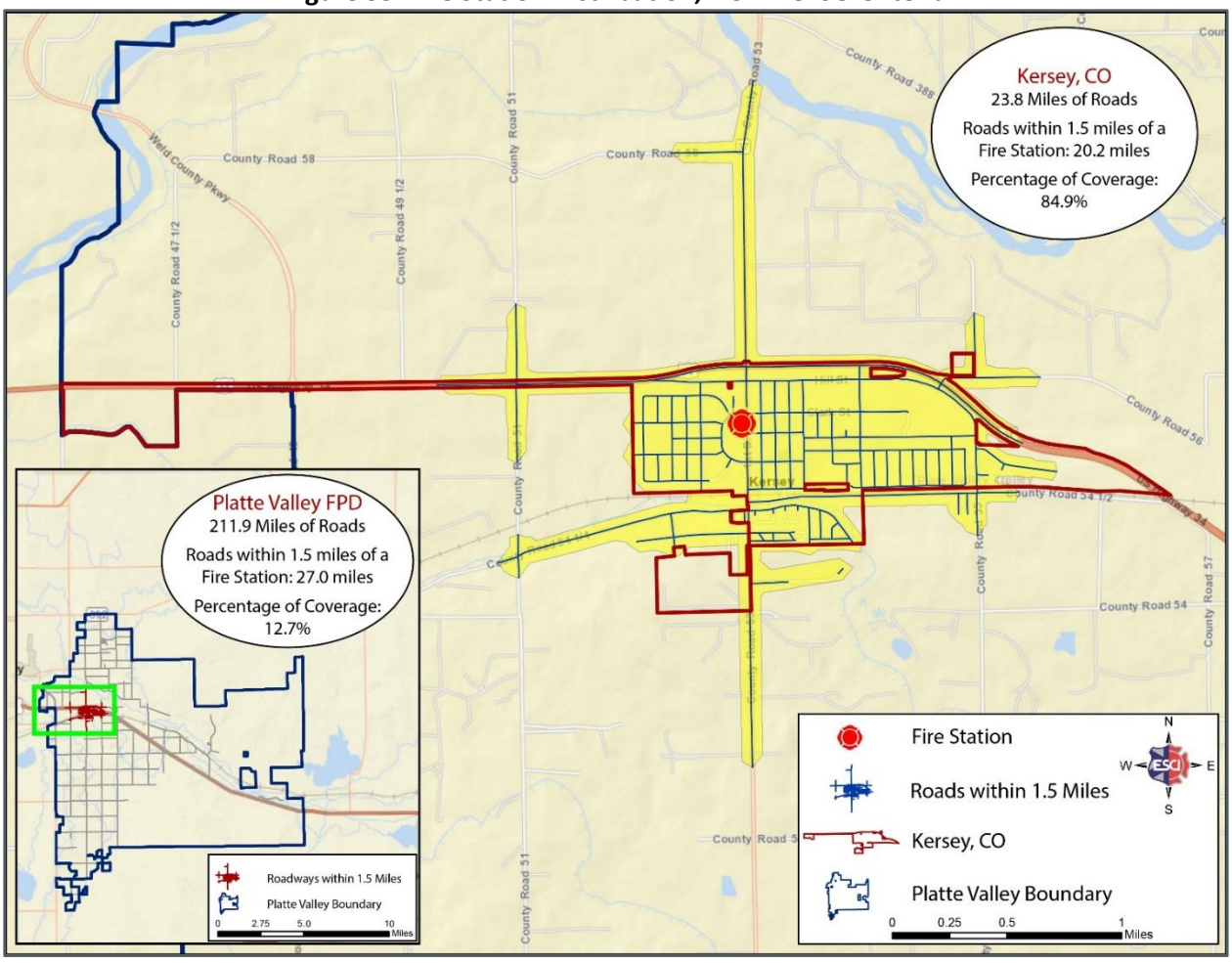
A comparison of the previous two figures illustrates the density and relative closeness of incidents identified in the Hot Spot map. While incidents tended to mostly occur on the western third of the District, multiple incidents were also reported along Highway 34 stretching east to the District border.

ISO Station Distribution

Several national consensus standards exist for evaluating fire departments. One is the Public Protection Classification (PPC) system developed by the New Jersey-based advisory organization Insurance Services Office (ISO) to provide insurance carriers with a classification rating of a local community's fire protection. The PPC score classifies communities based upon a rating scale of 1 (best protection) to 10 (no protection) and assesses all areas related to fire protection, broken into three major categories including; emergency dispatch and communications (10 points); water system supply and distribution capabilities (40 points); the fire department itself (50 points). A fourth category is community risk reduction which can add up to 5.5 additional points. The PPC score is developed using the Fire Suppression Rating Schedule (FSRS), which outlines sub-categories and the detailed requirements for each area of the evaluation.

Using FSRS service area guidelines, the following figure provides an illustration and statistics of PVFPD's capabilities to provide an engine company response, both within the Town of Kersey and the District.

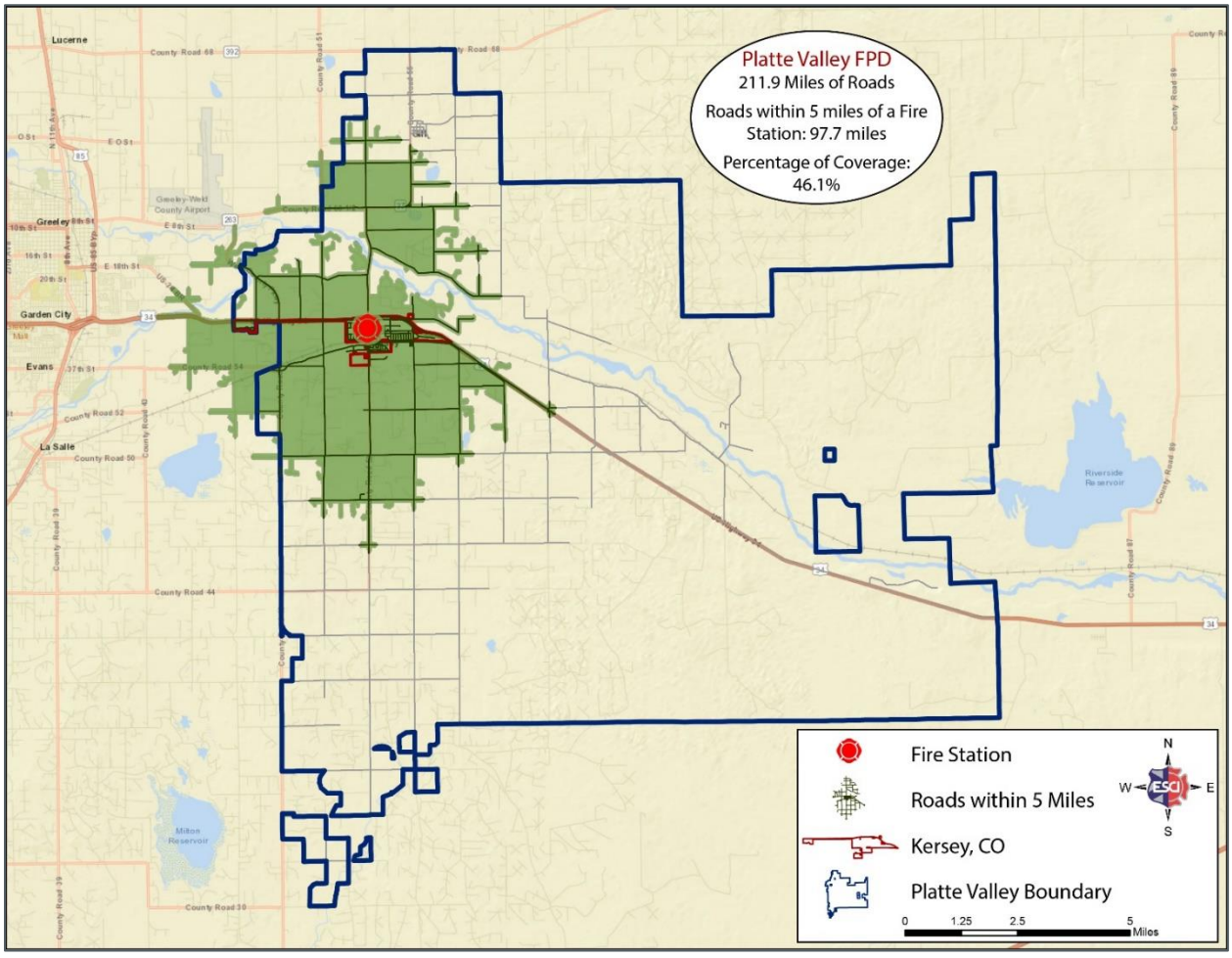
Figure 55: Fire Station Distribution, 1.5 Mile ISO Criteria



Based on ISO criteria, the PVFPD can provide approximately 85 percent coverage to available road miles within the Town of Kersey. Because of the size of the jurisdiction and relatively low coverage available, PVFPD should anticipate a split rating from ISO, meaning that some areas will receive a higher or lower rating than others based upon a structure's proximity to a fire station and the availability of an adequate water supply. The coverage within Kersey exceeds the ISO base and should be presented as documentation on subsequent ISO evaluations for consideration. However, the approximate 13 percent coverage of the District's road base is well below the threshold and may be considered as part of the base for areas within 5 road-miles of the fire department for the road base calculation. Areas outside of the 5-mile base, and lacking adequate fire flow, will most likely receive a rating of 8B or less.

The next figure provides the 5-mile road base coverage statistics.

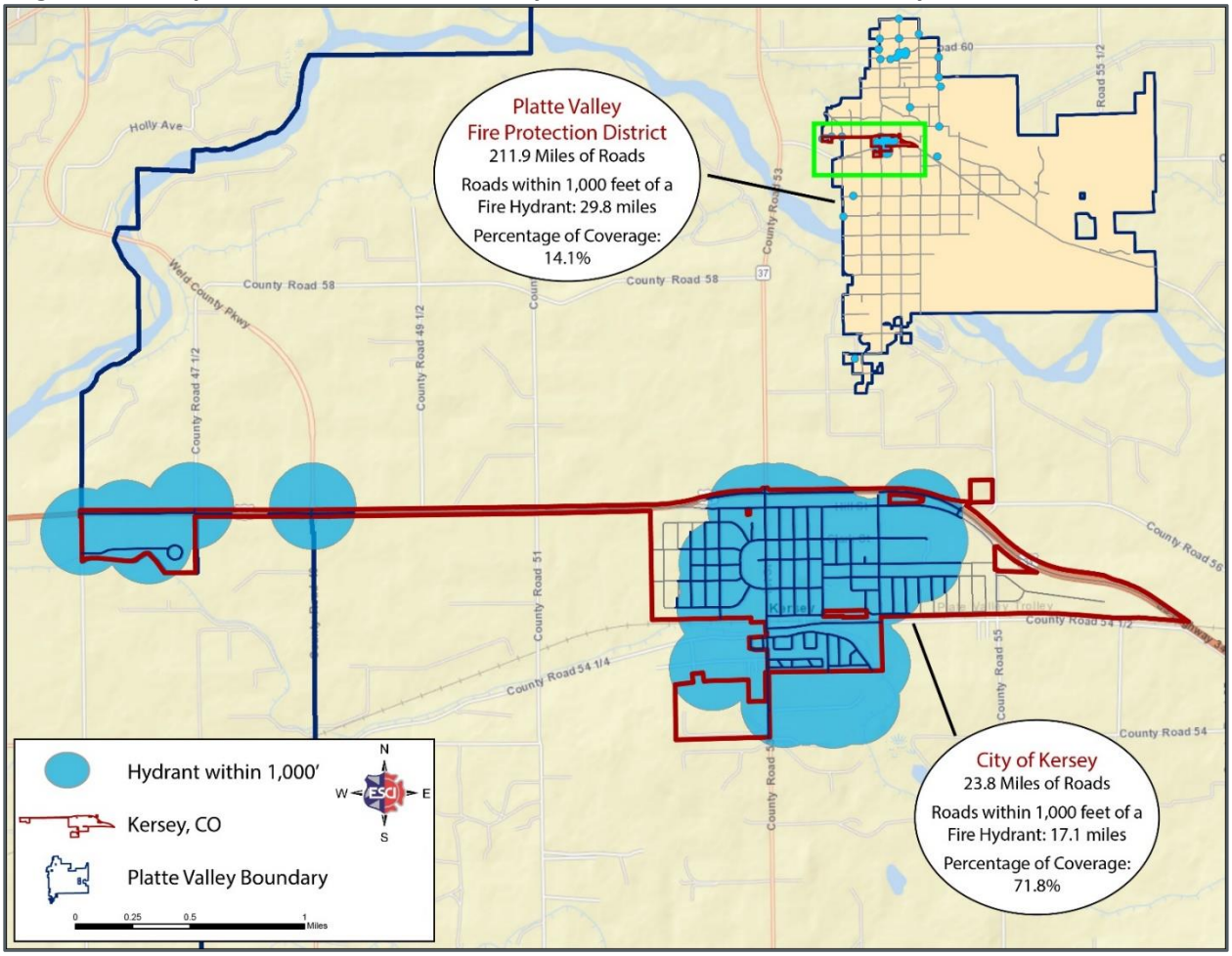
Figure 56: Fire Station Distribution, 5-Mile ISO Criteria



This figure provides the 5-mile road base for PVFPD. At 46 percent coverage, the District can most likely anticipate receiving the base scoring awarded by ISO. Additionally, depending upon how the split rating is divided, 1.5-mile engine company coverage of the 5-mile area is approximately 28 percent of the road base and would not contribute to additional credit by ISO.

Proximity to the fire department is not the only criteria used by ISO to establish credit for fire department protection. An adequate water supply must be available to provide sufficient fire flow based upon the Needed Fire Flow (NFF) of a given structure. The following figure provides an illustration of areas within 1,000-feet of a fire hydrant that would meet ISO NFF requirements.

Figure 57: Comparison of Fire Station and Hydrant Distribution, Area with Hydrants within 1,000 Feet



As seen in the figure, the Town of Kersey is capable of providing hydrant coverage to 72 percent of its road base, while in the District, only 14 percent coverage is available. Additionally, most of the densely populated areas of the District have an adequate source for NFF available. An exception to the 5 road-mile and the requirement of structures to reside within 1,000 feet of a fire hydrant is available. If the fire department can demonstrate that an effective tanker-shuttle operation may be employed to provide sufficient fire flow to a structure, the distance requirements may be extended. However, for any drafting areas, locations where water is transferred to fire apparatus that will then be shuttled to the scene of the fire, that are not connected to water service provider connections, a determination of water level and volume must be conducted by a qualified firm and submitted to ISO for review for applicability. Areas lacking these qualifications will most likely not be considered for available water supplies for NFF credit calculations by ISO.

NFPA 1720 Distribution

While ISO criteria is focused on fire suppression activities exclusively, NFPA standards provide benchmarks for all areas of responsibility for a fire department. As previously stated, PVFPD's size and distribution provide several challenges for providing fire suppression and rescue coverage. In this analysis, several travel time areas were calculated based on the current location of the fire station. Because PVFPD is a combination department, with more than 85 percent of the department composed of career staff, technically NFPA 1710 could apply to the department. The criteria in NFPA 1710 predisposes an urban environment throughout the District. This does not fit the PVFPD, so NFPA 1720, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments*, is deemed more applicable. The standard will allow for differing response zones based on population density.

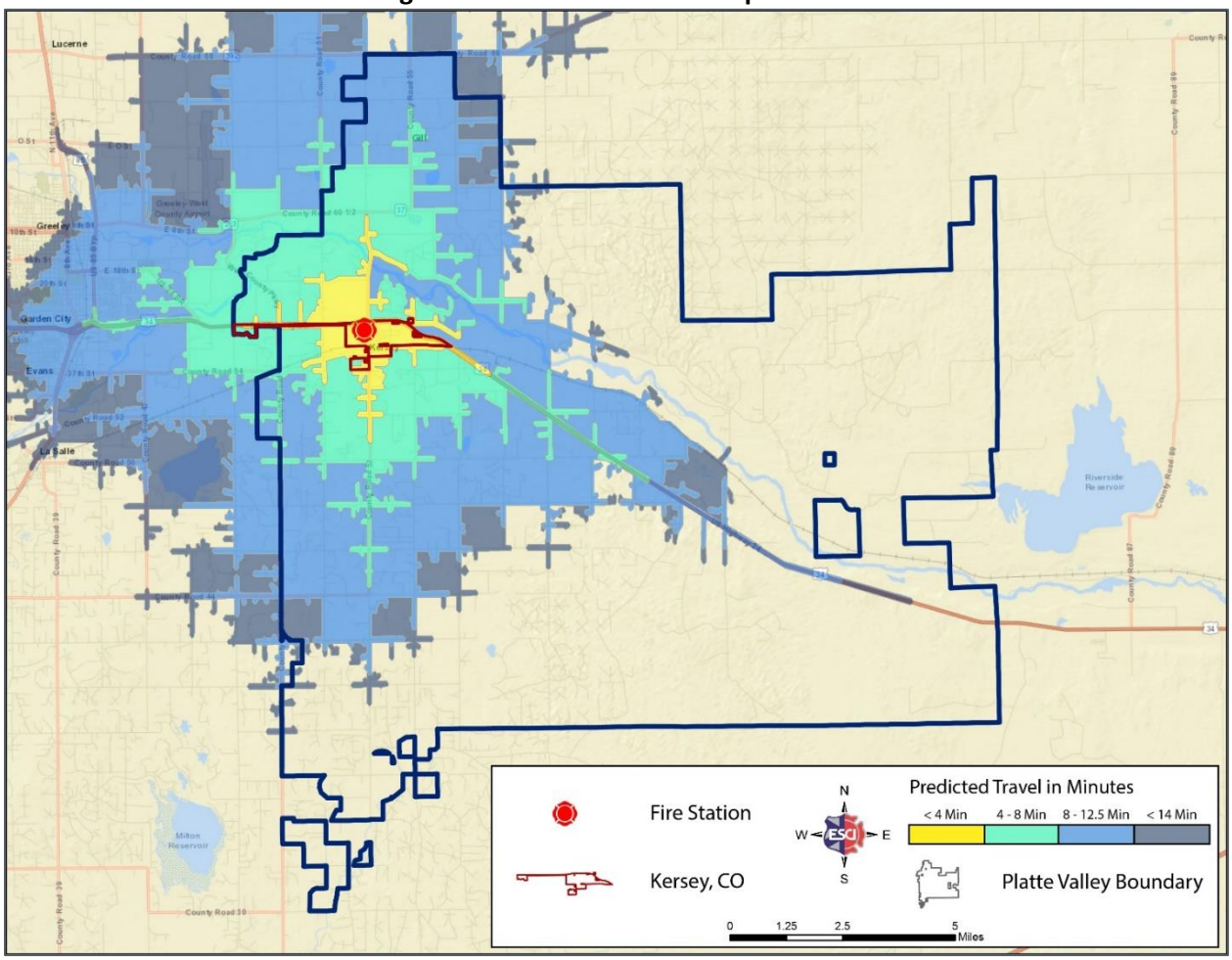
Figure 58: NFPA 1720 Deployment Criteria

Demand Zone	Population/Demographics	Minimum Response Staff	Response Time (minutes)	Meets Objective
Urban Area	> 1,000 persons/sq. mile	15	9	90%
Suburban Area	500–1,000 persons/sq. mile	10	10	80%
Rural Area	< 500 persons/sq. mile	6	14	80%
Remote Area	Travel distance ≥ 8 miles	4	Depends on distance	90%
Special Risks	Determined by AHJ	AHJ decision	AHJ decision	90%

Due to the diverse composition of the District and the location of the single fire station, PVFPD may consider the establishment of service demand zones within the District. The use of service demand zones allows for the establishment of realistic benchmarks for performance based upon the demonstrated capabilities of the department. For example, based on NFPA 1720 definitions, the Town of Kersey has an urban population, while the majority of the District is rural, and areas far to the east of the District may be considered remote. Based on the distribution of service demand, providing performance metrics for Districtwide performance would result in lackluster performance overall and an unrealistic representation of performance within the Town of Kersey and to areas in remote portions of the District.

To illustrate the projected capabilities of the department, the following figures provides calculated travel times from the fire station outward in to the District at multiple intervals. These intervals were selected as they represent benchmarks established within NFPA 1720 for performance.

Figure 59: Calculated Travel Capabilities



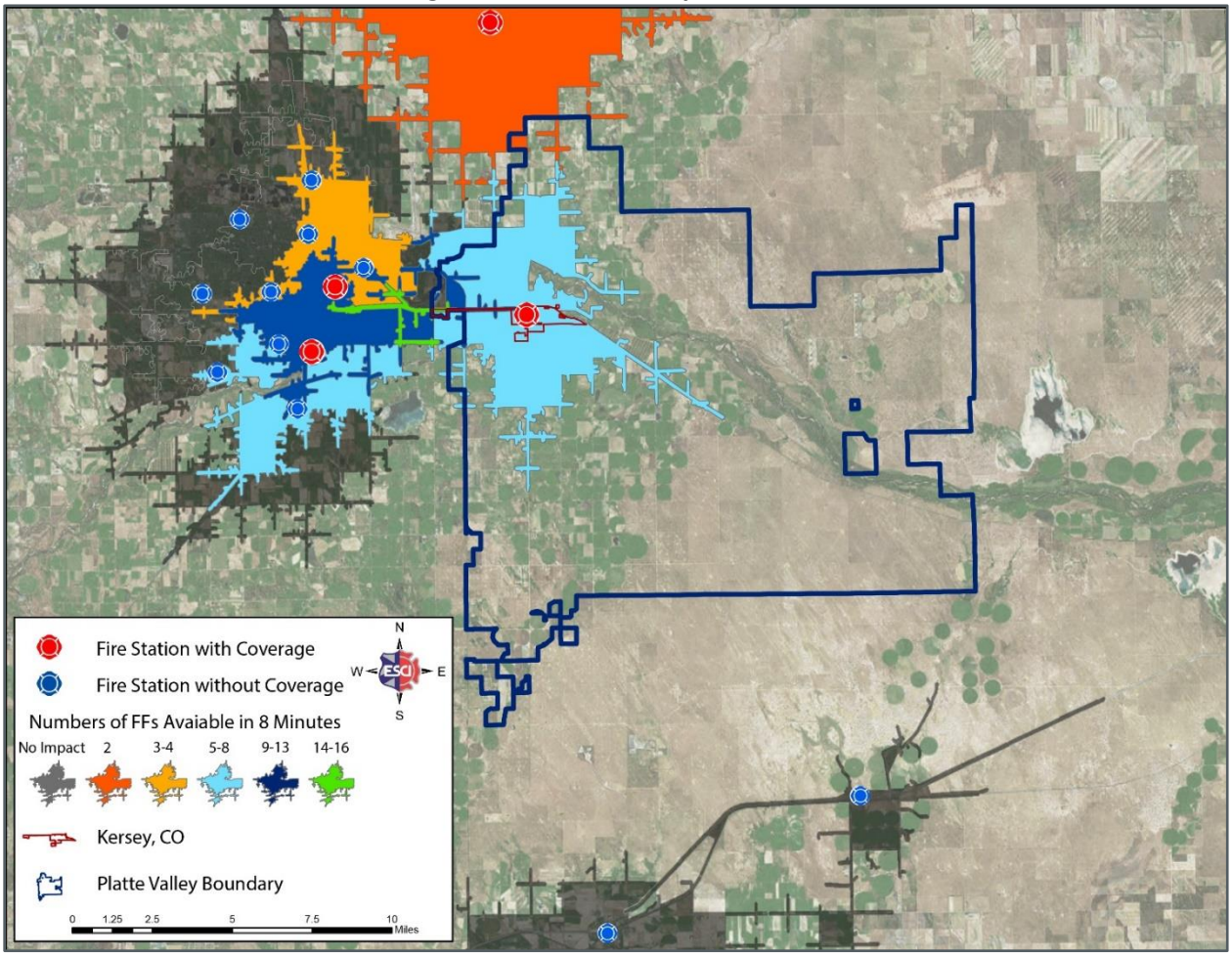
As illustrated in Figure 59, most of the Town of Kersey is lies within a 4-minute calculated travel time and PVFPD's densely populated areas lie within an 8-minute travel. These times were selected as they are used as benchmarks for both EMS and career department unit travel times. In remote areas, an Effective Response Force (ERF) should be assembled within 14 minutes of initial notification; however, NFPA 1720 provides a 90 second turnout time for staffed combination departments which would provide 12.5 minutes for travel. As shown in this figure, PVFPD should have the capability to respond a first due unit to most areas in the District within or near the NFPA 1720 standard. However, for incidents requiring more than one unit or the staffing normally available for that unit, personnel need to establish the ERF may not be available.

Concentration Study

The ability for fire departments to assemble resources from multiple areas to initiate safe and effective fire suppression and rescue operations is critical to the overall success of the department. In the previous section, the requirements of NFPA 1720 were benchmarked.

The following figure presents a resource concentration analysis for PVFPD using NFPA 1720 standards for the assembly of an Effective Response Force (ERF). In this figure, fire resources are provided 12.5 minutes of travel from their respective location to the incident. The results are provided below.

Figure 60: Effective Response Force



Reliability

The percentage of time that a unit is committed to an incident affects its availability to respond to other incidents as they occur. For example, if a unit is committed to calls 30 percent of the time, they cannot be reasonably expected to meet 90th percentile goals as other units must travel in to the area to pick up the additional workload. Additionally, when multiple incidents, referred to here as concurrent calls, occur simultaneously, it can create a strain on department resources and affect a jurisdiction's ability to muster sufficient resources to respond to additional emergencies.

Unit hour utilization (UHU) analyzes the amount of time that a unit is not available for response because it is already committed to another incident. The larger the number, the greater its utilization and the less available it is for assignment to subsequent calls for service. The figure below presents the analysis of Unit Hour Utilization for Platte Valley Fire Protection District.

Figure 61: Unit Hour Utilization, 2015–2017

	Number of Calls	Total Time Committed	Average Time on Scene	90th %	UHU
3701	406	278:07:59	0:42:02	0:11:59	1.1%
3702	20	20:44:09	1:09:07	3:31:07	0.1%
3703	1,221	698:13:33	0:34:51	1:06:00	2.7%
3721	1,167	662:21:03	0:34:33	1:00:00	2.5%
3731	243	193:05:15	0:47:52	1:57:58	0.7%
3732	81	104:19:10	1:18:14	3:26:28	0.4%
3733	81	83:06:41	1:03:07	2:06:19	0.3%
3741	48	75:25:07	1:38:22	4:02:02	0.3%
3742	220	227:50:31	1:03:17	2:24:08	0.9%
3751	427	305:41:18	0:43:22	1:25:56	1.2%
3700 3755 3756 3757 3760 3761 3762 3763	434	534:49:02	1:16:35	3:32:10	2.0%

The Unit Hour Utilization analysis for PVFPD indicates that all units fall below the 10 and 20 percent threshold to meet 90th and 80th percentile performance goals respectively. While PVFPD's service demand volume is currently such that the UHU rates fall within acceptable parameters, this is a metric that should be monitored regularly to ensure that system performance failures are not a result of over utilization of individual units.

Next, call concurrency will be examined. As mentioned previously, call concurrency measures the frequency of simultaneous incidents within a jurisdiction.

The following figure presents the analysis of call concurrency for Platte Valley Fire Protection District.

Figure 62: Call Concurrency, 2015–2017

Concurrent Incidents	Percent
Single Incident	83.0%
Two Incidents	11.6%
Three Incidents	2.7%
Four or More Incidents	2.7%

The call concurrency frequency for more than one incident occurring simultaneously in the District is 17 percent. This means that should a moderate risk incident occur requiring multiple personnel, some firefighters will be unavailable to respond approximately one-fifth, or 20 percent, of the time.

The next figure examines the frequency of multiple unit utilization for incidents occurring from 2015–2017. As PVFPD currently staffs two firefighters, and these firefighters cross-staff either an engine or another unit depending on the nature of the call, this analysis provides a deeper investigation into the probability that a system failure may occur.

In addition to call concurrency, the frequency and relative distribution of how often single or multiple units are utilized for responses was examined and the results contained in the following figure.

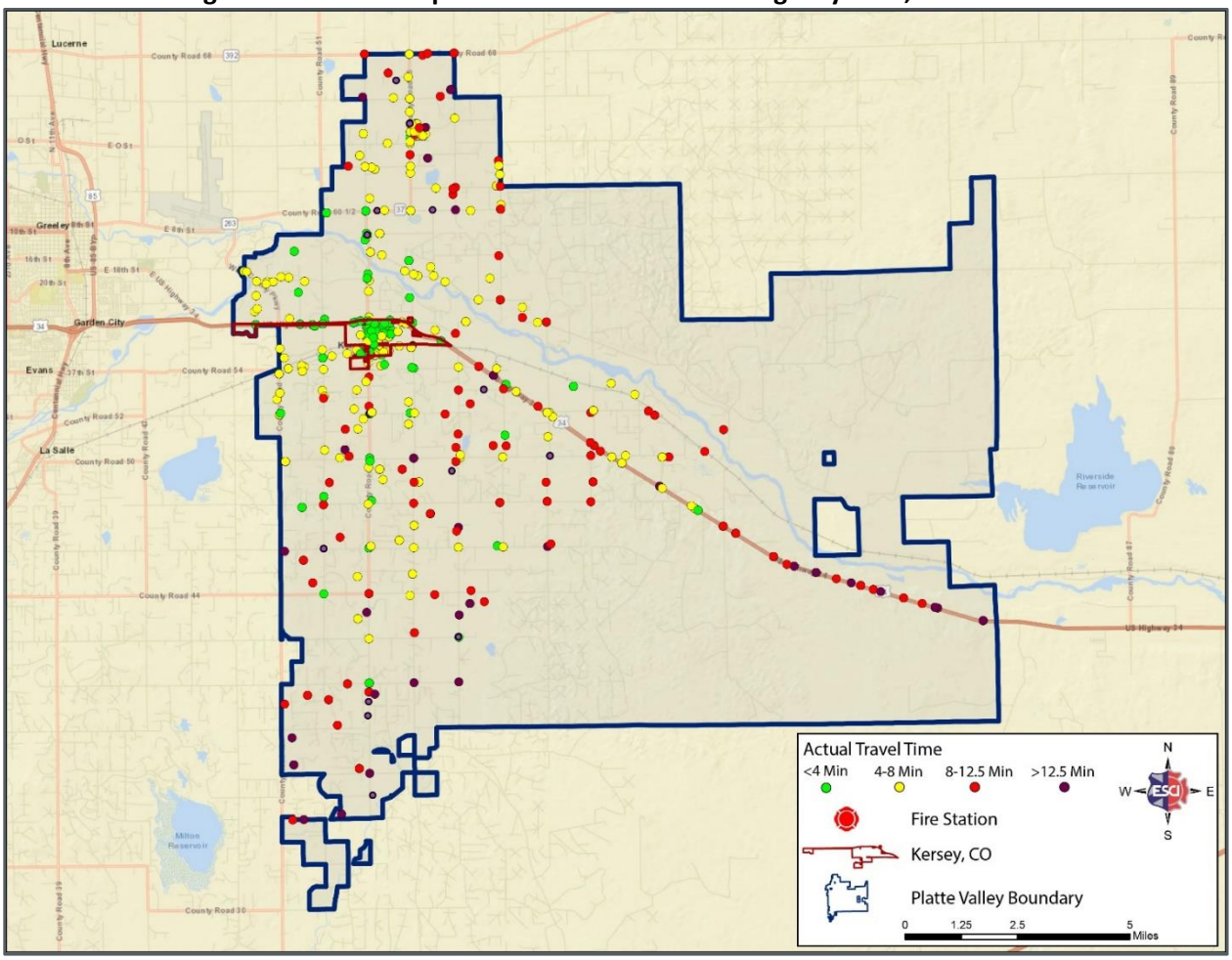
Figure 63: Number of Units Required by Percentage, 2015–2017

Number of Units	Percent
Single Unit	34.2%
Two Units	43.5%
Three Units	16.5%
Four Units	4.2%
Five or More Units	1.6%

Approximately 34 percent of calls were handled by a single unit from 2015–2017, meaning that nearly two-thirds of all responses required two or more units. According to RMS data, the average number of responders on structure fire calls was 2.2 firefighters, while four were available on scene at the 90th percentile. These figures indicate that PVFPD has a low internal reserve capacity for handling multiple calls and that they are most likely dependent upon mutual aid for moderate and high-risk incidents.

Finally, the actual travel time performance for PVFPD emergency responses from 2015–2017 is displayed in the next figure. In Figure 64, responses of less than 4 minutes are shown in green, 4–8 minutes in yellow, 8–12.5 minutes in red, and > 12.5 minutes in dark purple.

Figure 64: Actual Response Performance for Emergency Calls, 2015–2017



As illustrated in the figure, the actual response capabilities of PVFPD resemble the predicted performance in the travel time capability model. However, some outliers appear to be present in the data such as response times in excess of 8 minutes within the Kersey town limits, as well as response times of less than 4 minutes far outside of the predicted travel area. While these data points may be accurate, analysis such as this are useful in comparing how models and actual performance align and where potential trouble areas may occur.

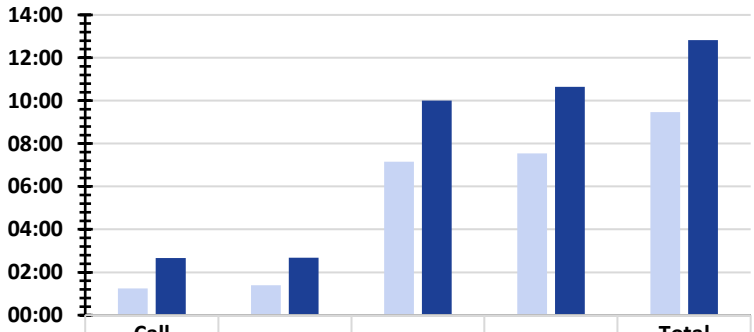
Performance Summary

In the performance summary, emergency response performance for Platte Valley Fire Protection District was examined using incident data from January 1, 2015 through December 31, 2017. Non-emergency incidents, mutual or auto-aid incidents (outside the PVFPD boundaries), data outliers, and invalid data were removed from the data set whenever possible. ESCI generated the average and 80th or 90th percentile response data, where applicable, for these emergency incidents.

Fire department leaders and policy makers often use average response performance measures, since the term is commonly used and widely understood. The most important reason for not using the "average" for performance standards is that it may not accurately reflect the performance for the entire data set and may be skewed by data outliers. One extremely good or bad value can skew the "average" for the entire data set. Percentile measurements are a better measure of performance since they show that the majority of the data set has achieved a particular level of performance. For example, the 90th percentile means that 10 percent of the values are greater than the value stated, and all other data is at or below this level. This can be compared to the desired performance objective to determine the degree of success in achieving the goal.

To assist PVFPD in providing a greater level of accuracy in their performance, performance baselines, benchmarks, and standards are provided as three separate service demand zones: 1) the entire District as a whole; 2) the Town of Kersey within its municipal boundaries; and 3) the District excluding the Town of Kersey. The following figure displays a summary of response performance Districtwide at the applicable percentile based on NFPA 1720.

Figure 65: Total Districtwide Performance Summary, 2015–2017

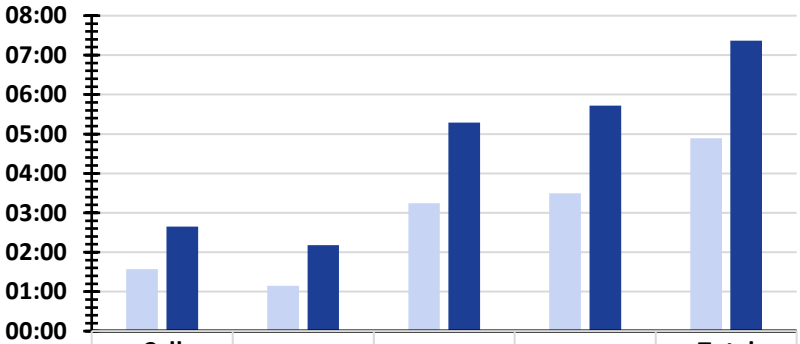


	Call Processing 90th%	Turn Out 90th%	Travel 80th%	Response 80th%	Total Reponse 80th%
Average	01:15	01:24	07:09	07:33	09:28
Fractile Performance	02:40	02:41	10:00	10:39	12:49

Districtwide performance is based upon NFPA 1720 guidelines that specify performance based on the population of the jurisdiction. With an overall population density of approximately 23.3 people per square mile Districtwide, PVFPD falls well within NFPA's definition of a rural district which requires that six firefighters arrive within 14 minutes of the initial notification of an alarm, 80 percent of the time (Response Time).

Within the municipal boundaries of Kersey, a population density of approximately 1,200 people per square mile places this service demand zone in to NFPA 1720's definition of an urban demand zone, requiring 15 firefighters arrive on scene to fires within nine minutes of the initial notification, 90 percent of the time. PVFPD's overall performance summary is illustrated in the following figure.

Figure 66: Performance Summary within Kersey at the 90th Percentile, 2015–2017

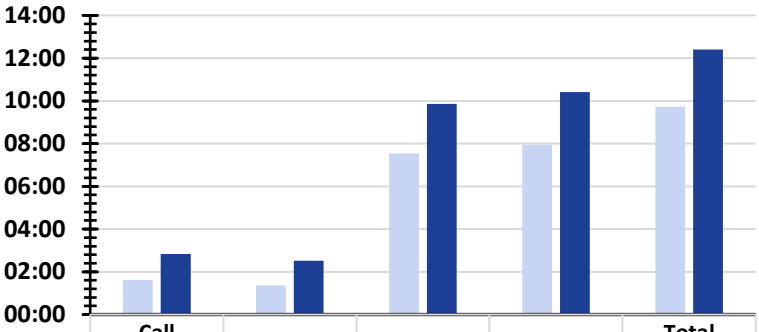


	Call Processing	Turnout	Travel	Response	Total Response
Average	01:34	01:09	03:15	03:30	04:53
90th Percentile	02:39	02:11	05:17	05:43	07:22

PVFPD's performance within the Town of Kersey exceeds NFPA 1720 standards for response at the 90th percentile with a fractile performance of 5 minutes, 43 seconds. However, the predicted ability for PVFPD to assemble an effective response force in a period of time to allow for effective mitigation of a moderate incident type, such as a 2,000 square foot residential structure fire, is approximately half of that recommended by NFPA. It should be noted that the NFPA rural requirement of six firefighters within 14 minutes will also compromise the ability of first responding crews to positively effect mitigation outcomes; however, NFPA recognizes the challenges present in rural areas and provides benchmarks based upon the typical capabilities of volunteer and combination departments located in those types of communities.

Finally, the performance summary for the District, excluding the Town of Kersey is presented.

Figure 67: Performance Summary Unincorporated District Only, 2015–2017



	Call Processing 90th%	Turn Out 90th%	Travel 80th%	Response 80th%	Total Reponse 80th%
Average	01:37	01:22	07:32	07:57	09:43
Fractile Performance	02:50	02:32	09:51	10:25	12:24

Average Fractile Performance

The performance of PVFPD when examining the District alone is similar to that of the Districtwide performance, with slight improvements to call processing, travel, response, and total response. However, there is a significant difference when compared to the Kersey service demand zone. The categorization of response capabilities based upon service demand zones allows departments to more accurately provide their community with the performance capabilities that should be expected.

Next, each component of the response summary will be evaluated in the same order of presentation, Districtwide, Kersey, and District alone without Kersey referred to as the "unincorporated" District.

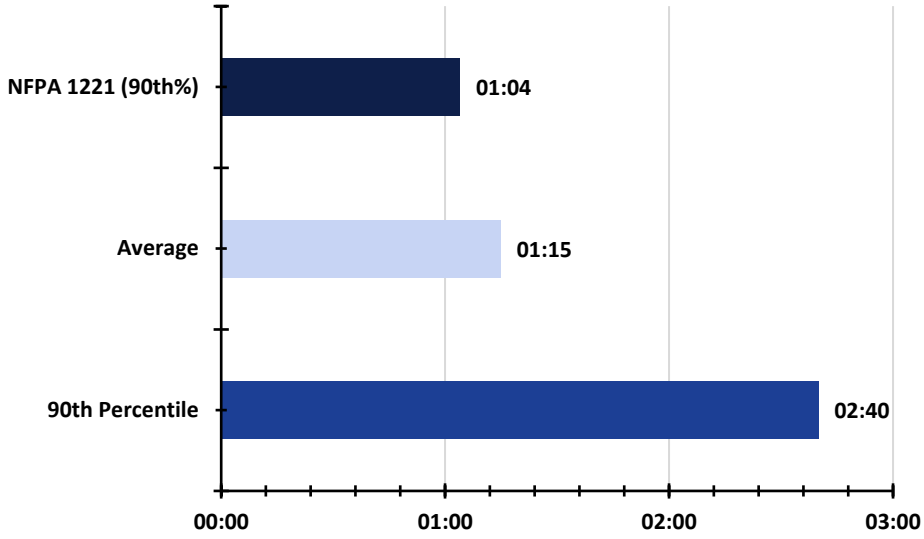
Call Processing

The NFPA standard for call processing is derived from NFPA 1221: *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems* and provides for communication centers to have alarm time processing of not more than 64 seconds, 90 percent of the time and for special operations, calls requiring translation, or other factors described in the standard, a call processing time not to exceed 90 seconds, 90 percent of the time. As the differentiation in call types received was not available within the data at the time of the report, 64 seconds was used to benchmark call processing.

Examination of the incident response data provided by the District reveals that the overall call-processing time for emergency responses Districtwide from January 1, 2015–December 31, 2017 was 2 minutes, 40 seconds at the 90th percentile. This is 96 seconds longer than the 64 second benchmark used by NFPA 1221.

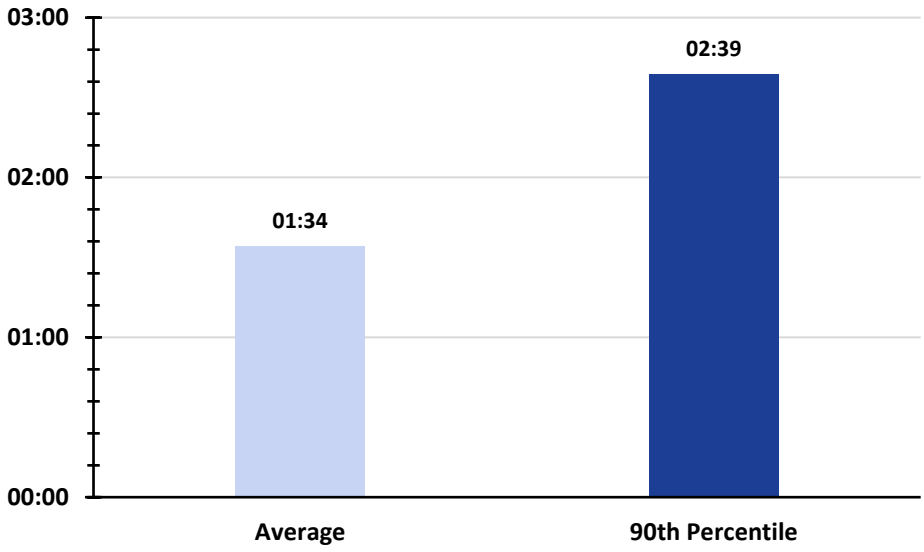
ESCI recommends that PVFPD examine the reasons for this high call-processing time and develop a plan to bring the 90th percentile call processing time to within the NFPA standard.

Figure 68: Call Processing Performance Total—Districtwide at the 90th Percentile, 2015–2017



Next, the call processing performance for emergency calls occurring within the Town of Kersey were examined and the results displayed in the next figure.

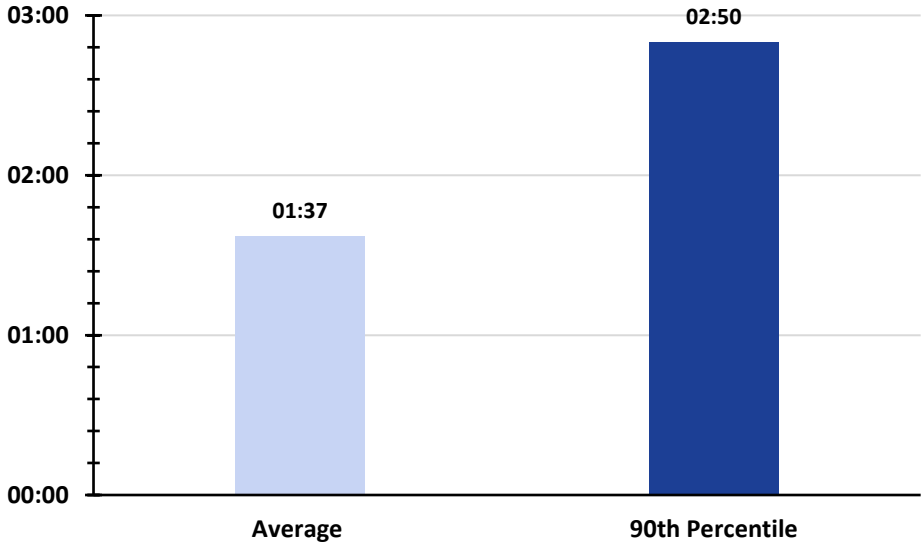
Figure 69: Call Processing Performance—City Limits Only at the 90th Percentile, 2015–2017



Performance improved slightly for Kersey only calls; however, overall fractile performance remained consistent while the average increased by 19 seconds. The change in average is most likely the effect of data outliers and it is for that reason that fractile performance is used by organizations such as NFPA, CPSE, and ISO.

Finally, call processing performance within the unincorporated District alone was evaluated.

Figure 70: Call Processing Performance—Unincorporated District Only at the 90th Percentile, 2015–2017



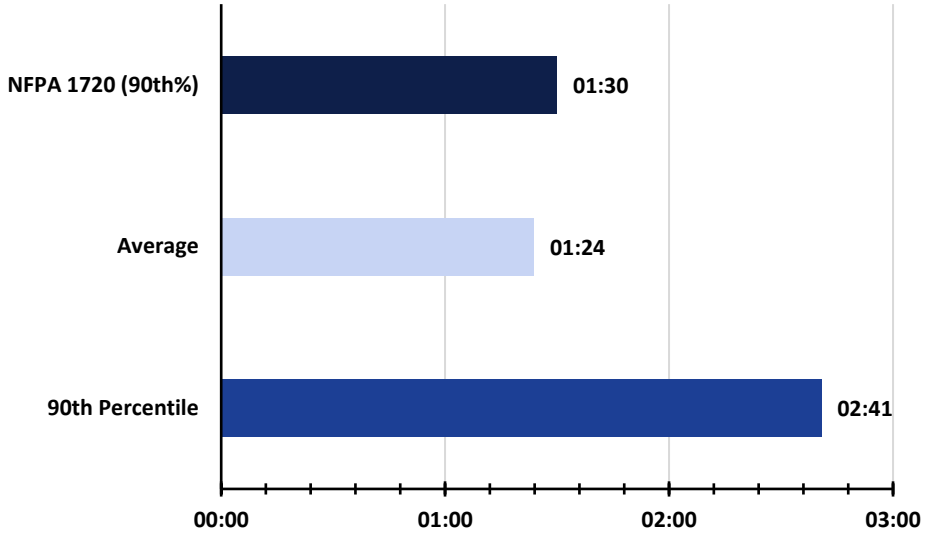
Both fractile and average performance increased when call processing for the District alone was examined. Several factors may contribute to this, such as low total incident numbers, data outliers, or actual increases in call processing due to the rural nature of the area. PVFPD should work with the communications center to monitor the performance and work collaboratively to improve overall system performance.

Turnout Time

Turnout performance is the time that elapses between the initial notification of an alarm to the fire department until the first unit begins to travel to the emergency scene. NFPA 1720 provides for a 90-second turnout time for staffed volunteer and combination departments. For non-staffed departments, no standard is provided specifically for turnout. This metric stands out as the area in which the fire department has complete control over how quickly personnel respond to an incident. Issues that can impact turnout time include: station design and layout, time of day, internal guidelines and procedures, and organizational culture.

The results for turnout performance Districtwide are displayed in the following figure.

Figure 71: Turnout Performance Total—Districtwide at the 90th Percentile, 2015–2017



Districtwide turnout performance for PVFPD at the 90th percentile was measured at 2 minutes, 41 seconds—1 minute, 11 seconds longer than the NFPA 1720 standard. Performance for Kersey alone is improved at 2 minutes, 11 seconds, and for the unincorporated District alone 2 minutes, 32 seconds, similar to Districtwide performance.

PVFPD should consider forming a working group with representation across the District to identify and evaluate possible issues and solutions to improve turnout performance. Additionally, the District should continue to monitor turnout times and establish performance targets at regular intervals.

The Kersey and District performance figures follow.

Figure 72: Turnout Performance—City Limits Only at the 90th Percentile, 2015–2017

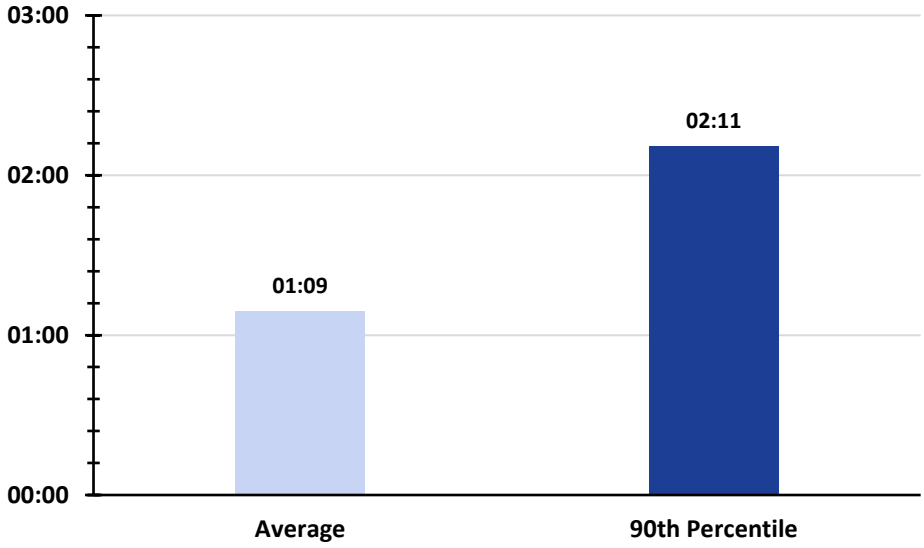
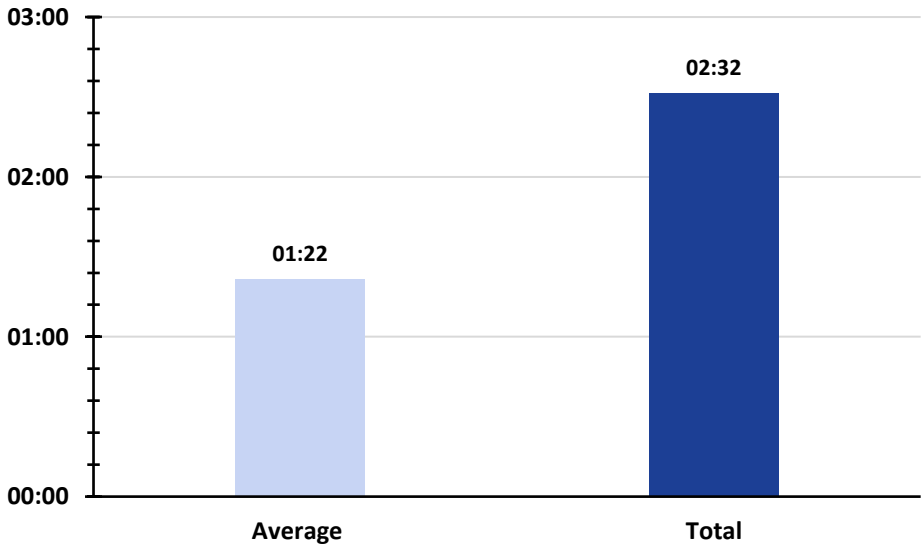


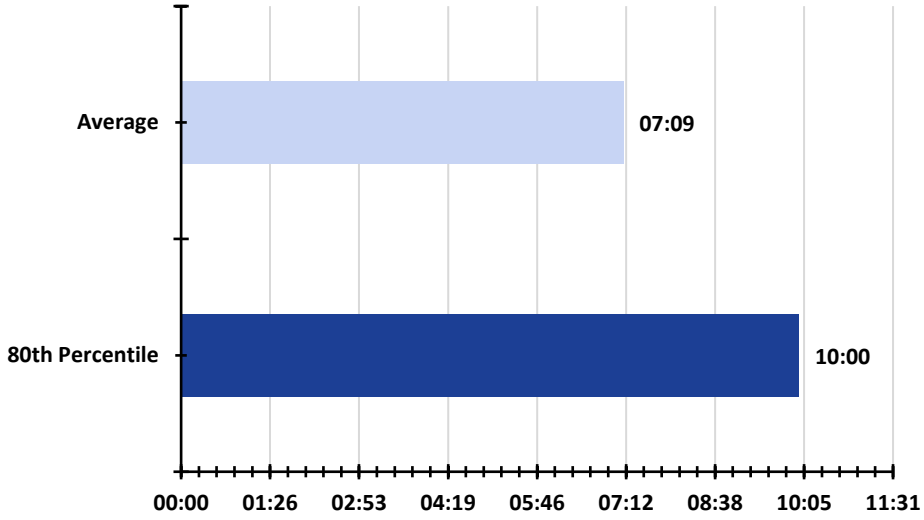
Figure 73: Turnout Performance—Unincorporated District Only at the 90th Percentile, 2015–2017



Travel Time

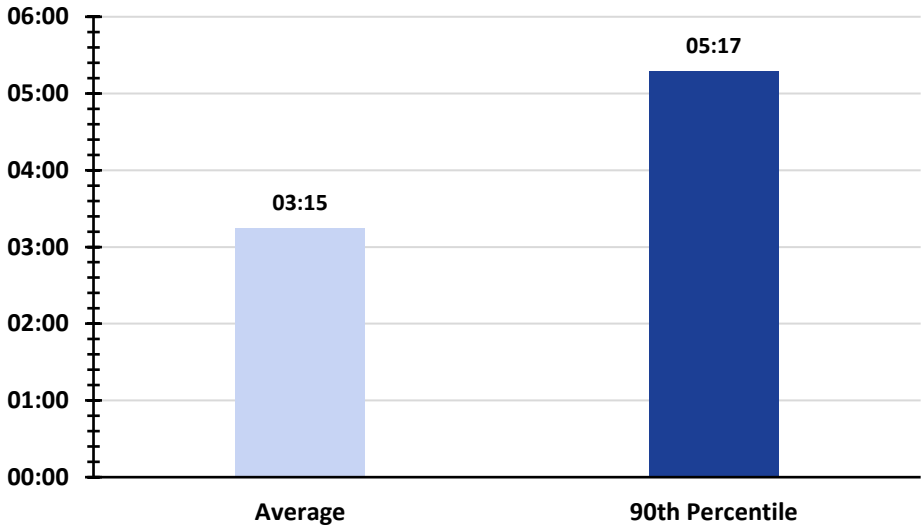
Travel time, or the amount of time to travel from where the call was received to the incident location, is most often reflective of the distance, road network, and traffic conditions encountered by responding crews. Because this metric most often represents the greatest portion of response time, initial notification to arrival, and the rural nature of the District, this metric is presented at the 80th percentile.

Figure 74: Travel Performance Total—Districtwide at the 80th Percentile, 2015–2017



Travel time Districtwide at the 80th percentile is 10 minutes. As mentioned previously, this metric is a component of response time and, therefore, does not have an associated standard. Next, this performance is compared to travel time within the Town of Kersey. As Kersey have a population density greater than 1,000 per square mile, the travel performance was measured at the 90th percentile.

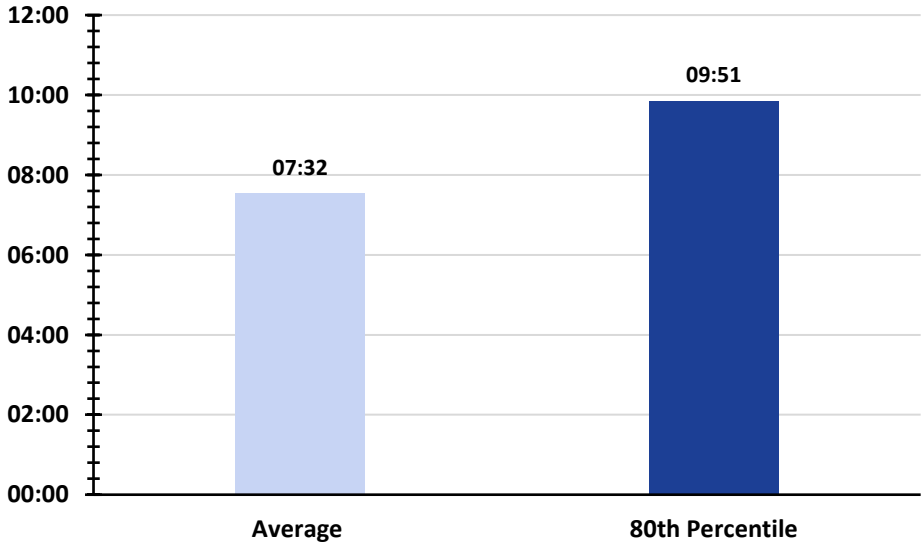
Figure 75: Travel Performance Total—City Limits Only at the 90th Percentile, 2015–2017



Travel performance within Kersey was measured at 5 minutes, 17 seconds at the 90th percentile. With this metric, the reasoning for dividing large service areas into distinct service demand zones becomes apparent as travel times in Kersey are approximately half that of the District, either independently or as a whole. Separating service demand zones based on population densities, zoning classifications, political boundaries, or another form of districting allows organizations to provide a more transparent assessment of the abilities and can assist in aligning community expectations.

Finally, the unincorporated District only performance is improved from overall performance, but remains similar.

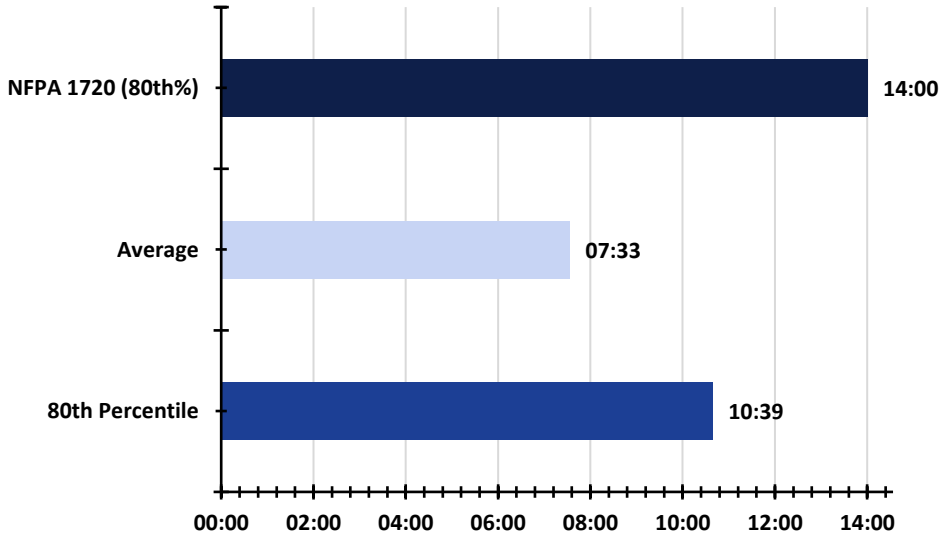
Figure 76: Travel Performance Total—Unincorporated District Only at the 80th Percentile, 2015–2017



Total Response Time

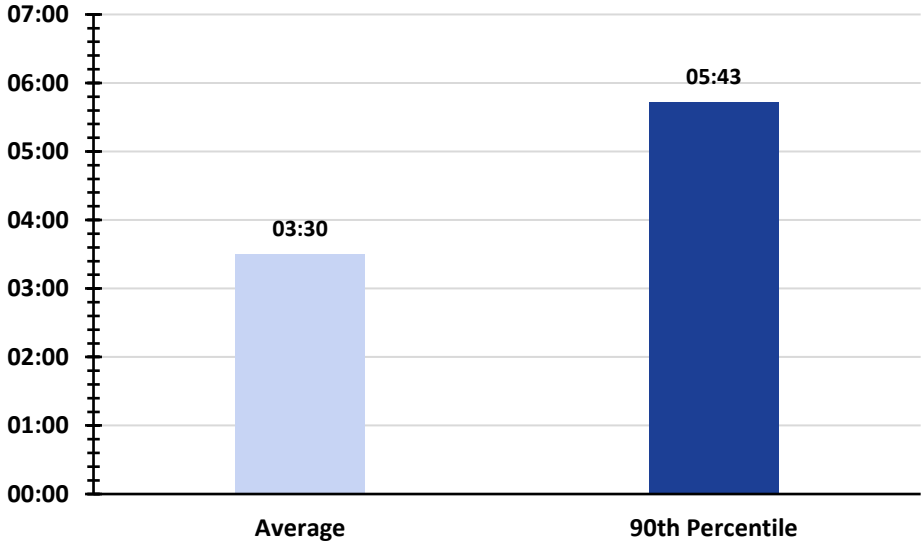
NFPA 1720 provides a standard for response time—the time from initial notification until arrival on scene—for rural volunteer and combination fire departments of six firefighters on scene with 14 minutes from initial notification at the 80th percentile. PVFPD exceeds NFPA 1720 standards for travel and with six firefighters on duty, would meet the staffing requirement, providing all six were available on the initial dispatch.

Figure 77: Response Performance Total—Districtwide at the 90th Percentile, 2015–2017



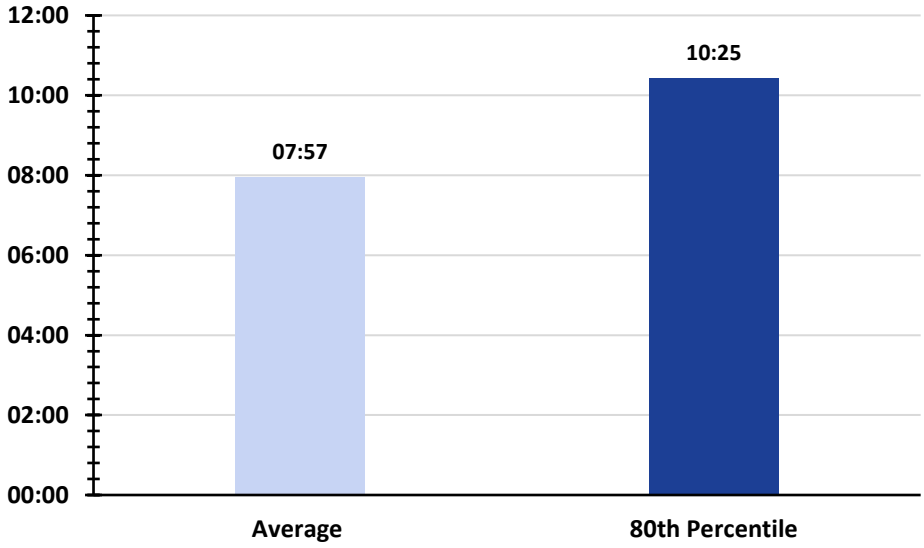
Response performance within Kersey was measured at the 90th percentile for urban volunteer and career departments and requires 15 firefighters arriving on scene within nine minutes. While PVFPD easily meets the response criteria for arriving on scene, they will have difficulty assembling the effective response force required by NFPA.

Figure 78: Response Performance Total—City Limits Only at the 90th Percentile, 2015–2017



Finally, performance within the unincorporated District only is provided below.

Figure 79: Response Performance Total—Unincorporated District Only at the 80th Percentile, 2015–2017



Summary

These individual metrics comprise the constituent pieces of the Total Response Performance displayed at the beginning of this section. While some pieces within this chain of events are outside of the fire department's direct control, such as call processing, others are directly impacted by the fire department's activities. Understanding and measuring these metrics will provide the department and the community with the information required to determine whether or not the department is meeting community expectations and can affect how different areas of the jurisdiction can reasonably expect to receive services.

RECOMMENDATIONS

- Examine the reasons for high call processing time and develop a plan to bring the 90th percentile call processing time to within the NFPA standard.
- Identify and evaluate possible issues and solutions to improve turnout performance.
- Monitor turnout times and establish performance targets.

PLANNING FOR FIRE PROTECTION & EMS

Emergency services exist in a rapidly changing environment. Along with improved tools and technologies used to provide service, there is the increased regulation of activities, new risks to protect, and other challenges that can quickly catch the unwary off guard. Only through continuous internal and external environmental awareness and periodic course corrections can an organization stay on the leading edge.

To do a better job with available resources, an organization like PVFPD must focus on improving services while identifying programs or activities that may no longer serve its changing needs. Through appropriate planning, a fire department can establish a vision for the future, create a framework within which decisions are made, and chart its course to the future. The quality and accuracy of the planning function determines the success of the organization.

To be truly effective, an emergency services agency must consider planning on five distinct levels:

- Tactical Planning
- Operational Planning
- Master Planning
- Strategic Planning
- Emergency Management Planning

Tactical, or pre-incident, planning is the development of strategies for potential emergency incidents. Operational planning is the organization of day-to-day activities—as primarily outlined by a District's standard operating guidelines and procedures—and the integration of the agency into other local, regional, or national response networks. Master planning is preparation for the long-term effectiveness of the agency as the operating environment changes over time. Strategic planning is a process of identifying an organization's mission, vision, and values and prioritizing goals and objectives for things that need to be accomplished in the near future. Finally, emergency management planning is the process of identifying local hazards and risks, gauging the potential incidents that could result in large scale emergencies or disasters, and establishing response plans for addressing them.

Overall, PVFPD's planning processes have been somewhat limited in the past but are clearly enhanced by the decision to undertake this Master Planning process. The District performs some fundamental short-term planning in the form of the annual budget development process, which is used to define the activities and priorities identified for the upcoming year. However, establishing a long-term planning perspective for the District is important as well. Without a plan, it is impossible for an organization to know when it is reaching milestones or providing exceptional services to its constituency.

The District has not adopted a formalized planning process, but is actively involved in County-wide operational planning, as well as consistent work with Weld County in emergency management preparation. Those efforts, combined with the commendable undertaking of this Master Planning project, are moving the District forward positively. Planning initiatives are discussed further on the following pages.

Tactical Planning

A firefighter's typical work area is usually quite foreign to him or her. Normally, a firefighter's first visit to a building is when the building is involved in fire or another emergency. This is also the point in time where the internal environment is at its worst. Contrary to Hollywood's portrayal of the inside of a building on fire, visibility is at or near zero due to smoke. A lack of familiarity with a building can easily lead a firefighter to become disoriented or injured by an unfamiliar internal layout, or by equipment or other hazards that might be encountered.

It is critically important that firefighters and command staff have information readily at hand to identify hazards, direct tactical operations, and use built-in fire resistive features. This can only be accomplished by building familiarization tours, developing pre-fire plans, and conducting tactical exercises, either on-site or by tabletop simulation.

PVFPD has not undertaken a pre-incident planning, or pre-plan, program in the past. There are no hazard-specific plans or hazardous materials response planning except that which is in place at the County level. District personnel do conduct periodic building familiarization tours, a first step toward a more formalized pre-incident planning initiative. Further, the District reports that they have recently decided to move forward with a more structured pre-plan program and that effort is currently under way.

The District is encouraged to develop and maintain effective pre-incident and special hazard plans, and to incorporate the plans routinely into internal training efforts as well as dispatch communications. Further developing and maintaining the program should be considered a priority for PVFPD. A defined list of "target hazards" should be developed and aggressive effort taken to ensure response crews have ready access to the plans.

Target hazards are defined by:

- Buildings with large potential occupant loads.
- Buildings with populations who are partially or completely non-ambulatory.
- Buildings of large size (greater than 12,000 square feet).
- Buildings that contain process hazards, such as hazardous materials or equipment.

Pre-incident plans should be easy to use, quick reference tools for company officers and command staff. At a minimum, a pre-incident plan should include information such as:

- Building construction
- Occupant characteristics
- Incorporated fire protection systems
- Capabilities of public or industrial responding personnel
- Water supply
- Exposure factors
- Facility layouts

NFPA 1620 provides excellent information on the development and use of pre-incident plans and should be used as a reference. Once pre-plans are established and/or updated, training should be provided to all personnel who may respond to an incident at those locations. In addition, copies of pre-incident plans and drawings should be available on each response vehicle and incorporated into dispatch procedures.

Operational Planning

Operational planning includes the establishment of minimum staffing policies, standardized response plans or protocols, regional incident command, mutual aid and automatic aid (locally and regionally), resource identification, and disaster planning.

Within an agency, operational plans should be in place that assure that adequate volumes of the appropriate types of resources are deployed to an emergency. Doing so involves:

- Identification of potential risk types;
- Determination of resources needed to mitigate an incident affecting the risk type; and
- A methodology assuring adequate resources are dispatched to an incident via 911 center protocols.

Looking beyond the agency's own resources, operational plans need to address the timely implementation of mutual and automatic aid. To do so, the identified risk exposures and resource needs are incorporated into mutual aid agreements. Further, of significant importance, automatic activation of mutual aid deployment is seamlessly incorporated into the 911 center's Computer Aided Dispatch (CAD) systems.

PVFPD is an active participant in a mutual aid agreement in place, inclusive of all of the fire agencies throughout Weld County. Included in the mutual aid system are automatic aid procedures. Automatic mutual aid involves the implementation of pre-programed dispatching of mutual aid resources, without the need for an incident commander to ask for them individually during a serious incident. PVFPD and the Weld County fire agencies have accomplished this via the use of a "run card" system. Under this type of system, the District is defined by response districts, call types are identified, and procedures established for dispatching pre-defined units based on the geographic location and call type.

A fully automated mutual aid system is essential to effective fire and EMS operations. The District, and the other Weld County agencies, are commended for establishing what is reportedly an effective system.

Master Planning

Master planning, also called Long Range Master Planning, is a process that seeks to answer three questions:

- Where is our organization today?
- Where are we going to need to be in the future? And,
- How do we get there?

The Platte Valley Fire Protection District has wisely recognized the need for a long-range planning effort by undertaking this Master Planning process. This plan gives the District a clear idea of where it is today, based on the Evaluation of Current Conditions, along with its future needs and strategies for meeting them, detailed in the Future Service Demand and Future Strategies sections of the report. This Master Plan is designed to provide a view of the organization in a 15-year time frame.

However, a Master Plan is of no value if it is not put to use upon completion. It is imperative that the District's leadership, and most importantly the elected officials, provide direction with regard to the implementation of the final report findings and ongoing use of this report. To do so, ESCI recommends two important steps:

1. Upon final presentation of this report, the District's elected officials should review the findings and recommendation in detail with the Fire Chief and his staff. In doing so, identify recommendations that are considered to be applicable, and modify others as needed to fit the organization's future needs. Having completed this effort, the Board members are advised to formally adopt the Master Plan, with modifications if need, by way of formal resolution. Doing so institutionalizes the intended future efforts of the District and provided staff with direction for implementation of the findings.

2. The Master Plan report will result in a lengthy list of work that needs to be completed over an extended time frame. Prioritizing and planning for the implementation of the findings can be a daunting task, one that may be best addressed by the use of a Strategic Plan process, as discussed in the next section.

Strategic Planning

A Strategic Plan involves a three-to-five-year planning window and establishes prioritized goals and objectives for the organization. The planning approach is particularly important when a Master Plan has been completed. The reasoning is that a Master Plan identifies multiple recommendations and future strategies, which are then evaluated and prioritized via the Strategic Plan.

Establishing a customer-oriented Strategic Plan accomplishes the following:

- Development of a mission statement giving careful attention to the services currently provided and which logically can be provided in the future.
- Development of a vision statement of the agency's for moving forward.
- Establish the core values of the members of the agency.
- Identification of the strengths, weaknesses, opportunities, and challenges of the agency.
- Determination of the community's service priorities.
- Understanding of the community's expectations of the agency.
- Establishment of realistic goals and objectives for the future, based on the findings and recommendations of the Master Plan report.
- Identifications of implementation tasks for each objective.
- Definition of service outcomes in the form of measurable performance objectives and targets.

The District has not completed a Strategic Plan in the past. A Strategic Plan is an essential tool with which the Fire Chief can manage the agency. It provides not only a defined sense of purpose and direction, but also a structured means by which to chart the course for the agency moving forward.

ESCI adds that, once the current Master Plan is completed, the final report will contain an extensive list of recommendations and advice for changes and new initiatives. The most effective way to prioritize and plan for the implementation of the Master Plan findings is via a Strategic Planning process. Completion of a Strategic Plan upon completion of this Master Plan is highly recommended. ESCI can assist with the process.

Emergency Management Planning

Emergency management, once a low priority in the mind of the public, has risen to the conscious level of everyday life. Nonexistent before 2001, the DHS (Department of Homeland Security), terrorist threat warnings, the Transportation Safety Administration (TSA) screenings on public transportation, and security checks at sporting events and concerts are now common parts of urban life.

Mindful community governments prepare themselves, other institutions, businesses, and the public to survive disaster by mitigating hazards to eliminate or reduce risk. By developing and maintaining emergency action plans, and by exercising and updating the plans regularly, municipal governments help limit (or manage) the consequences of a disaster. The common term for governmental disaster preparedness is emergency management.

The Superfund Amendment and Reauthorization Act, found in Title III of the Federal Code (SARA Title III), defines requirements for the tracking of hazardous materials used in fixed facilities and establishes requirements for emergency response planning. The District should be involved with the Local Emergency Planning Committee (LEPC) in place at the County level. The LEPC is charged with the responsibility to identify and collect information on the use of hazardous materials by private and public entities. Information collected includes the type of material, quantity, and location at each site. Additionally, the LEPC is charged with ensuring local response plans are adequate based on potential risk.

SARA Title III requires industries that use over a threshold limit of certain highly hazardous materials (extremely hazardous substance facilities – EHS) must develop comprehensive emergency plans for their facility. The act requires that local fire departments coordinate with the involved industry to ensure a quality response to the emergency.

PVFPD, has been actively involved in response planning in Weld County and at the state level. Platte Valley Fire District is the sponsoring agency for the Eastern Colorado Incident Management Team, (IMT) which is one of the five, Type 3 IMT teams in the State of Colorado. Chief Schaefer is the lead Operations Section Chief and Stephanie Cooke is the lead Public Information Officer for the team.

At the local level, plans currently in place include:

- Weld County:
  - Emergency Operations Plan (EOP)
  - Hazard Mitigation Plan
  - Recovery Plan—post incident
- Town of Kersey:
  - Multi-agency EOP
  - Town of Kersey Crisis Action Guide

The Town of Kersey, Platte Valley School District, and Platte Valley Fire Protection District have established the Town of Kersey Crisis Action Guide. The guide serves as the principal document for managing large scale emergency incidents in the Kersey area. The Town also has established an Emergency Operations Plan (EOP), which was developed in collaboration with PVFPD.

The District does not have a stand-alone emergency management plan, which is not expected, and instead relies on what is a solid working relationship with Weld County Office of Emergency Management (OEM). The office is staffed by a full-time Director and three full-time planning personnel. PVFPD is closely and appropriately active in in participating with the development of emergency plans as well as periodic training and hands on exercises related to the plans.

It is important that emergency plans be maintained in a current state of readiness. The Town EOP is dated, having been completed in 2007, and is past due for updating. While the District is not responsible for revising the plan, ESCI recommends that PVFPD actively engage with the Town to see that the plan is updated.

The Weld County EOP and Hazard Mitigation Plan are required to be updated every five years, by law. The EOP was last updated in 2015 and the Hazard Mitigation Plan was reviewed in 2016, so both are up-to-date. The County's post-incident recovery plan is in the process of being updated.

The District has done a good job if staying active in local, regional, and state level planning. ESCI recommends that PVFPD strive to maintain is involvement at all levels of emergency planning.

Further, PVFPD is advised to work closely with the LEPC to confirm that all EHS facilities within its service area have been identified, ensure that a local plan has been developed, and that District operations have been coordinated. Additionally, the District should confirm that mandated Tier II reporting forms are received, reviewed, properly filed, and available for training and use during emergency responses.

RECOMMENDATIONS

- Establish a more structured and formalized planning process.
- Develop and maintain effective pre-incident and special hazard planning practices.
- Adopt a District Master Plan using this report as a foundation with modifications if desired.
- Undertake a strategic planning process to prioritize and plan for the implementation of the findings and recommendations in this report.
- Actively engage with the Town of Kersey to see that the emergency operations plan is updated.
- Remain closely involved in current and future County or regional emergency planning initiatives.
- Work with the LEPC to assure that all required planning and reporting needs are addressed.

EMERGENCY MEDICAL SERVICES

The Emergency Medical Services component provides a summary of the agency's services relating to pre-hospital medical care. Focused interviews with internal and external stakeholders, combined with ESCI's survey of EMS elements, were used to develop a comprehensive perspective of current and future EMS needs throughout the Platte Valley Fire Protection District (PVFPD).

The purpose of this section is to evaluate the current level of pre-hospital care and future needs based on projected call volume and available resources. ESCI will identify challenges relating to the EMS program, and make recommendations with projected outcomes.

The fire service has been providing emergency medical services for over 40 years. In fact, 90 percent of the 31,000 departments provide some form of pre-hospital medical care.[9] Since 1980, residential and commercial structure fires nationwide have dropped 52 percent. In contrast, EMS responses have continued to climb nationally.[10] Based on data from the Service Delivery section of this report, PVFPD has seen a slight increase in fire calls, but EMS accounts for 59.3 percent of the total call volume. Additionally, Special Teams responses account for 1.5 percent of the total call volume. This data supports the need for PVFPD to prioritize EMS when developing a Master Plan. Prioritization should include increased staffing, capital equipment expenditures, and administrative oversight.

PVFPD currently provides advanced life support (ALS) medical response and transport throughout the District. The system is based on a contractional agreement between the District and Banner Health. The District provides all staffing for the ambulance, and Banner Health provides the unit and required ALS equipment. Several limitations were echoed during the ESCI site visit. The first is the requirement for all FF/Paramedics to be employed by Banner Health in order to function on the ambulance. Second, PVFPD is only able to provide a paramedic for two of the three shifts. C-shift is short a FF/Paramedic resulting in basic life support (BLS) limitations during the shift. Finally, there is generally only one paramedic on duty per shift. This then limited PVFPD from providing a paramedic on a subsequent call and/or when the ambulance was out of service or during transport to and from a medical facility. PVFPD's goal is to be able to provide a paramedic on each of the medical calls to which it responds.

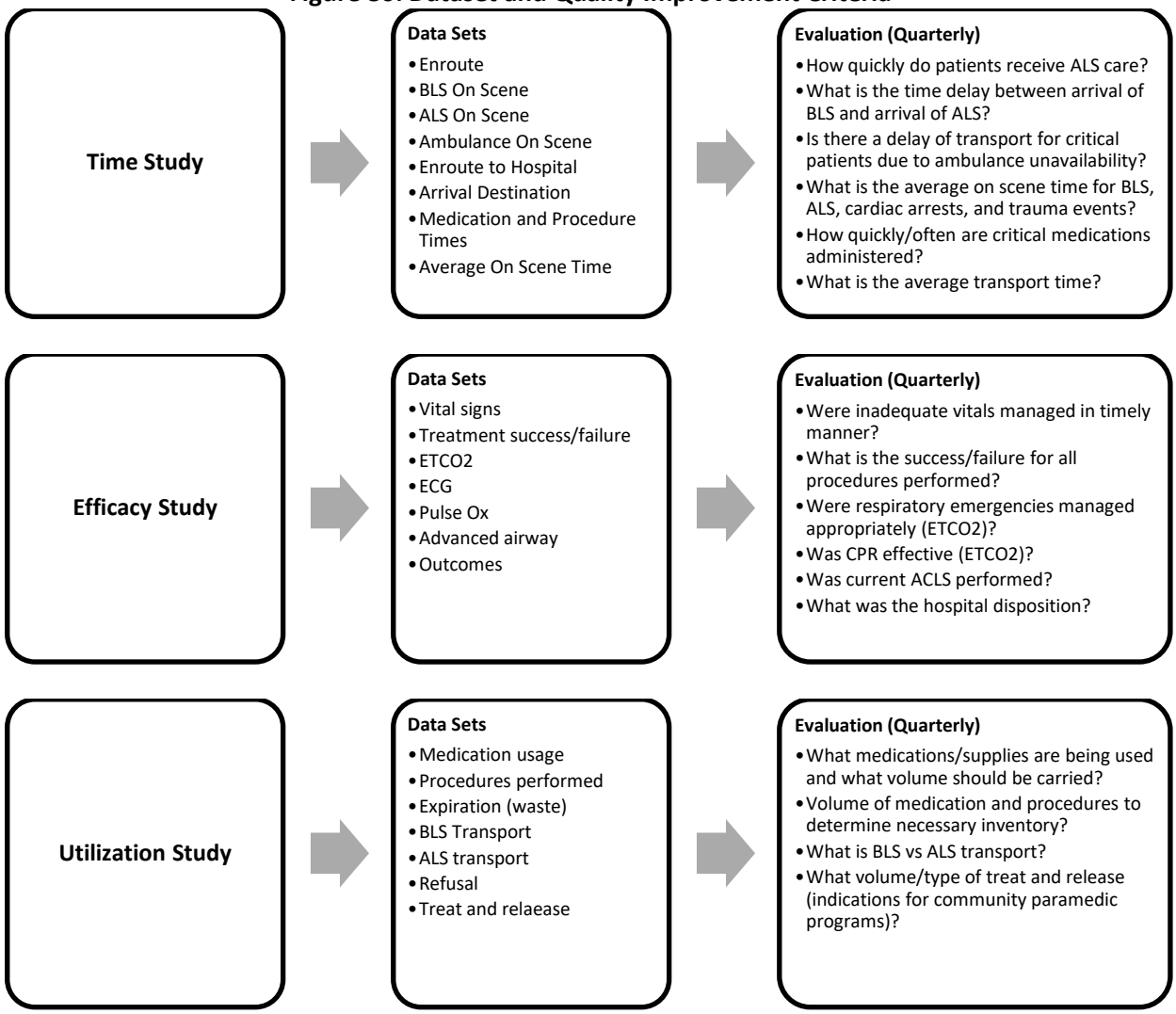
Quality Management

During ESCI's external stakeholder interviews, it was apparent that constituent satisfaction was very high. Based on the high percentage of EMS calls, ESCI recommends a thorough internal retrospective data review and corresponding quality improvement (QI) program. The program should be broken down into three sections. The first is a time study looking at areas to improve initial response. Second, is an efficacy study evaluating the patient care provided as it relates to national standards and best practices. The third area of evaluation is a utilization study. This study looks at opportunities for improved efficiency, inventory control, and corresponding fiscal responsibility.

[9] Compton, D. (2006). Fire Department-Based EMS: A Proud Tradition.
[10] Haynes, H. J. (2017, September). National Fire Protection Agency. Retrieved from NFPA.org.

Currently, PVFPD only documents calls that do not receive care and transport by Banner Health EMS. The information and data provided by Banner Health EMS to PVFPD is limited, and does not appear to provide the information necessary to evaluate current service. ESCI recommends that all EMS calls be documented internally, utilizing a patient care reporting (PCR) system. This system would provide complete/accurate data collection and support the QI program. Most PCR systems will export data to an Excel format, and the data can be easily interrogated to provide various evaluations. Figure 80 shows a minimal data set and potential evaluation criteria that would be beneficial in making objective decisions:

Figure 80: Dataset and Quality Improvement Criteria



EMS Training

Albert Einstein once said, "Intellectual growth should commence at birth and cease only at death." The fire service is in a constant state of change and PVFPD has demonstrated an extraordinary training program. Part of any QA process is the supportive training. According to survey documents, PVFPD dedicated about 11 percent of total training hours and documented limited training assets for EMS education. The department is currently in the process of getting certified through the State of Colorado to be an EMT Basic CE group. ESCI recommends that PVFPD continues the process with consideration to Initial IV Certification and a long-term goal of Paramedic CE Group. Following training center status, combined with an increase in advanced life support (ALS) training equipment, PVFPD would be a regional asset for EMS education. The increased emphasis would support possible training needs for future staffing models.

Logistical Support

As previously mentioned, a routine utilization study would help identify opportunities for improved inventory control. PVFPD currently has a functioning system to track equipment daily checks, repair, and partial inventory. The system is challenged with the burden of maintaining supplies for a wide variety of services, with a limited staff. ESCI recommends implementing a partially automated inventory control system. There are various systems available that have proven to be cost effective in the long run, especially in reducing expiration waste and lost supplies. Additionally, the inventory control systems can support new staffing, training, and response. The systems can provide current inventories that assist crews in familiarizing themselves with the location of equipment and supplies. Examples of these systems include Bar Code Scanning, QR Readers, and Radio Frequency ID (RFID).

Medical Control and Oversight

Emergency medical services rarely constitutes definitive care. The continuum of care starting in the pre-hospital setting and ending in the appropriate medical facility, is critical to positive patient outcomes. PVPFD is going to manage extensive change over the next few years. Survey documents describe a limited relationship and participation with the physician advisor. ESCI recommends establishing a program where the physician advisor participates in routine medical activities and helps plan the future of PVFPD EMS. This relationship is essential in maintaining quality assurance and limits District liability issues.

System Integrity and Required Credentialing

PVFPD utilizes Target Solutions to track and maintain required certifications. This program appears to be working well and should support the system during future growth and change. EMS credentialing on a local level is an issue requiring immediate attention. Paramedics are required to be employed by Banner Health in order to utilize the ambulance stationed at PVFPD. There was a consistent concern during all of the internal/external stakeholder interviews pertaining to the stability and service provided by Banner Health EMS.

Banner Health provided 2018 YTD (01/01/2018–06/11/2018) data specific to responses in the PVFPD. Based on this information, there were a number of observations worthy of discussion. First, 163 patients were transported to area hospitals. This accounts for 44.5 percent of EMS calls. Of the 163 patients, 42 percent were categorized as basic life support (BLS). The high percentage of BLS transport supports a teared response and staffing, which will be discussed later in this document. Second is regarding the 2017 response times report. Based on the data provided, Banner Health EMS had an urban compliance percentage response time less than 9 minutes of 57.2 percent. Additional information needs to be gathered to determine the delay of transport of critical patients when Banner Health is unavailable. Currently, C-shift does not have the necessary staffing to operate within the requirements of Banner Health resulting possible delayed transport. **The dependence of PVFPD on private organizations such as Banner Health will generally result in instability and an overall lack of internal control.**

Overall, PVFPD is providing quality EMS care to the constituents they serve. The recommendations provided can help improve system stability, support future staffing needs, and provide metrics for quality assurance.

RECOMMENDATIONS

- Internal documentation of all EMS calls.
- Develop an internal system to collect necessary EMS data.
- Develop internal retrospective EMS review and QA program.
- Acquire Colorado State EMT-Basis and Paramedic CE Group certification.
- Consider the use of an ALS training manikin.
- Implement automated inventory control program.
- Enhance PVPFD/Medical Director relationship.

FIRE AND LIFE SAFETY

An aggressive risk management program 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.[11]

The community risk assessment as a part of the risk management plan is relatively new. ESCI recommends that fire departments conduct a community risk reduction (CRR) planning process. Short of conducting a CRR plan, the fire department needs to review and understand the importance of fire prevention and public education appreciating its role in the planning process of a community with diversified zoning including residential, commercial, and industrial properties.

Community Risk Reduction

PVFPD has not conducted a current community risk assessment. Recently, U.S. fire departments have begun to recognize the value of Community Risk Reduction (CRR) programs that go beyond fire prevention activities alone. Some have gone so far as to re-name their "fire prevention" bureaus to "Community Risk Reduction Division."

Figure 81: Steps for Developing CRR Plan

Regardless of the name, fire departments should accurately identify the various potential community risks before developing prevention programs. This is not meant to imply that the ongoing fire problem should be diminished, but to look at other risks that can be mitigated through effective prevention activities.

Figure 81 illustrates the typical six steps to developing a Community Risk Reduction Plan. It begins by identifying the risks through a comprehensive community risk assessment process.

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

Risk Reduction Strategy

Community risk reduction depends on the five "E's" of protecting lives and property: education, enforcement, emergency responses, engineering, and economics.

Education about fire is crucial in preventing them. People need to be made aware of all the potential causes of fires so that they know the proper way to avoid them. Also, people need to be educated about what to do in the situation that a fire occurs; for instance, to not put water on a grease fire, or how to exit a burning building in the safest manner. These educational topics should be taught to all people to provide the safest environment.

Enforcement is incredibly important in the event of a fire. There are many fire safety laws that are in place, such as maximum occupancy laws, keeping hallways and doorways clear, and not parking in fire lanes in front of hydrants, are all important measures to assure that environments are as safe as possible.

Emergency response groups also need to be sure that they respond quickly and effectively to fire or other life-threatening situations. Even with the best of education, enforcement, and engineering these incidents will occur. Response personnel need to be competent regarding their jobs and equipped appropriately for the situation.

Engineering also plays a role in preventing fire-related injuries and loss. Buildings need to be constructed by the applicable building and fire codes. These would include items such as having doors open in the proper direction and having sufficiently wide enough corridors to protected exits. Both built-in fire protection and emergency response techniques should be based on the latest technology. The District is active with the Community Wildfire Protection Planning (CWPP) process. Which encourages community homeowners to make changes that will make survivability of their homes more likely. The procedures to mitigate fire travel from the wildland to the structure is an example of using engineering to reduce risk.

Economics plays a significant part in life and property safety. The loss from fires can be direct or indirect. The direct loss is that which is for medical treatments or property rebuilding. These may or may not be covered by insurance, but large losses will increase the cost for insurance by all insureds. Fires cause interruption to the business directly involved in an emergency, but also to neighboring businesses or companies supplying resources to that business. Business interruption can lead to business failure or extended loss of revenue for employee salaries and taxes to the community. A large percentage of businesses with fire loss never reopen. Loss of life or injury has an extended economic impact for families and for the community. All of these costs are part of the cost-benefit analysis that should be considered for the price of built-in fire protection, or for fire department resources to assure better fire safety.

Fire Prevention Program

A comprehensive prevention and life-safety services program enables a fire department to minimize life and property loss and injuries associated with fires and other events. The essential components of a fire prevention program are described in the following figure:

Figure 82: Fire Prevention Program Components

Fire Prevention Program Components	Program Elements
Fire Code Enforcement	• Proposed construction & plans review • New construction inspections • Existing structure/occupancy inspections • Internal protection systems design review • Storage and handling of hazardous materials
Public Fire & 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 & prosecution

Code Enforcement

General Inspection Program

The most effective way to combat fires is to prevent them. A strong fire prevention program, based on effective application of relevant codes and ordinances, reduces loss of property, life, and the personal disruption that accompanies a catastrophic fire. The impacts of fire are significant; it is reported that nearly 50 percent of all small businesses that are forced to close due to fire, never re-open. The economic consequences of a fire are estimated to be 2.5 times the actual damage that the fire causes to a structure and its contents.

Inspections of existing properties are an essential component of any fire protection system. The primary goal of such inspections is to identify and eliminate potential hazards to life and property. This is most effective when utilizing personnel with a proper combination of training and experience. In addition, property inspections must be completed with adequate frequency.

The recommended frequency for commercial fire safety inspections vary by the type of property and degree of hazard. The National Fire Protection Association recommends a standard for inspections by hazard class, as listed in the following figure:

Figure 83: Recommended Fire Inspection Frequencies

Hazard Classification	Example Facilities	Recommended Inspection Frequency
Low	Apartment common areas, small stores, and offices, medical offices, storage of other than flammable or hazardous materials.	Annual
Moderate	Gas stations, large (>12,000 square feet) stores and offices, restaurants, schools, hospitals, manufacturing (moderate hazardous materials use), industrial (moderate hazardous materials use), auto repair shops, storage of large quantities of combustible or flammable material.	Semi-Annual
High	Nursing homes, large quantity users of hazardous materials, industrial facilities with high process hazards, bulk flammable liquid storage facilities, facilities classified as an "extremely hazardous substance" facility by federal regulations (SARA Title III).	Quarterly

At present, there is no fire safety inspection program in the PVFPD other than inspections that may be specifically requested. There are many reasons for having an inspection program as cited in the Enforcement section of the 5 E's. Also, the fire inspection process is credited by the Insurance Services Office (ISO) with points towards the Fire Suppression Rating. ESCI recommends that PVFPD develop an engine company fire safety inspection program. The design of the inspection program should begin with assigning occupancies with the highest risk factors in the first year and continue in subsequent years with those buildings/businesses considered not to be as high a risk (Figure 83).

Having fire personnel in businesses has the added advantage of familiarizing them with the building interior layout, egress/access points, special features, and the functional operations/activities taking place in the building. Developing formal pre-incident plans (preplans) for these buildings increases the effectiveness of response and contributes to firefighter safety. PVFPD has developed some preplans of commercial and public buildings; however, they are limited in nature and not necessarily up to date. It is recommended that a more robust preplan program be implemented.

New Construction & Plans Review

An essential component to a fire prevention program is new construction plan reviews. When a new building is proposed within a fire department's boundaries, the structure is the protection responsibility of the fire department for the life of that building. If it is not constructed according to code, it may become a problem for the firefighters in the future and a risk to the community. Consequently, the fire department has a fundamental interest in ensuring a structure is properly constructed.

Plan reviews are conducted as needed at PVFPD. The number of plans needing review are not overwhelming at this point in time. As the community/area continues to grow, this may change.

Conducting effective plan reviews requires that the adopted fire code is the same model code and version (year) as the building codes used and enforced by the Town and County. PVFPD has adopted the 2012 International Fire Code (IFC) and is currently considering the adoption of the 2018 IFC. The Town of Kersey and Weld County both have adopted the 2015 International Building Code. ESCI recommends that PVFPD meet with the Town and County representatives for the purpose of coming to consensus on the adoption of matching versions of the International Fire and Building Codes.

Fire Investigations

The third important aspect of a fire prevention/life safety division is the ability to accurately determine the causes of fires within the community. Effective fire cause determination can define a community's fire problem. Causes of fires can help determine the need for code modifications and changes; identify areas in which to focus public education efforts; modify response deployment methods; and determine firefighter training needs and skills development.

In cases which fires have been set intentionally, identification and/or prosecution of the responsible offender is critical, in order to prevent further fires. When a fire is accidental, it is important to be able to identify the source of the problem. Knowing and understanding how accidental fires start, is one of the most effective means to identify fire prevention and public education requirements.

The PVFPD has a limited fire investigation section consisting of the Fire Chief and the Captain of the Fire Prevention Division. These two individuals are charged with determining the origin and cause of fires and/or explosions. When a fire is determined not to be accidental, PVFPD relies on the law enforcement community to provide the help needed with a criminal investigation. Fortunately, there are not that many fires and a large portion of the fires that occur are accidental in nature; therefore, at this time there is no need to change the process. However, in the future it may be necessary to train additional personnel in the science of fire investigations. ESCI recommends that the PVFPD explore the interest level of firefighters in becoming fire investigators. Offering the opportunity to take a basic 40-hour investigation class coupled with on the job training could very well provide trained individuals for the future and can relieve the Fire Chief from having to initially respond to investigate a fire.

Fire and Life Safety Education

Providing fire safety education to the public to minimize the occurrence of fire, and training the community in appropriate actions to take when faced with an emergency, are particularly important fire protection strategies. Fire safety education provides the best chance for minimizing the effects of hostile fire.

Community public education and risk reduction is a challenge for most smaller fire departments. The ability to conduct public education programs is limited by the personnel available. PVFPD has no formally designed public education program other than specific educational offerings as requested by the general public, i.e., safe and effective use of fire extinguishers; stop, drop and roll; etc. A robust public education program cannot only reduce losses, injuries, and deaths in the community, but also allow fire personnel to be part of community activities and functions. It is an excellent means by which the community gets to know its fire department, and the fire department its residents.

Conducting a community risk assessment aids the fire department in targeting fire prevention programs and fire safety material for best impact. This can also save time and effort when limited resources are a factor. ESCI would recommend that the PFVFPD conduct a community risk assessment to determine the highest priorities for preventing fire losses, injuries, or deaths. The greatest risk may not be a fire risk at all, but instead injuries related to accidents. Developing one or two high value prevention programs that can be related to those risk factors noted and delivering them to specific target groups may lessen the causes identified. Measuring the number of contacts made throughout the community, as well as analyzing the data, may reduce the number of fires or injuries/deaths which is a critical aspect of completing a risk assessment study in the community. Data collection is one of the primary reasons for maintaining an accurate record of emergency responses, fire inspections and code enforcement, fire investigations and public education programs. Complete, accurate, and thorough data collection is absolutely necessary for planning purposes.

Currently, there is a Captain assigned as a staff person in charge of Fire Prevention. It is this Captain's responsibility to try and address the responsibilities of this division which includes plan reviews, fire inspections, fire investigations, and public education. ESCI recognizes there is a need for additional assistance in this division which could be accomplished in a number of ways. One is to have each shift do company inspections with oversight from the Captain in charge. Public education could be shared with firefighters who are interested in this function to be accomplished on shift or as an overtime assignment. Specialized inspections and follow up on unresolved routine inspections remain the responsibly of the Captain in charge.

RECOMMENDATIONS

- Implement a company inspection program to review existing businesses.
- Improve the pre-incident/pre-planning program.
- Adopt a fire code that is of the same version as the adopted building codes.
- Pursue development of fire investigators for the future.
- Conduct a community risk analysis to determine best place to dedicate limited resources.

HAZARDOUS MATERIALS CAPABILITIES

PVFPD firefighters are certified at the operational level with two trained to the technician level. The District participates as a member of the Weld County Regional Hazardous Materials Team. The District can operate as the first due hazardous material response and either handle the situation or call the regional team for additional resources. This type of procedure is not unusual as the cost of outfitting, maintaining equipment, and personnel competency is very costly for the number of hazardous material responses that most departments encounter. The PVFPD jurisdiction has considerable hazardous materials potential due to the oil and gas industry, the number of wells and amount of storage, and transportation of hazardous materials. This risk is identified in the Community Risk Assessment section and should be a focus for training and response readiness.

TRAINING

A comprehensive training program is one of the most critical factors in helping to ensure the safe and effective delivery of emergency services and a requirement noted in NFPA 1720. This is especially true of smaller departments where staffing is limited but the types of incidents to which they respond can be the same as those found in any of the larger departments. To ensure maximum effectiveness and safety in the complex environments firefighters must respond to, maintaining a sufficient initial and on-going fire, rescue, and hazardous materials training program along with continuing medical education is essential. Failure to provide necessary and effective training on a continual basis endangers firefighters and the citizens they serve, and at the same time exposes the fire department to a liability factor that can have severe consequences. It is a proven fact that a well-trained workforce contributes substantially to a better response outcome.

In order to accomplish a comprehensive training regime, a fire department must have access to qualified instructors and training resources. These resources can be within the organization, externally with regional partners or both. It is essential to ensure training programs go beyond simply fulfilling mandatory hours. Fire administrators and instructors must see that firefighters, EMS personnel, and officers are not only competent, but also self-confident in the variety of skills necessary to perform effectively in high stress situations.

The type of training to be considered in a well-developed training program might include the following:

- Basic and advanced firefighter training
- Basic and advance medical training
- Driver/operators training courses
- Hazardous materials training
- Firefighter safety and survival
- Technical rescue training
- Wildland firefighting basics and refresher course work
- Officer development training

Training Operation

The current training program is directed by the Battalion Chief of the District. His responsibilities also include overseeing the Operations Division, which can be a full-time responsibility itself. The Chief's current involvement in training extends to setting up a training schedule and having company officers direct the training. At times, the Battalion Chief is also involved in the evaluating and testing process. PVFPD personnel have the opportunity and do participate in a good amount of training. There are training grounds and facilities on the main fire station property that allows for easy access, while at the same time, for companies to remain in service.

An issue with the current system is not having a person dedicated to the day-to-day training efforts. While there is at least one additional person who is a certified trainer, he is on shift and not always available to train the personnel on the other shifts. Additionally, the current fire training program does not have directives on how to conduct training on a specific subject matter. A strong training program will have lesson plans in a training manual that directs how to perform specific functions and assures the training is consistent for all involved. This ensures everyone is able to perform in the same way at hopefully the same level. Additionally, the topics and hours of training must be maintained and monitored to assure everyone is receiving adequate, documentable training. Under the current personnel alignment, developing such a manual and doing all of the administrative details would be difficult due to the time needed.

ESCI recommends having an individual who can not only identify the training needs, but set up the necessary administration of the program and instruct classes as well as develop a strong training program. This person could be recruited from within the department or hired from the outside. This additional cost might be cost-shared with other departments. Providing for regional training will also have the advantage of assuring when mutual aid resources are working together that they will be performing the same way.

Along with training for fire and rescue incidents, emergency medic training is required of all personnel. This has been accomplished with outside training resources such as Aims Community College. All personnel are required to meet the required number of training hours in order to maintain their EMT or EMT-P certifications. PVFPD should continue its quest for State of Colorado certification to be an EMT Basic CE group so as to provide certified EMS training in-house. Additionally, if a regional fire training center is implemented, PVFPD could provide regional EMS education as well.

PVFPD firefighters are actively involved in numerous Special Teams made up of personnel from a number of neighboring departments. These teams respond to specific incidents such as confined space rescue, wildland fires, hazardous materials incidents, low/high angle rescues, etc. Participation on these teams requires specialized training and associated certifications before a firefighter becomes a member. At present, any PVFPD member wanting to join a team can do so and receive the necessary training and certification while functioning as a team member. Training for these teams is handled both locally and regionally by certified instructors. As noted earlier in this document, PVFPD may want to evaluate how their firefighters become a member of a specific team as well as how many firefighters they allow on these teams.

RECOMMENDATION

- Consider implementing a Training Officer with primary training activities.

FUTURE SYSTEM—DEMAND PROJECTIONS

PVFPD is located in Weld County, Colorado. In 2017, the County had a population of 304,633 people. The population of the District is estimated to be 4,406. The District has a main population center of the Town of Kersey. The Town of Kersey had a population of 1,574 at the end of 2016. The Town has residential, commercial, and industrial zoning. Kersey has a defined growth influence area and there is a Coordination Planning Agreement in place to coordinate with the County on any development within those boundaries. The Town may be the primary source of growth for higher density residential, as well as industrial and commercial, along the Highway 34 corridor. The Town has wastewater capacity that can be extended to developing areas. However, water is supplied by another entity and cost of a water tap within the Town is expensive as it includes a portion to secure a certain amount of reserve water.

It is difficult to predict the speed at which growth will occur within Kersey or the District. It is reported that some developers may be ready to develop their land, but there are no major projects currently. There are some factors that suggest the District may be the next area to feel the pressure of growth from the south and west.

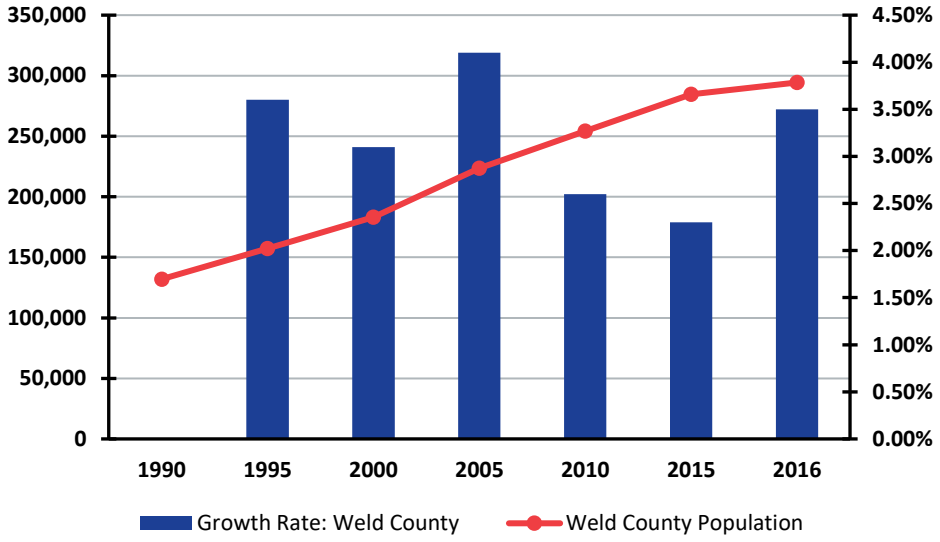
The western side of the District is close to the City of Greeley. As the City fills out, the pressure of residential development will likely push eastward into the District. Also, the north-south Weld County Road 49 is becoming a major transportation route and will likely develop as an industrial and commercial corridor. As development occurs along this route, it is likely that residential growth will follow on either side of the corridor. Outside of the Town is mostly agricultural. This includes a large area in the eastern portion of the District that is comprised of large ranches. These ranches have a great deal of oil wells. This area is unlikely to develop into residential subdivisions while the price of oil makes production profitable. Subdivision process of large parcels may take three years to complete.

Population Growth Projections

Historical Growth

The growth in Weld County has been increasing from 1980–2015. Over that time, the County has grown 131 percent. In the two decades between 1990 to 2010 the growth was 37 percent and 41 percent, respectively. Growth between 2010 and 2015 has been 12 percent which suggests that the growth for the next decade may not be as great as the previous two, but the growth will still be relatively strong.

Figure 84: Weld County Populations Growth



The population of Weld County is forecast to reach 336,437 by 2020, and 595,661 by 2040. The rate of growth is expected to decrease over the 2020 to 2040 range due to aging population and changes in childbearing ages.[12] The population growth in the District may occur later as the more populated areas of the County fill in and push growth to the less developed areas. The major area of development within the District is the Town of Kersey. The growth in Kersey has been steady since 2005, but at a rate slightly greater than one percent. The rate for 2015 and 2016 was one percent.

Figure 85: Kersey Population Growth

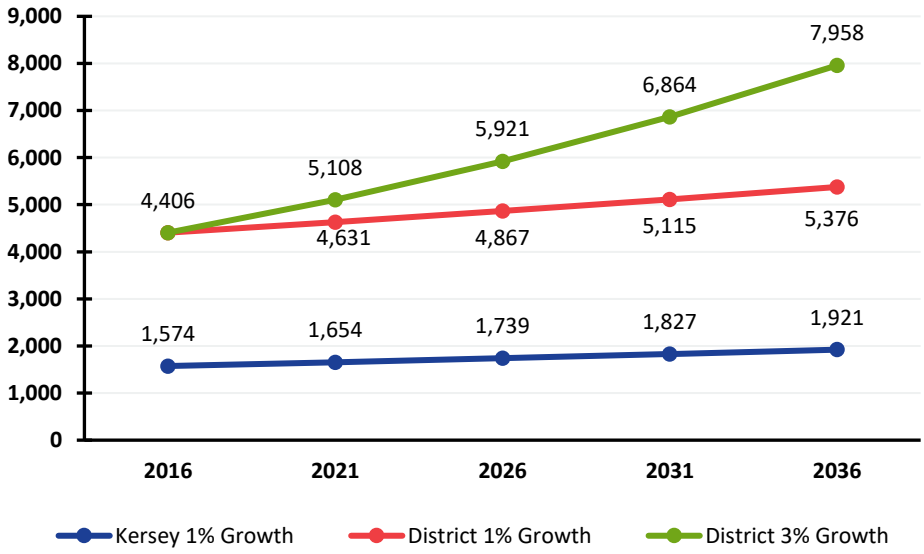
[12] State Demography Office, *Colorado Demographic Profile*, 8/3/2018.

Projecting Growth in PVFPD

Historically, the growth in the County has been higher than the Town of Kersey. In order to project District population, ESCI will look at two assumptions. The first is that the growth in the Town of Kersey will reflect the growth of the District due to the fact the Town represents the densest population center. That percentage historically would be one percent. The second would reflect the expected growth in the County which is estimated to be between 2.6 to 3.2 percent. The County Sheriff Office uses a three percent factor in their population projections. Understanding that much of the growth will occur in the southern end of the County, the growth in the northern portion may be somewhere between one and three percent. This growth in the unincorporated portion of may well result in a three percent growth rate for the District.

In the following figure, the population of the District is projected by two curves. The one reflects a one percent and the other reflects a three percent growth. It is assumed that the District growth will be within the two boundaries. The third curve reflects a one percent within the Town of Kersey.

Figure 86: PVFPD Population Projection



The ten-year (2026) population growth projection for the District is between 4,867 and 5,921. The twenty-year (2036) population growth projection is between 5,376 and 7,958.

Service-Demand Projections

The service demand for the last three years is shown in the following figure along with average for the three years for each type of incident type.

Figure 87: Historical Service Demand, 2015–2017

Type of Call	2015	2016	2017	3-Year Average	Calls per 1,000 Pop.
Rescue/EMS	300	357	278	312	71
MVC	120	124	137	127	29
Fire	107	100	129	112	25
Cancel/Good Intent	90	113	92	98	22
Service Call	50	60	59	56	13
False Alarm	18	20	25	21	5
Hazardous Condition	17	7	9	11	2
Other	2	1	4	2	0
Overpressure	1	1	2	1	0
TOTAL	**705**	**783**	**735**	**740**	**167**

The average total service demand over the three years is 740 calls per year. The three-year average and the current population of 4,406 will result in a rate of 167 total calls per 1,000 population.

The following figure defines the expected range for total number of calls for service in 2026 and 2036. It uses the one percent growth curve for minimum projected growth and the three percent curve for the maximum projected growth. It shows the total service demand predictions and the EMS service demand (with both EMS and MVC) as it is the greatest type of demand for service.

Figure 88: Projected Service Demand

		Population		2026	2036
		10-year	20-year	(10-year)	(20-year)
Total Service Demand	Minimum Projected Growth	4,867	5,376	813	897
	Maximum Projected Growth	5,921	7,958	998	1,329
EMS Service Demand	Minimum Projected Growth	4,867	5,376	487	538
	Maximum Projected Growth	5,921	7,958	592	796

Figure 88 gives some idea of the service demand ten and twenty years into the future. The ten-year forecast (2026) would be for a total service demand of 813 to 998 calls. The twenty-year forecast (2036) would predict 897 to 1,329.

Impact of Aging Population on Service Demand

The preceding discussion predicts EMS future service demand based on population forecasts with the demand being the same as the average of 2015 to 2017. However, the increasing elderly population will increase the demand for emergency medical services as the elderly population is a disproportionately greater user of these services. National medical industry studies suggest that the patients over 65 years of age are three times more likely to access local emergency services than other age groups. The current County demographics of the population over 45 years of age is distributed as shown in the following figure. Assuming that there will not be any reason for County population to move when they reach a certain age, then it is very likely that the existing population will continue to age in place.

Figure 89: Weld County Demographics 2018[13]

2018			
Age	**Males**	**Females**	**Total**
45 to 49 years	8,557	8,442	16,999
50 to 54 years	8,342	8,341	16,683
55 to 59 years	7,206	7,533	14,739
60 and 61 years	2,462	2,533	4,995
62 to 64 years	3,376	3,477	6,853
65 and 66 years	1,814	1,885	3,699
67 to 69 years	2,142	2,315	4,457
70 to 74 years	2,867	2,990	5,857
75 to 79 years	1,856	2,248	4,104
80 to 84 years	1,236	1,714	2,950

Based on the current population, the ten and 20-year age demographic forecasts are displayed in the next figure.

Figure 90: Weld County Aging Population

Age	2018	2028	2038
65–69	8,156	14,739	16,999
70–74	5,857	11,848	16,683
75–79	4,104	8,156	14,739
80–84	2,950	5,857	11,848
Total	**21,067**	**40,600**	**60,269**
Percent Change		**92.7%**	**48.4%**

[13] https://suburbanstats.org/population/colorado/how-many-people-live-in-weld-county

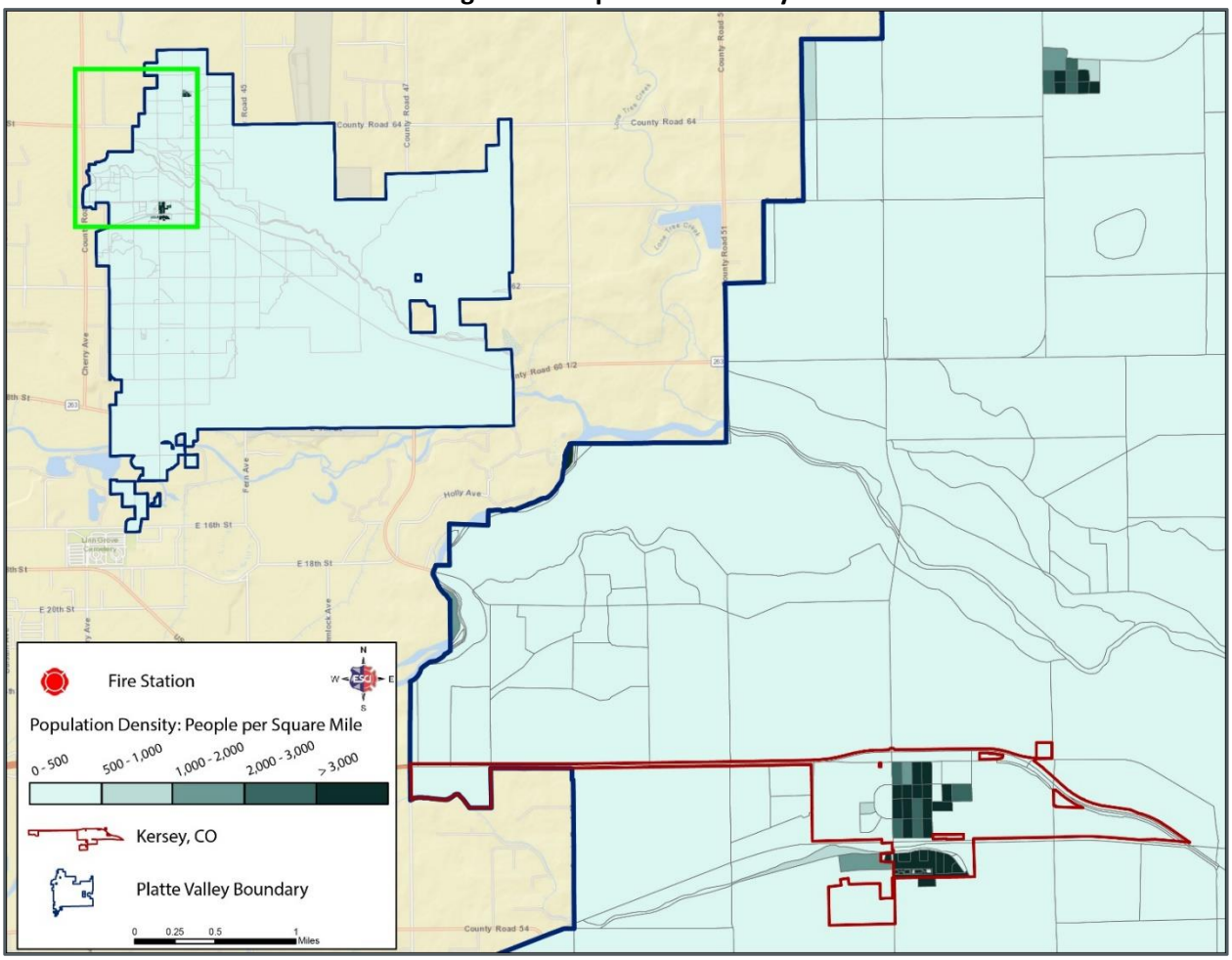
It is reasonable to assume that demand for emergency medical services in this age group will increase proportional to the increase in size of the demographic. This means that in ten years, the County and the District—assuming a homogeneous distribution of elderly population—to increase by nearly 100 percent (from 21,067 to 40,600), and in the following ten years to increase again by nearly another 50 percent. Since the service demand data for EMS calls is not stratified as to age, it is difficult to predict the exact impact on the number of calls. It is also impossible to know if whether as persons age they will remain in the County or move to other areas, or whether, conversely, it may be that the individuals moving into the District may be disproportionately in the over 65 demographic. Nevertheless, it does suggest that the demand for EMS services will increase to a higher degree than other types of calls for service.

Community Risk Analysis

ESCI examined a variety of risk factors for PVFPD. While this section cannot provide an exhaustive list of all hazards that could potentially affect the District, major categories of risk types are provided and discussed. Information for this section was collected from PVFPD and through open sources to create the illustrations and details for each risk identified.

First, populated areas of the District were revisited to provide a foundation for where people live and work relative to risk. The most densely populated areas of the District are found in the Town of Kersey and in the community of Alden. The remainder of the District's population is sparsely spread across a large geographical area.

Figure 91: Population Density



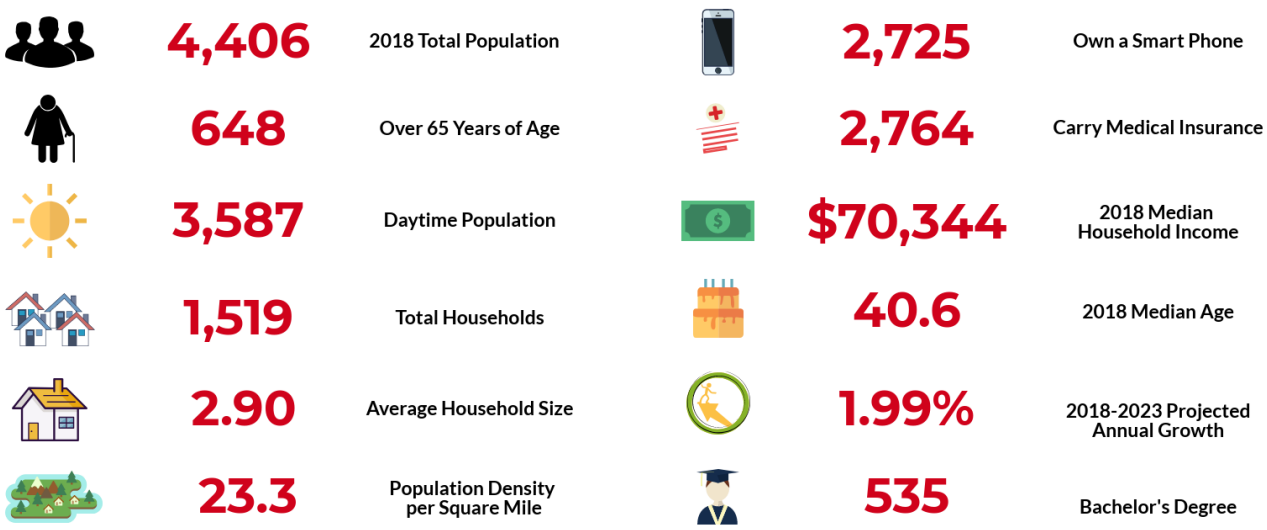
The effects of distribution on service demand by the District's population resulted in the more densely populated areas representing slightly less than half of PVFPD total service demand. The result of this distribution means that while approximately half of the population utilizing emergency services can anticipate relatively fast response times, the other will most likely experience response times nearly double that of the populated areas.

Demographics

In addition to where people live, demographic trends about the community can also be insightful to determine several risk related factors, such as the percentage of at-risk populations, income, ethnic composition, and housing information.

The following figure provides an overview of demographic data specific to PVFPD and its citizens.

Figure 92: Platte Valley Fire Protection District Demographic Summary



Source: ESRI Living Atlas 2018

In this figure, several demographic values are presented to provide a snapshot of the District's community makeup. Approximately one-fifth of the population commutes outside of PVFPD daily, indicating that the majority of places for employment are located outside of the District's boundaries. Additionally, with a median age of 40.6 years, the median age of PVFPD is slightly higher than the average median of the U.S. When comparing smartphone ownership, which could be valuable to issue information and warnings during emergencies or natural disasters through social media, PVFPD residents are comparable to smartphone ownership across the nation; however, the percentage of individuals who carry medical, hospital, or accident insurance is slightly lower than the national average.

A recent study found that segments of the population are at a higher risk of injury or death due to fire. ESCI has determined that a significant percentage of the population of the District falls into one or more of these categories.

- **Risk by age**: In 2015, adults ages 50 or older had a greater relative risk of dying in fires than the general population. Those ages 85 and older had the highest risk of fire death. While lower than the relative risk of the general population, children ages 4 and younger faced an elevated risk of both injury and death in a fire when compared with older children (ages 5 to 14).

41.3%

- **Risk by gender**: Males were 1.7 times more likely to die in fires than females.

50.0%

- **Risk by income level**: The danger of death or injury is closely tied to household income, and children and the elderly in the poorest homes are exposed to the greater risk.

9.6%

- **Risk by race**: African-Americans and American Indians/Alaska Natives were at a greater relative risk of dying in a fire than the general population.

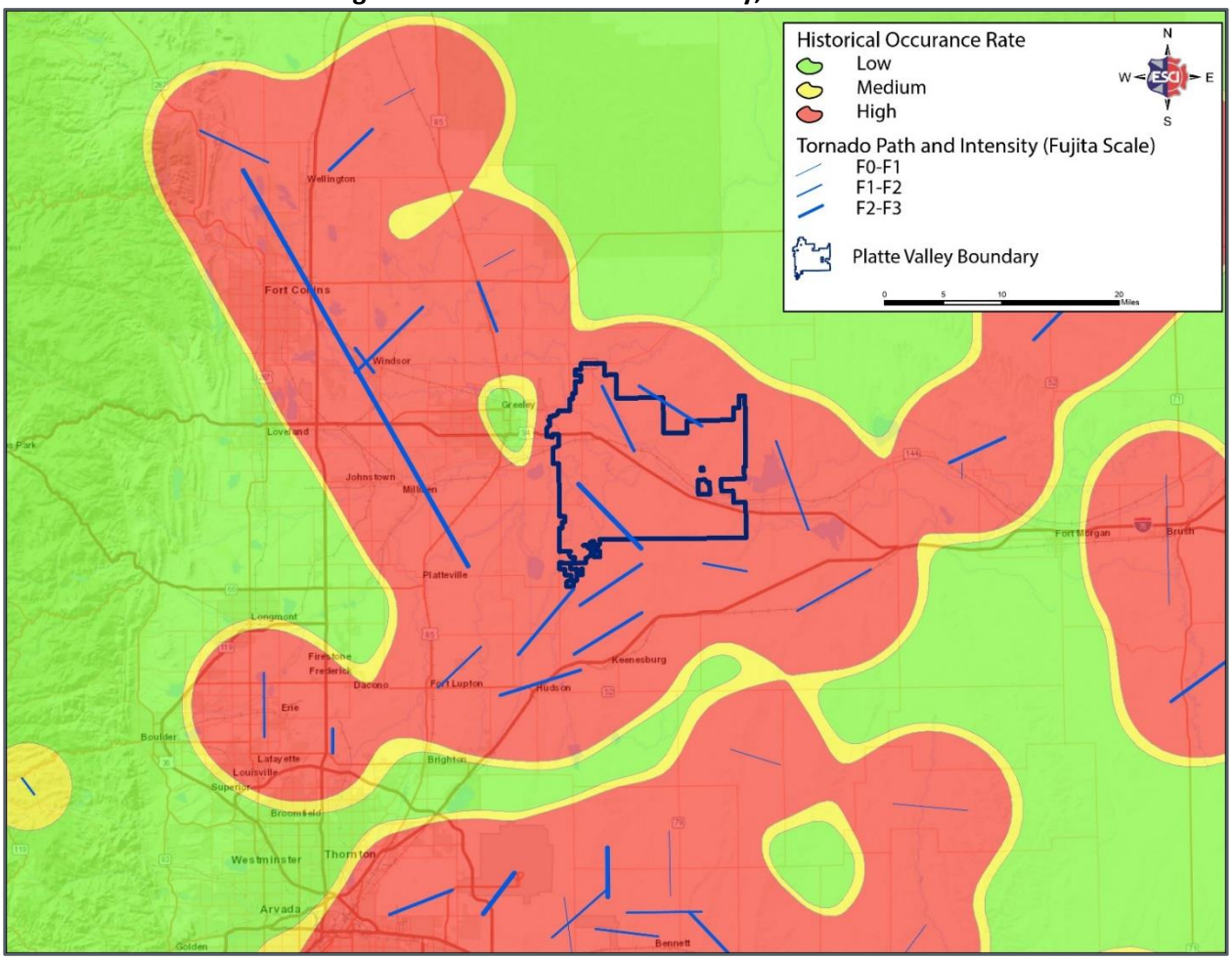
1.1%

Environmental Hazards

In this section, environmental risks factors for PVFPD are identified and discussed to provide an indication of likelihood and potential impact to the District. Environmental risks are those factors caused by the environment, as opposed to man-made risk factors that involve a human element. The first environmental risk examined is the threat from weather. Extreme weather events can be destructive and are responsible for billions in damages in the U.S. each year. The following figures provide a historical synopsis for tornado and hail damage both in and around PVFPD.

Tornados can be one of the most destructive types of natural events that can form, travel, and disappear quickly and without warning. The potential for PVFPD to experience tornadic activity is present and appropriate detection and notification procedures should be reviewed annually, as well as the District's emergency management plan. Impacts from these events can be devastating and recovery can take weeks to years to fully occur.

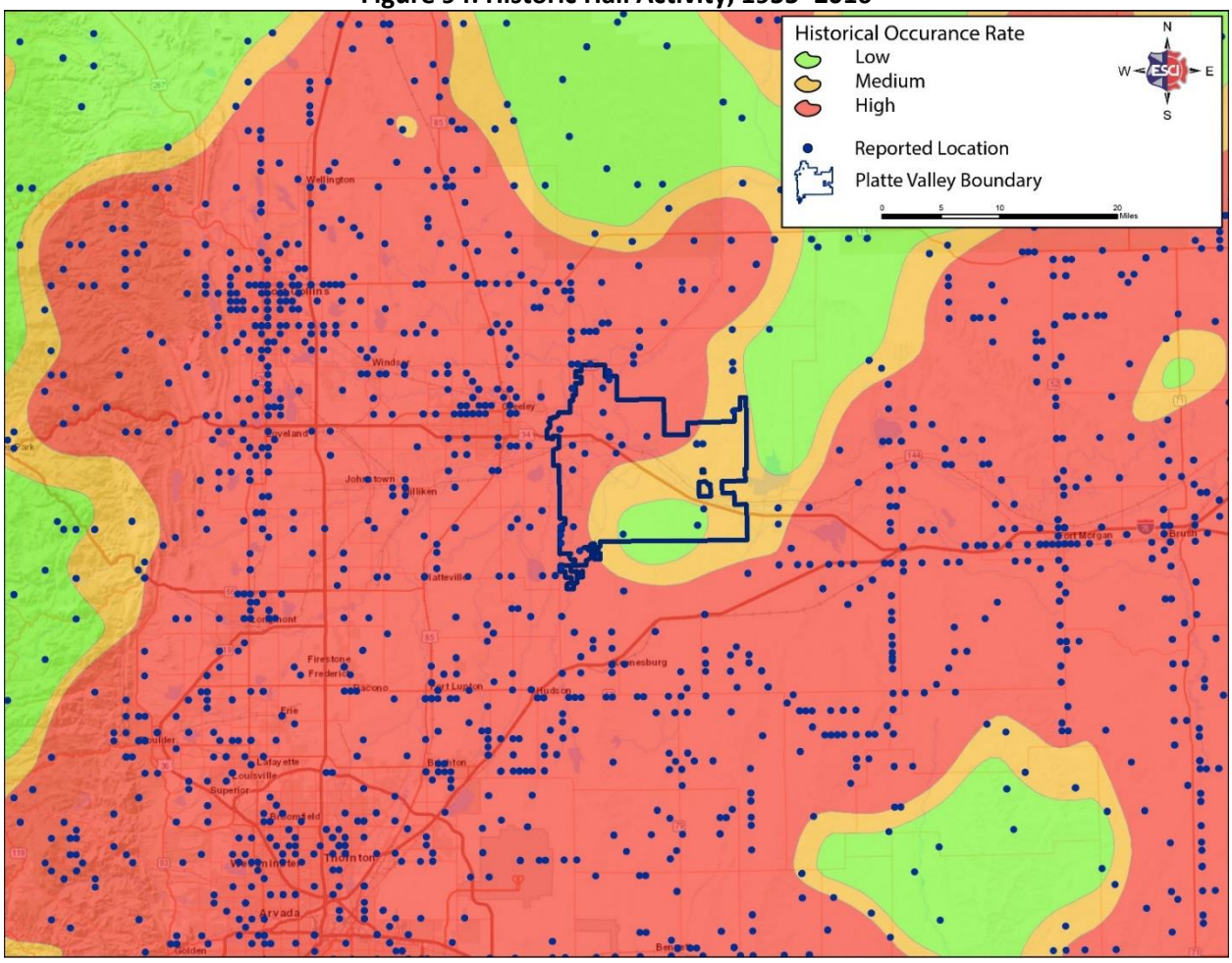
Figure 93: Historic Tornadic Activity, 1960–2014



As illustrated in this figure, the threat of tornadic activity is a viable threat to PVFPD and the surrounding area. While the touchdown of a tornado in the District is not a frequent occurrence, the impact from a tornadic event both in and outside the District can have dramatic effects on both the community and emergency services.

The next figure presents historical hail damage in and around PVFPD.

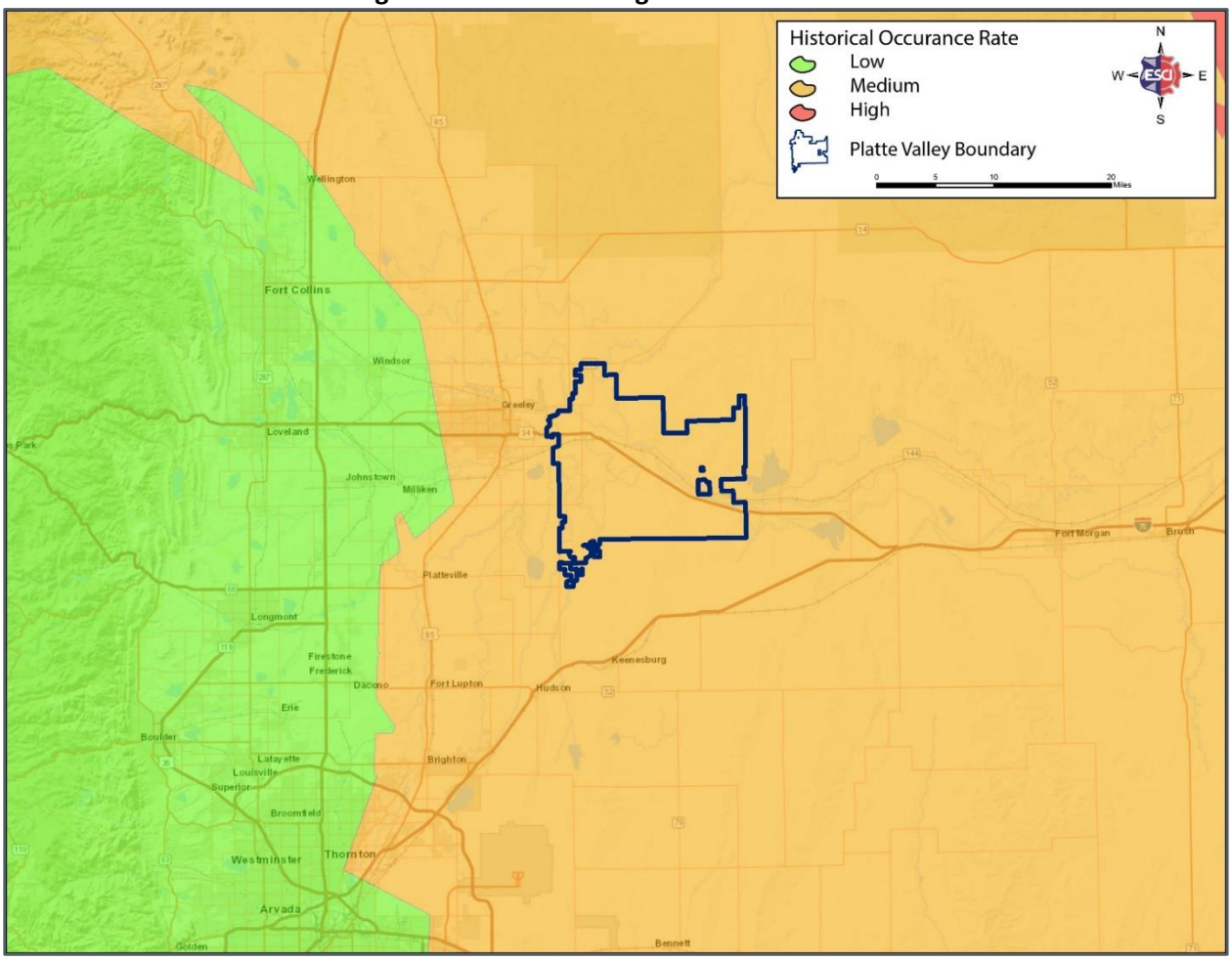
Figure 94: Historic Hail Activity, 1955–2016



From this figure, it is clear that hail incidents and damages occur with some frequency in Weld County and the surrounding area. Although it is not possible to prevent hail from occurring, it is possible to warn citizens when the potential for this phenomenon is present, and provide information on the precautions to be taken. While not common, injuries and death from hail are a possibility, as is the damage that can occur to property during a hail storm event.

Next, the historical occurrence of drought is illustrated to provide an assessment of the likelihood of PVFPD experiencing a drought event.

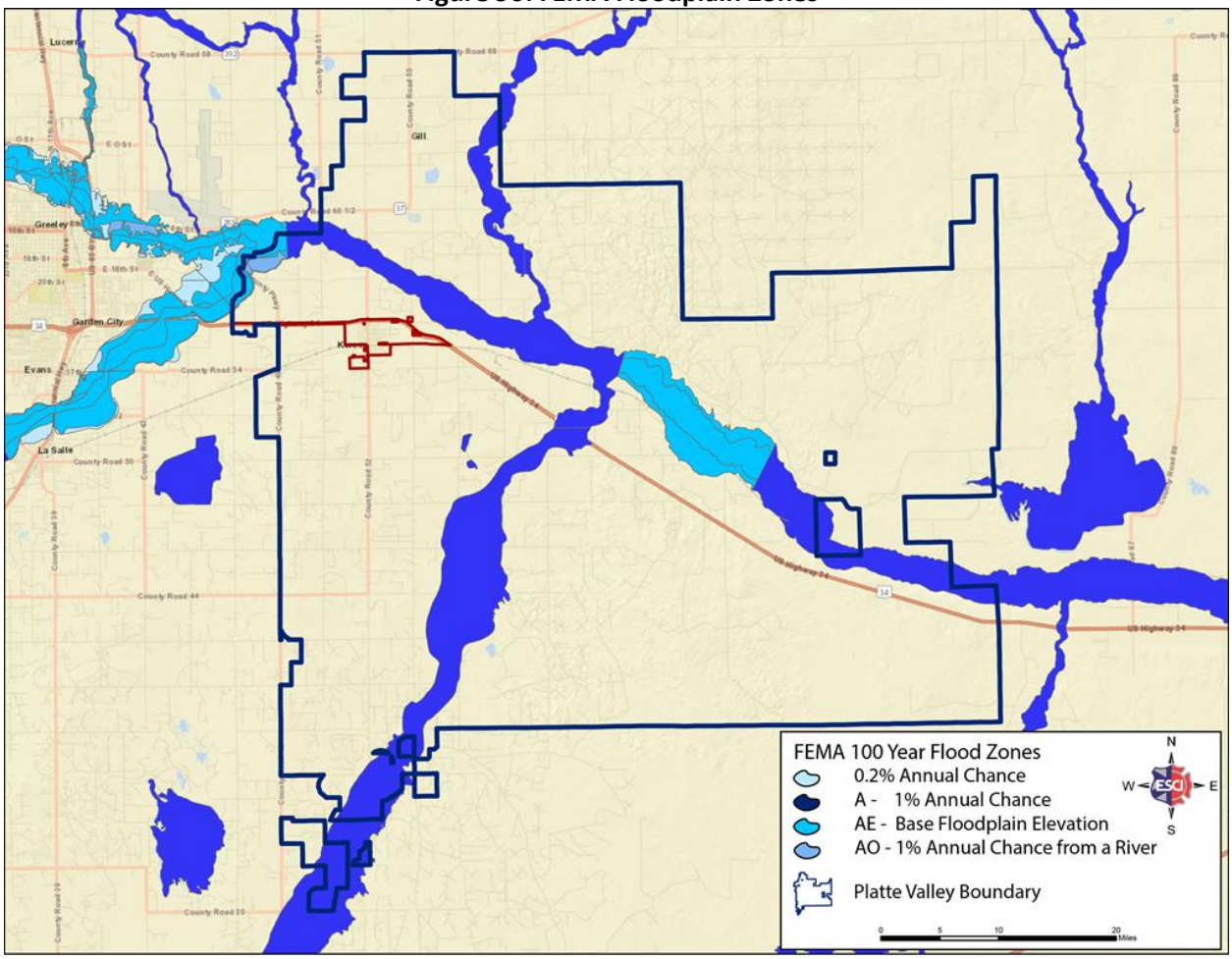
Figure 95: Historic Drought Occurrence Rate



Like hail and tornados, drought can be equally devastating to a community. Based on historical occurrence, PVFPD has a medium rate of drought with the chances of drought moving from low near the mountains to high towards the east.

While the likelihood for drought is present, flooding of the Platte River can cause significant challenges for citizens and responders. When major flooding occurs, such as in 1965 and 2013, the PVFPD could experience an extreme impact due to this weather event. The following figure displays the floodplain within the District.

Figure 96: FEMA Floodplain Zones



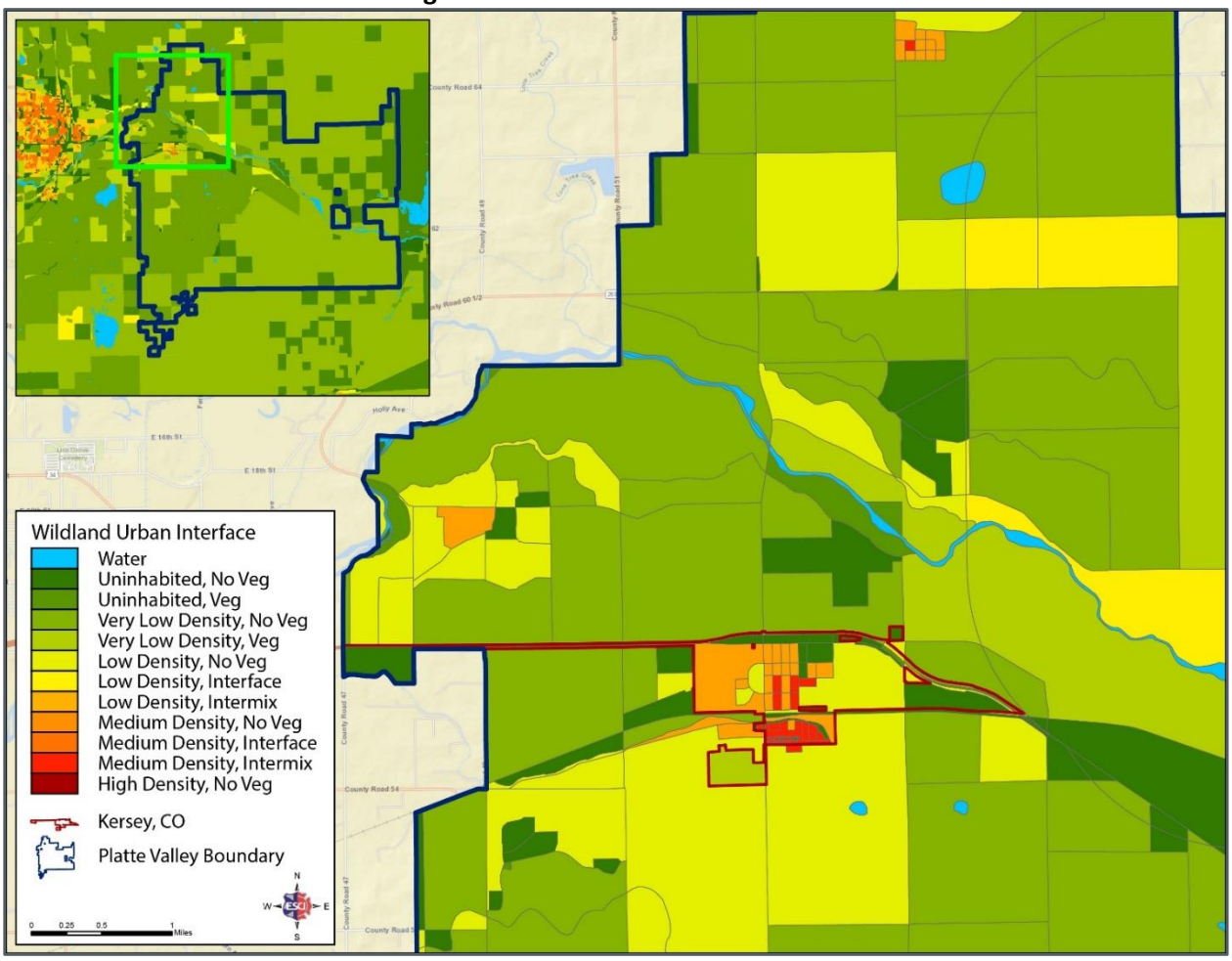
When heavy rains occur in the mountains, the potential for the Platte River to flood and cause major disruption to the area is a risk that the community should be prepared for. Although the Town of Kersey is outside of the designated FEMA flood zones, PVFPD's ability to travel across the District could be severely impacted if water should begin to rise over roadways as waterways bifurcate the District in to multiple segments.

Wildland Fire Potential

Finally, wildfire threat is examined for potential risk to populated areas along the wildland urban interface. Although wildland fires often result from human related causes, they are included in the environmental risk section as natural phenomenon can greatly influence the formation and severity of wildfires.

As PVFPD continues to grow and expand, the potential for residents and businesses to be impacted by wildland fires will increase as expansion in to previously uninhabited areas occur. This boundary between undeveloped or natural areas and areas of human activity is referred to as the Wildland Urban Interface (WUI). Several factors can influence the potential risk associated with the WUI, such as vegetation type, humidity and development density. The following figure provides an illustration of the WUI by presenting interface of population density and vegetation. Using this information, areas subject to a potential wild fire threat can be identified.

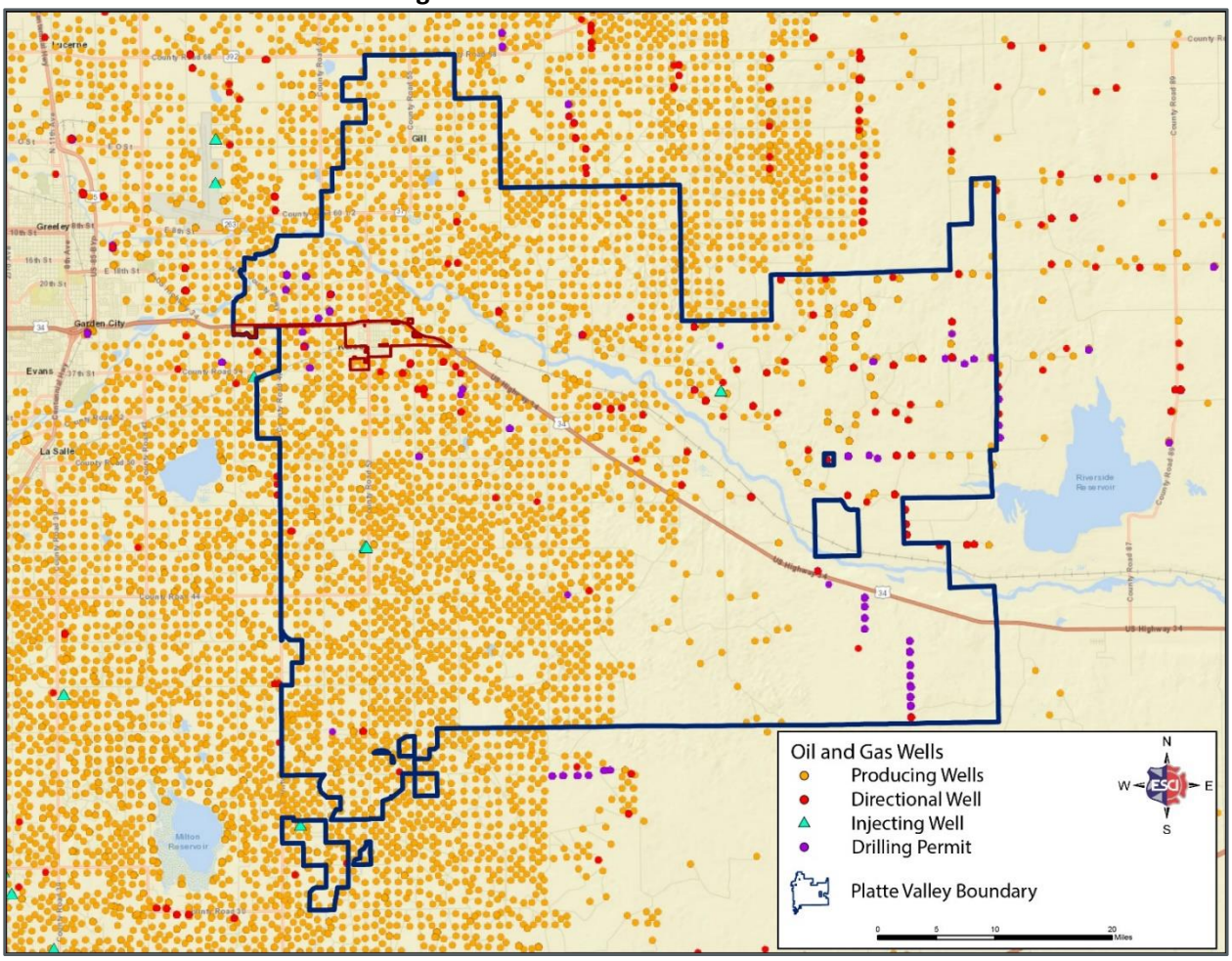
Figure 97: Wildland Urban Interface



Hazardous Substances and Processes

In addition to natural threats, risk due to human activities can also pose threats to the community and responders alike. The next figure provides an overview of oil and gas well locations by type across the District.

Figure 98: Oil and Gas Well Locations



As seen in this figure, PVFPD has numerous oil and gas wells, particularly in the western half of the District. Although these sites usually pose little threat, accidents, explosions, and fire are a possibility. Additional environmental risks such as spills and seepage into fresh water supplies are also potential threats associated with these locations.

FUTURE DELIVERY STRATEGIES

Short- and Mid-Term Strategies

The recommendations made in the report are listed here for convenience. Most of these recommendations can be implemented relatively quickly, although some may require some work that may span 2–3 years. It is suggested that those dealing with safety concerns be made higher priority. Creating a strategic plan to accomplish these items effectively is the best approach, although some of these can be implemented by the officers responsible.

There are other recommendations that are completely new strategies or may require some time and effort to implement and are reflected in the Long-Term Strategies section with additional explanation.

Administrative/Planning

- Post minutes on the District website.
- Periodically check that Board bylaws are current.
- Complete standard operating guidelines (SOGs) for each riding position and activities on the fireground.
- Develop and maintain effective pre-incident and special hazard planning practices.
- Adopt a District master plan using this report as a foundation with modifications if desired.
- Undertake a strategic planning process to prioritize and plan for the implementation of the findings and recommendations in this report.
- Actively engage with the Town of Kersey to see that the Emergency Operations Plan is updated.
- Remain closely involved in current and future emergency planning initiatives.
- Work with the LEPC to assure that all required planning and reporting needs are addressed.

Capital Assets

- Assess the condition and consider replacement of Engine 3702.
- Assess the condition and consider replacement of Water Tender 3741.
- Set up an apparatus replacement schedule and fund it.

Staffing

- Consider collaborative hiring of Battalion Chief/Training Chief position.
- Develop Dynamic Recruitment Program.
- Consider alternate EMS staffing models.

Service Delivery

- Examine the reasons for high call processing time and develop a plan to bring the 90th percentile call processing time to within the NFPA standard.
- Identify and evaluate possible issues and solutions to improve turnout performance.
- Monitor turnout times and establish performance targets.
- Establish response time standards for different population densities and monitor them.
- Establish a more structured and formalized planning process

EMS

- Internal documentation of all EMS calls.
- Develop an internal system to collect necessary EMS data.
- Develop internal retrospective EMS review and QA program.
- Consider the use of an ALS training manikin.
- Acquire Colorado State EMT-Basis and Paramedic CE Group certification.
- Implement automated inventory control program.
- Enhance PVPFD/Medical Director relationship.

Fire and Life Safety

- Implement a company inspection program to review existing businesses.
- Improve the pre-incident/pre-planning program.
- Adopt a fire code that is the same version as the adopted building codes.
- Pursue development of fire investigators for the future.
- Conduct a community risk analysis to determine best place to dedicate limited resources.

Recommended Long-Term Strategies

Long-term strategies evaluate opportunities for continued improvement in the future. Changes in service demands, increased target hazards, and growth projections will result in numerous future challenges. This section will discuss the future needs for staffing, additional facilities, special team response, and administrative support. PVFPD will continue to grow at a moderate, but likely steady rate. The demographic changes within the District will have a greater proportion of individuals over the age of 65. Demand on EMS services will increase disproportionately to other service demand in general.

ESCI identified several areas to consider for stability into the future. As noted earlier in the report, PVFPD should establish capital assets replacement schedules that are funded for future replacement. Based on the current uncertainty in EMS service and potential for greater EMS impact, PVFPD should look at providing EMS transport service and charging for that service outside of the tax-supported, fire-based services. Additional thought should be given to supporting the community with other (non-emergency) health/medical services which might be even more applicable in the future with greater numbers of elderly citizens. Some restructuring of the financial resources may be warranted to offset the potential for severe downturns in oil and gas effecting service provision. Finally, many of the services that PVFPD provides, or may provide in the future, could be expanded over larger areas without overwhelming the current resources. The existing cooperative environment between PVFPD and neighboring agencies may allow greater formal cooperative services either in the form of functional consolidations or operational consolidation. PVFPD should explore options of providing cooperative services with neighboring fire protection districts. Each of these recommendations are expanded in this section of the report.

Financial Planning

Based on the revenue scenarios in the Financial Analysis section, the District needs to act to insulate itself from potential downturns in the oil and gas industry. As shown by the financial models of 50 and 75 percent oil and gas revenue decreases, the operating budget can be severely impacted. ESCI recommends that the District identify the amount of revenues that should be applied to the general operating budget each year. The recommended steps are: 1) Determine the probable drop in revenues during a downturn. This could be based on making some assumptions or by using actual observations during the last downturn. 2) Determine if the remaining revenues are sufficient to support the operating costs minus any capital purchases and annual contributions made to the capital replacement fund. 3) If the remaining funds are not sufficient to maintain services it may be important to find the strategy to minimize the impact. This may be to ask for an increase in the mill levy to cover minimum level operations or to set up a specific reserve for the eventuality.

Ideally, the bulk of oil and gas revenues could be used only for capital reserves/purchases allowing the deferment of purchases during an economic downturn. The intent is to be able to continue to provide services without reduction of services or layoffs of personnel. If possible, during the time that oil and gas prices are high, this "extra" money should be placed in reserves. These reserves might be capital replacement reserves (discussed in the next section) or a contingency reserve for when the revenues drop in the future. The contingency reserve could provide funding for the District for a couple of years until the downturn is over or alternate funding is obtained. By conducting this exercise, it keeps management and the governing body aware of the danger of expanding services outside of what can be sustained.

Capital Replacement Planning

As discussed in the Capital Assets section, the planned replacement of expensive capital assets should be anticipated and funded. Three major areas of capital assets that should be considered are: facilities, apparatus, and equipment. Replacement of equipment—such as radios and SCBA units, hoses, and PPE—while not individually costly, can in the aggregate be a large expenditure. This is because a large portion or all of the existing equipment is usually replaced at once; i.e., change in radio system or legacy SCBA incapability. Replacement of all PPE can be structured to be replaced over a 5-year period by purchasing 20 percent of the needed replacements per year. Even then the cost can be sizable.

Each of these assets should have a replacement schedule and a method of funding the purchase as the schedule recommends. This is an area in which monies from oil and gas extraction could be used for the capital replacement which would not immediately affect the operating budget if there was no money for replacement in a year.

Fire Based EMS Transport Service

Based on limited information, ESCI recommends exploring the possibilities of purchasing and operating an ALS ambulance. The capital expenditure would support future opportunities. Since the asset would belong to PVFPD, multiple staffing models could be considered and implemented. Also, the asset would be 100 percent dedicated to servicing the District and neighboring jurisdictions, improving overall response times. The initial investment for a Type III ambulance and ALS equipment, would be approximately $197,300.[14] If PVFPD elected to purchase an ALS ambulance, consideration should be made to reclaim all or part of the expenditures through medical billing. The following figure shows a quick estimate of potential revenue from billing. Salaries, benefits, fuel, and vehicle maintenance are not calculated as these are currently supplied by the District (other than what is reimbursed by Banner when PVFPD employees are on their time). The assumptions are reasonable base fees for ALS and BLS transport and a collection rate of 55 percent. This rate is similar to other agencies in the metropolitan area. Actual collection rates might be higher or lower in PVFPD. A typical billing fee would be 3.5 percent of amounts billed. It results in a net revenue of $55,746 annually.

Figure 99: Estimated Potential EMS Transport Revenues

	BLS Transport	ALS Transport	ALS Treatment Charges	Billing Fee Rate	Collection Rate	Total Projected Annually
Revenue Parameters	$500	$800	$145	3.50% of billed	55%	
Supply Cost Estimates	$27.50/call	64.50/call				
2017 Transports	68	95	95			
Revenues	**$34,000**	**$76,000**	**$13,775**		**$68,076**	**$68,076**
Expenditures	**$1,870**	**$6,128**		**$4,332**		**$12,330**

[14] Peak Motor Coach, Ryan Lesher, 303-358-0683; Boundtree, Todd Beirne 720-281-2191; Physio Control, Nikki Kroner, 303-717-2191; Digitech Billing, Skylar Gifford, 914-432-8455.

This cursory analysis is not intended to be a business plan for conducting EMS transport, but it is intended to show the potential of providing this improved service for the District.

Cooperative Ventures

The approach to considering whether cooperative shared services is viable can be approached through two phases.

For the first phase, the District should perform a Strengths, Weaknesses, Opportunities, and Threats (S.W.O.T.) analysis with a wide variety of stakeholders representing the potential partners. This should identify ideas on what common needs exist and the capabilities that each partner brings to the table. This process is sometimes more successful when facilitated by an outside source as a disinterested party.

The second phase would be implemented in the event that the S.W.O.T analysis supports continued evaluation of cooperative services. The second phase would be to conduct a formal feasibility study. The study should evaluate all of the potential options of both functional and operational cooperation, identifying the costs and benefits for each partner. Funding mechanisms should be explored within Colorado statutes.

CONCLUSION

PVFPD is a very well managed fire district. It is a small staff with a large area of coverage, but is providing very good response times to the vast majority of the District calls for service. The number of calls for service are higher than the population would predict.

The agency is perceptive of issues that may have detrimental effects on the District's ability to provide service. The lack of an EMS transport within the District on a full-time basis and uncertainty of the future of the service is one of these areas. The ability to recruit and maintain staffing is another that is of concern and finally, the financial sustainability concern due to the high dependence on volatile mineral extraction production. Each of these has been analyzed in this report and some suggestions offered for the District to undertake. Additionally, recommendations to meet standards or industry best practices have been offered.

ESCI has every confidence that the Board, management, and staff at PVFPD will be able to take the recommendations and implement solutions that fit the District and community expectations. It is in this hope that this report will be beneficial, and the source of concepts offered will help the District build for the future.

APPENDIX A: TABLE OF FIGURES

APPENDIX B: CRITICAL TASK ANALYSIS

Critical Tasking Analysis

The ultimate goal of any emergency service delivery system is to provide sufficient resources (personnel, apparatus, and equipment) to the scene of an incident in time to take effective action to minimize the impacts of the emergency. This need applies to fires, medical emergencies, and any other emergency situation to which the fire department responds.

As the actual or potential risk increases for any particular emergency, 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. Each critical task requires the capability to accomplish it, i.e., trained personnel, appropriate apparatus, or specific equipment. From this list of critical tasks, a response model can be created setting the number of personnel and apparatus required to control the incident. This will differ from one department to another depending on resources available. Once the responses are set for the type of call and risk level, a validation of the response should be conducted. Each scenario is normally run multiple times, with a variety of fire companies, to validate and verify observations and times.

To further validate the analysis process, results are compared with records from actual working fires and similar incidents from previous years. Overall results are reviewed to determine if the actions taken within the early minutes of an incident resulted in a stop-loss or not, and if additional resources were required. The critical task analysis process demonstrates the rate in which the current deployment plan results in stopping loss a high percentage of time within initial critical time goals.

The following figures are provided as an example of critical tasking for various types of calls, both fire and non-fire related. The number of critical tasking lists will depend on the types of risk within the jurisdiction.

Figure 100: Sample Non-Structure Fire Critical Tasking

Task	Personnel
Command	1
Pump Operator	1
Primary Attack Line	2
Total	**4**

Figure 101: Sample Hazardous Materials Incident Critical Tasking

Task	Personnel
Command	1
Pump Operator	1
Primary Attack Line	2
Back-Up Line	2
Support Personnel	7
Total	**13**

Figure 102: Sample Motor Vehicle Collision with Entrapment Critical Tasking

Task	Personnel
Command	1
Pump Operator	1
Primary Attack Line	2
Extrication	3
Patient Care	2
Total	**9**

Figure 103: Example Structure Fire-Interior Attack Critical Tasking

Task	Personnel
Command	1
Pump Operator	1
Water Supply[15]	1
Primary Attack Line	2
Back-Up Line	2
Rapid Intervention Team (RIT)	2
Ventilation	2
Search and Rescue	2
Utilities/Exposures	2
Total	**15**

Figure 104: Example Emergency Medical Incident Critical Tasking

Task	Personnel
Ambulance Transport	2
First Responder	4
Total	**6**

Figure 105: Example EMS Incident-Cardiac Arrest Incident Critical Tasking

Task	Personnel
Direct Patient Care (Command)	1
CPR	2
ALS Patient Care	2
Transport (Driver)	1
Total	**6**

[15] Additional personnel required for rural water supply operations using water tenders for water supply.