

SAMPLE MASTER PLANS FOR EXAMPLE

Analysis of the Fire Department Community Survey

DINWIDDIE COUNTY, VIRGINIA

September 25, 2020

matrix 
consulting group

Table of Contents

1. Introduction and Summary of Key Findings	1
2. Community Identifiers	2
3. Services Provided	3
4. Service Expectations and Satisfaction	5
5. Customer Interactions	8
6. Open Ended Response	11
Appendix A - Verbatim Comments	12

1 Introduction and Summary of Key Findings

As part of the Matrix Consulting Group's standard of cover and strategic planning study for the Dinwiddie County Fire Department, an anonymous survey was distributed to residents and business owners in the County. The survey was designed to measure their view of services provided, the value and quality of those services provided by the Fire Department.

In the following sections a complete analysis is presented for each of the questions. The overall theme of themes of the survey are presented below related to the services provided by the County.

- Respondents identified the emergency medical services as their number one service in terms of importance provided by the County Fire Department.
- Respondents expressed a rapid response was their highest service expectation.
- Response time was ranked highest in terms of service concerns.
- Overall, the respondents were satisfied with the quality of service they received.
- There is an opportunity to improve the publics' knowledge about the fire services in the County.

The summary begins with a description of respondent characteristics.

2 Community Identifiers

The survey was distributed using the Dinwiddie County website and through social media accounts for the County and the Fire Department. A total of 424 responses were received and all responses are confidential. Based on Census Bureau data this represents a 4.0% participation rate of the 10,391 households.

While electronic survey responses were anonymous, the project team asked respondents to identify their status in the County as a resident or non-resident. The following table summarize responses to each of those questions.

Response	Count	%
County Resident	396	94.3%
Non-Resident	24	5.7%
TOTAL	420	100%

In addition, respondents were asked if they were an owner, manager or employee of a business or industry in the County.

Response	Count	%
Yes	13	48.1%
No	14	51.9%
TOTAL	27	100%

In this response, 397 respondents skipped this question.

3 Services Provided

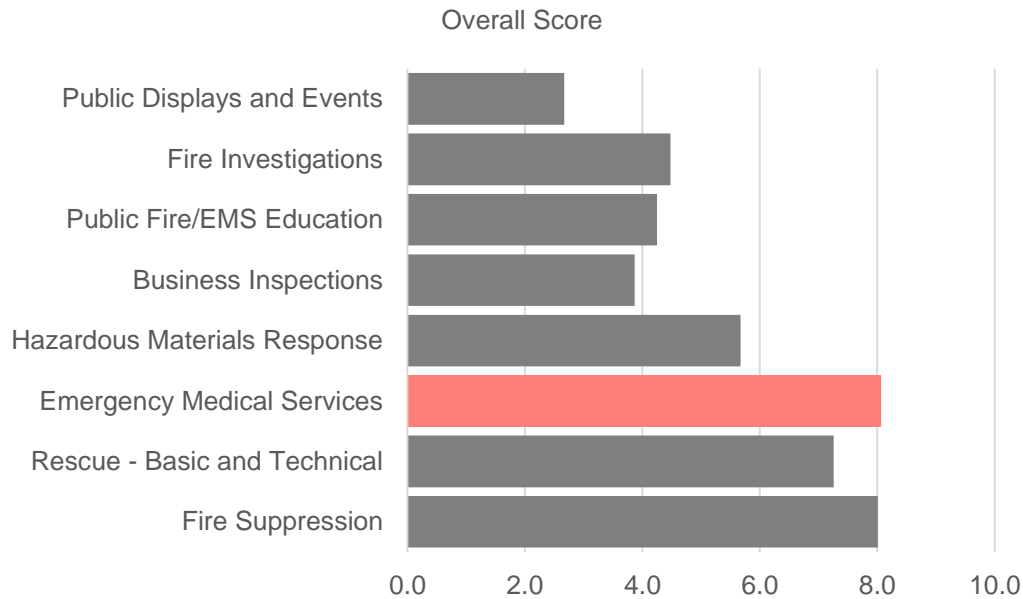
Respondents were asked to rank each of the services provided by the Department on a scale of 1 through 8 with 1 being the most important and 8 being the least important.

		Service to the Community							
#	Statement	1	2	3	4	5	6	7	8
1	Fire Suppression	46%	28%	15%	5%	2%	2%	1%	0%
2	Rescue - Basic and Technical	9%	33%	43%	10%	3%	1%	0%	1%
3	Emergency Medical Services	43%	30%	21%	4%	1%	0%	1%	0%
4	Hazardous Materials Response	1%	3%	10%	53%	17%	10%	3%	2%
5	Business Inspections	0%	0%	2%	6%	23%	28%	27%	14%
6	Public Fire/EMS Education	1%	3%	4%	7%	22%	26%	31%	5%
7	Fire Investigations	2%	1%	3%	13%	30%	24%	19%	7%
8	Public Displays and Events	1%	2%	1%	2%	2%	7%	16%	69%

Emergency responses are the highest ranked services provided by the Fire Department.

- **Emergency medical services is the top service:** Combining the top three rankings, 94% of the respondents felt the emergency medical services is the most important service.
- **Fire and rescue services is the second and third most important services:** Combining the top three rankings, 89% of the respondents felt fire suppression and 85% of the respondents felt rescue services were the second most important services.

For a different perspective, the following chart illustrates the average ranking for each of the services. The average is based on a scale of 1 through 10 with ten representing the most important service.



- Emergency medical services averages 8.07 points while fire suppression averaged 8.01 points.
- Basic and technical rescue averaged 7.26 points.

Overall, the respondents ranked the response to calls for service as more important than public displays and business inspections.

Respondents were given the opportunity to identify other services that should be provided by the Fire Department. Fifty-nine respondents provided comments, of those comments 35 responses were no, n/a, or none. The points that follow provide a synopsis of the comments.

- Public education to include open houses, CPR at discounted prices, smoke detector checks, and smoke detector installation.
- One comment about assisting with burning large piles of brush, possibly for a fee.
- Using community paramedics.
- Water rescue or dive team.

There are some areas that could be expanded in the future including the public education programs and technical rescue responses based on the comments from the public. All the comments for this question are included in the appendix .

4 Service Expectations and Satisfaction

1. Service Expectations

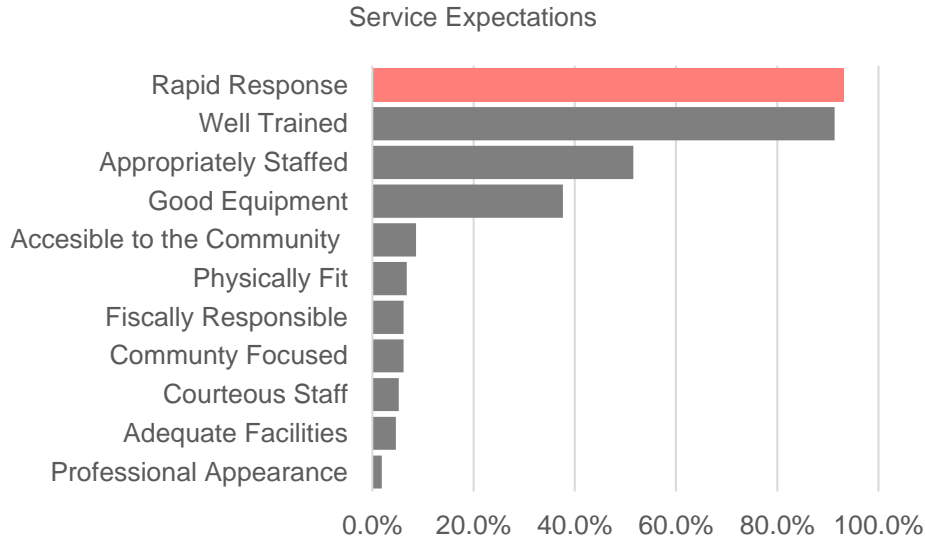
Respondents were asked to identify their top three service expectations as it relates to the Fire Department. They were provided eleven expectations. There were 324 respondents that answered the question with 100 respondents skipping the question.

The first question is for the initial response to a call for service.

Service Expectations

Expectation	Pct.	No.
Accessible to the Community	8.6%	28
Adequate Facilities	4.6%	15
Appropriately Staffed	51.5%	167
Community Focused	6.2%	20
Courteous Staff	5.2%	17
Fiscally Responsible	6.2%	20
Good Equipment	37.7%	122
Physically Fit	6.8%	22
Professional Appearance	1.9%	6
Rapid Response	93.2%	302
Well Trained	91.4%	296

Most of the respondents (93%) have a high expectation of a rapid response and approximately 91% have a high expectation of well-trained staff to make that response. The chart that follows provides a different perspective of the responses.



As illustrated, rapid response and well-trained personnel are of most importance to the respondents. On the opposite end the professional appearance and facilities are not as important.

2. Service Concerns

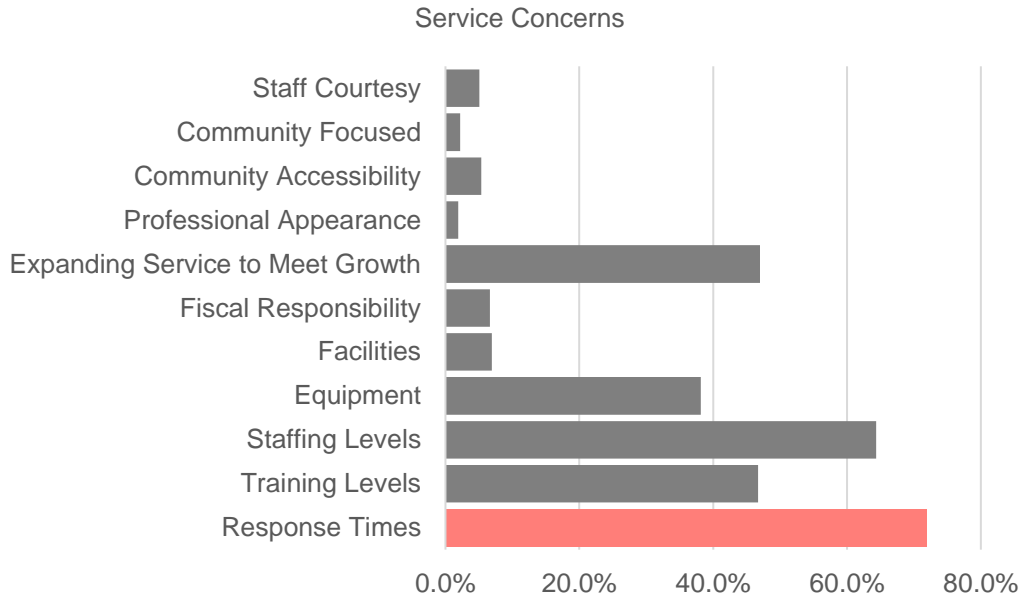
The following table outlines the responses about the concerns or worries regarding the Fire Department. The statement, “Please select the top three concerns or worries you may have about the Fire Department” was open to all respondents whether or not a service was used.

Service Concerns / Worries

	Pct	No.
Response Times	71.9%	228
Training Levels	46.7%	148
Staffing Levels	64.4%	204
Equipment	38.2%	121
Facilities	6.9%	22
Fiscal Responsibility	6.6%	21
Expanding Service to Meet Growth	47.0%	149
Professional Appearance	1.9%	6
Community Accessibility	5.4%	17
Community Focused	2.2%	7
Staff Courtesy	5.0%	16

Response times is the largest concern for the public with staffing levels the second highest concern for the future. The chart that follows provides a different perspective of

the responses.



Expanding the service to meet the needs of a growing community received 47% of the respondents concerns with training levels receiving 46%.

5 Customer Interactions

The survey questioned the respondent as to whether they had used the emergency services provided by the Fire Department in the past two years. If they had utilized any emergency services, they were provided an opportunity to rate those services.

1. Respondent Interactions

Respondents were asked if they utilized any emergency services provided by the Fire Department.

Fire Department Interactions

Response	Count	%
Yes	63	20%
No	260	80%
Total	323	100%

Total responses to the survey were 424 respondents, of those 323 (76%) responded to this question. Of the 323 respondents to this question, 63 (20%) have had some form of interaction with the emergency services provided by the Fire Department.

The following table indicates the service that was utilized by the respondents. Of the 63 respondents that used services from the Fire Department, only 57 indicated the type of service that was utilized.

Fire Department Service

Response	Count	%
Fire	15	26%
Emergency Medical Services	40	70%
Public Service (lift assist, smoke detector check, car seat check, etc.)	1	2%
Fire Code Enforcement/Inspections	1	2%
Total	57	100%

2. Interactions with Personnel

Respondents were asked to rate their experience with the Fire Department personnel.

Personnel Interaction

#	Statement	Excellent	Good	Fair	Poor
9	Response time to your call for assistance.	43%	38%	11%	9%
10	Knowledge of the personnel.	55%	36%	9%	0%
11	Responsiveness of the personnel.	56%	31%	11%	2%
12	Courtesy of the personnel	64%	23%	9%	4%
13	Your overall impression of the personnel.	57%	32%	9%	2%

- **Respondents were satisfied with their response time:** A majority (43%) rated the response time as excellent with 80% rating the response as excellent or good. This coincides with the service expectation responses previously noted.

In each of the statements, the personnel received high ratings from their knowledge, courtesy, and overall impression. In fact, the knowledge of personnel was rated at 91% when the excellent and good ratings are combined.

3. Interaction Comments

Respondents were given the opportunity to provide additional comments related to their experiences and interaction with the Fire Department.

Respondents were appreciative of the personnel and their efforts to provide a high level of service. Many of the comments indicated the staff were helpful and professional. However, numerous comments were directed at the long response times to some of the calls for service. Additionally, there were comments related to the lack of staffing and the need for additional staff to provide the needed services. These comments coincide with the service concerns expressed previously. All the comments for this question are included in the appendix .

4. Overall Interaction

Respondents were asked to provide their overall impressions of the Fire Department.

Overall Quality of Service

#	Statement	Excellent	Good	Fair	Poor
14	Rating the overall quality of service provided	56%	33%	11%	0%

Respondents were generally satisfied with the quality and response to their call for service.

- **Overall, the respondents were satisfied with the service:** 56% of the respondents found the overall services excellent and 89% of the respondents found the services to excellent or good. This concurs with the previous section on personnel interactions.

6 Open Ended Response

The final section of the survey provided an open-ended statement to allow the respondents an opportunity to further explain their responses to the previous questions and statements. It also provided an avenue for the respondents to express their thoughts about the Fire Department that may not have been addressed in any of the previous sections.

1. Additional Comments

The statement requesting a response for this section was: "Please elaborate on any questions or ratings you gave the department that may need further explanation or provide any additional comments you may have." There were 424 responses to the survey with 56 (13%) of the respondents providing additional comments to this statement. Included in the 56 responses, 11 responses were no, n/a, or none.

- **Staffing is an issue many respondents noted in their responses:** 24% of the respondents provided statements that supported the use of additional personnel for the stations that included both career and volunteer staffing.
- **Respondents indicated response time and station locations are a concern:** Statements indicated the response time was too long or there needs to be a station in a certain area such as the Sutherland area. This theme was included in 20% of the comments.

2. Other Comments

There were other comments made in the response to this question that were infrequent but should be noted:

- Making sure the fire departments keep up with the growth of the county.
- I wish there were more community events, not just the money in the boot collection.
- Response time is rather slow. I live 2 minutes from the fire department, and it took 15 – 20 minutes for them to get to me.

These comments would support a public education campaign to inform the public about the services, their operation, and improvements that may be needed.

Appendix A: Verbatim Comments

The survey provided the respondents numerous points to further expound on their ratings and experiences. This appendix provides all the responses made by the respondents.

1. Services Provided

Are there other services you feel the Fire & EMS department should provide that are not listed? There were 59 respondents that provided comments for this question.

Respondent Comments

#	Responses
1	No.
2	Open houses to the public to help build rapport. Also, to drive by stations and see training being conducted.
3	I think given the services provided they are way over funded!
4	Strong leadership (obviously lacking from within the public safety administration)
5	N/A
6	No
7	Help citizens identify hazards on their property, offering mitigation suggestions and suggested resources.
8	No.
9	Unsure
10	no
11	CPR classes discounted prices Dangers of playing with lighters to elementary and middle school students (you wouldn't believe those who think the small fires set will go out on their own) Dangers of leaving lit cigarettes around(adults) Anonymous way to tell about a fire someone started . Nobody teaches about safety anymore. Sending out bimonthly newsletters with safety hints and laws . Using words that are used within the fire and ems departments and find the matching definitions. Words used that have to do with the fire and end dept. It is hard to do much with the Covid - 19 . You need to include all the neighborhoods , big or small .
12	No
13	No
14	Every teacher in every school should be trained to the basic standards of tactical emergency casualty care. The fire Dept should provide paramedics to the sheriff's office for tactical medics.
15	Don't need paid fire fighters sitting around at Mckenney doing nothing 98% of time.
16	No
17	Technical rescue is listed, however, none of our fire depts, offer that service- instead it's outsourced to neighboring counties.
18	No
19	N/A
20	No
21	N/a
22	No
23	Smoke detector installation service
24	Disaster preparation - hurricane, tornado, etc

Respondent Comments

#	Responses
25	No
26	Explorer program
27	No
28	No
29	I feel that they do a Great Job! I feel much safer for my family and friends that we have paid firefighters and EMS providers. We need more as the County is growing.
30	Class for EMS
31	Keep it basic and do not duplicate state/fed mandates.
32	N/A
33	No
34	Technical rescue, dive team, water rescue, hazmat
35	Child fire education
36	possibly checking fire extinguishers, detectors, if brought to the station or a central site.
37	No
38	No
39	No
40	Build more fire stations
41	Community paramedics
42	No
43	No
44	Assistance with burning large brush piles. Possibly for a fee?
45	No
46	No
47	None
48	NA
49	What about a water rescue team?
50	No
51	Community training such as CPR, citizen response in mass shootings, etc
52	No
53	N/A
54	No
55	n/a
56	No
57	Smoke Detector installation in all homes that do not have them.
58	Fire detector check for senior citizens
59	No

2. Interactions with Fire Department Personnel

Those respondents that had interactions in the past 24 months were provided an opportunity to comment on their experiences. There were 63 respondents that utilized the service in the past 24 months and 16 of those provided additional comments as shown in the following table.

Respondent Comments

#	Responses
1	Responders arrived and were courteous and knowledgeable but didn't present well. Shirts were untucked and pants were above the boots. The responders came in with only a laptop and the presentation just wasn't professional. Thankfully, the service provided was acceptable. But there is room for improvement on their presentation and being prepared.
2	Although the county has paid Fire/EMS personnel being utilized through tax money, it appears that they remain busy on the EMS side (and are doing a fantastic job). The volunteers are unable to keep up with the demand for service on the fire side. Most of the volunteers responding seem to lack any structured training or courtesy when it comes to dealing with the job or the public. They show up understaffed and almost always appeared rushed and unkempt. Co1 volunteers continuously run citizens off the roadway and are some of the rudest volunteers I've ever met. Bring more paid professionals to this county that's in dire need of a hard pressed profession.
3	30 minute response time is ridiculous.
4	There were two emt One working on us was very nice The other I felt was rude and we were wasting her time
5	They got here as soon as they were able to as they are widely spread out. More citizens and homes but no extra fire and ems Bldg or personnel . More personnel is needed to staff .
6	I had a stroke and because of the quick response and knowledge of the responders, I am doing well. They were courteous and professional.
7	When I questioned the staff about why their response time was extended, they advised that they were career firefighters responding from a second due station because the volunteers did not respond.
8	Thank you for providing this much-needed service in our community. With COVID 19, your dedication and professionalism is very much appreciated.
9	EMT staff was helpful; they arrived in about 20 minutes for an emergency which was not life saving but needing rescue. They were professional and courteous and pleasant but seemed a bit hesitant when treating a wound.
10	EMS responded for my mother numerous times. They were always knowledgeable, quick and caring. Many times I feel if it weren't for them, she would not have made it to the hospital.
11	Not Familiar with the area ended up taking a back road longer than necessary instead of cutting through to the quickest route to a main road would've been an easier ride on the patient
12	New regulations in place because of COVID were relayed poorly by DFEMS and put the patient at a disadvantage. DFEMS poorly addressed concerns in an unprofessional manner.
13	Dispatch gave the wrong directions to our residence, which is on a private road. The FD drove around trying to find us. The response time (approx 45-60 minutes) was longer than to be expected since we have a Vol station a couple of miles from our house. My husband had the fire extinguished before they arrived. This wasn't a fault of the responders. They were professional, courteous, and thorough once they were able to find our residence. I think maybe areas like ours (near Old Hickory) need to be examined a little more thorough, to ensure dispatch can provide appropriate directions to the responding units. Our situation wasn't a major alarm fire, but had it been it could've been devastating given the lack of knowledge to reach the residence.
14	I live 10 minutes from company 2 why did it take the ambulance crew over 30 minutes to get to my mother when she had her heart attack?
15	Transported by ambulance
16	The start of it was the Communications dept. calling in at the scariest time of my life while my little girl was having a seizure and not breathing or responsive she was able to get me to calm down and guide me thru until emts arrived which felt life forever but over all good time.

3. Overall Comments

The final section allowed the respondents to comment on any questions or ratings they provided they felt needed further explanation or to provide any additional comments. There were 56 respondents that provided comments and are shown in the table that follows.

Respondents Comments

#	Responses
1	I believe they do a great job.
2	As a resident of the Midway School district and a Lake Chesdin community, I feel there is a significant gap between responding departments. The locations of Ford and Namozine stations do not adequately meet the layout of the county or its population.
3	Please hire additional paid professionals to adequately staff the county in its busier areas.
4	We all know they arrive on scene as fast as they possibly can, so that's not a concern. I'm more concerned with our Fire and EMS having the funding needed to have the training, staff and equipment needed to save lives. We're fortunate to have an outstanding group of first responders in Dinwiddie.
5	I have in the past called for EMS. They were very helpful and very nice and explained everything to me. Was very impressed with them and the response time was great.
6	Making sure the fire departments keep up with the growth of the county.
7	Station 4 is poorly ran and if my home catches fire, they will burn it down. I don't feel safe with our fire station.
8	Good Equipment is vital as well but could only choose 3
9	I wish there were more community events, not just the money in the boot collection.
10	Response time and personal
11	I have a son who is a firefighter and an EMT in another county and many friends who are or who have retired from fire dept or a EMT . They have shared their joys and anger on how the departments are run with not enough staff, money or equipment and some not enough training .
12	N/A
13	Dinwiddie Fire Dept. is number one in my book. Always ready saving the citizens of the county
14	The training of the responders and good equipment are important in this type of operation. I feel Dinwiddie has the best.
15	Question No. 9 needs to be rewritten.
16	We desperately need a station in the Sutherland Area.
17	N/A
18	N/A
19	Response time over 20 minutes for a 2 year old seizing and then when staff arrived they were quick to diagnose him and try and convince parents he did not need to go to ED, despite seizing over 20 minutes straight with decreased O2 stats, also have had the department try and convince multiple patients they don't need to go to the ED because they don't feel they will be admitted despite needing attention for chronic medical issues that is not being handled by the pcp or the pcp has requested they go to the hospital, I have worked with the department during education events and in emergency situations and they are wonderful, its more the chronic medical issues and when they feel its not an emergency, staff needs to realize they are not a doctor, they can not diagnose
20	Response time is rather slow. I live 2 minutes from fire department and it took 15-20 minutes for them to get to me
21	Better training for volunteers
22	N/a
23	I really do not have any. Just as long as services get to places quickly and staff are well trained on emergencies
24	I would say that adequate equipment is vital but, I could only pick three.
25	Allowing transportation to McGuire V.A. would be more cost effective and provide continuity of care for the veterans and their families.
26	Response times are entirely too long. 30-45 min waits for Fire or EMS is ridiculous. Then the apparatus aren't always properly staffed

Respondents Comments

#	Responses
27	The Fire and EMS department lacks appropriate professional 24/7 staffing . Current staffing levels are dangerous and create a liability to both the county and those who request services. Response times for medical calls are unacceptable in the Ford / Wilson area.
28	County funds should be focused on more career staffing to accommodate the needs of the County Residence. Relying on volunteer staffing is not appropriate anymore and has significantly impacted several large incidents lately with long response times due to limited career staffing numbers. Instead of focusing on volunteer staffing focus more on hiring staff that are reliable and ready. Time to make decisions that benefit your citizens that you were hired to serve rather than the volunteer system.
29	I do feel the providers should be professionals but also community oriented. I have seen Medics eating lunch at one of the local restaurants, and a little boy came up to them and you could tell he was amazed at seeing a super hero. The medics talked to him and 1 of them came back to the little boys table with a firefighter hat. That 5 minutes meant the world to that little boy and family. Who knows how many others payed attention as I did. Fire prevention is so important and children learn what we teach them.
30	Would like to see paid fire department in addition to volunteers. More rescue units staffed 24 hour throughout the county, especially in the Ford area and the North end.
31	Response was excellent when my family member needed Emergency Response
32	The current career staff are very in experienced and it has shown on many incidents. I recently saw a picture of a house fire where a career firefighter was applying water to a roof that was no involved in fire. The foam concentration was extremely high and the water was wasted by not applying the water to the seat of the fire.
33	Fire/EMS apparatus are often out of service due to maintenance issues or even break down responding to calls for service. The staffing levels are questionable at times, as there are times where all 4 of the county's main ambulances are in use and other counties need to provide medical assistance. As far as staffing, there will be times where a company cannot respond to their service area due to not having trained personnel in the station to operate the apparatus needed.
34	Fire trucks and ambulances should not be driven to go get meals and they certainly shouldn't be using lights and sirens to go to Kins Wok or Food Lion.
35	It is clear to the public that staffing is an issue.
36	Provide adequate service, do not buy any new equipment that is not needed, do not try to be something the county does not need or can afford. It appears sometimes you would like to be a big city service than a rural service. Charge those that abuse the department. You come across at being a fiefdom to county resources rather meeting county needs. You do not have a blank check as it appears you think. Your needs are no more important(actually)less than the schools. Your uniforms and badges are not important. You can do better for those who pay your expenses. I am glad you asked.
37	N/A
38	not enough volunteers or paid people
39	I love DFEMS at its roots as I have several family members involved. I interact with them on a community support level as well as professional level and hope to see professional growth brought on by the COVID changes and response.
40	i'm so grateful for the folks on our fire/ems staff. i pray for their safety and continued strength and that the needs are always met, especially for equipment and bodies!!
41	None
42	It is my understanding the county employs part time ems that are also trained in firefighting, but they do not utilize them as such and often time go understaffed even with these employees being available. I also understand some of the part time employees have more experience in certain tasks than the full time employees.

Respondents Comments

#	Responses
43	Dinwiddie is growing so fast and big county, we need to keep up with our growth with Fire/EMS coverage
44	Staffing and training are the greatest needs for emergency services and the county earns a poor grade in these areas. Dinwiddie is a larger county than most of the surrounding jurisdictions with minimal emergency services staffing to accompany it. The agency is stagnant- the job listings for firefighters and EMT's seem to be constantly open, which suggests an unfortunate attrition rate in the department. Dinwiddie needs to be more competitive for hiring new staff and retaining old staff. The structure in which decisions are made by the Fire Rescue Association instead of by county leadership is antiquated and needs to be replaced because it is not effective.
45	The Dinwiddie Fire and EMS facilities and crew are currently top notch, in my opinion. I feel that it's important though, to maintain the current level of performance while also continuing to strive to improve with ever changing population, technology, and techniques.
46	Should always have the best equipment to serve the community and to protect the fireman from hazards in performing their duties
47	Many I see appear over weight and do not give confidence that they are capable of helping. This also makes them appear not very professional. Many also have beards that does not seem right for a firefighter that has to wear a mask.
48	The fire department is still volunteer in our area and many people still work during the day and there are not enough volunteers to respond to emergencies rapidly.
49	The department and citizens would benefit greatly from having fully staffed fire engines in the County. Through word of mouth, I have learned that the career staff are seriously under staffed with minimal help from volunteer companies. Positive change needs to happen.
50	NA
51	Why not have more staffed stations? Why can't every station have a ambulance crew?
52	None
53	They should be appropriately trained, good equipment, sufficiently staffed and a great response time. It was hard picking just 3.
54	N/A
55	None
56	None

Fire Department Effectiveness and Efficiency Study

MERCED COUNTY, CALIFORNIA

FINAL REPORT

matrix 
consulting group

201 San Antonio Circle, Suite 148
Mountain View, CA 94040
v.650.858.0507 f.650.917.2310

JANUARY 2017

TABLE OF CONTENTS

1.	INTRODUCTION AND EXECUTIVE SUMMARY	1
2.	CURRENT FIRE PROTECTION DELIVERY SYSTEM	9
3.	CURRENT DEPLOYMENT STRATEGIES AND PERFORMANCE	81
4.	FIRE STATION LOCATIONS AND APPARATUS	101
5.	EXISTING STATION CONDITION ASSESSMENT	137
	APPENDIX A: EMPLOYEE SURVEY RESULTS	147
	APPENDIX B: COMPARATIVE SURVEY	158

1. INTRODUCTION AND EXECUTIVE SUMMARY

Merced County retained Matrix Consulting Group to conduct an efficiency and effectiveness study of the fire department.

In conducting this study, the project team utilized a wide variety of data collection and analytical techniques. The project team conducted the following data collection and analytical activities:

- The project team began an intensive process of conducting interviews with elected officials, fire department personnel and other local officials collecting a wide variety of data designed to document the workloads and service levels.
- The project team collected detailed workload statistics for the primary functional areas, including calls for service from the computer aided dispatch / records management system, budget documents and other statistical reports from the fire department.
- The project team toured the response areas to gain an understanding of the demographics and toured the fire stations for an assessment of the facilities and apparatus.

In this report recommendations are made for areas the project team has identified where a change should be made to improve function, practice or efficiency.

1. EXECUTIVE SUMMARY

The Department provided the project team excellent access to both data and personnel during the course of the study. This contributed to the project team gaining a strong understanding of the structure, staffing and operations of the Merced County Fire Department (MCFD). The interviews showed a strong desire by personnel to contribute positively to ensure Merced County remains a safe place to live and work through their delivery of public safety services.

The project scope of work included the following elements:

- Stakeholder input from both the fire department and county leadership
- A baseline evaluation of the current services provided by the department
- A review of the current service delivery and performance of the department

As information was gathered and the data analyzed, recommendations were developed for the staffing and deployment of resources.

During the analysis of the current operations and performance of the Merced County Fire Department, several opportunities were discovered by the project team to improve basic departmental performance and enhance service delivery to the County. Among these, several current stations are staffed with a single person each day. This is a practice that creates an unsafe working environment for emergency response personnel and decreases the ability for services to be performed effectively when the initial apparatus arrives at an emergency scene. While it is an acceptable practice for staffing fire apparatus with at least three personnel per apparatus, the County will realize an immediate improvement in the delivery of fire rescue services by utilizing two personnel to staff units.

However, this improvement has a significant cost associated with it, as described below. The following table provides a summary of the operating and capital costs recommended in the report. Some of these costs could be mitigated by partnering with UC Merced to meet the challenges associated with providing emergency services to the campus as it continues to increase the student population.

Category	Merced County		UC Merced		Total	
	Capital	Operating	Capital	Operating	Capital	Operating
Stations	\$7,500,000	\$163,200	\$3,750,000	\$0	\$11,250,000	\$163,200
Apparatus	\$3,630,000	\$0	\$0	\$0	\$3,630,000	\$0
Personnel	\$0	\$7,809,172	\$0	\$0	\$7,809,172	\$7,809,172
Total	\$11,130,000	\$7,972,372	\$3,750,000	\$0	\$22,644,172	\$7972,372

The project team realizes that these funds are not immediately available to the County and has recommended a phased approach to plan for and fund the improvements as funds become available up to and including combining stations.

2. RECOMMENDATIONS

The following table provides the recommendations by the project team. Details regarding each of the recommendations can be found in the body of the report.

Issue	Recommendations	Cost	Priority
Dispatch Center is unable to properly document the time required to process emergency calls.	Work with the Dispatch Center to capture the enroute and arrival times of paid call fire companies on mutual aid responses to the County Fire Department.	None	High
Turnout time standards should be set based on the type of call.	Establish turnout time benchmark performance objectives of 60 seconds for EMS responses and 80 seconds for fire and special operations responses.	None	High
There should be continual monitoring and reporting of performance objectives vs. actual performance related to response times.	Once the performance objective is established develop a mechanism to monitor and report the performance against the established benchmarks at least annually.	None	High
Travel time standards should be set based on population density and risks present in the service area.	Establish travel time benchmark performance objectives for the first arriving unit of 4 minutes for urban areas, 5 minutes for suburban areas and 10 minutes for rural areas.	None	High
The performance of travel times should be continually monitored and reported to show performance vs. objectives.	Once the performance objectives are established develop a mechanism to monitor and report the performance against the established benchmarks at least annually.	None	High
Staffing of each fire station should be brought to a minimum of 2 personnel daily. Several stations are currently staffed with 1 person.	Add 29 personnel to the fire department to bring the daily minimum staffing of each station to two personnel at a cost of \$3,579,204. This is an immediate need.	\$3,579,204 annually in salary and benefit cost	High

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Issue	Recommendations	Cost	Priority
Currently there are 8 stations that will not accommodate 2 personnel and will require temporary housing for personnel.	Facilitate the temporary housing for the stations to accommodate the increase in staffing to a minimum daily staffing of two persons at a cost of approximately \$1,700 per month lease.	\$20,400 annually per station, totaling \$163,200 annually	High
There are currently several repairs and upgrades needed at existing to ensure they provide a safe place for personnel to work.	Repair or renovate the fire stations to address the significant issues noted for the fire stations at an estimated cost of \$75.00 to \$100.00 per square foot.	Varies by station depending on need	High
A new fire station will be required to provide adequate emergency response to the UC Merced campus as development continues.	Work with UC Merced to fund the construction of a new fire station at a cost of approximately \$3.75 million in the area of Bellevue and Lake Roads to enable the fire protection services to provide appropriate responses to call for service.	\$3.75 million with costs funded by UC Merced	Medium
Station 83 should be closed and Station 81 relocated to allow the two stations to better serve their response area and provide 2 person staffing at the combined facility.	Close Station 83 El Nido. Use the personnel from this station to fill the second position at the relocated Station 81. The cost to the County will be a capital investment of \$3,750,000 for a 15,000 square foot facility. Operational costs will remain the same.	\$3.75 million construction cost	Medium
Stations 64 and 92 should be combined into a single station located in the area of Santa Fe Drive and El Capitan Way to better serve the area and allow 2 person staffing from the combined facility.	Close Station 64 Cressey and Station 92 Ballico combining them into a single station located in the area of Santa Fe Drive and El Capitan Way. There are no increased operational cost as current personnel would provide the two person staffing. The capital cost of \$3,750,000 will be needed for the construction of a new 15,000 square foot facility.	\$3.75 million construction cost	Medium
Stations currently having urban and suburban population density should be brought to 3 person staffing as funding permits.	As funding permits, add 31 personnel to the fire department to bring the daily minimum staffing of each station located in an urban or suburban risk category to three personnel at a cost of \$3,904,586.	\$3,904,586 annually in salary and benefit cost	Medium

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Issue	Recommendations	Cost	Priority
There is no formalized replacement schedule in place for vehicles and apparatus in the Fire Department.	Establish and adopt a formal replacement schedule for the replacement of fire apparatus at 20-year total life and administration vehicles at 8 years of total life.	None	Medium
There are several vehicles and apparatus that will require replacement to bring the plan into place.	Phase in the purchase of new apparatus and vehicles over the next four years. Current costs will be approximately \$600,000 for each engine totaling \$4.2 million, \$45,000 for administrative vehicles totaling \$315,000.	\$4.2 million for apparatus replacement and \$315,000 for vehicle replacement.	Medium
Replacement of specialized apparatus for the airport will be required as a part of the replacement plan.	Phase in the purchase of new ARFF units at approximately \$800,000 each for a total of \$1.6 million.	\$1.6 million for two ARFF units.	Medium
The only ladder truck available for response is in the City of Atwater.	As the growth continues north of Atwater to Livingston one of the engines should be replaced with a ladder truck at a cost of \$1.6 million.	\$1.6 million for a ladder truck	Medium
Each station should be inspected at least annually to ensure it provides a safe place to work and operate from.	Establish a program to inspect and examine the fire stations on a regular basis and then develop a plan to repair or renovate as needed.	None	Medium
Several stations are nearing end of life and are functionally obsolete.	Establish a long-term plan to replace the functionally obsolete facilities.	Varies depending on timing and station design.	Low
When population density changes from rural to suburban, the minimum daily staffing of stations should change from 2 to 3 personnel.	As development occurs in the County, increase the daily minimum staffing at the rural stations to 3 person staffing when suburban population density is reached in a service area at a cost of \$325,382 per station annually.	\$325,382 annually for each station.	Low

Issue	Recommendations	Cost	Priority
There is an underutilization of paid on call staff to supplement the career personnel.	Implement these or other programs to improve and increase the utilization of the paid on call staff throughout the fire protection system.	None	Medium

The following table provides an overview of the recommendations as it is related to cost and the priority of these recommendations using the cost as the primary factor.

Station and Staffing Improvements with Estimated Costs						
Programmatic Opportunities	Tier 1 Up to \$651,000	Tier 2 +Up to \$1m	Tier 3 +Up to \$2m	Tier 4 +Up to \$3m	Tier 5 +Up to \$4m	Tier 6 +Up to \$4m
1. Stations 85 and 71 - Increase staffing to a minimum two-person Engine Company	\$650,768					
2. Stations 63 and 75 - Increase staffing to a minimum two-person Engine Company - Renovate both stations to accommodate the additional staffing.		\$650,768 \$400,000				
3. Stations 74, 76, 81, 97, 95 - Increase staffing to a minimum two-person Engine Company - Renovate Stations 76 and 95 to accommodate the additional staffing			\$1,626,920 \$400,000			
4. Station 84, 86 and 96 - Increase the staffing to a minimum two-person Engine Company - Extensive Renovation for the Stations				\$976,152 \$1,200,000		
5. Build a new Station 81 and Close Station 83 - Build a new facility to replace Station 81 and 83.					\$3,750,000	

Station and Staffing Improvements with Estimated Costs						
Programmatic Opportunities	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5	Tier 6
	Up to \$651,000	+Up to \$1m	+Up to \$2m	+Up to \$3m	+Up to \$4m	+Up to \$4m
6. Build a new Station 64 and close the existing Station 64 and Station 92 - Build a new facility to combine Stations 64 and 92.						\$3,750,000
Total Cost	\$650,768	\$1,050,768	\$2,026,920	\$2,176,152	\$3,750,000	\$3,750,000

2. CURRENT FIRE PROTECTION DELIVERY SYSTEM

This chapter provides summary information regarding the current organization and operation of the Merced County Fire Department (MCFD) and serves as the context for the organizational and effectiveness study. The various types of data were developed through interviews with MCFD management and personnel, tours of stations and the Fire Department's response area, review of available documents and records, as well as access to computerized records and data sets. This chapter provides information that was utilized by the project team to analyze workloads, organization, management and service levels provided by the MCFD. The organization of this chapter is as follows:

- Background and Overview
- Organization and Staffing
- Department Financial Resources
- Emergency Operations Daily Staffing
- Fire Department Roles and Responsibilities
- Fire Department Workloads and Response Times

The first section that follows provides the general overview of Merced County, its area, government and history.

1. BACKGROUND AND OVERVIEW

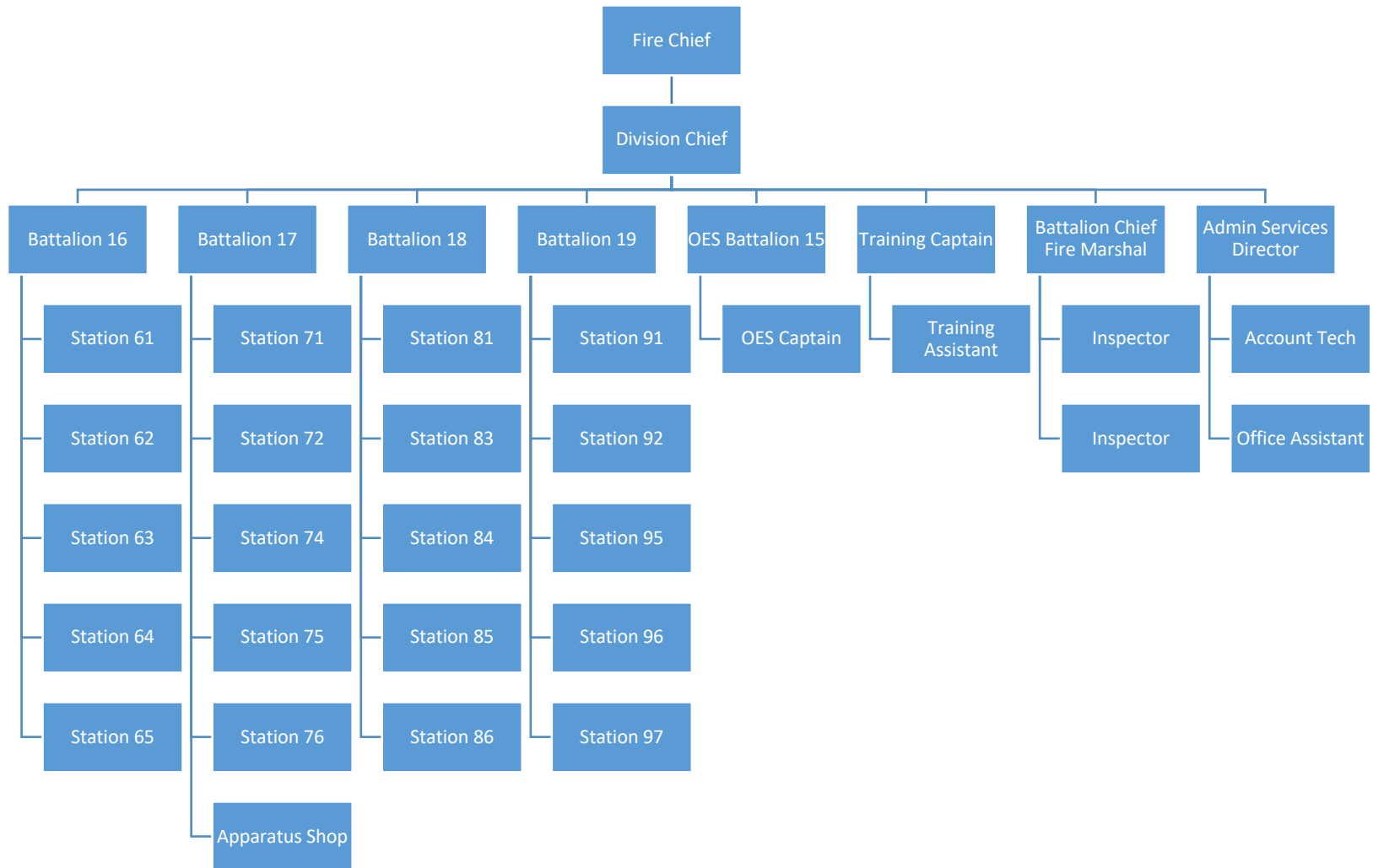
Merced County was formed in 1855 and is located in the northern San Joaquin Valley of the Central Valley of California. The county is comprised of 1,979 square miles and is home to an estimated 268,455 residents. The governing body, Board of

Supervisors, consists of five members elected by districts who serve four-year terms. Agriculture is the largest industry within the county and according to the 2014 agricultural report generated \$4,429,987,000 in commodities ranging from dairy products, almonds and cattle. In addition, the county is home of the former Castle Air Force base, which currently has limited operations, UC Merced and serves as a gateway to the nearby Yosemite National Park.

2. ORGANIZATION AND STAFFING

The fire department provides response to fires, emergency medical emergencies, hazardous materials incidents, natural and man-made disasters, mutual aid assistance to neighboring departments and related emergencies in an effort to reduce life and property loss. The fire department provides fire prevention activities including inspections and public education activities. In addition, the department is responsible for the emergency management functions for the County.

The organization chart below shows the current organizational structure of the Merced County Fire Department:



3. DEPARTMENT FINANCIAL RESOURCES

The following tables outline the revenues and expenditures for the fire protection services of Merced County:

Fire Protection Revenue FY 14 – FY 16

Revenues	FY 13-14	FY 14-15	FY 15-16
Property Taxes	\$13,031,720.00	\$14,185,559.00	\$15,182,737.00
Fees	\$6,800.00	\$4,800.00	\$4,400.00
Emergency Services Grants	\$874,852.00	\$746,945.00	\$662,792.00
Other Services	\$864,994.00	\$586,167.00	\$1,051,982.00
Total Revenues	\$14,778,366.00	\$15,523,471.00	\$16,901,911.00

As illustrated in the table above, revenues have increased 14% over the three-year period.

Fire Protection Expenditures FY 14 – FY 16

Expenditures	FY 13-14	FY 14-15	FY 15-16
Salaries & Wages			
County	\$533,365.00	\$450,928.00	\$562,971.00
Fire Prevention	\$183,651.00	\$133,420.00	\$124,322.00
Benefits			
County	\$261,900.00	\$225,011.00	\$323,660.00
Fire Prevention	\$149,323.00	\$122,530.00	\$118,152.00
Fire Operations - CAL FIRE Personnel Cost	\$10,759,483.00	\$11,910,438.00	\$12,574,164.00
Total Personnel Cost	\$11,887,722.00	\$12,842,327.00	\$13,703,269.00
Operational Costs	\$1,262,666.00	\$1,654,299.00	\$1,529,701.00
Emergency Services/OES	\$519,103.00	\$795,370.00	\$672,911.00
Total Fire Service Operations	\$13,669,491.00	\$15,291,996.00	\$15,905,881.00
Capital Improvements	\$1,208,741.00	\$1,116,598.00	\$599,087.00
Total Expenditures	\$14,878,232.00	\$16,408,594.00	\$16,504,968.00

As illustrated in the table above, expenditures have increased 10% over the three-year period.

The CAL FIRE contract with Merced County is for personnel services only, therefore the cost of those payments are shown as personnel costs in the above table.

Over the past few years the 4th quarter payment for the CAL FIRE contract has been paid in the next fiscal year. The above table adjusted the payment to reflect expenditures in the fiscal year they were incurred. As well, the FY 15-16 contract payment has been adjusted to reflect the final quarterly payment for that fiscal year.

The CAL FIRE contract provides a table that breaks out the personnel costs between salaries and benefits. The table below illustrates the costs as outlined in the contract and is not the actual expenditure for the fiscal years shown in previous table.

Salary and Benefit Costs FY 15 – FY 17

CAL FIRE Personnel Cost Budget			
	FY 14-15	FY 15-16	FY 16-17
Salaries	\$7,111,208.00	\$7,560,351.00	\$7,560,351.00
Benefits	\$3,502,150.00	\$4,376,140.00	\$4,376,140.00
Total	\$10,613,358.00	\$11,936,491.00	\$11,936,491.00
Overhead	\$1,448,186.00	\$1,725,826.00	\$2,432,461.00*
Contract Total	12,061,544.00	\$ 13,662,317.00	\$14,368,952.00

* Includes \$706,635 for projected wage increase

4. EMERGENCY OPERATIONS STAFFING

The table below outlines the minimum staffing assigned to each station as well as the apparatus assigned to those stations. On a typical day there are 24 line personnel with 2 Battalion Chiefs assigned to staff fire operations in the County.

Station #	Name	Address	Staffing	Apparatus
61	McSwain	961 Gurr Road, Merced	2	E61 WT61
62	Castle	3405 Hardstand, Atwater	2	E62 C62 HZ62
63	Winton	6825 North Winton Way, Winton	1	E63
64	Cressey	9255 Cressey Way, Cressey	1	E64
65	Snelling	15974 Lewis Street, Snelling	2	E65 WT65

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Station #	Name	Address	Staffing	Apparatus
71	Los Banos	525 "H" Street, Los Banos	1	E71 WT71 R71
72	Santa Nella	29190 Centinella Road, Santa Nella	2	E72
73	Los Banos CAL FIRE	31011 West Gonzaga Road, Santa Nella <i>Staffed by CAL FIRE during fire season, responds to county calls</i>	8	CAL FIRE
74	Gustine	686 3rd Street Gustine	1	E74 WT74
75	Dos Palos Wye	8047 West Dairy Lane, Dos Palos	1	E75 WT75
76	Dos Palos	1540 Golden Gate Avenue, Dos Palos	1	E76
81	Merced	735 Martin Luther King Jr. Way, Merced	1	E81 WT81
83	El Nido	10537 South Highway 59, El Nido	1	E83 WT83
84	Le Grand	3875 Santa Fe, Le Grand	1	E84 WT84
85	McKee	3360 North McKee, Merced	1	E85
86	Planada	9234 East Broadway, Planada	1	E86 WT86
91	Delhi	16056 Acacia Street, Delhi	2	E91 WT91 R91
92	Ballico	11284 Ballico, Ballico	1	E92 WT92
95	Hilmar	20021 West Falke Street, Hilmar	1	E95 WT95
96	Livingston	1430 "C" Street, Livingston	1	E96 WT96
97	Stevenson	2738 Lander Avenue, Stevinson	1	E97 WT97

The type of call received dictates the apparatus that responds to the call for service. For example, the Hilmar station may respond with the water tender if they are second or third due to assist another station. As well, if the station has two qualified operators (personnel) assigned they may each take an apparatus in order to establish a more efficient water supply.

5. DEPARTMENT ROLES AND RESPONSIBILITIES

The following table illustrates the basic roles and responsibilities of the personnel of the Merced County Fire Department:

Position / Classification	Positions	Key Roles and Responsibilities
Fire Chief (CAL Fire)	1	<p>Provides the executive management of the Fire Department, including the development of policies and procedures, providing leadership for future services, budget development, identifying service gaps, working with the elected officials to ensure that the HFD interests are considered.</p> <p>Supervises the Division Chief</p>
Division Chief (CAL Fire)	1	<p>Responsible for overall management and supervision of emergency operations</p> <p>Develops and reviews policies and procedures and ensures that Department goals and objectives are met</p> <p>Supervises the Battalion Chiefs,</p>
Battalion Chief (CAL Fire)	4	<p>Responsible for coordinating, managing and the field administrative activities within the Battalion</p> <p>Responds and directs activities at structure fires, wildland fires or other emergency operations where required.</p> <p>Assists supervisors with training regulations, policies, guidelines procedures and training resources on programs assigned to the battalion.</p> <p>Supervises the Fire Captains, Engineers, Firefighters</p>
Battalion Chief (CAL Fire)	1	<p>Responsible for fire inspections, plan review, and public education activities.</p> <p>Responds and directs activities at structure fires, wildland fires or other emergency operations where required.</p> <p>Supervises the inspectors.</p>
Battalion Chief (CAL Fire)	1	<p>Responsible for the Emergency Operations planning and related activities</p> <p>Oversees grants and other external funding mechanisms for emergency operations.</p> <p>Responds and directs activities at structure fires, wildland fires or other emergency operations where required.</p>
Fire Captain (CAL Fire)	16	<p>Oversees station operations, responds to emergencies, maintains pre-fire plans and assists with training.</p>

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Position / Classification	Positions	Key Roles and Responsibilities
		Organize, plan and supervise a shift and personnel assigned to the shift. Supervises Engineers and Firefighters
Engineer (CAL Fire)	52	Operates apparatus and emergency vehicles responding to structure fires, wildland fires, emergency medical incidents and other types of calls for the department Maintains the fire stations, emergency vehicles and related equipment. May perform small or routine repairs of fire stations, apparatus and related systems and equipment. May lead paid call personnel as needed. Supervises paid call personnel.
Paid Call Firefighter (County)	220	Respond to fires or other emergency calls as part of a firefighting crew May driver or operate fire apparatus as a part of a response force Perform firefighting function such as rescue, ventilation, entry, salvage works, overhaul and clean-up work. May perform lifesaving activities.
Inspector (County)	2	Inspects residential and commercial buildings for compliance with the California Fire Code, National Fire Protection standards and County ordinances. Inspects new construction and related fire protection systems. Conducts annual licensing inspections for day care homes, pre-school and mental care facilities.
Administrative Services Director (County)	1	Initiates, develops and implements programs and activities to increase efficiency and productivity within the fire department. Assists in the administration of the finance and county personnel functions within the County Fire/Office of Emergency Services (OES). Assist in the preparation of the budget and administer the final product through organization and directing the compilation and development of budget requests. Oversee and coordinate human resources functions. Supervises Account Tech and Office Assistant
Account Tech (County)	1	Prepare clear and accurate financial statements and reports, analyze accounting and budgetary data. Assists in developing forms and methods of financial record keeping or accounting systems

Position / Classification	Positions	Key Roles and Responsibilities
Office Assistant (County)	1	Answer inquiries related to department services, programs and operations. Makes appointments and screens and routes incoming calls. Maintain a variety of personnel, financial and statistical files and records.
Heavy Equipment Mechanic (County)	2	Conduct both preventive maintenance and repairs on all fire department apparatus.

6. FIRE DEPARTMENT WORKLOADS AND RESPONSE TIME

The project team collected extensive data from the department and the records management system. The charts and tables on the pages that follow summarize the workloads for the department as well as each station. Data from 2013 through 2015 was analyzed to provide the snapshot of the workloads. It should be noted that any data that appeared corrupt or was incomplete was removed from consideration so as to not skew the analysis.

Incidents by Type 2013 – 2015

Incident Type	2013	2014	2015	% Change
Auto Accidents	1,015	1,156	1,246	22.76%
Fire Alarm Activations	540	605	639	18.33%
Emergency Medical	6,337	6,382	7,358	16.11%
Mutual Aid Calls	2	2	5	150.00%
Other Fire Calls	372	416	448	20.43%
Public Assist	450	432	547	21.56%
Structural Fires	137	97	102	-25.55%
Wildland/Vegetation	505	446	488	-3.37%
Total	9,358	9,536	10,833	15.76%

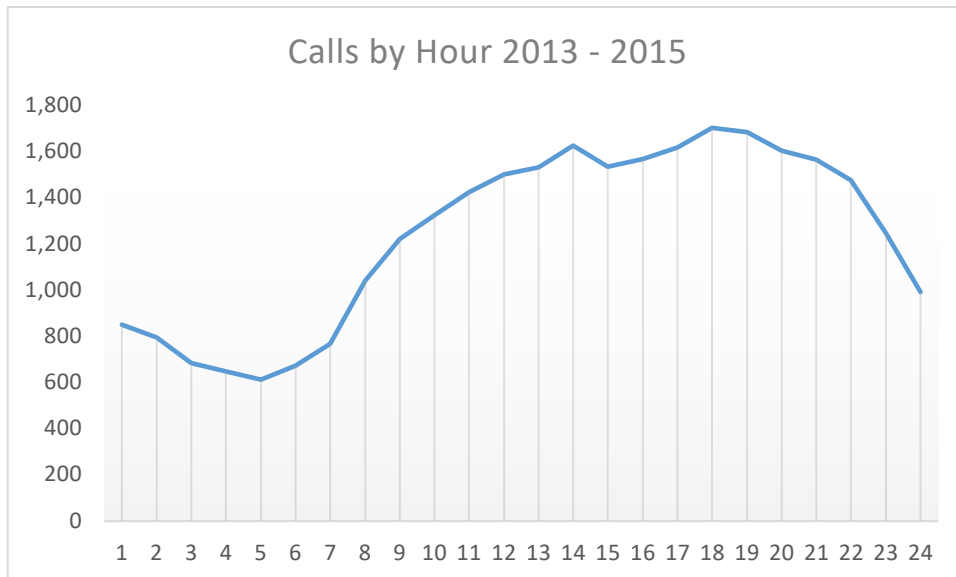
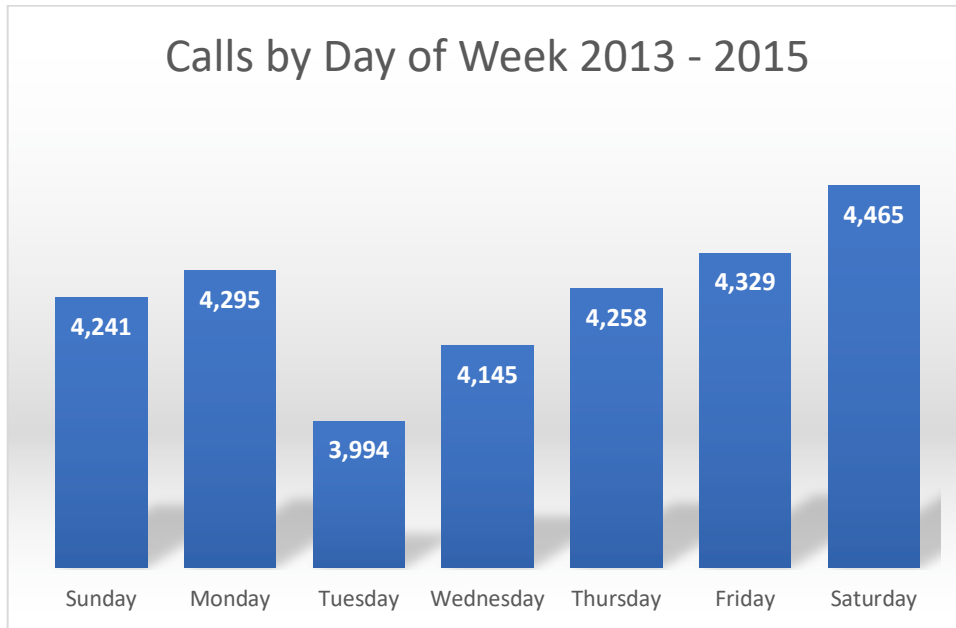
As shown above the workload has increased approximately 16% from 2013 to 2015 with the emergency medical calls accounting for approximately 70% the incident demand in any given year.

The table below shows the workload by the time of day and the day of the week for 2013 - 2015. The data indicates the busiest day of the week is Saturday and the busiest time of day being between the hours of 1:00 pm and 6:00 pm. In contrast, the slowest day of the week is typically Tuesday with the hours of midnight – 7:00 am being the slowest for call demand.

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	148	137	88	117	105	100	155	850	2.86%
0100	144	109	103	83	113	93	150	795	2.67%
0200	97	97	93	85	94	106	113	685	2.30%
0300	115	81	80	103	80	84	105	648	2.18%
0400	99	95	69	83	86	87	94	613	2.06%
0500	120	99	84	82	97	105	86	673	2.26%
0600	105	129	114	111	116	95	98	768	2.58%
0700	154	161	140	161	154	149	124	1,043	3.51%
0800	165	186	176	168	161	183	183	1,222	4.11%
0900	160	198	181	198	208	202	178	1,325	4.46%
1000	200	191	190	233	207	195	210	1,426	4.80%
1100	206	227	203	208	235	211	214	1,504	5.06%
1200	195	236	192	228	244	225	215	1,535	5.16%
1300	199	238	217	223	270	233	249	1,629	5.48%
1400	207	213	223	218	218	237	221	1,537	5.17%
1500	227	222	214	223	215	247	222	1,570	5.28%
1600	233	241	232	232	236	213	233	1,620	5.45%
1700	240	263	249	242	230	255	226	1,705	5.74%
1800	251	237	218	227	223	251	278	1,685	5.67%
1900	210	225	239	219	233	240	239	1,605	5.40%
2000	227	208	208	232	225	235	233	1,568	5.27%
2100	212	200	205	189	201	223	248	1,478	4.97%
2200	192	176	151	151	171	193	215	1,249	4.20%
2300	135	126	125	129	136	167	176	994	3.34%
Total	4,241	4,295	3,994	4,145	4,258	4,329	4,465	29,727	100%
Percent	14.27%	14.45%	13.44%	13.94%	14.32%	14.56%	15.02%	100%	

To further illustrate the two data points, the following charts present the information separately.



The following table summarizes the workloads for each station as it relates to busiest days of the week and time of day. Additionally, the call volume is summarized for each of the stations.

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

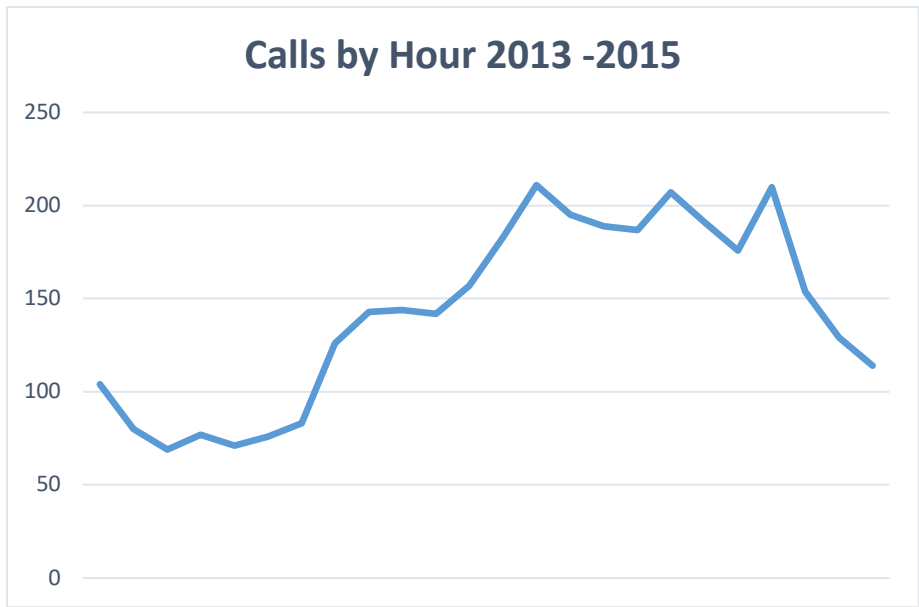
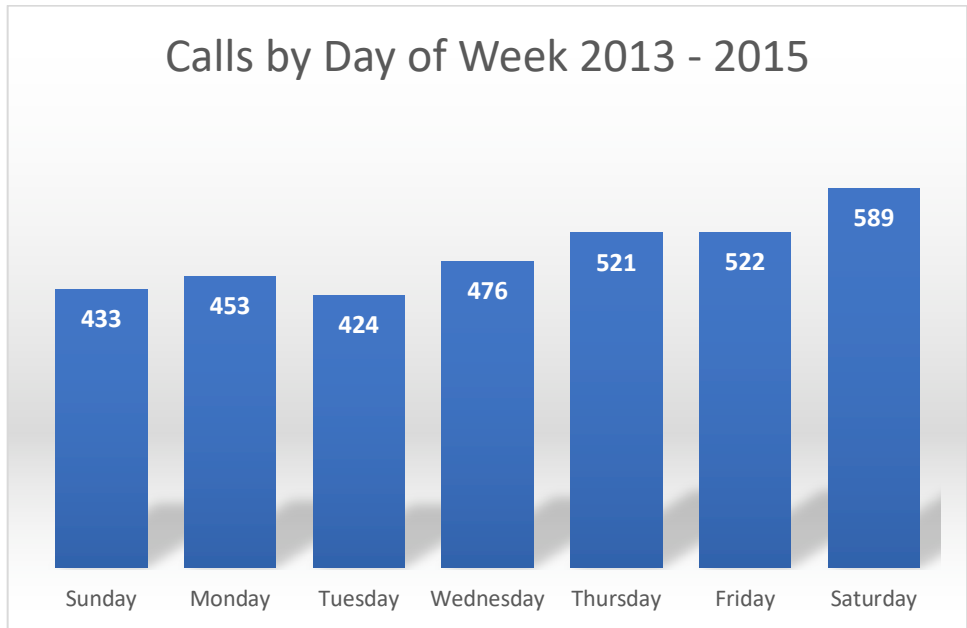
Station	Average Annual Calls	Busiest Day(s)	Busiest Time(s)	Average Response Time (2015)
61 McSwain	1,139	Saturday	14:00 - 18:00	9:49
62 Castle	546	Wednesday	12:00 - 18:00	10:04
63 Winton	1,327	Friday/Sunday	13:00 - 20:00	6:37
64 Cressey	354	Saturday	15:00 - 18:00	10:29
65 Snelling	136	Saturday/Sunday	11:00 - 17:00	12:07
71 Los Banos	751	Sunday/Monday	13:00 - 18:00	13:41
72 Santa Nella	674	Saturday	14:00 - 19:00	11:27
74 Gustine	923	Saturday/Sunday	12:00 - 18:00	7:15
75 Dos Palos Wye	404	Friday	14:00 - 19:00	12:23
76 Dos Palos	1,196	Sunday	12:00 - 19:00	7:12
81 Merced	1,098	Saturday/Monday	12:00 - 18:00	11:10
83 El Nido	248	Saturday/Monday	14:00 - 20:00	12:56
84 Le Grand	346	Friday/Saturday	14:00 - 20:00	10:12
85 McKee	867	Monday	16:00 - 21:00	9:28
86 Planada	568	Saturday/Monday	13:00 - 19:00	9:34
91 Delhi	1,140	Friday/Saturday	15:00 - 17:00	8:17
92 Ballico	216	Wednesday/Saturday	13:00 - 17:00	11:54
95 Hilmar	742	Saturday	11:00 - 19:00	7:31
96 Livingston	1,298	M/W/Th/F	12:00 - 21:00	7:23
97 Stevenson	382	Saturday	10:00 - 18:00	10:37

The following pages illustrate the individual workload and performance of each station in the Merced County Fire Department.

(1) Station 61, McSwain

The McSwain station is located to west of Merced and responds to the areas west of Merced and south of Atwater. This station averages 1,139 calls a year with Saturday being the busiest day of the week.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	18	17	13	14	12	10	20	104	3.04%
0100	18	12	4	7	12	5	22	80	2.34%
0200	8	7	7	12	12	13	10	69	2.02%
0300	18	6	9	14	9	14	7	77	2.25%
0400	16	11	9	14	2	9	10	71	2.08%
0500	11	12	13	10	9	14	7	76	2.22%
0600	11	9	15	13	19	6	10	83	2.43%
0700	20	20	18	20	22	12	14	126	3.69%
0800	14	15	23	23	21	21	26	143	4.18%
0900	14	20	24	18	27	23	18	144	4.21%
1000	23	21	17	24	10	17	30	142	4.15%
1100	12	21	23	16	38	27	20	157	4.59%
1200	20	26	24	21	30	31	31	183	5.35%
1300	18	28	23	25	36	42	39	211	6.17%
1400	21	30	24	21	37	31	31	195	5.71%
1500	22	20	27	32	24	33	31	189	5.53%
1600	21	17	24	27	37	29	32	187	5.47%
1700	31	35	27	32	25	29	28	207	6.06%
1800	22	24	20	29	31	25	40	191	5.59%
1900	17	31	17	22	31	25	33	176	5.15%
2000	28	31	19	31	23	35	43	210	6.14%
2100	19	12	17	21	24	20	41	154	4.51%
2200	15	19	12	14	16	27	26	129	3.77%
2300	16	9	15	16	14	24	20	114	3.34%
2400	18	17	13	14	12	10	20	104	
Total	433	453	424	476	521	522	589	3,418	100%
Percent	12.67%	13.25%	12.40%	13.93%	15.24%	15.27%	17.23%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	125	155	162	29.60%
Fire Alarm Activations	83	88	109	31.33%
Emergency Medical	603	540	668	10.78%
Mutual Aid Calls	0	0	0	0.00%
Other Fire Calls	50	44	49	-2.00%
Public Assist	68	67	103	51.47%
Structural Fires	76	56	60	-21.05%
Wildland/Vegetation	99	99	114	15.15%
Total	1,104	1,049	1,265	14.58%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:17	8:21	9:25
90 th Percentile	4:58	10:35	13:44

Station Performance 2014			
	Turnout	Travel	Total
Average	3:12	9:37	10:14
90 th Percentile	4:54	13:18	15:49

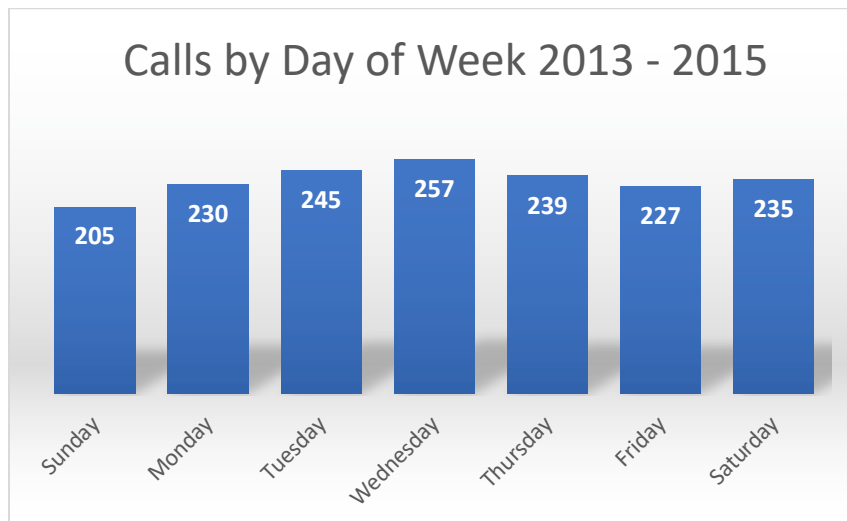
Station Performance 2015			
	Turnout	Travel	Total
Average	3:15	6:32	9:49
90 th Percentile	4:58	12:08	15:16

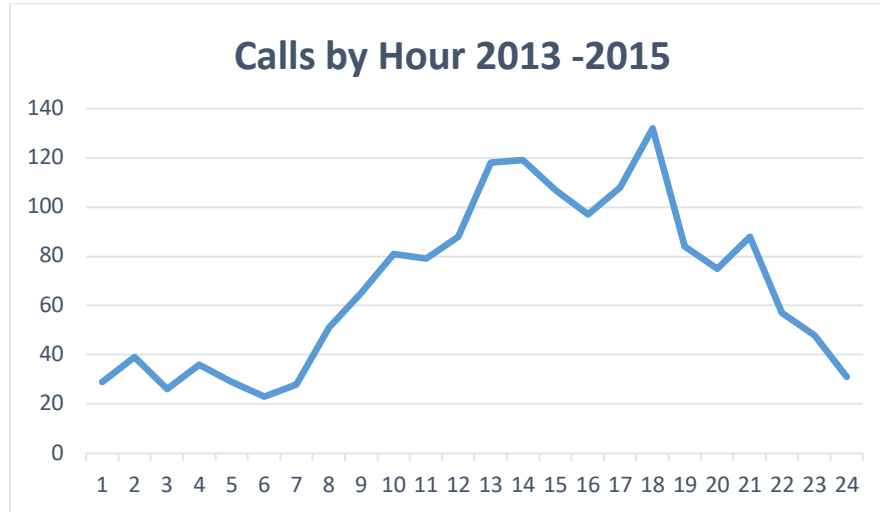
(2) Station 62, Castle

Station 62 is also the station at the Castle Airport located just north of Atwater. This station handles 546 calls a year on average that includes the airport responses and hazardous materials related incidents. The station is busiest during the 6 pm hour.

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	4	6	4	5	8	1	1	29	1.77%
0100	10	7	4	5	4	3	6	39	2.38%
0200	5	1	2	2	5	2	9	26	1.59%
0300	6	4	2	6	6	5	7	36	2.20%
0400	3	2	7	6	3	3	5	29	1.77%
0500	3	4	5	2	2	4	3	23	1.40%
0600	4	4	3	6	7	1	3	28	1.71%
0700	7	7	12	5	7	8	5	51	3.11%
0800	11	10	11	10	7	7	9	65	3.97%
0900	7	9	17	11	11	15	11	81	4.95%
1000	11	12	7	18	13	10	8	79	4.82%
1100	9	16	9	15	17	10	12	88	5.37%
1200	16	16	15	25	20	12	14	118	7.20%
1300	17	15	14	24	16	21	12	119	7.26%
1400	9	15	20	17	17	16	13	107	6.53%
1500	16	12	12	21	13	12	11	97	5.92%
1600	11	13	18	14	24	15	13	108	6.59%
1700	15	21	25	19	18	20	14	132	8.06%
1800	10	13	14	14	9	6	18	84	5.13%
1900	3	11	13	9	13	12	14	75	4.58%
2000	11	18	13	5	7	18	16	88	5.37%
2100	8	3	6	8	9	9	14	57	3.48%
2200	5	7	9	5	1	8	13	48	2.93%
2300	4	4	3	5	2	9	4	31	1.89%
Total	205	230	245	257	239	227	235	1,638	100%
Percent	12.52%	14.04%	14.96%	15.69%	14.59%	13.86%	14.35%	100%	





Incident Type	2013	2014	2015	% Change
Auto Accidents	122	123	130	6.56%
Fire Alarm Activations	77	77	87	12.99%
Emergency Medical	166	130	179	7.83%
Mutual Aid Calls	0	0	0	0.00%
Other Fire Calls	44	44	40	-9.09%
Public Assist	15	23	37	146.67%
Structural Fires	71	47	41	-42.25%
Wildland/Vegetation	72	46	67	-6.94%
Total	567	490	581	2.47%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:07	12:44	10:41
90 th Percentile	4:36	13:43	16:45

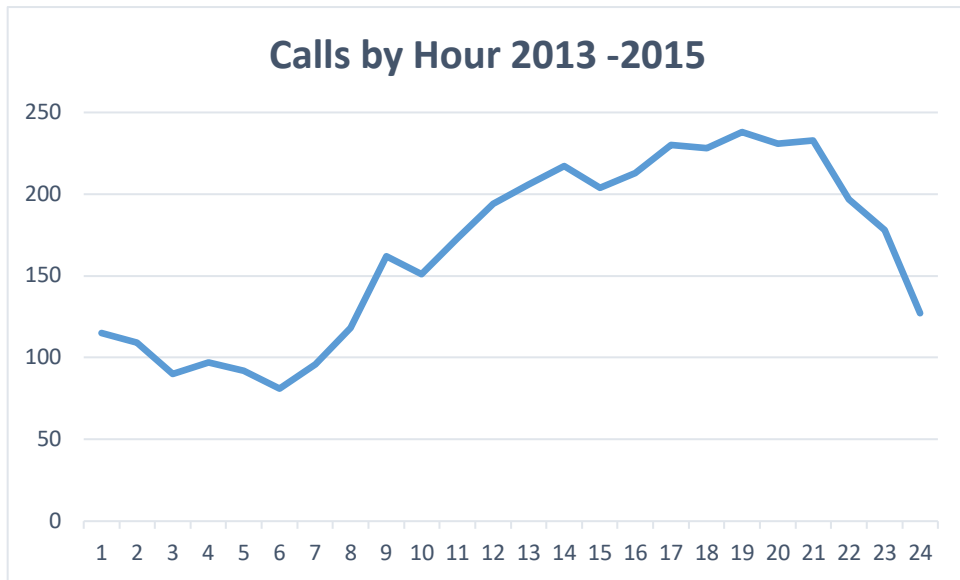
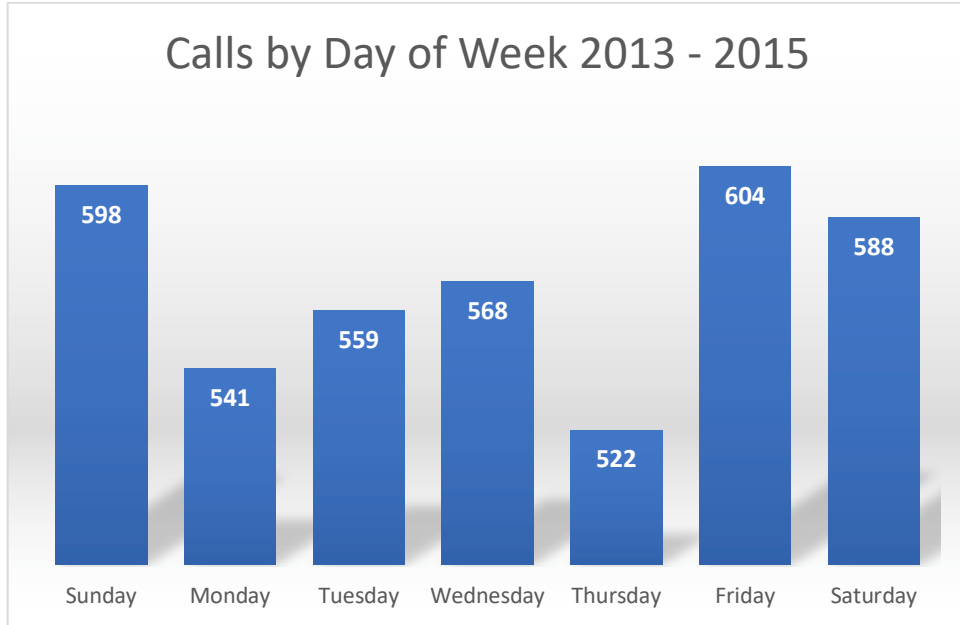
Station Performance 2014			
	Turnout	Travel	Total
Average	3:20	6:56	10:12
90 th Percentile	4:54	12:35	15:24

Station Performance 2015			
	Turnout	Travel	Total
Average	3:10	12:06	10:04
90 th Percentile	4:42	13:55	16:26

(3) Station 63, Winton

The Winton station is northwest of Atwater along Santa Fe Drive and services the north and west of Atwater. This station responds to 1,327 calls per year and is busiest during the weekend on Friday, Saturday and Sunday.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	22	19	12	19	11	13	19	115	2.89%
0100	22	13	13	13	13	16	19	109	2.74%
0200	15	7	11	17	13	8	19	90	2.26%
0300	13	10	10	16	14	13	21	97	2.44%
0400	15	8	11	16	16	10	16	92	2.31%
0500	12	12	8	11	12	15	11	81	2.04%
0600	15	15	17	14	12	10	13	96	2.41%
0700	20	18	21	16	15	15	13	118	2.96%
0800	16	33	21	25	20	27	20	162	4.07%
0900	15	26	21	22	25	27	15	151	3.79%
1000	27	29	26	30	24	18	19	173	4.35%
1100	33	26	20	28	27	25	35	194	4.87%
1200	25	27	24	30	29	43	28	206	5.18%
1300	39	33	25	30	32	32	26	217	5.45%
1400	25	29	34	27	22	33	34	204	5.13%
1500	36	25	24	37	25	29	37	213	5.35%
1600	31	34	29	34	35	39	28	230	5.78%
1700	43	23	41	36	30	32	23	228	5.73%
1800	36	30	41	29	25	29	48	238	5.98%
1900	23	36	45	26	24	46	31	231	5.80%
2000	46	23	33	30	29	45	27	233	5.85%
2100	25	26	27	29	24	29	37	197	4.95%
2200	27	23	28	18	24	32	26	178	4.47%
2300	17	16	17	15	21	18	23	127	3.19%
Total	598	541	559	568	522	604	588	3,980	100%
Percent	15.03%	13.59%	14.05%	14.27%	13.12%	15.18%	14.77%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	126	109	129	2.38%
Fire Alarm Activations	83	106	106	27.71%
Emergency Medical	781	799	1094	40.08%
Mutual Aid Calls	0	0	0	0.00%
Other Fire Calls	44	37	50	13.64%
Public Assist	48	38	49	2.08%
Structural Fires	68	45	43	-36.76%
Wildland/Vegetation	85	71	69	-18.82%
Total	1,235	1,205	1,540	24.70%

Station Performance 2013			
	Turnout	Travel	Total
Average	2:59	5:43	6:42
90 th Percentile	4:21	8:03	11:31

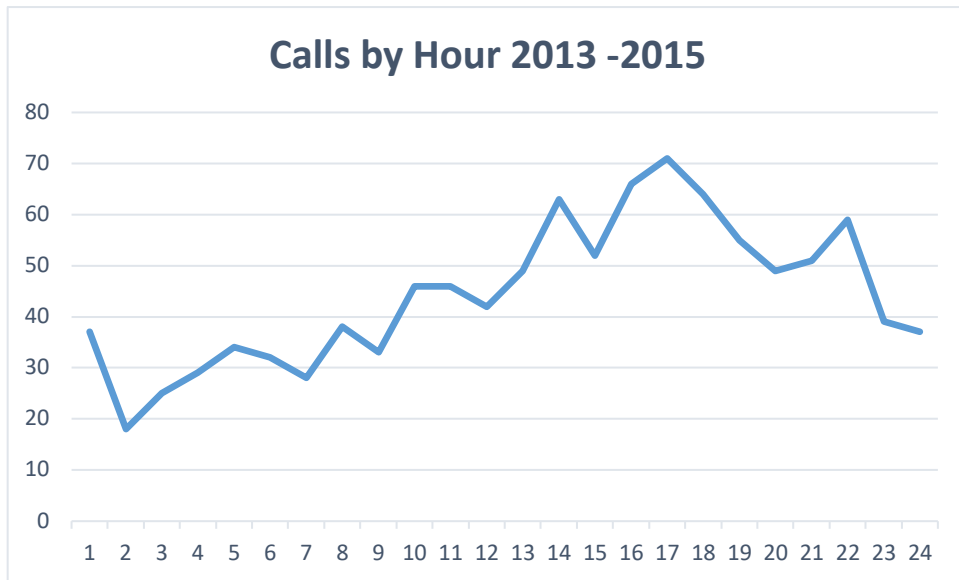
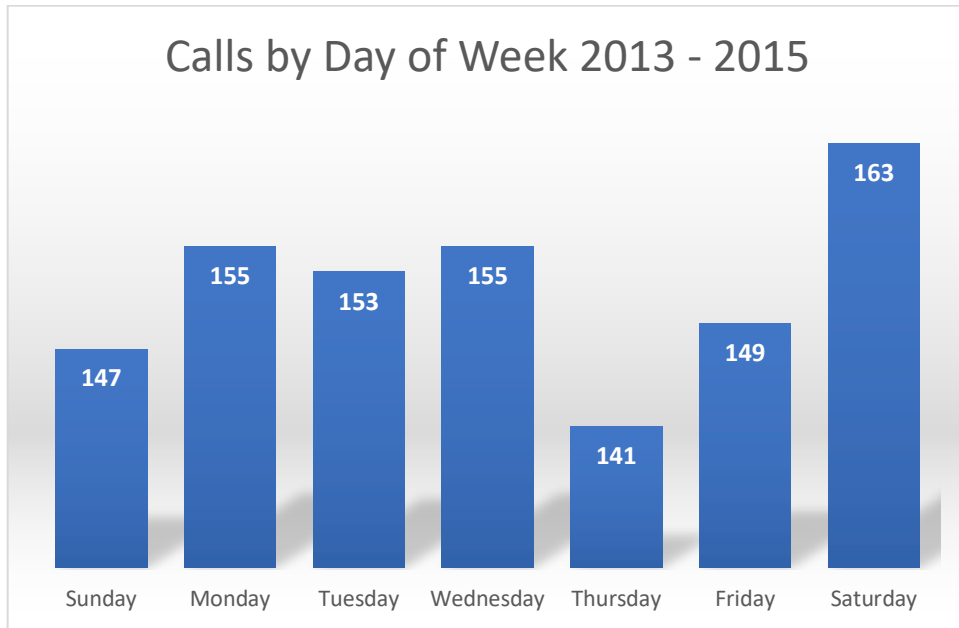
Station Performance 2014			
	Turnout	Travel	Total
Average	3:06	3:48	6:43
90 th Percentile	4:28	7:45	11:30

Station Performance 2015			
	Turnout	Travel	Total
Average	3:03	3:37	6:37
90 th Percentile	4:18	8:02	11:16

(4) Station 64, Cressey

The Cressey station handles 354 calls per year in the area north and west of Atwater and Winton. Saturday is the busiest day of the week and the 5 pm hour is the busiest time.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	7	8	2	7	4	3	6	37	3.48%
0100	3		6	2	4	1	2	18	1.69%
0200	2	5	4	1	4	5	4	25	2.35%
0300	7	3	3	6	4	2	4	29	2.73%
0400	4	5	7	7	3	3	5	34	3.20%
0500	7	6	5	2	5	5	2	32	3.01%
0600	1	6	4	6	4		7	28	2.63%
0700	4	8	5	4	4	7	6	38	3.57%
0800	5	4	3	8	4	6	3	33	3.10%
0900	3	8	6	7	6	8	8	46	4.33%
1000	7	5	3	10	8	6	7	46	4.33%
1100	5	5	7	7	3	5	10	42	3.95%
1200	6	7	3	9	12	6	6	49	4.61%
1300	9	9	6	14	10	8	7	63	5.93%
1400	7	11	12	2	5	7	8	52	4.89%
1500	7	8	11	11	12	8	9	66	6.21%
1600	8	17	11	6	6	11	12	71	6.68%
1700	9	7	16	9	7	10	6	64	6.02%
1800	10	7	10	6	7	5	10	55	5.17%
1900	5	8	5	9	5	8	9	49	4.61%
2000	6	5	6	11	7	8	8	51	4.80%
2100	15	7	6	6	5	10	10	59	5.55%
2200	5	5	6	1	7	9	6	39	3.67%
2300	5	1	6	4	5	8	8	37	3.48%
Total	147	155	153	155	141	149	163	1,063	100%
Percent	13.83%	14.58%	14.39%	14.58%	13.26%	14.02%	15.33%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	109	96	84	-22.94%
Fire Alarm Activations	53	64	39	-26.42%
Emergency Medical	96	107	96	0.00%
Mutual Aid Calls	0	0	0	0.00%
Other Fire Calls	30	25	20	-33.33%
Public Assist	8	5	4	-50.00%
Structural Fires	41	33	27	-34.15%
Wildland/Vegetation	43	46	37	-13.95%
Total	380	376	307	-19.21%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:29	6:09	9:42
90 th Percentile	5:04	10:39	13:42

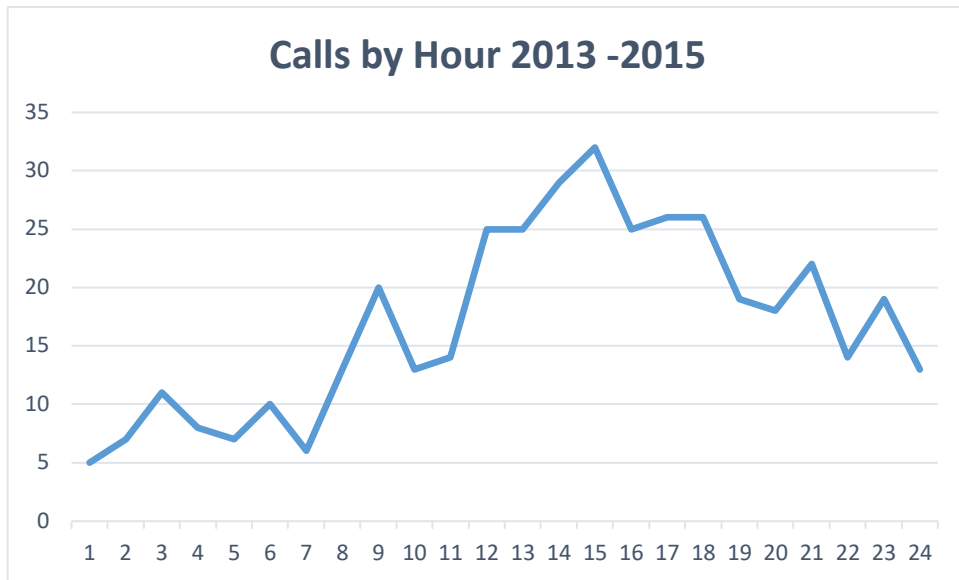
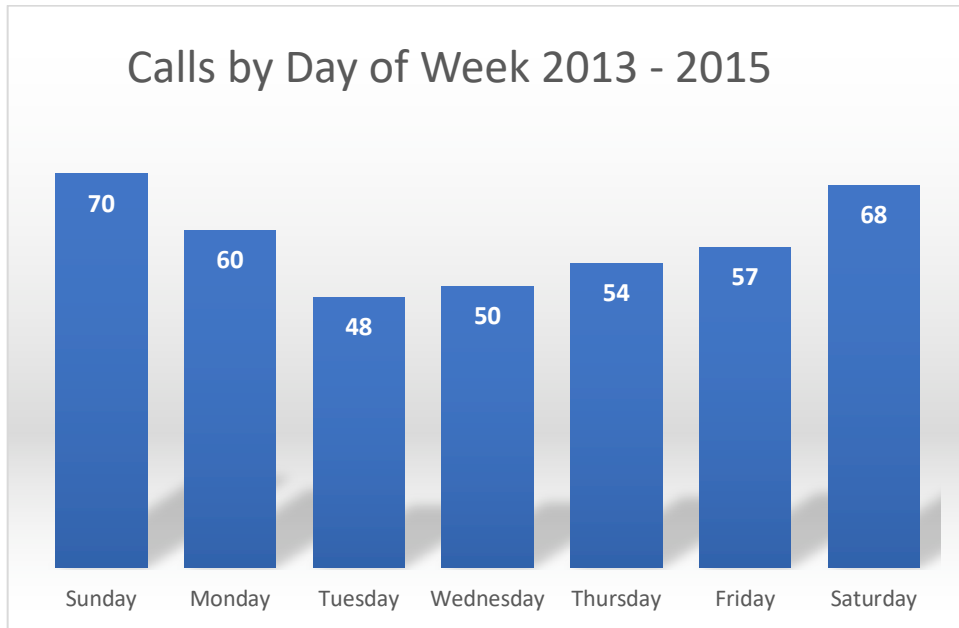
Station Performance 2014			
	Turnout	Travel	Total
Average	3:19	6:33	9:48
90 th Percentile	4:32	11:04	14:44

Station Performance 2015			
	Turnout	Travel	Total
Average	3:29	7:00	10:29
90 th Percentile	4:47	12:51	14:50

(5) Station 65, Snelling

The Snelling station is in the north east corner of the county providing services to the rural area. This station handles 135 calls a year and is busiest on Saturday and Sunday.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000		1	1	1		1	1	5	1.23%
0100		2	2	1	2			7	1.72%
0200	4	1		1		1	4	11	2.70%
0300		2	2		2	1	1	8	1.97%
0400	1			3	1	2		7	1.72%
0500	1	2	2	1	1	2	1	10	2.46%
0600			1	2		3		6	1.47%
0700	3		3	1	4	2		13	3.19%
0800	6	5	1		2	2	4	20	4.91%
0900	2	3	2	3		2	1	13	3.19%
1000	2	3	3	1	1	1	3	14	3.44%
1100	4	7	2	2	1	5	4	25	6.14%
1200	5	3	3	2	5	3	4	25	6.14%
1300	5	5	5	2	5	5	2	29	7.13%
1400	5	1	2	1	5	6	12	32	7.86%
1500	4	1	3	7	4	4	2	25	6.14%
1600	4	3	5	3	3	3	5	26	6.39%
1700	2	7	3	3	2	5	4	26	6.39%
1800	5	1	1	4	2	1	5	19	4.67%
1900	5	3	1	1	3	1	4	18	4.42%
2000	3	4	2	6	1	3	3	22	5.41%
2100	3	3	1	1	2		4	14	3.44%
2200	3			3	7	2	4	19	4.67%
2300	3	3	3	1	1	2		13	3.19%
Total	70	60	48	50	54	57	68	407	100%
Percent	17.20%	14.74%	11.79%	12.29%	13.27%	14.00%	16.71%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	34	35	36	5.88%
Fire Alarm Activations	11	9	14	27.27%
Emergency Medical	58	45	49	-15.52%
Mutual Aid Calls	0	0	0	0.00%
Other Fire Calls	6	10	10	66.67%
Public Assist	6	4	4	-33.33%
Structural Fires	5	6	3	-40.00%
Wildland/Vegetation	21	21	20	-4.76%
Total	141	130	136	-3.55%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:18	7:31	10:47
90 th Percentile	4:43	15:20	19:36

Station Performance 2014			
	Turnout	Travel	Total
Average	3:56	9:53	13:48
90 th Percentile	6:02	19:38	23:58

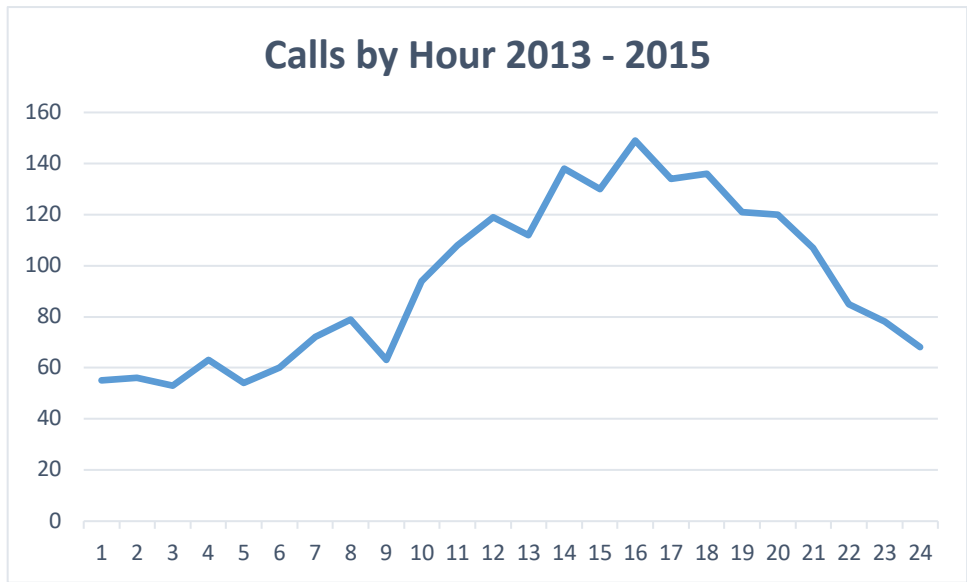
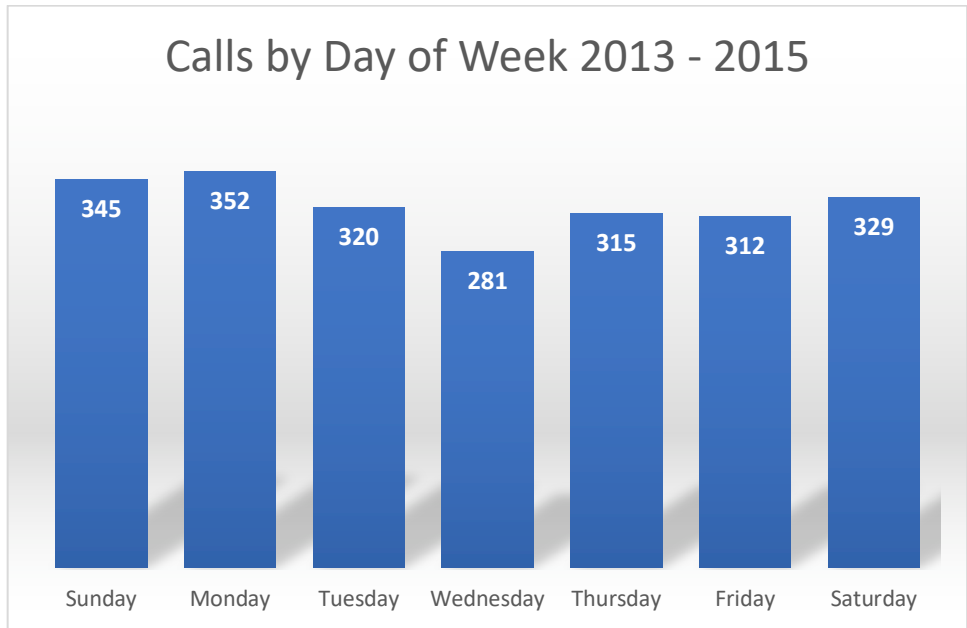
Station Performance 2015			
	Turnout	Travel	Total
Average	3:12	8:55	12:07
90 th Percentile	4:53	16:02	20:01

(6) Station 71, Los Banos

This station is located in the southern part of the County in Los Banos.

Responding to 751 calls a year with the busiest time of day being the 4 pm hour.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	6	12	4	12	8	3	10	55	2.44%
0100	3	9	9	5	9	8	13	56	2.48%
0200	4	8	7	5	4	11	14	53	2.35%
0300	12	11	8	13	7	7	5	63	2.80%
0400	10	7	8	8	10	6	5	54	2.40%
0500	10	9	7	8	13	7	6	60	2.66%
0600	10	13	10	9	8	12	10	72	3.19%
0700	9	17	8	16	11	9	9	79	3.50%
0800	8	6	11	7	13	8	10	63	2.80%
0900	12	18	9	18	10	13	14	94	4.17%
1000	13	16	16	17	13	16	17	108	4.79%
1100	17	18	17	13	21	16	17	119	5.28%
1200	17	21	13	17	16	10	18	112	4.97%
1300	24	19	23	17	25	13	17	138	6.12%
1400	19	20	18	13	22	20	18	130	5.77%
1500	28	22	17	21	20	20	21	149	6.61%
1600	21	19	25	12	20	21	16	134	5.94%
1700	20	25	20	12	16	27	16	136	6.03%
1800	15	22	12	11	17	23	21	121	5.37%
1900	25	14	25	8	14	11	23	120	5.32%
2000	26	14	16	14	9	15	13	107	4.75%
2100	13	11	12	11	11	12	15	85	3.77%
2200	14	9	16	8	11	13	7	78	3.46%
2300	9	12	9	6	7	11	14	68	3.02%
Total	345	352	320	281	315	312	329	2,254	100%
Percent	15.31%	15.62%	14.20%	12.47%	13.98%	13.84%	14.60%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	233	276	314	34.76%
Fire Alarm Activations	97	82	80	-17.53%
Emergency Medical	165	124	165	0.00%
Mutual Aid Calls	0	1	2	100.00%
Other Fire Calls	44	71	52	18.18%
Public Assist	11	17	10	-9.09%
Structural Fires	62	41	44	-29.03%
Wildland/Vegetation	120	106	137	14.17%
Total	732	718	804	9.84%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:34	11:26	15:04
90 th Percentile	5:24	23:39	2:51

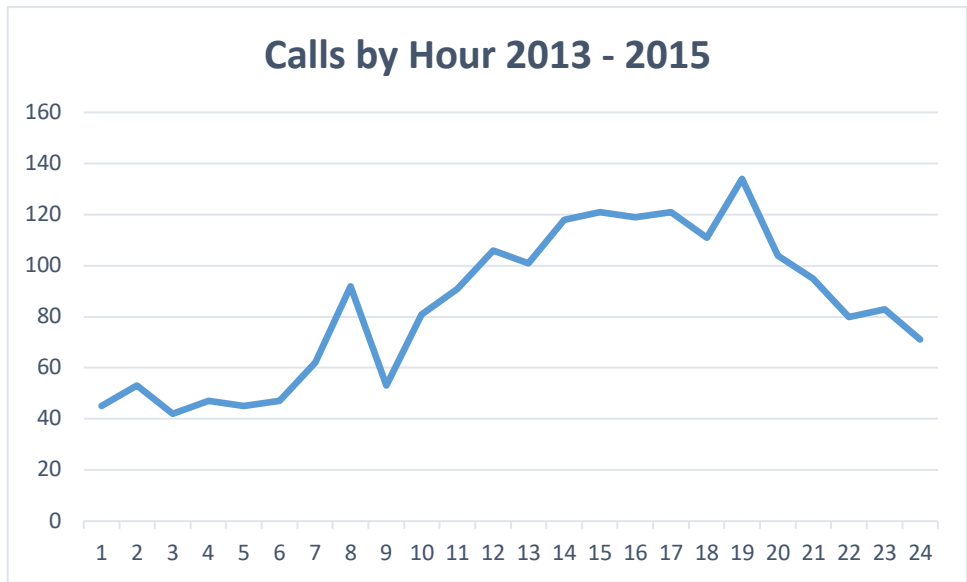
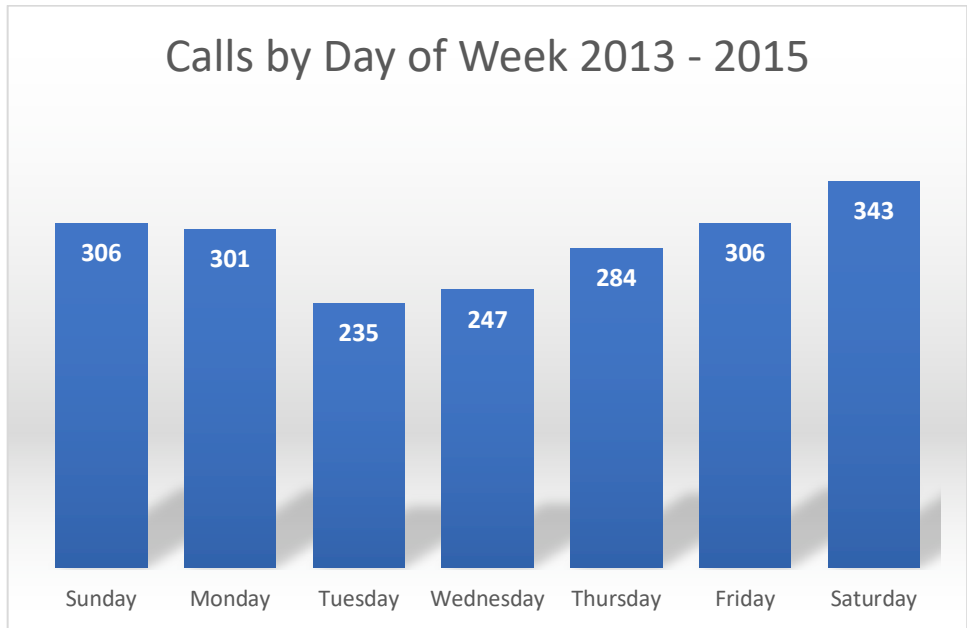
Station Performance 2014			
	Turnout	Travel	Total
Average	3:31	11:47	15:13
90 th Percentile	5:10	23:38	2:43

Station Performance 2015			
	Turnout	Travel	Total
Average	3:25	10:25	13:41
90 th Percentile	5:22	19:13	21:45

(7) Station 72, Santa Nella

The station is located in the Santa Nella along the I-5 corridor west of Los Banos. Its busiest time of the day is between 5 pm and 7 pm and they handle 674 calls per year.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	6	13	3	8	7	1	7	45	2.23%
0100	9	11	11	1	6	6	9	53	2.62%
0200	5	10	6	5	4	5	7	42	2.08%
0300	10	11	5	10	3	4	4	47	2.32%
0400	8	5	5	6	7	6	8	45	2.23%
0500	5	6	9	5	10	8	4	47	2.32%
0600	6	9	5	9	11	11	11	62	3.07%
0700	13	14	14	14	12	13	12	92	4.55%
0800	9	7	6	7	8	7	9	53	2.62%
0900	10	9	2	8	16	15	21	81	4.01%
1000	11	16	10	12	12	14	16	91	4.50%
1100	17	15	15	12	16	14	17	106	5.24%
1200	18	18	7	15	13	13	17	101	5.00%
1300	16	17	11	21	17	12	24	118	5.84%
1400	16	18	19	12	16	17	23	121	5.98%
1500	24	16	18	12	13	18	18	119	5.89%
1600	14	16	18	13	17	21	22	121	5.98%
1700	17	13	10	12	21	20	18	111	5.49%
1800	22	20	12	14	19	26	21	134	6.63%
1900	16	8	11	14	14	21	20	104	5.14%
2000	23	15	8	10	12	15	12	95	4.70%
2100	14	11	10	11	8	12	14	80	3.96%
2200	12	11	14	8	12	13	13	83	4.10%
2300	5	12	6	8	10	14	16	71	3.51%
Total	306	301	235	247	284	306	343	2,022	100%
Percent	15.13%	14.89%	11.62%	12.22%	14.05%	15.13%	16.96%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	221	296	308	39.37%
Fire Alarm Activations	70	77	75	7.14%
Emergency Medical	168	203	238	41.67%
Mutual Aid Calls	0	0	1	100.00%
Other Fire Calls	23	48	42	82.61%
Public Assist	11	11	14	27.27%
Structural Fires	15	16	13	-13.33%
Wildland/Vegetation	46	61	65	41.30%
Total	554	712	756	36.46%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:28	7:49	11:17
90 th Percentile	5:04	16:07	19:59

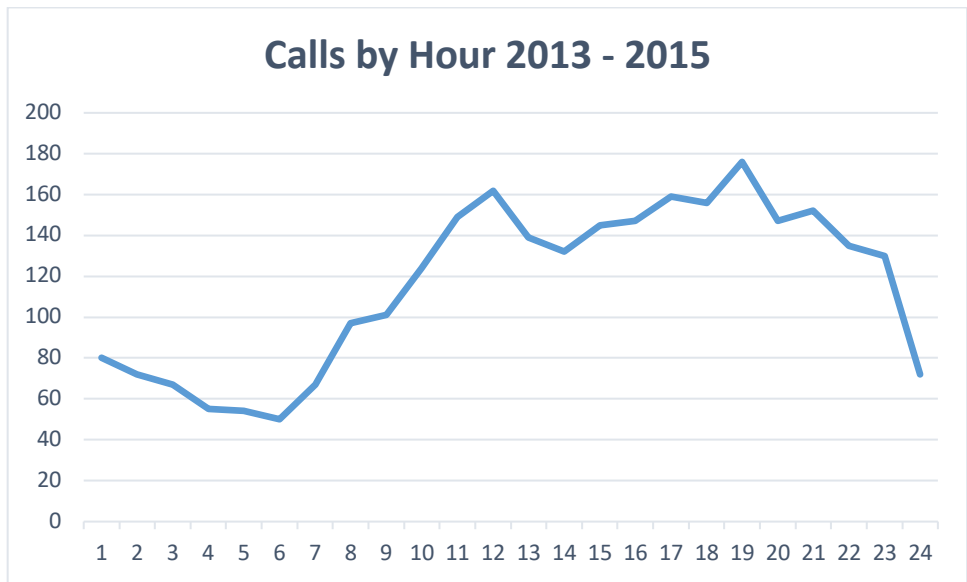
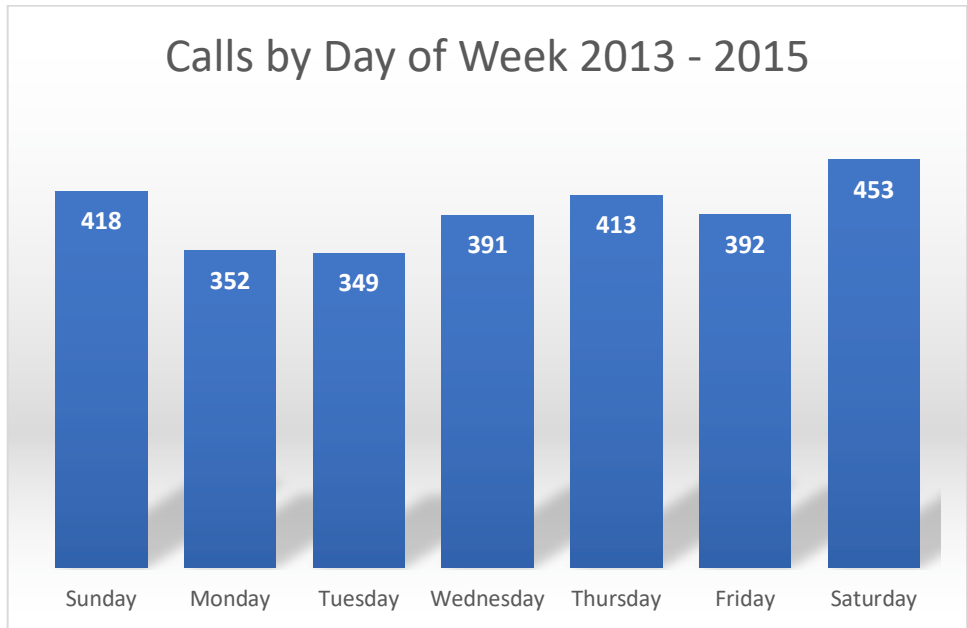
Station Performance 2014			
	Turnout	Travel	Total
Average	3:32	8:42	12:14
90 th Percentile	4:59	14:54	19:07

Station Performance 2015			
	Turnout	Travel	Total
Average	3:32	8:00	11:27
90 th Percentile	5:02	14:10	18:12

(8) Station 74, Gustine

Located in the City of Gustine in the southwest corner of the County, this station handles 922 calls a year with Saturday being the busiest day of the week and 7 pm being the busiest hour of the day.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	15	7	6	12	14	9	17	80	2.89%
0100	10	10	8	7	13	11	13	72	2.60%
0200	12	4	4	4	11	14	18	67	2.42%
0300	8	8	5	9	6	7	12	55	1.99%
0400	9	8	5	7	8	7	10	54	1.95%
0500	12	6	6	12	5	6	3	50	1.81%
0600	9	6	10	9	12	12	9	67	2.42%
0700	12	17	15	10	18	12	13	97	3.50%
0800	17	12	9	22	9	18	14	101	3.65%
0900	13	21	11	16	23	17	23	124	4.48%
1000	14	24	12	18	29	21	31	149	5.38%
1100	29	28	24	21	21	18	21	162	5.85%
1200	19	16	14	23	23	20	24	139	5.02%
1300	18	14	14	20	25	18	23	132	4.77%
1400	21	18	25	14	19	30	18	145	5.24%
1500	25	16	20	19	22	21	24	147	5.31%
1600	20	22	20	30	22	17	28	159	5.74%
1700	22	25	21	21	24	23	20	156	5.64%
1800	26	27	17	31	22	27	26	176	6.36%
1900	24	15	27	20	19	23	19	147	5.31%
2000	28	17	19	22	24	21	21	152	5.49%
2100	22	13	25	20	12	16	27	135	4.88%
2200	21	11	19	15	21	14	29	130	4.70%
2300	12	7	13	9	11	10	10	72	2.60%
Total	418	352	349	391	413	392	453	2,768	100%
Percent	15.10%	12.72%	12.61%	14.13%	14.92%	14.16%	16.37%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	102	107	109	6.86%
Fire Alarm Activations	75	65	66	-12.00%
Emergency Medical	510	580	661	29.61%
Mutual Aid Calls	2	0	1	-50.00%
Other Fire Calls	38	43	43	13.16%
Public Assist	41	51	52	26.83%
Structural Fires	19	18	14	-26.32%
Wildland/Vegetation	55	54	62	12.73%
Total	842	918	1,008	19.71%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:11	4:46	7:51
90 th Percentile	4:37	10:31	13:49

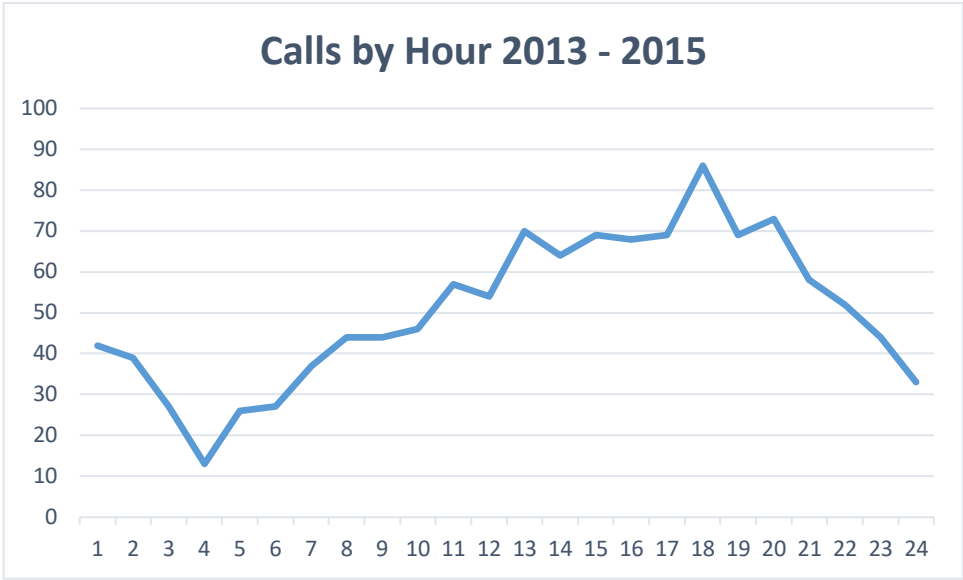
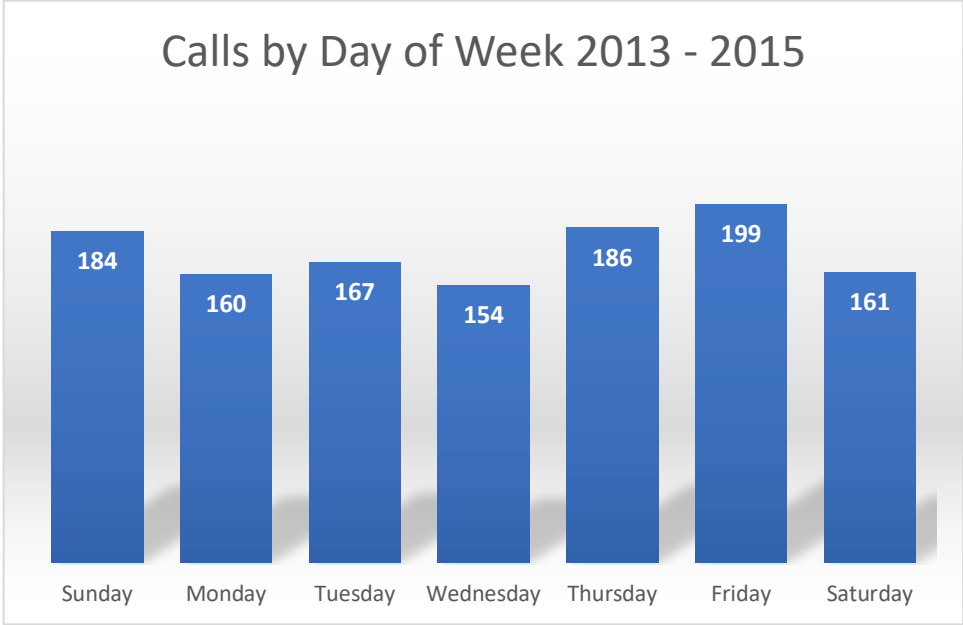
Station Performance 2014			
	Turnout	Travel	Total
Average	3:07	4:48	7:49
90 th Percentile	4:25	10:22	14:00

Station Performance 2015			
	Turnout	Travel	Total
Average	3:04	4:17	7:15
90 th Percentile	4:33	10:05	14:03

(9) Station 75, Dos Palos Wye

This station is located north of the City of Dos Palos at the intersection of Hwy 33 and Highway 152. The busiest day for this station is Friday with the busiest times being in the 7:00 pm hour.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	8	8	2	6	6	2	10	42	3.47%
0100	8	6	3	3	7	5	7	39	3.22%
0200	2	2	8	2	2	6	5	27	2.23%
0300	6			4	2	1		13	1.07%
0400	5	5	2	3	5	4	2	26	2.15%
0500	5	5	4	1	5	4	3	27	2.23%
0600	8	7	2	6	4	6	4	37	3.06%
0700	4	9	7	8	7	6	3	44	3.63%
0800	7	6	9	7	5	6	4	44	3.63%
0900	9	7	3	4	11	9	3	46	3.80%
1000	11	6	9	8	10	8	5	57	4.71%
1100	7	3	7	11	11	6	9	54	4.46%
1200	7	9	10	6	12	14	12	70	5.78%
1300	10	7	8	3	15	11	10	64	5.28%
1400	6	14	11	8	9	14	7	69	5.70%
1500	7	9	10	9	10	15	8	68	5.62%
1600	7	6	11	10	9	16	10	69	5.70%
1700	16	13	12	9	12	14	10	86	7.10%
1800	9	10	10	9	4	11	16	69	5.70%
1900	8	9	9	11	14	12	10	73	6.03%
2000	16	4	7	10	9	9	3	58	4.79%
2100	5	7	11	8	7	7	7	52	4.29%
2200	8	5	6	3	9	8	5	44	3.63%
2300	5	3	6	5	1	5	8	33	2.73%
Total	184	160	167	154	186	199	161	1,211	100%
Percent	15.19%	13.21%	13.79%	12.72%	15.36%	16.43%	13.29%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	78	108	122	56.41%
Fire Alarm Activations	51	37	45	-11.76%
Emergency Medical	145	126	149	2.76%
Mutual Aid Calls	0	0	1	100.00%
Other Fire Calls	30	34	32	6.67%
Public Assist	13	3	13	0.00%
Structural Fires	24	25	20	-16.67%
Wildland/Vegetation	47	51	57	21.28%
Total	388	384	439	13.14%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:30	7:29	11:00
90 th Percentile	5:11	14:23	18:33

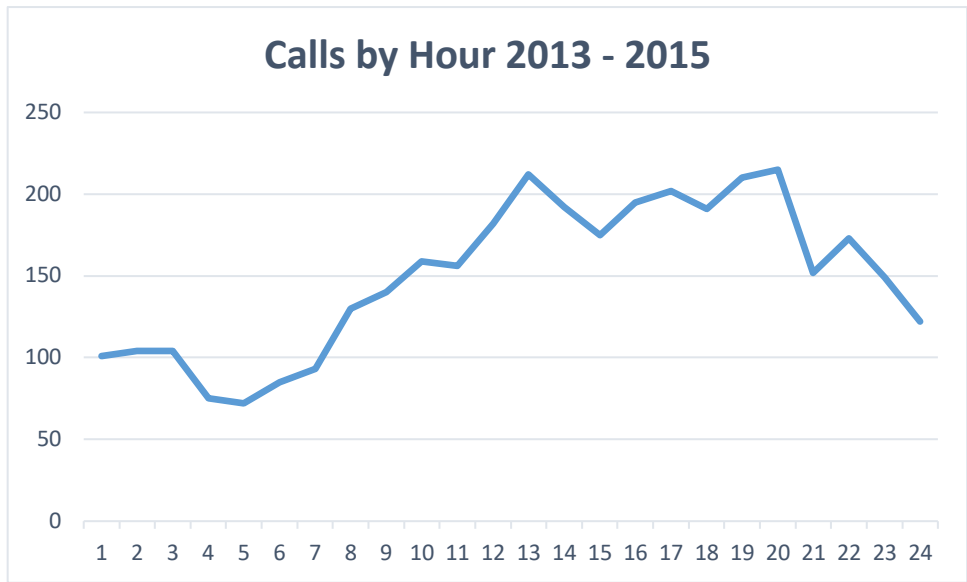
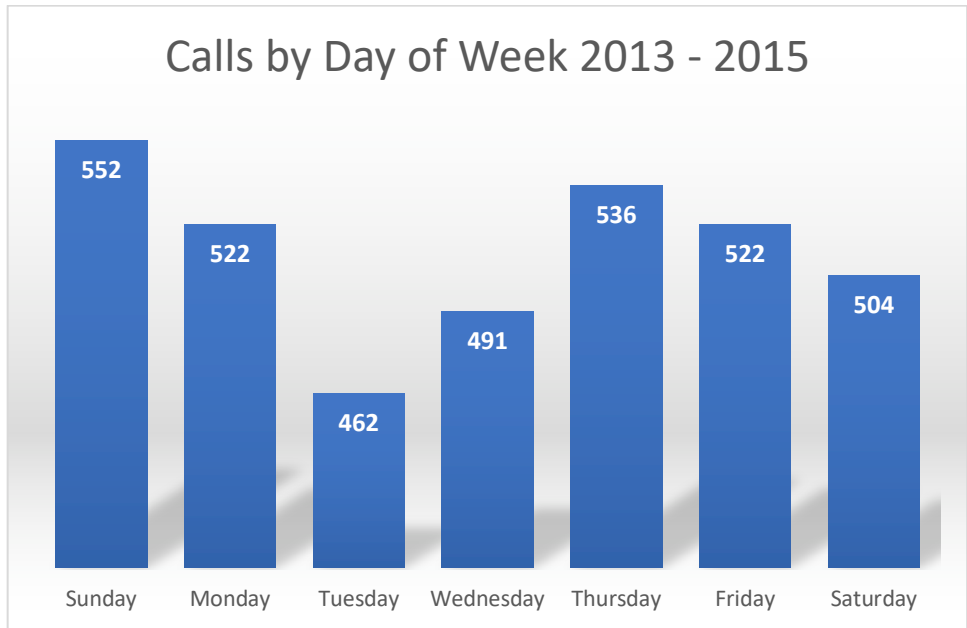
Station Performance 2014			
	Turnout	Travel	Total
Average	3:21	7:48	11:08
90 th Percentile	4:49	15:11	20:18

Station Performance 2015			
	Turnout	Travel	Total
Average	3:42	8:30	12:23
90 th Percentile	5:01	16:55	20:46

(10) Station 76, Dos Palos

Located off Highway 33 in the City of Dos Palos in the southern section of the County. This station handles 1,196 calls a year and is busiest on Sundays. The busiest time of the day is in the early afternoon and then again in the early evening hours.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	22	12	12	15	13	9	18	101	2.81%
0100	21	14	15	12	16	11	15	104	2.90%
0200	13	17	21	9	18	13	13	104	2.90%
0300	13	10	9	8	9	11	15	75	2.09%
0400	13	16	7	7	9	9	11	72	2.01%
0500	17	11	10	8	11	15	13	85	2.37%
0600	22	11	8	18	11	9	14	93	2.59%
0700	15	21	21	19	22	19	13	130	3.62%
0800	20	30	16	15	18	16	25	140	3.90%
0900	21	22	22	29	23	20	22	159	4.43%
1000	22	17	27	25	19	24	22	156	4.35%
1100	29	24	22	31	27	24	25	182	5.07%
1200	29	35	25	32	29	33	29	212	5.91%
1300	23	33	29	16	41	29	21	192	5.35%
1400	27	26	18	27	23	30	24	175	4.88%
1500	18	39	34	25	21	39	19	195	5.43%
1600	35	29	22	32	28	30	26	202	5.63%
1700	36	19	30	23	33	23	27	191	5.32%
1800	30	31	18	29	27	37	38	210	5.85%
1900	32	29	22	35	43	26	28	215	5.99%
2000	21	15	24	19	29	20	24	152	4.24%
2100	24	22	24	24	28	31	20	173	4.82%
2200	28	19	14	18	27	17	26	149	4.15%
2300	21	20	12	15	11	27	16	122	3.40%
Total	552	522	462	491	536	522	504	3,589	100%
Percent	15.38%	14.54%	12.87%	13.68%	14.93%	14.54%	14.04%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	57	92	90	57.89%
Fire Alarm Activations	46	34	43	-6.52%
Emergency Medical	979	879	802	-18.08%
Mutual Aid Calls	0	0	2	100.00%
Other Fire Calls	81	74	85	4.94%
Public Assist	56	36	50	-10.71%
Structural Fires	19	16	13	-31.58%
Wildland/Vegetation	43	44	48	11.63%
Total	1,281	1,175	1,133	-11.55%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:08	5:57	7:09
90 th Percentile	4:40	8:44	12:05

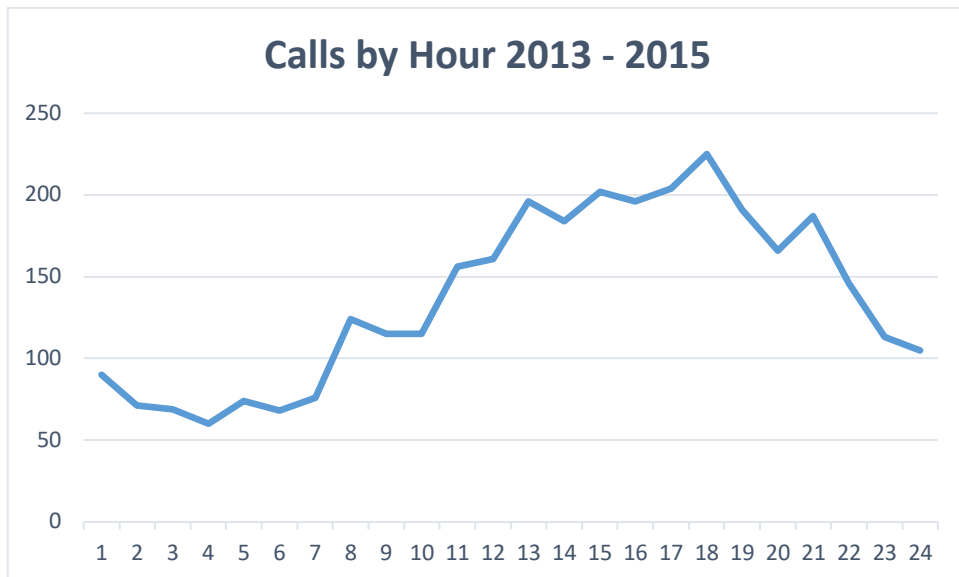
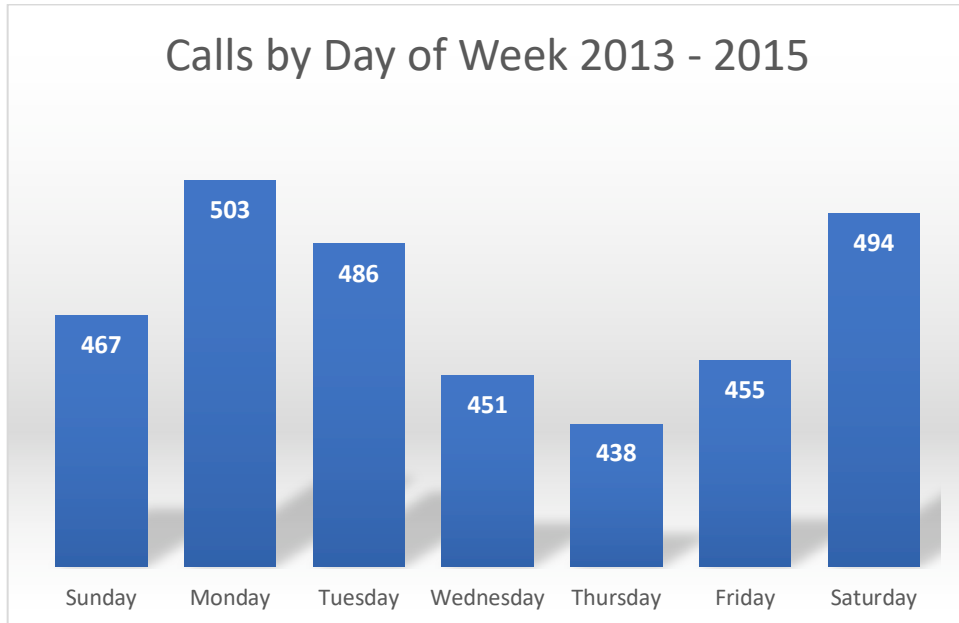
Station Performance 2014			
	Turnout	Travel	Total
Average	3:11	3:30	6:36
90 th Percentile	4:29	7:07	10:42

Station Performance 2015			
	Turnout	Travel	Total
Average	3:12	4:04	7:12
90 th Percentile	4:35	7:55	11:53

(11) Station 81, Merced

This station is located in the southern section of the City of Merced serving areas in the County to the south and east. Handling 1,098 calls a year with the busiest day being Monday and the busiest time being the 6 pm hour.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	15	20	8	8	11	11	17	90	2.73%
0100	13	9	7	9	11	4	18	71	2.16%
0200	10	7	6	10	17	12	7	69	2.09%
0300	10	7	5	12	9	4	13	60	1.82%
0400	13	11	10	7	8	10	15	74	2.25%
0500	13	7	13	5	12	9	9	68	2.06%
0600	9	21	9	6	10	12	9	76	2.31%
0700	23	21	14	22	18	14	12	124	3.76%
0800	19	18	15	19	13	20	11	115	3.49%
0900	19	15	19	9	17	24	12	115	3.49%
1000	12	22	23	36	18	21	24	156	4.74%
1100	23	30	23	25	24	18	18	161	4.89%
1200	26	34	38	26	25	20	27	196	5.95%
1300	25	29	32	24	27	24	23	184	5.59%
1400	25	30	42	25	20	29	31	202	6.13%
1500	32	18	25	32	29	35	25	196	5.95%
1600	33	31	36	24	31	20	29	204	6.19%
1700	18	39	35	35	26	41	31	225	6.83%
1800	34	30	33	29	17	20	28	191	5.80%
1900	20	22	30	15	24	21	34	166	5.04%
2000	25	26	24	35	23	28	26	187	5.68%
2100	15	18	20	21	24	23	25	146	4.43%
2200	18	19	9	8	10	21	28	113	3.43%
2300	17	19	10	9	14	14	22	105	3.19%
Total	467	503	486	451	438	455	494	3,294	100%
Percent	14.18%	15.27%	14.75%	13.69%	13.30%	13.81%	15.00%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	164	222	220	34.15%
Fire Alarm Activations	170	203	223	31.18%
Emergency Medical	309	357	408	32.04%
Mutual Aid Calls	0	1	2	100.00%
Other Fire Calls	41	72	75	82.93%
Public Assist	33	34	38	15.15%
Structural Fires	75	71	77	2.67%
Wildland/Vegetation	161	166	172	6.83%
Total	953	1,126	1,215	27.49%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:16	7:31	10:41
90 th Percentile	4:49	14:25	17:38

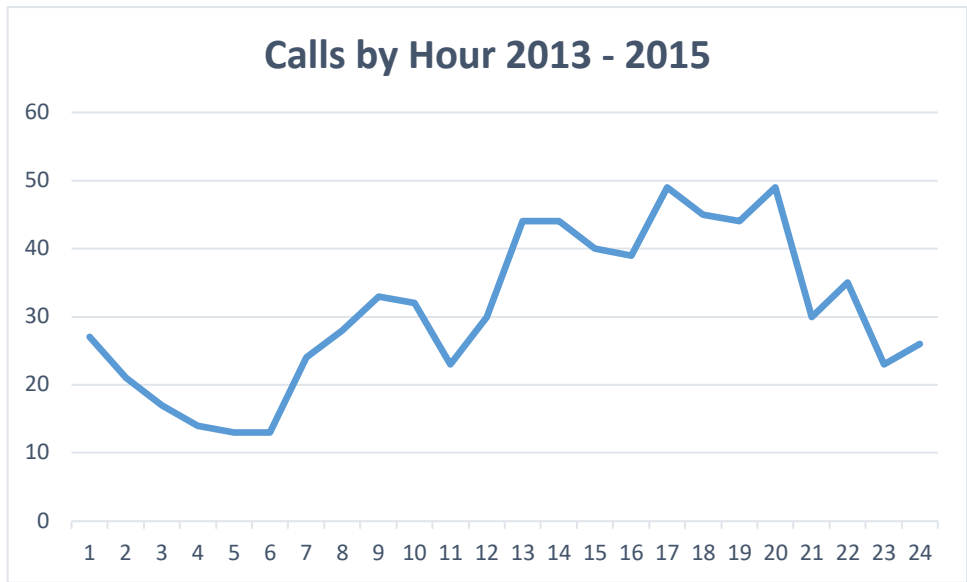
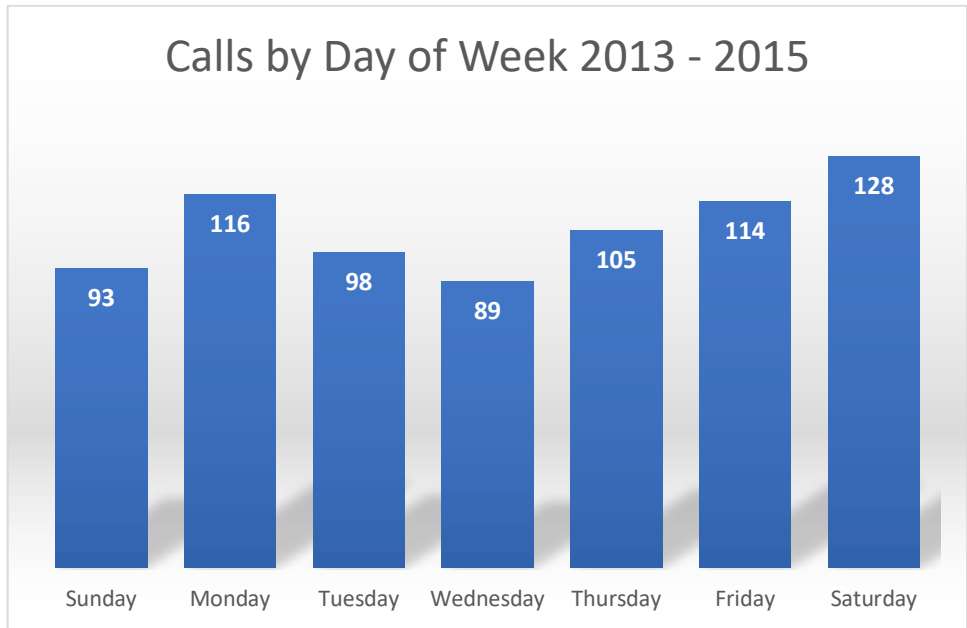
Station Performance 2014			
	Turnout	Travel	Total
Average	3:16	8:59	12:10
90 th Percentile	4:54	17:34	20:29

Station Performance 2015			
	Turnout	Travel	Total
Average	3:16	8:01	11:10
90 th Percentile	4:56	16:19	20:15

(12) Station 83, El Nido

This station is located along Highway 59 between Merced and Dos Palos. The busiest day for this station is Saturday with the busiest time being the 7:00 pm hour.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	4	8	1	3	3	2	6	27	3.63%
0100	4		2	2	2	5	6	21	2.83%
0200	3	2	5	2	3		2	17	2.29%
0300	3	1	1	2	2	3	2	14	1.88%
0400	5	3	1	3	1			13	1.75%
0500		2	2	2	2	3	2	13	1.75%
0600	5	5	2	2	5	2	3	24	3.23%
0700	2	9	3	4	4	4	2	28	3.77%
0800	5	3	6	6	3	5	5	33	4.44%
0900	2	3	6	4	5	7	5	32	4.31%
1000		3	3	4	6	4	3	23	3.10%
1100	1	8	5	6	4	3	3	30	4.04%
1200	3	8	9	3	3	8	10	44	5.92%
1300	6	6	9	6	6	7	4	44	5.92%
1400	6	7	4	3	7	5	8	40	5.38%
1500	6	5	5	4	7	5	7	39	5.25%
1600	6	7	6	7	6	9	8	49	6.59%
1700	2	7	7	5	8	8	8	45	6.06%
1800	8	10	2	4	8	8	4	44	5.92%
1900	10	6	6	6	3	9	9	49	6.59%
2000	4	2	2	1	7	6	8	30	4.04%
2100	2	1	6	8	5	5	8	35	4.71%
2200	5	3	3		3	1	8	23	3.10%
2300	1	7	2	2	2	5	7	26	3.50%
Total	93	116	98	89	105	114	128	743	100%
Percent	12.52%	15.61%	13.19%	11.98%	14.13%	15.34%	17.23%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	50	48	79	58.00%
Fire Alarm Activations	26	17	21	-19.23%
Emergency Medical	100	92	56	-44.00%
Mutual Aid Calls	0	0	0	0.00%
Other Fire Calls	24	23	12	-50.00%
Public Assist	3	6	2	-33.33%
Structural Fires	26	26	24	-7.69%
Wildland/Vegetation	38	31	39	2.63%
Total	267	243	233	-12.73%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:36	10:01	13:38
90 th Percentile	5:23	19:37	23:42

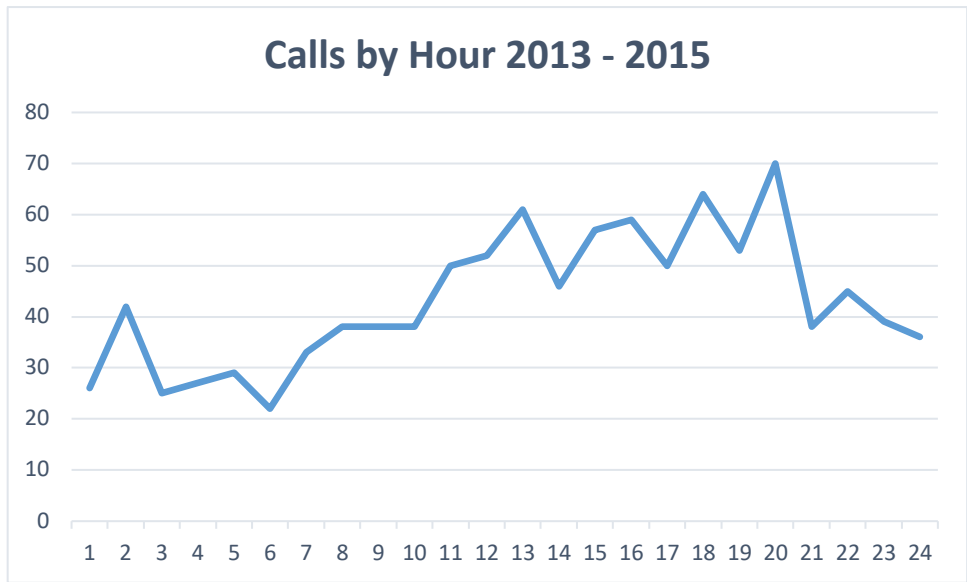
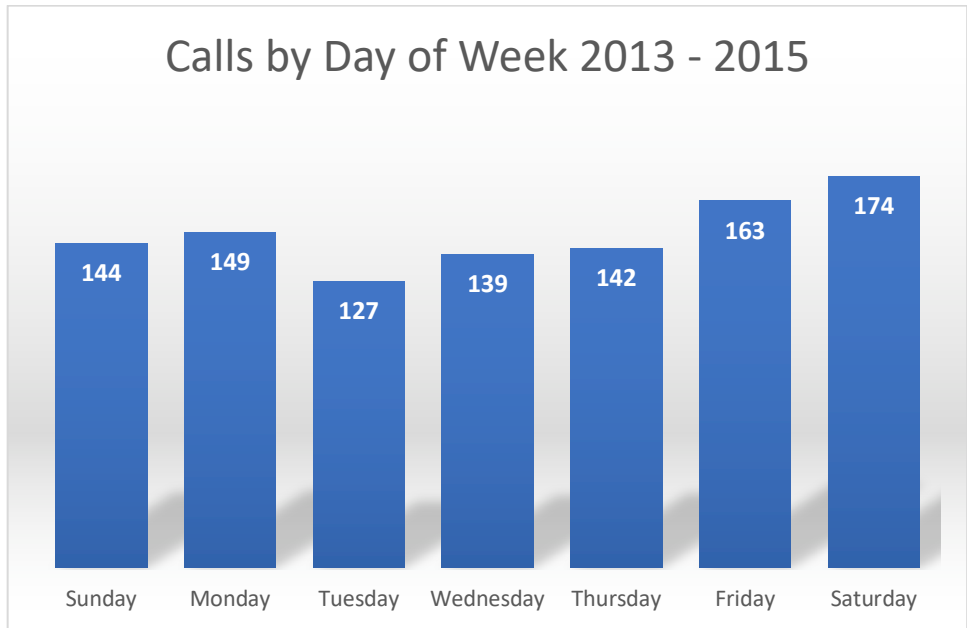
Station Performance 2014			
	Turnout	Travel	Total
Average	3:25	9:39	13:07
90 th Percentile	5:13	21:52	0:39

Station Performance 2015			
	Turnout	Travel	Total
Average	3:34	9:24	12:56
90 th Percentile	5:15	17:54	21:38

(13) Station 84, Le Grand

The Le Grand station is located in the eastern section of the County northeast of Highway 99. This station handles 346 calls per year and is busiest on Saturdays. The busiest time of day is the 8 pm hour.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	5	4	1	3	5	4	4	26	2.50%
0100	10	7	3	2	8	4	8	42	4.05%
0200	2	6		5	3	3	6	25	2.41%
0300	3	3	4	5	4	3	5	27	2.60%
0400	3	6	2	2	6	6	4	29	2.79%
0500	4	8		3	3	1	3	22	2.12%
0600	2	7	5	3	5	8	3	33	3.18%
0700	6	2	7	7	6	8	2	38	3.66%
0800	9	5	4	7	5	5	3	38	3.66%
0900	7	6	4	6	5	6	4	38	3.66%
1000	10	4	3	10	7	8	8	50	4.82%
1100	7	9	7	8	7	6	8	52	5.01%
1200	7	5	8	6	13	10	12	61	5.88%
1300	5	6	7	3	5	10	10	46	4.43%
1400	9	9	6	9	9	9	6	57	5.49%
1500	11	4	10	9	3	11	11	59	5.68%
1600	6	6	12	7	7	6	6	50	4.82%
1700	8	10	7	7	9	12	11	64	6.17%
1800	7	10	12	8	3	7	6	53	5.11%
1900	6	6	11	10	9	12	16	70	6.74%
2000	2	7	3	3	5	7	11	38	3.66%
2100	4	8	3	9	8	6	7	45	4.34%
2200	7	3	3	4	2	6	14	39	3.76%
2300	4	8	5	3	5	5	6	36	3.47%
Total	144	149	127	139	142	163	174	1,038	100%
Percent	13.87%	14.35%	12.24%	13.39%	13.68%	15.70%	16.76%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	51	56	80	56.86%
Fire Alarm Activations	30	23	39	30.00%
Emergency Medical	163	156	152	-6.75%
Mutual Aid Calls	0	0	0	0.00%
Other Fire Calls	16	17	26	62.50%
Public Assist	14	3	17	21.43%
Structural Fires	15	16	13	-13.33%
Wildland/Vegetation	52	54	45	-13.46%
Total	341	325	372	9.09%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:18	7:09	10:24
90 th Percentile	4:44	14:52	18:37

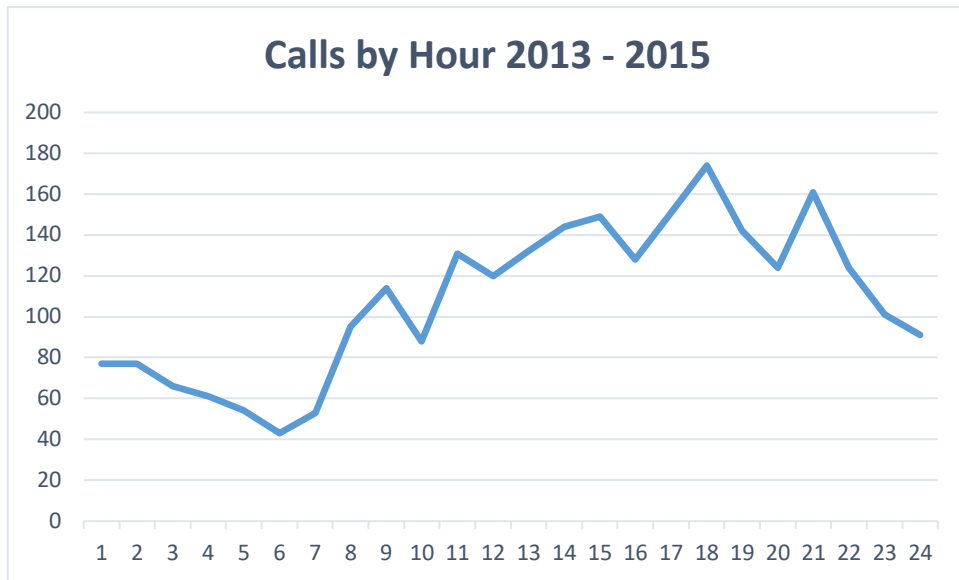
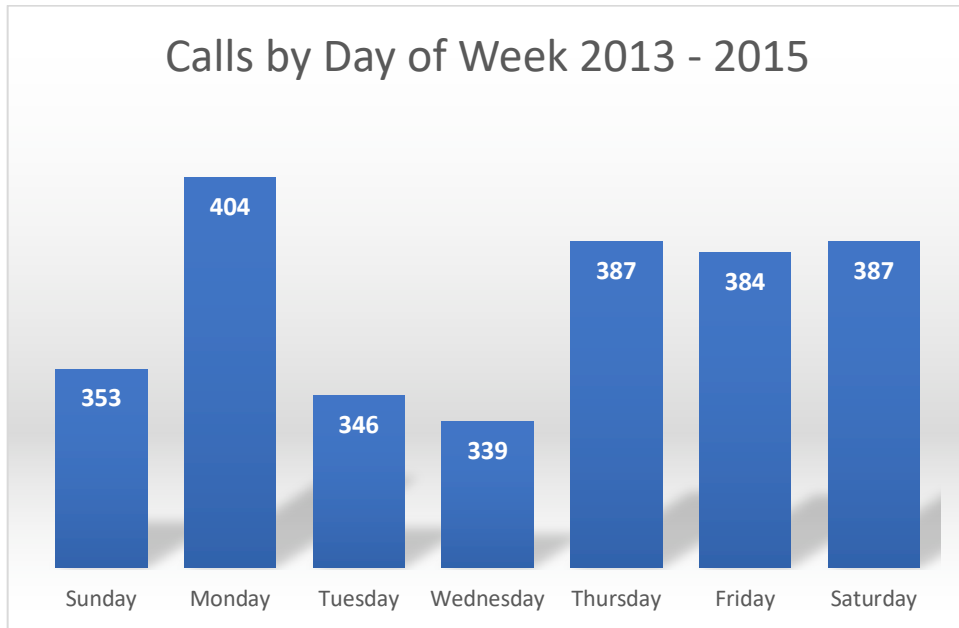
Station Performance 2014			
	Turnout	Travel	Total
Average	3:16	7:03	10:16
90 th Percentile	4:39	12:56	16:40

Station Performance 2015			
	Turnout	Travel	Total
Average	3:22	6:52	10:12
90 th Percentile	4:48	13:48	17:56

(14) Station 85, McKee

This station is located in the northeast section of the City of Merced servicing the unincorporated areas surrounded by the City and the area to the north including UC Merced. The station handles 866 calls per year with 165 of those calls being to the UC Merced Campus. The busiest time of day is the 6 pm hour. Monday is the busiest day of the week.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	11	16	8	9	8	10	15	77	2.96%
0100	12	11	7	7	14	6	20	77	2.96%
0200	12	7	5	11	8	12	11	66	2.54%
0300	14	10	7	9	7	5	9	61	2.35%
0400	10	3	7	7	7	8	12	54	2.08%
0500	9	6	4	4	4	11	5	43	1.65%
0600	8	12	2	7	8	11	5	53	2.04%
0700	18	15	15	12	13	11	11	95	3.65%
0800	12	16	14	15	19	20	18	114	4.38%
0900	12	13	10	15	16	13	9	88	3.38%
1000	26	19	17	23	16	14	16	131	5.04%
1100	19	22	24	13	20	13	9	120	4.62%
1200	14	27	22	14	22	18	15	132	5.08%
1300	16	33	16	18	25	17	19	144	5.54%
1400	17	21	23	19	21	21	27	149	5.73%
1500	13	13	18	20	17	27	20	128	4.92%
1600	23	20	23	17	20	24	24	151	5.81%
1700	14	33	26	21	26	30	24	174	6.69%
1800	19	18	22	23	19	22	19	142	5.46%
1900	19	10	20	11	23	20	21	124	4.77%
2000	21	25	20	27	21	23	24	161	6.19%
2100	13	20	20	14	24	16	17	124	4.77%
2200	15	19	6	14	16	18	13	101	3.88%
2300	6	15	10	9	13	14	24	91	3.50%
Total	353	404	346	339	387	384	387	2,600	100%
Percent	13.58%	15.54%	13.31%	13.04%	14.88%	14.77%	14.88%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	102	124	99	-2.94%
Fire Alarm Activations	114	137	142	24.56%
Emergency Medical	386	397	514	33.16%
Mutual Aid Calls	0	0	1	0.00%
Other Fire Calls	21	32	35	66.67%
Public Assist	63	58	73	15.87%
Structural Fires	35	32	31	-11.43%
Wildland/Vegetation	79	54	71	-10.13%
Total	800	834	966	20.75%

UC Merced	142	170	182	28.17%
-----------	-----	-----	-----	--------

Station Performance 2013			
	Turnout	Travel	Total
Average	3:18	6:30	9:47
90 th Percentile	4:46	13:14	16:02

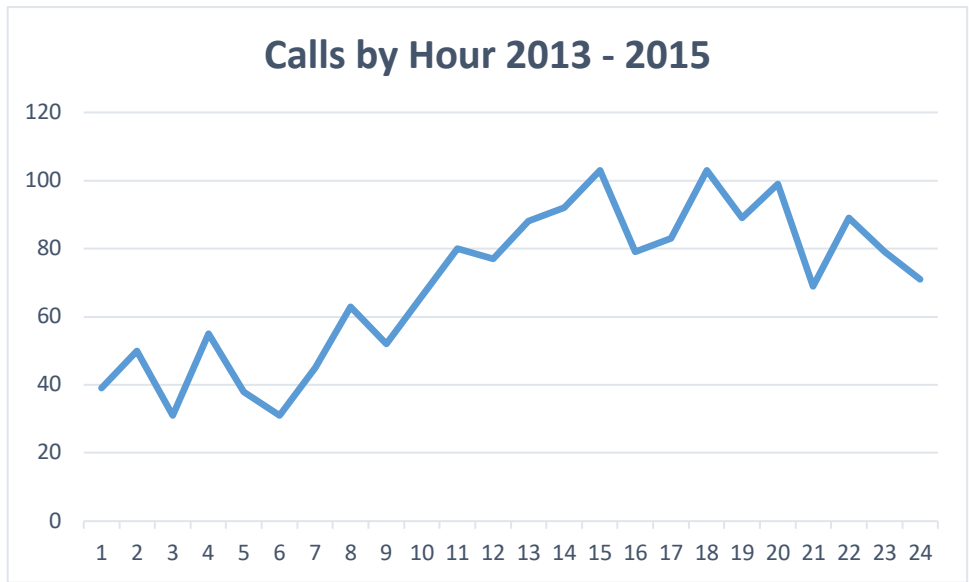
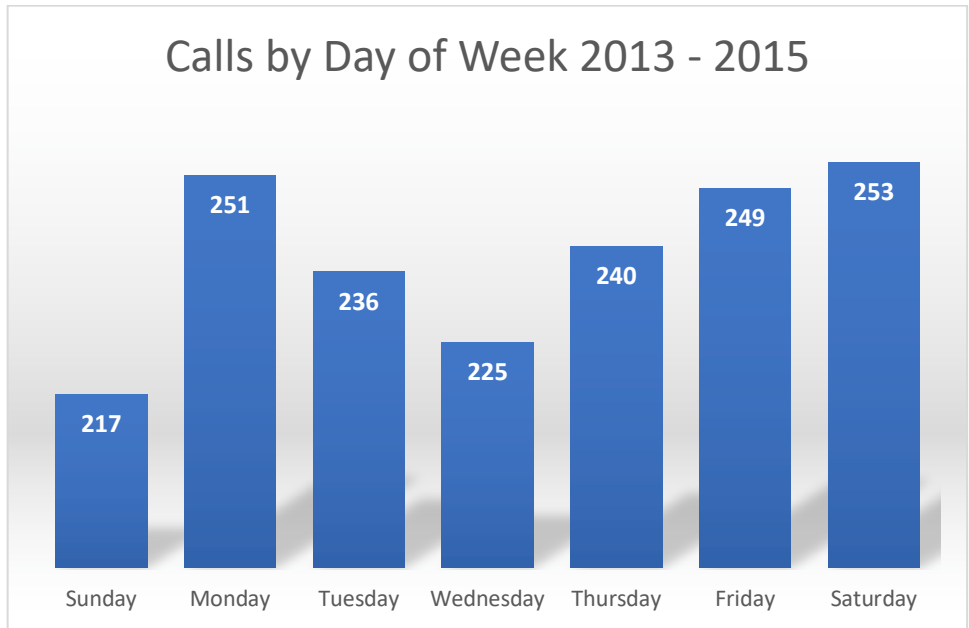
Station Performance 2014			
	Turnout	Travel	Total
Average	3:20	5:57	9:14
90 th Percentile	4:53	11:51	14:52

Station Performance 2015			
	Turnout	Travel	Total
Average	3:14	6:14	9:28
90 th Percentile	4:44	13:01	16:20

(15) Station 86, Planada

This station is located along Highway 140 and serves the area of Planada and areas east of Merced. It is busiest on Saturdays and Mondays and in the early afternoon and early evening hours. It handles 567 calls for service during the year.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	5	9	4	4	5	8	4	39	2.33%
0100	12	7	6	3	7	4	11	50	2.99%
0200	5	2	3	7	2	7	5	31	1.86%
0300	10	8	5	12	7	5	8	55	3.29%
0400	4	6	3	3	7	8	7	38	2.27%
0500	7	6	6	2	3	4	3	31	1.86%
0600	5	10	8	6	8	5	3	45	2.69%
0700	7	8	7	11	9	12	9	63	3.77%
0800	8	5	9	7	8	9	6	52	3.11%
0900	13	15	7	6	10	9	6	66	3.95%
1000	9	11	16	17	11	8	8	80	4.79%
1100	8	12	10	14	12	12	9	77	4.61%
1200	10	16	10	13	16	8	15	88	5.27%
1300	7	19	14	12	12	12	16	92	5.51%
1400	16	11	14	18	14	18	12	103	6.16%
1500	8	6	14	8	14	18	11	79	4.73%
1600	14	10	12	11	16	8	12	83	4.97%
1700	8	16	14	11	10	23	21	103	6.16%
1800	9	12	19	12	9	16	12	89	5.33%
1900	15	13	14	9	14	14	20	99	5.92%
2000	6	14	8	10	13	7	11	69	4.13%
2100	10	11	13	16	17	9	13	89	5.33%
2200	9	14	9	11	8	9	19	79	4.73%
2300	12	10	11	2	8	16	12	71	4.25%
Total	217	251	236	225	240	249	253	1,671	100%
Percent	12.99%	15.02%	14.12%	13.46%	14.36%	14.90%	15.14%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	53	70	68	28.30%
Fire Alarm Activations	35	34	57	62.86%
Emergency Medical	345	310	282	-18.26%
Mutual Aid Calls	0	0	32	0.00%
Other Fire Calls	22	33	32	45.45%
Public Assist	25	21	19	-24.00%
Structural Fires	29	22	22	-24.14%
Wildland/Vegetation	58	69	65	12.07%
Total	567	559	577	1.76%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:15	5:25	8:36
90 th Percentile	4:35	12:32	15:49

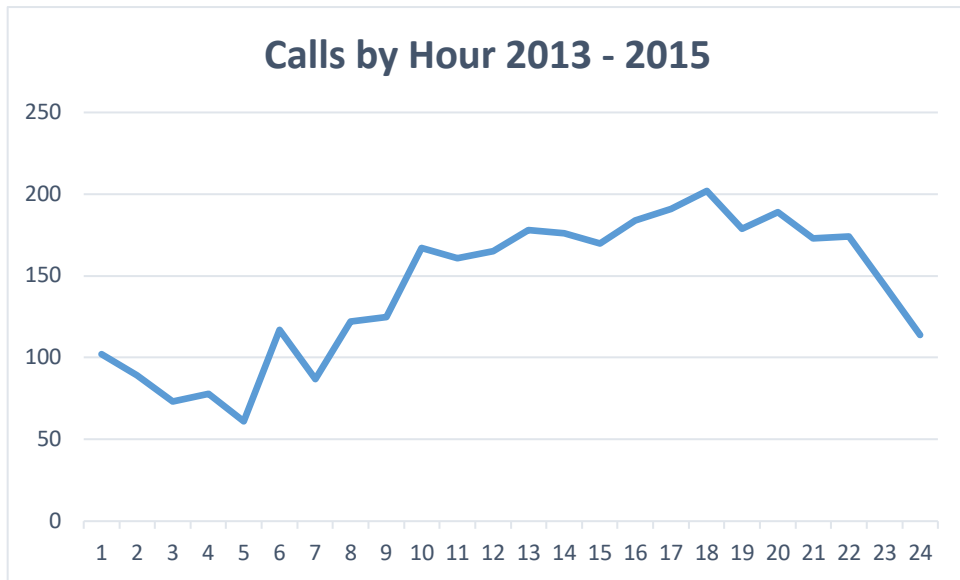
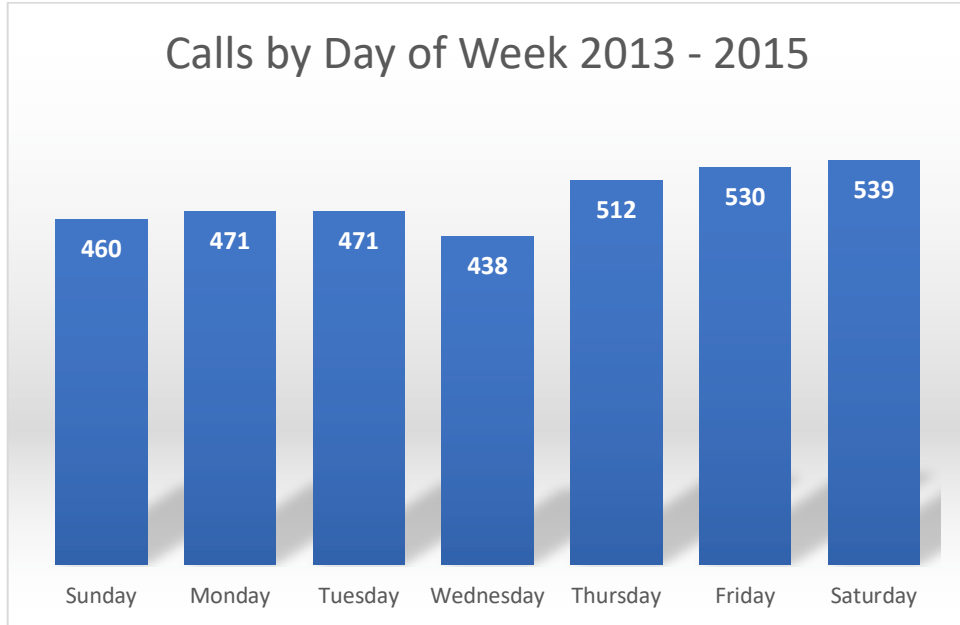
Station Performance 2014			
	Turnout	Travel	Total
Average	3:12	5:26	8:39
90 th Percentile	4:32	11:23	14:56

Station Performance 2015			
	Turnout	Travel	Total
Average	3:20	6:19	9:34
90 th Percentile	4:49	15:06	18:38

(16) Station 91, Delhi

This station provides service along the Highway 99 corridor northwest of Livingston. The busiest days of the week are Friday and Saturday with the busiest time of day being the 6 pm hour. During the year it handles 1,140 calls for service.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	22	15	11	11	11	10	22	102	2.98%
0100	22	9	12	9	11	9	17	89	2.60%
0200	10	9	10	7	9	11	17	73	2.13%
0300	8	14	9	12	12	10	13	78	2.28%
0400	9	10	10	6	8	9	9	61	1.78%
0500	21	22	14	15	13	15	17	117	3.42%
0600	11	15	9	13	10	14	15	87	2.54%
0700	19	15	19	16	14	20	19	122	3.57%
0800	21	18	21	11	17	20	17	125	3.65%
0900	20	28	22	27	26	23	21	167	4.88%
1000	17	16	17	26	29	33	23	161	4.71%
1100	15	17	20	24	31	33	25	165	4.82%
1200	24	23	22	24	28	29	28	178	5.20%
1300	19	14	26	27	33	28	29	176	5.14%
1400	14	16	31	25	33	28	23	170	4.97%
1500	23	29	22	26	26	30	28	184	5.38%
1600	33	29	31	21	23	22	32	191	5.58%
1700	28	30	30	28	32	33	21	202	5.90%
1800	24	33	22	22	20	32	26	179	5.23%
1900	24	22	37	21	30	24	31	189	5.52%
2000	18	30	28	24	22	23	28	173	5.06%
2100	25	28	17	18	25	34	27	174	5.09%
2200	20	20	19	11	24	26	24	144	4.21%
2300	13	9	12	14	25	14	27	114	3.33%
Total	460	471	471	438	512	530	539	3,421	100%
Percent	13.45%	13.77%	13.77%	12.80%	14.97%	15.49%	15.76%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	158	175	206	30.38%
Fire Alarm Activations	107	131	120	12.15%
Emergency Medical	524	542	647	23.47%
Mutual Aid Calls	1	0	0	-100.00%
Other Fire Calls	59	64	59	0.00%
Public Assist	39	32	36	-7.69%
Structural Fires	88	60	49	-44.32%
Wildland/Vegetation	133	79	112	-15.79%
Total	1,109	1,083	1,229	10.82%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:18	5:47	8:57
90 th Percentile	4:49	12:52	16:47

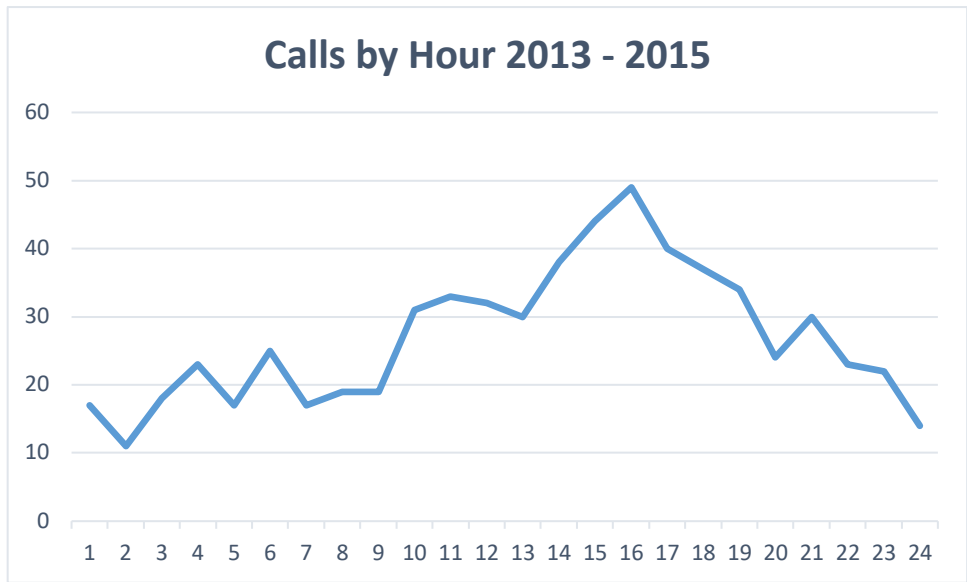
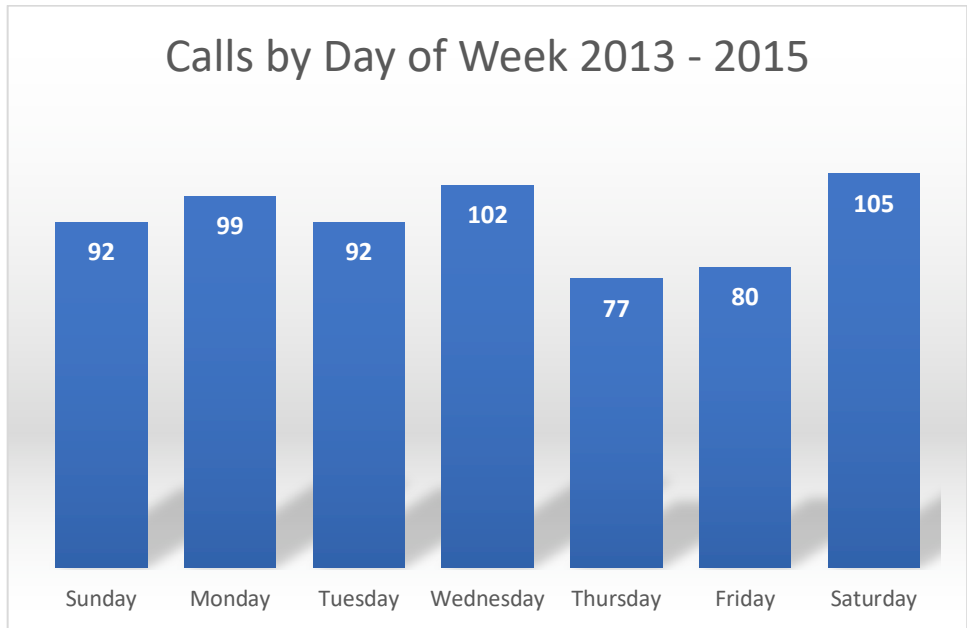
Station Performance 2014			
	Turnout	Travel	Total
Average	3:13	5:25	8:35
90 th Percentile	4:37	11:01	13:58

Station Performance 2015			
	Turnout	Travel	Total
Average	3:14	5:06	8:17
90 th Percentile	4:44	10:08	13:17

(17) Station 92, Ballico

This station is the furthest western station along Santa Fe Drive serving the areas of Ballico and Cortez. Handling 216 calls a year the busiest day is Saturday with the busiest time of day being the 4 pm hour.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	3	4	2	2	1	2	3	17	2.63%
0100	3	1	3			2	2	11	1.70%
0200	1	3	3	1	1	4	5	18	2.78%
0300	3	3	4	4	6		3	23	3.55%
0400		3	4	3	2	2	3	17	2.63%
0500	6	5	3	2	5	3	1	25	3.86%
0600		2	4	2	4	2	3	17	2.63%
0700	1	2	4	3	4	2	3	19	2.94%
0800	3	1	4	4	2	1	4	19	2.94%
0900	3	4	4	6	2	8	4	31	4.79%
1000	4	1	6	7	5	4	6	33	5.10%
1100	4	7	5	3	1	2	10	32	4.95%
1200	4	6	3	5	4	5	3	30	4.64%
1300	9	5	4	8	4	3	5	38	5.87%
1400	7	12	4	3	3	4	11	44	6.80%
1500	9	6	5	9	9	5	6	49	7.57%
1600	4	8	7	6	2	7	6	40	6.18%
1700	4	5	9	7	5	5	2	37	5.72%
1800	3	9		7	3	6	6	34	5.26%
1900	4	3	3	3	5	4	2	24	3.71%
2000	1	3	7	7	2	3	7	30	4.64%
2100	6	3	2	4	1	1	6	23	3.55%
2200	6	3	1	3	4	2	3	22	3.40%
2300	4		1	3	2	3	1	14	2.16%
Total	92	99	92	102	77	80	105	647	100%
Percent	14.22%	15.30%	14.22%	15.77%	11.90%	12.36%	16.23%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	35	29	39	11.43%
Fire Alarm Activations	24	34	26	8.33%
Emergency Medical	60	62	73	21.67%
Mutual Aid Calls	0	0	0	0.00%
Other Fire Calls	16	13	20	25.00%
Public Assist	9	4	6	-33.33%
Structural Fires	37	32	28	-24.32%
Wildland/Vegetation	36	28	36	0.00%
Total	217	202	228	5.07%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:31	8:34	12:01
90 th Percentile	5:22	16:16	20:35

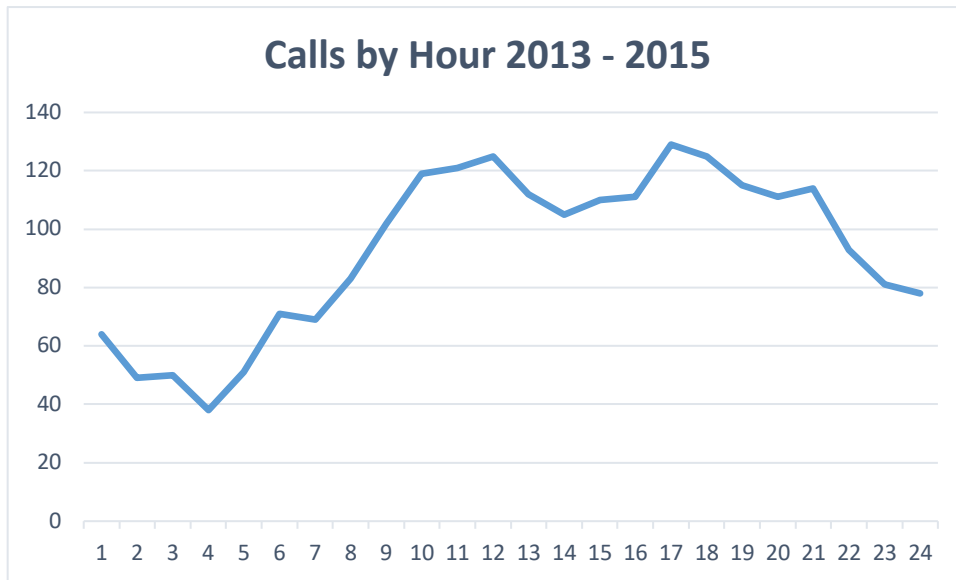
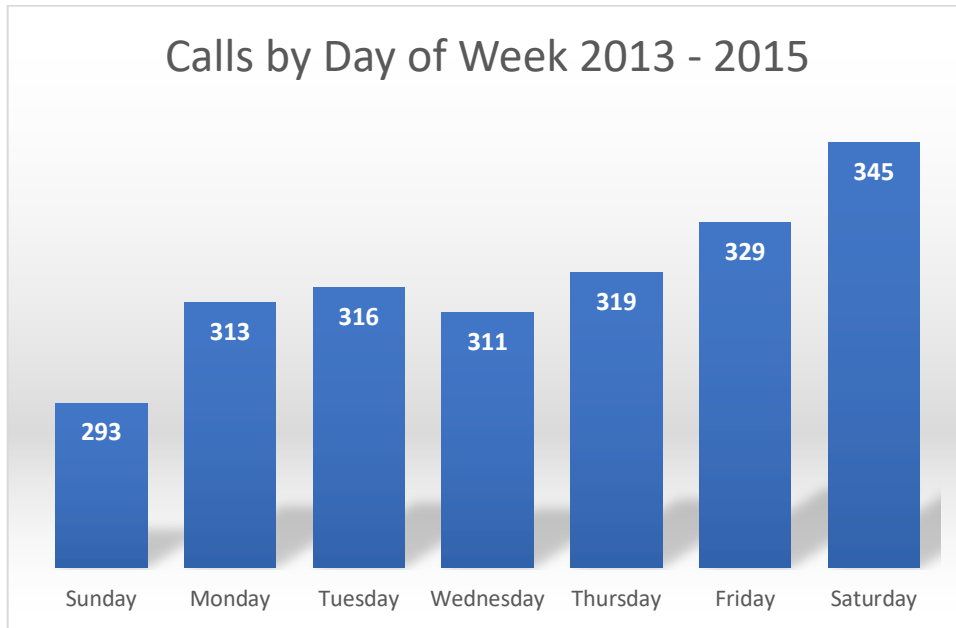
Station Performance 2014			
	Turnout	Travel	Total
Average	3:17	7:43	10:49
90 th Percentile	4:53	14:57	17:44

Station Performance 2015			
	Turnout	Travel	Total
Average	3:26	8:28	11:54
90 th Percentile	5:18	17:48	21:44

(18) Station 95, Hilmar

Located on the northern end of Highway 165 providing service the Hilmar and areas to the west. This station handles 742 calls for service a year with the busiest time of day being the noon hour and the 4 pm hour. The busiest day of the week is Saturday.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	9	14	7	5	8	10	11	64	2.88%
0100	7	3	8	2	7	12	10	49	2.20%
0200	10	7	4	5	9	9	6	50	2.25%
0300	2	5	5	4	8	6	8	38	1.71%
0400	8	11	7	6	7	5	7	51	2.29%
0500	13	8	8	11	12	10	9	71	3.19%
0600	11	18	13	11	7	4	5	69	3.10%
0700	16	12	13	11	12	7	12	83	3.73%
0800	12	17	16	10	10	19	18	102	4.58%
0900	12	17	18	18	25	17	12	119	5.35%
1000	11	13	16	19	20	19	23	121	5.44%
1100	17	17	15	19	23	17	17	125	5.62%
1200	9	14	22	18	17	12	20	112	5.03%
1300	12	11	16	16	15	12	23	105	4.72%
1400	12	17	11	22	14	19	15	110	4.94%
1500	8	16	16	13	22	15	21	111	4.99%
1600	21	21	21	18	12	13	23	129	5.80%
1700	22	17	19	18	20	22	7	125	5.62%
1800	16	14	16	14	14	20	21	115	5.17%
1900	11	14	20	11	14	19	22	111	4.99%
2000	16	17	14	25	10	20	12	114	5.12%
2100	15	10	15	10	10	19	14	93	4.18%
2200	12	9	7	12	9	15	17	81	3.64%
2300	11	11	9	13	14	8	12	78	3.50%
Total	293	313	316	311	319	329	345	2,226	100%
Percent	13.16%	14.06%	14.20%	13.97%	14.33%	14.78%	15.50%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	80	111	115	43.75%
Fire Alarm Activations	49	69	59	20.41%
Emergency Medical	371	393	461	24.26%
Mutual Aid Calls	1	0	0	-100.00%
Other Fire Calls	37	38	37	0.00%
Public Assist	38	52	61	60.53%
Structural Fires	44	38	31	-29.55%
Wildland/Vegetation	60	42	39	-35.00%
Total	680	743	803	18.09%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:18	4:25	7:39
90 th Percentile	4:55	9:26	12:56

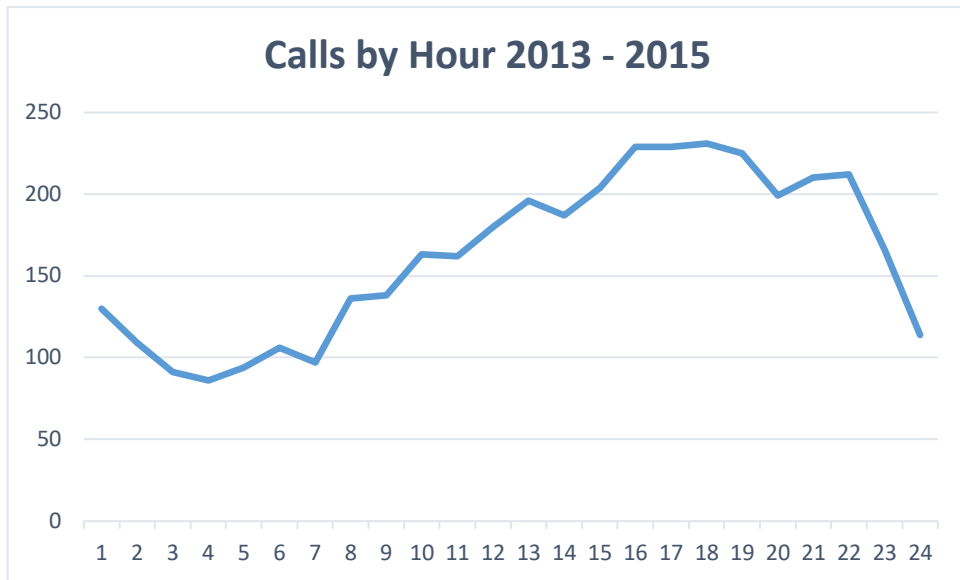
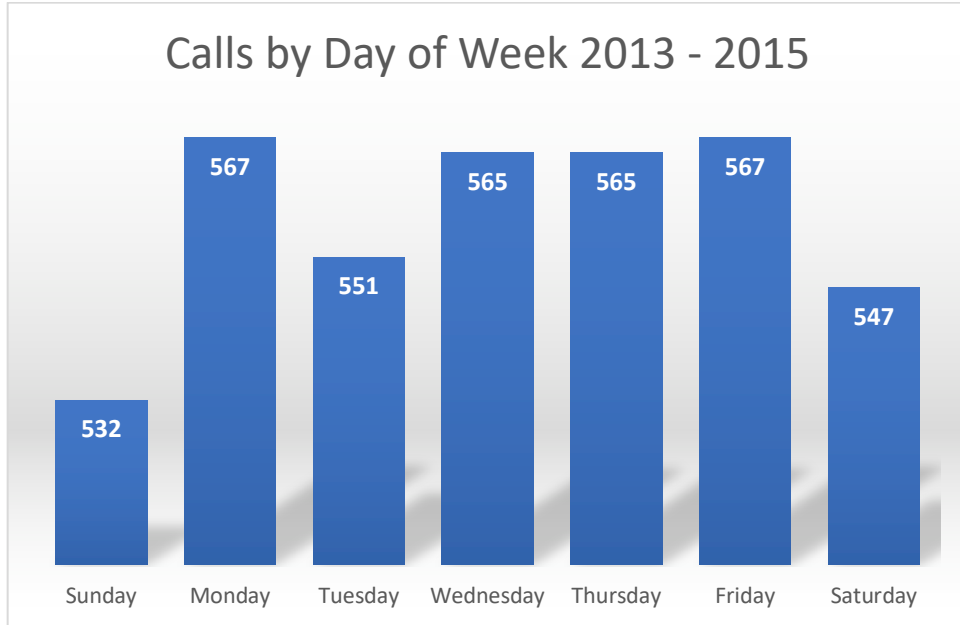
Station Performance 2014			
	Turnout	Travel	Total
Average	3:12	5:00	8:10
90 th Percentile	4:36	10:09	13:25

Station Performance 2015			
	Turnout	Travel	Total
Average	3:12	4:22	7:31
90 th Percentile	4:39	9:09	12:54

(19) Station 96, Livingston

This station provides service the City of Livingston. It handles 1,298 call for service a year. Monday and Friday are the busiest days of the week with the busiest time of day being between 3 pm and 6 pm.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	24	22	12	18	13	17	24	130	3.34%
0100	22	8	18	10	19	9	23	109	2.80%
0200	12	17	18	8	7	14	15	91	2.34%
0300	15	11	16	10	10	11	13	86	2.21%
0400	10	18	19	15	10	14	8	94	2.41%
0500	19	19	12	12	16	14	14	106	2.72%
0600	8	18	21	13	13	13	11	97	2.49%
0700	19	14	16	23	22	27	15	136	3.49%
0800	22	23	24	18	12	17	22	138	3.54%
0900	17	25	21	29	22	26	23	163	4.19%
1000	25	17	20	23	30	26	21	162	4.16%
1100	22	25	30	23	31	27	22	180	4.62%
1200	18	30	24	27	37	34	26	196	5.03%
1300	19	20	30	30	29	27	32	187	4.80%
1400	27	29	28	33	29	37	21	204	5.24%
1500	31	32	22	39	42	32	31	229	5.88%
1600	35	36	38	29	32	28	31	229	5.88%
1700	31	37	36	41	34	32	20	231	5.93%
1800	37	33	28	28	31	31	37	225	5.78%
1900	17	39	26	43	28	28	18	199	5.11%
2000	24	27	34	28	36	26	35	210	5.39%
2100	43	31	26	23	21	31	37	212	5.44%
2200	22	22	22	21	25	28	26	166	4.26%
2300	13	14	10	21	16	18	22	114	2.93%
Total	532	567	551	565	565	567	547	3,894	100%
Percent	13.66%	14.56%	14.15%	14.51%	14.51%	14.56%	14.05%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	160	166	189	18.13%
Fire Alarm Activations	84	121	109	29.76%
Emergency Medical	690	745	951	37.83%
Mutual Aid Calls	0	0	0	0.00%
Other Fire Calls	41	63	55	34.15%
Public Assist	36	34	52	44.44%
Structural Fires	79	57	51	-35.44%
Wildland/Vegetation	67	52	92	37.31%
Total	1,157	1,238	1,499	29.56%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:06	4:06	7:09
90 th Percentile	4:24	9:40	13:14

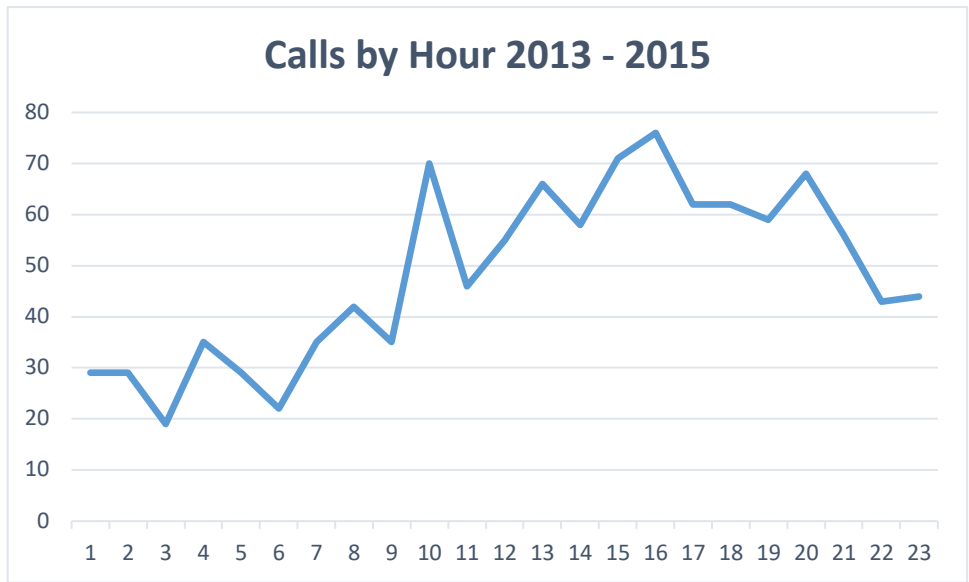
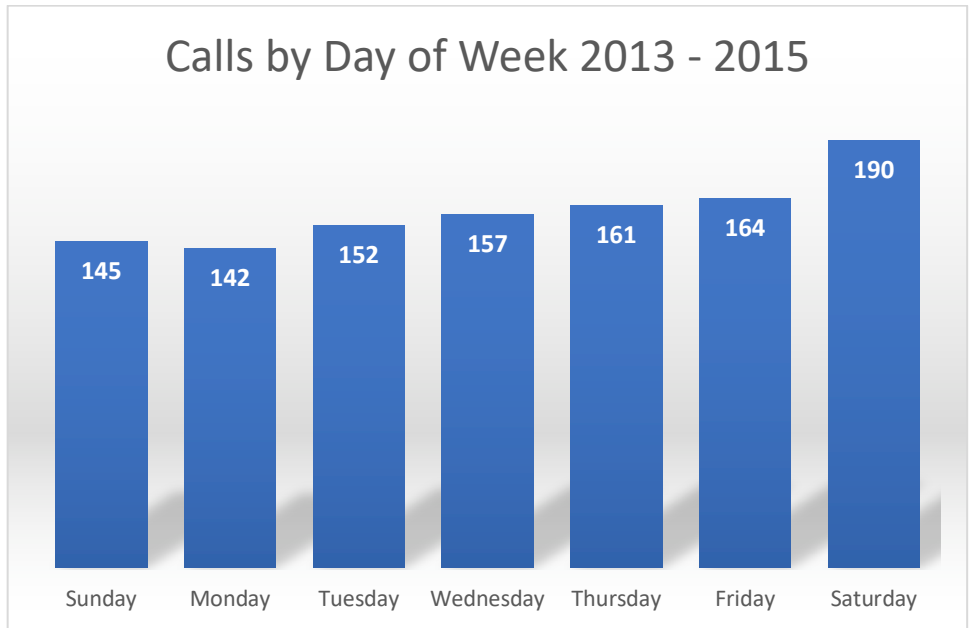
Station Performance 2014			
	Turnout	Travel	Total
Average	3:04	3:46	6:46
90 th Percentile	4:28	8:06	11:52

Station Performance 2015			
	Turnout	Travel	Total
Average	3:05	4:22	7:23
90 th Percentile	4:28	9:10	12:35

(20) Station 97, Stevenson

This station is located near the intersection of Highway 165 and 140 in the western section of the County. The busiest time of day is 10 am and again at 3 pm with the busiest day being Saturday. The station handles 381 calls a year.

Time of Day	Day of Week							Total	Percent
	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
0000	4	6	1	5	7	5	6	34	3.06%
0100	5	1	4	2	6	3	8	29	2.61%
0200	5	3	4	2	3	6	6	29	2.61%
0300	4	5	1	2	3	3	1	19	1.71%
0400	6	4	1	6	5	8	5	35	3.15%
0500	2	2	2	3	8	7	5	29	2.61%
0600		9	3	3	1	4	2	22	1.98%
0700	7	4	8	8		4	4	35	3.15%
0800	3	6	8	10	5	5	5	42	3.78%
0900	5	3	5	5	6	6	5	35	3.15%
1000	11	3	8	6	12	12	18	70	6.30%
1100	4	8	8	5	9	4	8	46	4.14%
1200	5	8	11	5	8	5	13	55	4.95%
1300	9	6	12	13	10	5	11	66	5.94%
1400	7	7	6	12	11	8	7	58	5.22%
1500	6	9	10	8	14	11	13	71	6.39%
1600	10	10	10	9	13	12	12	76	6.84%
1700	9	11	12	9	6	12	3	62	5.58%
1800	8	11	6	12	8	7	10	62	5.58%
1900	7	7	11	4	9	13	8	59	5.31%
2000	11	7	5	12	7	10	16	68	6.12%
2100	9	9	5	5	7	9	12	56	5.04%
2200	7	4	6	3	6	7	10	43	3.87%
2300	5	5	6	13	4	3	8	44	3.96%
Total	145	142	152	157	161	164	190	1,111	100%
Percent	13.05%	12.78%	13.68%	14.13%	14.49%	14.76%	17.10%	100%	



MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Incident Type	2013	2014	2015	% Change
Auto Accidents	84	93	109	29.76%
Fire Alarm Activations	41	43	56	36.59%
Emergency Medical	117	136	142	21.37%
Mutual Aid Calls	1	0	0	-100.00%
Other Fire Calls	16	30	21	31.25%
Public Assist	11	12	9	-18.18%
Structural Fires	37	31	28	-24.32%
Wildland/Vegetation	61	34	33	-45.90%
Total	368	379	398	8.15%

Station Performance 2013			
	Turnout	Travel	Total
Average	3:32	7:33	10:59
90 th Percentile	4:59	15:04	18:16

Station Performance 2014			
	Turnout	Travel	Total
Average	3:25	8:31	11:48
90 th Percentile	4:43	16:34	20:00

Station Performance 2015			
	Turnout	Travel	Total
Average	3:28	7:09	10:37
90 th Percentile	5:00	12:57	17:15

3. CURRENT DEPLOYMENT STRATEGIES AND PERFORMANCE

This chapter provides the background information the project team utilized to define, evaluate and analyze the operations of the MCFD. In order for a fire department to be effective and to successfully mitigate emergency situations, it must maintain an adequate, well-trained staff of emergency service personnel to utilize the equipment and apparatus. The effectiveness is reduced if too few personnel are at the scene and the risk of injury to those responding is thereby increased. The organization of this chapter is as follows:

- Service Level Definition within the Fire Service
- Critical Tasks Required at Emergency Scenes
- Area Demographics
- Response Time Goals and Objectives

1. SERVICE LEVEL DEFINITION WITHIN THE FIRE SERVICE

Since the mid-nineties there has been considerable discussion and dialogue about the level of service provided by the fire service. Community expectations, reduced funding, changes in service requests and availability of resources have all played a part in the community's level of service. At a minimum two critical points have emerged as being a constant in any analysis or discussion about the level of service and the intervention of emergency incidents.

The dynamics of fire growth is directly related to various configurations of fire station locations, built-in fire protection, and company staffing patterns. The fire suppression tasks required at a typical fire scene vary widely depending upon risk level.

In order to save lives and limit property damage, fire companies must arrive at the right time with adequate resources to do the job. One of the greatest challenges facing fire service managers is to match the arrival of resources with a specific point of fire growth.

The answer for controlling variations in fire dynamics lies in finding a common reference point - one that is common to all fires regardless of the risk level of the structure, the contents of the structure, or the time the fire has burned. This reference point is called flashover.

All fires go through the same stages of growth regardless of speed or length of burn time. The flashover stage is very significant, because it marks a critical change in conditions. It is desirable to have fire companies on scene with hose-lines deployed before flashover occurs.

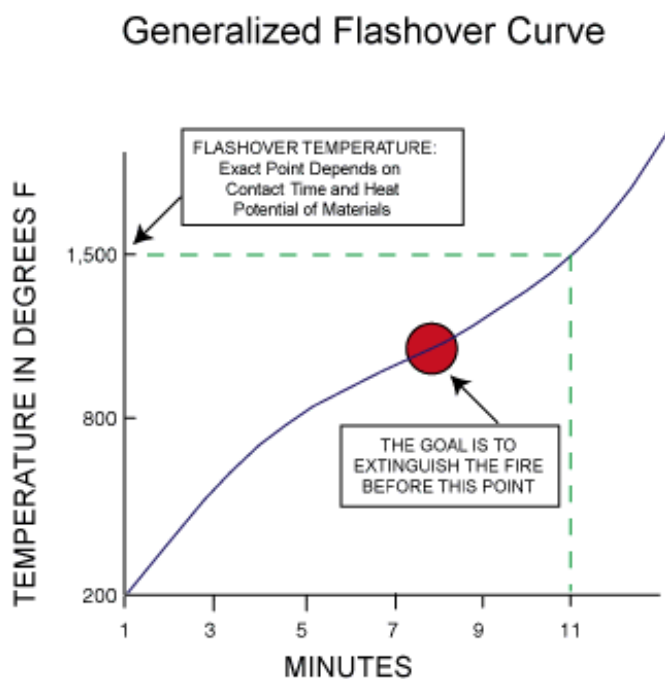
When flashover occurs, everything in the room instantaneously erupts into flame. This eruption generates a tremendous amount of heat, smoke, and pressure resulting in enough force to extend the fire beyond the room of origin through doors and windows or breaches in walls. The combustion process then speeds up because it has an even greater amount of heat to transfer to unburned objects through convection, radiation, and conduction.

Flashover is a critical stage of fire growth for two reasons. First, the chance of saving lives drops dramatically because no living thing in the room of origin will survive. Second, flashover creates a quantum jump in the rate of combustion, and a significantly greater amount of water and resources are needed to reduce the burning material to below its ignition temperature. Once a fire has reached flashover, it is too late to save

anyone in the room of origin, and a greater amount of resources (equipment and personnel) are required to handle the larger hose streams needed to extinguish the fire.

A post flashover fire will burn hotter and move significantly faster. This compounds search and rescue problems in the remainder of the structure and at the same time requires more firefighters for fire attack and extinguishment.

Flashover normally occurs from four to ten minutes after free burning begins. The time to flashover is a function of time and temperature. Fire growth occurs exponentially, doubling itself every second of free burning that is allowed. Consequently, given the progression of a structure fire to the point of flashover, two of the most important elements in limiting fire spread are the quick arrival of sufficient numbers of personnel and equipment to attack and extinguish the fire as close to the point of origin as possible.



The differences or critical factors between pre-flashover and post flashover

events are listed below:

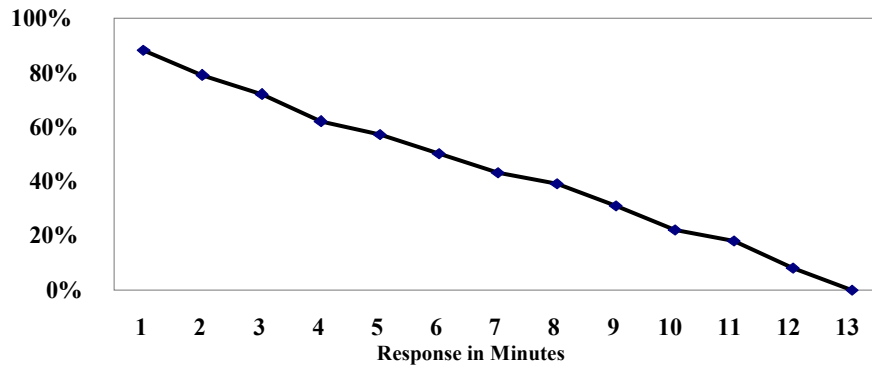
Critical Factors for Flashover

Pre-Flashover	Post-Flashover
Fire limited to room of origin	Fire rapidly spreads beyond the room of origin
Fire requires less and smaller attack lines (usually one hand line) to control	Fire requires more multiple and larger attack lines to control
Search and Rescue unhampered	Search and Rescue becomes greatly hampered
Requires less overall resources	Requires additional resources
Initial response can handle	Additional units needed (recall of off-duty personnel)

As with fire control, the emergency medical field has a critical point for the successful outcome of a response to a medical emergency. The MCFD does not provide emergency medical transport services to the County but they do respond to these incidents as a first responder.

Nationwide, a great deal of effort and research has been put into developing performance objectives for the delivery of EMS services. This effort is critical for agencies making decisions about deployment and location of emergency resources. The objectives promoted for EMS have their basis in research that has been conducted into the impact of the passage of time on the survivability for victims of cardiac arrest. The following graphic demonstrates the survivability of cardiac patients as related to time from onset:

% Survival Rate



The previous graph illustrates that the chances of survival of cardiac arrest diminish approximately 10% for each minute that passes before the initiation of CPR and/or defibrillation. These dynamics are the result of extensive studies of the survivability of patients suffering from cardiac arrest. While the demand for services in EMS is wide ranging, the survival rates for full arrests are often utilized as benchmarks for response time standards, as they are more readily evaluated because of the ease in defining patient outcomes (a patient either survives or does not).

This research results in the recommended objective of provision of basic life support (BLS) within four minutes of notification, and the provision of advanced life support (ALS) within eight minutes of notification. The goal is to provide BLS within six minutes of the onset of the incident (including detection, dispatch and travel time) and ALS within ten minutes. This is often used as the foundation for a two-tier system where fire resources function as first responders with additional (ALS) assistance provided by responding ambulance units and personnel.

Additional recent research is beginning to demonstrate the impact and efficacy of rapid deployment of automated external defibrillators (AED) to cardiac arrests. This

research – conducted in King County (WA), Houston (TX), and as part of the OPALS (Ontario Pre-Hospital ALS) study in Ontario, Canada – shows that the AED can be the largest single contributor to the successful outcome of a cardiac arrest – particularly when accompanied by early delivery of CPR. It is also important to note that these medical research efforts have been focused on a small fraction of the emergency responses handled by typical EMS systems – non-cardiac events make up the large majority of EMS and total system responses, and this research does not attempt to address the need for such rapid (and expensive) intervention on these events.

The science of fire and medical situations has led to more definitive roles and responsibilities for local government and the fire protection systems in the community. In the next sections the discussion will turn to the analysis of time, tasks, area demographics and other factors relating to the deployment of resources within the emergency response system.

2. CRITICAL TASKS REQUIRED AT EMERGENCY FIRE SCENES.

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

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

- Establish incident command outside of the hazard area. This will allow coordination and direction of the incoming emergency response personnel and apparatus. A minimum of one person should be dedicated to this task.

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

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

Critical Tasks for the Effective and Efficient Control of Structural Fires

Critical Task	Maximum Risk	High Risk	Moderate Risk	Low Risk
Attack Line	4	4	4	2
Search and Rescue	4	2	2	0
Ventilation	4	2	2	0
Backup Line	2	2	2	2
Rapid Intervention	2	2	0	0
Pump Operator	1	1	1	1
Water Supply	1*	1*	1*	1*
Support (Utilities)	1*	1*	1*	1*
Command	1	1	1	1
Safety Officer	1	1	1	1
Salvage/Overhaul	2	0	0**	0
Command Aid	1	1	0	0
Operations Chief	1	1	0	0
Logistics	1	0	0	0
Planning	1	0	0	0
Staging Officer	1	1	0	0
Rehabilitation	1	1	0	0
Division Supervisors	2	1	0	0
High-rise Evacuation	10	0	0	0
Stairwell Support	10	0	0	0
Total Personnel	50-51	21-22	14-15	8-9

*Tasks can be performed by the same individual **Task can be performed by the attack crew

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

Critical Tasks for Effective Patient Care

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

It is incumbent upon the fire department to have a response plan in place to ensure a sufficient number of personnel are on scene to accomplish the stated critical tasks in a timely fashion. Structure fires are very labor-intensive incidents with any number of factors, such as weather, making the task that much more difficult. Within Merced County there are two prevalent fire risks, Wildland/vegetation fires and moderate risk structure fires. A moderate risk structure fire is typically defined as a single-family home. The County has its share of higher risk structures such as those located at UC Merced and in some of the downtown areas of the communities protected by the Fire Department. Adding to the risk and potentially increasing the personnel needed for response is the lack of a water system in many areas of the County causing the Fire Department to bring their water supply with them in water tender apparatus.

Currently minimum staffing levels for MCFD is 25 personnel assigned to 20 stations throughout the County. This means 15 of the 20 stations or 75% of the facilities have one personnel assigned to respond to emergency incidents. Based on the moderate risk analysis, it could take 12 to 14 stations responding to a residential house fire to meet the effective response force recommendations. The current response guidelines for MCFD call for three engine companies, a water tender and a command

officer to respond as a first alarm assignment. This response brings 5 to 8 personnel depending on which stations are responding to the incident. MCFD utilizes their paid-call firefighters (PCF) throughout several communities in the County to provide additional personnel to meet staffing needs. The dispatch data is inconclusive and unable to support the response time for these PCF companies. There are numerous calls in the data that indicates a PCF company was dispatched but there is no corresponding enroute or on scene time recorded so it is unclear from the data as to how reliable the PCF fire departments are in providing support in a timely manner to the career Merced County fire personnel when needed. The dispatch center uses a queuing mechanism to identify the various units that are responding to the incident. Through this process the time is not recorded properly if at all to account for the PCF companies.

Recommendation: Work with the Dispatch Center to improve the method used to capture the enroute and arrival times of PCF fire companies on emergency responses to the County Fire Department.

Adding to the issues faced by Merced County is the OSHA requirement of two in – two out in 1910.134(g)(4). This regulation states that if entry into an Immediately Dangerous to Life and Health (IDLH) atmosphere is necessary, two firefighters must enter together and remain in contact with each other. In addition, there must be two firefighters located outside the IDLH atmosphere for potential rescue if needed. This is a mandatory requirement. The current staffing of the MCFD is such that it could take as many as four apparatus or stations to respond to an incident to be compliant with this regulation. This type of response results in significantly reduced fire protection for at least three other communities as they provide service to the fourth community.

3. AREA DEMOGRAPHICS

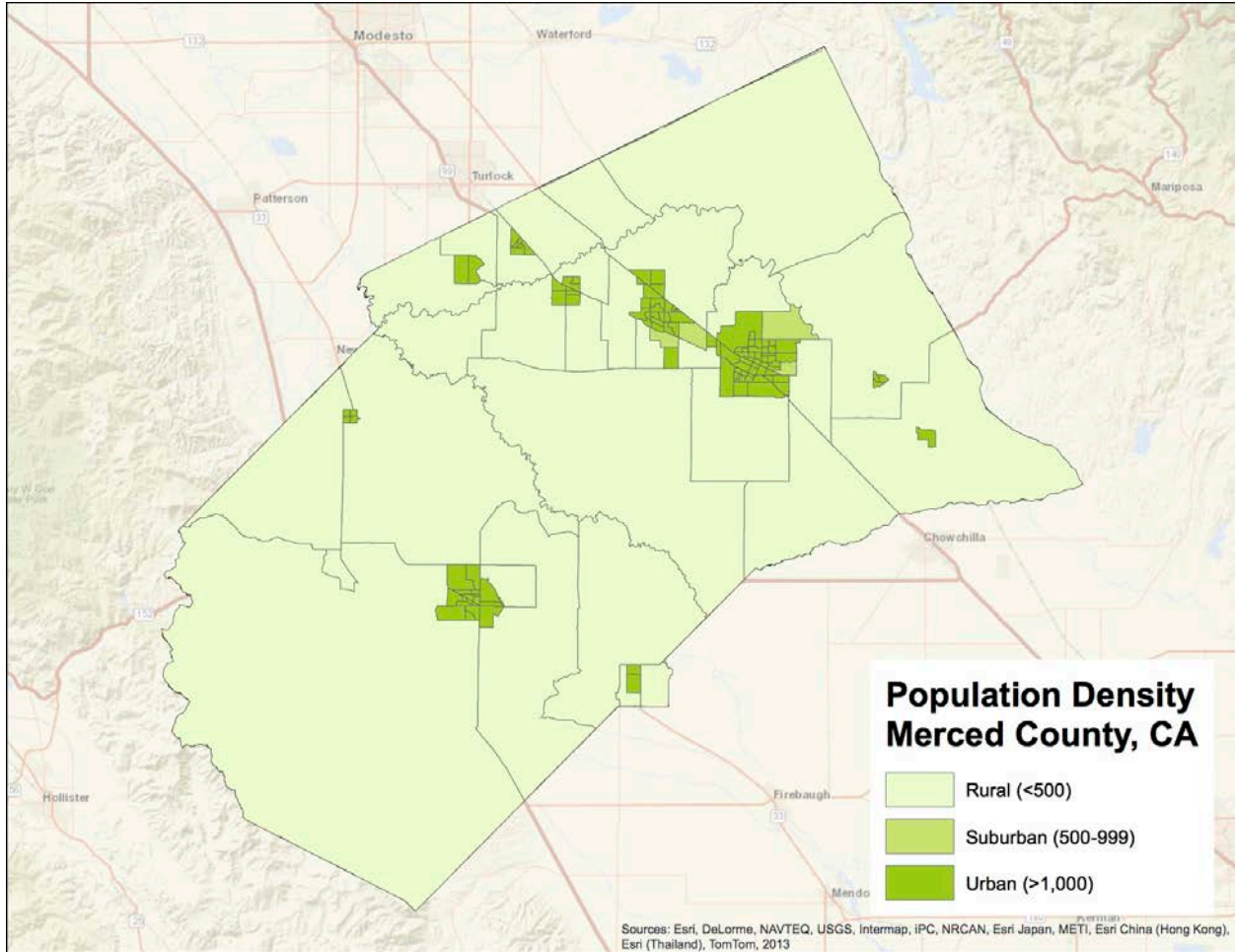
Area demographics play a role in the delivery of fire protection services along with the risk factors involved. Population density is one of the more critical factors as the more densely an area is populated, there is typically a corresponding increase in the use of emergency services.

The table below outlines how each of these factors are defined. These definitions, based on the National Fire Protection Association (NFPA), are then used to further the discussion about resource placement and response time benchmarks.

Demographic Risk Categories

Risk Category	Definition
Urban	An area with a population density greater than 1,000 people per square mile
Suburban Area	An area with a population density of 500 - 1,000 people per square mile
Rural Area	An area with a population density of less than 500 people per square mile

The map below further illustrates the population densities within Merced County. The area along Highway 99 and the Los Banos areas have the highest densities in the County.



It is possible for a jurisdiction to have multiple risk categories within its boundaries. In fact, many cities have multiple risk categories and Merced County is no exception with areas that are rural and areas that fit the urban and suburban category.

Data from the US Census Bureau for urbanized areas and census-designated places (CDP) and the general fire station locations were used to develop the chart below.

Population Density and Category by Station Coverage Area

Station	Population	Square Miles	Density	Housing Units	Category
61 McSwain	No CDP or other information available				
62 Castle	Primary focus on Airport				
63 Winton	10,613	3.04	3,491.1	3,056	Urban
64 Cressey	394	1.75	225.1	123	Rural
65 Snelling	231	0.54	427.8	112	Rural
71 Los Banos	37,457	10.12	3,701.3	11,375	Rural
72 Santa Nella	1,380	4.56	302.6	493	Rural
74 Gustine	5,756	1.55	3,713.5	2,087	Urban
75 Dos Palos Wye	323	1.57	205.7	123	Rural
76 Dos Palos	5,125	1.35	3,796.3	1,700	Urban
81 Merced	Located in the City of Merced				
83 El Nido	330	3.29	100.3	105	Rural
84 Le Grand	1,659	1.14	1,455.3	503	Urban
85 McKee	Located in the City of Merced				
86 Planada	4,584	1.57	2,919.7	1,207	Urban
91 Delhi	10,755	3.51	3,064.1	2,854	Urban
92 Ballico	406	3.02	134.4	132	Rural
95 Hilmar	5,197	3.9	1,332.6	1,841	Urban
96 Livingston	13,902	3.72	3,737.1	3,320	Urban
97 Stevenson	313	1.13	277.0	101	Rural

The population data is limited to census tracts and does not necessarily follow a station or district response boundary. Additional factors for consideration in area demographics include building inventory, age of the buildings and the roadway network.

For purposes of planning, Stations 61 McSwain, 62 Castle, 81 Merced and 85 McKee are considered in the suburban category and Station 71 Los Banos in the rural category. Three of the five stations are located in the City limits but do not respond to any calls for service inside those cities. While their service areas are outside the City limits, there is a considerable presence of housing that surrounds the city borders that is the responsibility of MCFD. The Los Banos station provides service to the area around

the City. Based on a survey of that area it is predominately farmland with few housing units and fits the rural category.

4. RESPONSE TIME GOALS AND OBJECTIVES

There is considerable debate about the response time continuum and the components that make up this aspect of the response to emergencies. The Center for Public Safety Excellence (CPSE) and the National Fire Protection Association (NFPA) have defined the components for response time. Call processing, turnout time and travel time make up the three primary components of the continuum.

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

With these definitions, the use of average response times to determine fire and EMS performance, has evolved to fractile response time and breaking the response down to each component. This allows the analysis to identify potential improvements in the system. This is however largely dependent on the accurate reporting by dispatch and field personnel of when each time component is achieved. The 8th Edition Fire and Emergency Service Self-Assessment Manual is the last edition the benchmarks and baselines are specifically identified as the CPSE has moved away from defining benchmark and baseline standards instead leaving it to the community and NFPA to determine the standards. NFPA 1221 Standard for the Installation, Maintenance and

Use of Emergency Services Communications Systems establishes the call processing benchmarks as outlined in the chart below.

NFPA 1221 Time Requirements

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

Call processing performance for 2013 – 2015 for MCFD is shown in the following table.

System Performance

Call Processing	2013	2014	2015
Average	0:22	0:20	0:18
90 th Percentile	0:00	0:00	0:00

In reviewing the data, it was noted the call received time and the dispatch time are identical. This is an indication the call received time is not being properly recorded as it is physically impossible for this to occur at the same time. In 2015 95.2% of the calls had identical call received time and dispatch time. In order to properly analyze the response time continuum, the call processing data must be accurate. This will require the MCFD to work with the dispatch center to begin accurately capturing and recording each element of the response time continuum.

Recommendation: Review the dispatch center procedures to ensure the call received time and the dispatch time are being properly recorded.

For turnout and travel time there are two national organizations that provide standards and benchmarks for these components. As noted previously, the CPSE has moved away from establishing benchmarks leaving those decisions to other standard making organizations. CPSE has identified the baseline as those times and data being the most current three years of data.

The NFPA has two standards that establish benchmarks for the emergency response. NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments and 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.

The Insurance Services Office (ISO) has a single standard established through the Public Protection Classification (PPC). In this standard, they use coverage of the area by engine companies and ladder companies to determine travel time.

The exhibit on the next page outlines the benchmarks established by each of these organizations and their respective standards. Also included is the CPSE benchmark from the 8th edition Fire and Emergency Service Self-Assessment Manual (FESSAM).

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Component	NFPA 1710		NFPA 1720		CPSE**		ISO PPC
	Benchmark	Performance	Benchmark	Performance	Benchmark	Performance	Benchmark
Turnout Time							
EMS Call	0:60	90%	0:60*	90%	0:60	90%	None
Fire Calls	1:20	90%	1:30*	90%	1:20	90%	None
Travel Time for initial company	4:00	90%					1.5 miles for Engine Co. 2.5 miles for Ladder Co.
Urban Area			No Standard		4:00	90%	
Suburban Area			No Standard		5:00	90%	
Rural Area			No Standard		10:00	90%	
Remote Area			No Standard				
Travel Time for Full First Alarm	8:00	90%					No Standard
Urban Area			8:00	90%	8:00	90%	
Suburban Area			9:00	90%	8:00	90%	
Rural Area			13:00	80%	14:00	90%	
Remote Area			Dependent on Travel Distance	90%			
*NFPA 1720 Turnout Time is for staffed stations.							
**CPSE 8th Edition Criteria							

As noted turnout time goals are defined by the NFPA as being 120 seconds for fire and special operations responses and 60 seconds for EMS responses. Both goals are to be completed for 90% of the responses. CPSE has defined the baseline as that being the most current performance of the department for the past three years.

MCFD turnout time performance is shown below. The performance time shown is the 90th percentile time.

System Performance

Turnout Time	Benchmark	2015		2014		2013	
		Gap	Performance	Gap	Performance	Gap	Performance
EMS Calls	60 sec	-3:27	4:27	-3:26	4:26	3:30	4:30
	Avg.:		3:07		3:07		3:07
Fire Related Calls	1:20	-3:56	5:16	-3:54	5:14	-3:58	5:18
	Avg.:		3:32		3:31		3:34

The data suggests the baseline, 90th percentile, for turnout time is four minutes thirty seconds for medical calls and five minutes fifteen seconds for fire related calls. With the issues noted previously regarding the call processing time, it is possible the call processing time is embedded within the turnout time, which illustrates the importance of ensuring each response time element is captured correctly.

Recommendation: Establish turnout time benchmark performance objectives of 60 seconds for EMS responses and 80 seconds for fire and special operations responses.

Recommendation: Once the performance objective is established develop a mechanism to monitor and report the performance against the established benchmarks at least annually.

Travel time is the third performance component for the fire department to continually analyze to ensure they are providing effective and efficient service to the community. NFPA 1710 has travel time standards of 4 minutes for the first arriving unit. NFPA 1720 does not identify a travel time for the first arriving unit but does for the

effective response force at 8 minutes for an urban area. ISO uses a slightly different methodology with the 1.5 and 2.5 mile radius in the built upon areas which somewhat considers the population density. The calculation used for the 1.5 mile radius translates to 4 minutes for the first arriving unit.

CPSE has recently removed their travel time benchmark criteria citing that they are not a standards setting organization. Instead they will rely on the NFPA, ISO and others to establish the benchmarks. However, in the past editions they have identified benchmarks for travel time that has also been a part of the national discussion and adopted by hundreds of jurisdictions across the country. While these benchmarks are no longer a part of the CPSE documentation, it is still a viable and useable set of benchmarks for the fire service. The organization has defined baseline performance as that which a community has actually delivers for most current three-year period.

Based on the US Census Bureau data Merced County has three risk categories, urban, suburban and rural. Previously each station area was categorized with their risk category based on the population for the census-designated areas. Stations 61, 62, 81 and 85 did not have any data for their respective areas. Due to their proximity of urban areas, being physically located in a City, and their service areas being around the City for purposes of planning they are considered suburban in nature. The table below outlines the travel times for each risk category and using the travel times from previous CPSE documents.

System Performance

Travel Time	Benchmark	2015		2014		2013	
		Gap	Performance	Gap	Performance	Gap	Performance
Urban Area	4:00	-6:25	10:25	-5:51	9:51	-6:50	10:50
Suburban Area	5:00	-8:51	13:51	-8:49	13:49	-7:59	12:59
Rural Area	10:00	-6:26	16:26	-7:14	17:14	-6:23	16:23

The data suggests the travel time has remained consistent for the past three years in all risk groups, but is longer than best practices for each of the population densities noted.

Recommendation: Establish travel time benchmark performance objectives for the first arriving unit of 4 minutes for urban areas, 5 minutes for suburban areas and 10 minutes for rural areas.

Recommendation: Once the performance objectives are established develop a mechanism to monitor and report the performance against the established benchmarks at least annually.

4. FIRE STATION LOCATIONS AND APPARATUS

This chapter of the report will focus on the analysis the current and projected fire station locations and apparatus used by the fire protection system in Merced County.

1. POTENTIAL GROWTH IN THE COUNTY

Any discussions about the placement of fire stations must include a review and understanding of potential growth. The project team interviewed County planners and cities within the County to get a perspective of the anticipated growth.

In many incorporated areas the plans are to grow through in-fill areas already within the city limits that have yet to be developed. The City of Livingston estimates it will take at least the next five years to build out the current inventory of available property. Given the amount of agricultural areas surrounding the City, annexation of these areas will be very limited over the next 10 to 15 years. Concerns have been expressed by the agricultural industry about tapping into the water supplies limiting the availability of water for agricultural use thereby limiting the annexation opportunities.

The City of Merced expressed similar concerns. They have a considerable inventory of developable land they are estimating will take 5 to 10 years to develop. As to annexation of new areas they pointed to the east and west boundaries that have not changed since 1999. By their estimation annexation to the north including UC Merced would take close to 30 years. However, the City has a plan known as the Merced 2030 Vision and the Bellevue Corridor Community Plan both of which identify plans for the City to expand north towards UC Merced. This design is for a mixed use of shops, businesses, schools and residential areas inside a 2.4 square mile area. The plans do

not necessarily specify a timeline but rather how they would perceive the development occurring within their sphere of influence.

The UC Merced campus has announced its 2020 plan. This is an aggressive plan that will significantly increase the physical size of the facility. By design the plan is to accommodate upwards of 10,000 students many of whom will live on campus. According to campus officials, they do have a concern about the fire protection system especially as it relates to this expansion. They believe the City of Merced will be annexing up to Bellevue Road area in the next 6 to 8 months. However, they also expressed concerns about the Board of Regents approving an annexation into the City. Campus officials did express their desire to have a joint agreement between MCFD and the City of Merced to provide services.

The County identified a couple of areas for annexation. The area known as the Ferrari Ranch will probably annex into the City of Atwater within the next 2 to 5 years. In addition, Los Banos is expecting to annex on the north side of the City, but not for another 8 to 10 years. There are County pocket areas in the middle part of the City that could potentially be annexed sooner.

Los Banos officials indicated there are no plans for annexation during the next five years. Beyond that, any annexation occurring would be to the south and east. Future development would be predominately residential with light commercial and industrial as a possibility.

Water treatment is the primary issue facing the City of Dos Palos as the facility is at capacity for the current City boundaries. Funding to increase the facility is the primary issue for the City and has been for a considerable amount of time. Without this

particular issue, the City would expand to the south with predominately residential housing. They indicated it could be five to ten years before the water treatment facility will be expanded.

Based on the conversations with various officials, it does not appear there are any major annexations planned for the next 5 to 10 years other than Ferrari Ranch. The other major annexation discussion involves UC Merced. Based on the comments from the City of Merced, it does not appear to be on their agenda at least for the next 10 to 15 years to annex the UC Merced property.

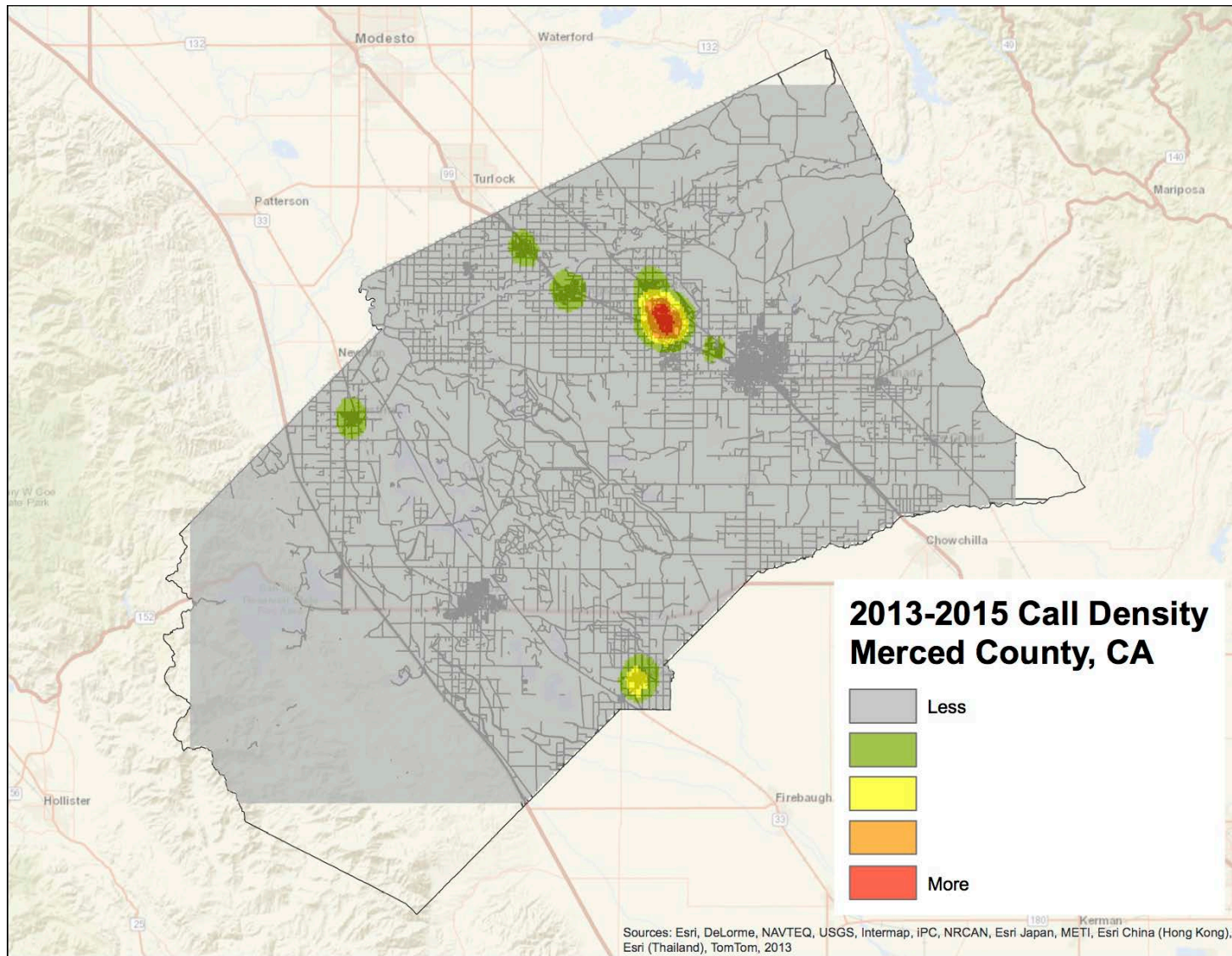
Projected population growth in the County is 2% annually along with an employment annual growth rate of approximately 1.1%. These indicators support the projected growth of the cities within Merced County as it relates to their annexation plans. While planning is important in any endeavor it is also difficult to plan beyond the 8 to 10-year mark.

2. FIRE STATION LOCATIONS

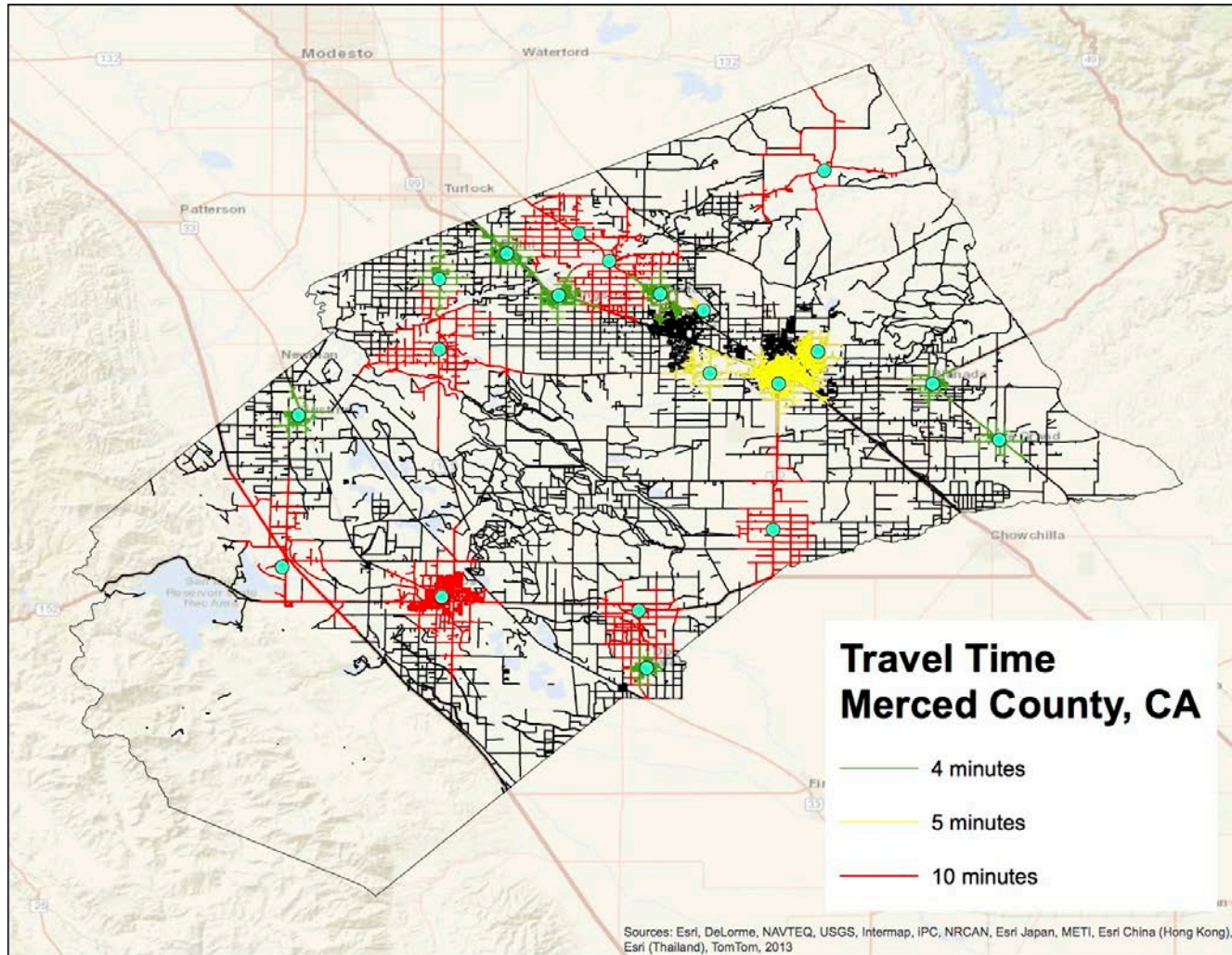
Call volume, potential future growth and the improvement to the response time continuum are all issues that need to be considered for fire station locations. Another consideration is the useful life of a station is at least 30 years if not longer depending on the area. This along with the considerable financial investment in the buildings and structures, moving and or building new stations must be a well thought out program.

The call volume is heaviest along the Highway 99 corridor. This is expected given the population densities noted previously. The map below provides a visual illustration of these calls. Using the calls for service for the entire county the gray areas

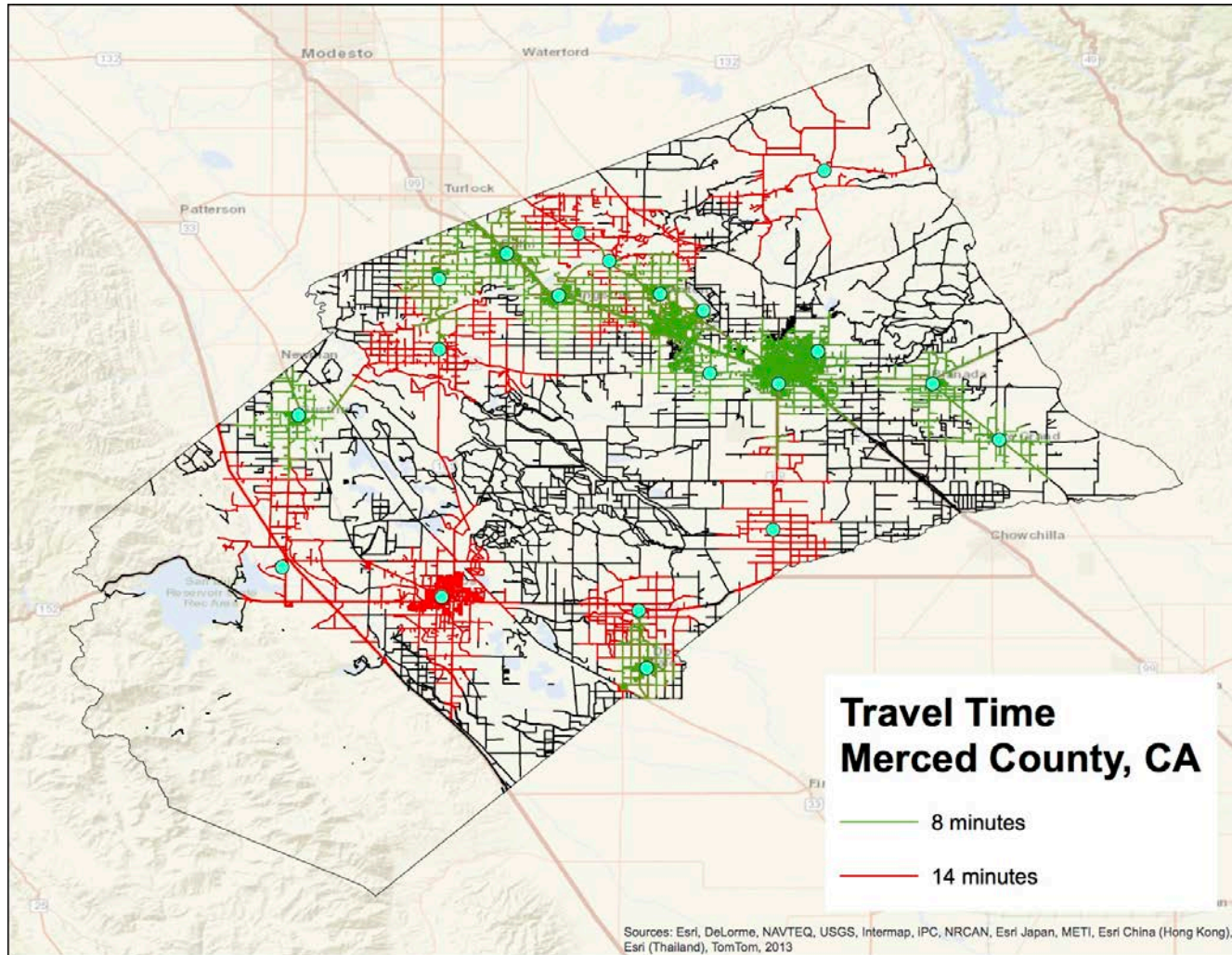
indicate less calls per square mile while the red shaded areas indicate a higher per square mile volume of calls.



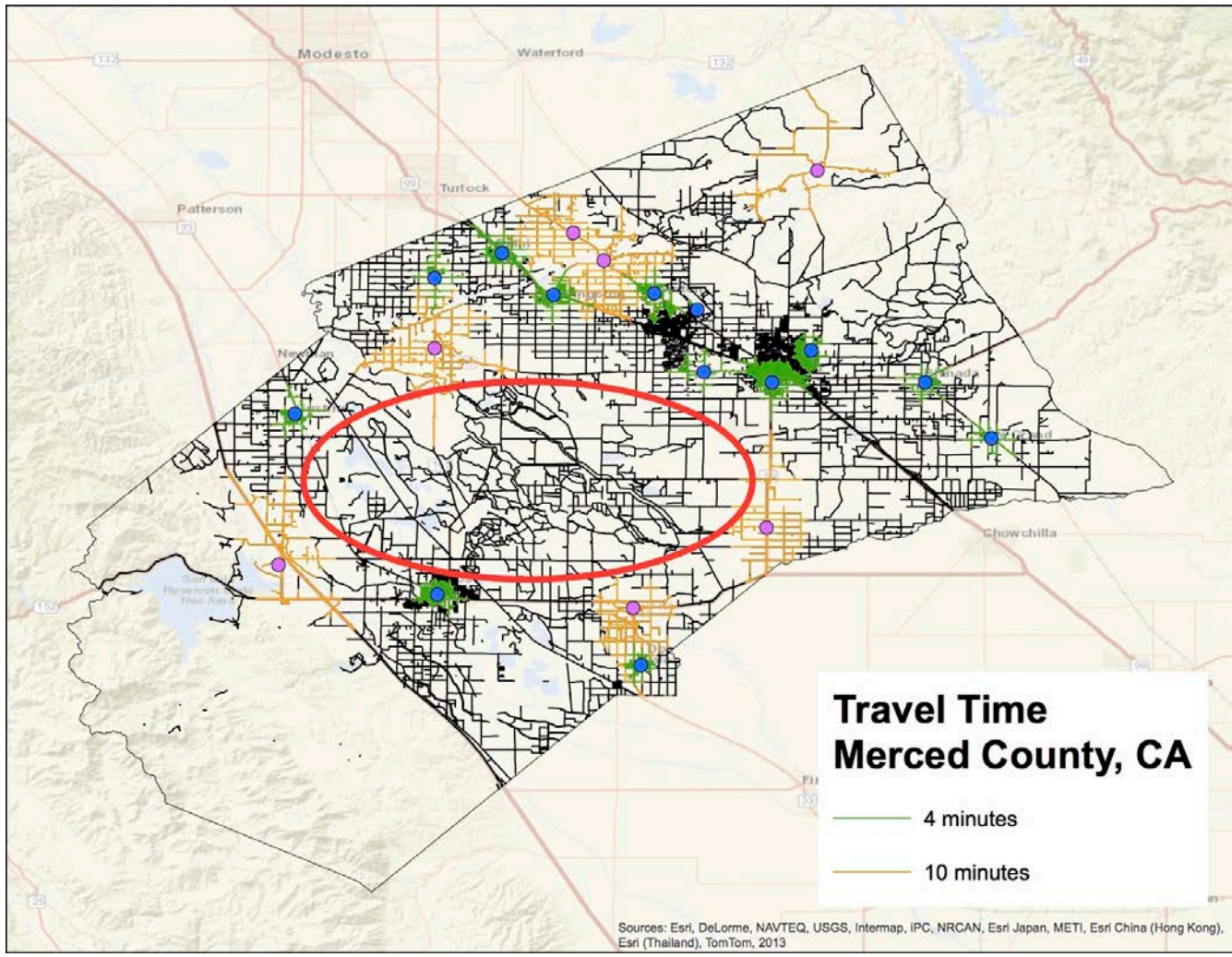
As previously discussed, the three primary risk categories in the County are urban, suburban and rural. The travel time for each of those categories was set at 4 minutes for urban, 5 minutes for suburban and 10 minutes for rural. The map below provides a visual illustration of those travel times.



The second part of the travel time continuum is the first alarm assignment. As previously discussed the full first alarm assignment also has a travel time component. In the urban and suburban setting it is 8 minutes while the rural setting is 14 minutes. The map below visually illustrates those parameters.



During the analysis of the travel time for each of the stations and the fire protection system it was noted there is a large area virtually untouched by any of the stations. On the map below this area is outlined with the red circle. As part of the analysis these areas need to be further examined and identified.



This area is largely farmland and part of the watershed area. Having a gap in this area would be expected.

(1) Station 85 McKee

Station 85 McKee is located in the City of Merced and provides first-due coverage to the area north of the City including UC Merced and pockets of the County surrounded by the City. The potential for the City of Merced to annex this northern area in the next ten years is high. The UC Merced campus expansion is expected to be completed in the next 5 years. This includes a significant expansion of the physical size of the campus that includes dormitory facilities with 1,700 beds and bringing the overall student population to 10,000 students. Currently fire protection services are being provided from Station 85 McKee located in the City of Merced.

This type of expansion will likely put a strain on resources including roadways, public works, utilities and public safety. There are several options related to the delivery of fire rescue services available to the County to handle this expansion.

- The first option is to move the existing Station 85 by constructing a new station along the Bellevue Corridor. This option places the fire station in an area outside the City and provides protection to UC Merced and the areas in the County north of the City of Merced. With this option the County would finance the construction of the station and continue to fund the operational costs. Based on research for the Merced County area, the cost for new construction estimates are in the range of \$200 to \$250 per square foot. Using 15,000 square feet as an estimated size and the high end of the per square foot estimate the cost of constructing a new facility is approximately \$3,750,000. However, given the potential for the City of Merced to annex this area in the next ten years this station could potentially be inside the City Limits.
- A second option is to partner with UC Merced to fund the construction of a new fire station in the area. While the station provides protection to the campus and the northern area it is there predominately due to the campus and to provide adequate fire protection to UC Merced. In this scenario the County would continue to fund the operations of the station, but have UC Merced fund the capital costs associated with station construction.

- The third option is for the County to contract with the City of Merced to provide fire protection services for this area and the smaller areas surrounded by the City. This would allow the County to close Station 85.

Over the last three years Station 85 McKee has averaged 650 calls for service in this northern area. Based on the budget FY 2016/17 budget for the City of Merced their cost per call is approximately \$1,046. With approximately 650 calls for service in the northern area and the City cost of \$1,046 per call a potential contract cost of \$679,900 would be a reasonable assumption.

The table below outlines some of the advantages and disadvantages of each option.

Advantages and Disadvantages		
Options	Advantages	Disadvantages
Replace Station 85 with a New Facility	<ul style="list-style-type: none"> • Allows the fire department to provide appropriate fire protection services. 	<ul style="list-style-type: none"> • Cost of New Facility that could be inside the City Limits in the next 10 - 15 years
UC Merced Funding the New Facility	<ul style="list-style-type: none"> • No cost to the County for a New facility. • Operational costs would not change. • If the City annexes the area, the County moves out and allows the City to move in as the station was paid for by State Funds. 	<ul style="list-style-type: none"> • Should the City annex the campus and take over the station, county fire protection to the east of the campus could be compromised.
Contract with the City of Merced	<ul style="list-style-type: none"> • Transfers fire protection responsibility to the City. 	<ul style="list-style-type: none"> • Sets the stage for the annexation and proves the point the County cannot adequately provide fire protection in the area. Although the County provides Haz Mat and Type 1 rescue services to the City of Merced. • The City may not be a willing participant in the contract option.

The best option for the County would be for UC Merced to fund the construction of the station. The overriding need for a station to be built in the area is due to the location of the campus and the planned and ongoing expansion that will bring close to 10,000 students to the area.

Recommendation: Work with UC Merced to fund the construction of a new fire station at a cost of approximately \$3.75 million in the area of Bellevue and Lake Roads to enable the fire protection services to provide appropriate responses to call for service. There is no additional cost associated with this recommendation as the capital cost would be absorbed by UC Merced and operational cost would remain the same.

(2) Stations 81 and 83

Station 83, El Nido, is currently located along Highway 59 providing service to an area south of the City Merced and the northeast of Dos Palos. This station handles an average of 230 calls per year with a travel time of 18 to 22 minutes in the 90th percentile. Further, the station does not physically have enough space to house more than one firefighter. In fact, the kitchen, bunk room and office is a single room. This station will require a major renovation or a complete rebuild to handle any increase in personnel.

Station 81 is currently located in the City of Merced on Martin Luther King Way and provides service to areas outside the City. The service areas are to the south and east of the current location. The response time for this station is in the range of 14 to 17 minutes in the 90th percentile.

The project team recommends the two stations be consolidated into a new location near the intersection of Highway 59 and Sandy Mush Road. This will provide service coverage to the south and east of Merced as well as the existing area handled

by Station 83. As well, it still allows for the Station to respond as a second or third company into Dos Palos.

The analysis illustrated the projected travel time for a combined Station 81 and 83 along Highway 59 south of the City of Merced would meet the 10-minute travel time requirement for a rural area.

The personnel from these two stations would collapse into a new facility and would not incur any additional operational cost. There would be a capital expenditure for a new facility. Based on research for the Merced County area, new construction estimates are in the range of \$200 to \$250 per square foot. Using 15,000 square feet as an estimated size and the high end of the per square foot estimate the cost of constructing a new facility is approximately \$3,750,000.

Recommendation: Close Station 83 El Nido. Use the personnel from this station to fill the second position at the relocated Station 81. The cost to the County will be a capital investment of \$3,750,000 for a 15,000 square foot facility. Operational costs will remain the same.

(3) Stations 64 and 92

Station 92, Ballico, is currently located along the northern end of Santa Fe Drive and handles an average of 215 calls a year. The travel time for this station is between 15 and 17 minutes in the 90th percentile. The station is currently staffed with one firefighter and would require a significant renovation to house two personnel.

Station 64 Cressey is currently located along Santa Fe Drive about half way between Ballico and Winton. This station handles on average 355 calls for service per year with a travel time between 10 and 12 minutes in the 90th percentile. This station is also staffed with one firefighter and will require renovation to handle two personnel.

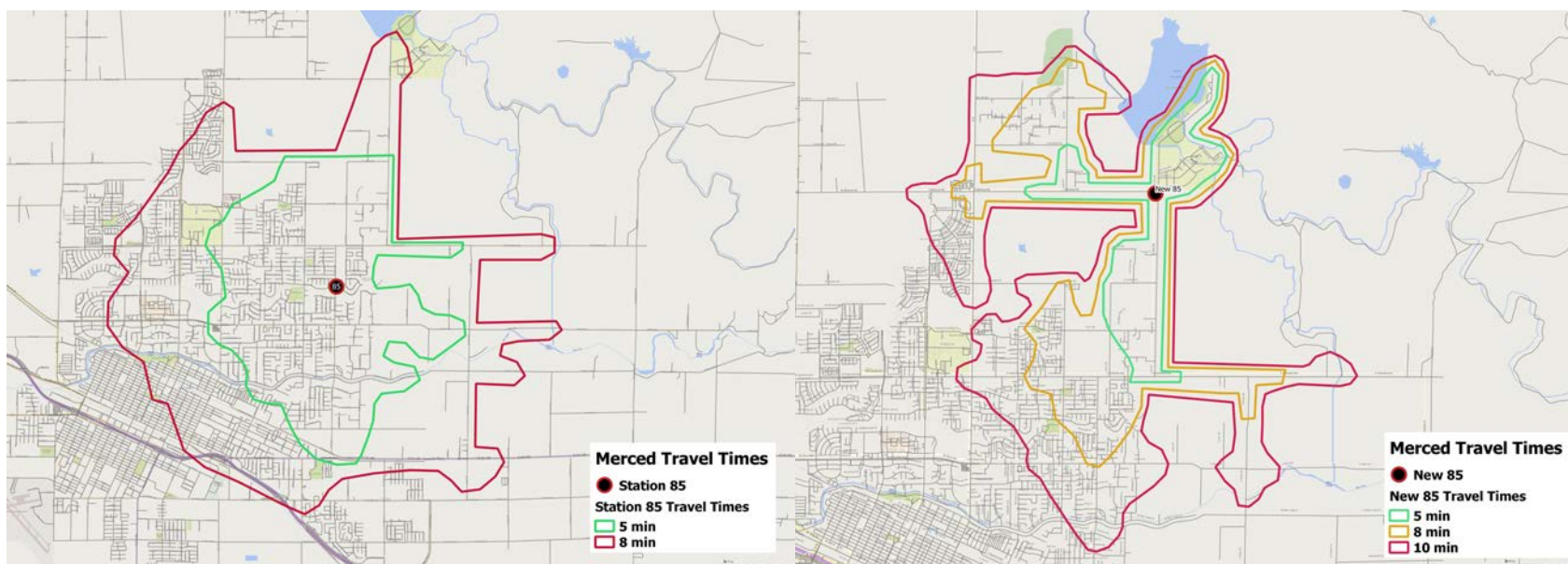
The project team recommends that these two stations be combined into a single station to be located near the intersection of Santa Fe Drive and El Capitan Way. These two stations are within 3 to 4 miles of each other and combined they average 550 calls for service per year. Their service areas are rural in nature and their response times are also similar. This new location essentially splits the difference between the two current locations so the response time is not significantly impacted. As far as the entire fire protection system is concerned, this location facilitates an improved response to Delhi, Livingston and Winton as the road network is more accessible. It also provides for a two-person station without increased operational costs.

The analysis indicated the travel time for the realignment of Station 64 Cressey and Station 92 Ballico to a new location near Santa Fe Drive and El Capitan Way would provide travel times of 10 minutes which is the standard for the rural area served by this station.

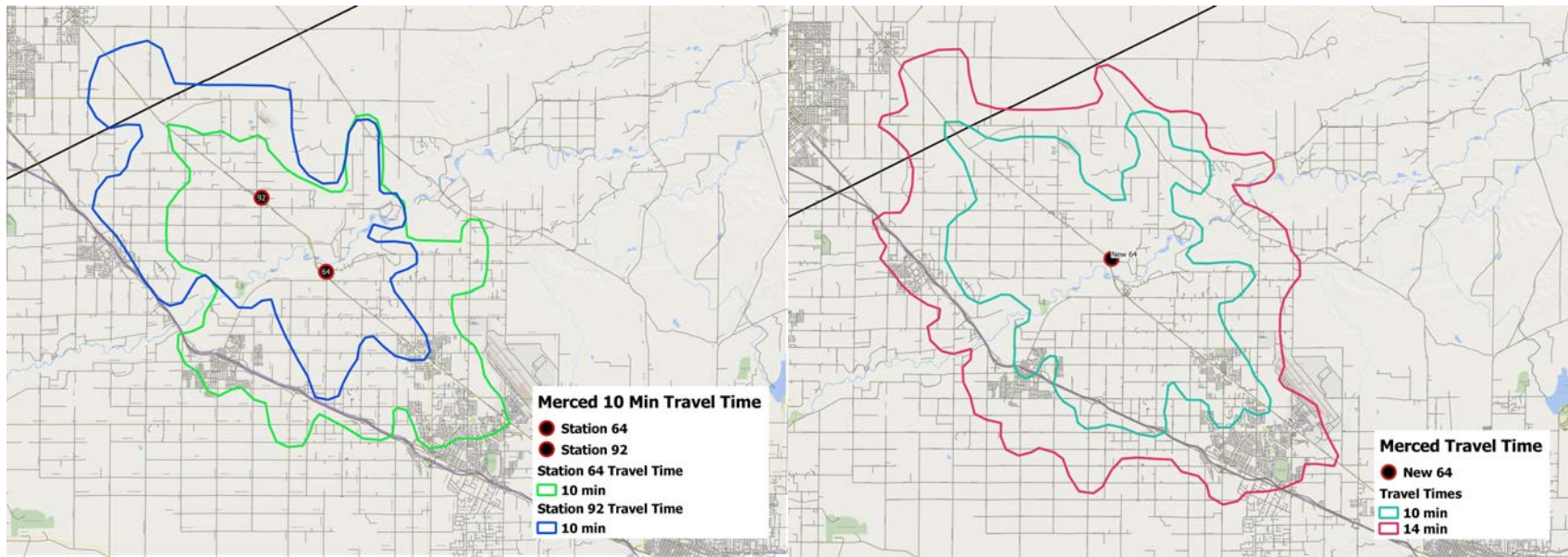
Recommendation: Close Station 64 Cressey and Station 92 Ballico combining them into a single station located in the area of Santa Fe Drive and El Capitan Way. There are no increased operational cost as current personnel would provide the two person staffing. The capital cost of \$3,750,000 will be needed for the construction of a new 15,000 square foot facility.

(4) Response Time Impacts Associated with Recommended Changes

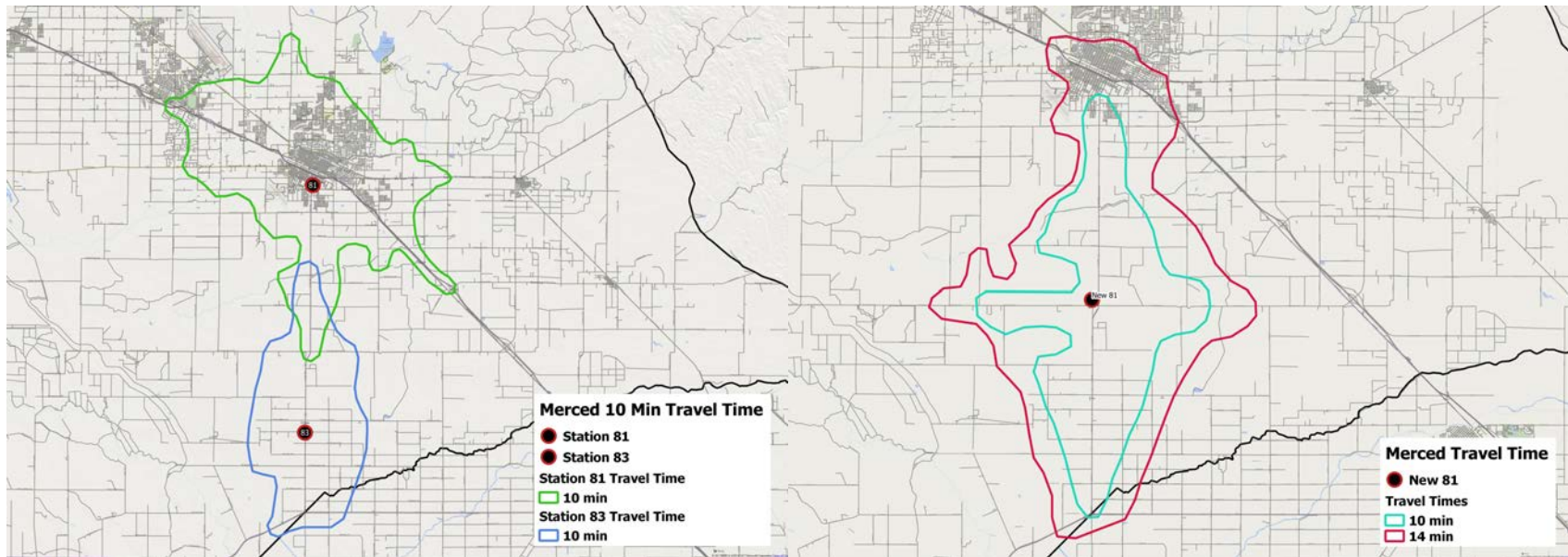
The maps below provide a visual illustration of the effects these changes will have on the response time continuum for the entire fire protection system. The new Station 81 location also changes the category from suburban to rural and thereby changes the response time measurements.



This map shows a new location for Station 85 McKee further to the north near UC Merced. The response time area shifts further north and provides better response to the northern section. As well the response into those areas surrounded by the City remain within the response time margin. The new location places the station in a position to handle more of the rural areas surrounding the city. The 10 minute travel time is illustrated to indicate the areas the station can get to using the rural travel time benchmark.

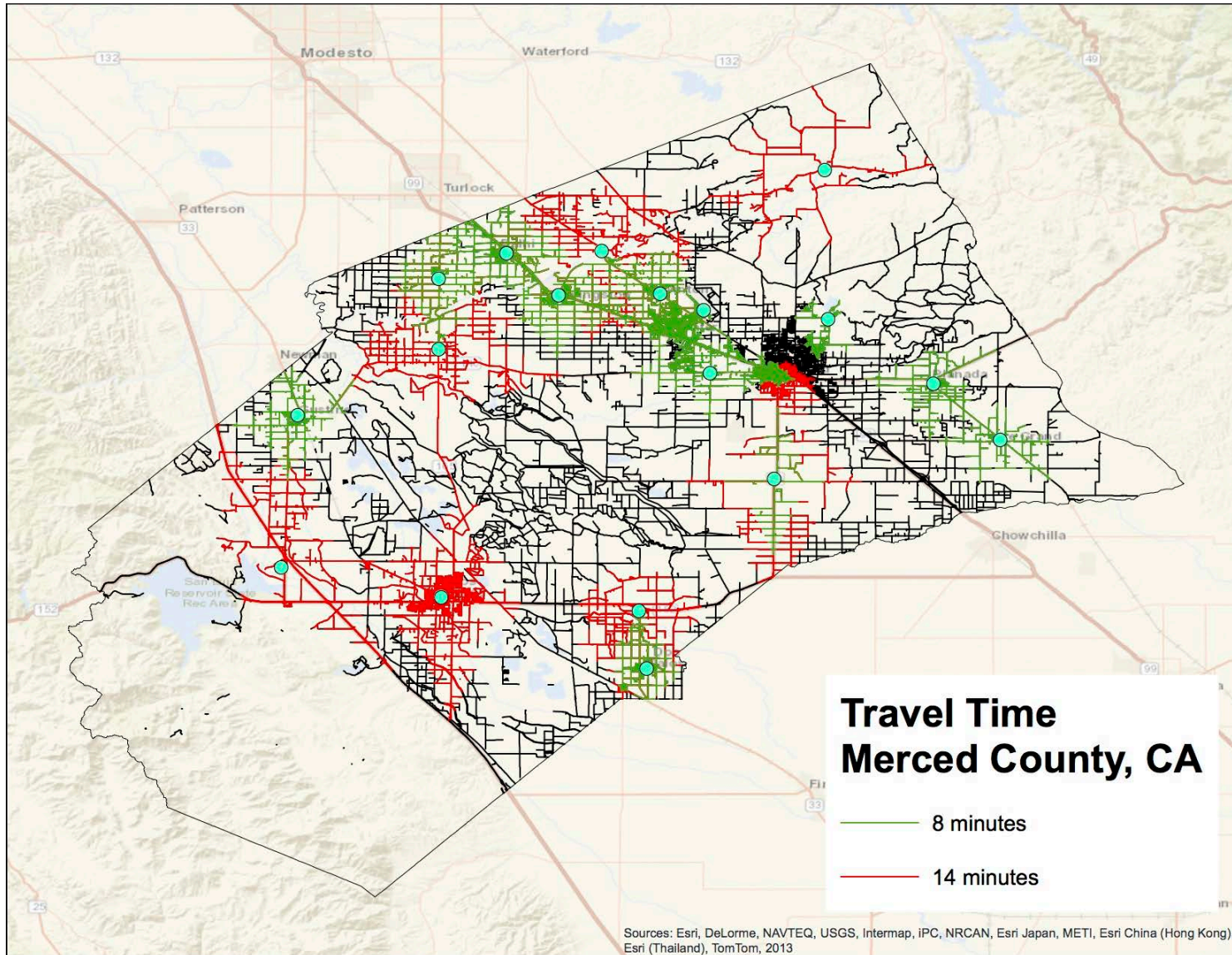


Consolidating Station 92 Ballico and Station 64 Cressey into a single location still provides the expected response time to the area. The map on the left illustrates the existing 10 minute travel time with both stations. The map on the right illustrates the 10 minute and 14 minute travel time from a new combined station. This allows for two-personnel at the station without further operational costs.



The combining of Station 81 Merced and Station 83 El Nido to a point between the two existing stations does not significantly affect the response time for the area. Station 62 picks up the area to the west of its location. This move allows for the new Station 81 to have two-personnel without additional operating costs. The map on the left illustrates the 10 minute travel time for each of the two stations. The map on the right illustrates the 10 minute and 14 minute travel time for the new combined station.

The following map illustrates the travel times associated with forming an effective response force and how well the County can be covered in the 8 and 14 minute travel time ranges.



3. FIRE STATION STAFFING

The current staffing for MCFD provides a minimum daily staffing of 25 personnel utilizing 20 stations with fifteen stations staffed with one person and five stations staffed with two personnel. The staffing of fire stations and apparatus have been the subject of national discussions for quite some time. The National Fire Protection Association, the Center for Public Safety Excellence and the National Institute of Standards and Technology have all weighed in on this.

In April 2010 The National Institute of Standards and Technology (NIST)¹ completed studies on the effectiveness and efficiencies of various crew sizes. Their work included numerous laboratory tests and actual field tests. For the field tests the study used a response of three engine companies, a truck company and a command officer with an aide. They measured and timed twenty-two fire ground tasks using different crew sizes. The crews arrived at the scene in a staggered fashion much like what is common in communities across the Country. The results of their sixty full-scale tests show that four-person crews were on average seven minutes faster than two-person crews at accomplishing the fire ground tasks. Further, the four-person crews completed their tasks 5.1 minutes faster than three-person crews. The field tests and tasks were performed using a typical one to two family dwelling. The study concluded that adding a fifth person to the crews did not significantly impact the time on this type of occupancy. None of the tests performed used a one-person crew as it is not a recognized best practice.

¹ Robertson, Bill. Report on Residential Fireground Field Experiments. National Institute of Standards and Technology. April 2010.

Another component of the above noted study was performed by Skidmore College² on the physiological effects of crew size. The average peak heart rates for firefighters on the 1st Engine were above 80% of age-predicted maximums when only 2 firefighters were deployed. In fact, the driver had an average peak heart rate nearly 90% of age-predicted maximums when there were only 2 firefighters on the engine¹.

Previous recommendations in the chapter included the combining of Station 83, El Nido and Station 81 Merced into a new realigned facility, and combining Station 64, Cressey, and Station 92, Ballico, into a new realigned facility. The net effect of these recommendations reduces the number of stations from twenty to eighteen. Increasing the daily minimum staffing to three-person crews will require an increase of 29 positions. The contract between the County and CAL FIRE outlines the pay scale for 2017. Using the same formula as in the contract it requires 2.6 people to staff one position. This includes relief personnel to cover off-duty time, sick days etc. The chart below outlines the cost to fill one position.

Position Cost			
Positions	Persons needed to fill the position	Salary & Benefits for One Person	Cost to fill One Position
1	2.6	\$125,147	\$325,382

The chart below indicates the number of positions needed to achieve a three-person minimum staffing model. This model assumes the realignment of stations.

² Smith, Denise, Ph.D and Benedict, Ron. Effect of Deployment of Resources on Cardiovascular Strain of Firefighters. April 2010.

Minimum Staffing of Three per Station

Station	Current Minimum Staffing	Station Changes	Adjusted Minimum Staffing	Proposed Minimum Staffing	Positions Needed for Three per Station
61 McSwain	2		2	3	1
62 Castle	2		2	3	1
63 Winton	1		1	3	2
64 Cressey	1	Close	0	0	0
65 Snelling	2		2	3	1
71 Los Banos (City)	1		1	3	2
72 Santa Nella	2		2	3	1
74 Gustine	1		1	3	2
75 Dos Palos Wye	1		1	3	2
76 Dos Palos	1		1	3	2
81 Merced	1		2	3	1
83 El Nido	1	Close	0	0	0
84 Le Grand	1		1	3	2
85 McKee	1		1	3	2
86 Planada	1		1	3	2
91 Delhi	2		2	3	1
92 Ballico	1		2	3	1
95 Hilmar	1		1	3	2
96 Livingston	1		1	3	2
97 Stevenson	1		1	3	2
Total	25		25	54	29

Based on this model, there are an additional 29 positions needed to meet the new alignment. The following chart provides the cost associated with this model.

Position Cost				
Positions	Persons needed to fill the position	Number of Persons Needed	Salary & Benefits for One Person	Total Cost
29	2.6	75	\$125,147	\$9,436,084

To achieve three-person crews for all apparatus, the department would need an additional 75 personnel at a cost of \$9,436,084. This represents a significant financial investment by the County and is not a recommendation that can be funded with

currently available funds. As a result, a phased approach is recommended to increase staffing and improve personnel safety while enhancing fire protection capabilities.

First, there is an immediate need to have all stations staffed with a minimum of two personnel daily. This will immediately improve the safety of the work environment and improve system performance as initial arriving crews will be able to begin fire and rescue services without having to wait for the second arriving unit. The implementation of this staffing plan will require 11 additional positions daily as shown in the table below.

Minimum Staffing of Two per Station					
Station	Current Minimum Staffing	Station Changes	Adjusted Minimum Staffing	Proposed Minimum Staffing	Number Needed for Proposed Minimum
61 McSwain	2		2	2	0
62 Castle	2		2	2	0
63 Winton	1		1	2	1
64 Cressey	1	Close	0	0	0
65 Snelling	2		2	2	0
71 Los Banos (City)	1		1	2	1
72 Santa Nella	2		2	2	0
74 Gustine	1		1	2	1
75 Dos Palos Wye	1		1	2	1
76 Dos Palos	1		1	2	1
81 Merced	1		2	2	0
83 El Nido	1	Close	0	0	0
84 Le Grand	1		1	2	1
85 McKee	1		1	2	1
86 Planada	1		1	2	1
91 Delhi	2		2	2	0
92 Ballico	1		2	2	0
95 Hilmar	1		1	2	1
96 Livingston	1		1	2	1
97 Stevenson	1		1	2	1
Total	25		25	36	11

The cost to implement this step is shown below.

Position Cost				
Positions	Persons needed to fill the position	Number of Persons Needed	Salary & Benefits for One Person	Total Cost
11	2.6	29	\$125,147	\$3,579,204

As shown the cost to implement the two-person staffing model is \$3,579,204 by adding an additional 29 personnel to the department.

The next step to optimize the fire protection system is to staff the stations to a three-person minimum daily staffing model. This staffing model will move the fire protection system closer to the recommended best practices including the critical tasks necessary for effective fire control. The project team recommends this begin as funds become available and start with urban and suburban areas of the County, with rural areas remaining at two person staffing until the more densely populated areas have three-person staffing.

The table below outlines the number of positions to align the urban and suburban stations to a three-person minimum staffing.

Minimum Staffing from Two to Three Urban/Suburban				
	Station	Two-Person Minimum Staffing	Positions Needed Urban/Suburban	Three-Person Minimum Staffing
61	McSwain	2	1	3
62	Castle	2	1	3
63	Winton	2	1	3
64	Cressey		Closed	
65	Snelling	2	0	2
71	Los Banos (City)	2	0	2
72	Santa Nella	2	0	2
74	Gustine	2	1	3
75	Dos Palos Wye	2	0	2
76	Dos Palos	2	1	3
81	Merced	2	1	3
83	El Nido		Closed	
84	Le Grand	2	1	3
85	McKee	2	1	3
86	Planada	2	1	3
91	Delhi	2	1	3
92	Ballico	2	0	2
95	Hilmar	2	1	3
96	Livingston	2	1	3
97	Stevenson	2	0	2
Total		36	12	48

To achieve this step an additional 12 positions will be required on each shift. The cost for this step is outlined below.

Position Cost				
Positions	Persons needed to fill the position	Number of Persons Needed	Salary & Benefits for One Person	Total Cost
12	2.6	31	\$125,147	\$3,904,586

The cost to implement this step is \$3,904,586. To add the additional personnel to each shift at a station will cost \$325,382 annually, based on the current contract cost. Again, the project team recommends the staffing be increased to a three-person

minimum daily staffing beginning in the urban/suburban stations. Nine of the twelve urban/suburban stations are located along the Highway 99 corridor that has the highest call and population density in the County.

The final phase in staffing increases would be to increase the staffing in the rural stations from two (2) person to three (3) person crews as areas of the County develop and the population density in these areas increases to bring them to the suburban population density. It is not anticipated that this will occur in the next ten years, but if development changes occur that cause more rapid development than is currently forecasted this can serve as a planning tool for the County. The table below outlines the number of positions to align the rural stations with a three-person minimum if population densities in the area increase to the suburban standard.

Minimum Staffing from Two to Three Rural Stations				
	Station	Two-Person Minimum Staffing	Positions Needed Rural	Three-Person Minimum Staffing
61	McSwain	3	0	3
62	Castle	3	0	3
63	Winton	3	0	3
64	Cressey		Closed	
65	Snelling	2	1	3
71	Los Banos (City)	2	1	3
72	Santa Nella	2	1	3
74	Gustine	3	0	3
75	Dos Palos Wye	2	1	3
76	Dos Palos	3	0	3
81	Merced	3	0	3
83	El Nido		Closed	
84	Le Grand	3	0	3
85	McKee	3	0	3
86	Planada	3	0	3
91	Delhi	3	0	3
92	Ballico	2	1	3
95	Hilmar	3	0	3
96	Livingston	3	0	3
97	Stevenson	2	1	3
Total		48	6	54

As illustrated above, this will require an additional six (6) personnel daily. The cost to implement this final phase of staffing alignments is illustrated below.

Position Cost				
Positions	Persons needed to fill the position	Number of Persons Needed	Salary & Benefits for One Person	Total Cost
6	2.6	16	\$125,147	\$1,952,293

Recommendation: Add 29 personnel to the fire department to bring the daily minimum staffing of each station to two personnel at a cost of \$3,579,204. This is an immediate need.

To facilitate this recommendation, the following tables outline the proposed phased approach to increase the minimum staffing to two personnel. These five stations are immediately capable of housing two personnel. They are listed in order of call volume

Station	Personnel Cost
74 Gustine	\$325,384
81 Merced	\$325,384
85 McKee	\$325,384
71 Los Banos	\$325,384
97 Stevenson	\$325,384
Total Cost	\$1,626,920

The next table outlines the stations that will require renovation work to accommodate the additional staffing.

Station	Personnel Cost
63 Winton	\$325,384
76 Dos Palos	\$325,384
95 Hilmar	\$325,384
75 Dos Palos Wye	\$325,384
	\$1,301,536

These stations are shown in order of call volume. The last table are stations that will require renovation work and may have another issue with the space available on the lot.

Station	Personnel Cost
84 Le Grand	\$325,384
86 Planada	\$325,384
96 Livingston	\$325,384
	\$976,152

These stations are shown in order of call volume. As to the renovation work that may be required there may be issues with the parcels they are located on or with the building itself.

Recommendation: As funding permits, add 31 personnel to the fire department to bring the daily minimum staffing of each station located in an urban or suburban risk category to three personnel at a cost of \$3,904,586.

Recommendation: As development occurs in the County, increase the daily minimum staffing at the rural stations to 3 person staffing when suburban population density is reached in a service area at a cost of \$325,382 per station annually.

4. EVALUATION OF PAID ON CALL FIREFIGHTER PROGRAM

Merced County utilizes paid call firefighters (PCF) to supplement their career staffing with 203 of the allocated 220 firefighters assigned to various stations throughout the fire protection system. The salary cost for these positions was \$257,477 in 2015 or about \$17 per call and \$315,774 in 2014 or about \$19 per call.

The Insurance Services Office (ISO) considers two classes of firefighters. Those that are at the station and responds to the initial alarm are considered on-duty firefighters. Those that respond from somewhere other than the fire station are considered on-call firefighters. To account for the time needed for notification, response to the call and assembly time they consider three on-call firefighters equal to one on-duty firefighter. Using this formula, the 203 paid on call firefighters are equal to sixty-seven on-duty firefighters.

The chart below outlines another view of the response data for the paid on call personnel. This chart represents the percentage of calls that at least one paid on call firefighter responded by station for the past four years.

Percentage of Calls PCF Responded

Station	2012	2013	2014	2015	4 yr Avg.
61 McSwain	75.60%	57.81%	48.78%	40.65%	54.96%
62 Castle	0.00%	0.00%	0.00%	0.00%	0.00%
63 Winton	93.28%	92.21%	87.66%	80.93%	88.02%
64 Cressey	56.42%	19.30%	11.11%	9.57%	23.87%
65 Snelling	8.62%	0.00%	8.33%	2.16%	6.20%
71 Los Banos	69.94%	58.03%	53.48%	54.56%	58.48%
72 Santa Nella	0.00%	0.00%	0.14%	0.93%	0.54%
74 Gustine	83.69%	73.50%	72.49%	66.33%	73.50%
75 Dos Palos Wye	0.00%	0.00%	11.41%	4.44%	7.62%
76 Dos Palos	62.02%	40.48%	31.56%	28.74%	37.04%
81 Merced	28.43%	31.16%	29.71%	33.44%	30.85%
83 El Nido	7.88%	0.69%	0.00%	16.22%	5.98%
84 Le Grand	72.62%	53.78%	46.23%	53.59%	56.51%
85 McKee	0.00%	0.00%	59.16%	58.93%	59.04%
86 Planada	0.00%	45.01%	49.17%	26.73%	40.38%
91 Delhi	0.00%	0.00%	80.15%	67.92%	73.56%
92 Ballico	0.00%	0.00%	73.24%	55.98%	64.21%
95 Hilmar	79.30%	81.97%	72.52%	60.25%	73.00%
96 Livingston	72.74%	76.50%	74.46%	71.14%	73.54%
97 Stevenson	72.87%	83.47%	84.78%	59.36%	74.77%
Department Total	65.91%	58.16%	51.60%	47.57%	54.26%

The responses have been trending down on average 7% over the past four years with less than half the calls being responded to in 2015. The next chart outlines the average number of paid on call firefighters per call.

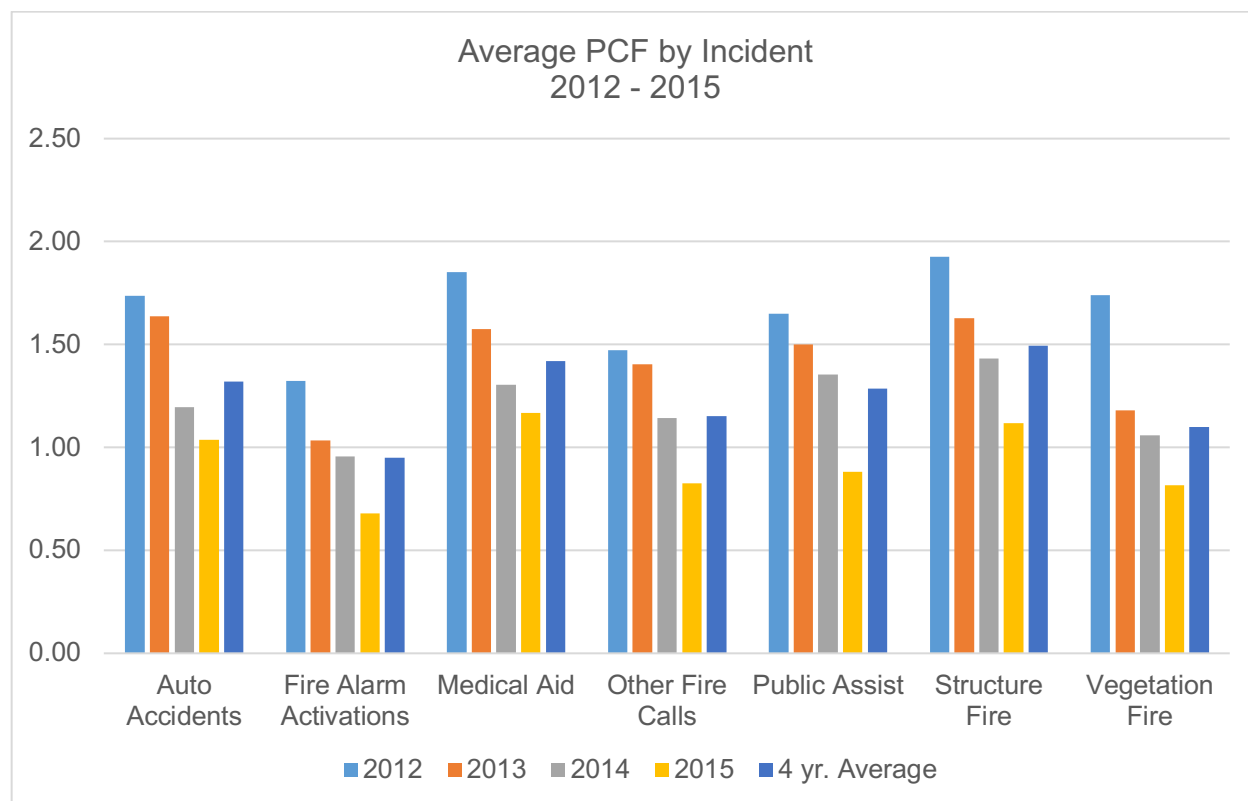
Average Number of PCF Per Call

Station	2012	2013	2014	2015	4 yr Avg.
61 McSwain	1.77	1.09	0.80	0.57	0.81
62 Castle	0.00	0.00	0.00	0.00	0.00
63 Winton	3.22	3.50	3.25	2.57	3.06

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

64	Cressey	0.97	0.26	0.18	0.13	0.19
65	Snelling	0.09	0.00	0.08	0.06	0.07
71	Los Banos	1.42	0.88	0.86	0.84	0.86
72	Santa Nella	0.00	0.00	0.00	0.01	0.01
74	Gustine	2.52	1.84	1.69	1.44	1.64
75	Dos Palos Wye	0.00	0.00	0.19	0.06	0.12
76	Dos Palos	1.23	0.69	0.57	0.45	0.55
81	Merced	0.38	0.45	0.44	0.47	0.45
83	El Nido	0.12	0.01	0.00	0.17	0.06
84	Le Grand	1.44	0.87	0.73	0.81	0.81
85	McKee	0.00	0.00	1.34	1.05	1.18
86	Planada	0.00	0.66	0.71	0.37	0.58
91	Delhi	0.00	0.00	2.08	1.65	1.85
92	Ballico	0.00	0.00	1.35	1.00	1.17
95	Hilmar	2.18	2.29	1.55	1.13	1.62
96	Livingston	2.27	2.42	2.16	1.98	2.17
97	Stevenson	1.48	1.77	1.65	1.01	1.46
Department Total		1.76	1.51	1.24	1.05	1.23

The trend for the past four years has been declining at an average rate of 15.7%. At this rate there will be on average less than one paid on call firefighter responding per call in 2017 for the department. To further illustrate the responses for the paid on call staffing the chart below is by the type call.



The chart above further supports the overall downward trend of the paid on call responses for the department as a whole. However, it also indicates the responses are highest on auto accidents, medical aid and structure fire calls.

A review of the individual stations provides additional information about the use of the paid on call staff. Eight stations are averaging one or more paid on call firefighter per call and these eight stations represent about 50.8% of the call volume in 2015. The table below outlines these eight stations and the responses.

Paid On Call Firefighters

Station	Number of Calls for Station	Number of Calls PCF responded	Pct of Calls	Number of PCF's Responding	Avg. per Call
63 Winton	1,552	1,256	80.93%	3,984	2.57
74 Gustine	989	656	66.33%	1,424	1.44
85 McKee	935	551	58.93%	982	1.05
91 Delhi	1,116	758	67.92%	1,844	1.65

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

92	Ballico	234	131	55.98%	234	1.00
95	Hilmar	795	479	60.25%	899	1.13
96	Livingston	1,476	1,050	71.14%	2,927	1.98
97	Stevenson	406	241	59.36%	409	1.01
	Totals	7,503	5,122	68.27%	12,703	1.69

The funding for the paid on call program is approximately \$260,000 per year and provides an average of 1.69 firefighters per call for 50.8% of the call volume. In the case of Station 63 over 80% of the calls are supplemented with an average of 2.5 personnel from the paid on call staffing. To add one career position at one station requires 2.6 persons at a cost of \$325,382. Using the paid on call staffing, these eight engine companies are staffed at 3 to 4 personnel 68% of the time at a cost of \$127,551.

Departments across the state have developed a number of ways to improve or otherwise increase the utilization and reliability of the paid on call staffing. The list below provides an overview of some of the programs:

- Some have minimums for the number of calls that staff is to respond such as 40% of the calls.
- Incentivized the training aspect by funding a trip to a conference or other outside training opportunity for responding to a certain number or percentage of calls.
- Limit the overnight calls to structural fires so they are not overwhelmed with their regular employment.
- Provide a stipend for being at the station in lieu of the per call stipend.
- Assign or allow a sign up program for availability.

These programs have had success at other departments for improving the use of paid on call personnel. Utilizing these or other improvements may reverse the trend noted with declining attendance and responses.

Recommendation: Implement these or other programs to improve and increase the utilization of the paid on call staff throughout the fire protection system.

4. APPARATUS AND EQUIPMENT

The project team found the apparatus in relatively good condition in terms of maintenance and repair. The engine companies are model year 1990 and newer with the water tenders being 2001 and newer. The administration vehicles were the oldest in the fleet with one vehicle being 28 years old.

The table below is a listing of the apparatus and rolling stock assigned to the MCFD. The table is subdivided by type of vehicle.

Inventory of Fleet Vehicles and Apparatus

Year	Unit Number	Description	Mileage	Age
Engines/Pumpers				
1990	E263	KME International 1250 gpm pump/750 gal tank	134,000	26
1990	E274	KME International 1250 gpm pump/750 gal tank	139,000	26
1990	E60	KME International 1250 gpm pump/750 gal tank	77,000	26
1990	E80	KME International 1250 gpm pump/750 gal tank	156,000	26
1990	E90	KME International 1250 gpm pump/750 gal tank	117,000	26
1993	E264	KME International 1500 gpm pump/750 gal tank	178,000	23
1993	E84	KME International 1500 gpm pump/750 gal tank	92,000	23
1997	E70	KME International 4WD 1500 gpm pump/750 gal tank	82,000	19
1997	E86	KME International 4WD 1500 gpm pump/750 gal tank	107,000	19
2000	E64	KME International 4WD 1500 gpm pump/750 gal tank	77,000	16
2001	E65	KME International 4WD 1500 gpm pump/750 gal tank	125,000	15
2001	E83	KME International 1500 gpm pump/750 gal tank	135,000	15
2001	E97	KME International 4WD 1500 gpm pump/750 gal tank	80,000	15
2004	E76	HiTech International 1500 gpm pump/750 gal tank	80,000	12
2004	EE5	HiTech International 1500 gpm pump/750 gal tank	106,000	12
2007	E75	HiTech International 1500 gpm pump/750 gal tank	77,000	9
2007	E81	HiTech International 1500 gpm pump/750 gal tank	66,000	9
2008	E63	Smeal 1500 gpm pump/700 gal tank	61,000	8
2008	E72	Smeal 1500 gpm pump/700 gal tank	92,000	8
2008	E74	Smeal 1500 gpm pump/700 gal tank	49,000	8
2008	E91	Smeal 1500 gpm pump/700 gal tank	52,000	8
2008	E95	Smeal 1500 gpm pump/700 gal tank	39,000	8
2010	E61	Smeal 1500 gpm pump/700 gal tank	60,000	6
2010	E62	Smeal 1500 gpm pump/700 gal tank	31,000	6
2010	E92	KME International 1500 gpm pump/750 gal tank	33,000	6
2015	E71	Rosenbauer 1500 gpm pump/750 gal tank	8,000	1
2015	E96	Rosenbauer 1500 gpm pump/750 gal tank	7,500	1

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Water Tenders				
2001	WT65	KME International 750 gpm pump/3000 gal tank	13,000	15
2001	WT71	KME International 750 gpm pump/3000 gal tank	16,000	15
2001	WT74	KME International 750 gpm pump/3000 gal tank	30,000	15
2001	WT75	KME International 750 gpm pump/3000 gal tank	22,000	15
2001	WT95	KME International 750 gpm pump/3000 gal tank	14,000	15
2001	WT97	KME International 750 gpm pump/3000 gal tank	18,000	15
2002	WT61	KME International 750 gpm pump/3000 gal tank	19,000	14
2002	WT86	KME International 750 gpm pump/3000 gal tank	15,000	14
2004	WT83	KME International 750 gpm pump/3000 gal tank	16,000	12
2004	WT84	KME International 750 gpm pump/3000 gal tank	8,500	12
2004	WT92	KME International 750 gpm pump/3000 gal tank	12,000	12
2004	WT96	KME International 750 gpm pump/3000 gal tank	16,000	12
2010	WT81	KME International 750 gpm pump/3000 gal tank	8,800	6

Specialty Apparatus				
1995	C-62	Oshkosh T1500	8,393	21
1995	C-262	Oshkosh T1500	6,274	21
1988	SQ63	Ford F350	58,000	28
2005	SQ92	Chevy 3500	8,200	11
2006	HM62	Sparten/Hackney Haz Mat Tractor Trailer	12,000	10
2010	R91	SVI Med Rescue	17,000	6
2011	R71	SVI Med Rescue	22,000	5

Administration				
1988	U61	Chevrolet Stakeside (Admin)	100,000	28
1990	U802	Chevrolet Service Body (Admin)	177,000	26
1997	A217	Ford Sedan (Admin)	240,000	19
1997	P802	Ford Sedan (Prevention)	225,000	19
2000	A15	Ford Sedan (Admin)	103,000	16
2001	U801	Ford F350 Service Body (Admin)	106,000	15
2002	C15	Chevrolet Tahoe (Admin)	203,000	14
2003	U71	Chevrolet 2500 (admin)	221,000	13
2003	U91	Chevrolet 2500 (Admin)	227,000	13
2004	U61	Chevrolet 2500 (Admin)	171,000	12
2005	C18	Chevrolet 2500 (Admin)	154,000	11
2008	A19	Chevrolet 2500 (Command)	130,000	8
2008	P801	Ford Sedan (Prevention)	72,000	8
2009	B16	Chevrolet 2500 (Command)	129,000	7
2009	T4235	Chevrolet 2500 (Training)	89,000	7
2010	P800	Chevrolet 2500 (Prevention)	58,000	6
2012	B19	Chevrolet 2500 (Command)	45,000	4
2012	D4204	Chevrolet Suburban (Command)	30,000	4

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

2013	B18	Chevrolet 2500 (Command)	35,000	3
2014	B15	Chevrolet 2500 (Command)	36,000	2
2014	B17	Chevrolet 2500 (Command)	32,000	2

Of the 27 engines in the fleet, 7 are twenty years or older with another two at 19 years. Next year 33% of the engines will be twenty years or older. In the Water Tender category, 6 of the 13 units are 15 years old with two more at 14 years. It should be noted in the inventory of apparatus there is no ladder truck. There is a ladder truck available to the county in the City of Atwater. As the growth continues between Atwater and Livingston the county should consider replacing one of the engines with a ladder truck if the risks present in the area being served illustrate the need for an elevated firefighting or rescue piece of apparatus.

As the apparatus ages it becomes more difficult to maintain, less parts are available for replacement and the pumps begin to fail their annual testing. Many of the administration vehicles have high mileage along with the age issue. There is a need for the County to plan for the replacement of older and high mileage vehicles and apparatus. The project team found that there is currently not a formalized apparatus and vehicle replacement program in place for the MCFD. Formalizing a schedule and setting funds aside annually to fund the program ensures vehicles and apparatus are replaced according to a fixed schedule before maintenance costs outweigh the value of the assets. It is recommended that Type 1 and Type 3 engines and Water Tenders be set on a 15 year front-line and 5-year reserve schedule and administrative vehicles be replaced every 8 years. Using age and mileage as two factors for the replacement of apparatus, the following chart outlines a replacement schedule to address the immediate needs. It follows a phased approach to these replacements.

Fleet Vehicles and Apparatus Replacement

Year	Unit Number	Description	Mileage	Age	Scheduled Replacement	Cost
Engines/Pumpers						
1990	E263	KME International 1250 gpm pump/750 gal tank	134,000	26	FY 16/17	\$600,000
1990	E274	KME International 1250 gpm pump/750 gal tank	139,000	26	FY 16/17	\$600,000
1990	E80	KME International 1250 gpm pump/750 gal tank	156,000	26	FY 17/18	\$600,000
1990	E90	KME International 1250 gpm pump/750 gal tank	117,000	26	FY 17/18	\$600,000
1990	E60	KME International 1250 gpm pump/750 gal tank	77,000	26	FY 18/19	\$600,000
1993	E264	KME International 1500 gpm pump/750 gal tank	178,000	23	FY 18/19	\$600,000
1993	E84	KME International 1500 gpm pump/750 gal tank	92,000	23	FY 19/20	\$600,000
Total Cost for Engine/Pumper						\$4,200,000
Specialty Apparatus						
1995	C-62	Oshkosh T1500	8,393	21	FY 17/18	\$800,000
1995	C-262	Oshkosh T1500	6,274	21	FY 18/19	\$800,000
Total Cost for ARFF Apparatus						\$1,600,000
Administration						
2002	C15	Chevrolet Tahoe (Admin)	203,000	14	FY 16/17	\$45,000
2003	U71	Chevrolet 2500 (admin)	221,000	13	FY 16/17	\$45,000
2003	U91	Chevrolet 2500 (Admin)	227,000	13	FY 17/18	\$45,000
2004	U61	Chevrolet 2500 (Admin)	171,000	12	FY 17/18	\$45,000
2005	C18	Chevrolet 2500 (Admin)	154,000	11	FY 18/19	\$45,000
2008	A19	Chevrolet 2500 (Command)	130,000	8	FY 18/19	\$45,000
2009	B16	Chevrolet 2500 (Command)	129,000	7	FY 19/20	\$45,000
Total Cost for Administration/Command Vehicles						\$315,000

Recommendation: Establish a formal replacement schedule for the replacement of fire apparatus at 20 years total life and administration vehicles at 8 years of total life.

Phase in the purchase of new apparatus and vehicles over the next four years. Current costs will be approximately \$600,000 for each engine totaling \$4.2 million and \$45,000 for administrative vehicles totaling \$315,000.

Phase in the purchase two ARFF units at a cost of \$800,000 each for a total cost of \$1.6 million.

As the growth continues north of Atwater to Livingston one of the engines should be replaced with a ladder truck at a cost of \$1.6 million.

5. EXISTING STATION CONDITION ASSESSMENT

This chapter provides an assessment of the current stations used by the Merced County Fire Department. The assessments were the result of site visits to the fire stations and examination of current station conditions.

1. FIRE STATION CONDITIONS

Each of the stations in the County have several items that are needed for effective and efficient operations and/or require upgrading and remodeling. The following list outlines those items.

- To remove carbon monoxide and potential carcinogens the fire stations should have a mechanism to remove exhaust particulates from the apparatus bays.
- There should be a separate enclosed storage area for turnout gear and/or contaminated articles of clothing. There is a potential for blood borne pathogens to be on the bunker gear or other articles of clothing. More studies are being published that support the potential for cancer causing agents contaminating the bunker gear and increasing the risks to the firefighters. In addition, the manufacturers of turnout gear have tested the materials in the gear and have determined that UV rays from the sun, while the gear is being stored, degrades the material.
- Arrangements for bathroom, shower and sleeping quarters will require updating and in some cases expanded to accommodate additional personnel and/or to accommodate male and female personnel.

The exhibit on the next page outlines those issues that are specific to each station as a result of the station assessment.

Station Specific Issues

Station	Address	Year Built	Overall Condition	Specific Issues
61 McSwain	961 Gurr Road	2006	Good	Nothing specific to this station was noted.
62 Castle	3405 Hardstand	1940's	Fair/Poor	Roof and drainage systems will need repair work; the eaves will also need attention.
63 Winton	6825 North Winton Way	Unk.	Fair	Apparatus bay doors are not sufficient for height and width clearances. Physical fitness area is in the apparatus bay.
64 Cressey	9255 Cressey Way	Unk.	Fair	Apparatus bay doors are not sufficient for height and width clearances. Kitchen area will need to be remodeled.
65 Snelling	15974 Lewis Street	1940's	Fair	Apparatus bay doors are not sufficient for height and width clearances. Located in a curve, visual access to road is problematic.
71 Los Banos	525 H Street	1950's	Fair	Nothing specific to this station was noted.
72 Santa Nella	29190 Centinella Road	1960's	Fair	Cracks in the bearing walls. Apparatus bay doors are not sufficient for height and width clearances.
74 Gustine	686 3rd Street	1970's	Good	Roof and drainage systems will need repair work; the eaves will also need attention.
75 Dos Palos Y	8047 West Dairy Lane	1970's	Good	Nothing specific to this station was noted.
76 Dos Palos	1540 Golden Gate Avenue	1950's	Good	Nothing specific to this station was noted.
81 Merced	735 Martin Luther King Jr. Way	1940's	Fair/Poor	Nothing specific to this station was noted.
83 El Nido	10537 South Highway 59	1940's	Poor	Office, Kitchen and bunk room is all one room. Apparatus bays too small for modern apparatus.
84 Le Grand	3875 Santa Fe	1940's	Fair	Apparatus bay doors are not sufficient for height and width clearances.
85 McKee	3360 North McKee	1960's	Fair	Nothing specific to this station was noted.

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Station	Address	Year Built	Overall Condition	Specific Issues
86 Planada	9234 East Broadway	Unk.	Fair/Poor	Bunk room, office, day room all combined. Apparatus bay doors are not sufficient for height and width clearances.
91 Delhi	16056 Acacia Street	1970's	Fair	Nothing specific to this station was noted.
92 Ballico	11284 Ballico	1940's	Fair/Poor	Apparatus bay doors are not sufficient for height and width clearances. Living areas are cramped, single room for sleeping arrangements. Physical fitness area is in the apparatus bay.
95 Hilmar	20021 West Falke Street	1970's	Good	Nothing specific to this station was noted.
96 Livingston	1430 "C" Street	Unk.	Fair	Station is owned by the City of Livingston.
97 Stevinson	2738 Lander Avenue	1940's	Fair	Station is close to roadway, not much apron space. Sleeping Quarters in a separate building. Apparatus bay doors are not sufficient for height and width clearances.

2. STATION IMPROVEMENTS

The immediate staffing need requires two personnel in each station, which results in required improvements to the stations to handle the increase in personnel housed at the station. The table below provides an illustration of the needs.

Station Staffing Renovation Assessment

Station	Two Person Capable	Will Need Renovation	May Not have the Space to Renovate	Notes
61 McSwain	X			
62 Castle	X			
63 Winton		X		
64 Cressey		X		
65 Snelling	X			
71 Los Banos	X			
72 Santa Nella	X			
74 Gustine	X			City Owned
75 Dos Palos Wye		X		

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

Station	Two Person Capable	Will Need Renovation	May Not have the Space to Renovate	Notes
76 Dos Palos		X		City Owned
81 Merced	X			
83 El Nido		X	X	Bunk Room/Day Room/Kitchen combined
84 Le Grand		X	X	
85 McKee	X			
86 Planada		X	X	Bunk Room/Day Room combined
91 Delhi	X			
92 Ballico		X	X	Only enough room for 1 person
95 Hilmar		X		
96 Livingston		X	X	City Owned
97 Stevinson	X			Sleeping Quarters are in a separate building

Five stations are already at two-person staffing and do not require any immediate renovation. Five of the stations with a single person can handle the additional staff with a small amount of reorganization or renovation within the station. Ten stations will require some form of significant renovation work to handle the additional staffing. Of those ten stations, five stations may not have the building size or lot size to handle the additional space needed.

The cost for these improvements will be largely based on the amount of work necessary to complete the project. Based on research for the Merced County area, the cost for interior renovation work is in the range of \$75 to \$100 per square foot. Using 2,000 square feet as a baseline the cost for renovation would be in the range of \$150,000 to \$200,000 per station. However, new construction estimates are in the range of \$200 to \$250 per square foot.

Another avenue for housing is the use of temporary housing units in the form of portable housing units. Utilizing these units will provide a safe environment for living quarters and the space needed for the additional personnel. The cost to lease one of these units is approximately \$1,700 per month, this cost does not include any delivery or set up fees that may be required by the leasing company.

Several stations in the network are approaching 60 to 80 years old and have become functionally obsolete. The County should begin to develop a long-term plan for their eventual replacement. The primary issue driving the timing of replacing the oldest facilities is the cost to build a new facility. Based on research for the Merced County area, the cost for new commercial construction is in the range of \$200 to \$250 per square foot. There are literally hundreds of designs for fire stations all of which fit the needs of that community and the space in which they had to build. Building a three apparatus bay station with the capability of housing six to nine people will take approximately 12,000 to 15,000 square feet putting the cost to build a new facility in range of \$3,000,000 to \$3,750,000. This cost could be higher depending on the design and the needs of the area. For example, the fire station at the Castle Airfield will have different requirements than in Winton. Any design should include expansion capabilities where the facility can be expanded as necessary in the future.

Recommendation: Facilitate the temporary housing for the stations to accommodate the increase in staffing to a minimum daily staffing of two persons at a cost of approximately \$1,700 per month lease.

Recommendation: Repair or renovate the fire stations to address the significant issues noted for the fire stations at an estimated cost of \$75.00 to \$100.00 per square foot.

Recommendation: Establish a program to inspect and examine the fire stations on a regular basis and then develop a plan to repair or renovate as needed.

Recommendation: Establish a long-term plan to replace the functionally obsolete facilities.

3. THE RECOMMENDATIONS MADE BY THE PROJECT TEAM ARE PRIORITIZED BASED ON NEED AND FUNDING.

The table on the next page illustrates the recommendations for staffing and facilities that are based predominately on the overall needs of the County and the funding that may be available in the future for these improvements. Several factors were considered in prioritizing these recommendations including call volume, back up to other stations and areas, financial resources, paid-call staffing and the ease at which to make the necessary changes.

Station and Staffing Improvements with Estimated Costs						
Programmatic Opportunities	Tier 1 Up to \$651,000	Tier 2 +Up to \$1m	Tier 3 +Up to \$2m	Tier 4 +Up to \$3m	Tier 5 +Up to \$4m	Tier 6 +Up to \$4m
1. Stations 85 and 71 - Increase staffing to a minimum two-person Engine Company	\$650,768					
2. Stations 63 and 75 - Increase staffing to a minimum two-person Engine Company - Renovate both stations to accommodate the additional staffing.		\$650,768 \$400,000				
3. Stations 74, 76, 81, 97, 95 - Increase staffing to a minimum two-person Engine Company - Renovate Stations 76 and 95 to accommodate the additional staffing			\$1,626,920 \$400,000			
4. Station 84, 86 and 96 - Increase the staffing to a minimum two-person Engine Company - Extensive Renovation for the Stations				\$976,152 \$1,200,000		
5. Build a new Station 81 and Close Station 83 - Build a new facility to replace Station 81 and 83.					\$3,750,000	

Station and Staffing Improvements with Estimated Costs						
Programmatic Opportunities	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5	Tier 6
	Up to \$651,000	+Up to \$1m	+Up to \$2m	+Up to \$3m	+Up to \$4m	+Up to \$4m
6. Build a new Station 64 and close the existing Station 64 and Station 92 - Build a new facility to combine Stations 64 and 92.						\$3,750,000
Total Cost	\$650,768	\$1,050,768	\$2,026,920	\$2,176,152	\$3,750,000	\$3,750,000

The recommendations in tier one are those that can be accomplished with a minimal amount of funding and have the greatest impact on the region. Increasing the staffing at Station 85 McKee is based primarily on the increased student capacity of the UC Merced Campus. The college is currently moving forward with their expansion and anticipates a large increase in their student population in the next couple of years. This increase will place more demand on public safety services. Station 85 also provides back up to Station 81 and the additional personnel will enhance that response. The second part of tier one is the increased staffing in the southern region of the county. Station 71 Los Banos has the capability of housing additional staffing immediately. The region, including Santa Nella, Dos Palos and Los Banos handles on average approximately 3,000 calls for service per year. Adding additional personnel to this region will enhance the response to these emergencies.

Tier two includes the recommendations for increased staffing at Stations 63 Winton and 75 Dos Palos Wye but will require renovations to the facilities. Both stations will require renovations to provide appropriate facilities to house additional personnel. Station 63 Winton handles the highest volume of calls in the system and has the highest paid-call firefighter per call response. This station also provides support to Stations 92 and 64 to the north as well as those stations in the Atwater area. Station 75 Dos Palos is in a region that averages about 3,000 calls for service a year and will provide support to calls in Los Banos, Dos Palos, and Santa Nella. The increased staffing for these two stations continue to improve the staffing levels in the areas of the County with the highest call volumes.

In tier three the recommendations include increased staffing for five stations and renovations to two of those stations. These recommendations begin to fill in the staffing for the stations surrounding the heavier call volume areas. Two of these stations will require renovations to provide appropriate facilities to house the additional staffing.

The last three tiers will require the most in terms of financial resources, which is the primary reason they are considered last. These recommendations call for the replacement of two stations and considerable renovation for the others.

APPENDIX A – EMPLOYEE SURVEY RESULTS

The Matrix Consulting Group conducted an online survey of the employees of the Merced County Fire Department in order to gauge the sentiments of the employees on a variety of issues. There were 65 responses to the survey and all results are confidential.

1. SURVEY OVERVIEW

The survey contained three sections. The first section asked respondents to provide demographic data for the purposes of filtering responses. Respondents provide their current assignment, rank, their length of service.

The second section contained 43 statements to which they were asked to select one of the following responses; “Strongly Agree”, “Agree”, “Disagree” and “Strongly Disagree”.

The third section consisted of four open-ended statements allowing the respondents to answer in their own words. Prompts for two of the statements included the strengths of the department and any opportunities for improvement. These types of questions allow the employee to comment on issues they feel are most pressing from their view.

2. DEMOGRAPHIC IDENTIFIERS

While the responses are confidential, respondents were asked to provide information about their position in the department. The table below outlines the breakdown by assignment and length of service. A review of the length of service indicates the department has a considerable amount of experience.

Demographics

Assignment	Number of Responses	Pct. Of the Total
Administration/Prevention/Civilian	7	10.77%
Operations	58	89.23%

Length of Service	Number of Responses	Pct. Of the Total
Less than 1 year	3	4.92%
1 - 5 years	8	13.11%
6 - 10 years	18	29.51%
11 - 15 years	11	18.03%
16 - 20 years	7	11.48%
More than 20 years	14	22.95%

The survey was an online system and available to all the employees of the Merced County Fire Department. A total of 65 responses were received from the employees.

The next section describes the employee responses to the multiple-choice statements regarding their perceptions and attitudes about a variety of subjects within the department. The responses varied widely in this portion of the survey with some statements receiving strong agreement while others were more negative.

3. MULTIPLE CHOICE STATEMENTS

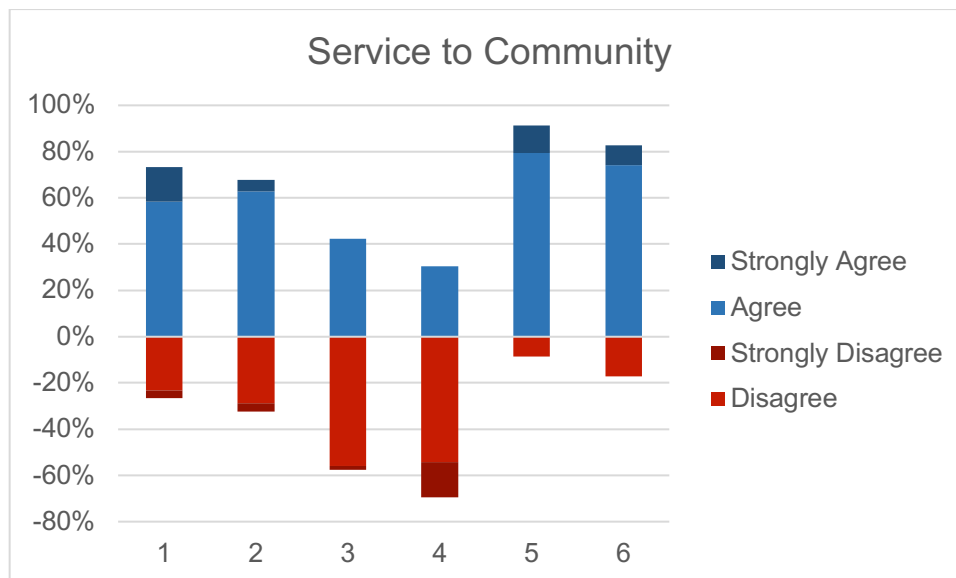
The following sections describe employees' responses to the multiple-choice statements from the second section of the survey regarding their perceptions and attitudes about various aspects of the department. Responses varied widely in this portion of the survey with some statements receiving strong agreement and respondents expressing more negative sentiments to others.

(1) Service to the Community

The following chart outlines the employees’ responses to statements regarding the department’s service to the community.

Service to the Community				
Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
1. The Department provides a high level of service to the Community	15.00%	58.33%	23.33%	3.33%
2. The residents of Merced County view the fire department as a high priority	5.08%	62.71%	28.81%	3.39%
3. The elected officials in the County view the department as a high priority	0.00%	42.37%	55.93%	1.69%
4. The department has a high amount of resources available for providing fire and EMS services.	0.00%	30.51%	54.24%	15.25%
5. There is good coordination with EMS on emergency calls.	12.07%	79.31%	8.62%	0.00%
6. The 911 dispatch system works well for fire/rescue calls.	8.62%	74.14%	17.24%	0.00%

The following graph provides a visual representation of the number of agreeing (blue) and disagreeing (red) responses to each statement in this category.



Please note the following points:

- **Statement #3:** “The elected officials in the County view the department as a high priority.” This statement received majority of disagreement along with a smaller number of agreement.
- **Statement #4:** “The department has a high amount of resources available for providing fire and EMS services.” This statement received a majority of disagreement with a smaller number of agreement.
- **Statement #5:** “There is good coordination with EMS on emergency calls.” This statement received a majority agreement with a very low number if disagreement.

The respondents made it clear they feel the department provides a high level of service to the community. They also made it clear they do not feel they have the resources to be effective.

(2) MANAGEMENT AND ADMINISTRATION

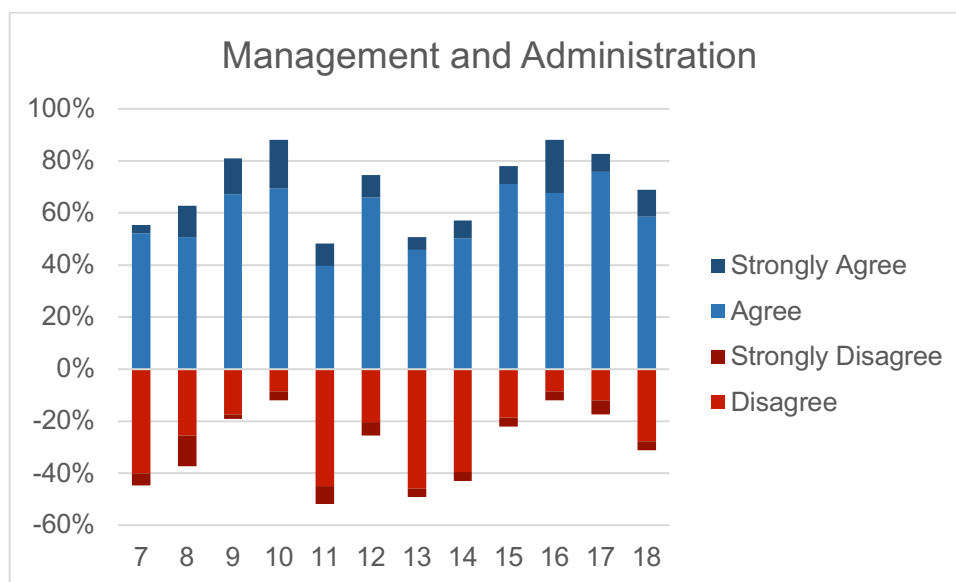
The following chart outlines the employees’ responses to statements regarding the management and administrative effectiveness of the department.

Management and Administration				
Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
7. Our department has a clear vision/direction for the future.	3.45%	56.90%	43.48%	5.17%
8. I am kept informed of departmental information that affects me.	11.86%	50.85%	25.42%	11.86%
9. I am able to provide input to my supervisor and management.	13.79%	67.24%	17.24%	1.72%
10. My work performance expectations are made clear.	18.64%	69.49%	8.47%	3.39%
11. Our department seems to be innovative and progressive.	8.62%	39.66%	44.83%	6.90%
12. Our department does a good job planning and scheduling our work assignments.	8.47%	66.10%	20.34%	5.08%
13. Our policies and procedures are up to date and are consistently followed.	5.08%	45.76%	45.76%	3.39%
14. The department strives to continually improve policies and procedures.	6.78%	50.85%	39.98%	3.39%
15. I receive the appropriate training to do my job well.	6.78%	71.19%	18.64%	3.39%

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

16. My supervisor listens to me and evaluates me fairly.	20.34%	67.80%	8.47%	3.39%
17. I am treated fairly by the department.	6.90%	75.86%	12.07%	5.17%
18. There is a good working relationship between paid call personnel, full-time personnel and administrative staff.	10.34%	58.62%	27.59%	3.45%

The following graph provides a visual representation of the number of agreeing (blue) and disagreeing (red) responses to each statement in this category.



Please note the following points:

- **Statement #7:** “Our department has a clear vision/direction for the future.” This statement received a majority of agreement along with a significant number of disagreements.
- **Statement #10:** “My work performance expectations are made clear.” This statement received a large majority of agreement along with a smaller group of disagreement.
- **Statement #11:** “Our department seems to be innovative and progressive.” This statement received a mixed reaction with a slight majority of disagreement.
- **Statement #13:** “Our policies and procedures are up to date and are consistently followed.” This statement also received a mixed reaction with a slight majority of agreement.

Respondents, for the most part, feel as though their supervisors are responsive to them and willing to listen. Their work expectations and fair treatment also ranked high with agreement. One area that is noticeably in disagreement is in the policy and procedures where the respondents seem to agree the policies are up to date but not necessarily followed consistently.

(3) ORGANIZATION, STAFFING AND OPERATIONS

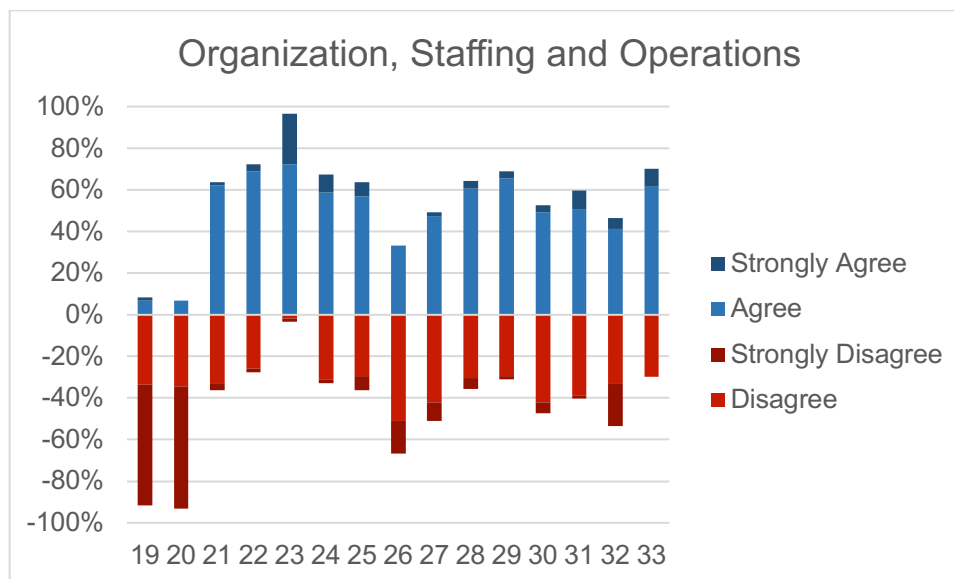
The following chart outlines the employees’ responses to statements regarding the organization, staffing and operations of the department.

Organization, Staffing and Operations				
Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
19. Our department is adequately staffed to meet the demands for services.	1.67%	6.67%	33.33%	58.33%
20. Current apparatus staffing allows us to effectively and safely perform our duties on emergency scenes.	0.00%	6.90%	34.48%	58.62%
21. Dispatch information provided to us on incidents is accurate.	1.72%	62.07%	32.76%	3.45%
22. Dispatch information provided to us on incidents is received in a timely fashion.	3.45%	68.97%	25.86%	1.72%
23. We get out of our stations quickly in response to emergency calls.	24.14%	72.41%	1.72%	1.72%
24. We receive the practical training we need to keep our skills high.	8.62%	58.62%	31.03%	1.72%
25. Our department places a high value on ensuring proper training for field personnel.	6.90%	56.90%	29.31%	6.90%
26. We have maximized the use of technology in delivering services in the field.	0.00%	33.33%	50.88%	15.79%
27. Our current approach to pre-fire planning is effective.	1.75%	47.37%	42.11%	8.77%
28. The business inspection program increases life-safety in our community.	3.57%	60.71%	30.36%	5.36%
29. Fire Prevention and Public Education information is adequately disseminated to the community.	3.45%	65.52%	29.31%	1.72%
30. Paid call personnel are able to perform their assigned tasks effectively.	3.51%	49.12%	42.11%	5.26%

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

31. The department makes effective use of paid calls.	8.77%	50.88%	38.60%	1.75%
32. The current shift model works well.	5.17%	41.38%	32.76%	20.69%
33. There are ways I could be used more effectively at work.	8.77%	61.40%	29.82%	0.00%

The following graph provides a visual representation of the number of agreeing (blue) and disagreeing (red) responses to each statement in this category.



Please note the following points:

- **Statement #19:** “Our department is adequately staffed to meet the demands for services.” This statement received a majority of disagreement with a small number of agreement.
- **Statement #20:** “Current apparatus staffing allows us to effectively and safely perform our duties on emergency scenes.” This statement also received a majority of disagreement with a small number of agreement.
- **Statement #23:** “We get out of our stations quickly in response to emergency calls.” This statement received a majority of agreement with a small number of disagreement.
- **Statement #30:** “Paid call personnel are able to perform their assigned tasks effectively.” This statement received mixed reaction with a slightly higher agreement than disagreement.

- **Statement #31:** “The department makes effective use of paid call.” This statement also received a mixed reaction with a slightly higher agreement than disagreement.

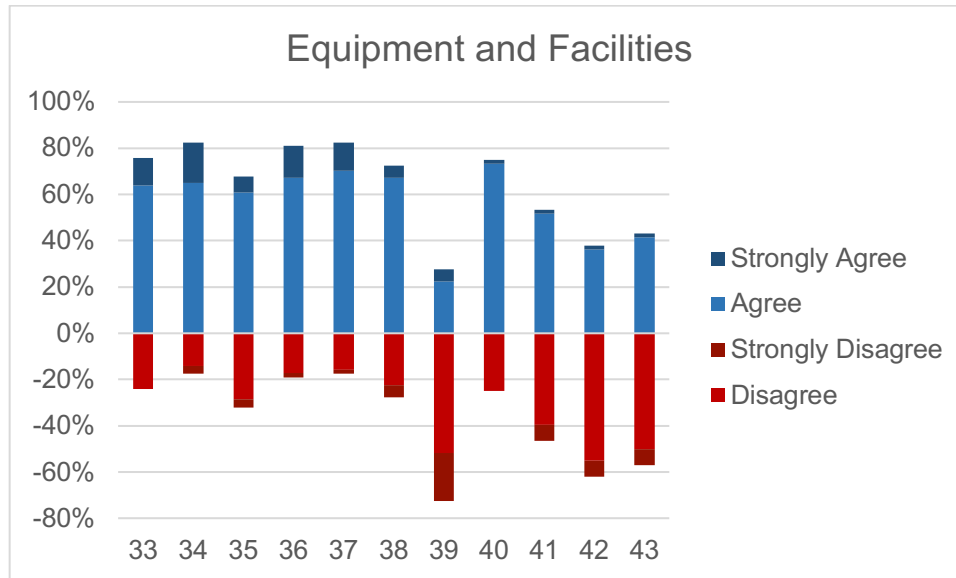
Respondents were very clear with their opinions about staffing and available resources. There were mixed reactions related to the use of the paid call staff, pre-fire planning and the effective use of their own time while at work.

(4) EQUIPMENT AND FACILITIES

The following chart outlines the employees’ responses to statements regarding the organization, staffing and operations of the department.

Equipment and Facilities				
Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
33. We have the equipment we need to provide high levels of service.	12.07%	63.79%	24.14%	0.00%
34. We have the apparatus we need to provide high levels of services.	17.54%	64.91%	14.04%	3.51%
35. We are replacing our fire and EMS apparatus on an appropriate schedule.	7.14%	60.71%	28.57%	3.57%
36. Our fire and EMS equipment is well maintained.	13.79%	67.24%	17.24%	1.72%
37. Our fire and EMS apparatus are well maintained.	12.28%	70.18%	15.79%	1.75%
38. Our apparatus is repaired in a timely manner.	5.17%	67.24%	22.41%	5.17%
39. Our fire stations are in good condition and provide a safe and comfortable place to work.	5.17%	22.41%	51.72%	20.69%
40. The locations of our fire stations are effective in meeting community needs.	1.79%	73.21%	25.00%	0.00%
41. Our fire stations are well maintained.	1.72%	51.72%	39.66%	6.90%
42. Our fire stations meet the needs of the department.	1.72%	36.21%	55.17%	6.90%
43. Our fire stations meet the needs of the County.	1.72%	41.38%	50.00%	6.90%

The following graph provides a visual representation of the number of agreeing (blue) and disagreeing (red) responses to each statement in this category.



Please note the following points:

- **Statement #33:** “We have the equipment we need to provide high levels of service.” This statement received a majority of agreement along with a small number of disagreement.
- **Statement #34:** “We have the apparatus we need to provide high levels of services.” This statement received a majority of agreement with a small number of disagreement. This mirrors the response to the previous statement as would be expected.
- **Statement #39:** “Our fire stations are in good condition and provide a safe and comfortable place to work.” This statement received a majority of disagreement with a small number of agreement.
- **Statement #42:** “Our fire stations meet the needs of the department.” This statement received a majority of disagreement with smaller number of agreement.
- **Statement #43:** “Our fire stations meet the needs of the County.” This statement received a majority of disagreement with a smaller number of agreement. This response mirrors the response of Statement #42.

Respondents believe the equipment and apparatus is sufficient for their mission and is well maintained. They also believe their facilities are not adequate based on the response patterns of those statements.

4. OPEN-ENDED PROMPTS

There were three open-ended prompts and a section to clarify any answers to their statements above. The following sections summarize those comments found at the end of the survey.

(1) Please indicate what you believe are the most important strengths of the Fire Department

There were 45 responses to this prompt. Themes that appeared in multiple responses are outlined below:

- Limited staffing performing at high levels (9 responses)
- Quality personnel (5 responses)
- Reliable and quality service (5 responses)
- Morale (2 responses)
- Can do attitude (2 responses)
- Service to community (3 responses)
- Dedicated personnel (11 responses)
- Training (6 responses)
- Equipment (6 responses)

These responses align with the Service to Community and Management and Administration sections earlier in this survey. The overall opinion of the employees is they are doing the best they can with the resources they have.

(2) Please indicate what you believe are the most important improvement opportunities facing the department.

There were 48 responses to this prompt. Themes that appeared in multiple responses are outlined below:

- Improving and increasing staffing levels (41 responses)
- Improvements to training (6 responses)
- Improvements to stations (14 responses)

The overwhelming majority of the responses had a comment about staffing levels with the next item being station improvements. This response mirrors the response

noted in the multiple-choice statements in the Organization, Staffing and Operations section.

(3) Please provide additional information regarding any statements with which you “Strongly Disagree”. Please cite the question number

There were 28 responses to this prompt. Themes that appeared in multiple responses are outlined below:

- Inadequate and lack of staffing (21 responses)
- Fire station improvements, expansion or replacement (5 responses)
- Work schedule (3 responses)

The responses for this prompt is strong support to the multiple-choice statements regarding fire station conditions. Virtually every response had a comment regarding the conditions of the stations.

(4) Please provide any comments you wish to clarify your answers or to provide further information to the project team.

There were 11 responses to this prompt. Themes that appeared in multiple responses are outlined below:

- Conditions of the stations (3 responses)
- Lack of staffing (8 responses)

As expected the responses to this prompt continue the theme of staffing issues and the conditions of the stations. These responses further support the responses to the multiple-choice statements and the responses to the open-ended statements.

APPENDIX B – COMPARATIVE SURVEY

As a function of the General Plan review, the project team conducted a comparative survey of the Merced County Fire Department with the fire departments of other similar California counties. Six departments were contacted, four departments completed the survey. The data contained in this section was acquired through a combination of contacts made with participating agencies and online research conducted by the project team, including the review of budget documents, relevant government records, and departmental annual reports, as well as the online websites of various agencies. Each of the contacts representing the surveyed Fire Departments consisted of current leading position of one of the following: Assistant Chief, Deputy Chief or Captain. The comparisons highlight a wide range of subject areas relating to fire services, including departmental budgets, staffing levels, accreditation, Insurance Services Offices rating, civilianization, the overall scope of operations within the agency, and many others.

It is important to stress that the contents and findings of the comparative survey should not be considered recommendations of the overall study, but rather a reflection of current trends and commonalities present in a limited sample of agencies similar to the Merced County Fire Department. An additional limitation of the survey that is worth noting is the incompleteness of the data, as the project team was not able to attain the full required data from each agency because of the lack of data recorded by the agency surveyed; certain comparisons will be limited in scope as a result. Those incomplete responses or lack of data are noted as not reported in the results listed below.

1. COMMUNITY OVERVIEW

As a basis for comparison, Table 1 examines various background statistics across each of the cities included in the survey, listed in order of population.

Surveyed Counties by Population

County	Population	Population Density	Area (sq. miles)	Per Capita Income	Fire Stations	Square Miles per Station
Mariposa	17,531	12.0	1,463.0	\$18,190	15	97.5
Shasta	179,533	46.7	3,847.0	\$17,738	32	120.2
Marin	261,221	315.5	828.0	NR	6	138.0
Merced	268,455	135.7	1,979.0	\$14,257	20	99.0
San Luis Obispo	281,401	192.3	1,463.0	\$21,864	21	69.7
Average	201,628	105.2	1,916.0	\$18,012	18.8	101.9

While the counties included in Table 1 vary somewhat by population, area, and per capita income, Merced is close to the average area and number of fire stations. These were not the only deciding factors in the selection of the counties for the comparative survey; input from fire department staff, geography, community similarities (e.g., rural counties in the valley area) were other factors that guided this process.

2. COMPARISON OF FIRE SERVICES

(1) Overall Staffing

Table 2 displays overall staffing levels separated into divisional categories by the position's functionality. The first county shown has the fewest total number of staff employed by the agency.

Number of Staff Employed

MERCED COUNTY, CALIFORNIA
Fire Department Effectiveness and Efficiency Study

County	Fire Suppr. Staff	Paid Call Staff	Fire Prev. Staff	EMS Staff	Civilian Support Staff	Admin. Staff	Total Staff
Mariposa	0	125	1	0	0	1	127
Marin	78	60	2	0		3	143
Shasta	14	200	4	0	0	4	222
Merced	75	220	3	0	8	2	308
San Luis Obispo	106	241	4	0	15	1	367
Average	54.6	169.2	2.8	0.0	5.8	2.2	233.4

Merced is close to the average in several categories and employs more personnel than half of the respondents. All the agencies surveyed utilize volunteer or paid on call staffing in some manner. With the exception of administrative staff Mariposa County is all volunteer.

(2) Budget

Table 3 presents the overall budget figures for each department, using fiscal year 15/16 data.

Fire Department Budget and Cost per Capita

County	Personnel	Maintenance & Operations	Total Budget	Full Time Salaries	Overtime Budget	Overtime % of FTE Salaries	Cost per Capita
Merced	\$13,065,596	\$2,449,669	\$15,515,265	\$8,247,644	NR	NR	\$58
Mariposa	\$1,891,684	\$925,993	\$1,816,760	\$164,684	\$1,727,000	1049%	\$64
San Luis Obispo	\$17,116,873	\$4,156,769	\$21,366,484	\$9,499,109	\$1,143,111	12%	\$76
Marin	\$20,318,160	\$1,333,460	\$23,254,596	NR	NR	NR	\$89
Shasta	\$4,200,000	NR	\$7,200,000	NR	NR	NR	\$216
Average	\$11,318,463	\$2,216,473	\$13,830,621	\$5,970,479	\$1,435,056	24%	\$69

- It should be noted that these budget figures include general fund expenditures only; they do not include capital costs.

- Mariposa County utilizes paid-on-call staffing therefore the overtime budget appears inflated due to the costs for this particular service.
- Among the agencies included in the survey, the average proportion of personnel expenses in an agency is approximately 81.8%.
- Merced ranks slightly above average in this category, with spending on salaries constituting approximately 84.2% of the department’s overall budget.

The proportions of overall fire budgets to the population totals for each county, however, vary far more extensively, ranging from a low of \$58 (Merced) to a high of \$216 (Shasta) per resident. In this regard, at \$58 Merced is below the group average of \$69 spent on fire services per capita.

(3) Sworn Positions

Sworn staffing levels for each city are displayed in Table 4, excluding the top executive management positions.

Fire Department Sworn Positions

County	AC	Deputy Chief/Fire Marshal	BC	Capt	Eng	FF / Paramedic	FF / FF EMT	Volunteer /POC	Civilian	Total Staff
Mariposa	1	0	0	0	0	0	0	125	0	126
Marin	1	1	5	19	39	6	6	60	6	143
Shasta	1	3	1	6	4	0	4	200	0	219
Merced	0	1	6	16	52	0	0	220	8	303
San Luis Obispo	0	0	2	41	30	18	15	241	15	362
Average	0.6	1.0	2.8	16.4	25.0	4.8	5.0	169.2	5.8	230.6

Merced is above the average of the total staff in the group as well as volunteer/paid-on-call staff. The positions within each department are similar with the variable being the use of volunteer/paid-on-call staffing.

(4) Apparatus and Vehicles

Table 5 compares the total number of staffed apparatuses and by each type of vehicle an agency uses daily. The table is sorted by the total amount of vehicles used daily in an ascending order.

Daily Apparatus and Vehicle Staffing

County	Engines	Quint/Truck Companies	Ambulances	Command Vehicles	Specialty Vehicles	Total Daily Staffed Vehicles
Mariposa	0	0	0	2	0	2
Marin	7	0	0	1	1	9
Shasta	5	0	0	3	1	9
San Luis Obispo	14	0	0	1	4	19
Merced	20	0	0	2	5	27
Average	9.2	0.0	0.0	1.6	1.4	12.2

With the departments utilizing volunteer/paid-on-call staffing, the physical staffing of apparatus is limited. While Merced is considerably higher than the average the use of the volunteer/paid-on-call staffing will skew the data.

Table 6 compares the daily and minimum staffing figures for each agency relating to emergency operations and engine companies. None of the departments surveyed have truck/quint companies.

Daily Apparatus and Vehicle Staffing

County	Total Daily Staffing of Emergency Operations	Minimum Daily Staffing of Emerg. Operations	Schedule Staffing of Engine Companies	Minimum Staffing of Engine Companies	Are Ambulances Staffed by Firefighters?
Shasta	10	10	2	2	NA
Merced	26	26	1 / 2	1 / 2	NA
San Luis Obispo	40	40	2 / 3	2 / 3	NA
Marin	45	39	4	2	NA
Mariposa	Volunteer	Volunteer	Volunteer	Volunteer	NA
Average	30.3	28.8	2.3 / 2.7	1.8 / 2.3	

In terms of minimum staffing for an engine company Merced is below average of those surveyed. Merced is in the middle of the group as far as total daily staffing. Mariposa being a volunteer/paid-on-call does not have apparatus physically staffed during the day.

(5) Fire Prevention

Table 7 displays the fire prevention staffing numbers for each agency, as well as the areas personnel are assigned.

Fire Prevention and Investigations Staffing

County	Fire Prevention Staff	Personnel Assigned to Plan Review	Personnel Assigned to Inspections	Personnel Assigned to Fire Investigations
Merced	3	1.5	3	0
Marin	2	2	2	2
San Luis Obispo	4	4	4	4
Mariposa	1	1	1	1
Shasta	4	4	4	4
Average	3.0	2.5	2.8	2.2

Staffing of the fire prevention function appears to vary a significant degree across those surveyed. Merced and Marin both have the average number of personnel. It

should be noted that most of the agencies do not have dedicated personnel to specific functions within the fire prevention bureau but rather they all perform the tasks as needed.

Table 8 displays additional fire prevention service comparisons below.

Fire Prevention Services					
County	Fire Inspectors Sworn or Civilian?	Fire Companies Conduct Annual Business Inspections?	Fire Companies Conduct Pre-Fire Planning Activities?	Number of Inspectable Properties	Number of Inspections Completed
Merced	Both	No	Yes	6,400	250
Marin	Sworn	Yes	No	NR	NR
San Luis Obispo	Both	Yes	NR	<100	50
Mariposa	Sworn	No	No	NR	50
Shasta	Both	No	Yes	NR	NR

Two departments have engine company inspection programs. Merced is in the process of developing the program, their staff indicate it could at least 18 to 24 months before everyone is appropriately trained and the program is fully operational. Merced has a workload of approximately 6,400 properties that should receive periodic fire safety inspections, with 250 being completed. Two other agencies identified partial statistical information in this category.

(6) Agency Accreditation, Insurance Services Offices (ISO), Regional Dispatch, Training and Technology

Table 9 displays the accredited status, ISO rating and type of dispatch concerning the surveyed agencies.

Accreditation, ISO, Regional Dispatch and Turnover Rate				
County	Annual	Agency	ISO Class	Member of a

	Turnover Rate	Accredited?		Regional Dispatch Center?
Merced	5%	No	4 / 4y	No
Marin	5	No	3 / 3x	No
San Luis Obispo	15 - 20%	No	4	No
Mariposa	10%	No	5 / 8	No
Shasta	NR	No	5 / 5y	Yes

None of the agencies are accredited and one department is a member of a regional dispatch center. The turnover rates ranged from 5% to 10%

Table 10 displays the training and the conducted company evolution details pertaining to the surveyed agencies.

Training and Company Evolutions

County	Training Staff	Daytime Evolutions	Nighttime Evolutions	Evolutions with Mutual/Automatic Aid Partners
Merced	1	Yes	No	Yes
Marin	2	Yes	Yes	Yes
San Luis Obispo	3	Yes	Yes	Yes
Mariposa	3	Yes	Yes	Yes
Shasta	3	Yes	Yes	Yes

Merced has one person handling the training which is below the norm for these agencies. All of respondents indicated they have daytime evolutions and with the exception of one they conduct nighttime drills. Merced has indicated they handle their training in round robin rotations due to the staffing and station location issues.

Table 11 displays the use of technology in the field related to the surveyed agencies.

Use of Technology

County	Use of MDT's in Apparatus	Fire Prevention Use of Mobile Devices	Other Uses of Electronics
Merced	Yes	Yes	Yes
Marin	Yes	Yes	NR
San Luis Obispo	Yes	Yes	NR
Mariposa	No	Yes	NR
Shasta	No	Yes	NR

Most of the respondents are using mobile data terminals and other devices in their responding units. The use of these devices are also extended to other functions such as fire prevention and pre-fire planning.

City of Modesto Fire Department

California



Fire Department Program Service Audit, Master Plan, and ISO Community Fire Service Performance Review

ISO Community
Analytic Services

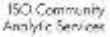



September 2015



Emergency Services
Consulting International

Table of Contents

Table of Contents	iii
Acknowledgments	1
Executive Summary	3
Evaluation of Current Conditions	11
Organizational Overview	11
Focus Group meeting	14
Customer Strengths	19
Customer Expectations	19
Customer Concerns	20
MFD Mission, Vision, and Values	20
Governance and Structure	22
Organizational Design	23
Organizational Chart	25
Service Area and Infrastructure	26
Budget and Finance	28
Emergency Response Type and Frequency	34
  Insurance Services Organization (ISO) Community Fire Service Performance	
Review	39
1.0 Public Protection Classification	40
1.1 PPC™ Total Points Scored	40
1.2 Insurance Money Savings	41
2.0 Performance	42
2.1 Fire Severity	42
3.0 Prevention	43
3.1 PPC™ Points for Community Risk Reduction	43
3.2 PPC™ Points for Distribution of Companies	44
3.3 Commercial Property Sprinkler Adoption	44
4.0 Personnel	46
4.1 PPC™ Points FOR Personnel	46
4.2 Firefighters per Population	47
5.0 Training	48
5.1 PPC™ Points for Training	48
5.2 Pre-Plan Coverage	49
5.3 Pre-Incident Planning Frequency	50
9.0 Data Sources and Notes	51
Management Components	53
Foundational Elements – Mission, Vision, Strategic Planning, Goals, and Objectives	53
Management Documents and Processes	55
Critical Issues	57

Challenges.....	57
Record Keeping and Documentation.....	59
Staffing and Personnel Management	61
Administrative and Support Staffing.....	61
Fire Prevention.....	63
Training	63
Emergency Management.....	63
Emergency Response Staffing.....	64
Service Delivery and Performance	69
Demand Analysis.....	71
Temporal Variation	74
Geographic Service Demand.....	76
Distribution Analysis	79
Concentration Analysis	90
Reliability.....	94
Response Performance	97
Turnout Time	100
Travel Time	101
Support Programs – Training	102
General Training Competencies.....	103
New Personnel Training.....	105
Firefighter Safety Training	105
Pre-Incident Planning.....	106
Minimum Training Requirements.....	106
Training Program Management and Administration.....	106
Training Program Administration	108
Training Program Planning.....	108
Training Resources and Methodology	109
Training Facilities and Resources.....	111
Training Manual	111
Professional Development.....	111
Performance Standards and Periodic Skills Evaluation	111
Training Delivery Methodology – Competency-Based Training	112
Support Programs – Life Safety Services (Fire Prevention)	113
Fire and Life Safety Code Enforcement.....	115
New Construction Plan Review and Inspection	117
Existing Occupancy Inspection Program	118
Fire and Life Safety Public Education Programs.....	120
Fire Cause and Origin Investigation	121
Fire Investigation	123
Emergency Medical Services Support and Systems Oversight.....	123
EMS Program Services	124
EMS Program Supervision.....	125
Agency Based EMS Medical Director and Clinical Protocols	126



EMS Quality Improvement.....	126
Prospective (Pre-Incident) Medical Control	126
Concurrent (Real-Time) Medical Control.....	126
Retrospective (Post Incident) Medical Control.....	127
EMS System Integrity	128
Certification and Recertification Recordkeeping.....	129
Training and Continuing Education.....	129
Supplies and Materials Management.....	129
Capital Assets and Capital Improvement Programs	131
Facilities	131
Apparatus.....	143
CAPITAL REPLACEMENT PLANNING	145
Apparatus Maintenance and Repair	148
Future System Demand Projections	149
Population History	149
Population Projection	151
Service Demand Projections	151
Community Risk Review.....	153
Natural and Manmade Hazards	157
Future Delivery System Models	158
Development of Response Standards and Targets.....	158
Critical Tasks, Risk, and Staffing Performance	158
Response Time Performance Objectives	161
Short- and Mid-Term Strategies	163
Response Deployment.....	163
Fire Prevention.....	164
Emergency Medical Services (EMS)	165
Emergency Management.....	165
Comprehensive Cooperative Service Agreement.....	166
Training	167
Administrative Support Staff	167
Organizational Development.....	168
Recommended Long-Term Strategies	170
Add an Additional Ladder Truck Company at Station 5.....	170
Add an Additional Battalion Chief at Station 5.....	174
Industry Best Practices and Standards	177
Conclusion.....	179
Appendices	181
Appendix A: Economic Theory of Vehicle Replacement.....	181
Economic Theory of Vehicle Replacement	181
Appendix B: Table of Figures	183

Acknowledgments

Without the considerable support of the leadership of the City of Modesto, this project would not have been possible. Emergency Services Consulting International thanks and acknowledges the following representatives for their invaluable contribution to this undertaking

Garrad Marsh, Mayor

John Gunderson, Council Member

Tony Madrigal, Council Member

Dave Lopez, Council Member

Bill Zoslocki, Council Member

Jenny Kenoyer, Council Member

Dave Cogdill, Council Member

James Holgersson, City Manager

City of Modesto Fire Department

Sean Slamon, Fire Chief

Alan Ernst, Division Chief, Operations

Mike Payton, Fire Marshal

Jesse Nicasio, Battalion Chief, A-Shift

Hugo Patino, Battalion Chief, B-Shift

Randy Anderson, Battalion Chief, C-Shift

Tim Tietjen, Administrative Support Battalion Chief

Josh Hauselmann, EMS Coordinator

Jair Juarez, Modesto Professional Firefighters IAFF, President

Executive Summary

Emergency Services Consulting International (ESCI) was engaged by the City of Modesto to provide a long-range plan for the delivery of emergency services within the Modesto Department (MFD). This Emergency Services Master Plan will assist the department in future planning and provision of comprehensive emergency services to the citizens of Modesto. This report is organized as an organizational master plan that evaluates current conditions; projects future growth, development and service demand; and provides recommendations to enhance current services or to provide an equal level of service over the next 10 to 20 years.

ESCI thanks the Modesto City Council, the City Manager, and the staff of the MFD for their outstanding cooperation in the preparation of this report. All involved were candid in their comments and provided a tremendous amount of essential information. Special appreciation is offered to Fire Chief Sean Slamon in acknowledgement of the time, effort, and resources he provided for this plan.

The audit and master plan begins with a community forum and review of the current service delivery provided by MFD including its programs, administration, management, service delivery performance, and financial health. All areas are evaluated and discussed in detail, and specific recommendations are provided where applicable.

Community Forum

In order to dedicate time, energy, and resources on the functions that are most desired by its customers, the MFD wants to understand the customers' priorities and expectations. To better understand these priorities and expectations, two facilitated citizen forums were utilized to obtain community perspective regarding the MFD.

The community forums were conducted with community members invited to participate in the master planning process. Invitations were sent out from the City of Modesto and MFD to community leaders and neighborhoods throughout the city. Approximately 20 attendees were asked to fill out several survey instruments pertaining to how they think the MFD should plan for the future. The citizens represented were asked to identify the most important functions and services the fire department provides, based on the list of services currently provided, and rank those services as a critical priority, an important priority, or a low priority. In addition, participants were asked to rate a number of key indicators as they related to service levels, staffing, and cost of service.

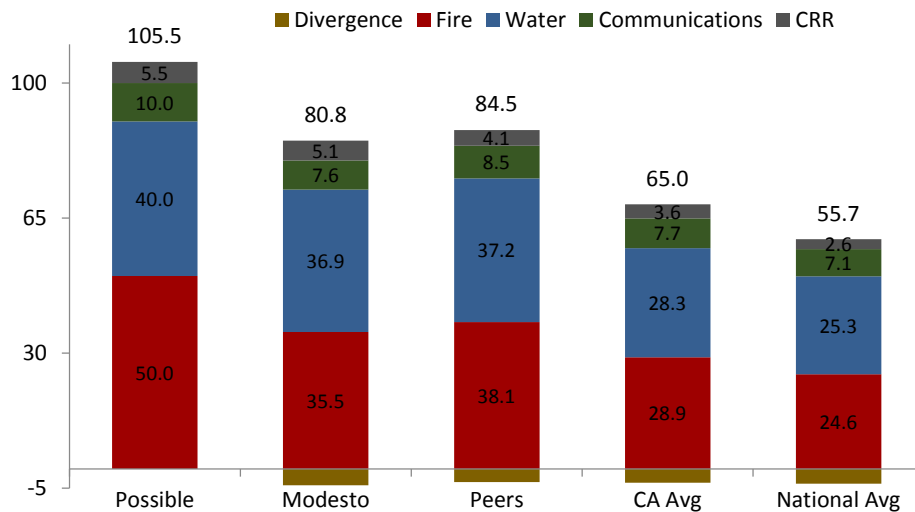
Understanding what the community expects of its fire and emergency medical services organization is critical to developing an effective long-range perspective. Armed with this knowledge, the MFD internal emphasis can be adjusted to better fulfill customer needs. The citizens group identified the following expectations:

- Adequate staffing and a timely response
- Maintenance of existing fire suppression and emergency medical service levels
- Well trained and response ready
- Professionalism and competency
- Continued integration and partnership with the communities served
- Community access to stations and personnel

Report Section I: Evaluation of Current Conditions

An analysis of current conditions is documented in nine survey sections, reviewing the MFD administration, governance, staffing, personnel management, service delivery, planning, support programs, and capital assets. Each component of the evaluation includes an introductory explanation of the subject area and discussion of desirable outcomes and identified best practices.

Criterion used to evaluate the fire department has been developed over many years. These gauges include relevant guidelines from national accreditation criteria, the National Fire Protection Association (NFPA) standards, federal and state mandates for fire and EMS systems, recommendations by various organizations such as the Center for Public Safety Excellence (CPSE), and generally accepted best practices within the fire and EMS industry. In addition, the Insurance Service Organization (ISO) Analytics Division established a peer comparison group of approximately 15 similar departments and benchmarked key MFD functions and attributes with the identified peer agencies. The following figure shows the ISO rating criteria points against peer, state, and national standards. These point values and rating system determine the city’s ISO rating. This ISO rating is utilized by the insurance industry in determining fire insurance rates for the specified jurisdiction.



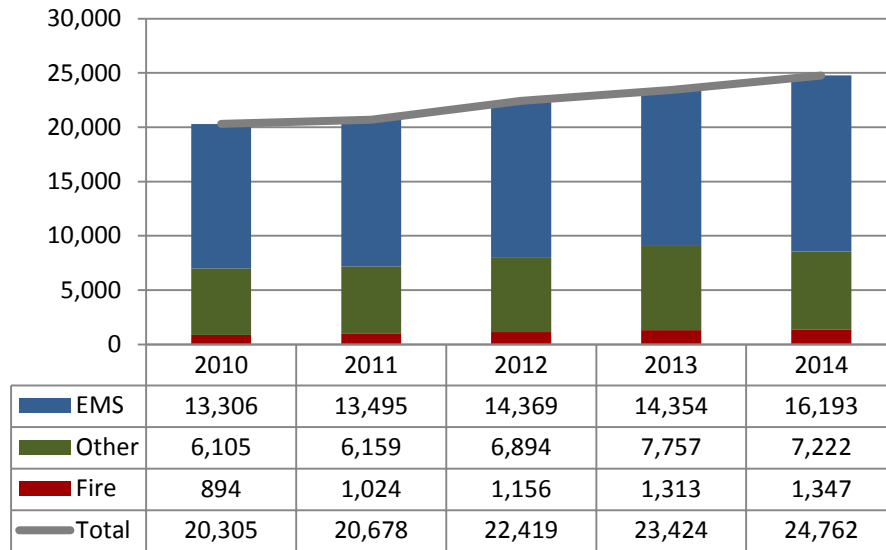
The evaluation of current conditions offers the City a detailed assessment of existing fire department operations and also provides the ESCI project team with a snapshot in time, the basis from which the balance of the Fire Department Program and Service Audit and Master Plan is developed. The following discusses some of the key findings:

Service Demand

The City of Modesto and adjacent areas are experiencing mild to moderate economic and population growth, which is expected to continue into the near future. With the economic and housing trends seen in Modesto and the central valley in general, cities and communities are seeing increased service demand and workload on the fire department. This increased service demand has been significant within the city of Modesto and has created some service delivery challenges for the MFD as they try to keep pace with the growing community needs.

Over the years, the department has evolved into the agency it is today, providing fire prevention and suppression, technical rescue, hazardous materials, and advanced life support (ALS) and basic life support (BLS) medical first response. The department operates from 11 strategically placed facilities using a fleet of 9 engines, two aerial ladder units (truck companies), one Airport Rescue Fire Fighting engine, three engines with ALS capabilities, a hazardous material and heavy rescue unit, several brush/wildland units, and a number of ancillary support vehicles. The department staffs entirely career personnel that include an administrative complement of 10 and an operations complement of 140 personnel.

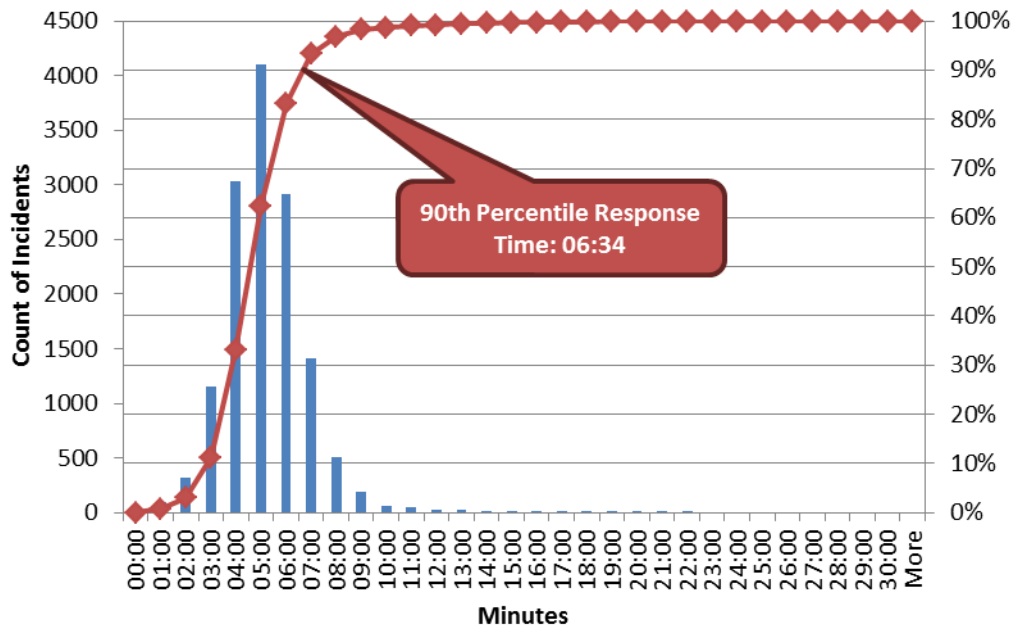
The following figure shows a 50 percent increase in the number of fire calls over the past five years. This is significant as similar jurisdictions have seen reductions in fire calls and are showing a consistent trend throughout the fire service as a result of enhanced fire prevention services, increased fire safe construction, and adopted fire code standards. This fire call increase is further impacted by double-digit increase of 21.7 percent for EMS calls. Additionally, other service demand resulted in an 18.3 percent increase in calls for service. "Other" calls are representative of those not falling into the fire or EMS categories and include calls such as citizen assists, alarm sounding, and other calls for assistance.



Service Delivery and Response Performance

Response performance criteria and actual service delivery performance is analyzed in detail, providing information with which the Department can develop future deployment methodologies and identify desired levels of response performance and staffing.

The response time to calls within the City of Modesto that the Department responded to in the study year were answered in 6 minutes 34 seconds or less 90 percent of the time. The following chart displays the 90th percentile response time from dispatch to arrival:



Fire stations are generally well located to provide reasonable response time intervals. GIS analysis indicates that just over 90 percent of incidents occurring within the City are within 6 minutes 34 second “travel” time from an existing fire station. This 90th percentile, 6 minute 34 second coverage is considered acceptable. However, without defined response performance goals, it is unknown if it meets community expectations or is meeting desired outcomes. It is explained further in the report that some aspects of response performance are best developed locally, based on identified risk, community expectations, and desired service levels. It is important that Modesto develops and adopts response, performance, and staffing standards that best meet the city’s risk profile and needs of the communities served. To meet the identified standards and/or improve upon current response times with anticipated future growth, additional personnel, fire apparatus and alternative response capabilities will be needed in the future.

It was noted that the MFD’s ability to assemble multiple units as an effective firefighting force is negatively impacted by three key elements seen within the city: 1. Simultaneous calls or unit reliability is an issue due to the high EMS and fire call volume frequently putting units out of position for optimum response. 2. Truck company coverage is inadequate to ensure optimized rescue, ventilation, and coordinated fire attack functions. 3. Battalion Chief response is extended due to one battalion chief covering the entire city. This chief officer response model is causing delayed response times for assigned Chief Officers. This delayed response is resulting in an excessive span of control for supervision and oversight, delayed incident command and scene control measures, and delayed fire ground accountability functions.

Staffing

The staffing section of the report reviews both operational and administrative and support personnel deployment. In general terms, operational (emergency response) staffing of fire apparatus is found to be within acceptable parameters. However, as mentioned previously, key response elements are challenged based on staffing levels being stretched to meet current service demand and inability to optimize response for anticipated future service demand growth.

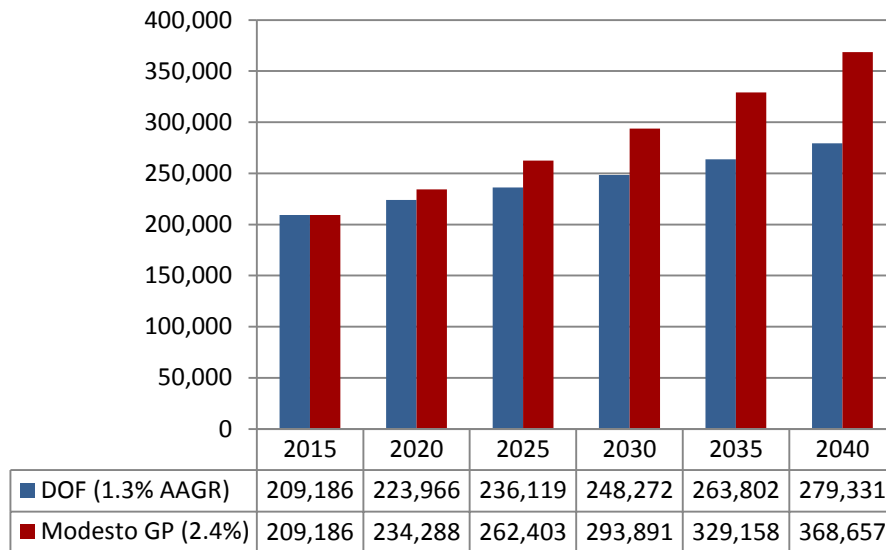
In review of administrative and support staffing levels, several shortcomings are revealed. The ratio of administrative staffing to departmental operational manpower is lower than what ESCI’s experience finds to be most effective. Further, the Operations Division Chief position is assigned multiple responsibilities, exceeding the capacity of one individual. Additionally, it is found that the Training Division is under-staffed in consideration of the anticipated addition of new personnel and the need to meet existing and future training mandates, which directly impact training workload.

Finally, the Department’s Fire Prevention, Emergency Management, and Public Education functions are understaffed, a situation that has been partially addressed by utilizing line (on duty responders) personnel to assist with prevention and education functions. Several opportunities to address inadequate administrative staffing can be addressed through enhanced regional partnerships with the existing cooperative service partners. Additional assessment and recommendations are provided in the report.

Report Section II: Future System Demand Projections

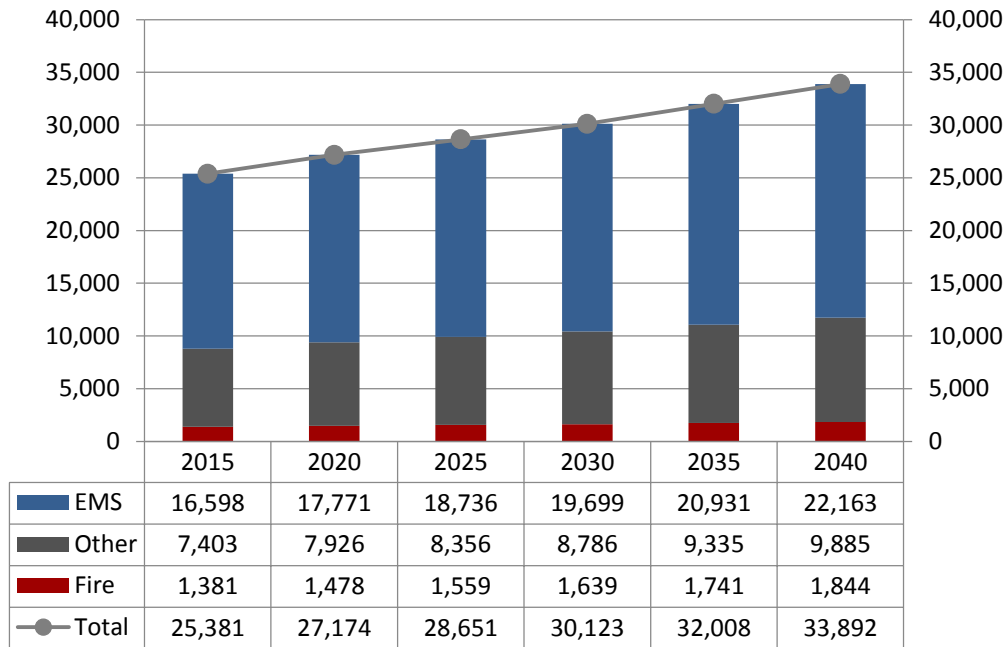
Following the evaluation of current conditions, the report continues to analyze the service delivery demands that can be expected to confront the MFD in the future. Existing demographics are identified and compared to the U.S. Census Bureau as well as local and regional planning resources for development of projected future needs.

In evaluating the deployment of facilities, resources, and staffing, it is imperative that consideration be given to potential changes, such as population growth, that can directly affect emergency workload. Changes in service demand may require changes and adjustments in the deployment of staffing and capital assets in order to maintain acceptable levels of performance. For the purposes of this study, ESCI utilizes data from the US Census Bureau, the California Department of Finance (Demographics Division), the Modesto Urban Area General Plan, and the Stanislaus Council of Governments (Stancog) to project population change within the MFD service area. The results are shown in the following figure:



The following figure displays projected service demand (summarized as “Fire,” “EMS,” and “Other” incident categories) through 2040. Fires (includes all types of fires) demonstrate the lowest rate of increase. This reflects a national trend attributed to improvements in building codes and fire prevention over the last several decades. EMS incidents are expected to continue to be the predominant factor affecting service demand in the MFD service area. This projection demonstrates a nearly 34 percent increase in service demand over the next 25 years. Note that using the 2.4 percent annual adjusted growth rate (AAGR) from the 2008 Modesto General Plan results in a projection of possible future service demand of over 33,800 incidents by 2040.





Report Section III: Future Delivery System Models

The current conditions analysis and system demand projections form the foundation from which ESCI has developed strategies for the delivery of services in Modesto for the future.

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

The discussion of future delivery systems begins with an explanation of the importance of developing response time standards and targets, viewed by ESCI as a critical step that is needed if MFD is to be able to appropriately plan for the future. Guidance is offered regarding how the agency can assess critical tasking, risk analysis, and staffing performance from which response time performance objectives can be established.

Short and mid-term strategies and models are discussed next. The initiatives identified and explained include:

- Future resource deployment needs
- Fire Prevention and Public Education operations and staffing needs
- Emergency Medical Services system participation/engagement and future considerations, including alternative response units
- Emergency Management program shortcomings and needs
- Administrative and Support program and organizational development needs
- Implementation of a comprehensive cooperative service agreement
- Training Program direction and ability to meet increasing training needs

The report continues by discussing long-term strategies and needs, including:

- Additional ladder truck company at station 5
- Additional Battalion Chief at station 5
- Fire Department accreditation
- Fire Dispatch center Academies of Emergency Dispatch (ACE) accreditation

The strategies needed to meet future service demand do not come without cost. It is understood and recommended that the MFD and City of Modesto view these strategies as longer term and incremental. The implementation of these recommendations should be based upon the identified service delivery need, meeting adopted performance and outcome standards, and the city's ability to provide the necessary capital equipment, revenue and personnel resources.

In the corresponding strategic plan to this report, alternative funding and phased implementation of the identified long-range recommendations are addressed. The strategic plan also contains recommendation tables and tracking tools that provide a consolidated view of the key short, mid- and long-term recommendations. The recommendation tables and tracking tools can serve as a tracking and progress report for the recommendations submitted as part of the Master Plan.

Evaluation of Current Conditions

Emergency Services Consulting International (ESCI) was engaged by the City of Modesto to provide a long-range plan for the delivery of fire and emergency services within the Modesto Fire Department (MFD) that will assist the department in future efforts and long-range planning. This report serves as the culmination of the project and is configured as an organizational Master Plan that evaluates current conditions; projects future growth, development, and service demands; and provides recommendations to enhance current services or provide an equal level of service over the next 10 to 20 years.

Using organizational, operational, staffing, and geographic information system (GIS) models; this phase of the study provides recommendations for improvement in current services delivered to the community. The evaluation and analysis of data and other information is based on California state laws and regulations, National Fire Protection Association (NFPA) standards, Commission on Fire Accreditation International (CFAI)¹ self-assessment criteria, health and safety requirements, federal and state mandates relative to emergency services, and generally accepted best practices within the emergency services community.

Each section in the following report provides the reader with general information about that element, as well as observations and analyses of any significant issues or conditions that are pertinent. Observations are supported by data provided by the MFD and collected as part of the review and interview process. Finally, specific recommendations are included to address identified issues or to take advantage of opportunities that may exist.

ORGANIZATIONAL OVERVIEW

The Organizational Overview component provides a review of the organization, discussing the agency's configuration and the services that it provides. Data provided by the MFD, City of Modesto Planning Department, and Stanislaus Regional Communications Center (SR 911) was combined with information collected in the course of ESCI's 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 agency's composition. This provides the foundation from which the Program and Services Audit and 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 agency's operations. Where appropriate, ESCI includes recommended modifications to current observations based on industry standards and best practices.

The Modesto Fire Department (MFD) provides emergency response services and life safety education programs to the citizens of the City of Modesto. This service is provided to approximately 205,000 people residing in a 37 square-mile area. Emergency response services include: fire suppression, emergency medical services, hazardous materials response, technical rescue, as well as wild land fire suppression.

In 2014, MFD responded to 24,762 calls for service from 11 fire stations located throughout the service area. In addition, MFD responded to 266 calls outside the service area in neighboring jurisdictions for a

¹ The CFAI organization is now a subsection of the Center for Public Safety Excellence (CPSE) but maintains its prime function of accrediting fire agencies.

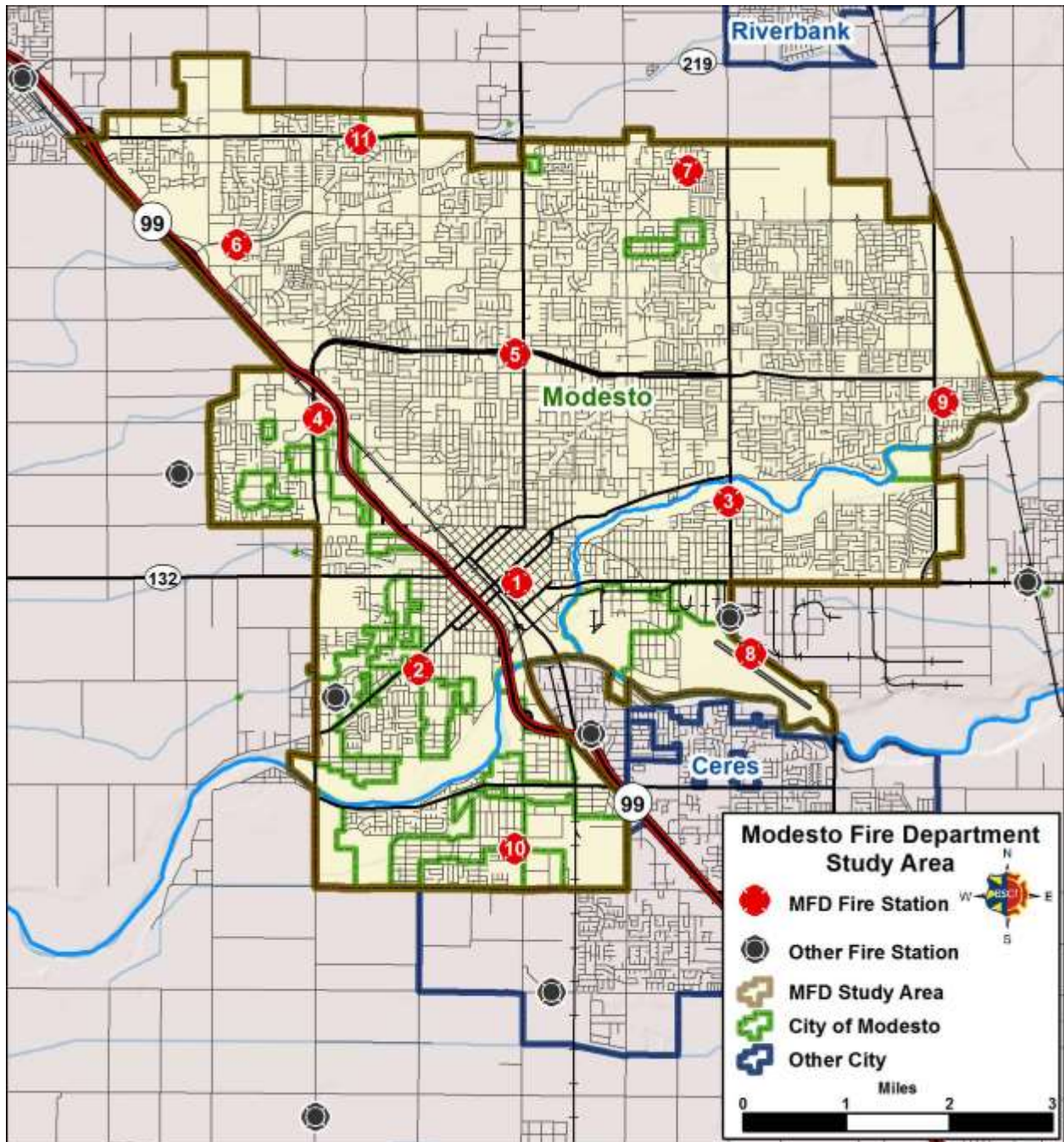
total of 25,005 responses. Approximately seventy percent of those calls were medical emergencies. Three MFD fire engine medic vehicles are fully equipped for advanced life support capabilities.

MFD's Prevention Division manages code review and revision; plan review, code enforcement, and fire/arson investigations. In addition, the MFD Prevention Division provides fire and life safety programs for all age groups and special events, such as station tours and open houses. Trained and certified instructors teach fire and life safety in an entertaining, yet meaningful format. Educational programs include: Juvenile Fire-Setter Program, Life Safety Education Presentations, Bike Helmet Safety, and Community Safety Events.

The MFD receives dispatch services from the Stanislaus Regional Communication Center (SR911) as a member of a joint powers authority (JPA) involving several jurisdictions. SR 911 is managed by the Stanislaus County Sheriff's Department and has a JPA governing board with representation from the major stakeholders including the Modesto Fire and Police Departments. The Stanislaus Regional Communications Center is the "first" first responder on fire and medical emergencies. This team provides assistance and information to citizens, both to emergency 911 calls and to routine fire request calls, 24-hours a day. If needed, communications specialists assist with CPR and rescue breathing instructions over the phone until paramedic/fire personnel arrive.



Figure 1: Service Area Map



FOCUS GROUP MEETING

In order to dedicate time, energy, and resources on the functions that are most desired by its customers, the MFD wants to understand the customers' priorities and expectations. Two facilitated citizen forums were utilized to obtain community perspective regarding the MFD. Invitations were sent out from the fire department and City of Modesto to community leaders and established community stakeholder and participation mailing lists.

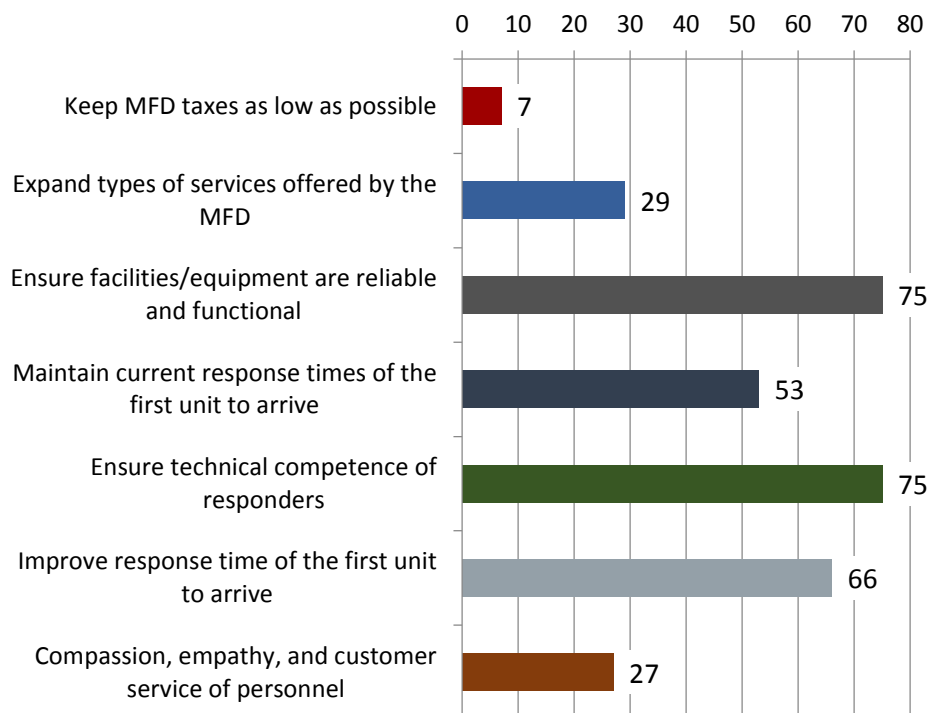
The beginning is the most important part of the work.

Feedback was solicited regarding:

- The appropriateness of the current mission, vision, and guiding principles.
- Expectations, concerns, and organizational strengths.
- Current services and planning elements were prioritized.
- Cost, staffing, and response performance were surveyed.

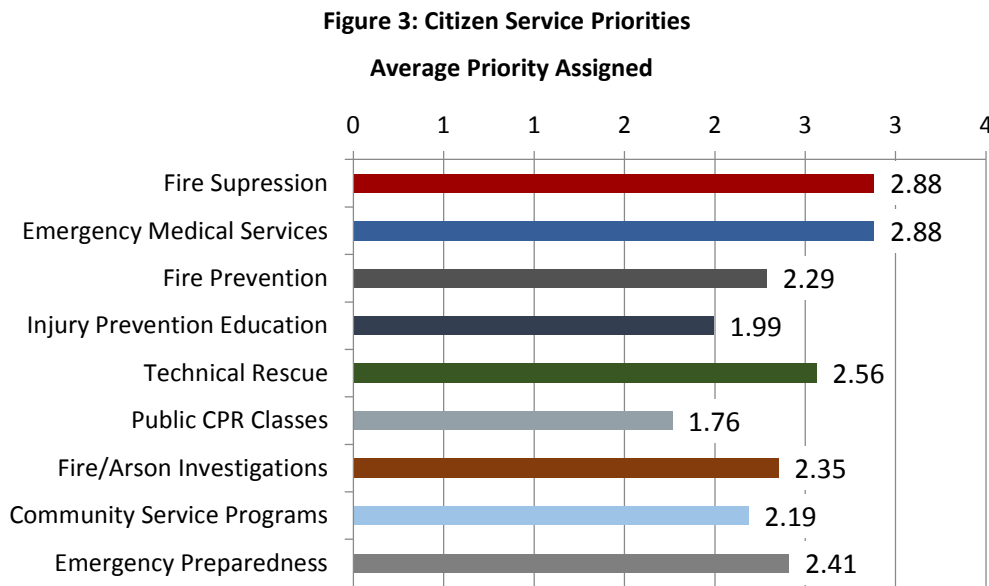
Forum participants were asked to fill out several survey instruments pertaining to how they think the MFD should plan for the future. The planning priorities were presented to the citizens as a forced ranking of seven separate dimensions, allowing the citizens to list those dimensions each citizen felt were more important than the others and so on. These were then compiled as a group to reflect consensus ranking of planning priorities. The following figure describes citizen planning priorities.

Figure 2: Citizen Planning Priorities



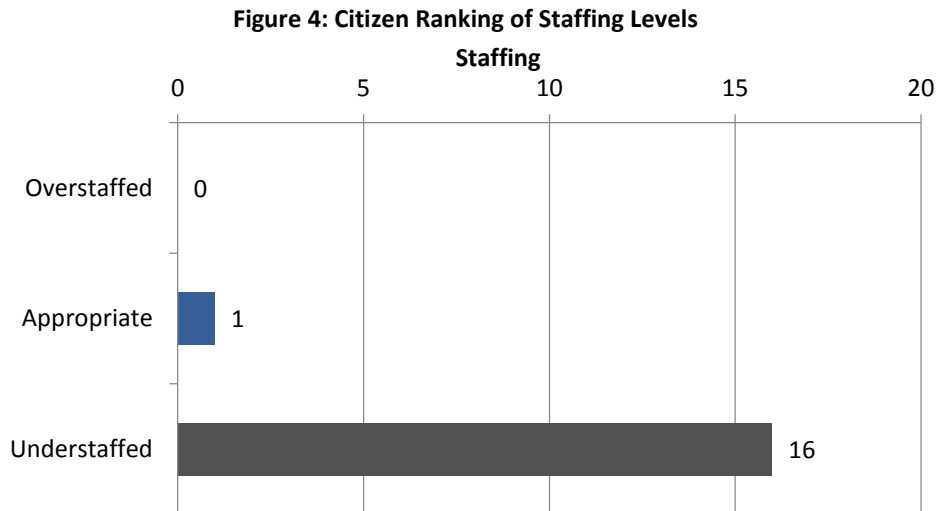
Forum participants felt it was most important to center the MFD planning and funding efforts on the technical and professional competence and safety of their fire service providers, ensuring they can adequately provide services their communities. Equal prioritization was given to ensuring that fire department facilities and equipment were maintained, reliable, and functional. The next level of planning priorities was to ensure the MFD provides adequate response times resulting in an adequate and effective response force.

Next, the citizens were asked to identify the most important functions and services the fire department provides based on the list of services that are currently provided, and rank those services as a critical priority, an important priority, or a low priority. In this case, the participants could elect to assign a single priority to multiple services. The following figure describes the forum participants' service priorities:

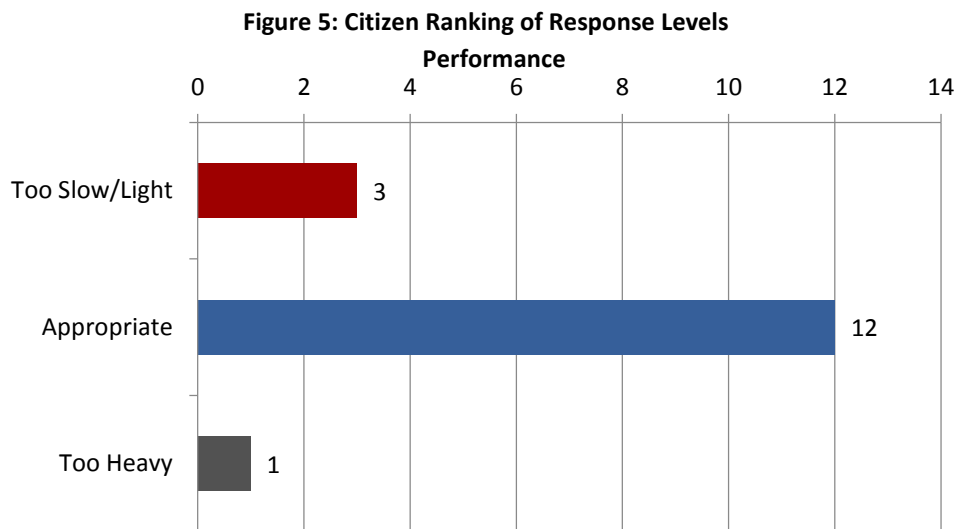


Forum participants were consistent in their desire to have MFD center their service efforts on their core mission of fire, EMS, and specialized rescue services. The next tiers of service priorities were centered on code enforcement, fire investigation, and community preparedness. Lastly, while everyone enjoyed and felt community education classes were important they were considered optional given limited resources. However, there was consistent and strong support for continued presence and interaction with the communities served.

Next, the forum participants were asked to rate and compare the staffing, response performance, and cost of services with their expectations and desired service levels. The following figures describe the results.

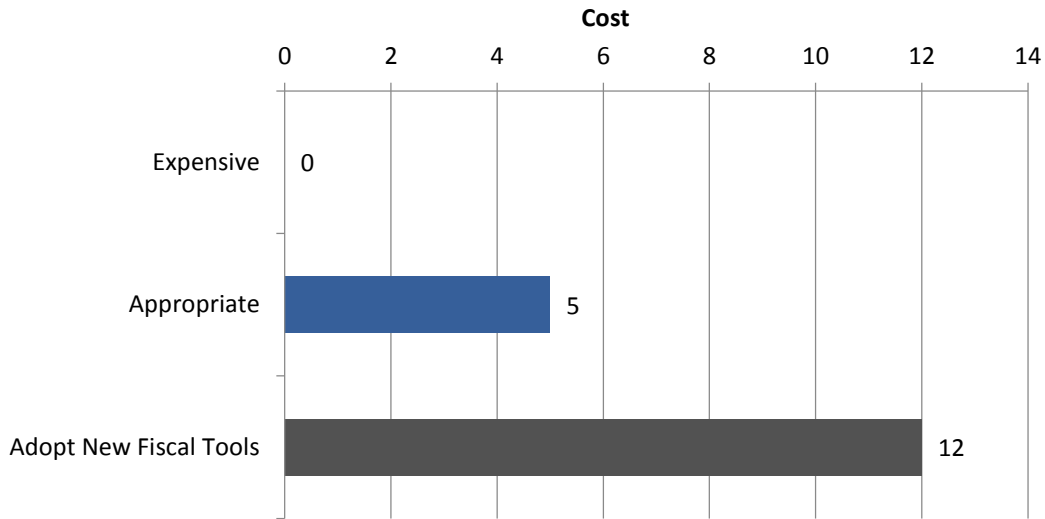


Forum participants clearly identified a need for additional personnel to meet existing and anticipated future service delivery needs. There was acknowledgement that existing resources have experienced significant reductions and have been redistributed in an effective manner. The community recognized that the service delivery demands exceed current resource capabilities.



Participants (by a three to one margin) felt responses by MFD were appropriate. While this seems somewhat inconsistent with the staffing level responses, it is understandable that the participants feel they are adequately protected by the MFD. However, it was consistently mentioned they would like to see MFD distribute and concentrate resources in a manner that will ensure adequate personnel and apparatus within the desired response time targets and take into account the severity, magnitude, and appropriate response level for each call.

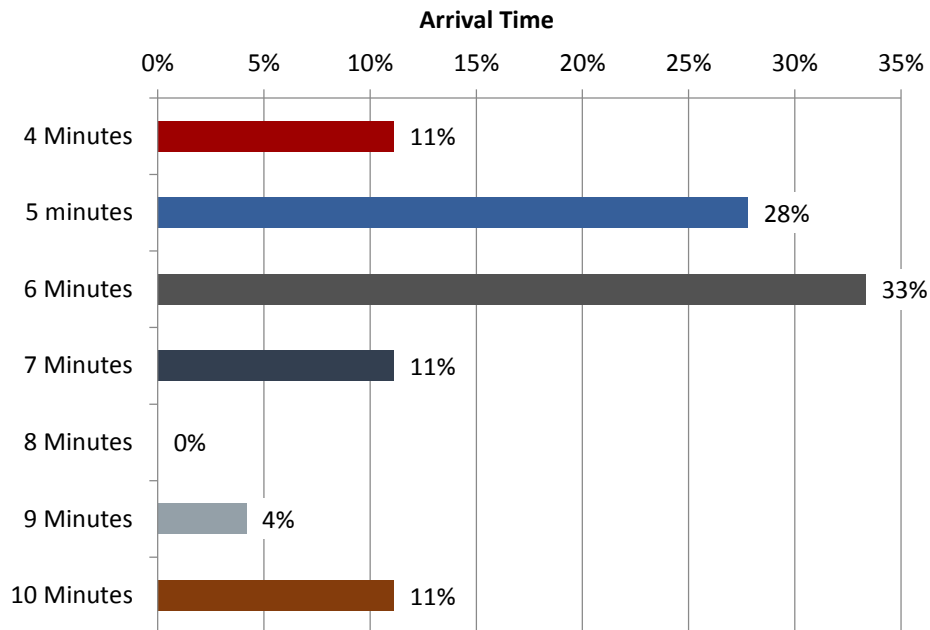
Figure 6: Citizen Ranking of Cost of Services



While cost was a significant issue and concern for all in attendance, the overwhelming perspective was that the resources allocated to MFD are managed well and being maximized for efficiency and effectiveness. There was broad support for adopting new fiscal tools such as peak demand staffing, grants, and other efficiency and revenue measures to ensure adequate service levels and capabilities are maintained.

Lastly, forum participants were instructed to share with ESCI their desired response time, given their understanding and observation of response times by MFD. These responses are based on the personal perceptions and biases of the forum attendees and did not take into consideration past performance data or comparison to fire service industry best practices or standards.

Figure 7: Citizen Ranking of Preferred Response Time



There was a significant and somewhat equal deviation of what stakeholders viewed as an acceptable response time. Current overall MFD response times are at 6 minutes 34 seconds ninety percent of the time. The five-minute and six-minute response time target received the highest amount of votes at 28 and 33 percent each for a total of 61 percent of the votes, four and seven minutes received the next highest amount of votes at a combined 22 percent. A response time of over seven minutes received a cumulative percentage of 26 percent of the vote.

There was a consistent desire by attendees of the forums for MFD to meet industry and regional best practices. Overall, current response times were thought not to be optimum and that service demands are exceeding the available resources on a regular basis. There was support to decrease current response times to meet industry best practices. In addition, there was a common understanding and desire to have appropriate resources respond to calls based on the urgency of the call and need for personnel and services. There was strong support for a tiered response force with alternative response options based on the type of call and the associated urgency and magnitude of the incident.



Customer Strengths

Customer views on the strengths and image of MFD must inform and impact all effective planning. Needless efforts are often put into over-developing areas that are already successful. However, using and promoting customer-identified strengths may help the organization overcome or offset some of the identified weaknesses. The citizens group identified the following strengths:

- Resource placement
- Focus on EMS
- Leadership and professionalism
- A valued community resource
- Capabilities
- Creativity and innovation
- Strong stakeholder relationships
- Forward thinking organization and leadership

Customer Expectations

Understanding what a community expects of its fire and emergency medical services organization is critical to developing an effective long-range perspective. Armed with this knowledge the MFD internal emphasis can be adjusted to better fulfill customer needs. The citizens group identified the following expectations:

- Be on time when the emergency occurs
- Be thorough and responsive
- Well equipped
- Strong community preparedness
- Operate in a safe manner
- Be well trained and knowledgeable
- Community involvement and engagement

Customer Concerns

The customer centered planning process would be incomplete without expression from the customers of concerns about the organization. Some concerns, in fact, identify weaknesses within the delivery system. However, others may be perceptions based on limited customer knowledge. The citizens group identified the following concerns:

- Lack of response consistency throughout the service area
- Understaffed
- Response times too long
- Not enough resources to meet future needs
- Adequate future funding and fire station closures

MFD Mission, Vision, and Values

In order to effectively establish a planning framework, it is imperative that organizations adopt and utilize a mission statement, vision statements, and values on which they can build policy priorities, goals, objectives, and recommendation for the future. Citizens were asked to comment on the relevance and impact of the MFD existing mission statement and values. In addition, they offered suggestions on key elements that should be included in vision statements for the future. The citizen groups identified the following key elements:

Previous Mission Statement Perceptions:

- Too long
- “Hostile fire” is a confusing term
- Needs to speak to the citizen/community protection
- No life safety, prevention, and education reference
- Focus on life and property
- “Mission of,” “effective,” and “efficient” is redundant
- First sentence says it all
- Reference timely and appropriate response
- Make customer service focused
- Statement of responsiveness to community
- Needs to state essential service

Current Vision Statements to Address:

- Dependability
- Industry leader/model department
- Adequate and safe facilities
- Fully staffed with fair compensation
- Citizen first community partnership
- Rapid, efficient, and closest appropriate unit response
- Innovation and creativity resulting in alternative service delivery
- Fiscal stewardship
- Build upon industry best practices
- Measurable outcomes
- Transparency
- Benchmarking against similar departments
- Strong marketing
- Achieve and maintain national standards

Values Important to the Community:

- Professionalism
- Quality service with a customer service focus
- Fiscal stewardship and business best practices
- Teamwork
- Competence and knowledge
- Strong expertise
- Demonstrate respect and empathy
- Strong cultural competency
- Physically fit
- Responsive
- Integrity and trustworthy (doing the right thing)
- Strong work ethic
- A Strategic organization

Governance and Structure

Regardless of organization type, fire departments, like any other formal organization, are overseen by a governing entity. This entity can take the form of a City Council, County Commission, Board of Directors, or Executive Board. Since the MFD is a municipal fire department that is a standing department within the organizational structure of the City of Modesto, the fire chief reports to the city manager and ultimately answers to the City Council.

Figure 8: Survey Table – Governance

Survey Components	Modesto Fire Department Observations	Comments And Recommendations
Governance And Lines Of Authority		
Governing Body	City Of Modesto	
Head Of Governing Body	Mayor	
Key Employee Of Governing Body	City Manager And Two Deputy City Managers	
Meetings	First Three Tuesdays Of Each Month	
Elected Official Authority Defined	Defined By City Charter	
Fire Chief Position		
Hired By Contract	Yes	
Term Of Contract	Open Ended Term	
Periodic Performance Evaluation	Yes	
Fire Chief/Authority Defined	Defined In The City Charter	
Policy And Administrative Roles Defined	Defined In Charter As Well As City Personnel Administrative Orders (PAOs)	
Attributes Of Successful Organizations		
Policy, Rules, Guiding Documents	Policy And Procedure Manual, Rules And Regulations Manual	
Process For Revision Provided	Revised On An As Needed Basis Via City Attorney's Office, Contracted Service	Establish A Defined Annual Process For Regular Review And Revision Of Rules, Policies, And Procedures. Include Labor Input.
Legal Counsel Maintained	Contracted Service	
Consultation Available	Available As Needed	
Labor Counsel	Same Contract Attorney Advises On Labor Matters	
Financial Controls		
Financial Control System	Fire Department Falls Under City Financial Protocols	
Financial Review	Outside Audit Performed As A Part Of The City Wide Audit Process	
Auditor	Moss Adams	
Frequency Of Review	Annual	
Governing Body Minutes Maintained	Yes	
Availability Of Minutes	Posted And Public Broadcast	



Key Recommendations:

- Establish a defined annual process for regular review and revision of rules, policies, and procedures that includes labor participation.

Discussion

The City of Modesto governance configuration is typical of California cities, operating under the direction of a City Council and mayor. Within the organization itself, the department is structured in a typical top-down hierarchy and is separated into clear operating divisions consisting of administration (overseen by the fire chief), operations overseen by a Division Chief, prevention (overseen by a fire marshal), training (overseen by a captain), and EMS (overseen by an EMS officer). Each division has additional support positions as identified in the figure that follows.

Organizational Design

The organizational design of an emergency services agency is vitally important to the agency's 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. During an emergency, an individual's ability to supervise multiple personnel is diminished; thus, industry standards recommend a span of control of four-to-six personnel under stressed situations. This recommendation is derived from military history and has shown to be effective in emergency service situations.

Figure 9: Survey Table – Organizational Design

Survey Components	Modesto Fire Department Observations	Comments And Recommendations
Organizational Structure		
Structure Type	Traditional Top-Down Hierarchy	
Descriptions Of All Jobs Maintained	Yes	
Job Descriptions Updated	As Needed Only	Scheduled Job Description Review And Update Is Needed.
Employment Agreements	IAFF Local 1289 Contract Inspectors: Modesto Police Non-Sworn Association (MPNSA) Non-Sworn: Modesto Confidential Management Association (MCMA) Clerical Staff (Non-Confidential): Modesto City Employees Association (MCEA)	
Chain Of Command		
Defined Chain Of Command	Yes	
Span Of Control	Five Direct Reports To Fire Chief. One Battalion Chief (BC) To 12 Companies.	BC Span Of Control Excessive 16:1 With 4 Relief Engineers That Also Report Directly To BC. Need To Establish Second Battalion To Establish A Manageable Span Of Control.
Hiring/Firing Authority	Fire Chief Recommends To City Manager	
Formation And History		
Organization Formed	1875	
History Maintained	Yes	
Individual Or Group Responsible	Retired Battalion Chief	
Key Recommendations:		
<ul style="list-style-type: none"> Establish an additional battalion 24/7 to reduce the existing span of control and ensure adequate oversight, supervision, and safer fire ground operations. 		

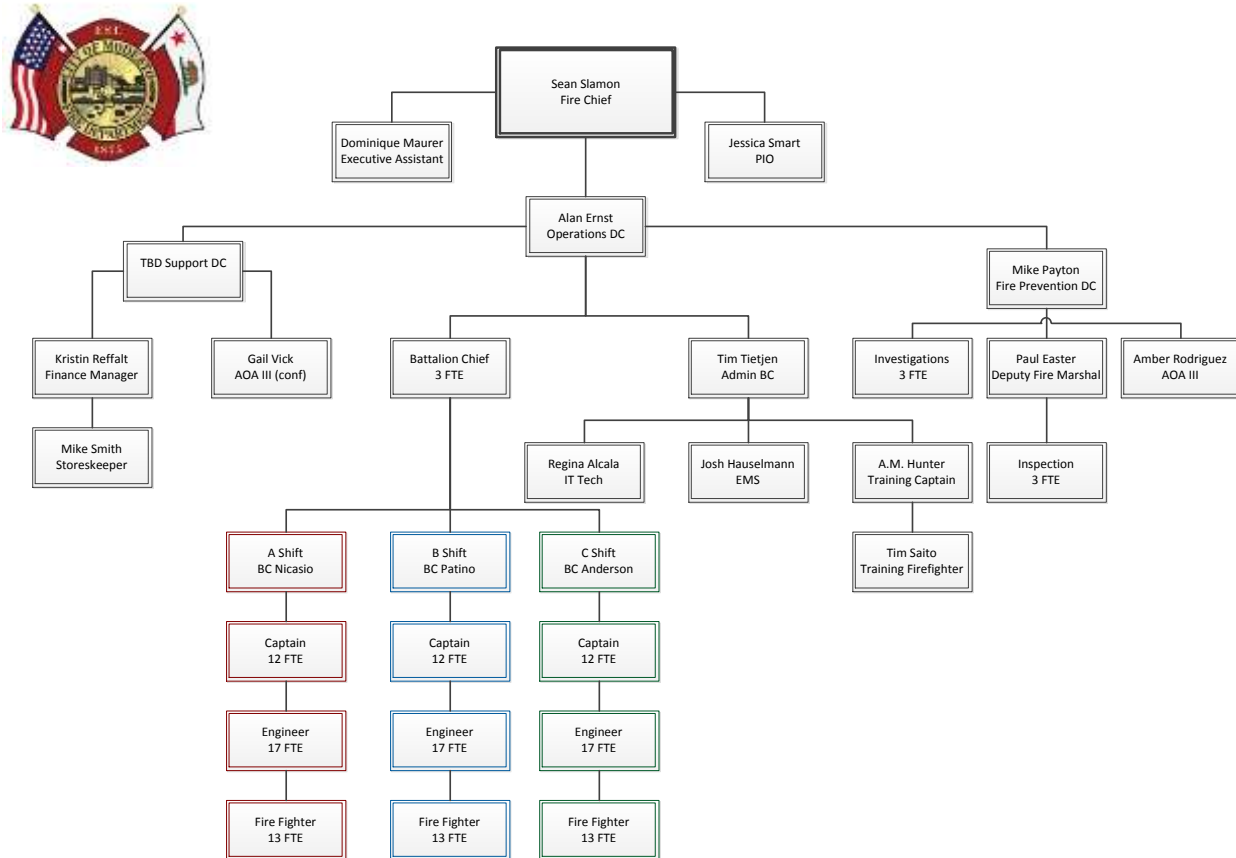


Organizational Chart

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, reporting authority. A well-developed chart helps to assure that communication flows appropriately and limits opportunities to circumvent the reporting structure.

Figure 10: Organizational Chart



While the chart above shows an appropriate and traditional organizational structure, it is important to note the span of control for the battalion chief position is well beyond accepted industry standards. In addition, the fire prevention, training, and EMS divisions are functioning at minimal staffing levels and below similar departments and industry standards.

Service Area and Infrastructure

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

Figure 11: Survey Table – Service Area and Infrastructure

Survey Components	Modesto Fire Department Observations	Comments And Recommendations
General Description Of Agency		
Agency Type	Municipal Subdivision	
Area, Square Miles	37	
Headquarters	Station 1	
Fire Stations	11	
Other Facilities	Administration Office And Rented Offices At City Hall. Also Partial Ownership And Use Of Offices At The Regional Fire Training Center.	
Population Served	Estimated 205,000 Including Unincorporated Area.	
Service Delivery Infrastructure		
Emergency Vehicles		
Engines	9	
Engine, Reserve	3	
Ladder Truck	2 + 1 Reserve	
Ambulance	0	
Ambulance, Reserve	0	
Quick Response Unit	0	
Water Tender	0	
Brush	3	
Rescue	1 Heavy Rescue	
ARFF	1 + 1 Reserve	
Haz Mat	1 Level A Team	
ISO Rating	2	
Total Fire Department Personnel, Uniformed And Civilian	150 Allocated Positions	
Administrative And Support Personnel, Full-Time	10	
Administrative And Support Personnel, Volunteer	1	
Operational Personnel, Full-Time	140	
Operational Personnel, Volunteer	12 Explorers	



Key Recommendations:

- Implement alternative delivery models that realize efficiencies and increase unit reliability and effective response force capabilities without reducing existing ISO rating.

Discussion

The MFD has been able to deploy people and apparatus in 11 strategically located fire stations, balancing the needs of providing effective coverage to both city and cooperative service automatic aid areas. However, the department is challenged to meet current and future service demand needs in the light of static staffing and apparatus levels for the past five years with a significant increase in annual service demand and a very significant 35 percent increase of fire incidents during the same period.

Based on an estimated 3-4 percent annual increase in service demand, additional and/or relocated fire apparatus, and alternative service delivery models will need to be considered and implemented. These types of efficiencies and innovations will be vital to address increased service demand with limited revenue and personnel resources. The ongoing test will be making the most prudent decisions based on multiple considerations including risk exposure, response times and deployment, community expectations, and fire department capacity. Those decisions are difficult given financial considerations that must be taken into account.

ESCI understands the complexity that is confronting the City of Modesto in terms of growth management, future risk exposure, fire department workload, and financial considerations. With those factors in mind, a detailed assessment of current service delivery and effectiveness is provided in the Service Delivery and Performance section of this report.

Budget and Finance

No fire or EMS agency can survive without adequate funding. Funding, which typically comes in a variety of means (i.e. property taxes, fundraisers, donations, etc.) form the basis from which the entity is able to provide a high level of service to the community.

In the current economic state, communities in California and throughout the rest of the nation are seeking means to reduce expenses while keeping high levels of service at the forefront of their operations. Alongside this, many have asked the community for increases in funding to adequately supply expected levels of service.

Displayed below is a summary of Modesto’s current conditions, revenue and expense trends, per capita costs, and projected future costs based on inflationary factors/assumptions.

Current Conditions

Figure 12: Survey Table – Operating Budget and Financial Resources

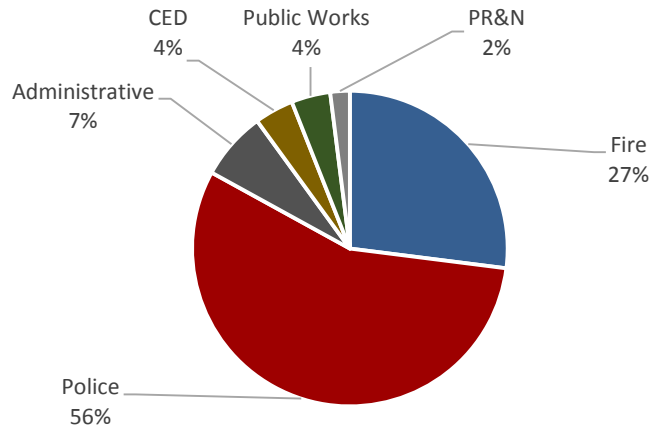
Survey Components	MFD
Designated Fiscal Year	July To June
Assessed Property Value, FY 2014 - 15	\$3.3 B
Revised Current Year General Operating Fund Budget, Fire Department	\$25.3 M
General Fund Property Tax, City Levy – Current Budget Year	\$33.8 M
Levy Rate	1.001%
General Fund Levy Collection Rate – Prior Year	1.001%
Bonds, Fire Department	None
Levy Rate	N/A
Other Tax Levy, Public Safety	None
Levy Rate	N/A



Revenues and Expenses

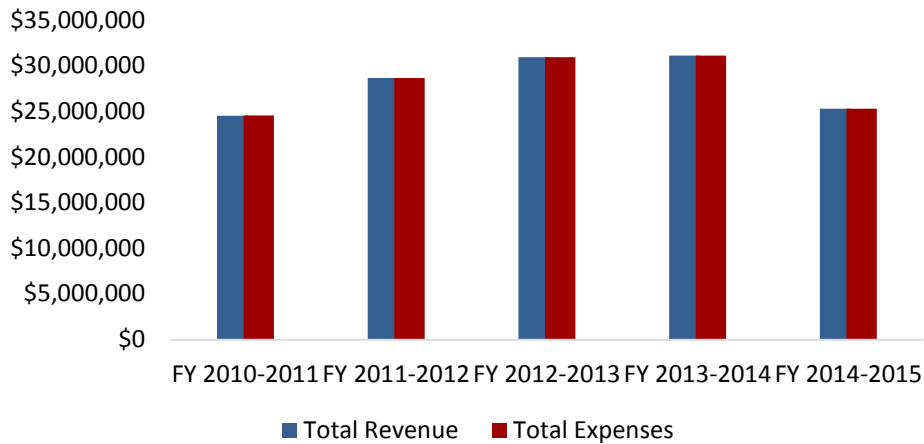
ESCI reviewed baseline financial information provided by the City and fire department to identify the structure of MFD’s funding support. Based on FY 14/15 Proposed, all public safety services (police and fire) account for approximately 83 percent of the total City of Modesto general fund revenues. Included in the following figure are the police, fire, administration, CED, public works, and PR&N. Within this subdivision, the fire department comprises 27 percent of the public safety total. This is illustrated in the following figure.

Figure 13: City of Modesto Net of Cost Allocations and Department Revenues, FY 2015-16 Proposed



As illustrated in the following figure, the department has seen an increase in annual budget over the last four years at an average of two percent. It is very important to note, fiscal years 2011-12 through 2013-14 Modesto fire and emergency services were a part of a joint powers agreement between the City of Modesto, County of Stanislaus, and District of Salida – known as Modesto Regional Fire Authority. Therefore, budgetary figures are slightly misrepresentative of a standalone agency as a result of having a blended budget of three entities. Based on our interviews with fire executives, City of Modesto Fire made up approximately 85 percent of each year’s budget during the time under the MRFA. Additionally, fiscal years 2011-12 through 2013-14 Less than Countywide revenues were part of the County contribution amount.

Figure 14: Revenues and Expense Trends, 2010-2014



As with many city fire departments, general fund revenue (typically in the form of a property tax) comprises a vast majority of the operating revenue. General fund revenues have remained fairly consistent with a slight decline since fiscal year (FY) 2010-11 of less than one percent over the past five fiscal years. As shown in the following figure, FY 2014-15 general fund contributions make up 89 percent of the total revenues.

Figure 15: Revenues Trends, 2010-2014

Revenue Source	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15
City of Modesto General Fund	\$23,172,559	\$23,388,508	\$24,458,566	\$24,590,642	\$22,617,884
Salida/County Contribution	\$0	\$4,537,826	\$5,279,527	\$4,848,827	\$1,230,000
Reimbursed Expenses	\$0	\$10,000	\$353,575	\$0	\$325,000
Other Income	\$1,371,906	\$719,444	\$859,867	\$1,682,824	\$788,810
LTCW Funding	\$0	\$0	\$0	\$0	\$331,058
Total Revenue	\$24,544,465	\$28,655,778	\$30,951,535	\$31,122,293	\$25,292,752

Expenses have increased by three percent from FY 2010-11 through FY 2014-15. Personnel costs make up 87 percent of the total operating expenses (which is typical for most emergency services organizations, personnel and benefits costs comprise a vast majority of the department’s overall budget).

IT support, insurance, and legal are not included within the department’s budget above. The City of Modesto charges for these services two years in arrears through inter-department services charges. Consequently, MFD will begin to see inter-department charges for these functional services in FY 2016-2017. Lastly, there is a line item in the budget for apparatus maintenance; however, beginning in FY 2016-2017, it will also be handled through inter-department charges.

In addition to expenses discussed above, MFD completed a capital lease in 2014-15 and retained full ownership of the equipment, extinguishing an outstanding debt of \$77,611.89. However, they have acquired two new engines during the current fiscal year that are expected to be delivered next fiscal



year payable over next three fiscal years (2015-16 through 2017-18) in the amount of \$367,077.61 per year. The termination value is \$1.

There are no capital improvement plans that have been adopted and funded.

Figure 16: Expense Trends, 2010-2014

Expenditure Source	FY 2010-11	FY 2011-12*	FY 2012-13*	FY 2013-14*	FY 2014-15
Salaries and Benefits	\$21,366,983	\$24,038,374	\$24,175,975	\$25,630,840	\$22,053,828
Supplies & Services	\$1,370,322	\$2,153,450	\$2,190,055	\$2,389,353	\$1,420,655
Fleet Maintenance/Fuel	\$261,754	\$153,454	\$579,339	\$723,304	\$602,000
Capital Lease Expense	\$77,612	\$77,612	\$77,612	\$77,612	\$77,611
911 Dispatch Services	\$795,000	\$1,174,350	\$1,188,577	\$1,272,650	\$850,000
City Services	\$682,794	\$1,058,538	\$656,211	\$270,845	\$288,658
Salida/County Services	\$0	\$0	\$140,186	\$24,689	\$0
Fixed Assets	\$0	\$0	\$1,943,580	\$733,000	\$0
Total Expenses	\$24,554,465	\$28,655,778	\$30,951,535	\$31,122,293	\$25,292,752

* In Fiscal Years 2011-12 through 2013-14 MFD was part of a joint powers agreement between the City of Modesto, County of Stanislaus, and District of Salida – known as Modesto Regional Fire Authority.

Cost per Capita

The cost of delivering high quality services to citizens varies on a variety of factors such as seasonal conditions, deployment schedules, and service level demands. There is little evidence supporting a “standard” in terms of how much a community should pay. However, many public officials have expressed an interest in per capita cost relative to peer groups and national averages.

The cost per capital comparison is based on government data relative to all fire department types in California and the rest of the United States, and should be viewed only as a broadly generalized point of reference. The actual cost of service delivery results from a local community decision that identifies the level of emergency response that is desired and the risk present within each community. MFD has unique challenges geographically and internally that drive the need for distinctive resource deployment, along with a community desire and expectation for a high level of services. The following figure is a quick comparison of the cost per capita for Modesto, a California peer group, and the United States.

Figure 17: Comparison of Cost per Capita (Summary) – FY 14/15

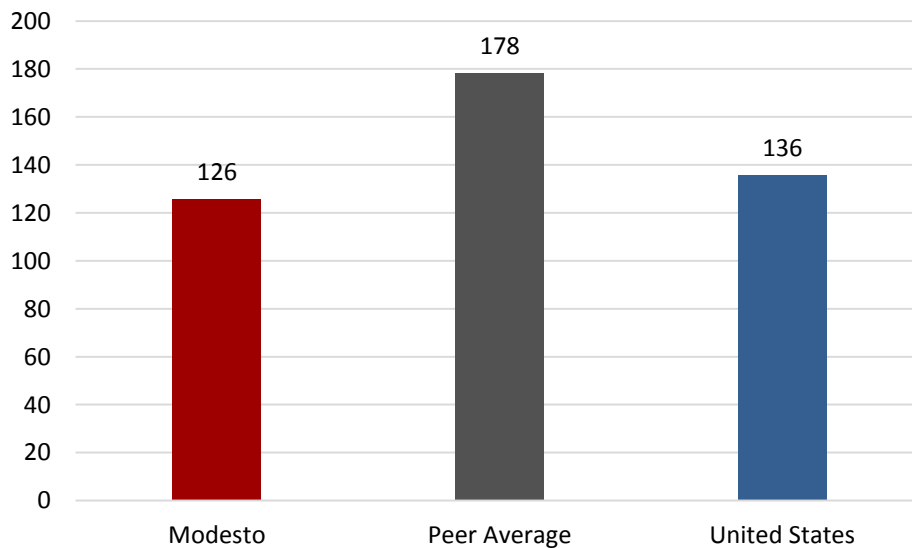


Figure 18: Comparison of Cost per Capita (Detailed) – FY 14/15

Entity	Population	Coverage (Sq. Mi.)	Pop per Sq. Mi.	Per Capita Cost	Per Capita Peer Rank
Fremont	214,082	87	2,452	\$174	5
Glendale	191,914	31	6,257	\$293	9
Huntington Beach	191,057	49	3,866	\$233	7
Ontario	164,066	50	3,281	\$239	8
Escondido FD	155,016	48	3,213	\$141	4
Chula Vista	244,171	54	4,561	\$100	1
Santa Rosa	176,445	45	3,934	\$189	6
Modesto	201,051	37	5,462	\$126	3
Oxnard	197,684	52	3,833	\$110	2
Peer Group Average	192,832	50	4,095	\$178	-
United States	320,970,000	3,805,943	84	\$136	-



The preceding figures indicate that MFD costs per capita are below the California peer group average and below the national average. It is noted that the total used includes the department’s annual operating budget for FY 2014-15 utilizing the most current population data. Among the peer group, Modesto ranks as the third lowest funding level in terms of per capita costs.

Revenues and Expenses Projections

As part of this study, ESCI developed baseline projections utilizing trend data and industry standards. The forecasts shown below are not predictions of future policy direction nor are they recommendations as to what revenues and expense levels should be. The projections purely reflect a series of assumptions based on historical behavior, inflationary factors, and industry experience. The following tables include key assumptions utilized in the forecast.

Figure 19: Baseline Revenue Forecast – FY 15/16 - 19/20

Revenue Source	FY 2014-2015	Forecast				
		FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
City of Modesto General Fund	\$22,617,884	\$26,841,733	\$27,915,402	\$29,032,018	\$30,193,299	\$31,401,031
Salida/County Contribution	\$1,230,000	\$0	\$0	\$0	\$0	\$0
Other Revenue	\$1,113,810	\$1,142,713	\$1,394,865	\$1,668,368	\$1,964,659	\$2,285,262
Total Revenue	\$24,961,694	\$27,984,446	\$29,310,267	\$30,700,386	\$32,157,958	\$33,686,293

General fund revenues could potentially increase over the next five fiscal years at an average of three percent year over year. As shown in the figure below, FY 2019-20 general fund contributions make up 92 percent of the total revenues.

Figure 20: Baseline Expense Forecast – FY 15/16 - 19/20

Expenditure Source	FY 2014-2015	Forecast				
		FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
Salary and Benefits	\$22,053,828	\$24,522,590	\$25,748,720	\$27,036,155	\$28,387,963	\$29,807,361
Service and Supplies	\$2,950,266	\$3,323,077	\$3,422,769	\$3,525,452	\$3,631,216	\$3,740,152
ISF/Inter-Fund Charges	\$288,658	\$138,779	\$138,779	\$138,779	\$138,779	\$138,779
Total Expenses	\$25,292,752	\$27,984,446	\$29,310,268	\$30,700,387	\$32,157,958	\$33,686,293

Expenses potentially increase from FY 2015-16 through FY 2019-20 by three percent each year. Personnel and material (combined) costs make up 93 percent of the total operating expenses. Two new engines in the amount of \$367,077.61 per year are included in the assumptions as well.

Emergency Response Type and Frequency

In 2014, the MFD responded to 24,762 requests for assistance from the citizens of the city and joint response areas in the 2013 reporting year. As is typically found, the vast majority of incidents are of an emergency medical nature. The department’s emergency calls for 2014 are listed in the following figure.

Figure 21: Survey Table – Emergency Response Type and Frequency

Survey Components	Modesto Fire Department Observations	Comments And Recommendations
Incidents		
Fire	1,367	
Value Of Property Exposed To Fire, Last Full Calendar Year	\$25,384,882	
Value Of Property Lost To Fire, Last Full Calendar Year	\$9,276,295	
Rupture Or Explosion	4	
EMS/Rescue	16,193	
Number Of EMS Transports	Na	
Hazardous Condition	379	
Service Call	1,643	
Good Intent Call	4,240	
False Call	908	
Severe Weather	4	
Other	24	
Total	24,762	

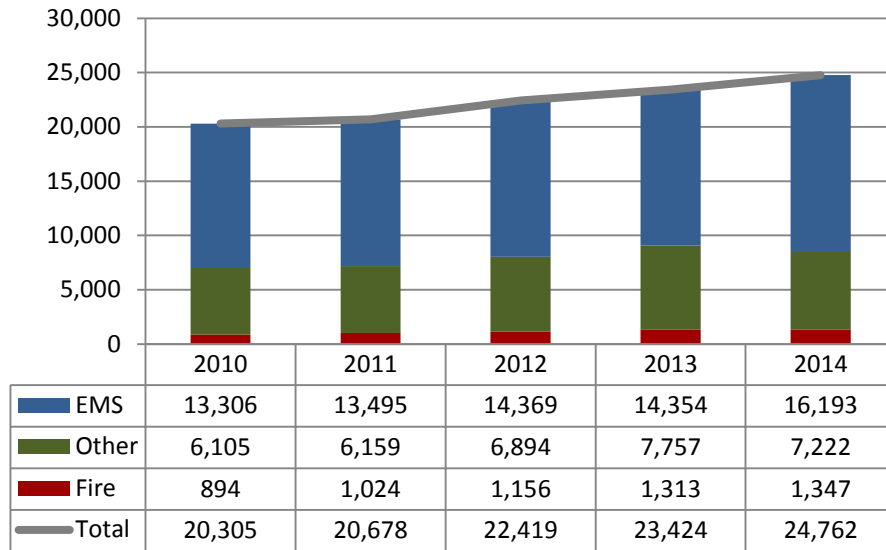
Discussion

65.4 percent of MFD’s 2014 incidents involved response to medical emergencies. The percentage is similar to, though slightly lower than, what is generally found in most fire departments. 1,347 incidents were reported as fires in the reporting year, which is significantly higher than is typically found in similar sized agencies. Additional detail on emergency response, service delivery effectiveness, and response performance is provided in the Service Delivery and Performance section of this report.

ESCI compared the number and type of incidents the MFD responded to over a five-year period. The following figure displays the call volume, type numbers, and trend line for 2009 through 2013. A total increase of 15.7 percent in service demand is significant given the average 3.1 percent increase in service demand annually.



Figure 22: MFD Service Demand, 2010 through 2014



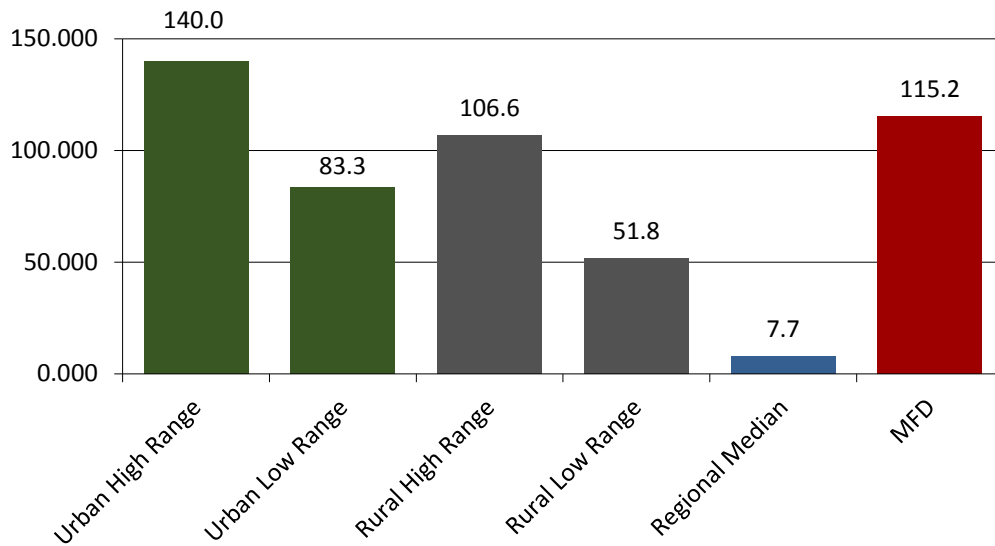
The following figure shows a 50 percent increase in the number of fire calls over the past five years. This is significant as similar jurisdictions have seen reductions in fire calls that are showing a consistent trend throughout the fire service as a result of enhanced fire prevention services, increased fire safe construction and adopted fire code standards. This fire call increase is further impacted by double-digit increase of 21.7 percent for EMS calls. Additionally, other service demand resulted in an 18.3 percent increase in calls for service. “Other” calls are representative of those not falling into the fire or EMS categories and include calls such as citizen assists, alarm sounding, and other calls for assistance.

Figure 23: Total Percent Change – 2010-2014

Incident Category	Percent Change
Fire	50.7%
Other	18.3%
EMS	21.7%
Total Demand	15.7%

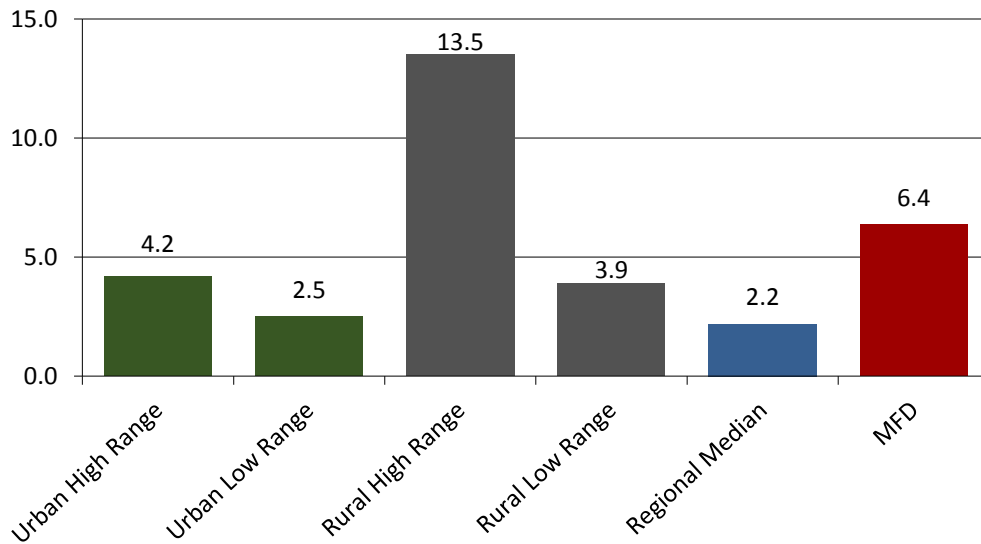
In total emergency incidents, MFD falls at the high end of the incidents per 1,000 population. This indicates a robust unit hour utilization of resources and shows the MFD is utilizing their emergency response resources at a level that is over 90 percent higher than the regional median.

Figure 24: Total Incidents per 1,000 Population



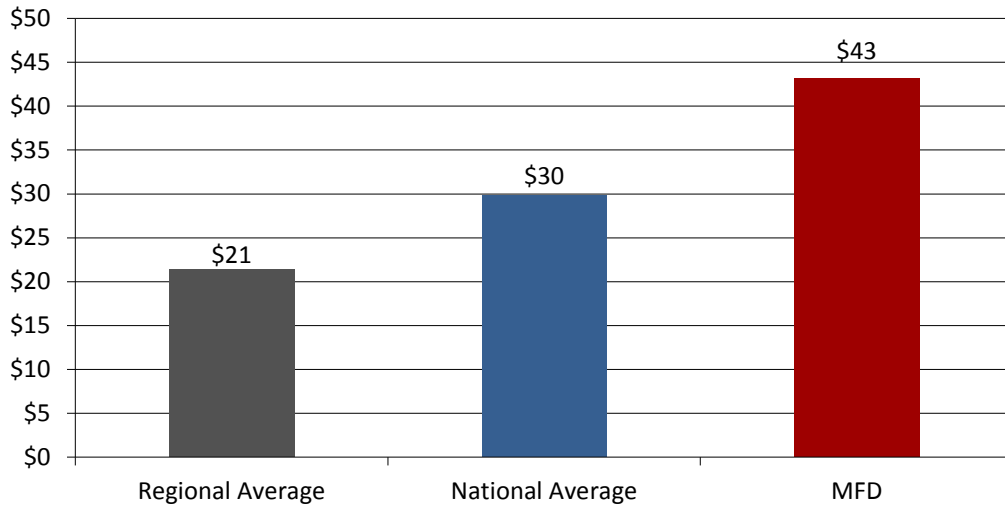
The occurrence of fires per 1,000 population is above the urban high range category and well above the regional median. A significant increase over the regional median is likely a result of a combination of unique, growth, housing vacancy patterns, construction, occupancy types, and fire incidents that are not being seen by other similar sized communities within the region. The high number of rural fire incidents per thousand is not relevant as they respond to much fewer calls and have very low population.

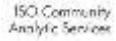
Figure 25: Total Fires per 1,000 Population



The following figure is based on 2013 and 2014 data, indicating that MFD fire losses are significantly above the national and double the regional averages. Since the number of fires per capita is over 60 percent higher than the regional average combined with over twice the fire loss per capita, the higher dollar loss is indicative of high fire loss incidents over the past two years. The benchmarking elements are consistently pointing to the City of Modesto having a significant fire problem that significantly exceeds similar regional and state agencies.

Figure 26: Fire Loss per Capita





Insurance Services Organization (ISO) Community Fire Service

Performance Review

In addition to the previous statistical and national benchmarking criteria, ESCI has partnered with ISO for the purpose of providing a more in-depth benchmarking and comparison process. This performance review is focused on a hand-selected peer group that most accurately reflects the key elements of fire protection and response within the City of Modesto.

While it is impossible to create perfect comparisons due to the uniqueness of fire departments, the use of ISO’s extensive data universe and intelligent segmentation provides highly directional guidance to identify areas of strength and opportunity. Peer groupings were developed leveraging our vast database of over 26,000 fire departments. The peer groupings are defined to enable fair and actionable comparisons. The peer group includes 16 fire jurisdictions that have the most commonalities with City of Modesto Fire Department across the six criteria listed below. The large number of peers will ensure that any statistical outliers will not impact the analysis. State and national comparisons are also included for context.

Figure 27: Criteria Used for Peer Group Selection

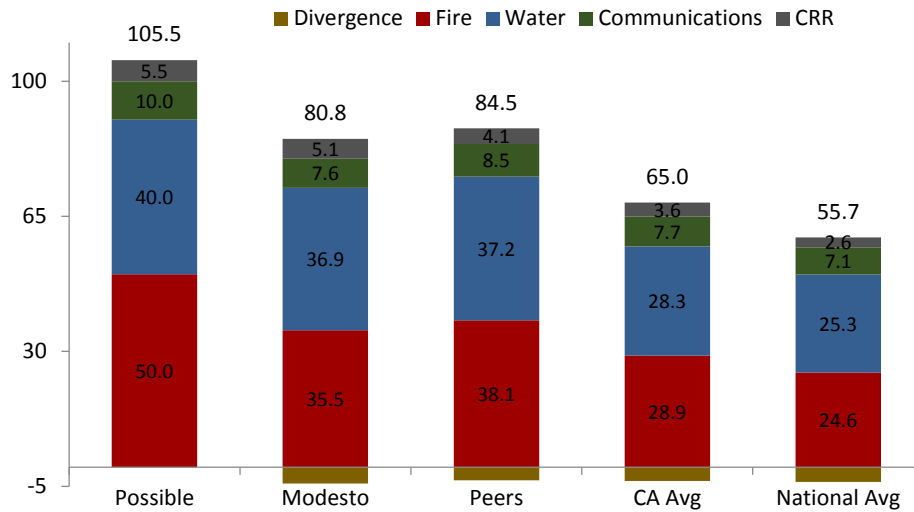
Criteria	Modesto	Peer Group Range
Population	205,000	153,000-244,000
Coverage	37 Square Miles	31-128 Square Miles
Department Structure	100% On-Duty Firefighters	100%-100% On-Duty Firefighters
Region	CA	CA, AZ, OR, UT, NV
% Fire-Related Structure Calls	1.19%	0.4%-12%
% Buildings Residential	95%	83%-98%

*Calculated using census households vs. ISO Commercial Property “risks.” Note: Seven of the 16 peers have been evaluated under the 2012 version of the ISO schedule.

1.0 PUBLIC PROTECTION CLASSIFICATION

1.1 PPC™ Total Points Scored

Figure 28: Distribution of PPC™ Points



Data source: ISO Fire Department survey.

Description

PPC™ is an aggregate measure of a community’s fire suppression facilities to suppress structure fires. It does not evaluate other, equally important, services provided by the fire department (i.e. rescue, ambulance, EMT services, etc.). Total points include all elements captured to assign a Public Protection Classification (PCC): fire department (50 points), water supply (40 points), and emergency communications (10 points). A “divergence” adjustment is also applied to account for the limiting effect a lower fire/water score has on the other. Communities that earn more than 90 total points achieve the best class rating of a 1. Note that the sum of PPC™ components displayed in the previous figure may not add up to the total points scored due to the divergence adjustment.

1.2 Insurance Money Savings

Figure 29: Comparison of Potential Insurance Premium Savings

PPC Class	Business Owners		Commercial property			Homeowners	
	Building	Contents	Frame, Joisted Masonry, Non-Combustible	Masonry Non-Combustible, Modified Fire Resistive, Fire Resistive	Sprinklered Risks	Frame	Masonry
1	27%	26%	49%	43%	35%	34%	29%
2	27%	26%	47%	41%	33%	33%	29%
3	27%	26%	44%	39%	32%	31%	27%
4	23%	26%	43%	38%	31%	30%	25%
10	0%	0%	0%	0%	0%	0%	0%

Data source: ISO insurance data.

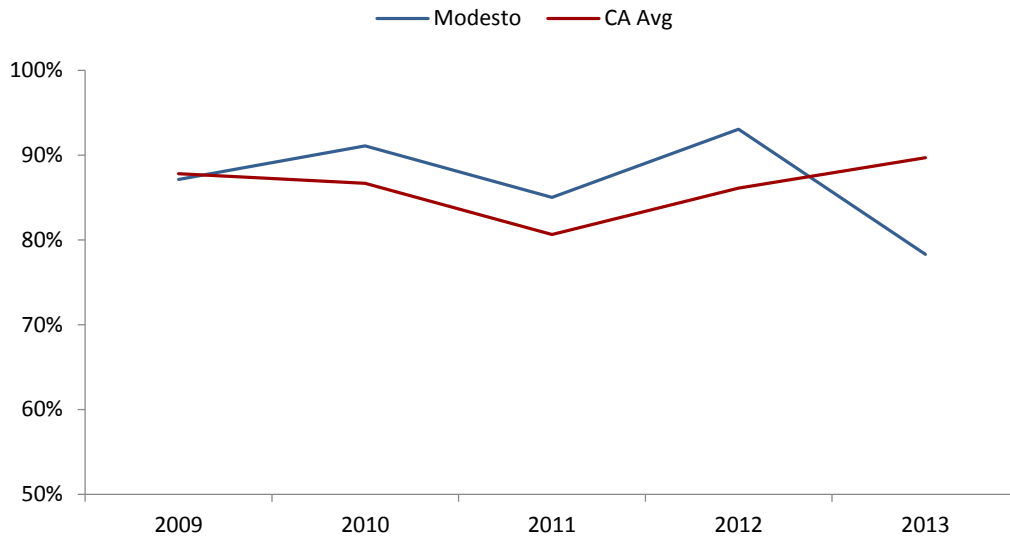
Description

Approximately 80 percent of fire insurance premiums take ISO’s PPC Class into consideration. PPC class can therefore be used to approximate the money saved on property insurance due to a jurisdiction’s level of fire protection. Percent savings is based on the isolated impact that PPC class has on the loss cost (ISO’s prospective portion of the premium rate that covers projected claim payments and loss adjusting expenses).

2.0 PERFORMANCE

2.1 Fire Severity

Figure 30: Residential Dollars Saved (%) per Property Value at Risk (2009-2013)



Data source: ISO insurance claim loss data.

Description

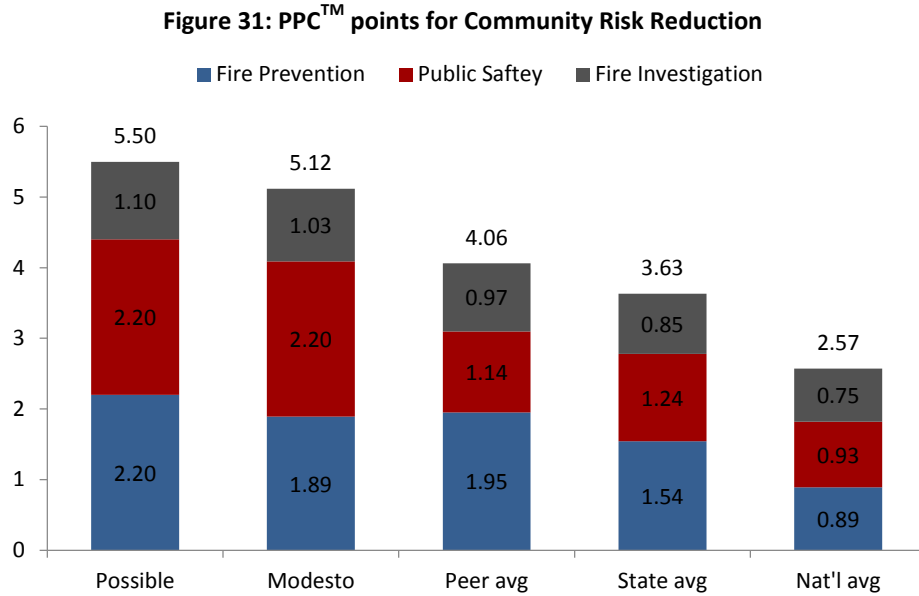
Fire severity is defined as the average dollar saved per property value at risk and is an indicator of fire suppression effectiveness.

Notes:

- It is estimated that ISO has data on approximately 30 percent of homeowners' premiums and claims in California.
- Modesto property information comes from claims that occurred in zip codes 95350, 95351, 95354, 95355, 95356, 95357, 95358.
- There were between nine and 13 claims reported for each year within the Modesto zip codes.
- Losses attributed to catastrophes are excluded.

3.0 PREVENTION

3.1 PPC™ Points for Community Risk Reduction



Data source: ISO Fire Department survey.

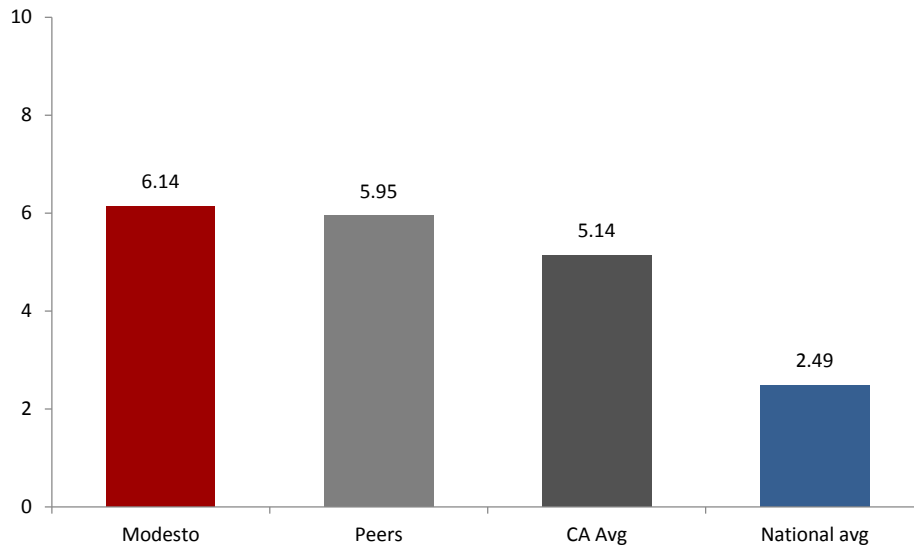
Description

This metric measures the community efforts to reduce losses through fire prevention, public fire safety education, and fire investigation. Maximum amount of points available = 5.5.

Note: The Modesto peer average only includes the seven peers that have been graded with the new FSRS schedule.

3.2 PPC™ Points for Distribution of Companies

Figure 32: PPC™ Points for Distribution of Companies



Data source: ISO fire department survey, ISO commercial property survey.

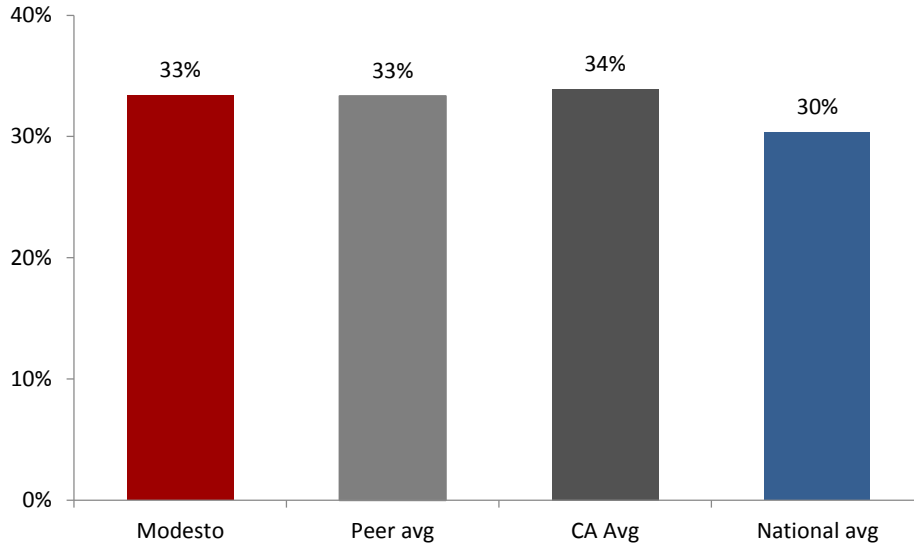
Description

This metric measures the number and adequacy of existing engine and ladder-service companies to cover built-upon areas of a jurisdiction. Maximum amount of points available = 10.

3.3 Commercial Property Sprinkler Adoption

Figure 33: Commercial Property Sprinkler Adoption





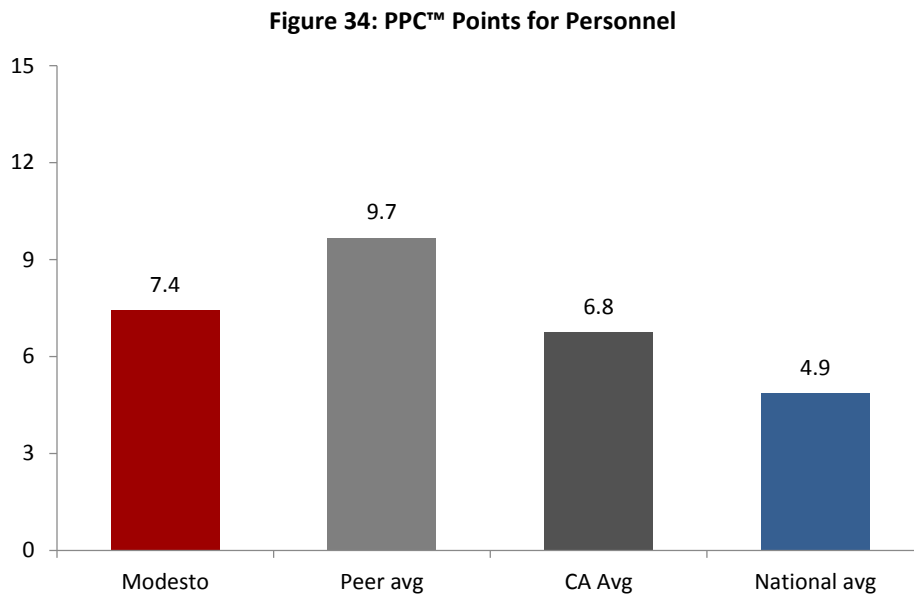
Data source: ISO commercial property survey.

Description

Percentage of commercial properties with a partial or full sprinkler system. Numbers are estimated based on a representative sample of surveyed properties collected in ISO’s commercial property database. Sprinkler systems are designed to mitigate property damage and allow potential victims to exit a hazardous situation quickly.

4.0 PERSONNEL

4.1 PPC™ Points FOR Personnel



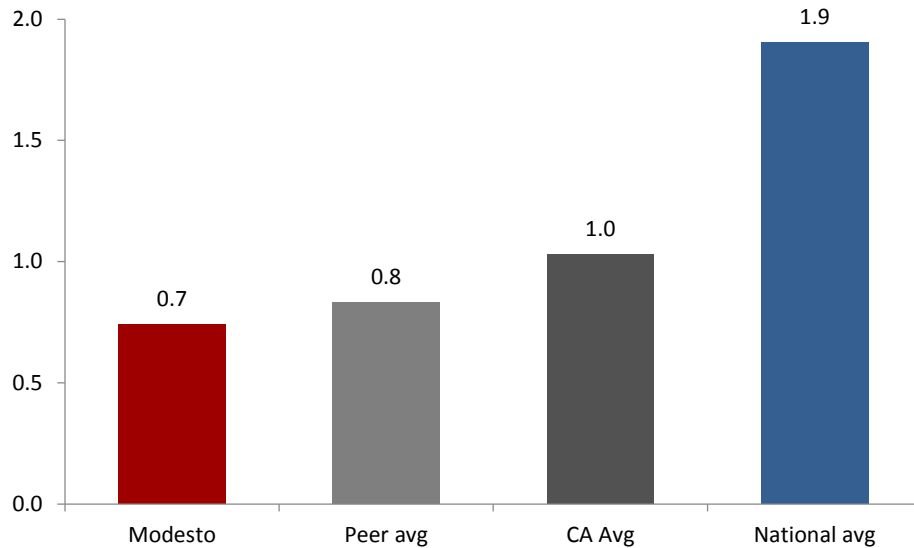
Data source: ISO fire department survey.

Description

This metric measures the adequacy of staffing for existing engine, ladder and service companies. The score is based on members staffing apparatus at stations, as well as off-duty, volunteer, and on-call members who respond when alerted. Maximum amount of points available = 15.

4.2 Firefighters per Population

Figure 35: Number of Firefighters per 1,000 People



Data sources: ISO fire department survey, census.

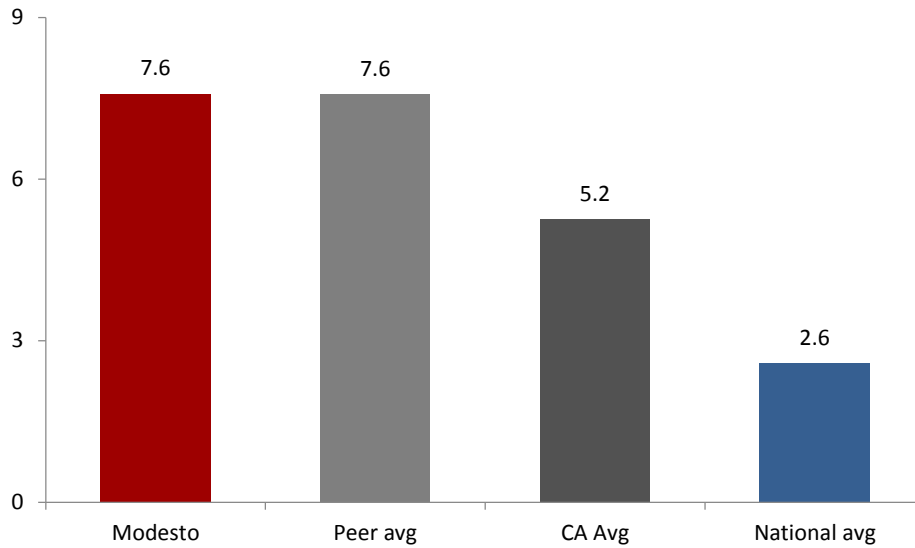
Description

Number of firefighters per 1,000 people. Firefighter enrollment is an indication of the community investment in fire protection. For this metric, firefighter enrollment is the sum of the average number of on-duty fire suppression personnel per day and 33 percent of the number of on-call, volunteer, and off-shift members responding to first alarms per day. This sum is divided by the jurisdiction population and then multiplied by 1,000.

5.0 TRAINING

5.1 PPC™ Points for Training

Figure 36: PPC™ Points for Training

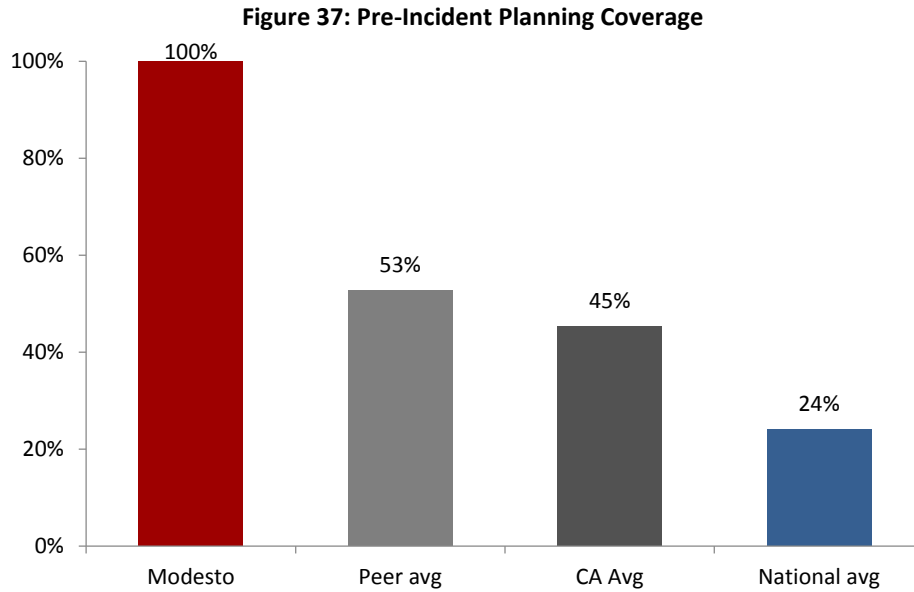


Data source: ISO fire department survey.

Description

Measurement of the adequacy of fire department training related to structure fires. Items in this evaluation include: department training using a fire training facility; company training at fire stations; fire officer training; driver and operator training; hazardous materials training, pre-incident planning, and training records. Maximum amount of points available = 9.

5.2 Pre-Plan Coverage



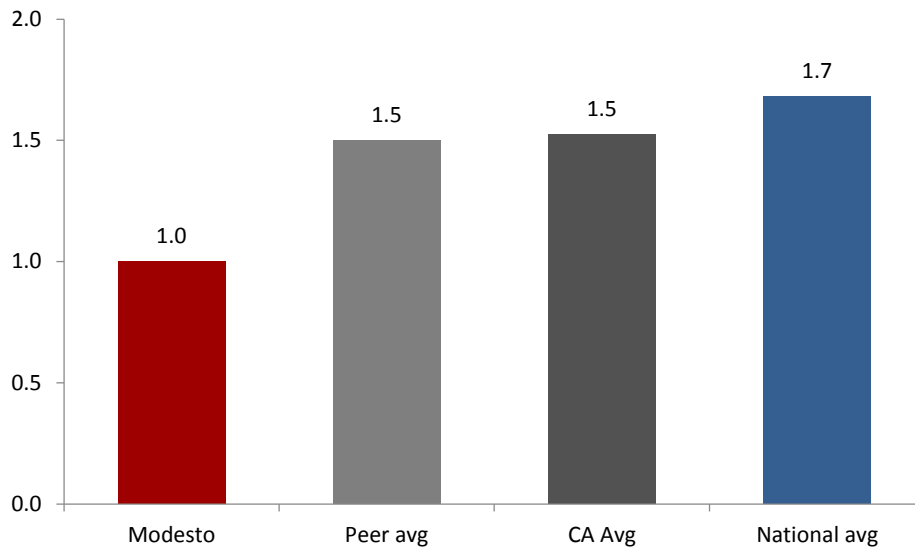
Data source: ISO fire department survey.

Description

Pre-plan coverage is calculated as the percentage of buildings with a pre-plan that has been updated in the last five years. Pre-incident planning coverage is a reflection of the extent of outreach for fire department preparedness.

5.3 Pre-Incident Planning Frequency

Figure 38: Average Age of Pre-Plans



Data source: ISO Fire Department survey.

Description

The average age (in years) of existing pre-plans. This is a reflection of the currency associated with fire department preparedness.

9.0 DATA SOURCES AND NOTES

Figure 39: List of Data Sources

	ISO Fire Dept. Survey ²	ISO Commercial Property Survey ¹	ISO Insurance Data ⁴	NFIRS (National Fire Incident Reporting System) ⁵	US Census
Public Protection Classification	X		X		
Performance	X		X	X	
Prevention	X	X		X	X
NFPA 1710 Analysis				X	
Personnel	X				X
Training	X				
Commercial Property		X			

Annotated Notes:

¹ ISO has comprehensive risk information on approximately 3.5 million commercial properties. While we believe this coverage is strong, it is certainly not complete. There may be commercial properties within your jurisdiction that are not included in this report’s analyses. For the purposes of this report, each ISO “risk” is assumed to be the equivalent of a building.

² The PPC grading schedule was updated in 2013. While this revision incorporates newer technologies and fire prevention methodologies, it was designed so that a jurisdiction’s classification would typically not change with an updated survey. All selected peer fire departments have surveys that were updated within the last 5 years. Peers that have not had an update within the last five years were excluded if it is believed there have been changes since the last grading.

³ Insurance savings estimates are based on guidance that ISO provides to carrier customers. Insurance companies are not required to price premiums based on ISO guidance. Fire severity data is based on homeowner claims submitted to ISO.

⁴ NFIRS data includes structural fire incidents defined by incident types 100-123 and reported by NFPA. It may include mutual and automatic aid responses.

© Insurance Services Office, Inc., 2015

Management Components

As a service provider to a large community, MFD faces obstacles affecting organizational growth and management, including substantial financial challenges. The organization must assure that it is adequately prepared in terms of the fundamental components of its management configuration to keep pace with future needs.

In addition to the operational challenges of emergency response, the management of the business of a fire department always presents unique issues involving the administration of financial resources, the establishment of goals and objectives, effective internal and external communications, information management, and security. This section of the report examines the MFD’s efforts in this area and preparation for the future health of the organization.

FOUNDATIONAL ELEMENTS – MISSION, VISION, STRATEGIC PLANNING, GOALS, AND OBJECTIVES

The process of strategic planning involves clarifying an organization’s mission, articulating its vision for the future, and specifying the values within which it will conduct itself.

Figure 40: Survey Table – Foundational Elements

Survey Components	Modesto Fire Department Observations	Comments And Recommendations
Mission, Vision, Strategic Planning, Goals, And Objectives		
Mission Statement Adopted	Yes	
Displayed	On Website Only	Post The MFD Mission Statement In Stations And On Written Communications.
Periodic Review	No	Establish A Process Of Periodic Review Of The Mission Statement.
Vision Established And Communicated	In Place, Generally Communicated Internally.	
Values Of Staff Established	In Place, Generally Communicated Internally.	
Strategic Or Master Plan	Strategic Plan In 2007	Update The 2007 Strategic Plan.
Adopted By Elected Officials	Recognized But Not Adopted.	Once Updated, Formally Adopt The New Strategic Plan.
Published And Available	Yes	
Periodic Review	Not Reviewed Since Writing.	Scheduled To Review And Update A Part Of This Study Process.
Agency Goals And Objectives Established	In Place As Short Term Goals, Based On 2007 Strategic Planning Process.	Update Organizational Goals And Objectives During The Strategic Plan Update.
Date Developed	First Of The Year	
Periodic Review	To Be Reviewed As A Part Of This Study Process.	
Tied To Division/Personnel Performance Statements/Plans	No	
Objectives Linked To Programs	No	

Survey Components	Modesto Fire Department Observations	Comments And Recommendations
Performance Objectives Established	No	
Code Of Ethics Established	Included In Rules And Regulations	

Discussion

MFD conducted a strategic planning process in 2007. The plan is outdated and is scheduled for update and revision as a component of this study process. The department's mission statement has been established, but is not prominently displayed or posted. A mission statement, institutionalizing the organization's core purpose should be displayed in fire stations and included on agency letterhead, business cards, etc.

A statement of organizational vision and one of the agency's values is also in place but is only communicated informally and internally. ESCI recommends that both statements, once updated in the upcoming strategic planning process be more effectively communicated.

Through its upcoming strategic planning process, the department will be identifying specific goals and objectives through which it intends to meet its mission. These goals and objectives will provide guidance in decision-making and focus the agency's efforts on the most critical issues that will impact its success in the future. In addition, the plan will provide the members with direction on the future and how they each fit in.

MFD is acknowledged for its proactive efforts in developing the past and upcoming Strategic Plan.



MANAGEMENT DOCUMENTS AND PROCESSES

Similarly, an organization should develop 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 fire department as well as with its constituents.

Figure 41: Survey Table – Foundational Documents and Processes

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Availability Of SOPS, Rules And Regulations, Policies		
Copies Of Rules Provided	Rules And Regulations Provided To Personnel On Intranet.	
Last Date Reviewed	No Recent Review	
Copies Of SOGS Or Procedures Available	Included In The Policy And Procedure Manual As A Section. Provided To Personnel On Intranet.	Separate SOGS From Policy Manual As A Stand-Alone Document.
Regular Update	No Formal SOG Update Process	Establish A Practice Of Regular Review And Update Of SOGS.
Process For Development Of New SOGS	Defined Process Included In SOGS	
SOGS Used In Training Evolutions	Yes	
Policy Manual Available	Policy And Procedure Manual, Includes SOGS.	Separate Policy Manual From SOGS As A Stand-Alone Document.
Reviewed For Consistency	Not Regularly	Establish A Practice Of Regular Review And Update Of Policy And Procedure Manual.
Reviewed For Legal Mandates	No	Submit Policies And Procedures To Legal Review, As Appropriate.
Training On Policies Provided	Yes, Included In Ongoing Training.	
Critical Issues		
Critical Issues Are Identified	Informally Only	
First Critical Issue	Staffing At All Levels, Operational, Administrative, Prevention.	
Second Critical Issue	Changing Dynamics In EMS	
Third Critical Issue	Financial Sustainability	
Internal Evaluation Of Critical Issues Process	No Structured Process Is In Place For Identifying Critical Issues.	Establish A Practice Of Regular, Periodic Identification Of Critical Issues Affecting The Organization.
Challenges Of The Future		
Challenges Are Identified	Informally	Establish A Practice Of Periodic Identification Of Challenges Affecting The Organization.
First Challenge	Infrastructure Needs – Aging Stations And Apparatus.	Develop A Funded Capital Replacement Plan.
Second Challenge	Need For A Structured Professional Development Program.	Establish And Adopt A Succession Planning Process.
Third Challenge	Need To Explore Alternate Staffing Models.	Consider Contemporary Options Including Peak Activity Units (Paus), Community Paramedicine, And Alternative Response Units.

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Internal And External Communications		
Internal Communications		
Regularly Scheduled Staff Meetings (Fire Department)	Weekly Executive Team Meeting. Weekly Command Staff Meeting. Annual Company Officer Meeting.	
Written Staff Meeting Minutes	Maintained And Distributed	
Memos	Used Routinely And Archived. Loosely Defined Process.	Adopt A Memo/Email Policy.
Member Newsletter	Monthly Operational Newsletter Produced And Distributed To Personnel And Council.	
Member Forums	Daily Morning Brief Via Conference Call With All Stations By Battalion Chief, Also Fire Chief Or Fire Marshal As Needed.	
Open Door Policy	Liberal Open Door Policy In Place.	
Bulletin Board	Physical Bulletin Board At Each Station.	
Vertical Communication Path Clearly Identified	Identified Via The Organizational Chart.	
E-Mail	Used Regularly, City Use Policy Is In Place.	
Employee Mail Boxes	Company Officer Mailboxes Only. In Place But Does Not Work Properly In Stations. No Voicemail Notification On Station Mailboxes.	Review And Improve Voicemail Systems.
Voice Mail		
Issues Taskforce	In Place	
External Communications		
Community Newsletter	None	
Website	In Place, But In Need Of Updating.	Review And Update The Agency Website.
Advisory Committee(s)	None	
Complaint Process	No Defined Complaint Process.	Establish A Formalized, Tracked, Complaint System.
Social Media (Facebook/Twitter)	Active Facebook And Twitter Accounts Are In Place.	
Community Survey	Have Been Done In The Past, But Not Recently.	Reestablish Community Survey Processes.
Local Community Planning Organizations	Fire Marshal Attends Various Community Planning Meetings Regularly.	
Focus Groups	Fire Department Participates And Attempts To Host Groups At Fire Stations. Not Well Established Process, However.	Improve/Enhance Community Outreach And Community Forums Relating To Fire Department Services.

Key Recommendations:

- Separate policies and procedures and Standard Operating Guidelines into stand-alone



documents.

- Conduct scheduled review and updating of rules and regulations.
- Complete regular review and update of Standard Operating Guidelines.
- Establish a practice of periodic identification of critical issues and challenges affecting the organization

Discussion

MFD policies and procedures and Standard Operating Guidelines (SOGs) reside in a single manual. The manual is provided to new personnel upon hire and is accessible to all via the agency intranet.

A review of the rules, procedures, and guidelines reveals that they are appropriate and generally comprehensive. However, some of the content is not current. The periodic review of foundational documents is essential and ESCI underscores the importance of establishing a regular schedule for future review of all foundational documents, which should be completed at least every three years.

SOGs and policy and procedure documents are in a single manual. The two differ in their applicability to agency operations and are more appropriately separated into two, stand-alone documents in the interest of ready accessibility.

Critical Issues

The process of taking time periodically to list the issues that are facing an organization can be invaluable as a checkpoint for the agency as it moves forward. Doing so on a periodic basis is recommended. In the course of ESCI's fieldwork, the fire chief was asked to identify critical issues and challenges that face the organization.

The critical issues identified are listed in the previous figure. A primary concern is that of staffing. The concern exists at all levels including not only emergency response staffing, but administrative, support, training, and fire prevention administration, as well. ESCI discusses the staffing concerns in further detail in the subsequent Staffing section of this report.

Also identified was the need to address the source of MFD's greatest service demand – Emergency Medical Services. The face of EMS has changed substantially in recent years resulting in increased workload and financial challenges associated with cost recovery. ESCI concurs with the fire chief's concern regarding EMS services and encourages the organization to actively consider service delivery alternatives, which are explained in subsequent report sections.

Finally, but of no less importance, is the issue of long-term financial sustainability. MFD clearly struggles to meet existing citizen demands for services with limited funding. The organization's financial challenges are apparent in review of current staffing, facilities, and equipment and sustainable alternatives must be developed if the agency is to avoid future deterioration of its ability to serve its constituents appropriately.

Challenges

Also discussed during ESCI's fieldwork were challenges that face MFD today. One concern is the condition of current infrastructure, specifically fire stations and response equipment. ESCI underscores the critical importance of appropriate and full comprehensive capital asset replacement planning, given

that fire stations and fire apparatus represent a substantial expense and have readily predictable life expectancies and replacement costs. The matter is discussed further in the Capital Assets and Capital Improvement Planning section.

An additional challenge identified is that of professional development and succession planning. ESCI advises the establishment of a broadly based professional development program that will prepare and encourage employees to move forward in the organization.

The third challenge identified is the need to seek alternative staffing and service delivery models that will mitigate the considerable impacts of growing service demand. The impacts are largely found in regard to Emergency Medical Services delivery, as the largest percentage of workload. A number of alternative strategies have evolved in recent years, including the implementation of community integrated health care programs, deployment of smaller, quick response vehicles, and use of peak activity response units (PAUs) during times of heightened workload.

RECORD KEEPING AND DOCUMENTATION

In any organization, documentation of activities is of paramount concern. The following figure reviews the practices that are in place in the department.

Figure 42: Survey Table – Record Keeping and Documentation

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Document Control		
Process For Public Access Established	Defined Process In Place At Both Fire Department And At The City Level.	
Hard Copy Files Protected	Yes	
Computer Files Backed Up	Scheduled Backups Are In Place	
Security		
Building Security	Key Locks On All Stations, Access To All Stations With A Single Key.	Implement A Combination Locking System To Eliminate One Key That Opens All Stations.
Office Security	Offices Are Locked When Not Occupied.	
Computer Security	Password Protection Is In Place.	
Vehicle Security	No Policy In Place. Narcotics On Ambulances Are Locked.	Establish Vehicle Security And Locking Policy.
Capital Inventory Maintained	City Wide Annual Inventory System Is In Place.	
Asset Security System Used	Barcode System	
Inventory Interval	Annual	
Monetary Controls Used		
Cash Access Controls	Petty Cash Controls Are In Place And Tracked Appropriately.	
Credit Card Controls	Monthly Reconciliation With Receipts.	
Purchasing Controls	Purchase Order Process For Local Vendors. Both City And Department Level Controls Are In Place.	
Reporting And Records		
Records Kept By Computer		
Type Of Platform	PC Based, Server System.	
Operating System	Windows Based	
Periodic Report To Elected Officials		
Financial Report	Regular Financial Report To City Manager	
Management Report	No Formal Report	Establish Regular Management And Operational Report Format For City And Department Distribution.
Operational Report	Monthly Report To The City Manager, Passed On To City Council And Includes Management Elements.	

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Distributed To Others	To City Council Via City Manager	
Annual Report Produced	Yes	
Distributed To Others	Annual Report Distributed Publicly And Throughout City Government	
Analysis Of Data Provided	Not Formally	
Required Records Maintained		
Incident Reports	Completed And Tracked	
Patient Care Reports	Completed For All Patients Treated	
Exposure Records	Maintained Appropriately	Enhance And Automate Exposure Records Practices.
SCBA Testing	Annually	
Hose	Annually	
Ladder	Annually	
Pump	Annually. Have Been Interruptions.	Assure That All Fire Pump Tests Are Completed Annually Per NFPA ² Standards.
Breathing Air	Tested Quarterly, Consistent With OSHA Requirements.	
Information Technology		
Computer Platform	PC/Windows Based	
Maintenance/IT Support Provided By	Provided By The County, Currently Transitioning Back To The City IT Department.	
Computer Security	All Computers Are Password Protected	

Key Recommendation:

- Implement the use of programmable combination locks on fire stations.
- Establish regular management and operational report format for city and department distribution.

Discussion

MFD’s reports and records practices are generally appropriate, with a few recommendations noted above. The importance of effective record keeping cannot be overstated and it was apparent from the data provided to ESCI in the course of this project that the agency has effective records management practices in place.

In regard to security practices, building security was noted as an area of concern. Currently, all 11 fire stations are locked with a common key. Should that key fall into the wrong hands, access could be made to any, or all, of the fire stations. Use of combination locks, which can be readily changed for security purposes, is recommended.

² National Fire Protection Association.



STAFFING AND PERSONNEL MANAGEMENT

Although management and organization of an emergency services agency is important, the personnel that deliver those services are the backbone of the system. Without proper administrative and support personnel to handle supervision, command and control, operational personnel may not be able to perform satisfactorily.

Administrative and Support Staffing

One of the primary responsibilities of a fire organization’s administration and support staff is to ensure that the operational entities of the organization have the ability and means to accomplish their responsibilities on an emergency incident. Efficient and effective administration and support are critical to the success of a fire agency.

Like any other part of a fire department, administration and support require appropriate resources to function properly. Analyzing the administrative and support positions of a fire department facilitates an understanding of the relative number of resources committed to this important function. The appropriate balance of the administration and support components to the operational component is critical to the success of the department’s mission and responsibilities.

This section reviews the staffing within MFD and provides evaluation of the historical staffing performance.

Figure 43: Survey Table – Administrative and Support Staffing

Survey Components	Modesto Fire Department Observations	Comments And Recommendations
Administration And Other Support Staff		
Fire Chief	1	
Division Chief	1	Consider Addition Of A Second Division Chief For The Purpose Of Managing And Administration Support Services.
Administrative Battalion Chief	1	
Training Captain	1	Add Additional Training Personnel To Ensure Training Mandates Are Met And Proper Documentation And Certification Status Is Maintained.
EMS Coordinator	1	Consider Addition Of A Dedicated Ems Chief Officer To Ensure Adequate Authority And Policy Administration Elements Are In Place For Current And Future Ems Delivery.
Fire Marshal	1	
Deputy Fire Marshal	1	
Fire Inspector	3	
Executive Assistant	1	
Finance Manager	1	

Survey Components	Modesto Fire Department Observations	Comments And Recommendations
Administrative Analyst	1	
Administrative Office Assistant	2	Payroll And FP
It Assistant	1	
Stores Keeper	1	Logistics
Total Administrative & Support Staff	17	
Percent Administrative & Support Staff To Total	11.3 Percent	

Key Recommendations:

- Consider addition of a second division chief for the purpose of managing and administration of support services.
- Consider addition of a dedicated EMS chief officer to ensure adequate authority and policy administration elements are in place for current and future EMS delivery.
- Add additional training personnel to ensure training mandates are met and proper documentation and certification status is maintained.
- Add additional fire prevention staff to address increased fire occurrences and loss.
- Consider a dedicated public education or specialist position.
- Consider adding a second captain FTE to the training division and establish shift training coordinators.
- Consider creation of a dedicated emergency manager at a regional level.

Discussion

ESCI notes that currently the level of administrative and support staffing represents 11.3 percent of MFD total membership. It is our experience that typically effective administrative of high volume paid department staffing totals range from 12 percent to 15 percent of agency totals. After reviewing the functions and responsibilities assigned to the work group, ESCI concludes that the number of FTEs assigned is below what is needed to appropriately accomplish the responsibilities of the support services division.³

³ ESCI recognizes organizational goals, regulatory environment, and workloads are the actual drivers that determine the number of administrative personnel required to deliver support services. The 15 to 20 percent ratio is the range ESCI typically sees in fire service organizations and is used for comparison purposes.



Fire Prevention

The fire prevention functions of the MFD appear to have an insufficient number of personnel assigned to match the risk, inspection, and enforcement workload. Given the on-going workload, combined with increased fire occurrences and fire loss, it is reasonable to conclude that additional prevention and education measures are necessary to help control and ultimately reduce the number of fires and the subsequent loss being experienced by the MFD.

The primary new construction plan review function is handled by fire prevention staff and includes large sprinkler and alarm system review. This task is currently being accomplished in a reasonable time frame with good quality of the review and appropriate plan revisions. However, if additional inspection and prevention measures are implemented to address the significant fire problem or significant development and growth were to occur, consideration should be given to utilizing contract plan review services that can be expanded or contracted with the corresponding workload.

Education of the public regarding relevant risks – including fire, disaster, and emergency medical – and their appropriate mitigation strategies is an essential component of a fire department’s mission. MFD does not have a defined public education strategy and there are not enough personnel resources dedicated to this effort to provide the desired level of service. ESCI encourages MFD to evaluate this component of their overall prevention strategy and take the requisite steps to bolster this initiative. We also note that this is a very appropriate function wherein MFD should consider a regional cooperative strategy for these services. The need to provide this service at the local and regional level justifies the need to establish a dedicated public education specialist or coordinator.

Training

MFD assigns a captain to the function of fire training. This places the functions of program needs assessment, design, coordination, and evaluation with the same single personnel resource. This position is also responsible for program development and delivery of fire suppression as well as EMS and all other training mandates, and must ensure appropriate curriculum, drills, and training plans are in place. This results in a significant workload and difficulty in meeting training mandates and MFD training goals. As discussed further in the Training section, ESCI encourages MFD to reevaluate the resources and assign a second FTE position to the training division and establish shift-training coordinators to assist with the administration of training and compliance with training mandates.

Emergency Management

Currently, the city and MFD are committed to the development of an appropriate strategy to deliver emergency management functions and services to their community. Within MFD, the fire chief’s designee manages this function as part of “other duties.” The MFD acknowledge this is an issue and is ready and willing to consider potential methodologies to best serve the community. To reach that goal, the City will need to place additional emphasis on the program, including that establishment of an emergency management oversight position, as is discussed later in this report. We note this also is a very appropriate function wherein MFD should consider a regional cooperative approach to meeting emergency management needs.

EMERGENCY RESPONSE STAFFING

It takes an adequate and properly trained staff of emergency responders to put the appropriate emergency apparatus and equipment to its best use in mitigating incidents. Insufficient staffing at an operational scene decreases the effectiveness of the response and increases the risk of injury to all individuals involved.

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

The number and types of tasks needing simultaneous action will dictate the minimum number of firefighters required to combat different types of fires. In the absence of adequate personnel to perform concurrent action, the command officer must prioritize the tasks and complete some in chronological order, rather than concurrently. These tasks include:

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

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

Figure 44: Survey Table – Emergency Response Staffing

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Emergency Service Staff – Fire		
Battalion Chief	3	Need Additional Battalion Coverage, Current Span Of Control Is To Large.
Captain	36	
Engineers	51	
Firefighters	39	
Fire Investigators	3	
Emergency Service Staff - EMS		
Shift Paramedic	14	
EMT-I	115	
EMT-P	16	
Total Operational Staff	132	



Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Fire Department Total	150	
Percent Of Operational Officers To Firefighters	40 Percent	Approximately 1 To 3.
Use Of Career And Volunteer Personnel		
Career Scheduling Methodology	2 On 4 Off	
Length Of Normal Duty Period	48 Hours	
FLSA Period	56 Work Week	
Residency Requirements	No	
Operational Career Services		
Fire Suppression	Yes	
EMS/Rescue, First Response	Yes	
EMS, Advanced Life Support	Yes	
Specialized Rescue	Yes	
Fire Prevention Inspections	Yes	
Emergency Management	Yes	Fire Prevention
Public Education	Yes	Fire Prevention
Hazardous Materials Response (Level)	Yes	
Volunteer Services		
Chaplain	No	
Civilian Administrative Volunteer	1	Fire Prevention, Plan Checks.
Responsibilities And Activity Levels Of Personnel		
Assignment Of Routine Duties:		
By Position		
By Areas Of Personal Interest	Yes	
Special Duties Assigned By:		
Duty Assignment	Some	e.g. Hose Management
Work Groups/Committees		
EMS Quality Management	No	
Chaplain	No	
Training	No	Have JAC Committee
Safety	Yes	
Building Development	No	
Operations Committee	Yes	
Uniform Committee	Yes	
Apparatus Committee	Yes	
Standards/SOGS	Yes	Sub Committee Of Operations Committee

Key Recommendations:

- Consider the addition of a second battalion chief within the city.
- Consider addition of a second truck company to increase unit reliability and effective firefighting force capabilities.
- Continued expansion of local cooperative service agreements to enhance truck company and battalion chief response capabilities.

Considerable ongoing local, regional, and national discussion and debate draws a strong focus and attention to the matter of firefighter staffing. Frequently, this discussion is set in the context of firefighter safety. While there are published national standards regarding firefighter staffing, they generally speak in terms of the number of firefighters assigned to a particular response apparatus, often characterized as a “minimum of four personnel per engine-company.” ESCI notes that the more critical issue is the number of firefighters that are assembled in a timely manner at the scene of an incident in conjunction with the scope and magnitude of the job tasks expected of them, regardless of the type or number of vehicles upon which they arrive.

It is important to understand that the assembly of firefighters on an incident, also called an “Effective Firefighting Force” or “Effective Response Force,” is a determination that is made at the community level based on risk, capability, and citizen expectations. There is not mandated requirement, though there are standards that are discussed in detail in this report. In the Service Delivery section, resource concentration is evaluated in detail, finding that MFD is capable of establishing an effective response in a timely manner in many areas of the response area, but also challenged to do so in other areas. In addition, the MFD is faced with the somewhat unique factor that due to the call volume and high amount of fire incidents, there is a significant percentage of time multiple units are busy or out of position impacting the ability of the MFD to assemble the necessary number of personnel and equipment.

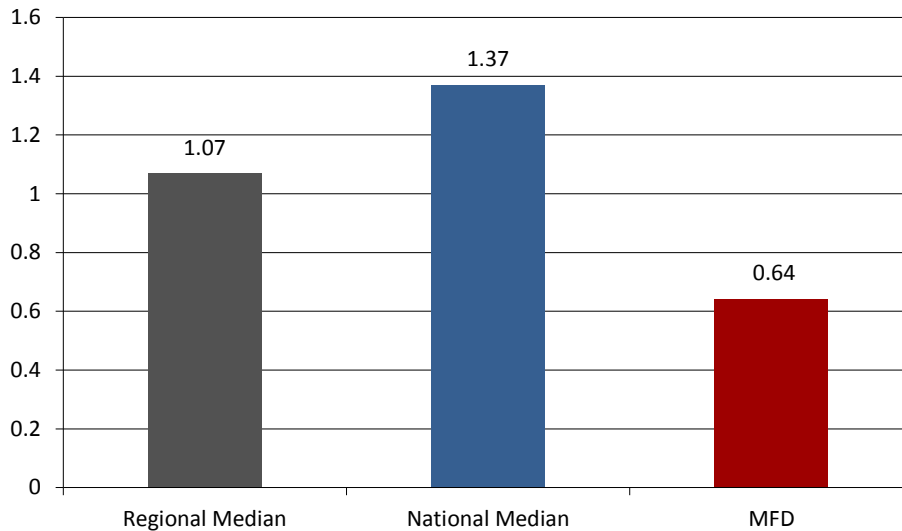
As noted in the Service Delivery section of this report, the MFD has a significant deficit in its ability to provide adequate truck company, battalion command, and control response. This also creates a challenge with an adequate span of control and general oversight and administration of emergency response and suppression forces within the city.

Another means of comparison, also used on a national basis, is that of measuring the number of firefighters on staff per 1,000 population of the service area. The following figure illustrates the current comparison of MFD staffing with both national and regional norms.⁴

⁴ Data drawn from NFPA reports "U.S. Fire Department Profile- 2011" and "U.S. Fire Loss- 2011" (most recent available).



Figure 45: Firefighters per 1,000 Population



At minimum daily staffing levels, MFD has 39 emergency personnel available to respond to all emergencies. MFD has the capability to respond to one or two house fires at a time with the likelihood of simultaneous structures being higher than most in similar jurisdictions. As will be seen later in this report, a majority of the department's workload is medical in nature and, given the current resources and service demand; the department is frequently stretched and utilizing a number of resources simultaneously to meet the existing EMS and fire response workload.

Using this comparison, MFD has a relatively low number of firefighters per capita. The MFD does appropriately staff each of its engine and truck companies but struggles with meeting established response time standards based on volume and frequency of resource utilization. In addition, as noted in the Service Delivery Analysis, the MFD has a significant deficit in its ability to provide adequate Battalion and truck coverage within the city.

It is recommended that an additional truck company and battalion chief be added within the city limits to ensure an adequate effective firefighting force, command and control is available and general unit reliability can meet local standards and industry practices. It is also recommended that the MFD continue to finalize and enhance local cooperative service agreements with surrounding jurisdictions to contribute to enhanced unit reliability, truck company response and command, and control functions.

ESCI notes that, given the slow and incremental financial recovery from the recession that the rapid addition of resources with the associate increased costs present a financial challenge for the MFD and city. Given this financial reality the MFD should begin an incremental approach to increasing response staffing in the context of the projected growth and the deployment analysis. Given the limited training and support function resources currently in place, and the incremental growth in revenue that often lags actual recession recovery and development, we recommend MFD avoid attempting to staff an entire fire station facility at a single point in time, but rather build resources and capacity incrementally to parallel revenue and service demand growth.

Service Delivery and Performance

The delivery of fire suppression, rescue, and emergency medical services is no more effective than the sum of its parts. It requires efficient notification of an emergency and rapid response from well-located facilities in appropriate apparatus with a sufficient number of well-trained personnel following a well-practiced plan of action. This section of the report provides an analysis of the current service delivery components of the MFD. National Fire Incident Records System (NFIRS) data, incident response data, and apparatus response data collected by the department is used in this section of the report.

Figure 46: Service Delivery and Performance

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Service Demand		
Current Service Demand		
Tracked By Incident Type And Temporal Variation	Yes	Conduct Regular Review And Include In An Annual Report.
Geographical Call Distribution	No	Consider GIS Display And Tracking Incident By Response Zones.
Demand Zones Based On Population	No	Consider Adopting Urban, Suburban, And Rural, Response Zones And Standards.
Resource Distribution		
Facilities		
Total Area Protected	42 Square Miles	
Number Of Fire Stations	11	
Number Of Stations Staffed	11	
Number Of Stations Unstaffed	Airport Station Staffed In 1	
Apparatus		
Apparatus Appropriate To Risk (Fire, Medical, Special)	No	Address Additional Truck And Battalion Chief Coverage Needs To Meet Adopted Standards, Implement Additional ALS/BLS Response Utilizing Quick Response Units To Decrease Engine/Truck Response To Non-Emergent Medical Calls.
Staffing	3-0 On Engines, 4-0 On Trucks	
Adequate For Initial Attack Of Predominant Risk	17 On Scene But Not In 10 Minutes	Evaluate Auto-Aid, Additional Resources, And Other Adjustment Of Reconfiguration To Meet 10 Minute Standard.
Resource Concentration		
Effective Response Force		
Defined By Call Type	Yes And Determined By SOC	
Actual Performance Monitored	Yes	
Response Reliability		
Workload Analysis		

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Unit Hour Utilization (UHU)	No	Given High EMS And Fire Call Volume, Consider Measuring UHU For All Units To Better Understand And Address Workload And Unit Reliability Concerns.
Failure Rate By Station Area Or Response Zone	In SOC But Not Real Time	Report Unit Reliability As Part Of A Standard System Performance Report.
Concurrent Calls	SOC Not Real Time	Report As Part Of A Standard System Performance Report.
Response Performance		
Response Performance		Measure And Distribute Turn Out And Travel Time By Shift And Station To Engage Work Force In A Reducing Response Time Intervals.
Call Processing Time	No	Establish Regular Call Processing Time Report From SR 911.
Turnout Time	No, Working On A Process.	
Travel Time	Yes, With 90% Fractal.	
Total Response Time	No	
Response Time Goals		
By Response Zone	Yes, Citywide By Call Type.	Establish Demand Zones With Associated Response And Dynamic Deployment Standards.
By Incident Type	Effective FF Force	
Actual Response Performance Documented And Published	Yes, City Managers' Office	Include Response Performance In An Annual Report For Distribution To All Internal And External Stakeholders.
Mutual/Automatic Aid		
Given/Received Balance	Yes	
Automatic Aid Incorporated In Run Cards/Dispatch Procedures	Yes	
Inter-Agency Training And SOP's	Yes, For Auto Aid Only.	
Signed Mutual Aid Agreements And County Plan	Yes	
Incident Control And Management		
Incident Command System		
Incorporated In All Emergency Operations	Yes	
Addressed In SOP Or SOG	Yes	
Addressed In Training	Yes	



Key Recommendations:

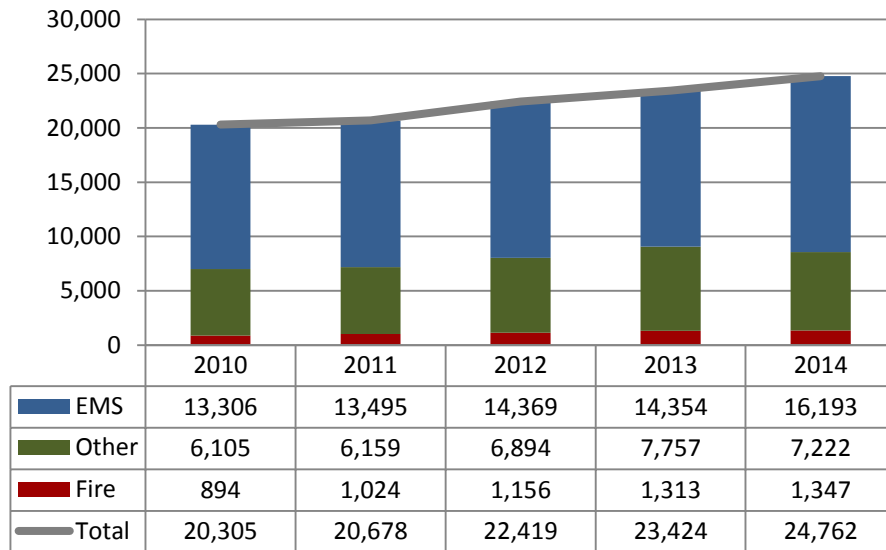
- Measure and distribute turn out and travel time by shift and station to engage work force in a reducing response time intervals.
- Establish demand zones with associated response and dynamic deployment standards.
- Establish regular call processing time report from SR 911.

Discussion

DEMAND ANALYSIS

Service demand is defined as the workload experienced by an emergency services organization. This workload can be emergency and/or non-emergency depending on the mission of the organization. The following figure demonstrates historical service demand over the last five calendar years for MFD.

Figure 47: MFD Service Demand, 2010 through 2014



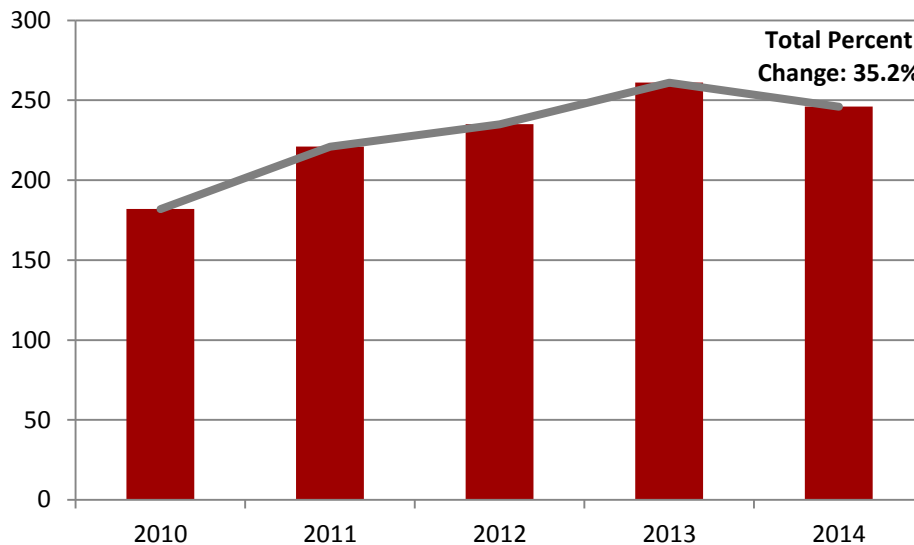
This figure demonstrates that MFD service demand increased every year from 2010 through 2014. Overall, service demand increased by approximately 22 percent. Using the NFIRS incident type definitions, ESCI categorizes incidents as “Fires” (structures, vehicle, brush, any 100 series incident in NFIRS), “EMS” (all calls for medical service including MVA’s and rescues, any 300 series incident in NFIRS), and “Other” (false alarms, hazmat incidents, service calls, all other NFIRS incident series). The next figure demonstrates the percent change in service demand for fire, EMS, and other incident categories from 2010 through 2014.

Figure 48: MFD Percent Change by Incident Category, 2010-2014

Category	Fire	EMS	Other
Percent Change 2010-2014	50.7%	21.7%	18.3%

As opposed to many fire jurisdictions which have experienced a steady decrease in the number of fire incidents; MFD experienced an over 50 percent increase in all types of fire incidents over the last five years. The following figure illustrates number of actual building fires (NFIRS code 111) from 2010 through 2014.

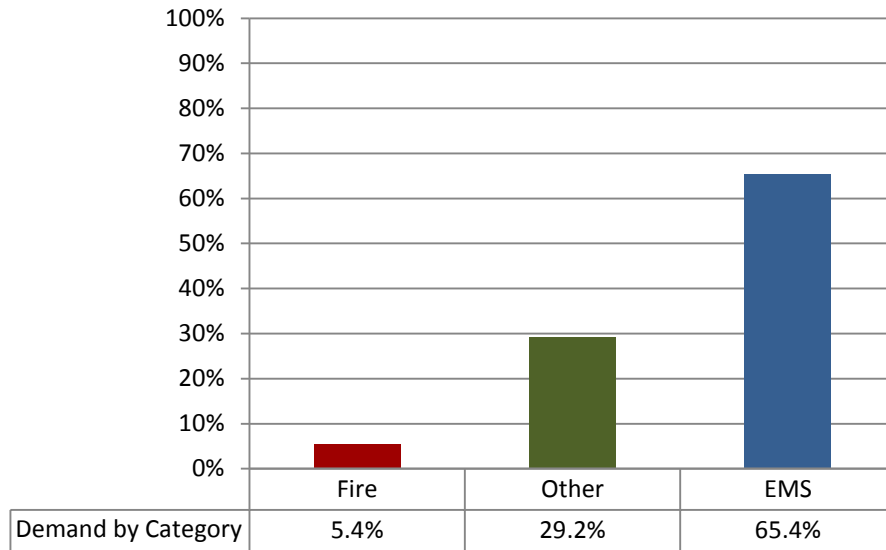
Figure 49: Building Fires from 2010-2014



Although the number of building fires decreased between 2013 and 2014; building fires increased by over 35 percent in the time period illustrated. The following figure summarizes MFD service demand by incident category during 2014.



Figure 50: MFD Service Demand by Incident Category, 2014

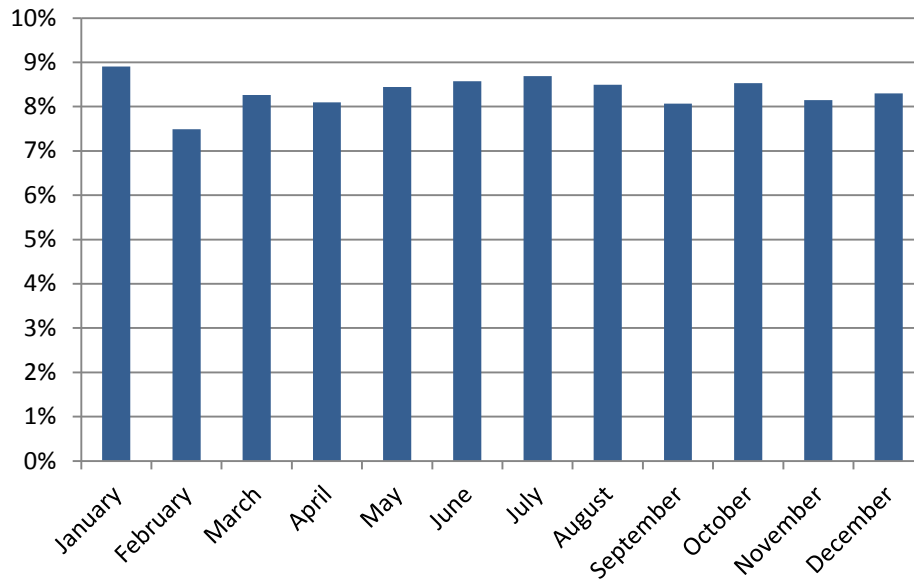


The previous figure displays the nature of service demand in the MFD study area in 2014. EMS incidents represent the largest portion (65.4 percent) of 2014 service demand. Even with the increase in fire incidents between 2010 and 2014, fires represent 5.4 percent of total service demand during 2014. Incidents such as hazardous material responses, service calls, and false alarms comprise the remainder of MFD service demand. The data displayed is similar to that of other all hazard fire jurisdictions in the region and nationwide.

TEMPORAL VARIATION

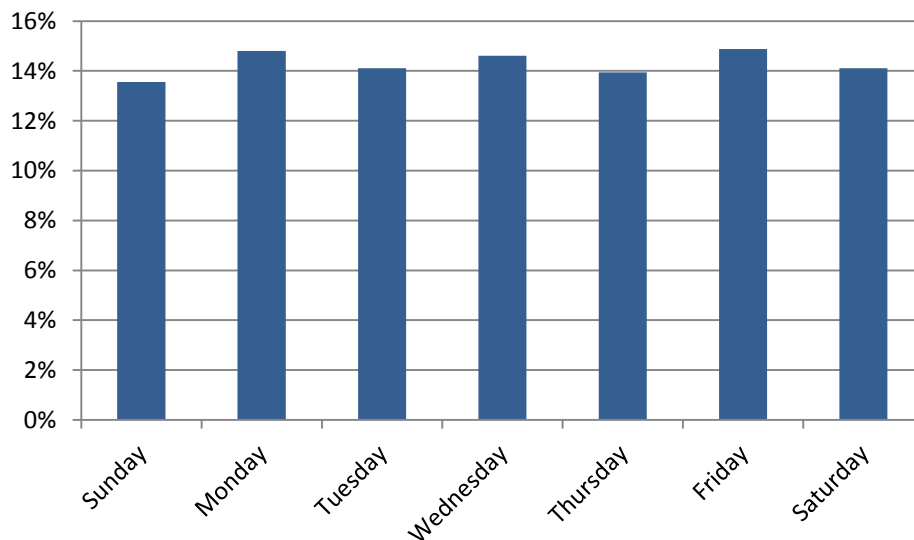
Service demand is not static, and the workload within the study area varies by temporal variation. The following figures illustrate how MFD service demand varied by month, day of week, and hour of day during 2014 in order to identify any periods of time that pose significantly different risks and hazards. This analysis begins by evaluating service demand by month.

Figure 51: MFD Service Demand by Month, 2014



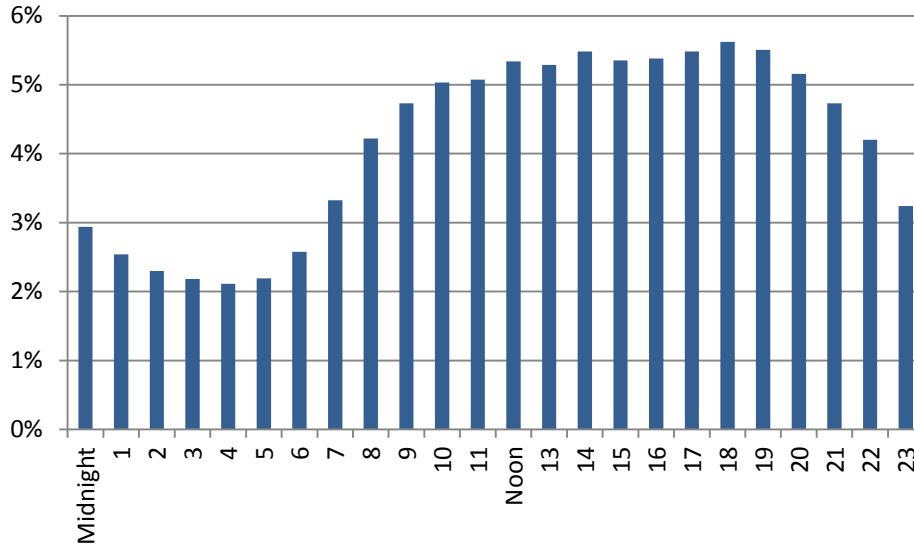
Overall service demand varies throughout the year, with the lowest demand in February (7.49 percent) and the highest percentage (8.9 percent) of incidents in January 2014. This represents a range of 1.4 percent. The next figure looks at service demand by day of the week.

Figure 52: MFD Service Demand by Day of the Week, 2014



As with monthly service demand, service demand by day of the week varies within a narrow range throughout the week. The last analysis of temporal variation demonstrates workload by hour of the day.

Figure 53: MFD Service Demand by Hour of the Day

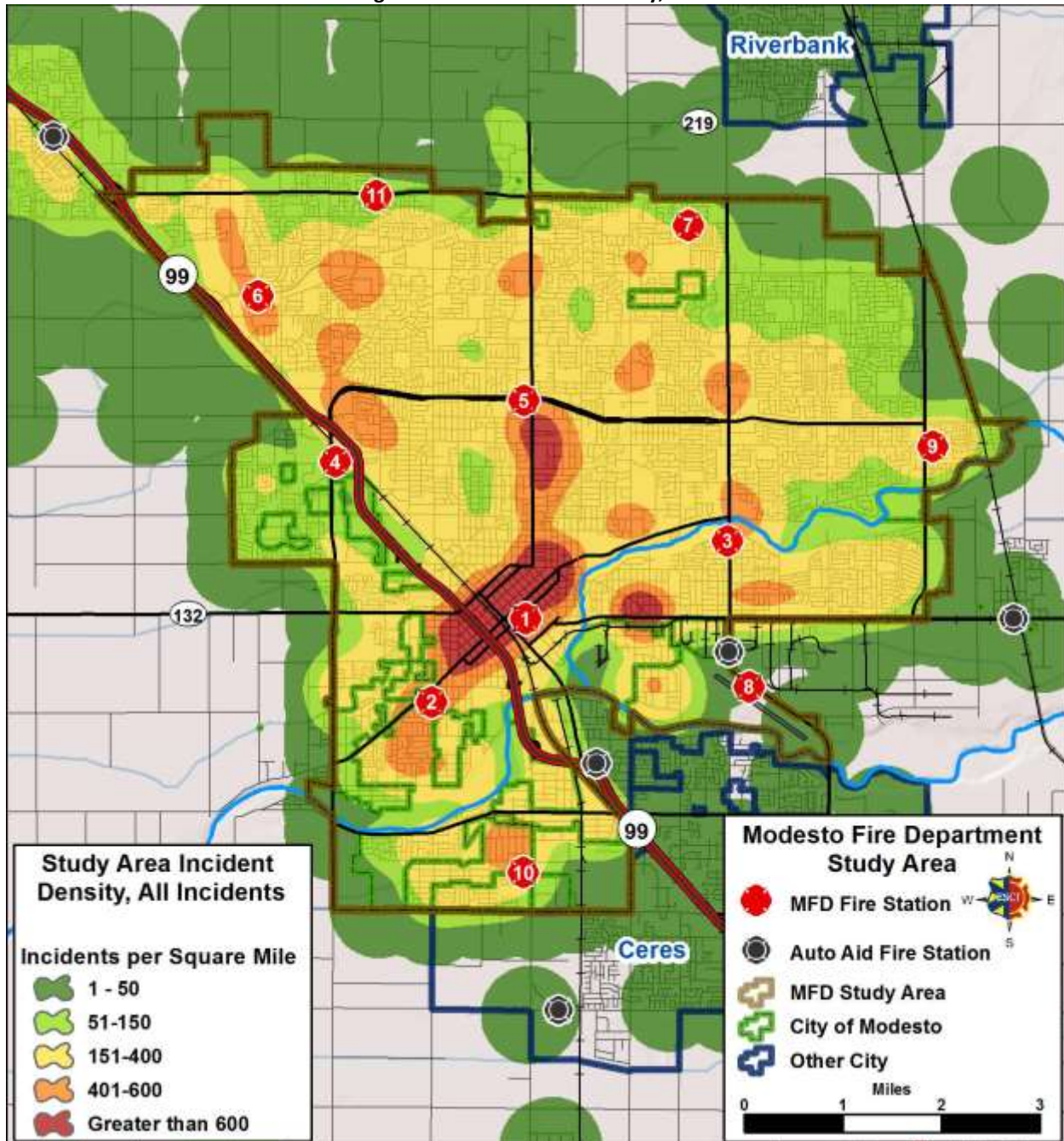


Service demand directly correlates with the activity of people, with workload increasing during daytime hours and decreasing during nighttime hours as shown in the preceding figure. Over 65 percent of MFD service demand in 2014 occurred between 9:00 AM and 9:00 PM. The increase in service demand during the day is significant and predictable. There is an opportunity to anticipate increased workload and improve response performance by deploying additional apparatus or personnel during the busiest times of the day.

GEOGRAPHIC SERVICE DEMAND

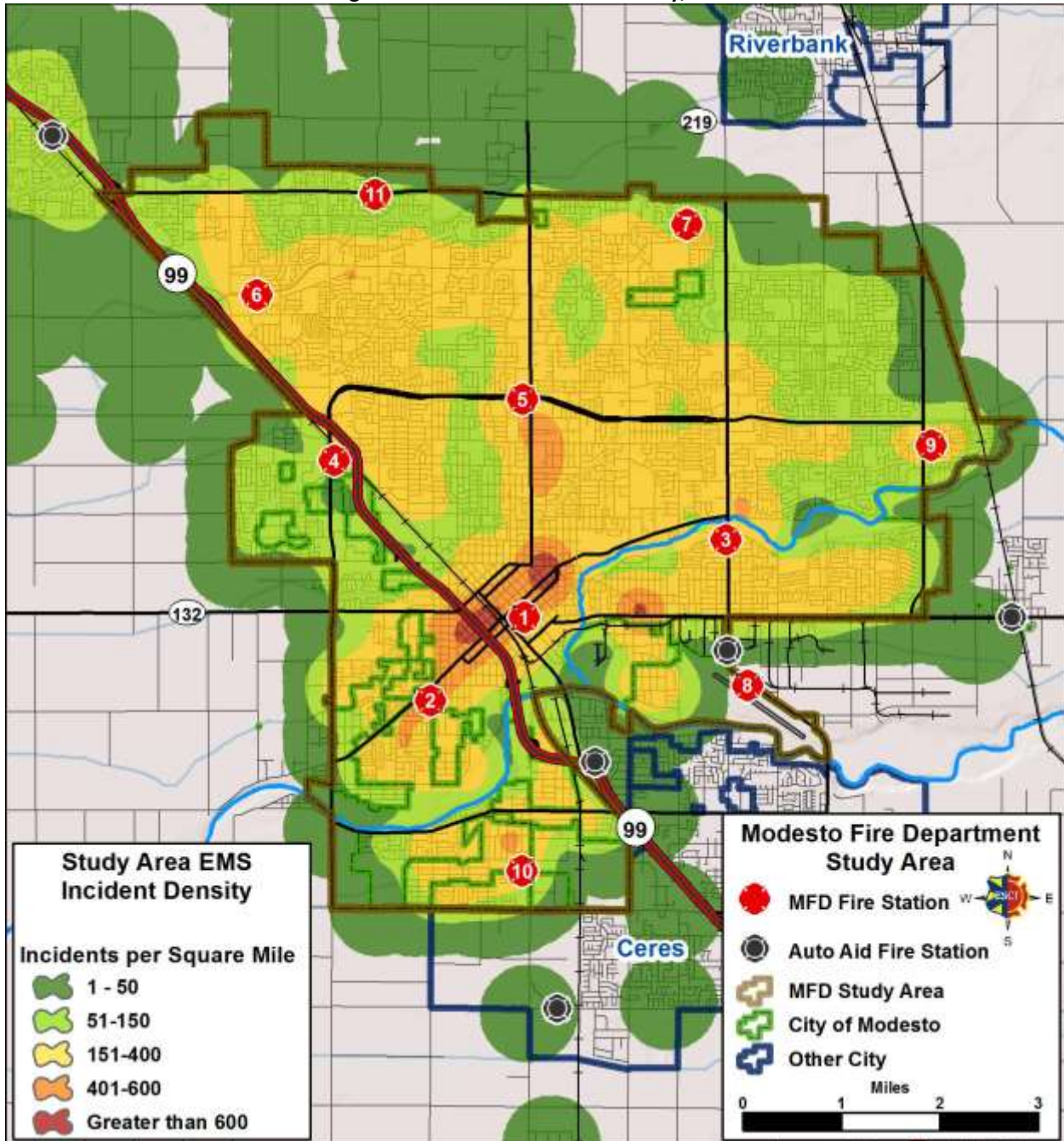
In addition to the temporal analysis of service demand, it is useful to examine the geographic distribution of service demand. In the following figure, ESCI plots incident locations and calculates the mathematical density of 2014 service demand in the MFD service area.

Figure 54: MFD Incident Density, 2014



Service demand is distributed throughout the MFD service area. The highest incident density occurs in the downtown core area, primarily in the first due areas of Stations 1, 2, and 5. As discussed earlier, EMS incidents represent the majority of MFD service demand. The next figure illustrates 2014 EMS incident density.

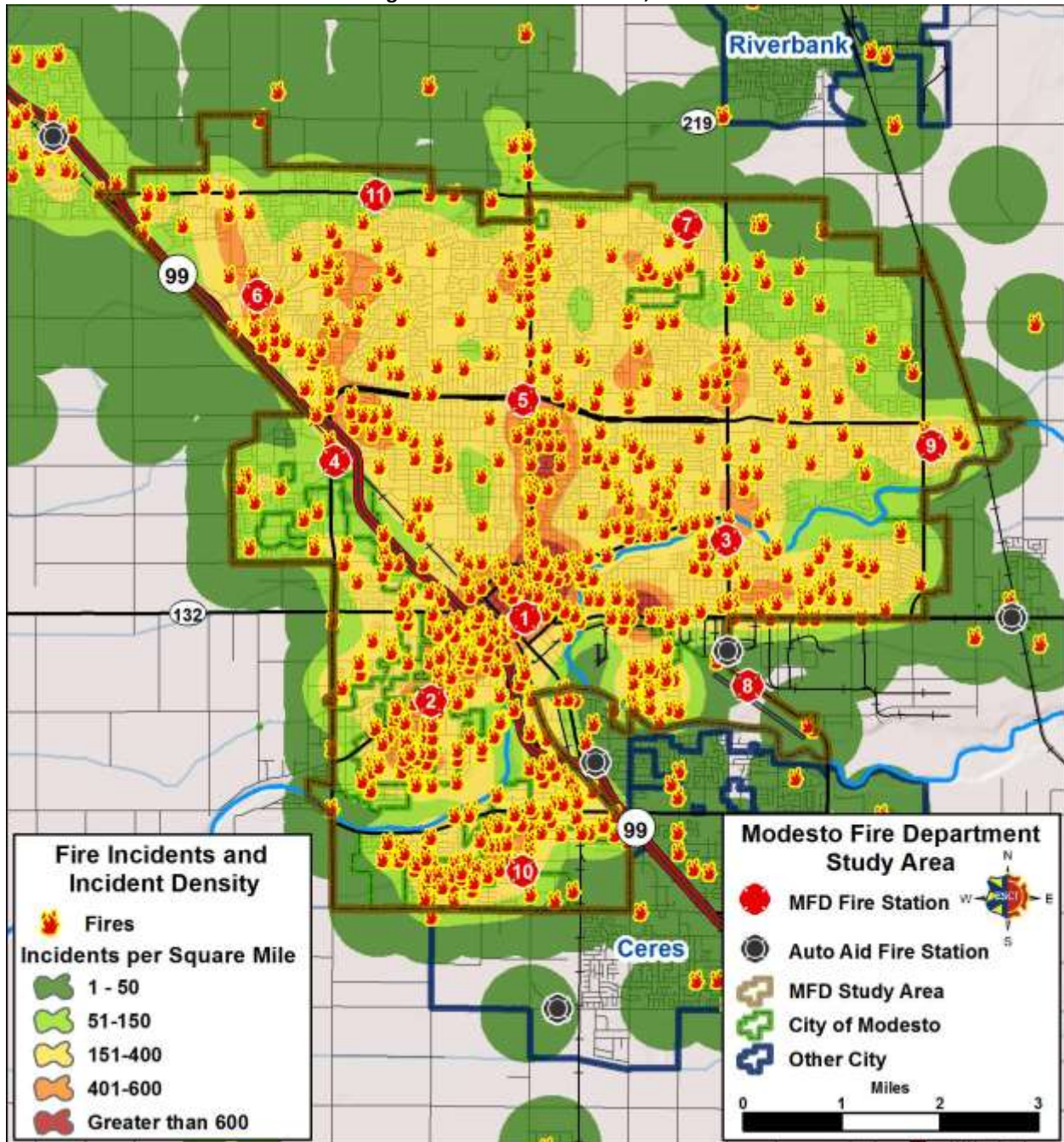
Figure 55: MFD EMS Incident Density, 2014



Not surprisingly, EMS incident density is similar to the overall density displayed in the Figure 54. However, removing “Fire” and “Other” incidents from the data set eliminates several areas of higher

incident density throughout the service area; and decreases incident density in the downtown core area. The last figure in the demand analysis pinpoints fire incidents in the 2014 MFD data set.

Figure 56: MFD Fire Incidents, 2014

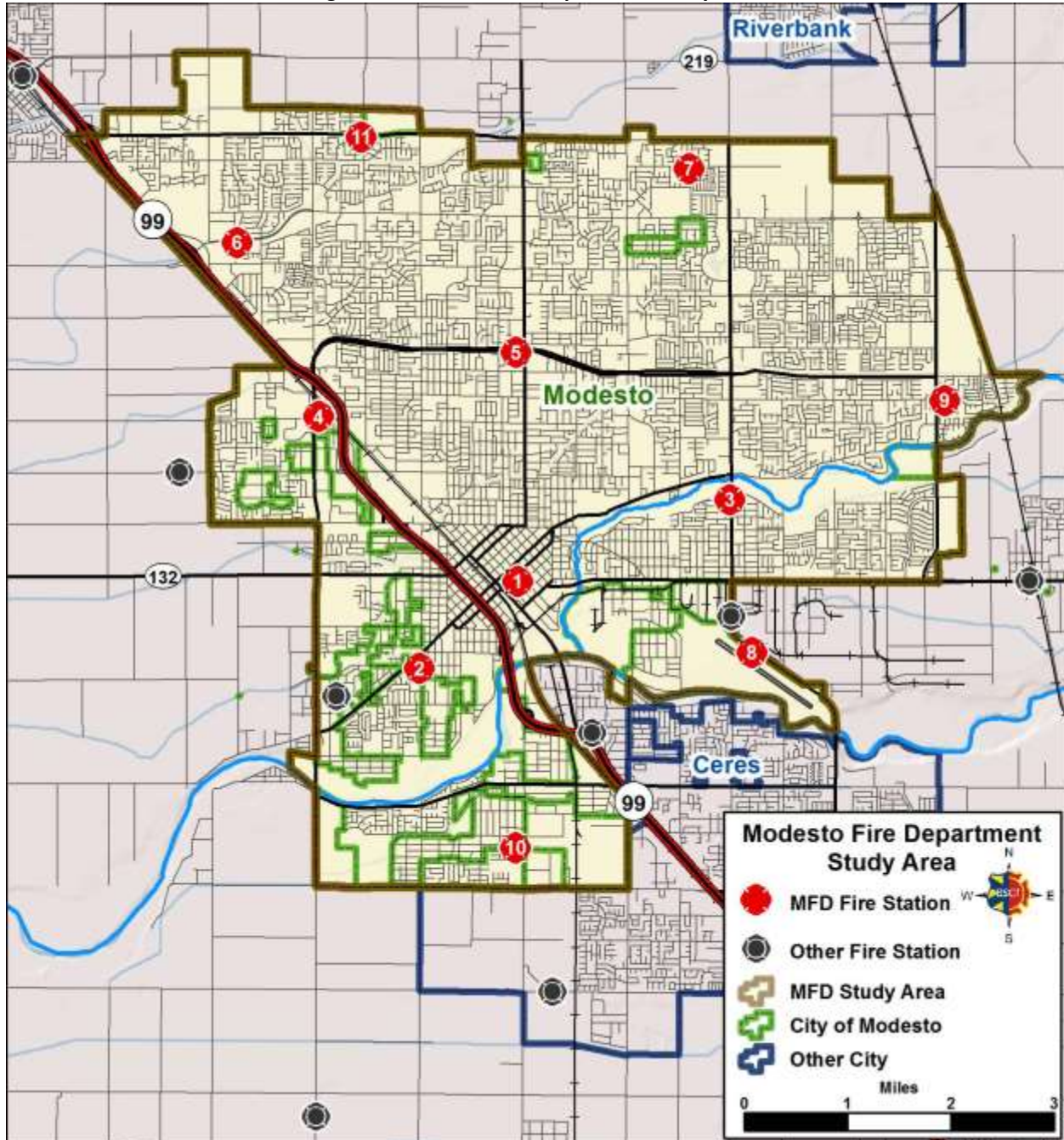


This figure illustrates the distribution of fire incidents throughout the study area. Examination of the GIS data reveals that over 62 percent of 2014 fire incidents occurred in the first due areas of Stations 1, 2, 5, and 10.

DISTRIBUTION ANALYSIS

The analysis of distribution of resources presents an overview of the current deployment of fire department facilities, equipment, and personnel within the MFD service area.

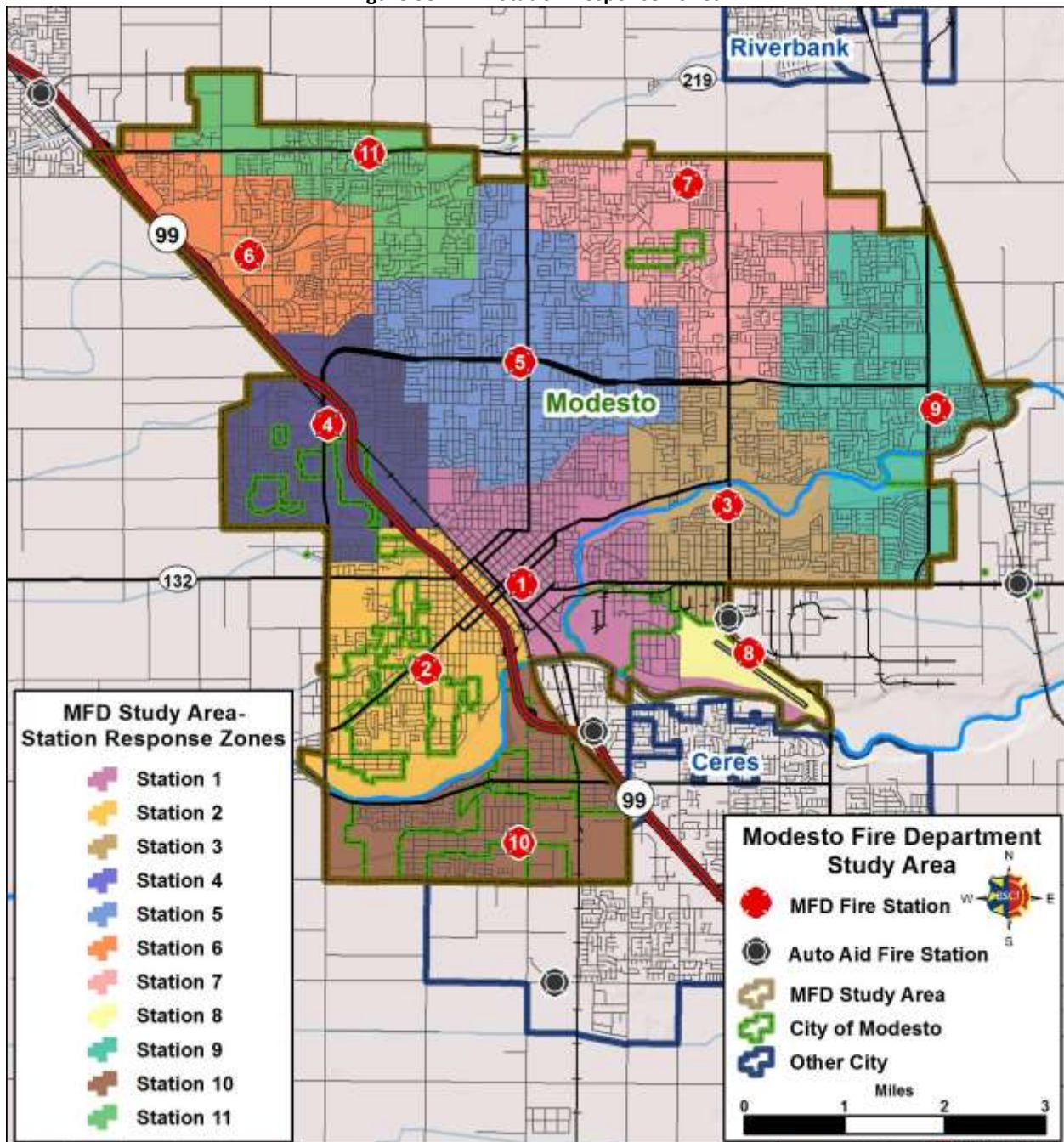
Figure 57: Modesto Fire Department Study Area



MFD currently provides fire protection, EMS first response (ALS and BLS), hazmat, and rescue services within the City of Modesto and unincorporated areas around Modesto. The MFD service area encompasses approximately 42.5 square miles, (37.2 square miles inside the City of Modesto); and is

bounded by the City of Ceres to the south, the unincorporated community of Salida to the northeast, and unincorporated Stanislaus County to the east and west.

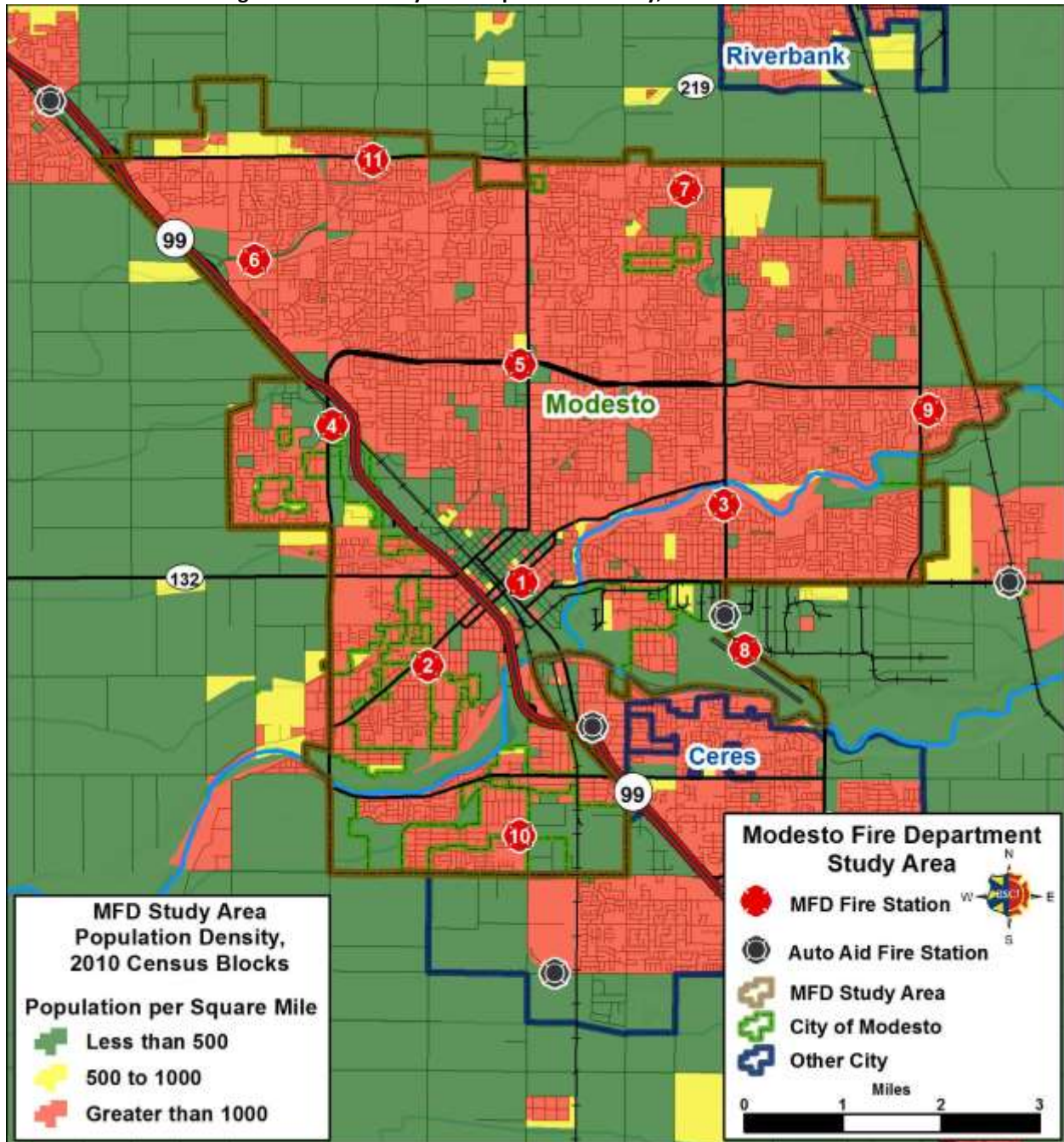
Figure 58: MFD Station Response Zones



MFD currently operates from the 11 stations displayed in this figure. The stations are staffed with career firefighters on a 24 hour basis. Note that Station 8, located at the Modesto Airport, is staffed by a single engineer, who operates a specialized aircraft fire fighting apparatus. This apparatus does not routinely respond outside the airport. Station 8 is not included in the travel distance and travel time models later

in the distribution analysis. The following figure displays population density throughout the study area using 2010 US Census Bureau census block data.

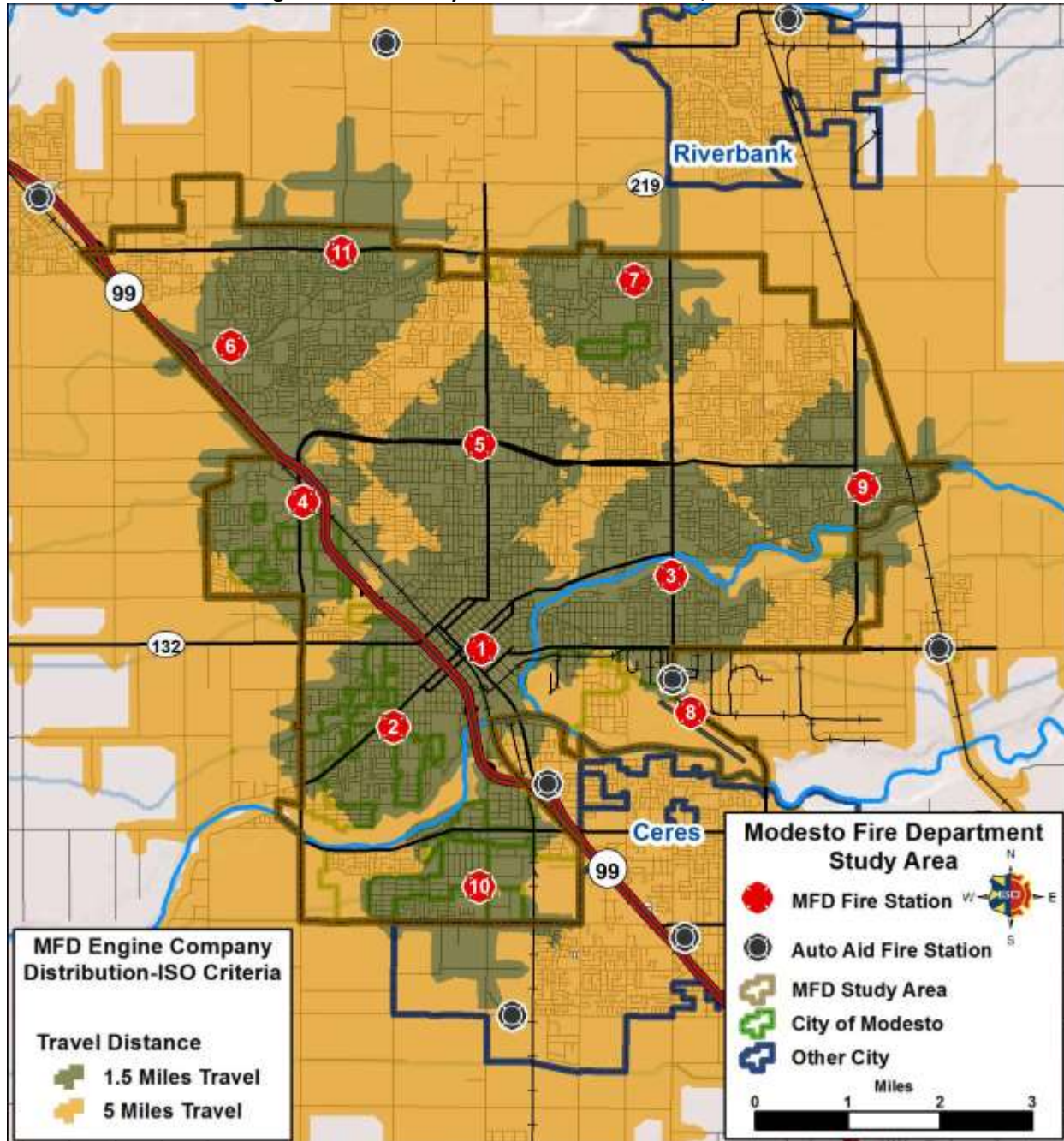
Figure 59: MFD Study Area Population Density, 2010 Census Blocks



The population density inside the study area is largely urban in nature. The estimated population of the City of Modesto as of January 2015 (California Department of Finance Demographic Research Unit – most recent estimate available) was 209,186. The overall population density within the MFD service area is over 4,900 per square mile.

The Insurance Services Organization (ISO) is a national insurance industry organization that evaluates fire protection for communities across the country. A jurisdiction's ISO rating is an important factor when considering fire station and apparatus distribution; since it can affect the cost of fire insurance for individuals and businesses. For ISO purposes, response areas are measured at 1.5 miles of travel distance for each engine company; and 2.5 miles for a ladder company (aerial apparatus) on existing roadways. For a structure to be in a protected rating for insurance purposes, it must be within five miles of a fire station. The next two figures examine current MFD station and apparatus distribution based on the rating criteria of the Insurance Services Organization (ISO).

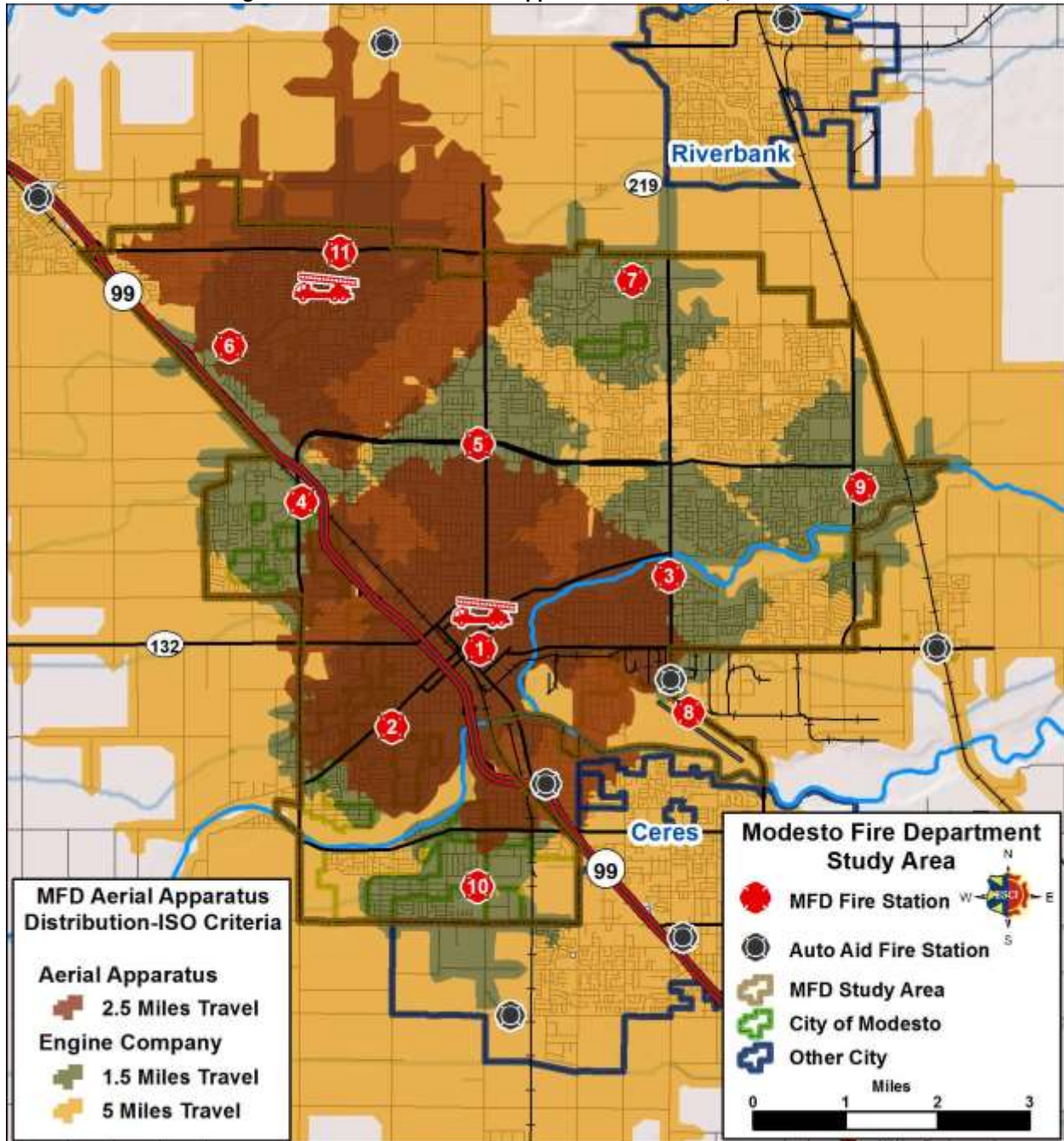
Figure 60: MFD Study Area Station Distribution, ISO Criteria



Approximately 64 percent of the current road network within Modesto is within 1.5 miles of a MFD fire station. All of the MFD service area is within five miles of a fire station.

Similar to engine company criteria, ISO recommends that ladder companies (aerial apparatus) be placed at 2.5-mile intervals in areas with buildings over three stories in height.

Figure 61: MFD Current Aerial Apparatus Distribution, ISO Criteria



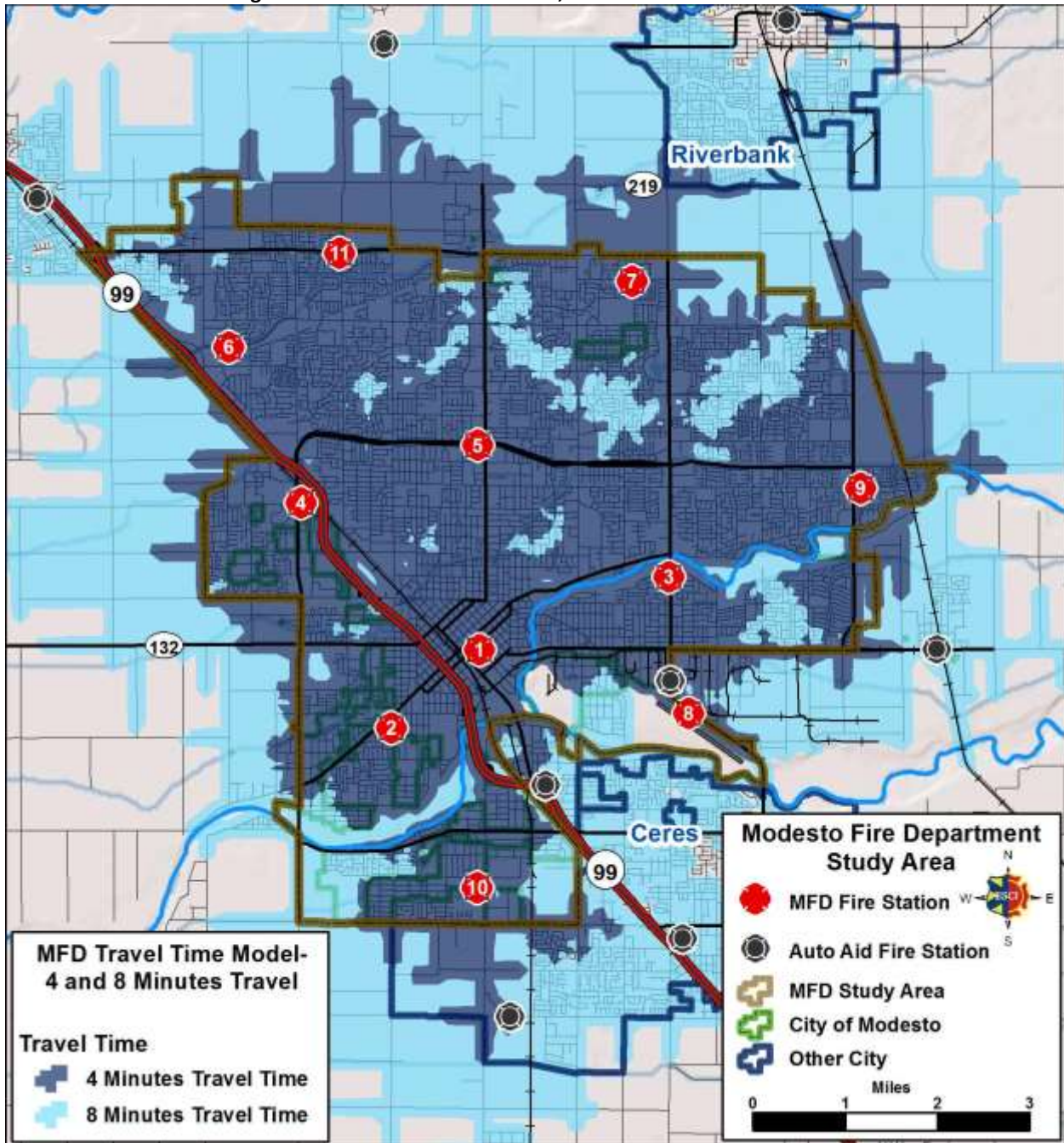
Currently MFD houses aerial apparatus at Station 1 and Station 11. Four personnel at Station 1 staff the aerial at Station 1. The aerial at Station 11 is cross-staffed by the three personnel stationed at this station and respond as an aerial or engine company based on call type and need.

The most recent ISO rating assigned a Public Protection Classification (PPC) of Class 2 (with 1 being the best and 10 being the worst) for the MFD. Based on the ISO rating criteria, the MFD stations and apparatus are distributed effectively within the service area with the exception of aerial apparatus coverage not meeting the ISO 2.5 mile travel time in the northeast portion of the city.

It is worth noting that aerial apparatus coverage is limited and outside the ISO and adopted response time standards in the response areas bordered by stations 3, 5, 7, and 9.

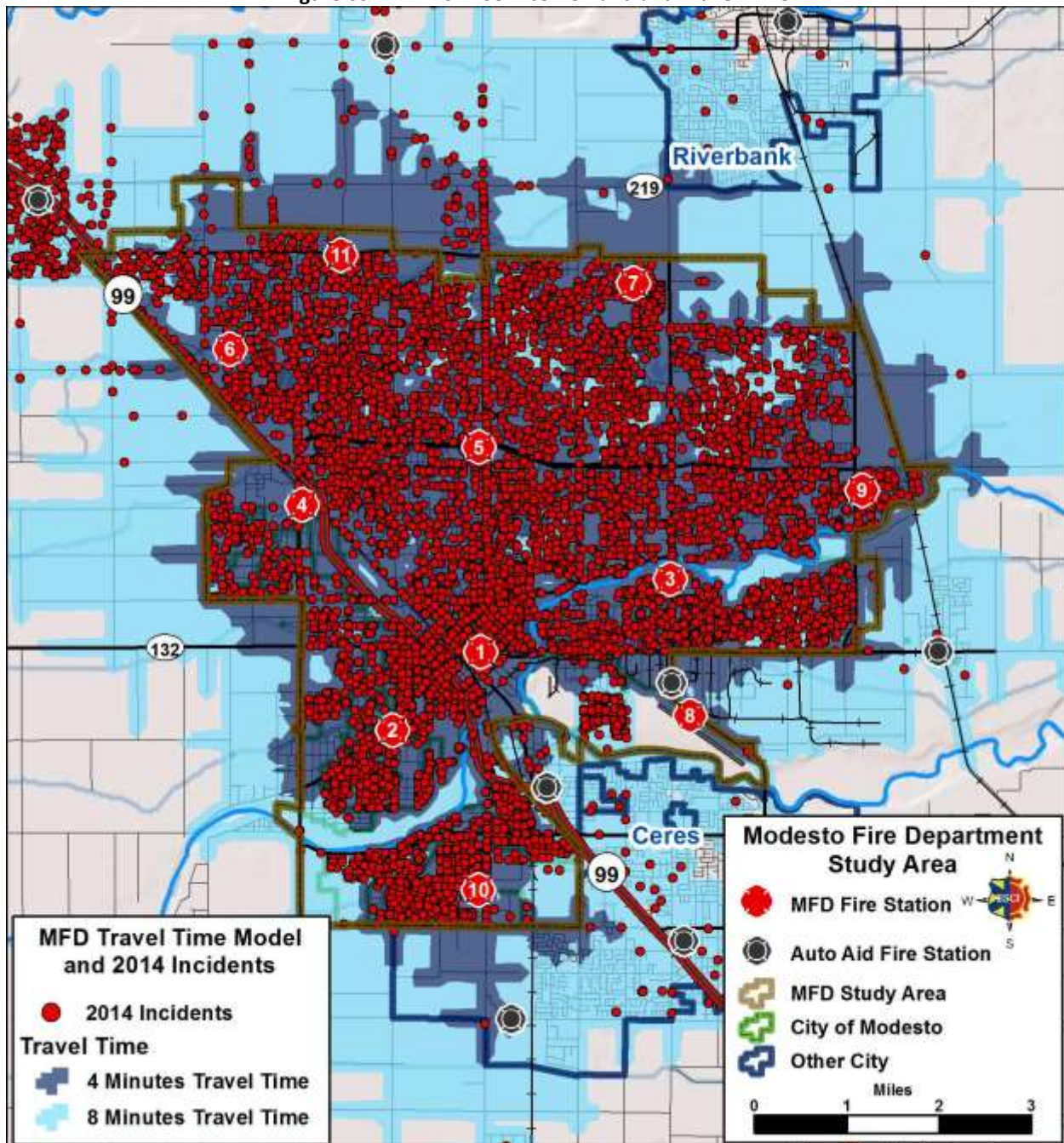
The ISO Public Protection Classification program only addresses fire suppression activities and is primarily concerned with the geographic coverage of property. For fire jurisdictions such as MFD, that respond to all types of emergencies, the travel time required to respond from a fire station to any emergency call for service is of equal importance. The following figures demonstrate travel time over the existing road network. Travel time is calculated using the posted speed limit and adjusted for negotiating turns and intersections.

Figure 62: MFD Travel Time Model, 4 and 8 Minutes Travel Time



This previous figure demonstrates that the majority of the MFD service area is within four minutes travel of a currently staffed MFD fire station. More significantly, the following figure demonstrates the percentage of current service demand (2014) that is within four minutes travel of a MFD fire station.

Figure 63: MFD 2014 Service Demand and Travel Time



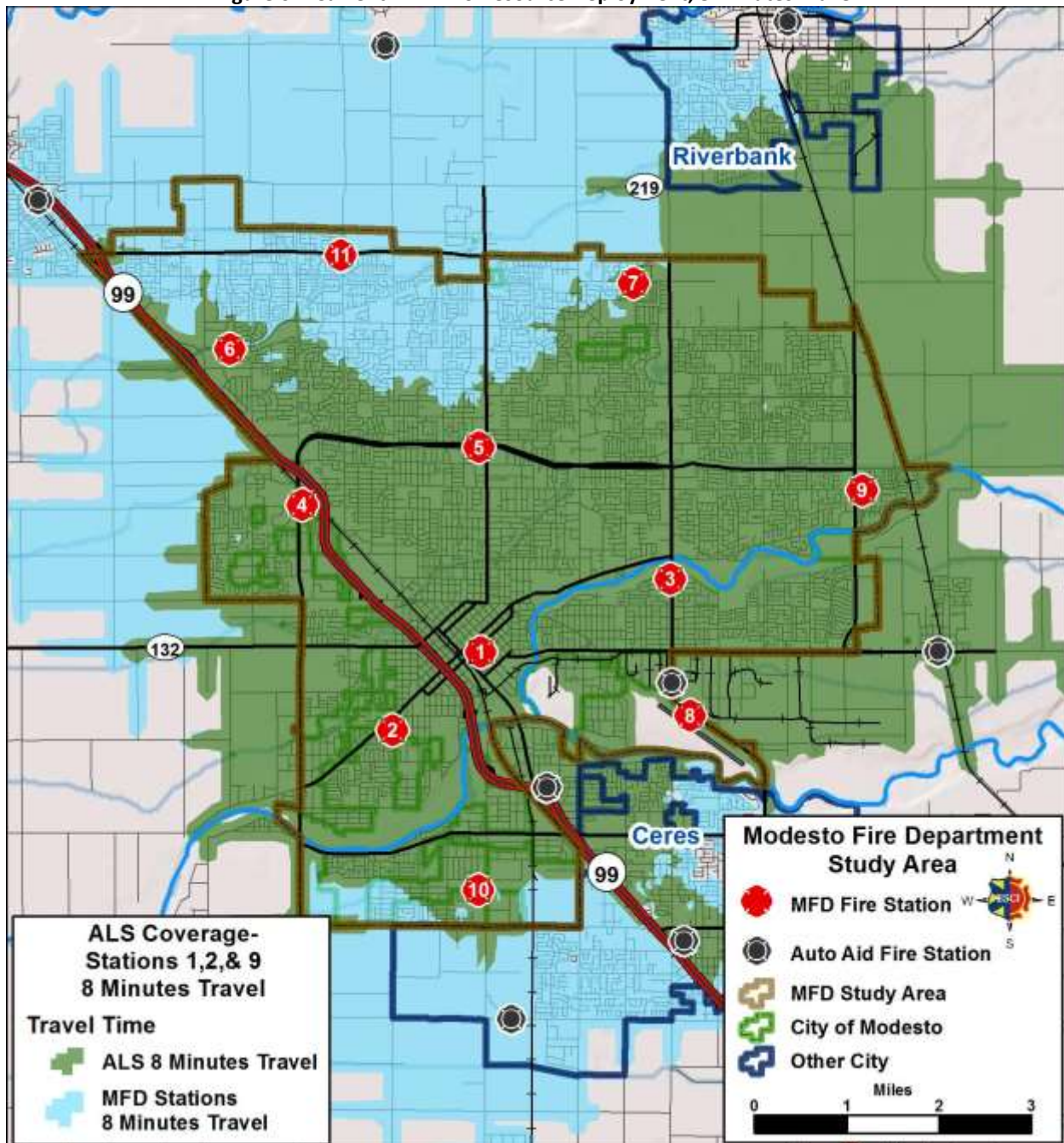
National consensus standards, such as *NFPA 1710*,⁵ specify that career staffed, urban fire departments should deploy resources such that 90 percent of emergency service demand can be reached in four minutes travel or less.

⁵ *NFPA 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* (National Fire Protection Association 2010).

Figure 63 illustrates that based on the four-minute travel time model; MFD apparatus can theoretically reach approximately 88 percent of current service demand in 4 minutes or less travel time. Note this analysis does not include incidents outside the MFD study area. Actual MFD travel time and response time performance is discussed in the Response Performance Analysis later in this report.

MFD provides EMS first responder service utilizing the engine companies from the ten stations modeled in the travel time maps displayed above. The department delivers Advanced Life Support (ALS) service from three stations. The following figure demonstrates the portions of the service area within 8 minutes travel of an ALS equipped and staffed MFD station.

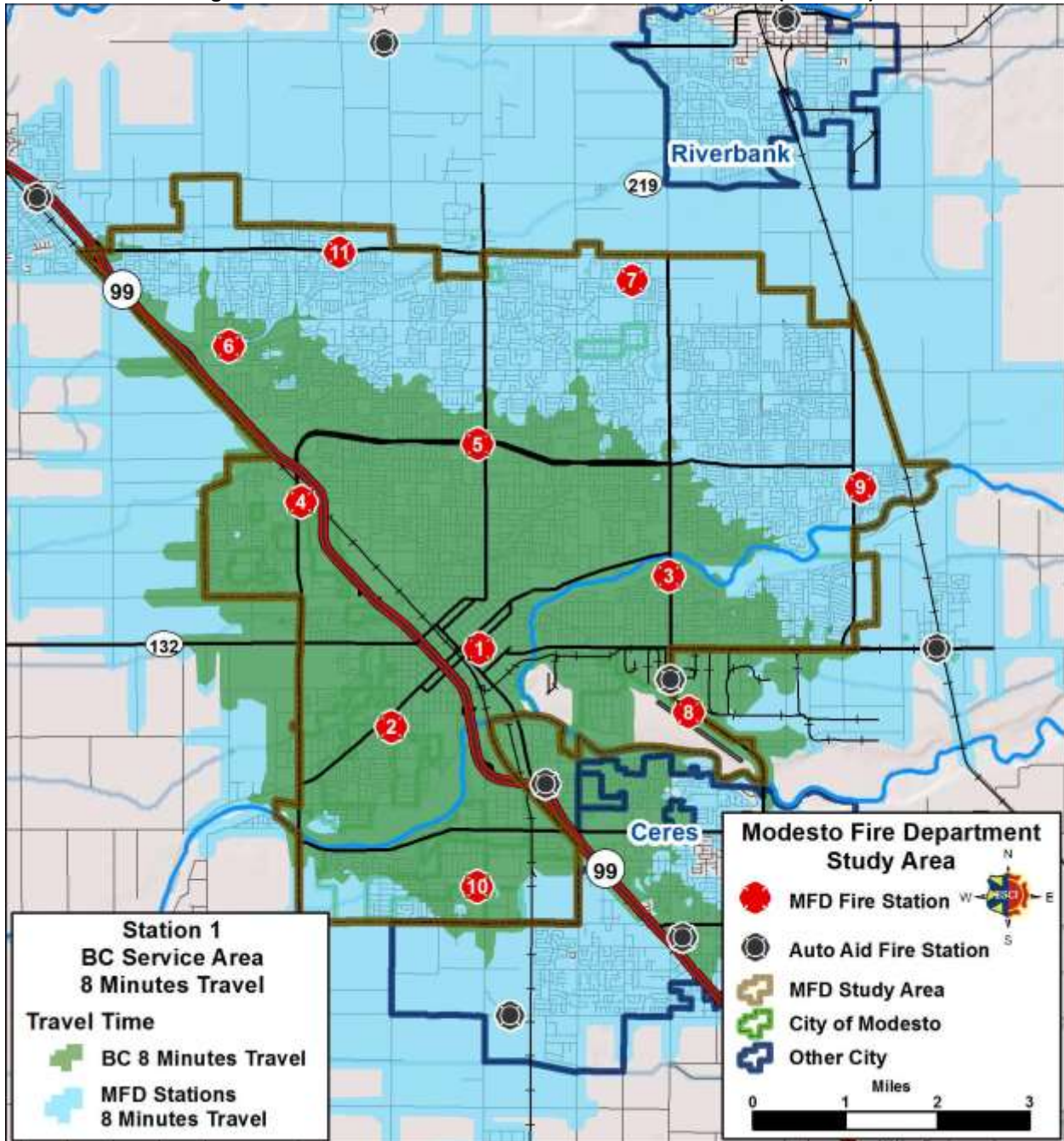
Figure 64: Current MFD ALS Resource Deployment, 8 Minutes Travel



Industry best practices call for the arrival of the first ALS responder within eight minutes travel time for ALS incidents. 87.3 percent of 2014 EMS incidents are within 8 minutes travel of a MFD ALS resource. ESCI was unable to distinguish ALS incidents from BLS incidents with the data provided. It is recommended additional ALS first response units be implemented to ensure complete ALS coverage within adopted response times and integration with ambulance response standards.

Currently a single battalion chief (BC), located at Station 1, runs daily emergency operations within the MFD service area. The span of control and the size of the service area for this single command officer has been identified as an area of concern. The following figure demonstrates the eight-minute travel time service area for the battalion chief at Station 1.

Figure 65: Current MFD Battalion Chief 8 Minute Service Area (Station 1)



A command officer is part of the initial MFD first alarm assignment for incidents requiring more than one or two apparatus to mitigate the emergency. The previous figure demonstrates that the northern and eastern portions (Stations 11, 7, and 9 first due) of the MFD service area is beyond eight minutes

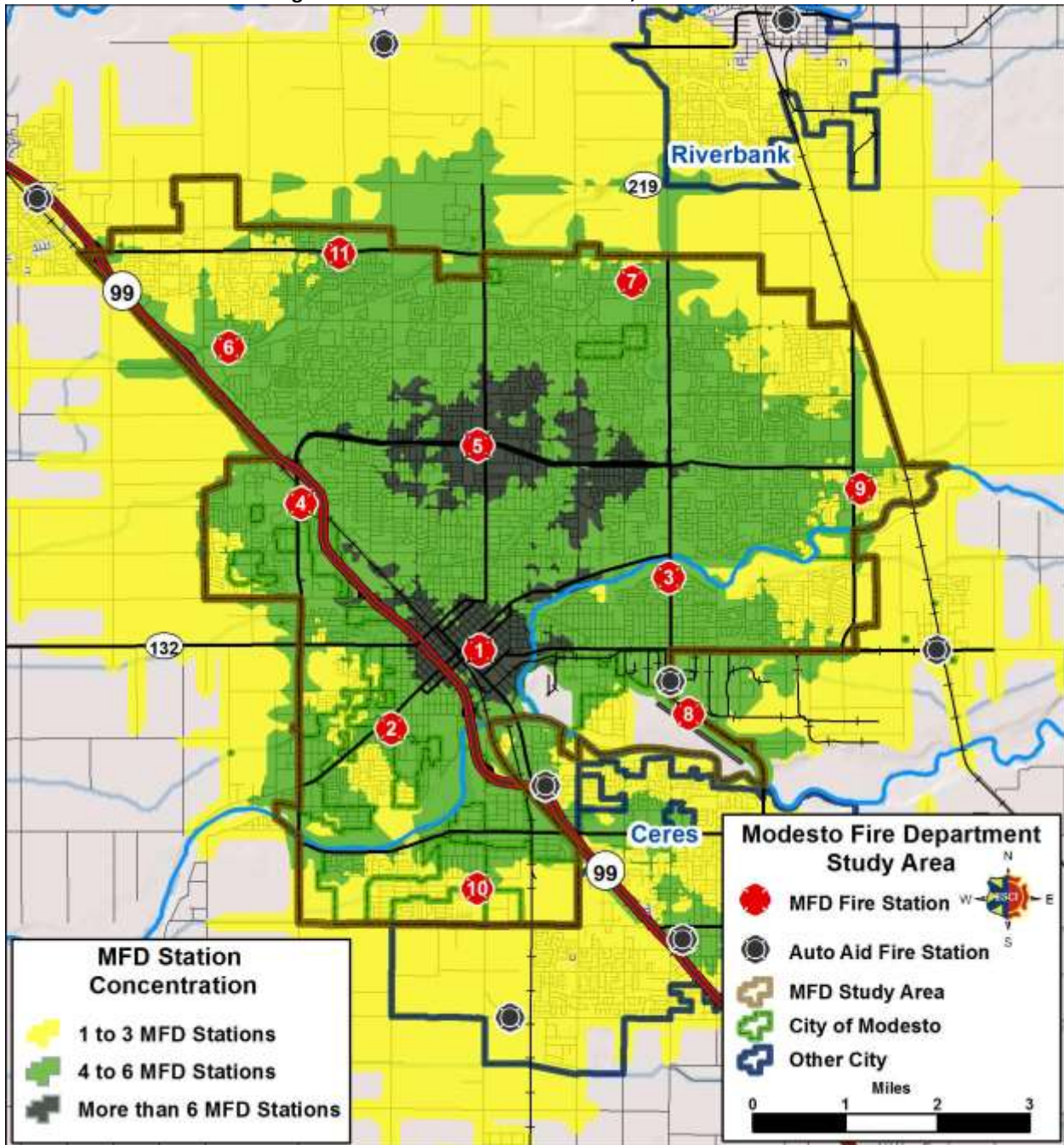
travel of the BC at Station 1. This affects the department's ability to assemble an effective response force (ERF) in a timely manner for more complex incidents. Further discussion of effective response force occurs in the concentration analysis.

CONCENTRATION ANALYSIS

The concentration analysis examines MFD's ability to assemble multiple resources (both apparatus and people) such that sufficient resources to safely and effectively mitigate an emergency arrive in a timely manner. The following figure displays the concentration of MFD stations in the study area in eight minutes or less travel time. The eight-minute travel time criteria used for this analysis is based on the National Fire Protection Association (NFPA) Standard 1710. The 1710 standard specifies that the full first alarm assignment for a moderate risk structure fire (single story residential structure) should arrive within eight minutes' travel.



Figure 66: MFD Station Concentration, Current Stations



The demonstrated service demand in the MFD service area requires a high concentration of stations to assure that additional apparatus are available to respond when the first due unit is committed to an incident. The highest concentration of stations occurs in the center of Modesto around Station 1 and Station 5. The majority of the service area is within eight minutes travel of 4 to 6 MFD stations. MFD relies on automatic aid resources to provide additional coverage throughout the service area. The following figure displays the station concentration within the MFD service area including automatic aid resources.

Figure 67: Station Concentration, MFD and Automatic Aid Stations

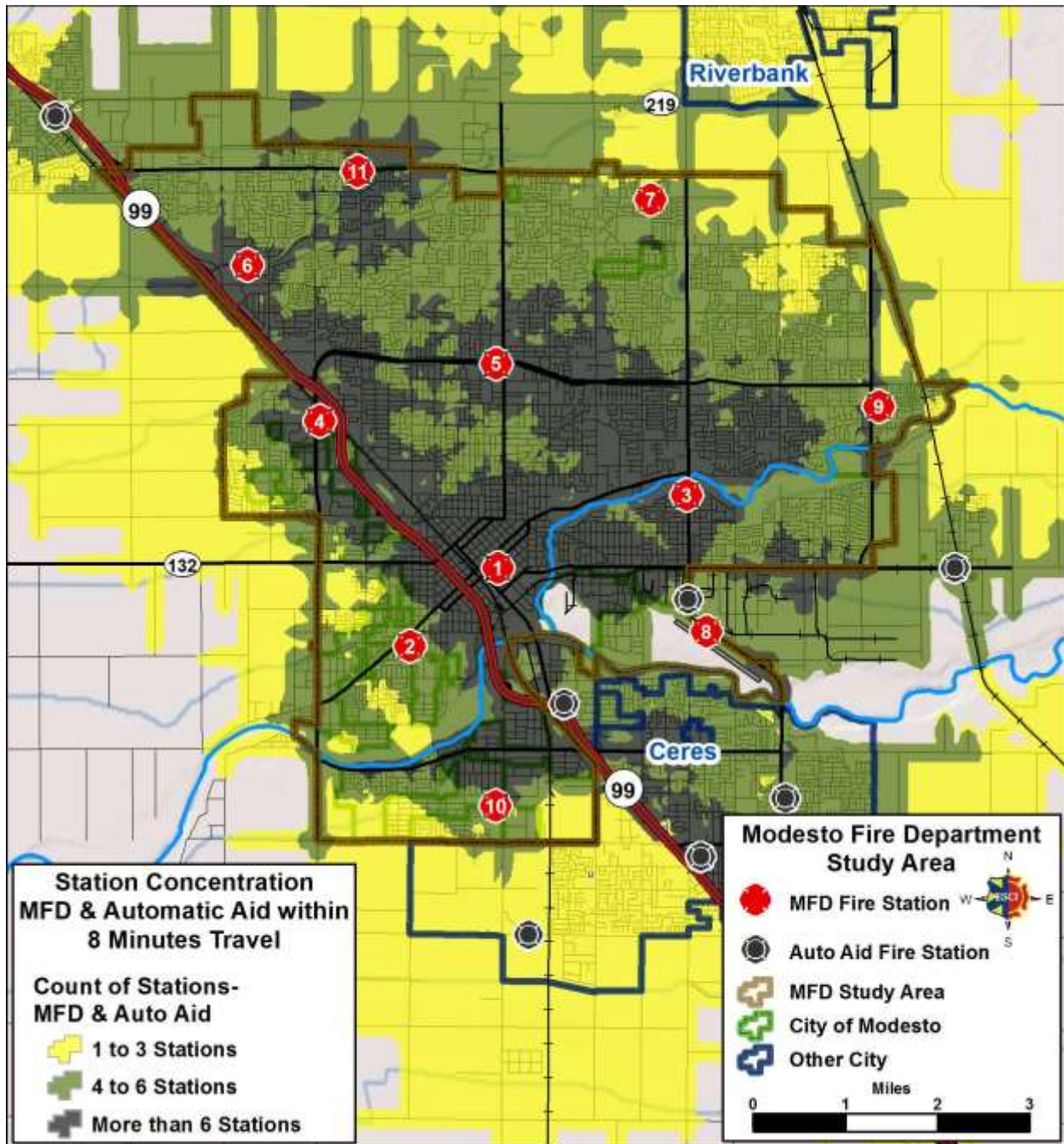
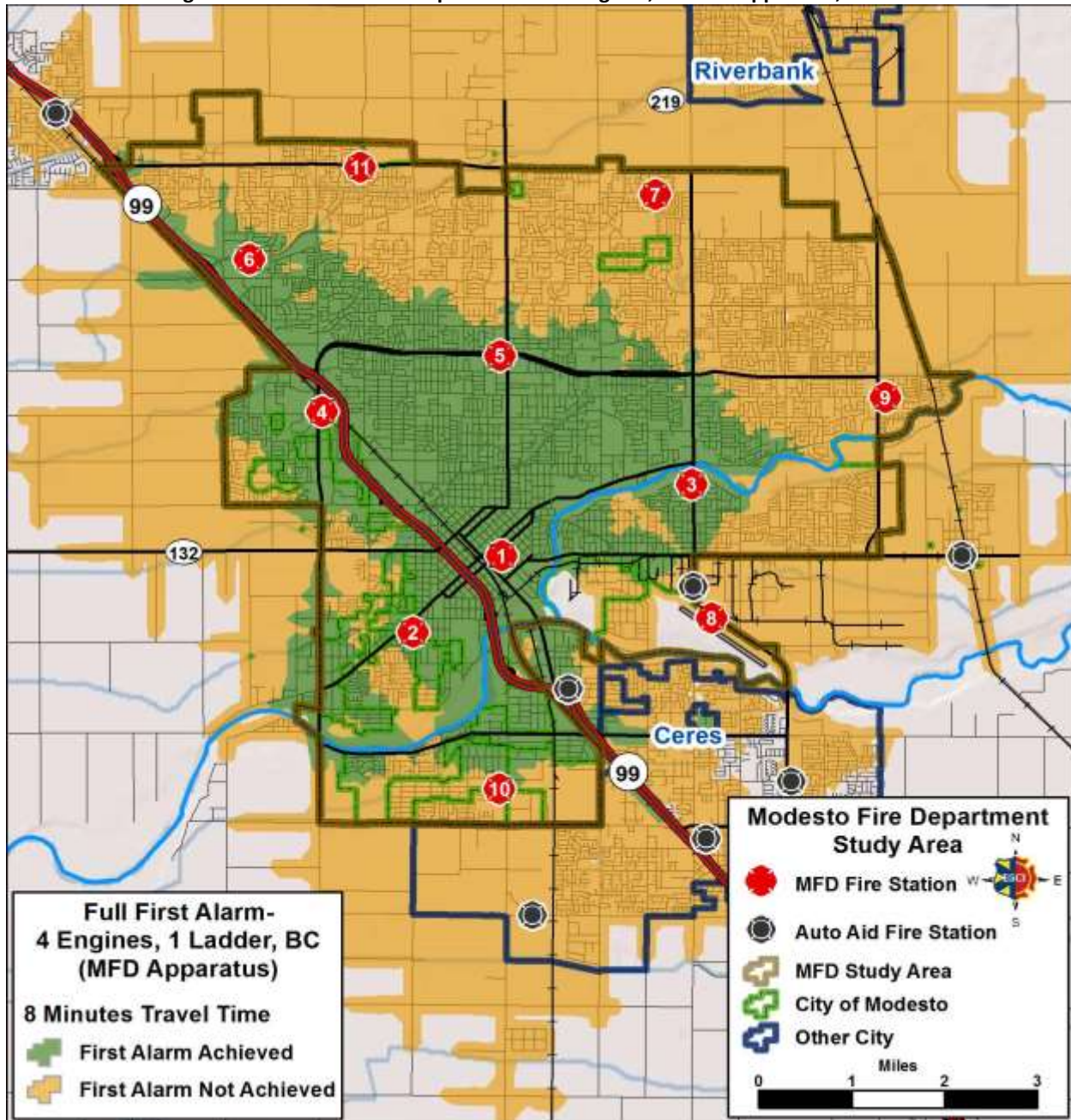


Figure 67 demonstrates that automatic aid resources increase the concentration of resources available in eight minutes travel around the fringes of the MFD service area. Also, examination of the GIS data reveals that large portions of the core area (Stations 1 through 5), are within eight minutes travel of eight to ten stations.

The MFD full first alarm assignment for a working structure fire consists of one ladder truck, four engines, and a battalion chief. The NFPA 1710 standard recommends that the first alarm assignment for

a moderate risk fire incident arrive within eight minutes travel time. This figure displays the portions of the MFD service area within eight minutes travel of a full first alarm assignment.

Figure 68: MFD Effective Response Force-4 Engines, 1 Aerial Apparatus, and BC



The current first alarm contingent for a moderate risk structure fire brings 16 personnel on five apparatus and a command officer to the scene, in 8 minutes travel time; for a total of 17 personnel. Note that number of personnel meets industry best practice recommendation of 14-16 personnel for an effective response force for a moderate risk fire suppression incident.⁶ While the core area of Modesto is within eight minutes travel of a full first alarm assignment; much of the MFD service area north of

⁶ Center for Public Safety Excellence/Commission on Fire Accreditation (CPSE/CFAI) *Standards of Cover, 5th Edition*.

Briggsmore Avenue is beyond eight minutes travel of a full first alarm assignment. Factors that limit the department’s ability to assemble a full first alarm are the travel time limitations of the single battalion chief and the lack of an additional fully staffed ladder truck at Station 5.

RELIABILITY

The workload of emergency response units can be a factor in response time performance. The busier a given unit, the less available it is for the next emergency. If a response unit is unavailable, then a unit from a more distant station (or mutual/automatic aid department) must respond, increasing overall response time. Although fire stations and response units may be distributed in a manner to provide quick response, that level of performance can only be obtained when the response unit is available in its primary service area.

Simultaneous or concurrent incidents can affect a fire department’s ability to muster sufficient resources to respond to additional emergencies. The following figure demonstrates the percentage of the time that MFD resources were committed to more than one incident at the same time in 2014.

Figure 69: MFD Concurrent Incidents, 2014

Concurrent Incidents	Percentage
Single Incident	33.94%
2	35.39%
3	18.62%
4	8.13%
5 or More	3.92%

Nearly 34 percent of 2014 service demand within the MFD service area occurred as a single event. Over **66 percent** of the time, two or more incidents were in progress in the MFD service area. The percentage of concurrent incidents experienced by MFD is higher than that experienced by similar fire jurisdictions. The high overall service demand, high volume of working fires, and the number of EMS assists contribute to the high percentage of concurrent incidents.

Unit hour utilization (UHU) measures the amount of time that a unit is committed to an incident. The larger the number, the greater the unit’s utilization and the less available it is for assignment to subsequent calls for service. The following figure displays the total time MFD first out apparatus were committed to an incident in 2014 and expresses this as a percentage of the total hours in the year.

Figure 70: MFD Unit Hour Utilization, 2014 Incidents

Apparatus	Average Time Committed	UHU
Engine 1	16:55	11.62%
Truck 1	20:24	6.32%
Engine 2	21:00	12.43%
Squad 3	18:57	9.28%
Engine 4	20:11	9.37%
Engine 5	15:32	11.72%
Engine 6	16:37	6.89%



Apparatus	Average Time Committed	UHU
Engine 7	18:25	7.50%
Engine 9	20:27	6.63%
Engine 10	21:11	7.26%
Squad 11	20:16	4.88%
Truck 11	21:12	3.24%

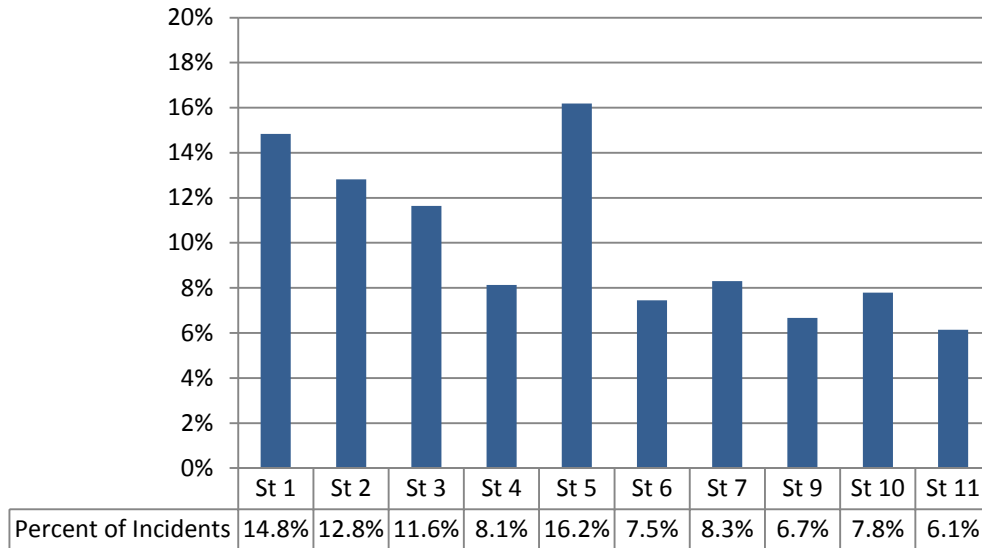
Although MFD apparatus responded to over 24,700 incidents in 2014; the previous figure reveals that the average time an apparatus is committed to an incident is relatively low. Fire service publications such as the Commission on Fire Accreditation (CFAI) *Standards of Cover, 5th Edition*, suggest that UHU rates in the range of 25 to 30 percent can negatively affect response performance and lead to personnel burnout issues. In addition, as the UHU rate increases, companies are less able to perform other duties such as training, public education, or company inspections. MFD apparatus do not demonstrate excessive UHU rates currently; however the first out apparatus respond to a substantial number of incidents per apparatus. The next figure displays the workload per first out apparatus.

Figure 71: MFD Apparatus Workload-First Out Apparatus, 2014

Apparatus	Count of Incidents
BC 1	1,626
Engine 1	3,611
Truck 1	1,628
Engine 2	3,112
Squad 3	2,574
Engine 4	2,440
Engine 5	3,966
Engine 6	2,180
Engine 7	2,141
Engine 9	1,705
Engine 10	1,801
Squad 11	1,265
Truck 11	804

The data in this figure demonstrates that the single engine company at Station 5 is the busiest MFD apparatus. The companies stationed at Station 1 (BC 1, Engine 1, and Truck 1) combined, responded to the highest number of incidents in 2014. Note that this table reflects multiple apparatus responses to the same incident. While MFD responded to over 24,762 incidents within the service area in 2014, the apparatus displayed above responded over 28,800 times which reflects multiple unit responses to the same incident. Note that cancelled incidents, mutual/automatic aid outside of the MFD service area, and incidents with invalid time stamps are not included. The following figure demonstrates the workload per station within the MFD service area.

Figure 72: MFD Station Workload, 2014



Over 55 percent of MFD service demand occurred in the Stations 1, 2, 3, and 5 first due areas. Service demand ranged from 11.6 percent in the Station 3 service area to slightly over 16 percent in the Station 5 area. The remainder of 2014 service demand was distributed within a range of 6.1 percent in the Station 11 response zone to 8.3 percent in the Station 7 service area. Note Station 8 is not included in this analysis.

The ability of a fire station’s first-due unit(s) to respond to an emergency incident within its assigned response area is known as unit or station reliability. The following figure demonstrates the percentage of incidents that a first-due apparatus from each of the MFD response zones was the first apparatus on the scene of an emergency incident in their particular station area.



Figure 73: MFD Station Reliability, 2014 Emergency Incidents

MFD Station Reliability-2014 Emergency Incidents	
Station 1	88.2%
Station 2	83.4%
Station 3	87.1%
Station 4	86.7%
Station 5	83.3%
Station 6	87.8%
Station 7	89.3%
Station 9	87.4%
Station 10	87.6%
Station 11	82.1%

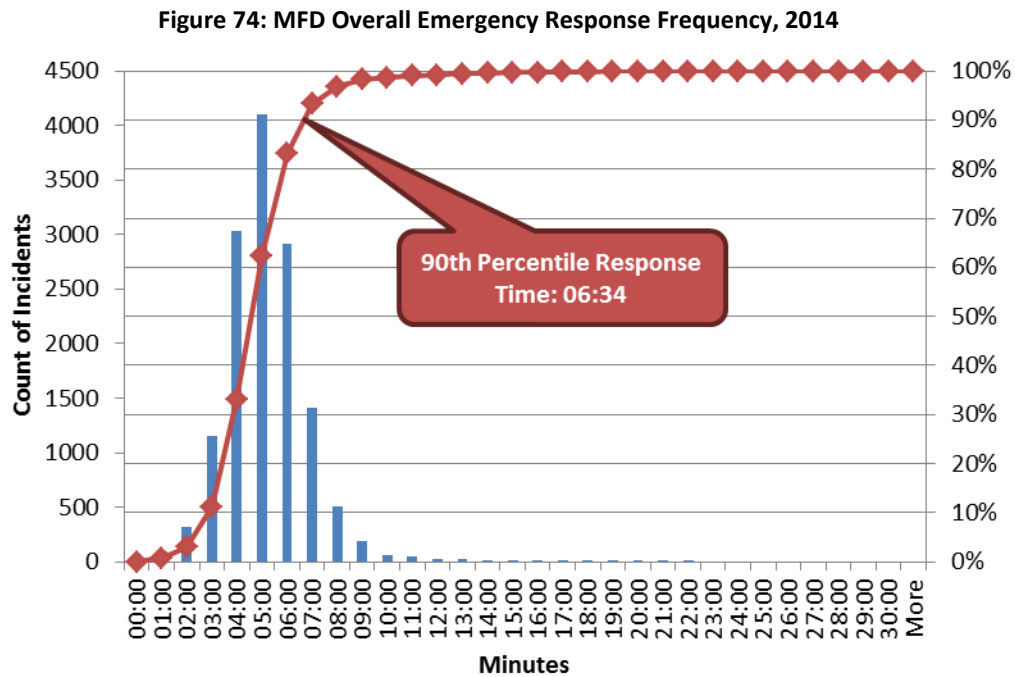
Response performance can be negatively affected by apparatus from a more distant station responding into another station response zone, due to the commitment of assigned apparatus to different incident. To meet a 90th percentile response goal, the optimum station reliability rate should be 90 percent. As seen in the previous figure, station reliability within the MFD service area varies between approximately 82 percent in the Station 11 response zone to slightly over 89 percent in the Station 7 response zone. Actual response performance is discussed in the Response Performance analysis that follows.

RESPONSE PERFORMANCE

Perhaps the most publicly visible component of an emergency services delivery system is that of response performance. Policy makers and citizens want to know how quickly they can expect to receive emergency services. In the performance analysis, ESCI examines emergency response performance within the MFD service area. The data used for this analysis is 2014 emergency responses extracted from the MFD records management software (RMS). Non-emergent incidents, mutual/automatic aid incidents outside the MFD service area, incidents cancelled prior to arrival, data outliers, and invalid data points are removed from the data set.

Response time is measured from the time the fire department is notified on the emergency to when the first MFD apparatus arrives on the scene of an emergency. Response performance is calculated using “percentile” measurement. The use of percentile calculations for response performance follows industry best practices and is considered a more accurate measure of performance than “average” calculations.

The first figure in the performance analysis displays overall emergency response performance throughout the MFD service area in 2014.



The mean (average) response time is 4 minutes 44 seconds, which represents approximately 54 percent of emergency incidents. Ninety percent of the time (90th percentile), the first MFD apparatus arrived at the scene of an emergency incident in 6 minutes 34 seconds or less during 2014.

Total response time is comprised of several different components:

- Call Processing Time – The amount of time between when a dispatcher answers the 911 call and resources are dispatched.
- Turnout Time – The time interval between when units are notified of the incident and when the apparatus are enroute.
- Travel Time – The amount of time the responding unit actually spends travelling to the incident.
- Total Response Time – Total Response Time equals the combination of “Processing Time,” “Turnout Time,” and “Travel Time.”

Industry best practices documents⁷ recommend tracking and recording all of the components of total response time listed above. Currently call-processing time is not consistently recorded in the MFD RMS data. ESCI encourages MFD leaders to work cooperatively with the regional dispatch center to insure that accurate, complete response time data is available and recorded.

Tracking all components of the total response time continuum allows fire departments to identify deficiencies and areas for improvement.

⁷ Center for Public Safety Excellence/Commission on Fire Accreditation (CPSE/CFAI) *Standards of Cover, 5th Edition*.

The following figure examines MFD 2014 emergency response performance for the components of total response time that are currently available in Modesto Fire Department response data. For this analysis response time is the interval from when the fire department is notified to the arrival of the first fire department apparatus.

Figure 75: MFD Emergency Overall Response Time Performance, 2014

	Turnout Time	Travel Time	Response Time
90th Percentile	02:49	04:34	06:34

ESCI notes that MFD response performance reported in the MFD 2014 Annual Report states that MFD apparatus arrived at the scene of Fire and EMS emergencies in 6 minutes or less, 92 percent of the time. The performance analysis presented here includes all emergency responses and the results may differ somewhat from the MFD analysis. Additionally, differences in the methodology ESCI used to filter the data set may differ from the methodology employed by MFD. ESCI commends MFD leaders for establishing response performance goals and monitoring response performance. MFD should continue to work toward developing performance goals for all components of total response time performance.

The following figure displays the response performance reported by the MFD records management software (RMS) for Fire and EMS emergencies during 2014. The report is summarized by station area.

Figure 76: MFD Response Time Report-Fire and EMS Emergencies, 2014

Station	Count of Incidents	Total Under 6 Minutes	Percentage
1	2,264	2105	92.98%
2	2,265	2126	93.86%
3	1,779	1651	92.80%
4	1,352	1295	95.78%
5	2,497	2374	95.07%
6	1,215	1169	96.21%
7	1,120	1009	90.09%
8	5	3	60.00%
9	1,037	856	82.55%
10	1,296	1177	90.82%
11	946	896	94.71%
Overall	15,776	14,661	92.93%

According to the MFD report, nearly 93 percent of the time the first MFD apparatus is on the scene of a Fire or EMS emergency incident in six minutes or less. Station 9 and Station 8 do not meet the departmental response performance goal of six minutes (measured from time dispatched to arrival of the first unit). Station 9 is located on the edge of the MFD service area and travel time performance may affect response time performance. Station 8 is the airport firefighting and rescue station; ESCI would suggest that Station 8 response data be considered an outlier.

Turnout Time

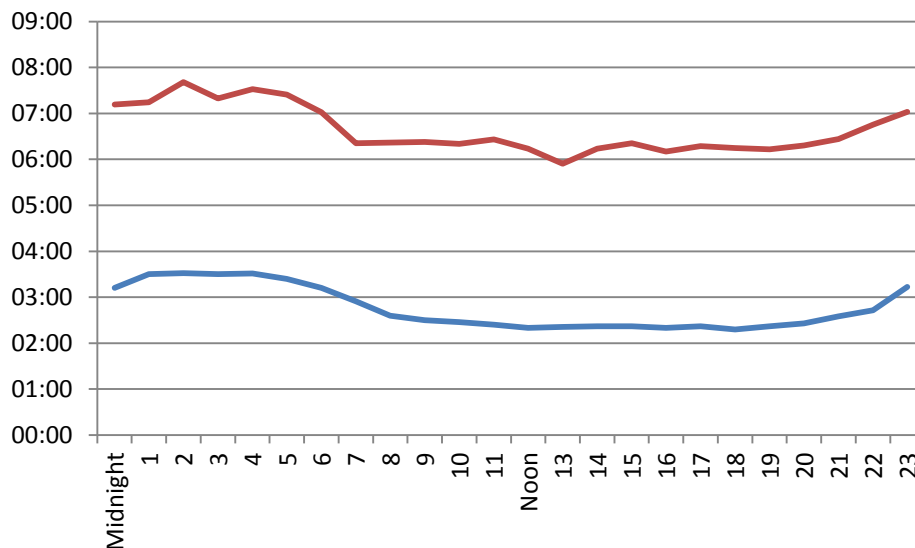
The first component of the response continuum in the figure above, and one that is directly affected by fire department personnel is turnout time. Turnout is the time it takes personnel to receive the dispatch information, don personal protective equipment as appropriate, move to the appropriate apparatus and proceed to the incident. The following figure demonstrates MFD turnout time performance for 2014, summarize by station area.

Figure 77: MFD Turnout Time Performance by Station Area, 2014

Station	Turnout Time 90th Percentile
1	03:07
2	02:45
3	02:46
4	02:52
5	02:28
6	02:44
7	02:46
9	03:03
10	02:41
11	02:50

Overall MFD turnout time performance is 2 minutes 49 seconds; the figure above demonstrates that turnout time performance ranges from 2 minutes 28 seconds in the Station 5 response area to over 3 minutes at Stations 1 and 9. Turnout time appears excessive for a career staffed fire agency; and does not meet national consensus standards such as the NFPA 1710 Standard for Career Fire Departments. The figure below displays the almost direct correlation between turnout time and total response performance.

Figure 78: MFD Turnout Time (Blue) and Response Performance (Red), 2014



The rise in turnout time at night is a nationwide phenomenon and is reflected in an increase in total response time during the same period. Turnout time is one component of total response time that fire department personnel have some ability to control; given training, information, and proper facilities that allow for the rapid and efficient movement of responders. ESCI encourages MFD to monitor turnout time performance and provide performance information to response personnel for self-correction.

Travel Time

Travel time is potentially the longest component of total response time. The distance between the fire station and the location of the emergency influences total response time the most. The quality and connectivity of streets, traffic congestion, and geography all play crucial roles in travel time.

Figure 79: MFD Emergency Travel Time Performance by Station Area, 2014

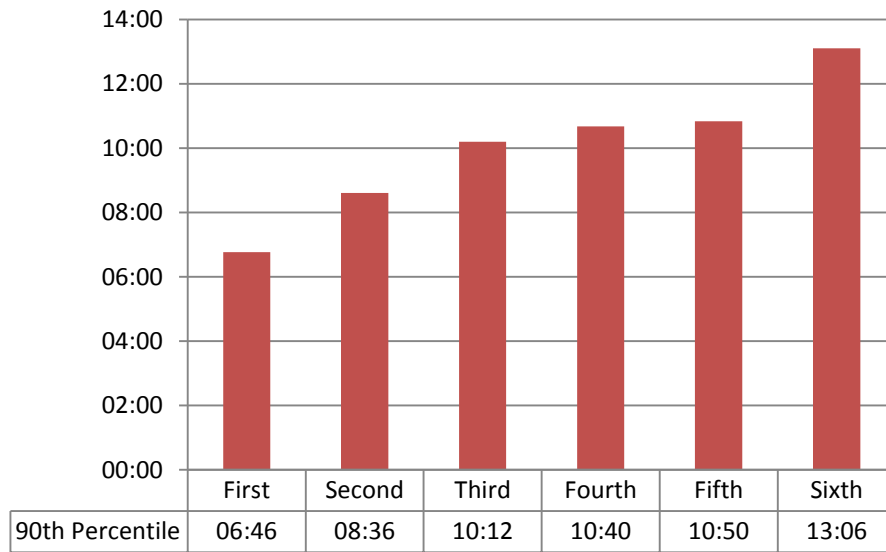
Station	Travel Time 90th Percentile
1	04:29
2	04:19
3	04:24
4	03:54
5	04:29
6	03:56
7	04:53
9	05:25
10	05:00
11	04:17

Travel time varies throughout the MFD service area. Stations 4 and 6 demonstrate the best travel time performance; while Stations 9 and 10 experienced the longest travel times during 2014. Referring to

Figure 76, ESCI notes that in the MFD service area total response time performance by station area mirrors travel time performance by station area. This illustrates the importance of recording and monitoring all components of the response time continuum.

Up to this point, the performance analysis has been concerned with response time performance for the first arriving apparatus. The last analysis in the performance summary examines response performance as it pertains to the assembly of multiple apparatus at a structure fire. As discussed in the concentration study, a full first alarm assignment for a working structure fire consists of four engines, one aerial device, and a command officer. This brings 17 personnel to the scene of a structure fire. This compliment of personnel and apparatus would be considered a full first alarm or Effective Response Force (ERF). The figure below examines MFD’s response performance for the first though the sixth apparatus on scene at structure fires in 2014.

Figure 80: MFD Structure Fire Response Performance by Arrival Order, 2014



For this analysis, ESCI examines 2014 incidents classified as a structure fire in the MFD incident data. The first arriving apparatus generally waits less than two minutes for the second apparatus to arrive. The difference between the first unit and the sixth unit is over 6 minutes. MFD has established a response performance goal of 10 minutes for the arrival of an Effective Response Force (ERF) measured at the 90th percentile. The figure above demonstrates that MFD does not meet the established performance goal for the arrival of a full first alarm for a working structure fire. There are various factors that can affect a jurisdiction’s ability to assemble multiple resources. The excessive travel time required to assemble multiple resources (especially the BC and ladder companies) and a lack of availability due to service demand and concurrent incidents are most probably the two factors that have the greatest negative affect on MFD’s ability to meet the department’s response performance goal for an effective response force.

Support Programs – Training

Providing safe and effective fire and emergency services requires a well-trained workforce. Training and education of personnel are critical functions. Without quality, comprehensive training programs emergency outcomes are compromised and the safety of emergency personnel may be at risk. One of the most important jobs in any department is the thorough training of responders.

Initial training of newly hired firefighters is essential, requiring a structured recruit training and testing process. Beyond introductory training, personnel need to be actively engaged on a regular basis and tested regularly to ensure skills and knowledge are maintained. To accomplish this task, the fire department must either have a sufficient number of instructors within its own organization or work with their regional partners to provide those resources. The training program should be based on a structured annual plan and educational sessions should be formal and follow prescribed lesson plans that meet specific objectives.

In the following pages, ESCI reviews MFD training practices, compares them to national standards and best practices, and recommends modifications where they are found to be appropriate.

GENERAL TRAINING COMPETENCIES

For training to be fully effective, it should be based on established standards. There are a variety of sources for training standards. MFD uses the NFPA and the International Fire Service Training Association (IFSTA) as the basis for its fire suppression training practices. California Emergency Medical Services continuing education and MFD Medical Director's standards are used as the baseline for medical training coursework.

81: Survey Table – General Training Competencies

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
General Training Competency		
Incident Command System	NIMS Based System Is Used	
Accountability Procedures	“Passport” System Is In Place	
Policy And Procedures Training	Yes	
Safety Procedures	Yes	
Special Rescue (High Angle, Confined Space, Etc.)	High Angle, Confined Space, Trench, Water Rescue	
Hazardous Materials	Technician And Specialist Levels	
Wildland Firefighting	Red Card	
Vehicle Extrication	Yes	
Defensive Driving	Via Drivers Training Target Solutions Coursework. Annual Skills Proficiency Component.	
EMS Skills And Protocol	Consistent With Continuing Education Requirements. 24 Hours BLS, 48 Hours ALS Annually Plus Local Change In Protocol Or Related Training.	
Entry Level Recruit Training		
Required Minimum Entry Training	Required To Have Completed An Accredited Firefighter I Academy Plus EMT-Basic Level Certification. A “Firefighter Trainee” Completes A 10 Week Training Period. Some Hired Directly As A Firefighter At Step A And At Reduced Recruit Training Requirement. Tied To Immediacy Of Need To Get The New Hire On Line. Not Well Defined, Not Standardized.	
Minimum Recruit Training Requirement		Develop A More Structured, Standardized New Recruit Training Protocol With More Clearly Defined Recruit Requirements And Practices.
Delivery Methodology	Loosely Defined And May Be Independently Structured Based On How Quickly The Department Needs To Get A New Hire On Line. Not Adequately Tied To Minimum Standard Requirement	Same As Above
Probationary Practices	One Year Probationary Period. Task Book Sign Off Required. Based To The Complete Firefighter I And II Requirements.	Probationary Process Is Well Defined And Effective.



Key Recommendations:

- Review, update and provide greater structure to the current process of new-hire training and response qualification.
- Provide additional focus on firefighter safety in training activities.
- Incorporate pre-incident planning into the ongoing training program.
- Develop more clearly defined minimum annual training requirements.

Discussion

ESCI first reviews the baseline competencies that are addressed as a part of a fire department’s training program, as listed in the first section of the above figure. Based on that review, it is apparent that MFD is including the appropriate fundamental elements in its training program.

New Personnel Training

Proper training of emergency services personnel starts prior to being hired or joining an agency. Specific knowledge and skills must be obtained to achieve a basic understanding of the roles and responsibilities of an emergency responder. MFD has addressed this need by requiring Firefighter I certification level training at a recognized regional or state fire academy, along with certification at the EMT-Basic level, as a minimum qualification for hire. Doing so enables the agency to hire new personnel that are qualified at a minimum standard and avoids the need to conduct time-consuming recruit training programs.

Subsequent to initial hire, new personnel are placed on a ten-week training schedule that is MFD-specific training and supplemental to what they have obtained to meet the minimum requirements of Firefighter I education. The additional training is conducted to insure that the new hire is adequately familiarized with equipment and practices specific to the MFD.

However, it was indicated to ESCI that the new-hire training practice is not adhered to consistently. At times when the department is short-handed and needs to get a new firefighter on-line quickly, the process may be shortened and the time requirement reduced. Indications are that the process of training and qualifying new personnel is not well developed or consistent in its application, which may result in compromised skill development and, potentially, safety concerns. ESCI recommends that the training of new personnel be reviewed and more effectively structured.

Firefighter Safety Training

Firefighter safety is generally incorporated into routine training activities addressed in the course of regular training, but is not separated specifically as dedicated safety training. Safety education could be more effectively delivered by incorporating the national “Fire Safety Initiatives” and the “Firefighter Close Call” reporting system. A close call reporting and review system should be in place to ensure release of initial observation and recommendations relating to any significant safety or close call incident within 72 hours of occurrence. A program such as the California Department of Forestry and Fire Protection (Cal Fire) “green sheet” near miss reporting system is a good model to review and replicate.

Pre-Incident Planning

A pre-incident (or pre-fire) plan is a simple document that is developed for commercial occupancies and target hazard buildings for the purpose of providing firefighters with information about a building, should a fire occur there. Information is typically gathered regarding a building's configuration, exiting, protection systems, and hazards that may present themselves to a firefighter in the event of an incident. Pre-incident plans help to make firefighting more effective and to provide for increased firefighter safety. MFD has established a pre-incident planning process in its fire prevention division; however, it does not appear to be incorporated into ongoing training practices. ESCI recommends the department develop a pre-incident planning training component.

Minimum Training Requirements

The MFD personnel are generally trained to the Firefighter I and II level as defined by the California State Fire Marshall's Office and NFPA standards. The department has indicated that baseline training requirements are aligned with the minimum requirements necessary to local state and federal continuing education requirements. Beyond that minimum standard, there is not a well-developed departmental minimum standard in regard to annual or periodic training requirements. Additional development of minimum requirements is recommended.

Training Program Management and Administration

To function effectively, a training program needs to be managed. Administrative program support is important, though frequently weakly addressed. An additional element of effective administration is the development of program guidance in the form of training planning, goals, and defined objectives.

The next figure reviews the MFD training program administration and management practices.

Figure 82 : Survey Table – Training Program Management and Administration

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Training Administration		
Director Of Training Program	Training Officer Is Currently A Captain, Designated As Training Officer. His Is The Only Training Position, With No Delivery Or Administrative Support.	Provide Greater Training Program Support. Establish Shift-Level Training Delivery Personnel And Administrative Support Measures. Consider At Least One Additional Dedicated Training Program Position.
EMS Training	EMS Coordinator Is Responsible For Oversight Of EMS Training, Collaboratively With Training Officer.	Establish Shift And Administrative Support Measures.
Program Goals And Objectives Identified	2-Year Training Plan In Place. Goals To Meet Local State And Federal Continuing Education Requirements.	
Governing Body Support And Concurrence	Limited Awareness Of Training Need. Recent “Fire 101” Event Raised Awareness.	
Recordkeeping		
Individual Training Files Maintained	Yes	
Records And Files Computerized	Yes, But In Dual Platforms. Mainly Captured In Fire EMS. Target Solutions Used For EMS CE Primarily, But Attempting To Move All To Target Solutions.	Centralize All Training Recorded Keeping In A Single Platform.
Daily Training Records	Yes	
Company Training Records	Yes	
Lesson Plans Used	Lesson Plans In Place For Most Areas	
Pre-Fire Planning Included In Training	Through Fire Prevention Division	
Administrative Priority		
Budget Allocated To Training	Program Is Not Funded Adequately. Program Budgeting In Limbo Due To The MRFA Separation – Undetermined At This Time.	Increase Budget To Meet Mandates And Annually Adopted Training Schedule And Standards.
Using Certified Instructors	Yes	
Annual Training Report Produced	No Formal Report	
Adequate Training Space/Facilities And Equipment	Inadequate. Most Stations Do Not Have Classrooms And Do Not Have Connectivity To Video Conferencing Resources. Access To Use Of Training Center Is Declining.	Establish Adequate Video-Conferencing For Training Delivery.
Maintenance Of Training Facilities	Via Regional Training Center	
Training Program Clerical Support	No Dedicated Clerical Support	

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Key Recommendations: <ul style="list-style-type: none">• Provide an additional, dedicated, position to assist in managing the training program.• Appoint shift-level training delivery positions.• Establish a Training Advisory Committee (TAC) that produces an annual training plan.		

Discussion

The MFD training program operates under the oversight of a single captain. The assigned captain is well qualified and experienced and has an appropriate background for training program management.

Training Program Administration

The training program is inadequately staffed. The captain is the only position dedicated to training and must perform all aspects of the administration and coordination of the department’s training program, absent dedicated assistance with training delivery, program management, or administrative support. This staffing model results in a significant workload, considering the need to provide requisite training for fire, EMS and other response services, professional development, and operational oversight. ESCI encourages MFD to reevaluate the resources assigned to this function and add personnel and funding, as needed.

It is recommended that the city consider dedicating a minimum of one additional FTE position to the training division. Further, it is advised that a training position be established on each of the three shifts, serving in a role of shift training officer to provide for the delivery of educational content identified by the program administrators.

Training Program Planning

While the training program operates effectively overall, it does so in the absence of a structured program planning process with input and contributions from members of the organization. To be fully effective, training delivery should be based on:

- Periodic training needs assessments
- Defined annual program goals based on the needs assessment
- Specific delivery objectives addressing program goals
- A process of performance measuring and monitoring
- Periodic re-evaluation and modification

ESCI recommends a “Training Advisory Committee” be utilized to develop the annual training plan based on the above criteria including clearly defined program goals and objectives. The committee should be comprised of a diverse representation from various ranks, stations, and subject matter experts. This group can be very effective identifying training needs as well as recommending relevant strategies to meet departmental, shift, company, and individual needs.

TRAINING RESOURCES AND METHODOLOGY

In order to deliver effective training to fire and EMS personnel, some resources are necessary to arm the trainer with the tools needed to provide adequate educational content. In addition to tools, effective methodologies must be employed for delivery to be sufficient to meet needs.

Figure 83 : Survey Table – Training Resources and Methodology

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Training Facilities And Resources		
Training Facilities (Tower, Props, Pits)	Modesto Regional Fire Training Center Includes Multiple Props. State Of The Art Training Facility, But Access For Training Use Is Problematic Due To Availability.	Crews Are Often Unable To Schedule, And Have To Use Alternative Locations.
Live Fire Prop	Offsite At Wastewater Treatment Plant	
Fire And Driving Grounds	At Training Center	
Classroom Facilities	Three Classrooms At Training Center, But Difficult To Access. Many Stations Do Not Have Classrooms.	Need To Develop Options For “Overflow” Training Needs. Having To Move Classes Offsite Due To Scheduling Conflicts.
AV, Projectors, Computer Simulations	Training Center Is Well Equipped. There Are Very Limited AV Resources In The Stations And No Effective Video Conferencing.	
Books, Magazines, Instructional Materials	Adequate Supply. Centralized Library At The Training Center.	
Training Procedures Manual		
Manual Developed And Used	A Training Manual Is Accessible On The Intranet. However The Content Is Very Dated And Not Maintained In A Current State.	Prioritize Development And Maintenance Of An Appropriately Developed Training Manual And Lesson Plans.
IFSTA Manuals Used	Yes	
Training Scheduling		
Career Training Schedule	2 Hours Training Per Day Required And Enforced – Incident Volume May Interfere, However.	
Volunteer Training Schedule	N/A	
Minimum Training Hours, Competencies	Meet 2 Hour Daily Training Requirement And Mandated Training Requirements.	
Methodology Used For Training		
Manipulative	Yes	
Task Performances	In Task Books For Probation Only	
Annual Training Hours	2 Hour Per Shift Requirement	
Use Of Lesson Plans	Yes	
Night Drills	Yes	
Multi-Agency Drills	Frequently	
Inter-Station Drills	Frequently	

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Physical Standards Or Requirements	None	
Annual Performance Evaluation Conducted	No Periodic Skills Competency	Establish And Implement Skills Competency Program And Requirements (Utilize Same Standards For Return To Duty). Was In The Past. Implement A Succession Planning Process And Requirements.
Employee Development Program	None	
Operations And Performance		
Disaster Drills Conducted	Mass Casualty And Similar Drills Annually	
Attention To Safety	High	
Post Incident Critique(After Action Review)	Completed By Operations And Battalion Chiefs. Scalable Based On Incident Significance.	
Priority By Management Toward Training	High	

Key Recommendation:

- Pursue improved access to the Modesto Regional Training Center.
- Improve fire station classroom facilities.
- Implement an effective video conferencing system to share training between stations.
- Review and update the department’s training manuals and other foundational program documents.
- Implement an employee professional development program.
- Establish a program of periodic skills proficiency testing.
- Consider a competency-based training program design.

Discussion

ESCI finds that the MFD training program lacks many of the foundational structural elements that are expected to be seen in a fully effective program in an organization serving a community the size of Modesto. This is not to say that personnel are not capable and appropriately educated, but that a need exists for improved structure, management, and establishment of clear standards and requirements. The department is encouraged to assign a high level of priority to training program improvements.

Modesto firefighters are also significantly challenged in regard to their access to necessary training. While a standard is in place requiring that personnel undertake a minimum of two training hours per day, meeting the requirement is difficult due to the high volume of emergency responses that the department sees. As a result, personnel are not able to meet minimum needs.



Training Facilities and Resources

A training facility or drill ground is an indispensable element. Training facilities provide a controlled and safe environment to simulate emergencies, developing and testing the skills of emergency workers. ESCI learned that hands-on training facilities are challenging for MFD. The Modesto Regional Training Center (MRTC) is a state of the art training facility with extensive drill grounds, props, and classroom resources. However, access to the center was reported to be an ongoing problem, largely because the resource is shared with other agencies, competing for scheduling opportunities. In addition, the current level of call volume and unit hour utilization impacts the ability of MFD units to assemble and perform hands-on training without interruption. As a result, much training has to be completed using alternative buildings and parking lots.

Classroom instruction is an essential component of preparing emergency responders with knowledge and skills. At MFD, classroom facilities in the existing fire stations are limited and generally inadequately equipped with audio-visual equipment. Finally, there is not an adequate video-conferencing system in place between stations.

It is recommended that the MFD work with the MRTC and its regional partners in addressing the shared needs of the various organizations, while improving access to the training center's resources. In addition, ESCI recommends that classroom facilities in the existing fire stations be updated and that an effective video conferencing system be established.

Training Manual

A departmental training manual is the foundation upon which the delivery of educational content is based. In the absence of this kind of document, personnel will tend to train in "the way we do it here," rather than in a manner that is consistent with the department's established operational practices and standards.

Some components of a training manual are in place and accessible over the city intranet. However, information developed in the course of stakeholder interviews indicates that the content is out dated. The development of a current and comprehensive departmental training manual is essential to the organizations ability to meet current and growing training demands. ESCI recommends the MFD identify the revision and update of the existing document to a current state as a high priority. It is further recommended that the training manual be reviewed in coordination with the previously recommend training advisory committee.

Professional Development

Beyond the regular training offered to general staff, certain individuals should be offered specific officer development training in order to prepare them for more responsibility as they progress through the agency's command structure. Placing individuals in positions of authority without first giving them the tools to succeed often ends in failure and discouragement by both the officer and their subordinates. A professional development program was reportedly in place in the past, but was discontinued. ESCI recommends that the MFD restore or establish standardized professional development programs.

Performance Standards and Periodic Skills Evaluation

It is important that a fire department adopt appropriate standards that set minimum physical capability levels and that demonstration of skills competence is required periodically. Regular testing of hands-on

skills competency is essential to assure not only that personnel are receiving adequate training, but they also are able to put their knowledge and skills into practice. A program of periodic skills testing not only enables the department to verify that its personnel possess the necessary capabilities, but it also provides a valuable tool for assessing the effectiveness and subsequent training calendar needs of the organization's training program.

MFD does not routinely undertake a skills testing process. Doing so can be accomplished by completing an annual evaluation process. Alternatively, skills assessment can be incorporated into the ongoing training plan on a weekly or monthly basis. ESCI recommends a system of annual individual skills proficiency testing be established.

Training Delivery Methodology – Competency-Based Training

The amount of training delivered to MFD personnel is currently based on contact hours. The fundamental objective is to deliver two hours of training during each shift. Other minimums are in place including those related to state certification maintenance and emergency medical continuing education.

An hours-based approach is appropriate and generally effective. However, the shortcoming of this methodology is that sometimes training will be delivered simply to meet minimum hour requirements when, in fact, the individuals receiving the training are already well versed in the subject matter. Time in this instance would be better spent by: 1) subjecting the students to a skills performance demonstration; and 2) once competency in the skill area is demonstrated, use the remaining time to address new skills or subject areas.

Under a competency-based system, an evaluation of skill performance is conducted at scheduled intervals to determine if the person being evaluated can perform the tasks in accordance with pre-determined standards. Those skills that are performed well require no additional training. Those skills not performed well are practiced until the standard is met. This approach maximizes the time used for effective training. Further, it ensures that members are performing at an established level. Specialty skills can be evaluated in the same manner with further training provided as needed. Ideally, the competency-based training approach is used on an ongoing basis. For example, each quarter different skills are evaluated on an individual basis.

To institute a competency-based approach to training, all of the needed skills must be documented to describe the standard of performance expected. This would include all skills such as hose handling, apparatus operation, EMS procedures and protocols, use of equipment and tools, forcible entry, ventilation, tactics and strategy, and others. Implementation of a competency-based approach to identify training needs, customize course content accordingly, and maximize the effective use of very valuable training time is recommended.

Support Programs – Life Safety Services (Fire Prevention)

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

The National Fire Protection Association recommends a multifaceted, coordinated risk reduction process at the community level to address local risks. This requires engaging all segments of the community, identifying the highest priority risks, and then developing and implementing strategies designed to mitigate the risks.⁸

A fire department, especially in a city like Modesto, needs to review and understand the importance of fire prevention and public education, appreciating their role in the planning process of a community with diversified zoning including residential, commercial, and industrial properties.

The fundamental components of an effective fire prevention program are listed in the following figure, accompanied by the elements needed to address each component.

Figure 84: Fire Prevention Program Components

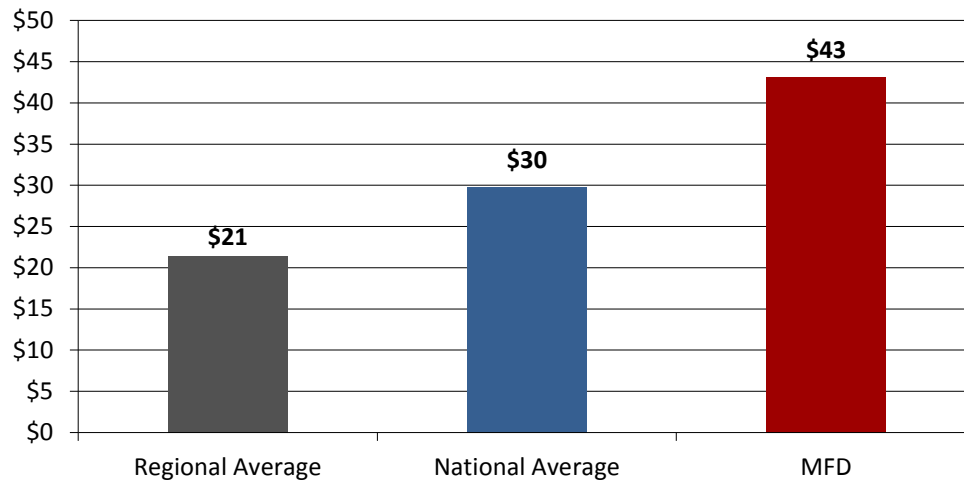
Fire Prevention Program Components	Elements Needed To Address Program Components
Fire Code Enforcement	Proposed Construction And Plans Review New Construction Inspections Existing Structure/Occupancy Inspections Internal Protection Systems Design Review Storage And Handling Of Hazardous Materials
Public Fire And Life Safety Education	Public Education Specialized Education Juvenile Fire Setter Intervention Prevention Information Dissemination
Fire Cause Investigation	Fire Cause And Origin Determination Fire Death Investigation Arson Investigation And Prosecution

MFD has developed a healthy appreciation for the importance of fire prevention and public education. The fire marshal understands that, through assertive code enforcement, a fire department should actively promote the use of fire resistive construction, built-in warning and fire suppression systems and maintenance of fire safe buildings to minimize risk to fire and health challenges.

As a point of reference, ESCI compared fire loss data provided by MFD with similar data that is made available by the National Fire Protection Association (NFPA) based on an annual process of surveying fire departments nationally. The following chart depicts MFD’s fire losses relative to national and regional averages on a per-capita basis.

⁸ Kirtley, Edward, *Fire Protection Handbook*, 20th Edition, 2008, NFPA, Quincy, MA.

Figure 85 : Comparison of Fire Loss per Capital



Based on available data, MFD’s fire loss per capital falls well above both national and regional averages. The comparison underscores the importance of effective fire prevention efforts.

In the following figures, the program components listed are compared to the initiatives under way in Modesto.



FIRE AND LIFE SAFETY CODE ENFORCEMENT

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

Figure 86 : Survey Table – Fire Prevention Code Enforcement

Survey Components	Modesto Fire Department Observations	Comments And Recommendations
Code Enforcement		
Fire Codes Adopted	State Fire Code	
Code Used – Year/Version	State Of California 2013 Model Fire Code	
Local Codes Or Ordinances Adopted, Amendments	Additional Key Amendments – Sprinkler Requirement About 5,000 Sq. Ft. Commercial. Fireworks Requirements, Require UL Alarm Systems. Above Ground Flammable Liquids Tank Restrictions. Propane Storage Limitations.	
Sprinkler Ordinance In Place	Statewide Residential Sprinkler Requirement Is In Place And Mandatory. Applies To All New Construction Residential.	
Number Of Personnel Devoted To Program	1 Fire Marshal 1 Deputy FM 3 Inspectors 1 Administrative Support Also 3 Investigators (Not Involved In Inspection Work) And 4 Shift Personnel That Are Also Investigators.	Used To Have 4 Inspectors, Plus 1 PT Plan Checker And 1 PT Admin Support. Has Developed A System Of Prioritizing Based On Risk Exposure.
Key Recommendation:		
<ul style="list-style-type: none"> • Review and evaluate current fire prevention division staffing. • Identify workload shortcomings and modify staffing accordingly. 		

Discussion

The city of Modesto has adopted the most current edition of the State Fire Code and has, appropriately, supplemented the code with a variety of local code amendments or ordinances.

Fire code enforcement and administration is the responsibility of a full-time fire marshal. Reporting to the fire marshal is one deputy fire marshal, three inspectors, and one administrative support position. In addition, three full time fire investigator positions are assisted by four shift personnel that are assigned fire investigation as an additionally assigned duty.

The prevention division faces multiple, and difficult, challenges and is working with limited personnel resources. A key factor is that the State of California mandates a large number of annual fire inspections,

including those of apartment, residential care facilities, institutional occupancies, jails, high-rise buildings, hotels, and schools. The state requires that the local fire department complete these inspections, resulting in a considerable impact on workload. The prevention division is unable to fully comply with the state mandates due to staffing limitations, which, while the failure to do so does not result in penalties, may expose the city to resultant liability.

In addition to the state-mandated inspection work, multiple other occupancies should be inspected, based on best practices. These include hazard classified occupancies as well as mercantile, restaurant, and others that are considered as moderate risk occupancies, along with others. ESCI was informed that the above listed inspections are not performed, or are performed only on a complaint related basis, because a priority has to be placed on the inspections that are required by the state.

Staffing of the prevention division has been reduced. In the past, there was one additional fire inspector and one part time plan review position, as well as a part time administrative support employee. The staffing reductions have left the division short of an adequate number of personnel and, as a result, the fire marshal has found it necessary to alter the priorities of various prevention function, which is compromising the program's effectiveness, as is further discussed below. A comprehensive review and evaluation of fire prevention division staffing is recommended.

NEW CONSTRUCTION PLAN REVIEW AND INSPECTION

An essential component of a fire prevention program is new construction plan reviews. When a new building is proposed within the city of Modesto’s boundary, the MFD will have the responsibility to protect the structure for the life of the building. The city and fire department have a fundamental interest and duty to ensure all building within its jurisdiction is properly constructed.

Figure 87 : Survey Table – New Construction Plan Review and Inspection

Survey Components	Modesto Fire Department Observations	Comments And Recommendations
New Construction Inspections And Involvement		
Consulted In Proposed New Construction	Consulted In All New Construction.	
Perform Fire And Life Safety Plan Review	Fire Marshal’s Office Completes Plan Reviews On All New Construction Building Permit Applications And Change Of Occupancy Tenant Improvements.	
Sign-Off On New Construction	Required For Building Permit Issuance.	
Charges For Inspections Or Reviews	Permit Fee Includes Inspections Pursuant To The Permit. Installed Systems Have Additional Cost For Inspections Based On Type.	

Discussion

MFD new construction code enforcement activities consist of regular review of submitted plans for commercial building permits as well as change of occupancy permits. The fire marshal is provided with the plans for review and sign off is required prior to the city issuing a building permit. The fire marshal and/or a fire inspector complete a variety of inspections that are related to the new construction permitting process.

The existing practices are appropriate and adequately address the need for proper new construction code enforcement efforts. It is noted that the process of reviewing and approving plans, as well as the inspections that are necessary pursuant to the issuance of a building permit, are labor intensive, further challenging the prevention division staffing resources.

EXISTING OCCUPANCY INSPECTION PROGRAM

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

Figure 88 : Survey Table – Existing Occupancy Inspection Program

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
General Inspection Program		
Performance Of Existing Occupancy Inspections	High Rise, Assembly, Schools, And Institutions Are To Be Inspected Annually.	
Special Risk Inspections	Residential Care Facilities Inspected Per State Requirement And As-Needed/Required.	State Mandated Inspections.
Storage Tank Inspections	Only On New Construction. Existing Tanks Are Not Inspected. Only Permit-Related.	
Key-Box Entry Program In Place	Knox Box System Is In Place And Required On Commercial Occupancies.	
Hydrant Flow Records Maintained	Fire Prevention Division Maintains Flow Test Records.	
Self-Inspection Program In Place	None	Program In Place In The Past. Discontinued.
Frequency Of Inspections	Goal Of Annual For All Commercial, Apartments, Institutional, Assembly, And Other High Risk Occupancies.	Annual Inspection List Of 1,467 Occupancies. Able To Inspect Only 740 In 2014 Due To Staffing Limitations.
Citation Process In Place And Formally Documented/Adopted	Process In Place, Citations Issued By Fire Prevention Division.	
Court-Cited To	Administrative Citation Process	
Inspections Computerized	Zoll Fire RMS® Inspection Module Used	
Community Feedback System In Place	None	

Key Recommendation:

- Provide the fire prevention division with sufficient resources to achieve annual commercial occupancy and state-mandated inspection goals.
- Consider utilization of contact plan checking services to accommodate peak demand and provide ability for fire inspector’s to meet code enforcement and fire prevention initiatives.



Discussion

MFD completes existing occupancy inspections, as described earlier, per the mandated requirements of the State of California. In addition, the fire prevention division attempts to inspect the occupancies that are not required by the state, but that need to be reviewed as an appropriate fire prevention practice.

The fire marshal maintains a list of 1,467 existing occupancies in the city that are subject to inspection. The prevention division's goal is to inspect all occupancies on an annual basis, at a minimum, which is consistent with best practices. However, it is reported that only 740, or 50% of the buildings that should be inspected each year are actually visited, due to staffing limitations. As a result the fire marshal has established a system of prioritizing inspections based on risk, appropriately, but a significant number of buildings go without an annual review.

Of particular concern is the City of Modesto's recent structure fire history. ESCI was informed by MFD that they have experienced an increase of approximately 35 percent in structure fires in the last five years. If accurate, that number is extremely concerning and clearly exceeds comparable norms. While the cause of the increase cannot be verified without additional analysis, shortcomings in fire prevention and code enforcement activities should be considered as at least a potential factor.

Achieving the fire marshal's goal of annual inspection of all commercial occupancies at a minimum, as well as addressing the state-mandated inspection requirements should be identified as a high priority in Modesto. While doing so will likely necessitate additional personnel resources, the importance is significant. ESCI recommends that steps be taken to address the need to achieve an acceptable existing occupation inspection standard.

FIRE AND LIFE SAFETY PUBLIC EDUCATION PROGRAMS

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

Figure 89 : Survey Table – Fire Safety and Public Education

Survey Components	Modesto Fire Department Observations	Comments And Recommendations
Fire Safety And Public Education		
Public Education/Information Officer In Place	One Inspector Is Assigned To Public Education As Additionally Assigned Duty. Delivers School Programs, Book Readings, Etc. With Engine Companies When Available.	
Feedback Instrument Used		
Public Education In The Following Areas:		
Calling 9-1-1	Yes	
EDITH (Exit Drills In The Home)	Yes	
Smoke Alarm Program	Yes	
Fire Safety (Heating Equipment, Chimney, Electrical Equipment, Kitchen/Cooking, Etc.)	Yes	
Injury Prevention (Falls, Burns/Scalding, Bike Helmets, Drowning, Etc.)	Included In The Clown Program.	
Fire Extinguisher Use	Some. Just Received A Grant For Extinguisher Training Prop.	
Fire Brigade Training	None	
Elderly Care And Safety	Limited, On Request.	
Curriculum Used In Schools	NFPA	
Baby-Sitting Classes Offered	No	
CPR Courses, Blood Pressure Checks Offered	Provided By Engine Companies.	
Publications Available To Public	Multiple	
Bilingual Information Available	Yes, And Expanding Supply.	
Annual Report Distributed To Community	Overview Is Included In The Fire Department Annual Report.	
Juvenile Fire Setter Program Offered	Yes. Two Department Personnel Are Trained.	
Wildland Interface Education Offered	None	



Discussion

Public education and outreach is viewed by the organization as an important undertaking, however, staffing limitations compromise the level of attention that can be paid to the program. Despite limited career and dedicated public outreach staffing, the majority of fundamental community outreach elements are being addressed. Of note is a highly active clown program, which in 2014 was estimated to reach 3,300 children as a part of annual Fire Prevention Week school activities. Additional school outreach is not routinely conducted, but is completed on a request basis. When available, on duty fire personnel also assist with public education outreach.

Public education and outreach is assigned to one of the three fire inspectors as an additionally assigned duty. The program is approximated to involve about 50 percent of the inspector’s time. That time, however, is taken away from the inspector’s other fire prevention work. It is recommended that public education be prioritized and that one FTE position be established to manage the program. In addition, use of community volunteers to assist with public education outreach be incorporated to mitigate workload impacts on line personnel.

Key Recommendation:

- Seek to provide a dedicated full time public education officer position.
- Identify opportunities to make use of citizen volunteers and other alternative public education staffing resources.

FIRE CAUSE AND ORIGIN INVESTIGATION

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

Figure 90 : Survey Table – Fire Investigation

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Fire Investigation		
Fire Origin And Cause Determination	3 On-Duty Investigators, One Assigned To Each Shift. Also 4 On-Call Investigators That Are Engine Company Personnel.	
Arson Investigation And Prosecution	Investigation And Prosecution Is Handled By Fire Investigation Staff. Investigators Are Certified, Armed, And Carry Law Enforcement Authorization.	
Arson Investigation Training Provided	Investigators Are Trained To NFPA 1033 Standards.	
Person Responsible For Investigations	On Duty Investigator And Fire Marshal.	
Local FIT Membership (Fire Investigation Team)	County Level Investigation Task Force Is Under Development.	

Survey Components	Modesto Fire Department Observations	Comments and Recommendations
Process For Handling Juvenile Suspects	Processed Through District Attorney And County Juvenile Court.	
Liaison With Law Enforcement	Fire Marshal	
Scene Control Practices In Place	Yes	
Adequate And Appropriate Equipment Issued/Supplied	Yes	
Evidence Collection Process In Place	Process In Place And Processed Through State Lab Analysis And Processing.	
Reports And Records Of All Incidents Made	Yes	
File, Record, And Evidence Security	Hard Copies Secured In Building, Electronic Access Restricted Appropriately.	
Pre Incident Planning		
Pre-Plans Completed	Engine Companies Do Some, "Detail Pages" But Limited. Program Had Been Reduced And Is Being Re-Instituted.	Prioritize Pre Planning Program To Include A Standardized Format And Regularly Scheduled Drills Utilizing Plans.
Frequency Of Review	Annual But In Transition To Restore Previous Program.	
Accessibility Of Plans	Hard Copies On Engines. No Electronic Access At This Point.	Recorded Electronically
Statistical Collection And Analysis		
Records Kept By Computer	Yes	
Type Of Operating Platform	PC/Windows	
Software Used	Zoll RMS®	
Information Collected In The Following Areas:		
Fire Incidents	Yes	
Time Of Day And Day Of Week	Yes	
Method Of Alarm (How Received)	Yes	
Dispatch Times	Yes	
Response Times	Yes	
Information Analyzed & Used For Planning	Reviewed Periodically For Trends, Compliance.	
Reports Made & Distributed	State Required NFIRS Reporting Completed.	
FTES Used In Data Collection & Analysis	No Dedicated Position	



Discussion

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

Fire Investigation

Fire cause and origin determination in MFD starts with the fire officer on the scene of a fire. At a small incident, a company officer may determine whether a fire has an obvious cause or is suspicious. If on-scene personnel view the fire as questionable or are unsure about the fire's cause, they will request assistance from one of the investigators in the fire marshal's office to conduct the cause and origin investigation. Suspected arson cases are processed directly by the fire inspectors, as opposed to being referred to local law enforcement for processing and criminal charges, which is a more common practice.

The investigation function is staffed by three, full time investigators who are also certified as law enforcement officers. In addition, four line firefighter personnel serve as investigators as an additionally assigned duty.

The fire marshal's office handles data entry and processing of fire response and investigation data. Hard copy reports are forwarded for entry into the department's RMS software suite. The fire marshal submits National Fire Incident Response data from the RMS software program.

Emergency Medical Services Support and Systems Oversight

EMS incidents constitute 65.4 percent of all responses for MFD. The MFD serves as the primary first responding agency and provides basic life support (BLS) first response with defibrillation capabilities and three First Responder Advanced Life Support (FRALS) units within the City of Modesto. First Responder BLS and ALS services are provided in accordance with the California Health and Safety Code, California Code of Regulations, and Mountain Valley EMS policies, procedures, and protocols.

American Medical Response provides advanced life support ambulance transportation services to the City of Modesto. Ambulance transportation services in the City of Modesto are authorized under an exclusive contract for services with the Mountain Valley Emergency Medical Services Agency via statutory authority provided in the California Health and Safety code sections 1797.201 and 1797.224.

The MFD has a long and established history as the first responder agency in the city. This integrated first responder and ambulance transportation system represents a large and vital component of the overall emergency services provided to the City of Modesto. The recommendations are intended to ensure the MFD EMS program provides a high level of management, performance, quality, and integration of system components.

Figure 91 : Survey Table – EMS Medical Control and Quality Assurance

Survey Components	Modesto Fire Department Observations	Recommendations
Medical Control		
EMS Service Delivery Level	3 FRALS Units, 2 PAU's Not 24/7, Slight Increase With Ambulance Response Times On Month To Month Basis Fines Are Way Up, Fines 80-120 Per Month, System Enhancement Fund 1.3 Balance, SEMSA, Patterson Going FRALS, SCFPD Wants A Rig Asap, Modesto Expanding FRALS, Will Work On Redesign In Next 6 Months For Next Contract, Pit Crew Responses Way Up With Great Results, 38 Percent Save Rate For Witnessed Arrest, State CP Pilots Going Well Stanislaus EMTALA Issue Slowing Stanislaus Behavioral Health Project, Interoperability Both VHF, Hospitals UHF, Turlock 800mhz, Work AB 678 Options, EMT Intermediate, Smaller Response Vehicles For Non-Emergency Calls, Peak Demand Staffing. BLS Transport Vs. ALS Transport.	Establish A FRALS Expansion Plan To Address ALS Unit Expansion And The Use Of ALS Alternative Response Vehicles. Begin To Work With MVEMS On Future Community Paramedicine Services That Can And Should Be Provided By The MFD. Explore Ambulance Transportation Partnership Options To Allow System To Collect AB 678, HHS Supplemental Ambulance Transportation Funding.
Written Protocols Adopted	Yes In Place And Consistent	

Survey Components	Modesto Fire Department Observations	Recommendations
Case Reviews Conducted Regularly	EMS Coordinator Does 100%, No Focused Audits, PEER Review Done At Specialty Centers For Surgeons, TAC Committee For Trauma Centers.	Conduct Internal PEER Review Of Calls, Conduct Focused Audits And Identify Trends Relating To System Strengths, Weaknesses, Opportunities, And Threats. PEER Committee Should Assist With Development And Delivery Of Subsequent Training And Education.
EMS Officer Conducts In Service Training	EMS Coordinator, Protocol Updates As Needed.	
Q.A./Q.I. – (Quality Assurance/Quality Improvement)		
Internal Committee	All ALS Crews Brought In	
Lessons Learned Are Shared?	No Process In Place Yet Because Of Small Numbers, Address Through Local Training, No PIP Process Yet, Use AMR Template.	Establish A PEER Review Committee And Process To Handle Larger ALS Service Delivery Program.
Medical Program Director Participates?	Dr. Donovan, Narcotics Only.	Pursue Medical Director Involvement In QA/QI Processes And CE Development And Delivery
Charts Spot Evaluated For Accuracy?	Check All Reports Twice A Week, Automatically Sent To EMS Coordinator Changes Made And Sent Back.	

Key Recommendations:

- Consider creation of a dedicated EMS chief officer or EMS director to oversee the MFD EMS programs.
- Consider utilization of shift EMS coordinator to assist the MFD EMS administrator with oversight, accountability, training, and education within the EMS Division.
- Establish a FRALS expansion plan to address ALS unit expansion and the use of ALS alternative response vehicles during peak demand hours (1100-2300 hours).
- Begin to work with MVEMS on future mobile integrated health care (Community Paramedicine) services that can and should be provided by the MFD.
- Explore ambulance transportation partnership options that allow system to collect CA, AB 678, supplemental ambulance transportation funding.
- Establish a PEER review committee and process to handle larger ALS service delivery program.

EMS Program Services

The MFD is at a place where a determination will need to be made as it relates to the manner and scope in which it provides emergency medical services to the City of Modesto. The current EMS environment



in California (CA) is in a state of change. As with EMS system nationally, CA EMS systems are working to develop mobile integrated health care systems in a manner that will improve patient care and routing while ensuring the 911 response safety net is preserved and sustainable into the future.

The MFD should address three key areas as they relate to the EMS services provided by the MFD:

- First responder ALS services (FRALS) are currently provided from three units and cannot meet the current City of Modesto adopted six-minute response time citywide. If this response time standard is to be met, FRALS units will need to be implemented for all first responding units. This level of expansion of the FRALS program should be undertaken as part of an EMS system design committed to utilizing these services and recognizing this level of response as it relates to response time standards and subsequent ambulance staffing requirements and unit hour requirements.
- Given the high volume of EMS and fire incidents within the City of Modesto, a reduction in responding engine and truck companies to non-emergent medical calls will contribute to increased unit reliability and an enhanced effective force response. MFD should consider the utilization of two peak demand alternative EMS first responder units to handle non-emergency calls identified through the emergency medical dispatch system (EMD). Alternative response units should be in service from 1100-2300 hours and should be staffed by a minimum of one ALS provider. For optimized response and coverage, these units should be located at station one and five to handle all non-emergency EMS responses within the city.
- These services should be coordinated with American Medical Response (AMR) to stop the clock on non-emergent calls and assist with ambulance response time compliance for non-emergent calls in accordance with the existing ambulance contract for service. The MFD should work with AMR and MVEMS to receive reimbursement from AMR for handling these calls. These alternative response vehicles should also be available and utilized for current and future mobile integrated health care services provided by MVEMS within the City of Modesto.
- As a result of CA assembly bill 678, fire-based ambulance transportation services can access supplemental Medicaid funding for ambulance transportation services provided to patients that qualify for medical or are uninsured. This funding can significantly impact the amount of revenue collected in a system with a significant medical and or uninsured payer mix. The MFD should begin working with AMR and MVEMS to explore models that would result in a public private partnership that would capture this additional revenue not being collected under the current ambulance transportation system.

EMS Program Supervision

Currently, a single department staff member, holding the rank of engineer, predominantly oversees the department's advanced life support and EMS program. This presents challenges as it relates to all aspects of supervision of an expanding advanced life support responder program. Issues such as required on going continuing medical education, quality improvement, equipment, and clinical research and development, infectious disease management, and on-scene supervision all compete for supervisory attention. The department may consider dedicated EMS chief officer, given that EMS

represents a significant amount of the call volume. Consideration should also be given to identifying shift EMS coordinators to assist with the administration and oversight of the MFD EMS program.

Agency Based EMS Medical Director and Clinical Protocols

MFD technically receives agency medical director oversight from the American Medical Response (AMR) medical director, including authorization for the purchase and management of controlled substances/drugs. The department's EMS coordinator has limited to no interaction with the AMR office of medical director in providing input in medical procedures, interventions, and protocols. The medical director is not active in MFD emergency medical services training, oversight, research and clinical innovations.

It is recommended the MFD work with American medical response to memorialize and expand the scope and manner in which medical director services will be provided. The MFD EMS Administrator should have consistent and regular interaction with the designated MFD medical director. The MFD should participate in training, education, research and innovation that is directed and managed by the MFD medical director.

EMS Quality Improvement

The department's EMS coordinator currently reviews all paramedic EMS reports in the records management system and reviews other EMS data on a targeted or as needed basis. The EMS coordinator provides informal feedback to crews.

The department is able to get some community out-of-hospital outcomes, but is only upon request and is not a regular reporting element. There exists further opportunity to identify key performance areas that are essential to successful outcomes of EMS cardiac arrest survival and other system outcome performance indicators. Examples of such outcome-based measurements may include utilizing the well-accepted Utstein reporting template, STEMI, stroke and trauma system outcomes, reduction of pain scores for cardiac patients, and improvement in shortness of breath in difficulty breathing populations.

The department should establish a peer review and committee process that makes recommendations of reports and trends for medical director review and establish monthly reporting metrics to include key performance indicators for EMS activities. Proper medical control, oversight, and proactive quality measures should include a prospective, real time, and retrospective elements.

Prospective (Pre-Incident) Medical Control

The EMS administrator and/or assigned staff should participate in the development of local and state policy and procedures as well as data collection elements and system design. Staff should ensure the current and future needs of the MFD and the growing service scope and manner are addressed. This will reduce the risk of the department being mandated to adhere to standards and system requirements that may be lacking input, customization, or key service elements for the MFD service area.

Concurrent (Real-Time) Medical Control

The EMS administrator should ensure the EMS system provides real-time feedback with relevant training and education. Having assigned and trained staff that can observe the integrated first responder and ambulance transportation system will provide valuable data on areas of strengths, deficiencies, and opportunities for the MFD. Early identification of trends and field performance will reduce potential for

clinical mistakes and provide for early intervention with responding personnel to create a proactive and cooperative learning environment.

Retrospective (Post Incident) Medical Control

The EMS administrator or assigned staff should implement and monitor an internal review committee and retrospective medical control measures. The MFD should implement a PEER review committee that performs random patient care report reviews and evaluates calls and trends to offer constructive feedback and educational improvement programs to individuals and the department as a whole. This committee should also take a leadership role in the development of patient documentation, transfer of care, and EMS operational policies. The MFD should participate in appropriate pilot projects and focused studies approved by the department and medical director. Audits and study results need to be reported in a manner that clearly demonstrates the benefits to the patients and communities served.

EMS SYSTEM INTEGRITY

The department participates in a two-tiered EMS oversight system. First, the State of California provides statutory authority that enables counties/EMS Regions to establish local treatment protocols, EMS certification and other system components. Secondly, the MVEMS under the direction of the medical director adopts localized policies and procedures to meet the needs of the Stanislaus County and the City of Modesto. These requirements are adhered to by the MFD and managed and monitored at the department level.

Figure 92 : Survey Table – EMS System Integrity and Logistical Support Services

Survey Components	Modesto Fire Department Observations	Recommendations
Certification/Recertification		
Ongoing Training & Evaluation System In Place?	CE Through Target Solutions, Infrequently Used Skills Every Few Months.	
Skills Assessment Performed By Qualified Evaluators?	PHI, Use Local Helicopter Crews, ALS ITLS/PHTLS, ACLS, PALS/PEP AMR Classes Available, Will Need To Grow For Expansion Of FRALS	Explore ALS CE Training Consortium With Air Ambulance, AMR, And Fire ALS Providers.
Recertification Exams Administered By Qualified Testing Center?	EMT Skills Done On Multi Company Drills, Written Exam Administered On Duty.	
Medical Supplies		
Inventory Controls In Place	EMS Coordinator Does All Ordering, Supply Cache At Training Center. Each Engine Carries Enough For Three Codes. Order As Needed Resupplied By EMS Coordinator.	
Controlled Meds Security	Done Through DEA Safe, Wi-Fi Safe, Waste At The Hospital, AMR Replaces The Complete NARC Pack.	
Replenishment System In Place	AMR And EMS Coordinator Handle All Supplies.	Consider Alternative Delivery System That Is Not Dependent On One Position Conducting Supply Delivery And Replenishment.
Temperature Controlled Environment For Liquids	No, Use Hot And Cold Packs.	Establish Temperature Control Measures On All ALS Response Units.

Key Recommendations:

- Explore ALS CE training consortium with Air Ambulance, AMR, and Fire ALS providers.
- Consider alternative delivery system that is not dependent on one position conducting supply delivery and replenishment.



Discussion

Maintenance and currency of EMS certification, training, and equipment records is a vital component of an EMS program. Providing centralized control and monitoring of these functions reduces the risk of lapsed certifications and unnecessary costs of training and equipment to meet State of California and MVEMS requirements.

The process of initial certification and recertification involves a variety of education and performance requirements at the department and state level. ESCI's review of the current certification, EMS training records, and equipment tracking identified a number of areas that warrant review and system modifications or enhancements.

Certification and Recertification Recordkeeping

The department has maintained training and certification records in accordance with existing MFD recordkeeping systems and policies. ESCI recommends MFD centralize the responsibility for certification and EMS training and continuing education records under the EMS administrator as a single point of contact and centralized recordkeeping for all EMS certification, recertification, and continuing education records. ESCI further recommends MFD conduct a detailed audit of all EMS continuing education and certification records to ensure currency and compliance. There needs to be established written policies that establish the procedures for certification and continuing education recordkeeping requirements by the EMS administrator and individual personnel.

Training and Continuing Education

The MFD provides EMS training in a decentralized manner and utilizes supplements training with a centralized classroom instruction. Skills testing is a crucial part of ensuring EMS personnel have a proper understanding of their scope of practice and protocols. Scenario-based training ensures personnel have an adequate understanding of their EMS roles and responsibilities with the capacity to translate that from an understanding to demonstrated hands-on skills performance.

ESCI recommends MFD conduct one third (30%) of EMS training in a centralized classroom environment. Hands-on, skill-based testing and training should be a significant portion of the classroom training requirements for BLS and ALS personnel. MFD should also provide scenario-based training to simulate actual field conditions and enhance operational effectiveness and coordination between assigned engine/truck company and ambulance personnel.

Supplies and Materials Management

MFD maintains disposable EMS supplies in each station that are periodically inventoried and resupplied by AMR via a contract for restock and resupply. Inventories are not currently based on utilization or anticipated call or patient volume. There are differing levels of restock occurring from a single ordering point and authority. Heart monitors/defibrillators are on each apparatus but are not separately maintained as part of an amortized internal service replacement fund.

ESCI recommends station supply par levels be established based on historical volume and utilization. Regular inventories should be conducted with single-point ordering and distribution coordinated by the EMS administrator to AMR. ESCI recommends the MFD establish a capital inventory and replacement program for EMS capital equipment with a regularly scheduled inventory. An amortized capital

replacement program should be established that is annually funded to ensure adequate revenue exists for replacement of these items when they have reached their projected equipment life cycle.

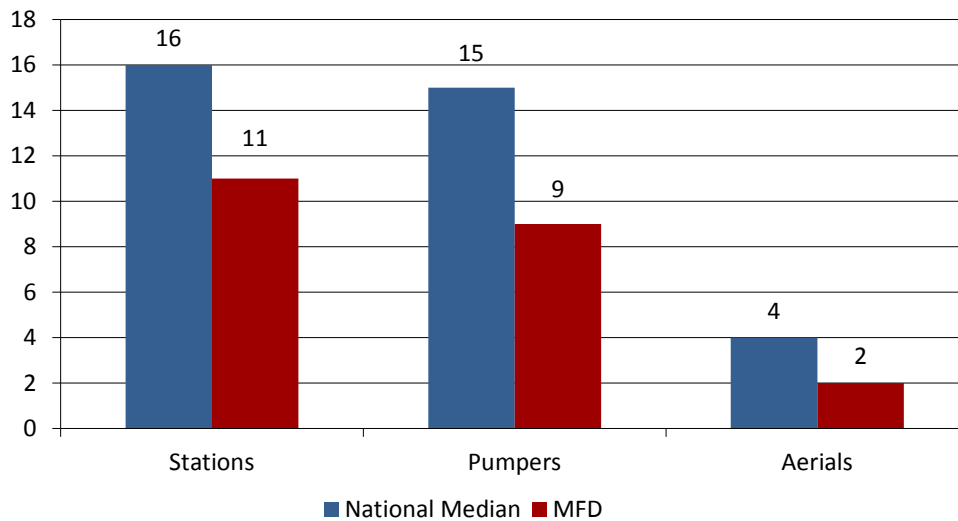


Capital Assets and Capital Improvement Programs

Regardless of an emergency service agency's financing, if appropriate capital equipment is not available for the use by responders, it is impossible for a fire department to deliver services effectively. MFD maintains a balance of three basic resources that are needed to carry out its emergency mission: People, equipment, and facilities. The adequacy of personnel resources is a primary concern, as discussed in the Staffing section of this report; but no matter how competent or numerous the firefighters are, the fire department will fail to execute its mission if it lacks sufficient equipment and apparatus distributed in an efficient manner.

The MFD maintains 11 fire stations and millions of dollars-worth of capital assets. These assets are necessary to provide service and must be maintained and replaced as needed. A comparison of major capital assets, including fire engines, aerial ladder trucks, and fire stations is provided in the following figure.

Figure 93 : Capital Assets per 1,000 Population



MFD's major capital asset inventory falls below national medians for the region.

FACILITIES

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

Figure 94 : Modesto Fire Department Station 1



Modesto’s Fire Station 1 houses a fire engine, a ladder truck, a grass vehicle, a heavy rescue truck and a battalion chief, along with several reserve units. The vehicles are housed in four bays of double depth. Crews housed in the station include staffing for the engine and the ladder truck, along with the battalion chief.

Station 1 is dated and has undergone little updating since it was constructed in 1939. It exhibits deterioration and significant signs of deferred maintenance. The station is due for replacement.

Structure	
Construction type	Masonry construction with wood frame, flat roofing system.
Date Built	1939
Seismic protection/energy audits	A seismic audit was reportedly completed in the past, but no upgrades were performed as a result.
Auxiliary power	Undersized, older generator is not configured to automatically start.
Condition	Poor
Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.)	The station is not ADA compliant, nor is it configured appropriately for dual gender staffing. Storage is adequate.
Facilities Available	
Exercise/workout	An exercise room is located in the basement.
Kitchen/dormitory	A small kitchen is present but very dated. Sleeping for up to 10 is accommodated in two, shared dorm rooms.
Lockers/showers	One very small bath and shower room is substantially outdated and in poor condition.
Training/meetings	A small conference room seats 10.
Protection Systems	
Sprinkler system	Fire sprinklers are present only in the basement. Residential areas are not protected.
Smoke detection	Only battery powered smoke alarms are present in the residential areas.
Security	A single key lock provides access to the building. The same key opens all fire stations.
Apparatus exhaust system	Installed on front line apparatus only.



Figure 95 : Modesto Fire Department Station 2



Station 2 is Modesto’s newest fire station. It is smaller, consisting of two apparatus bays of drive-through configuration. Two fire engines are found in the building, one of which is staffed, the other in reserve. Quarters are present for six responders in single bed rooms. The station is staffed with three personnel.

Station 2 is in excellent condition, having been constructed in 2008. While it has little room for future expansion, it will serve the fire department as intended for many years.

Structure	
Construction type	Masonry construction with a steel frame, steel clad, pitched roof design.
Date Built	2008
Seismic protection/energy audits	A seismic and energy considerations were factored into the building design in 2008.
Auxiliary power	An automatically starting generator is provided for emergency backup power.
Condition	Excellent
Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.)	The station is ADA compliant and appropriately configured for dual gender staffing. Storage is adequate.
Facilities Available	
Exercise/workout	An exercise room is well equipped and accessible for public use.
Kitchen/dormitory	A kitchen is equipped with commercial grade appliances. Six individual sleeping rooms are available for responders.
Lockers/showers	The station includes three individual restrooms with single showers.
Training/meetings	Training and meetings are held at the kitchen table. The adjacent community center offers additional meeting space.
Protection Systems	
Sprinkler system	Fully protected by a fire sprinkler system.
Smoke detection	The building is also protected with a smoke detection system.
Security	A single key lock provides access to the building and all fire stations.
Apparatus exhaust system	Installed on all apparatus.

Figure 96 : Modesto Fire Department Station 3



The smallest of its facilities, Station 3 consists of two, double depth apparatus bays of drive-through configuration. A single fire engine is housed in the station along with a grass fire unit that is cross staffed with the engine crew.

Residential accommodations include three bedrooms with two beds in each.

Station 3 is in fair to good condition but has no room for future growth or expansion.

Structure	
Construction type	Concrete block construction with a wood framed, flat roof.
Date Built	1967
Seismic protection/energy audits	No seismic or energy audits have been performed.
Auxiliary power	An automatically starting generator is provided for emergency backup power.
Condition	Fair to good
Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.)	The station is not ADA compliant. Storage is limited.
Facilities Available	
Exercise/workout	There is no workout room. Exercise equipment is in the apparatus bays.
Kitchen/dormitory	A small, residential type kitchen is present with a small day room. 3 individual sleeping rooms are configured with two beds each.
Lockers/showers	There are two, individual, bathrooms, each with a single shower.
Training/meetings	Training and meetings are held at the kitchen table in the absence of a conference room.
Protection Systems	
Sprinkler system	The station is not protected by a fire sprinkler system.
Smoke detection	Batter powered smoke alarms are present in the sleeping area only.
Security	A single key lock provides access to the building and all fire stations.
Apparatus exhaust system	Installed on the engine.

Figure 97 : Modesto Fire Department Station 4



Station 4 was constructed in 1976 and consists of two, drive-through apparatus bays that are double in depth. The station houses an engine and the department’s hazardous materials response team vehicle. A crew of three responders staffs the station.

Station 4 is small and adequately meets current needs. However there is little room for expanded future use. The building is in generally good condition.

Structure	
Construction type	Concrete block construction with a wood framed roof structure.
Date Built	1976
Seismic protection/energy audits	No seismic or energy audits have been performed.
Auxiliary power	An emergency backup generator is in place but does not start automatically.
Condition	Good
Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.)	The station is not ADA compliant. Storage is limited.
Facilities Available	
Exercise/workout	A small exercise area is well equipped.
Kitchen/dormitory	The kitchen area, though small, is adequate for its current use. Three individual sleeping rooms are provided for crews.
Lockers/showers	There is one, individual bathroom/shower.
Training/meetings	Training and meetings are held at the kitchen table in the absence of a conference room.
Protection Systems	
Sprinkler system	The station is not protected by a fire sprinkler system.
Smoke detection	Hard wired smoke alarms are present in the residential portions of the station.
Security	A single key lock provides access to the building and all fire stations.
Apparatus exhaust system	Installed on the engine.

Figure 98 : Modesto Fire Department Station 5



Station 5 is a 1965 vintage building and is the fire department's busiest station. It occupies an optimal location in regard to response, providing ready access to incidents in several directions.

A single engine company is housed at the station, which consists of four, single depth, drive-through apparatus bays. A fire investigator is also housed in the facility.

Station 5 is good sized, but is aging and showing signs of deterioration. Unrepaired plumbing problems have resulted in water damage.

Structure	
Construction type	Concrete block construction with a wood framed, flat roof structure.
Date Built	1965
Seismic protection/energy audits	No seismic or energy audits have been performed.
Auxiliary power	An emergency backup generator is in place but does not start automatically.
Condition	Fair to poor
Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.)	The station is not ADA compliant nor is it configured for dual gender occupancy. Storage space has reached capacity.
Facilities Available	
Exercise/workout	No exercise room is present. Work out equipment is in one of the dorm rooms.
Kitchen/dormitory	A small kitchen is equipped with residential grade appliances. Two dorm rooms are in place, one with beds for three and another with beds for sleeping five.
Lockers/showers	A single locker/shower room is present and is not dual gender appropriate.
Training/meetings	There is no training room, training and meetings are held at the kitchen table.
Protection Systems	
Sprinkler system	The station is not protected by a fire sprinkler system.
Smoke detection	Smoke alarms are present in the residential portions of the station.
Security	A single key lock provides access to the building and all fire stations.
Apparatus exhaust system	Installed on the engine.



Figure 99 : Modesto Fire Department Station 6



Built in 1979, Station 6 is in generally good condition. It houses a single engine company and crew and has two, double depth apparatus bays. It is a smaller, neighborhood station.

The station is small and can accommodate only three responders in the residential portion of the building. There are no meeting areas and only a single office, which is in the main entry.

Structure	
Construction type	Wood frame construction with a wood framed, pitched roof.
Date Built	1979
Seismic protection/energy audits	No seismic or energy audits have been performed.
Auxiliary power	An emergency backup generator is in place but does not start automatically.
Condition	Fair to good
Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.)	The station is not ADA compliant nor is it configured for dual gender occupancy. Storage is maximized.
Facilities Available	
Exercise/workout	No exercise room is present. Work out equipment is in the apparatus bays.
Kitchen/dormitory	A small kitchen is equipped with residential grade appliances. Three, single sleeping rooms are present.
Lockers/showers	A single bath/shower room is present.
Training/meetings	There is no training room, training and meetings are held at the kitchen table.
Protection Systems	
Sprinkler system	The station is not protected by a fire sprinkler system.
Smoke detection	Smoke alarms are present in the residential portions of the station.
Security	A single key lock provides access to the building and all fire stations.
Apparatus exhaust system	Installed on the engine.

Figure 100 : Modesto Fire Department Station 7



Constructed in 1981, Modesto Station 7 is another smaller, neighborhood station that houses only one fire engine and response crew.

The facility has two, single-depth back-in apparatus bays. The bays are smaller in overall size and will not accommodate a larger fire engine or a ladder truck, as currently configured.

Station 7 is located on a small building lot. Space in the station is maximized and there is not room for future expansion. The station is also suffering from deferred maintenance. Unrepaired plumbing issues have resulted in water damage.

Structure	
Construction type	Concrete block construction with a wood framed, pitched roof structure.
Date Built	1981
Seismic protection/energy audits	No seismic or energy audits have been performed.
Auxiliary power	An emergency backup generator is in place but does not start automatically.
Condition	Fair
Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.)	The station is not ADA compliant nor is it configured for dual gender occupancy. Storage space has reached capacity.
Facilities Available	
Exercise/workout	No exercise room is present. Work out equipment is in one of the apparatus bays.
Kitchen/dormitory	A small kitchen is equipped with residential grade appliances. Three, single sleeping rooms are present.
Lockers/showers	Two single locker/shower rooms are present.
Training/meetings	There is no training room, training and meetings are held at the kitchen table.
Protection Systems	
Sprinkler system	The station is not fully protected by a fire sprinkler system.
Smoke detection	Smoke alarms are present in the residential portions of the station.
Security	A single key lock provides access to the building and all fire stations.
Apparatus exhaust system	Installed on the engine.



Figure 101 : Modesto Fire Department Station 8



Station 8 is located at the Modesto Airport. The station is staffed by a single responder, trained in aircraft emergency response and staffing a specialized aircraft fire response. There are no structural fire vehicles in the station and only one crew member.

The station consists of two, double-depth apparatus bays, with a drive-through configuration. The building is in generally good condition, considering its age of 35 years, but is showing signs of aging. Dry rot, paint, and roof leak issues were reported.

Structure	
Construction type	Stucco covered wood frame building with a wood framed, pitched roof structure.
Date Built	1980
Seismic protection/energy audits	No seismic or energy audits have been performed.
Auxiliary power	An emergency backup generator is in place but does not start automatically.
Condition	Fair to good
Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.)	The station is not ADA compliant nor is it configured for dual gender occupancy.
Facilities Available	
Exercise/workout	No exercise room is present. Work out equipment is in a separate, adjacent building.
Kitchen/dormitory	A small kitchen is equipped with residential grade appliances. Three, sleeping rooms are present with two beds each.
Lockers/showers	A single bath/shower room is provided.
Training/meetings	There is no training room, training and meetings are held at the kitchen table.
Protection Systems	
Sprinkler system	The station is not protected by a fire sprinkler system.
Smoke detection	Smoke alarms are present in the residential portions of the station.
Security	A single key lock provides access to the building and all fire stations.
Apparatus exhaust system	Installed on the engine.

Figure 102 : Modesto Fire Department Station 9



As another smaller, neighborhood fire station, Station 9 was built in 1985. It houses a single engine company and response crew and has two, double depth apparatus bays.

The station has residential accommodations for only three responders and is marginally appropriate for dual gender occupancy. Although older, the building is in generally good condition.

Structure	
Construction type	Wood frame structure with a wood framed, pitched roof, finished with composition roofing.
Date Built	1990
Seismic protection/energy audits	No seismic or energy audits have been performed.
Auxiliary power	An emergency backup generator is in place but does not start automatically.
Condition	Good
Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.)	The station is generally ADA compliant. Storage is very limited.
Facilities Available	
Exercise/workout	No exercise room is present. Two machines are in the day room and additional work out equipment is in the apparatus bays.
Kitchen/dormitory	A small kitchen is equipped with residential grade appliances. Three, individual, single sleeping rooms are present.
Lockers/showers	Two bath/shower rooms serve the on duty crews.
Training/meetings	There is no training room, training and meetings are held at the kitchen table.
Protection Systems	
Sprinkler system	The station is not protected by a fire sprinkler system.
Smoke detection	Smoke alarms are present in the residential portions of the station.
Security	A single key lock provides access to the building and all fire stations.
Apparatus exhaust system	None

Figure 103 : Modesto Fire Department Station 10



Station 10 serves the city as well as the Industrial Fire District and is an aging facility that was constructed in 1950. It has three apparatus bays, all of which are single depth, back-in bays.

There are accommodations for five responders.

Station 10 is clearly aging and its future viability will be limited by maintenance challenges. The apparatus bays and front apron demonstrate serious deterioration.

Structure	
Construction type	Wood frame structure with a flat, wood framed, roof.
Date Built	1950
Seismic protection/energy audits	No seismic or energy audits have been performed.
Auxiliary power	None
Condition	Poor
Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.)	The station is not ADA compliant. Storage is filled to capacity. Facility is not configured for dual gender use.
Facilities Available	
Exercise/workout	No exercise room is present. Work out machines are in the day room.
Kitchen/dormitory	A good sized kitchen is equipped with residential grade appliances. Two sleeping rooms have two beds each and the captain's office includes sleeping accommodations.
Lockers/showers	There is a single bath/shower room.
Training/meetings	There is no training room, training and meetings are held at the kitchen table.
Protection Systems	
Sprinkler system	The station is not protected by a fire sprinkler system.
Smoke detection	Smoke alarms are present in the residential portions of the station only.
Security	A single key lock provides access to the building and all fire stations.
Apparatus exhaust system	None

Figure 104 : Modesto Fire Department Station 11



Station 11 is in excellent condition, having been constructed in 2005. It is well designed for its current use and includes two, drive-through, apparatus bays, housing an engine and a ladder truck company and their crews.

The station can sleep eight in single bedrooms and is dual gender appropriate.

Structure	
Construction type	Wood frame structure, with stucco finish and a wood framed, pitched roof, finished with tile.
Date Built	2005
Seismic protection/energy audits	When originally designed in 2005.
Auxiliary power	An emergency backup generator is in place and starts automatically.
Condition	Excellent
Special considerations (American with Disabilities Act of 1990 (ADA), mixed gender appropriate, storage, etc.)	The station is ADA compliant and consistent with current applicable construction codes. Storage is very limited.
Facilities Available	
Exercise/workout	A well-equipped exercise room is present.
Kitchen/dormitory	A large kitchen is equipped with commercial grade appliances. Eight, individual, single bed sleeping rooms are provided.
Lockers/showers	Three individual bath/shower rooms serve the on duty crews.
Training/meetings	There is no training room, training and meetings are held at the kitchen table.
Protection Systems	
Sprinkler system	The station is fully protected by a fire sprinkler system.
Smoke detection	Smoke alarms are present in the residential portions of the station.
Security	A single key lock provides access to the building and all fire stations.
Apparatus exhaust system	None

Discussion

MFD fire stations range from some that are in good condition to others that are well past due for replacement. Stations 2 and 11, for example is in excellent condition and several of the other stations can be described as in fair to good condition. Station 5 is aging and due for upgrading or replacement.

Station 1 of particular concern, the building is deteriorated and areas of significant water damage were observed. The station has clearly exceeded its reasonable service life and is well past due for replacement. Addressing the condition of Station 1, specifically, should be considered a high priority.



APPARATUS

MFD maintains a sizeable fleet of response vehicles that are used frequently and run relatively hard. A small number of the units are fairly new and all are well maintained. The overall condition of the fleet was found to be good with a number of units requiring replacement. An inventory of fire apparatus, configuration, and condition is provided in the following figures.

Figure 105 : Major Apparatus Inventory

Apparatus Designation	Type	Year	Make/Model	Condition	Minimum Staffing	Pump Capacity (GPM)	Tank Capacity (GAL)
Station 1							
Engine 1	Type 1 Pumper	2013	Pierce Velocity	Good	3	1500	500
Truck 1	Aerial	2006	Pierce Quantum	Fair	4	0	0
Grass 1	Type 6 Brush	2004	Ford F550	Fair	3	125	250
Brush 1	Type 3	2014	Pierce	Good	3	1000	500
Rescue 5	Heavy Rescue	2007	Pierce Quantum	Good	Cross Staffed	0	0
Station 2							
Engine 2	Type 1 Pumper	2009	Pierce Velocity	Good	3	1500	500
Station 3							
Squad 3	Type 1 Pumper	2004	Pierce Quantum	Fair	3	1500	500
Grass 3	Type 6 Brush	2004	Ford F550	Fair	3	125	250
Station 4							
Engine 4	Type 1 Pumper	2001	Pierce Quantum	Fair	3	1500	500
Haz Mat 4	Specialty Haz-Mat Unit	2004	Ford F450, Featherweight Trailer	Good	3		
Station 5							
Engine 5	Type 1 Pumper	2007	Pierce Quantum	Very good	3	1500	500
OES 321	Light rescue	2005	HME	Good	4	1250	800
Station 6							
Engine 6	Type 1 Pumper	2005	Pierce Quantum	Fair	3	1500	500
Station 7							
Engine 7	Type 1 Pumper	2004	Pierce Quantum	Fair	3	1500	500
Station 8							

Airport Rescue	ARRF Rescue	2010	Oshkosh	New	1	1500	1500
Reserve AP	ARRF Rescue	2000	E-One Titan	Good	1	1500	1500
Station 9							
Engine 9	Type 1 Pumper	1994	Pierce Arrow	Poor	3	1500	500
Station 10							
Engine 10	Type 1 Pumper	2003	Pierce Quantum	Fair	3	1500	500
Reserve 30	Type 1 Pumper	1989	Pierce Arrow	Poor	3	1500	500
Station 11							
Truck 11	Light Rescue	2002	Pierce Quantum	Fair	3	0	0
Reserve 31	Type 1 Pumper	1990	Pierce Dash	Poor	3	1500	500

Discussion

ESCI found MFD's vehicles to vary widely in condition. As listed in the previous figure, some are in relatively good condition, while a considerable number of units are considered to be fair to poor. Overall, the fleet consists of vehicles that range in age from two to 25 years, with an average age of just over 12 years. When the two reserve engines are removed from the calculation, the average comes to 10.375 years. It is also noted that two new fire engines have been ordered and are scheduled for delivery as this report is being completed. The new equipment will improve the situation, but does not fully address the apparatus challenges.

Accepted service lives for fire apparatus vary widely, depending on type, maintenance and amount of use. Generally, a fire engine is expected to last a maximum of 15 years; however, in Modesto the high volume of responses reduces the expected service life, which the department considers to be 10 to 12 years.

Given the age, condition and high use of MFD's fire vehicles, maintenance and replacement is viewed as a critical issue and one that needs to be more effectively addressed. **Error! Reference source not found.**

CAPITAL REPLACEMENT PLANNING

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

Fire department vehicles also have a readily predictable life span, and replacement costs can be accurately forecast. Because of their large cost, it is essential that a community plan ahead for the cost of replacement. In fact, ESCI advises that, as soon as a new vehicle is delivered, a fire department immediately start to dedicate funding for its future replacement. To properly do so, agencies are advised to undertake the practice of establishing a life cycle for the apparatus that results in a replacement date being 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 following figure summarizes MFD’s capital replacement planning:

Figure 106 : Survey Table – Capital Assets and Capital Improvement Planning

Survey Components	Modesto Fire Department Observations	Recommendations
Fire Stations/Structures		
Replacement Plan Maintained	No Structured Plan Is In Place	
Period Of Plan (From – To)	N/A	
Funding Mechanism	N/A	
Apparatus		
Replacement Plan Maintained	No Structured Apparatus Replacement Plan Is In Place	
Period Of Plan (From – To)	N/A	
Funding Mechanism	N/A	
Purchase Or Refurbishment Schedule	None	
2015, Planned	Two Engines Are On Order, To Be Delivered In October, 2015	
2016, Planned	None Scheduled	
2017, Planned	None Scheduled	
Support Equipment		
Replacement Plan Maintained	No Structured Plan Is In Place	
Period Of Plan (From – To)	N/A	
Funding Mechanism	N/A	
Methods Of Financing		
General Fund Revenue	Current Purchases Are Being Funded From General Operating Budget	

Survey Components	Modesto Fire Department Observations	Recommendations
B. Reserve Fund(S)	No Reserve Funds Are Dedicated	
Revenue Fund(S)	No Revenue Funds Are Dedicated	
General Obligation Bond	GO Bonds Are Not Used Typically	
Lease-Purchase	Used For Apparatus Purchases	
Grants Or Gifting	When Available	
Special Fees		

MFD does not maintain a formal schedule that places all apparatus on a specified replacement cycle from date of primary service. The department does maintain a list of apparatus and projected replacement dates, but there is no formalized or funded plan in place. ESCI recommends that the department develop a vehicle replacement schedule, including a funding strategy that will fully meet future needs. Additional discussion is provided below.

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

Because of the expense of fire apparatus, most communities develop replacement plans. To enable such planning, establishing a life cycle for the apparatus identifies an anticipated replacement date for each vehicle. Funding is then set-aside during the life of the vehicle so cash is available when needed. This decision is influenced by many factors:

- Actual hours of use of any specific piece of equipment can vary significantly in comparison to other similar apparatus, even within the same fire department. Attempts to shuffle like apparatus among busy and slower fire stations to distribute hours of use more evenly will prove to be difficult in Modesto because all stations are busy. Further, frequent changes in apparatus create familiarity and training challenges.
- Actual hours of use, even if evenly distributed, do not necessarily equate to intensity of use. For example, a pumper making mostly emergency medical responses will not age as rapidly as a pumper with a high volume of working fire incidents that require intense use of the pump or hydraulics. However, for every hour you idle an engine it is equivalent to driving 33 to 35 miles of wear and tear. Likewise, road mileage can also be a poor indicator of deterioration and wear.
- Technology, which is increasingly a factor in fire equipment design, becomes outdated even if the apparatus wear is not as significant. In some departments, crews at different fire stations deal with widely different technology on pumpers simply because of the age of the equipment. These differences can be significant, affecting everything from safety and lighting systems to automated digital pump pressure controls and injection foam generation.

NFPA 1901: Standard for Automotive Fire Apparatus is a nationally recognized standard for the design, maintenance, and operation of fire suppression apparatus.⁹ The issue of replacement cycles for various

⁹ *NFPA 1901: Standard for Automotive Fire Apparatus*, 2009 edition.



types of apparatus has been discussed in the committee that develops the standard for many years. In developing its latest edition, the NFPA Fire Department Apparatus Committee called for a life cycle of 15 years for front-line service and five years in reserve status for engines; 15 years in front-line service and five years in reserve status for ladder trucks.

Does this mean that a fire engine cannot be effective as a front-line pumper beyond 15 years? A visit at many departments in the United States might prove otherwise. Small, volunteer fire departments with only a hundred or so calls per year often get up to 25 years from a pumper, though the technology is admittedly not up to date. Likewise, busy downtown fire stations in some urban communities move their engines out of front-line status in as little as eight years.

MFD has developed a listing of anticipated service lives for its apparatus, as listed below:

- Front line engines 10 to 12 years
- Front line trucks (aerials) 15 years
- Reserve equipment 20 years

Service lives and replacement costs are highly variable and are subject to multiple interpretations based on what kind of apparatus is purchased and how it is configured. With this in mind, ESCI developed an example replacement schedule, using the MFD service lives listed above, estimated service lives for other apparatus types, and conceptual replacement prices. It is understood that the assumptions used below may be subject to change, including projected pricing, so this is offered as an example only. ESCI will revise the schedule at any time, should the department prefer to use different numbers.

The schedule is based on the following service life estimates:

Figure 107 : Apparatus Life Expectancies

Vehicle Type	Life Expectancy	Replacement Cost
Engines	12	\$550,000
Aerial Truck	15	\$1, 200,000
Reserve engines	20	\$550,000
Custom Pumper	12	\$550,000
Airport Rescue	10	\$1,500,000
Wildland	15	\$140,000

Using these life expectancies, the following replacement schedule was developed.

Figure 108 : Apparatus Replacement Schedule

Unit	Year	Current Age	Life Expectancy	Replacement Year	Replacement Cost	Annual Fund Contribution	Current Cash Requirement
Engine 1	2013	2	12	2025	\$550,000	\$45,833	\$91,670
Truck 1	2006	9	15	2021	\$1,200,000	\$80,000	\$720,000
Grass 1	2004	11	15	2019	\$140,000	\$9,333	\$102,668
Brush 1	2014	0	15	2029	\$350,000	\$23,333	\$23,338
Rescue 1	2007	8	15	2022	\$340,000	\$22,667	\$181,333
Engine 2	2009	6	12	2021	\$550,000	\$45,833	\$275,002
Squad 3	2004	11	12	2016	\$550,000	\$45,833	\$504,167
Grass 3	2004	11	15	2019	\$140,000	\$9,333	\$102,668
Engine 4	2001	14	12	OVERDUE	\$550,000	NA	\$550,000
Haz Mat 4	2004	11	15	2019	\$125,000	\$8,333	\$91,668
Engine 5	2007	8	12	2019	\$550,000	\$45,833	\$366,668
Engine 6	2005	10	12	2017	\$550,000	\$45,833	\$458,334
Engine 7	2004	11	12	2016	\$550,000	\$45,833	\$504,167
Engine 9	1994	21	12	OVERDUE	\$550,000	NA	\$550,000
Engine 10	2003	12	12	OVERDUE	\$550,000	NA	\$550,000
Reserve 30	1989	26	20	OVERDUE	\$550,000	NA	\$550,000
Truck 11	2002	13	15	2017	\$1,200,000	\$80,000	\$1,040,000
Reserve 31	1990	25	20	OVERDUE	\$550,000	NA	\$550,000
Airport ARRF	2015	0	20	2035	\$1,500,000	\$75,000	\$0
Reserve Airport ARFF	2000	15	20	2020	\$2,115,000	\$75,000	\$1,125,000
TOTALS						\$657,997	\$8,336,683

Based on the above example, were the City of Modesto to *fully* fund their apparatus replacement planning, a current cash on hand balance of \$8,119,001 would be needed, with an additional annual contribution planned in the amount of \$662,831. While may be unrealistic to expect that these levels will be readily set aside in the immediate future, the figure serves as an example of the level of funding that is involved and the shortfall that it represents to the city.

APPARATUS MAINTENANCE AND REPAIR

Fire apparatus, by its very nature, is expensive and complex to operate and maintain. The more specialized a piece of equipment is, the higher its maintenance costs can be expected. A prime example is an aerial ladder or quint apparatus as compared to more typical fire engines. For this reason, the deployment of ladder and quint apparatus should be carefully reviewed for necessity in regard to risk exposure that necessitates elevated (ladder) devices and insurance rating effects of changing current deployment.

Maintenance of fire department vehicles in Modesto was being performed by the previously consolidate fire protection district and remained so after the city separated from the district. However, at the time of ESCI's fieldwork, the city and fire department were considering moving that function under the city's maintenance department umbrella.

A key component of an adequate apparatus and equipment maintenance program, in addition to the technicians that perform the work, is the availability of needed parts, supplies and the logistics associated with managing a repair and maintenance operation. ESCI visited the Modest Fleet Services facility and met with the supervisor. The vehicle and equipment maintenance shop was found to be a modern, state of the art, facility that is well equipped and professionally operated. ESCI supports the concept of relocating fire department maintenance services to the city facility.

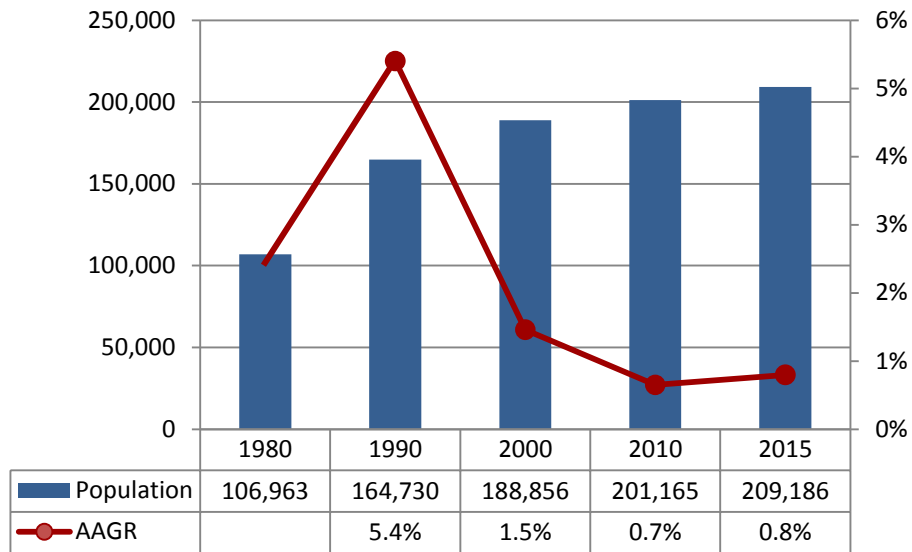
FUTURE SYSTEM DEMAND PROJECTIONS

Future service demand for fire department services is largely dependent on changes to the population in and around the service area; and the activity of that population. It is desirable to evaluate the population history of the response area and attempt to predict how the population will change in the future. ESCI utilizes data from the US Census Bureau, the California Department of Finance (Demographics Division), the Modesto Urban Area General Plan, and the Stanislaus Council of Governments (Stancog) to project population change within the MFD service area.

Population History

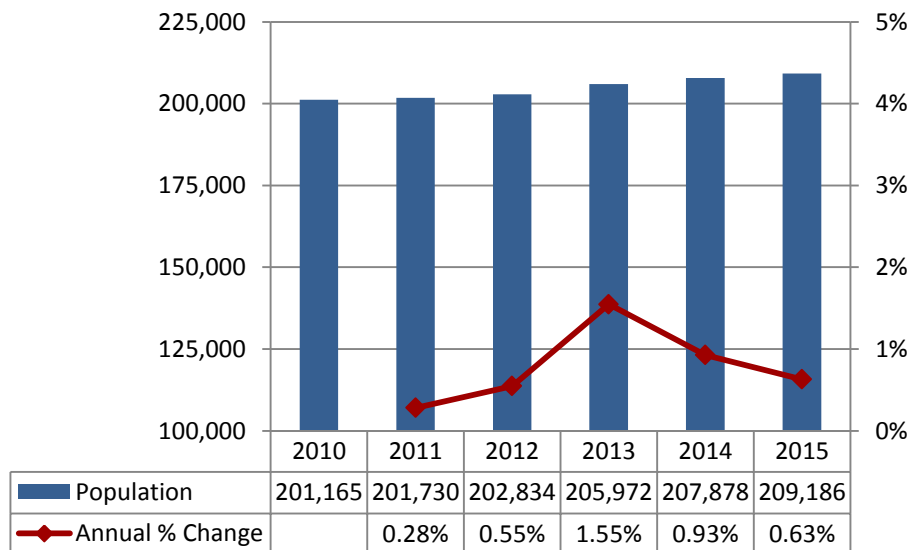
Population growth in the City of Modesto and Stanislaus County has varied over the last 35 years. The population of Modesto has nearly doubled from 106,963 to over 205,000 according the Department of Finance (DOF) January 2015 estimate; and the population of Stanislaus County has increased from 265,900 in 1980 to nearly 532,300 in 2015. The following figure demonstrates the historical population growth in Modesto from 1980 to 2015.

Figure 109 : City of Modesto Historical Population Change, US Census Data 1980-2015



Although the average annual growth rate (AAGR) has decreased since 1980, the population of Modesto has increased for each of the decennial census periods shown in this figure. The following figure illustrates population growth within Modesto from the last decennial census to January 2015.

Figure 110 : Modesto Population Growth, 2010-2015 California DOF Data

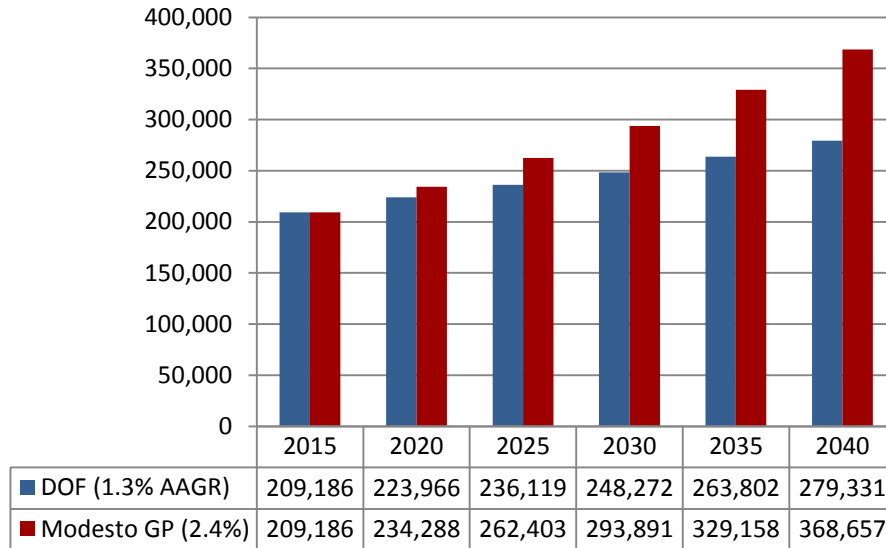


The population of Modesto continued to grow between 2010 and 2015, according to the Department of Finance estimates. This figure demonstrates that the population has grown by approximately four percent in the time period displayed. During the same time period the population of Stanislaus County grew by nearly 3.5 percent.

Population Projection

Using population projections and information from the Modesto Urban Area Growth Plan and California Department of Finance (DOF); ESCI calculates and displays two possible population projections for the Modesto Fire Department service area in the following figure.

Figure 111 : MFD Study Area Population Projections 2015 through 2040

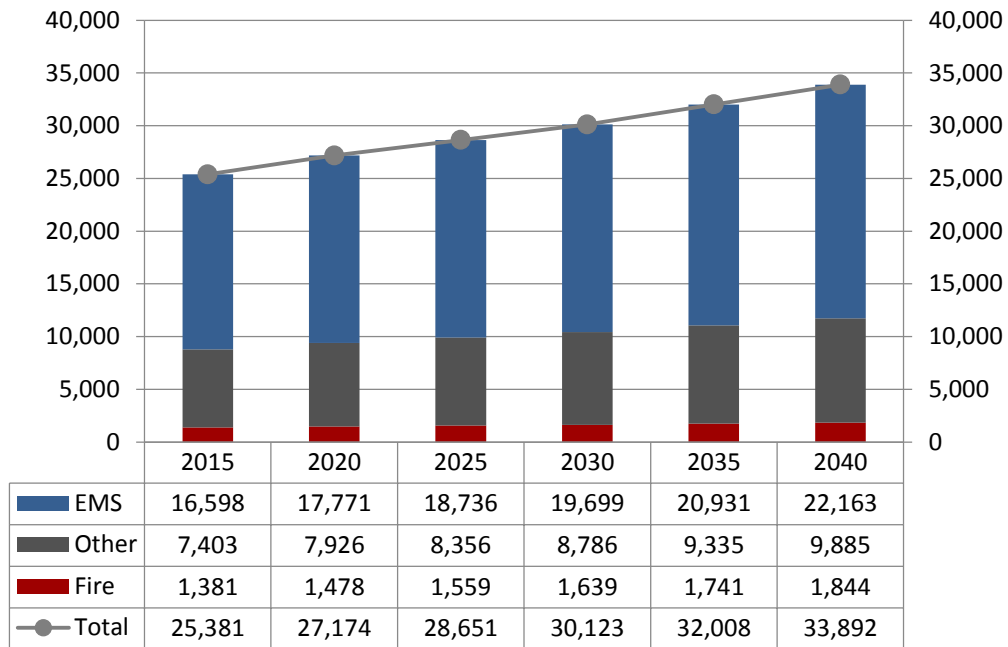


In the projections displayed, ESCI began with the current estimated population estimate of the Modesto and then applied the projected growth rate for each of the projections to this number. The Modesto Urban Area General Plan (Modesto GP) forecast the population of Modesto to reach approximately 334,000 by 2025; which is higher than the population projection seen in the figure. The growth rate was expected to average 2.4 percent annually. The Modesto GP was published in 2008 prior to the 2008 recession and the resultant down turn in economic and population growth. Note that a 2015 review of the general plan acknowledges that growth has not occurred at the rate projected in the original plan. The DOF projection was published in 2014 and is based on revisions to the annual estimates which reflect current trends and data. This projection shows the population of Modesto increasing to nearly 280,000 by 2040.

Service Demand Projections

For the purposes of this study, ESCI utilizes the 1.3 percent average annual growth rate from the DOF projection; and multiplies this by a forecasted incident rate (incidents per capita) derived from MFD historical service demand for the last five years (2010 through 2014). This information is employed to identify workload potential, based on population, through the year 2040. The results are displayed in the following figure.

Figure 112 : MFD Study Area Service Demand Projection, 2015 through 2040



This figure displays projected service demand (summarized as “Fire,” “EMS,” and “Other” incident categories) through 2040. Fires (includes all types of fires) demonstrate the lowest rate of increase. This reflects a national trend attributed to improvements in building codes and fire prevention over the last several decades. EMS incidents are expected to continue to be the predominant factor affecting service demand in the MFD service area. This projection demonstrates a nearly 34 percent increase in service demand over the next 25 years. Note that using the 2.4 percent AAGR from the 2008 Modesto General Plan results in a projection of possible future service demand of over 43,600 incidents by 2040.

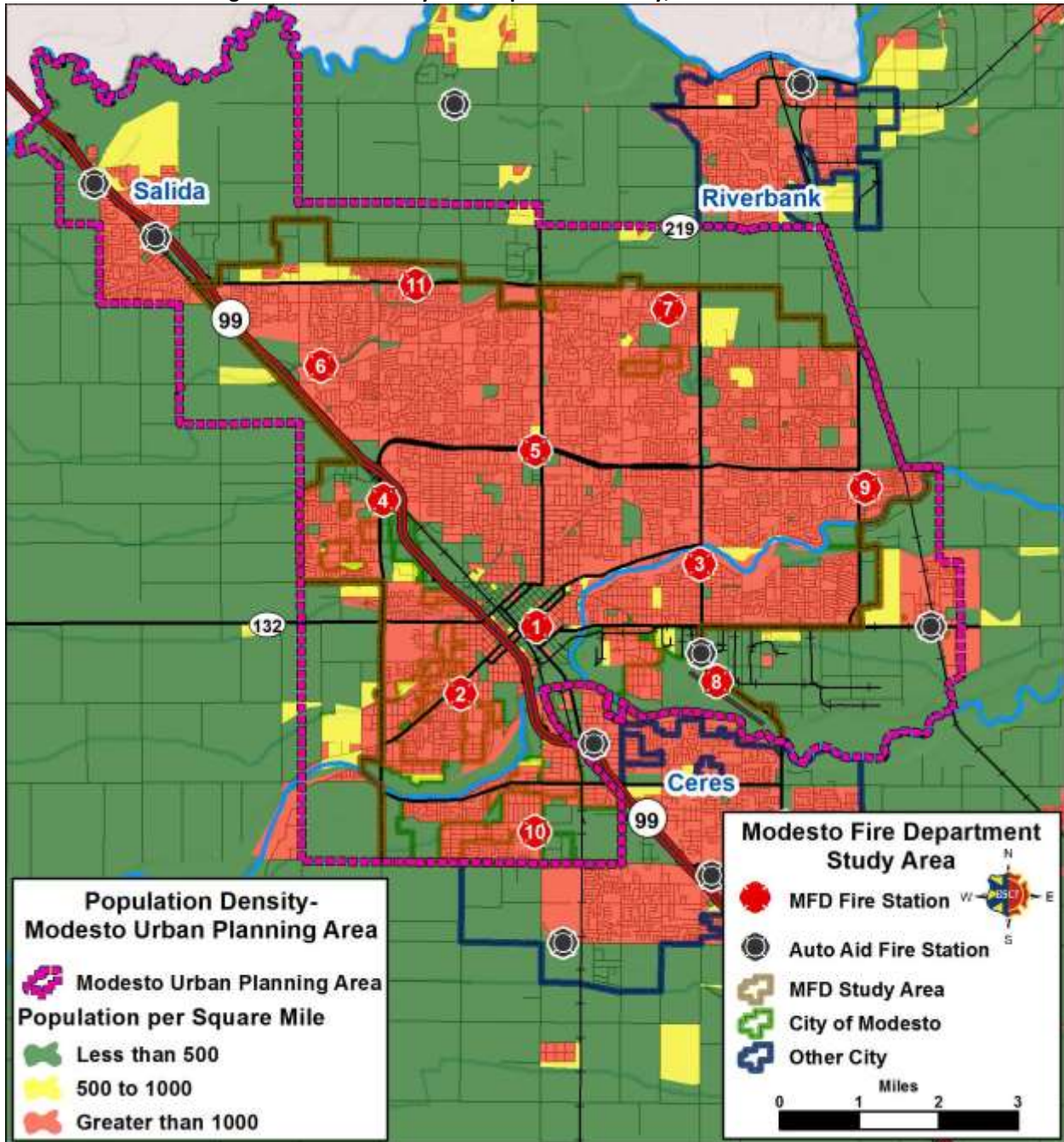
It is not the intent of this study to be a definitive authority for the projection of future population in the service area, but rather to base recommendations for future fire protection needs on a reasonable association with projected service demand. Since human activity is a primary driver of emergency service demand, it is important to have a population-based projection of the future size of the community.



COMMUNITY RISK REVIEW

Community risk is assessed based on a number of factors: the service area population and population density, the demographics of the population, local land use and development, and the geography and natural risks present within the community. These factors affect the number and type of resources (both personnel and apparatus) necessary to mitigate an emergency. The following figure, examines population density in the MFD service area.

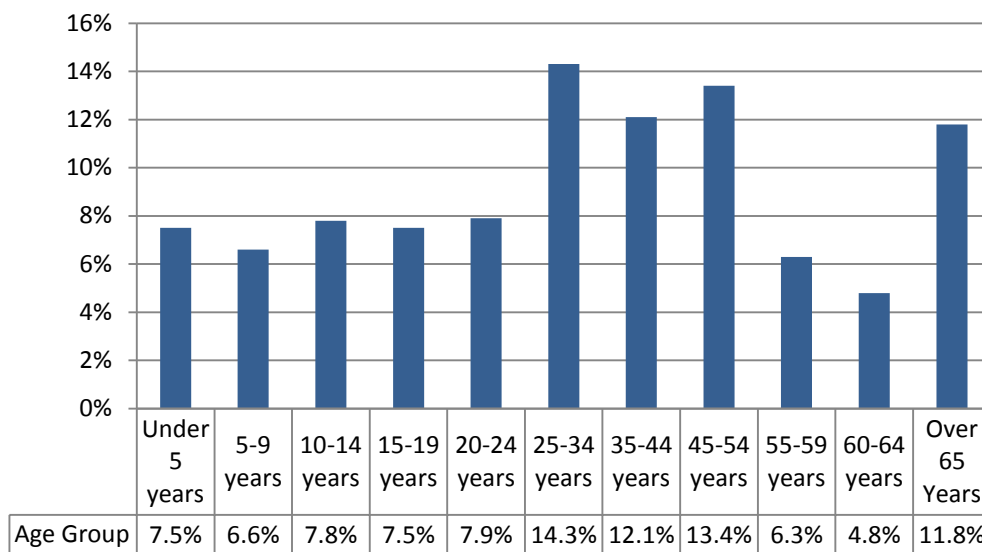
Figure 113 : MFD Study Area Population Density, 2010 Census Blocks



As discussed in the Distribution analysis, the population density within the current MFD service area is predominantly urban. With an estimated population of over 209,000 and a population density of over 4,900 per square mile, Modesto is considered a metropolitan community. Approximately 40 percent of the population of Stanislaus County resides in Modesto. In the previous figure, ESCI displays the Modesto Urban Area Planning boundary. This represents the area in and around Modesto addressed in the Modesto Urban Area General Plan. The portions of the planning area around the perimeter of the current boundaries of Modesto are expected to absorb substantial urban development in the future. That growth will be guided by the Modesto Urban Area General Plan. Note that the unincorporated community of Salida is included in the Modesto planning area, but maintains a separate community general plan. The Modesto General Plan (published in 2008) forecasts that the planning area has the capacity for a potential population of 428,000. Growth and increased population density inside the Modesto planning area will change the nature of the community risk within the MFD service area.

In addition to the distribution of the population, the demographics of the population can affect the amount of service demand and the risk within a community. The following figure displays the population by age group within the MFD service area.

Figure 114 : MFD Study Area Population by Age, 2013 Census Data



According to the 2013 Census Bureau American Community Survey (ACS) estimate, nearly 12 percent of the population of Modesto is over 65 years of age. This is similar to the same metric within in Stanislaus County and California. However, examination of the California DOF population projections reveals that the population of this age group in Modesto is expected to grow at over three times the rate of the general population over the next 25 years. This is a trend that is increasing EMS service demand for fire jurisdictions across the country. Also note that NFPA studies indicate the population over 65 or less than 5 is at higher risk for fatalities in residential fires.



In the following figure, ESCI displays other demographic values for Modesto from the 2013 ACS estimates; and compares these values to those of Stanislaus County and California.

Figure 115 : MFD Study Area Demographics, 2013 Census Data

Demographic	Modesto	Stanislaus County	California
Median Household Income, 2009-2013	\$47,060	\$49,297	\$61,094
Owner-Occupied Housing, 2009-2013	54.5%	58.1%	55.3%
Persons Without Health Insurance, Under Age 65 Years	17.5%	17.8%	17.8%
Personal Income Below Federal Poverty Level	20.8%	20.3%	15.9%

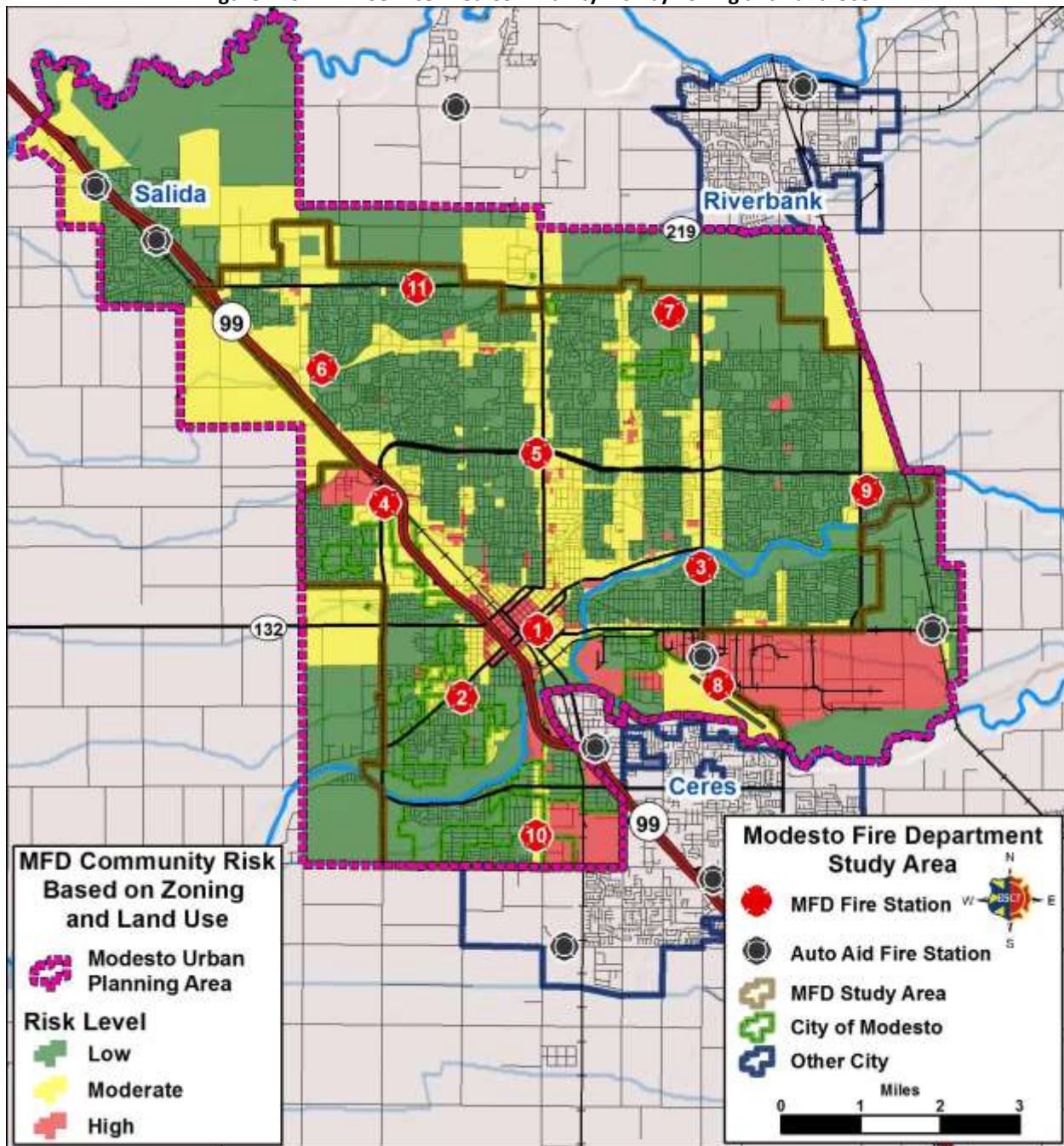
The demographics displayed above, are factors that may indicate a population that is more or less likely to use fire department services than other populations. Individuals with lower incomes and no health insurance are more likely to use local EMS resources than individuals with health insurance and a personal physician. A high percentage of owner occupied homes generally equates to wage earners willing to invest in the community.

ESCI uses GIS software and land use and zoning classifications from the Modesto Urban Area General Plan to examine current and future land use. Risk is assigned to the land use and zoning classifications to present a view of relative community risk.

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

The following figure maps relative community risk within the MFD service area using the criteria listed above.

Figure 116 : MFD Service Area Community Risk by Zoning and Land Use



The Modesto service area is a mix of low, moderate, and high risk properties. Residential properties are primarily single family dwellings (approximately 72 percent). While single family dwellings are usually categorized as a moderate fire risk, they represent a lower risk when compared to commercial and industrial properties; and low density residential areas are classified as low risk in this analysis. Areas classified as moderate risk are predominantly commercial properties or mixed use areas; and tend to be distributed along the major transportation routes through the Modesto planning area. Areas classified as high risk are primarily zoned for manufacturing and industrial uses. Areas zoned for high density multi-family residential structures are also included in the high risk category. The downtown core area is

classified as a high risk area due to multi-story structures, building density, and commercial activity in this area.

The land use planning districts and zoning classifications displayed above are intended to accommodate growth and in fill within the Modesto Urban Planning Area. Increased development and activity inside the planning area will result in additional service demand inside the current MFD service area. Additionally, when growth occurs in the portions of the planning area outside of the current MFD service area; MFD must be prepared to address new service demand in these areas.

Natural and Manmade Hazards

The Modesto Urban Area General Plan identifies earthquake, flood, dam failure, wildland fire, and landslide, or hazardous material spills (contamination of soil or groundwater) as the most likely natural disasters with the potential to affect public safety in and around the planning area. The city has adopted a Local Hazard Mitigation Plan (LHMP), which addresses public safety and the reduction of losses from natural or manmade disasters. ESCI encourages MFD to work with city planners to identify the impact on public safety and the fire department's ability to mitigate effects of these hazards.

Future Delivery System Models

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

DEVELOPMENT OF RESPONSE STANDARDS AND TARGETS

Throughout this report, ESCI has emphasized the importance of the establishment of response performance metrics by the MFD. Once established, these standards establish measurable goals for service delivery, which then form the baseline upon which planning for deployment of resources is based. Absent these processes, the organization is not able to determine where it needs to go, nor is it able to know when it is achieving its goals and meeting its community's expectations.

Response standards must be developed by the individual community, based on the expectations of elected officials and citizens, balanced against the financial aspect of what a community is able and willing to afford. For this reason, ESCI cannot establish these standards for MFD, but rather will provide guidance and examples of what we consider to be acceptable metrics.

Critical Tasks, Risk, and Staffing Performance

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

The number and types of tasks needing simultaneous action will dictate the minimum number of firefighters required to combat different types of fires. In the absence of adequate personnel to perform concurrent actions, the command officer must prioritize the tasks and complete some in chronological order, rather than concurrently. These tasks include:

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

The fire service assesses the relative risk of properties and occurrences based on a number of 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. The level of risk categories used by Commission for Public Safety Excellence (CPSE) relate 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 business districts and structures, mixed use areas, high density residential, industrial, warehousing, and large mercantile structures.

The CPSE has a sample critical tasking analysis for the number of personnel required on scene for various levels of risk. This information is illustrated in the following figure as an example of critical tasking only and is not intended to conclusively define the actual personnel necessary based on risk.¹⁰

Figure 117 : Sample of Critical Task Staffing by Risk

Sample Critical Tasking Analysis 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 incident.

indicates task may, at times, be completed concurrently with other position.

The first 15 minutes is the most crucial period in the suppression of a fire. How effectively and efficiently firefighters perform during this period has a significant impact on the overall outcome of the event. This general concept is applicable to fire, rescue, and medical situations.

Critical tasks must be conducted in a timely manner to control a fire or to treat a patient. Three scenarios of commonly encountered emergencies are routinely utilized by fire departments when conducting field validation and critical tasking: a moderate risk structure fire, a traffic collision with a trapped victim, and a cardiac arrest. Each scenario is conducted using standard operating procedures and realistic response times based on actual system performance. Each scenario is normally run multiple times with a variety of fire companies to validate and verify observations and times.

¹⁰ Note: Based on examples provided in the publication Commission on Fire Accreditation International, Inc. (now Center for Public Safety Excellence), *Creating and Evaluating Standards of Response Coverage for Fire Departments*, 4th edition.

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.

Again, critical tasks are those activities that must be conducted in a timely manner by firefighters at emergency incidents in order to control the situation, stop loss, and to perform necessary tasks required for a medical emergency. The MFD is responsible for assuring that responding companies are capable of performing all of the described tasks in a prompt, efficient, and safe manner.

All Risk Critical Resource Tasking

Fire departments respond to many incidents other than structure fires, including hazardous materials (dangerous goods) releases, motor vehicle collisions, basic and advanced life support medical emergencies, and non-structural fires. Personnel responding to these types of incidents should be assigned tasks similar to structure fires.

The following figures are provided as an example for these types of incidents, although ESCI recommends MFD conduct field validation exercises with its crews to verify the critical tasking analysis provided. After field validation is complete, the department may find that the critical tasking can be adjusted appropriately upward or downward for each incident type.

Figure 118 : Non-Structure Fire Critical Tasking

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

Figure 119 : 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 120 : 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 121 : Emergency Medical Incident Critical Tasking

Task	Personnel
Ambulance Transport	2
First Responder	4
Total	6

The aforementioned minimum staffing criteria should be used in setting specific service level objectives for each of the incident types.

Response Time Performance Objectives

The process of setting response time performance objectives will include two sets of questions:

- What are the expectations of the community and elected officials in regard to initial response times of the fire department to an emergency incident? What is the public’s perception of quality emergency services where response time is concerned?
- What response time performance would be reasonable and effective in containing fire, stopping the loss, and saving lives when considering the common types of incidents and fire risks faced by the MFD?

To initiate the process of considering the expectations of the customer, the historical travel time and loss history needs to be examined from the data that was submitted by the MFD. Then, historical service levels are compared to known and anticipated service demand and community growth projections. Considering these projections, suggested response time standards are created to ensure MFD is meeting local service demand expectations in accordance with relevant industry standards and best practices.

The MFD is a fully career department and therefore references the industry standard for the Center of Public Safety Excellence (CPSE) and the *NFPA 1710* performance measures. These response time measures are displayed in the following figure:

Figure 122 : NFPA Performance Measurement Recommendations

Response Element	NFPA Recommendation
Call Processing ¹¹	0:60 @ 95 th %
Turnout	0:60 @ 90 th % for Medical 1:20 @ 90 th % for Fire
Response	4:00 @ 90 th %
Effective Response Force	8:00 @ 90 th %

NFPA 1720 provides direction for variable density response performance measures that are intended for volunteer or combination fire departments, but can be used as guidelines for career departments that provide services to a wide range of population densities and geographic areas.

Figure 123 : Additional NFPA Response Performance Objectives by Population Density Categories

Response Element	Response Performance Objective
Call Processing	0:60 @ 95 th Percentile
Turnout	0:60 @ 90 th Percentile for Medical 1:20 @ 90 th Percentile for Fire
Urban Zone	4:00 @ 90 th Percentile
Suburban Zone	8:00 @ 80 th Percentile
Rural Zone	14:00 @ 80 th Percentile

Although NFPA performance recommendations are considered an industry standard, departments working with their governing bodies have the authority to implement performance measures that are better suited to their communities. This is known as the Authority Having Jurisdiction (AHJ). The MFD 90th turnout time is 2 minutes 49 seconds and travel time is 4 minutes 34 seconds resulting in a 6 minutes 34 seconds overall response time. Given the current response time performance, ESCI recommends the Modesto adopt performance measures that, for the most part, adhere to NFPA 1710/1720 standards methodology although some of the adopted measures deviate from those standards as illustrated in the following figures.

To most accurately reflect system performance in accordance with identified risk, ESCI recommends tiered response performance objectives for the city based on population density. This methodology will effectively segregate the service area into three distinct response zones: urban, suburban, and rural.

The first example is the “first due” response of a single utilizing standard reflex time from dispatch to arrival 90 percent of the time:

¹¹NFPA 1221: Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems.



Figure 124 : First Due Response Standard Example

First Due, Single Unit Response	
Urban (> 1000 Per Square Mile)	7 Minutes To 90 Percent Of Incidents
Suburban (500-1000 Per Square Mile)	7 Minutes To 90 Percent Of Incidents
Rural (<500 Per Square Mile)	15 Minutes To 90 Percent Of Incidents

The next example represents a first alarm response to a moderate risk structure fire, utilizing standard reflex time from dispatch to arrival 90 percent of the time:

Figure 125 : First Alarm Response Standard Example

First Alarm, Response of 3 Engines, 1 Truck and 1 Battalion Chief	
Urban (> 1000 Per Square Mile)	10 Minutes To 90 Percent Of Incidents
Suburban (500-1000 Per Square Mile)	10 Minutes To 90 Percent Of Incidents
Rural (<500 Per Square Mile)	15 Minutes To 90 Percent Of Incidents

This discussion is intended to provide the MFD with the information necessary to begin the process of establishing response standards and targets. The department is encouraged to begin the process as soon as possible, especially in light of the potential for the addition of a fire station and personnel in the future.

SHORT- AND MID-TERM STRATEGIES

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

Response Deployment

Population growth projections for the City of Modesto continue to be strong and current activity supports that picture. ESCI concludes that the current service demands and the projected growth and expected service demand justifies an increase in response resources. Specifically, there is an immediate need to address truck company, battalion chief, and alternative response capabilities for non-emergency EMS calls. Response times are lengthening and unit reliability is decreasing with the significant call increase and 32 percent increase in fire over the past five years. Incident outcomes are generally acceptable but there is notable increase in fire loss and EMS response times. Unit reliability is dropping below the 90 percentile standard in most response areas raising concern over timely and effective response to an increasing call volume and increasing number of fire incidents. The following are short-term recommendations that will enhance current response and service delivery levels and efficiencies until additional City of Modesto resources can be funded and implemented.

- It is recommended that the MFD pursue an enhanced cooperative service agreement with the Stanislaus Consolidated and Ceres fire departments to coordinate and provide adequate truck and battalion responses to meet effective firefighting force standards and response times. These services should be utilized until additional Modesto truck and battalion resources can be funded

and implemented. These services can continue to support responses in the City of Modesto after the implementation of an additional battalion and truck company.

- There is opportunity to enhance automatic aid by implementing the negotiated complete boundary drops between Modesto, Stanislaus Consolidated, Ceres, and Turlock fire departments. Full implementation of this cooperative service agreement will provide increased unit concentration and reliability for the MFD service area, which is experiencing a high level of service demand and response time challenges. Currently, unit requests are based on CAD recommendation utilizing geographic coordinates and run cards. The technology does exist to utilize GIS based CAD recommendations for the closest unit to respond. This technology should be accessed and complete boundary drops implemented as soon as possible.
- Current dispatch call-processing time exceeds the 60-second industry standard goal. Stanislaus County Regional Dispatch (SR 911) is a regional multi-agency, multi-disciplinary (law enforcement, Fire, EMS) agency; and call-processing time is generally not under the direct control of the fire department. Fire department leaders need to be aware of call processing time and work cooperatively with the dispatch agency to meet standards. It is recommended the MFD identify and implement a dispatch model that eliminates the current number of call transfers, interrogation points, and delay in EMD call classification and dispatch.

Fire Prevention

Consistent with its general mission, the MFD is responsible to manage a significant portion of public safety risk within its service area. In managing the risk, a well-designed and properly managed fire prevention program has consistently served communities well and measurably reduced risk.

As has been discussed in detail in the Fire Prevention and Public Education section, the MFD fire prevention program will need to adapt to the ever-increasing workload and address the existing fire problem as well as future anticipated growth. ESCI recommends that MFD undertake a comprehensive planning process that will:

- Identify and assess pertinent risks.
- Prepare and staff the Fire Prevention Division to ensure they have the ability to manage the additional workload that will come with projected growth and regional and community impacts to fire and life safety programs.
- Incorporate a blended strategy of education, engineering, and enforcement to mitigate as much of the risk as practical.
- Work aggressively with city planning and abatement services to identify and mitigate fire and life safety issues with a focus on abandoned and high-risk structures and buildings.
- Seek to achieve an inspection frequency of at least annual completion and more frequently for higher risk occupancies.
- Provide strong direction for the program; and
- Appropriately staff the program to maintain the existing inspection compliance rate and continue to work toward the 100 percent goal.

Within the fire prevention program, ESCI recommends the MFD specifically explore cooperative services initiatives in the areas of public education and maintain control and leadership of regional fire/arson investigation.

Emergency Medical Services (EMS)

Advanced life support (ALS) emergency medical transportation is provided under a contract for service with American Medical Response. The MFD EMS response system includes three ALS FRALS units staffed by one credentialed paramedic under medical supervision, strategically stationed throughout the city. In addition to the FRALS units, there are nine first responder BLS engine companies that respond within their service areas to provide rescue and clinical care.

The MFD is the primary provider of first responder EMS services within its service area; and there is one fire engineer dedicated to the planning, delivery, evaluation, and overall effectiveness of MFD resources. The EMS delivery system overall within the city is very well integrated and provides a high level of EMS. The MFD has not established identified outcome based EMS system performance benchmarks, which could serve as a measure of efficiency and effectiveness.

EMS response constitutes a very significant portion of MFD's response activity and is also a critically important service. ESCI recommends MFD enhance the current EMS program and planning process that will:

- Identify and assess system performance benchmarks, training requirements, equipment requirements, and skills gaps.
- Incorporate a blended strategy of system integration, outcome based performance measures, training, and skills development and assessment.
- Prioritize implementation and utilization of a Medical Priority Dispatch System (MPDS) and an appropriate tiered response to medical calls for service (right resource, right patient, right time).
- Incorporate first responder Peak Activity Units (PAUs) from 1100-2300 hours as ALS Quick Response Units to maintain adopted response time standards.
- In coordination with local health care providers and related stakeholders, conduct a community needs assessment to identify future integrated community health care (community paramedicine) and health care services that can and should be provided by the MFD.
- Work with the cooperative service partners to fully integrate, training, equipment/supplies, quality assurance, and EMS administrative functions.
- Provide strong direction for the program; and
- Appropriately staff the program with the establishment of an EMS chief officer and shift EMS coordinators or lead personnel to ensure adequate oversight and supervision are present for current and future EMS delivery needs.

With EMS services representing 64.5 percent of the calls for service, it is imperative that the MFD adequately staff and manage this vital community service.

Emergency Management

The MFD is responsible to manage a significant portion of public safety risk within its service area that results from disaster preparedness. In managing the risks resulting from both natural and human-caused

disasters, a well-designed and properly managed emergency management program has consistently served communities well and measurably mitigated risks and improved public preparedness.

Currently, the MFD emergency management program lacks planning, design, and staffing. ESCI recommends that the MFD undertake a comprehensive planning process that will:

- Identify and assess pertinent disaster risks.
- Incorporate a blended strategy of planning, mitigation, response, and recovery initiatives such as active Community Emergency Response Teams (CERT), Federal Emergency Management Agency “Map Your Neighborhood,” as well as other appropriate programs to address the identified risks.
- Provide strong direction for the program; and
- Appropriately staff the program with, minimally, a program manager or coordinator.

Within the context of the emergency management program, ESCI recommends the MFD aggressively explore cooperative services initiatives with neighboring jurisdictions to ensure area-wide planning, interoperable plans and equipment, common public messages, and distributed program cost.

Comprehensive Cooperative Service Agreement

The MFD has done a significant amount of groundwork and development of a regional cooperatives service agreement that results in closest unit response with complete boundary drops with like staffed departments. ESCI commends the MFD for these efforts and these exceptional foundational elements.

ESCI had identified and shared concern with the MFD that the program has not been implemented. The MFD lacks some critical support resources necessary to effectively support and facilitate consistent fire protection and EMS delivery as the department experiences future growth and increased service demand. We strongly recommend the MFD take the opportunity now to bolster and solidify these programs and resources even as they prepare to strengthen their response resources in the future.

Several of these key programs can be significantly improved and fortified through building upon the currently developed cooperative services initiatives with the MFD’s adjacent jurisdictions and service partners. ESCI encourages the MFD to develop a “formal” multi-faceted cooperative services agreement that will equitably serve the MFD and their partners alike; and will produce consistent and defined support programs and services at a reduced cost for all partners the address at a minimum:

- Regional EMS administration, quality assurance/medical direction, training, supplies, and supervision in the field.
- Vehicle maintenance and repair services at an identified location with mobile capabilities to meet the needs of department vehicles in the field.
- Continued fire investigation services to ensure trained, certified fire investigators available 24/7/365 days a year.
- Emergency management functions to address preparedness, mitigation, response and recovery plans, and services to all participating agencies.
- Joint training staff and facility services to meet the training mandates and needs of all participating agencies.

- A regional purchasing cooperative that ensures competitive bidding and purchasing requirements are in place resulting in economies of scale and timely purchase and delivery of goods and services.

Training

The MFD has devoted significant focus and attention to the enhancement of training programs and standards within the organization. The program staffing, however, lacks the depth necessary to handle the significant mandated training standards and anticipated influx of new response personnel due to turnover and growth. ESCI believes the existing training staff model will rapidly exceed its capabilities based on anticipated growth, recommended service enhancements, and the need to handle the ongoing training, skills maintenance, recertification, and the expectations for professional development within a very busy and growing organization.

Successful fire and EMS training programs typically incorporate a leadership/managerial component and also a delivery and evaluation specialist. ESCI recommends the MFD work to ensure effective incorporation of both components within their training program.

ESCI recommends that The MFD undertake a comprehensive planning process that will:

- Identify and assess training requirements, developmental needs, and skills gaps.
- Establish, implement, and manage a comprehensive training and professional development program for all MFD employees.
- Incorporate a blended strategy of education, training, and practical skills development and assessment.
- Provide strong leadership for the program.
- Provide effective training delivery and skills assessment; and
- Appropriately staff the program with the addition of at least one additional FTE training captain position and designated shift training coordinators.

Within the training program, ESCI recommends the MFD specifically explore cooperative services initiatives in the areas of recruit training, Multi-Company Tactical Operations (MCTO), technical rescue programs, incident command system (NIMS) training, and special operations training e.g. hazardous materials, technical rescue, etc.

Administrative Support Staff

The roles of administrative support personnel include the critical functions of:

- Planning
- Data and information analysis
- Documentation and reporting
- Logistical support
- Process guidance and support

As noted, the present roster of support staff represents 11.3 percent of the MFD total staffing and ESCI regards this as a minimal amount. Successful municipal organizations more typically use a roster totaling 12 percent to 15 percent of agency total staffing.

Currently, the MFD office/administrative staffing functions are carried out by two FTE safety positions with operational and policy level responsibilities and, three administrative staff and two administrative assistants. ESCI notes that, while these employees are flexible and capable in multiple areas, they are frequently stretched to accomplish the range of tasks and duties before them. There is a significant deficit in managing support services division activities. The fire chief and operations chief are not able to administer their primary responsibilities and support service functions. In such circumstances, the functions of data/information analysis, reporting, and vital support service functions such as fleet maintenance and administrative support supervision are most frequently short-changed; we believe this is also true at the MFD.

ESCI also notes a majority of fire and EMS agencies focus training, educational, and development resources on operational response personnel, often to the exclusion of key support staff personnel. It is not uncommon for capable administrative support personnel to enlarge skill sets and improve efficiencies, given agency support for their development. The MFD is encouraged to look for opportunities to further develop incumbent support personnel.

It is further recommended the MFD undertake a comprehensive planning process that will:

- Identify and assess administrative support functional requirements, developmental needs, and skills gaps.
- Incorporate a blended strategy of education, training, and practical skills development and assessment.
- Provide strong leadership for the program.
- Appropriately staff the program; and
- Specifically consider adding one division chief of support services with primary responsibility to administer and manage support service functions within the MFD.

Organizational Development

The MFD is in a state-of-transition, in part due to recent the re-establishment of City of Modesto Fire Department. As a result, the membership is in the process of navigating its way through a set of new priorities and paradigms, which is often a difficult process.

To assist in the transition, ESCI recommends internal communications be enhanced in an effort to increase ownership in decisions and appreciation for organizational changes. The establishment of internal advisory committees is recommended in areas such as:

- Training Advisory Committee
- Special issues Task Force
- Operations/Special Operations Committee
- Apparatus Committee
- EMS Committee

Committees should include the participation and oversight of a departmental chief officer as well as labor representation.

Another identified area of concern by City leadership, the MFD management, labor representatives, and the community is the issue of current and potential turnover at the firefighter rank. This is universally believed to be in response to a base pay schedule compared to available salaries in the San Francisco Bay area market and the amount of call volume and work hours being experienced at the MFD. While the MFD personnel tend to focus on earnings and take home pay as the dominant measurement of funding, work place desirability, workload, and appropriate employee satisfaction are contributing factors to recently experienced turnover.

- ESCI recommends the City of Modesto and the MFD explore a realignment of spending priorities as well as the pursuit of new revenue and efficiencies as recommended in this report. It is recommended the city establish a pay policy that maintains pay scales in the “median” or “average” of the established Central Valley and Bay Area comparable agencies. ESCI has observed that departments that develop pay policies that keep pay rates in the medium or average for the comparable areas and agencies tend to not have excessive turn over based on pay scales and wages.

RECOMMENDED LONG-TERM STRATEGIES

Add an Additional Ladder Truck Company at Station 5

Currently ladder truck coverage within the City of Modesto does not meet adopted response time criteria or ISO truck coverage criteria. A delay in truck company response can result in delays in performing critical fire ground tasks such as search, rescue, and ventilation that contribute to increased life safety and reduced fire loss. Current ladder truck company response comes from Station 1 from a dedicated truck company, and Station 11, which also responds as an engine company, reducing its ability to operate as a ladder truck on many of its responses.

Currently, much of the eastern portions of the city are outside a ladder truck response area that meets Modesto's current response time standards. Portions of this service area represent some of Modesto's most dense population and highest service demand areas. Due to the lack of street network connectivity, Stations 1 and 11 ladder truck resources cannot serve much of the eastern first due areas within a city's six-minute travel time and does not meet industry best practices. A comparison of coverage of 2014 emergency incidents shows that the addition of a ladder truck is capable of reaching all fire occurrences in the east Modesto area that does not currently meet city and industry response standards.

The proposed relocation of an additional ladder truck will serve a much larger portion of the city's response area and provide a significant enhancement that can be reached within eight minutes for a first alarm assignment: four engines, one ladder truck, and one battalion chief. In addition, the additional truck company will significantly increase the number of personnel available to respond to the high frequency and high life safety target hazard responses seen in the downtown and core Modesto areas. In addition, Stations 1, 2, 3, 4, 5, and 6 can receive a commercial response of five engines, two ladder trucks, and two battalion chiefs to target hazards located within their districts. The proposed relocation area of Station 5 (located at Briggsmore and McHenry) is an intersection of major east-west and north-south routes through Modesto. This location will not only increase service levels to the Station 5 area, but will also allow good access to the east side of the city.

The following figures display the enhanced response capabilities based on the addition of a ladder truck at Station 5.

Figure 126 : 3rd Ladder Truck at Station 5, 8-Minute Travel Time

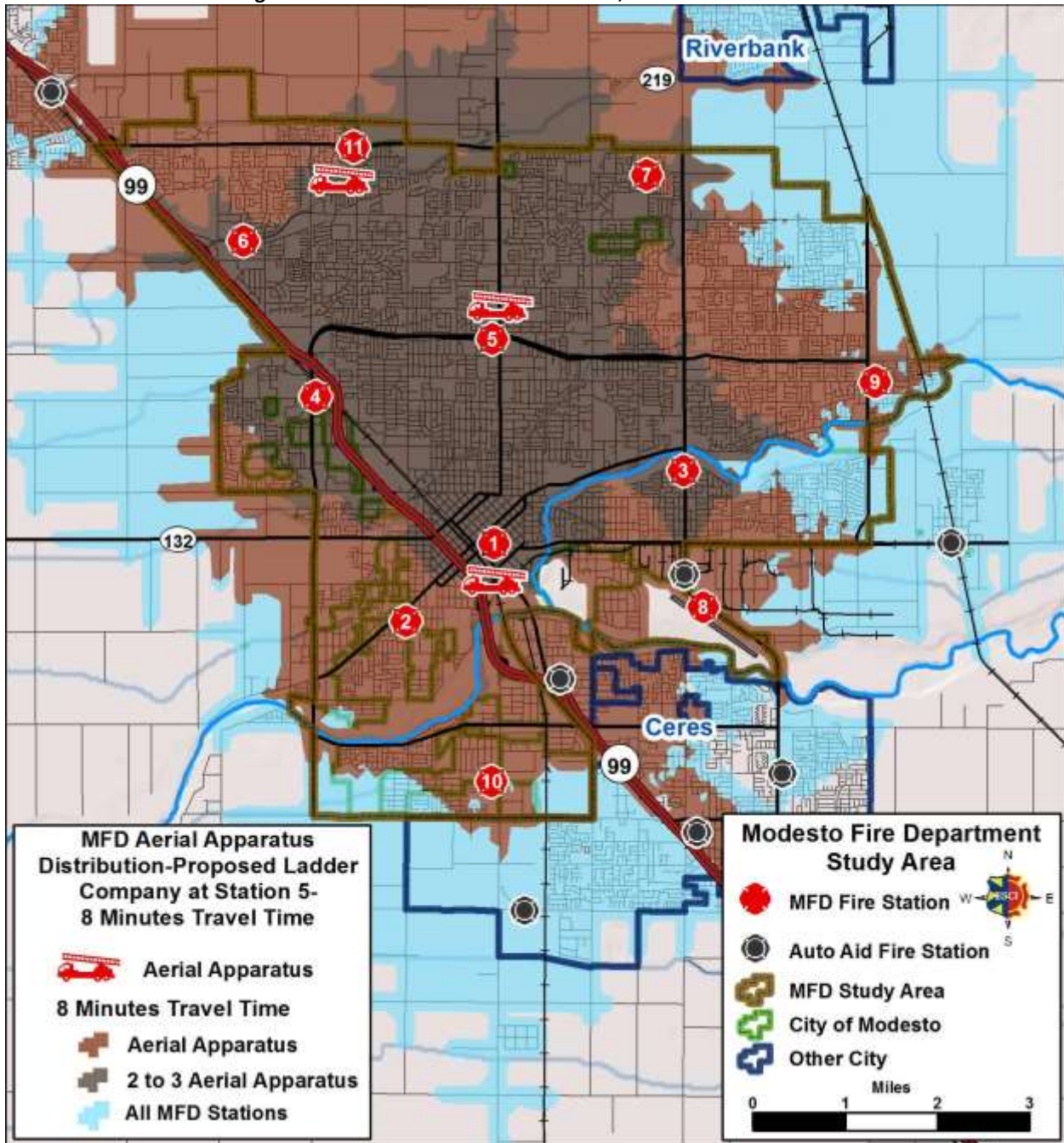


Figure 127 : 3rd Ladder Truck at Station 5 Full First Alarm 8-Minute

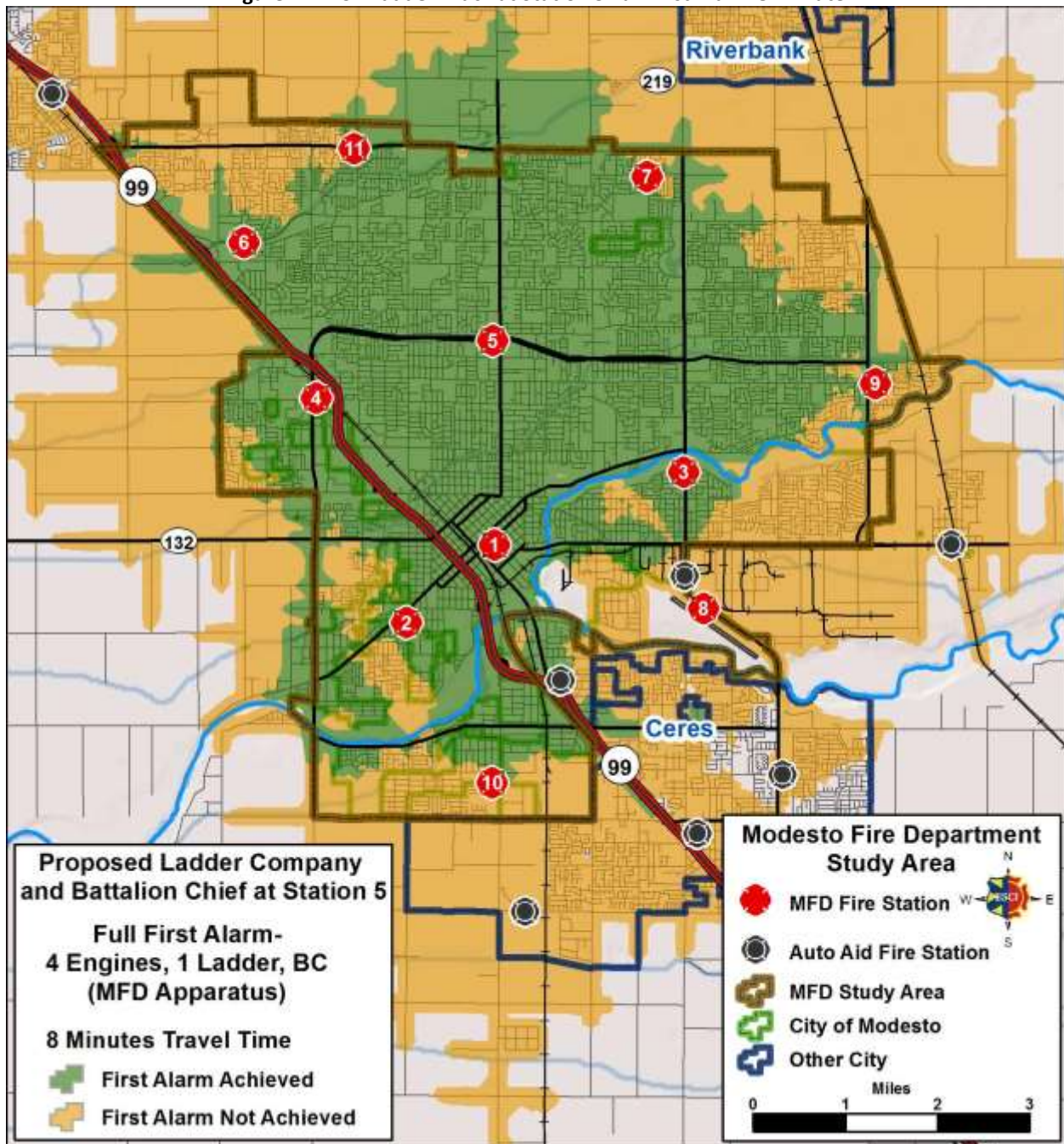
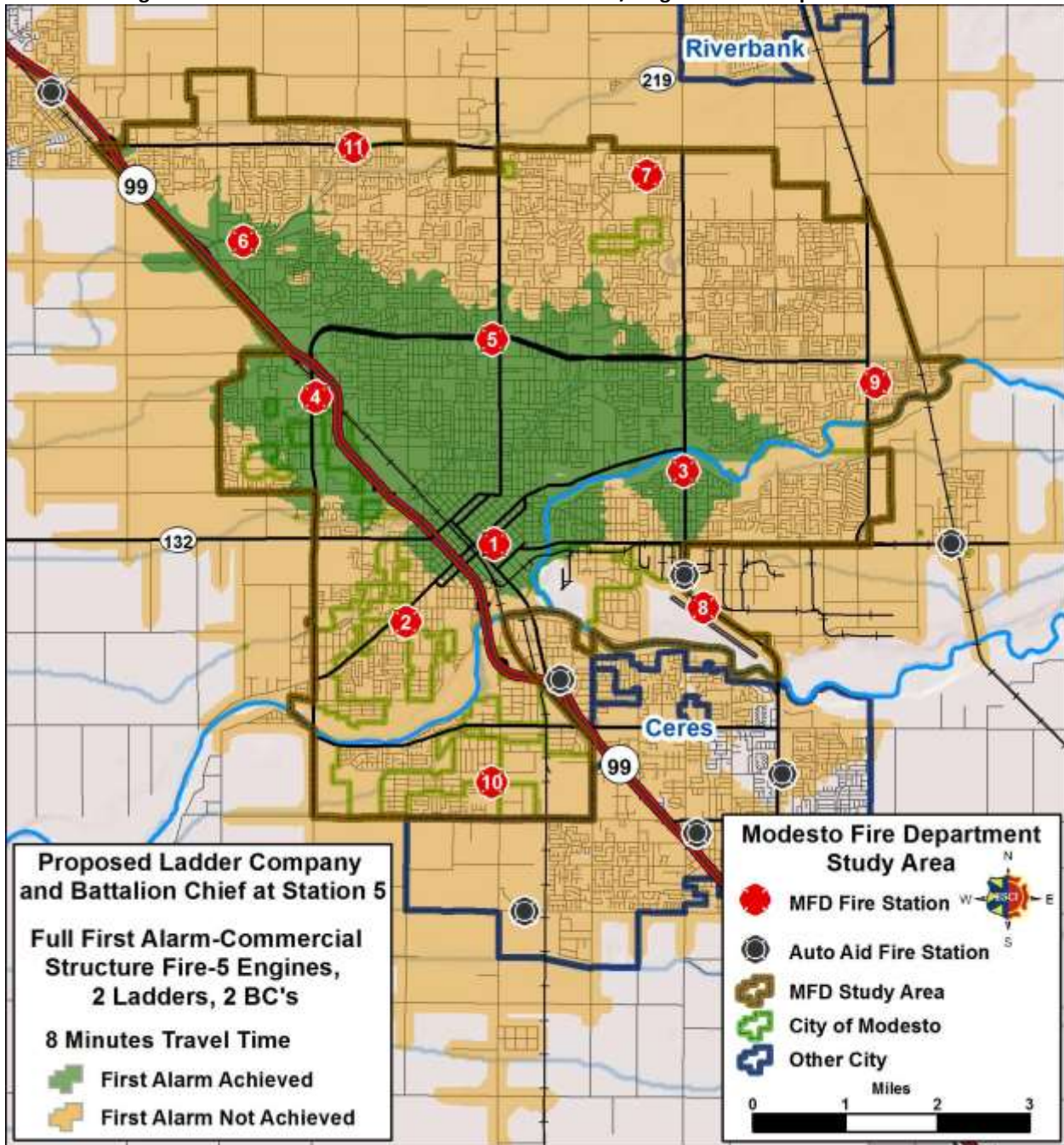


Figure 128 : 3rd Ladder Truck at Station 5 Commercial/Target Hazard Response 8-minute



Add an Additional Battalion Chief at Station 5

Battalion chief response and supervision is a key element of an all risk fire based response system. On a day-to-day basis, battalion chiefs provide supervision of company officers and suppression personnel. This includes daily oversight of staffing, training, performance and command, and control on emergency scenes.

A critical part of any emergency scene is having appropriate oversight and supervision. The fire service best practice for a supervisor to company officer ratio is 5 to 7:1. Currently with one battalion chief the MFD supervisor to company officer is 12:1. This ratio is too large and does not allow for adequate supervision, accountability emergency scene oversight, and command functions. By adding a second battalion chief, the supervisor to company officer ratio will be 6:1, well within accepted industry best practices.

This level of oversight and supervision is in compliance with industry best practices and significantly reduces the potential for error and injury as a result of inadequate oversight and overextended command and control practices. In addition, having two battalion chiefs on the scene of a structure fire or complex incident will allow for one chief officer to directly handle incident operations and or safety officer functions. This segregation of tasks will allow the company officers to conduct their tasks in an uninhibited manner and focus on the delivery of operational tasks and supervision of their assigned personnel. This will directly impact the capabilities of on scene crews and result in expanded capabilities and effectiveness of emergency operations

The following figures show the current response capabilities of one battalion chief in eight minutes and the response capabilities of two battalion chiefs in eight minutes. As the figures show, in many portions of the city battalion chief response time will be cut in half. This configuration will also allow for a timely response of two battalion chiefs to working fire and large complex incidents in the high call volume and high life safety risk areas of the city.

Figure 129 : Single Battalion Chief Response from Station 1

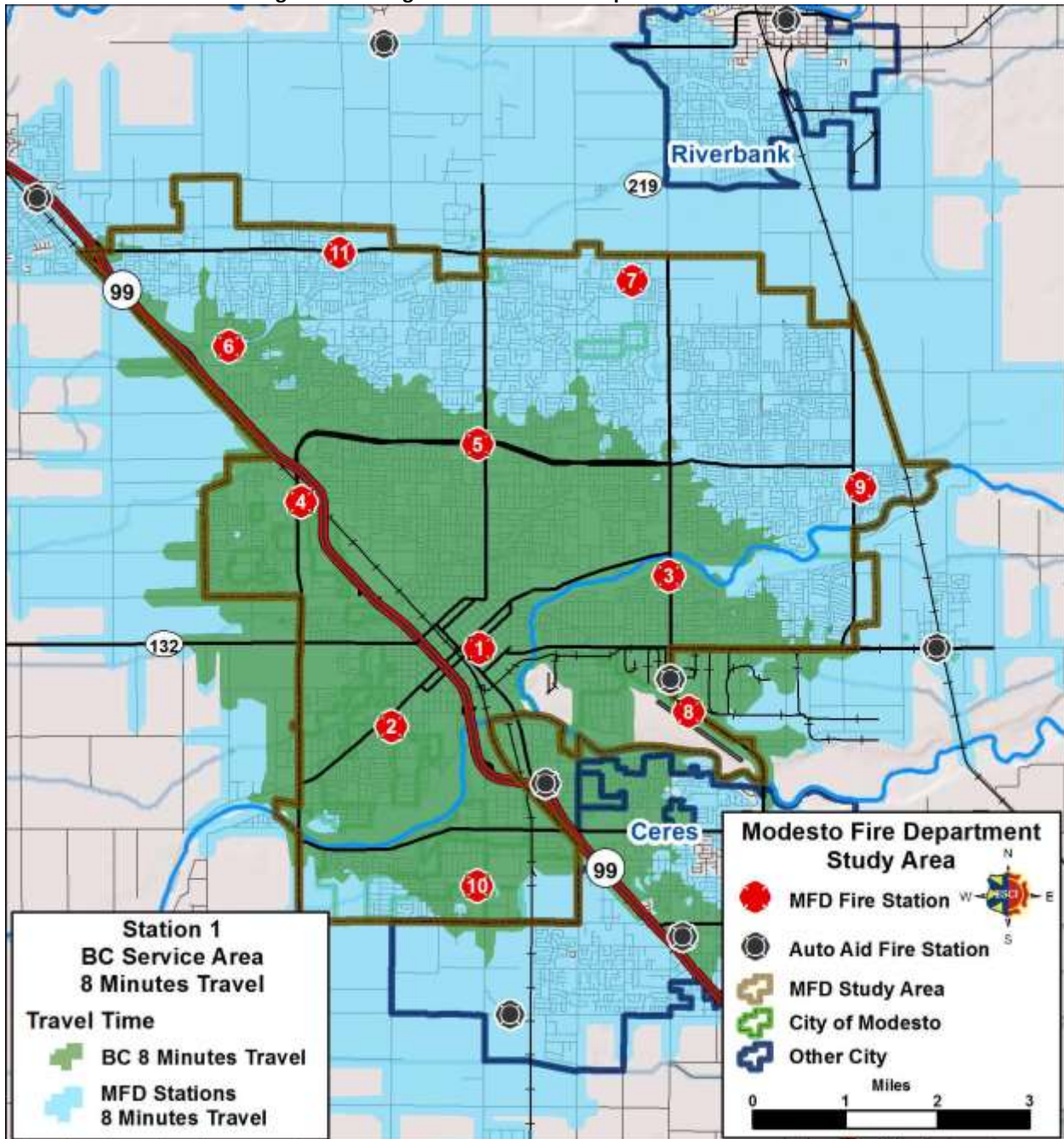
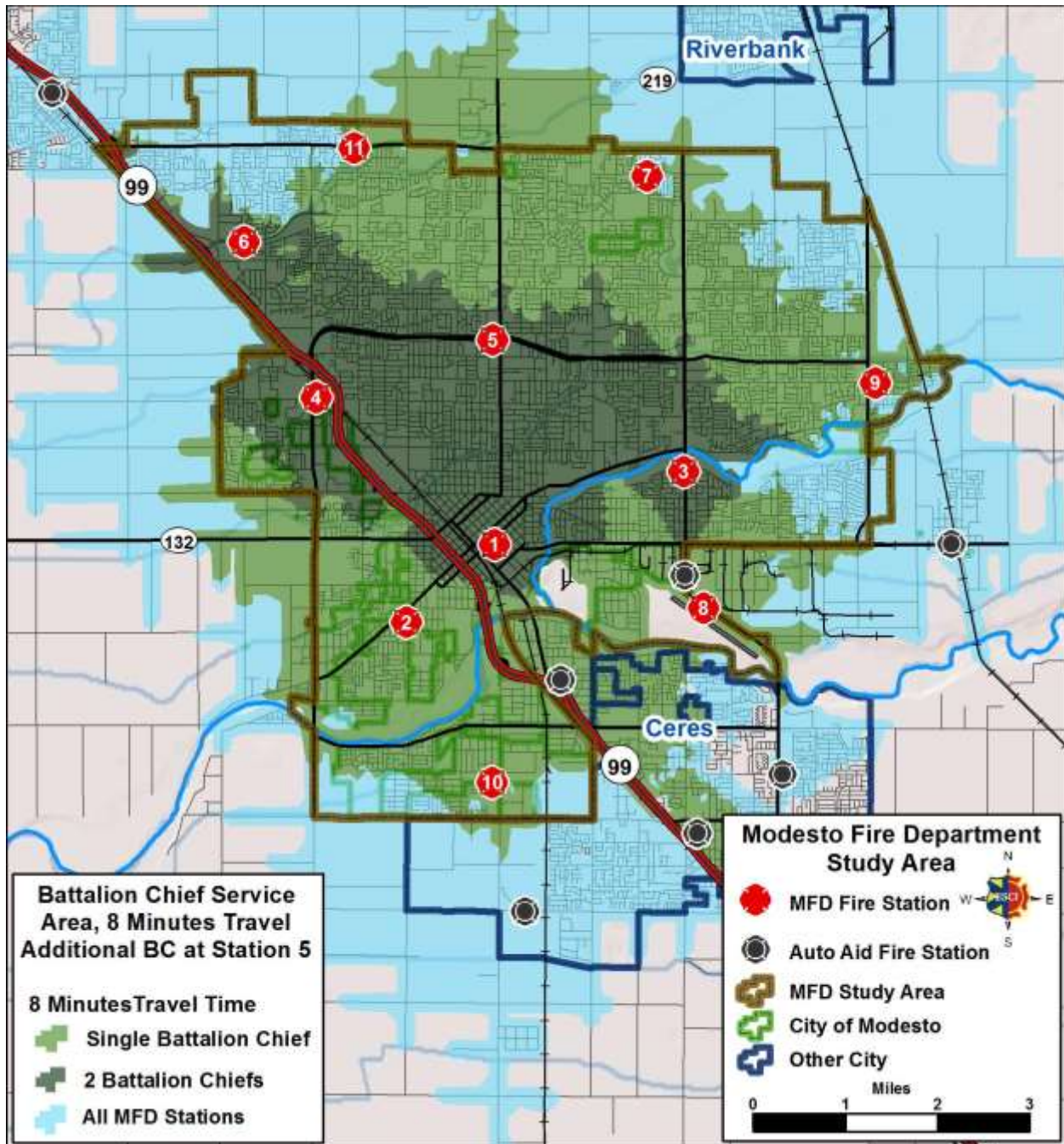


Figure 130 : 2nd Battalion Chief Located at Station 5 8-minute response



Industry Best Practices and Standards

As the MFD continues to move toward a high performing agency that meets or exceeds system best practices, ESCI recommends the following programs and accreditations be implemented and maintained. These programs will ensure the MFD is at the forefront of industry innovation and efficiencies. In addition, these best practices will position the department to minimize risk while maximizing opportunities for partnerships and grant programs as well as maintaining and/or increasing ISO ratings, supplement funding, resources, and services provided.

- **Commission on Fire Accreditation recognition of accreditation:**
An accreditation process that provides well defined internationally recognized benchmark system for measuring the delivery of fire and emergency services in relation to industry best practices.
- **International Academies of Emergency Dispatch Accreditation (ACE Accreditation):**
An established high standard of excellence for emergency dispatch, by providing the tools to achieve this high standard at both the dispatcher level through certification, and at the communication center level through the accreditation program. While the EMS dispatch center currently has this designation it is recommended MFD either pursue this level of capabilities in the current SR 911 center or consider utilizing the EMS dispatch center to receive timely EMD response categorization and realize the full benefit of an integrated EMD and tiered response program.

Conclusion

This document provides an enormous amount of technical data, much of which was provided by the department, and allows the reader to gain a clear understanding of the services provided by MFD as well as an indication of how well those services are being provided. This document is not intended to be a critical evaluation of the organization but rather provide fire department personnel and city policymakers' information from which to make informed decisions about the future of the department.

Based on information obtained throughout this process, MFD is functioning at a level commensurate with community expectations and providing services to the city in line with adopted objectives. While response performance analysis indicates that the department could improve, it is possible that the adoption of the tiered performance recommendations will show that the department is performing much better than presented here based on a single objective. Given the method of funding the fire department, the organization is well resourced and should be commended for undertaking this project to initiate a formal plan for future service delivery.

ESCI began collecting data and information for this project in March 2015 and the analysis presented in this report is comprised of months of data review and evaluation including one-on-one interviews with department and city personnel, evaluation of internal documents, policies, rules and regulations, assessment of current service delivery, and the creation of projected service demand and alternative service delivery models. It is ESCI's sincere hope that the information contained within this document is found to be useful and provides policymakers with the information necessary to meet the emergency services needs of the citizens of Modesto.

Appendices

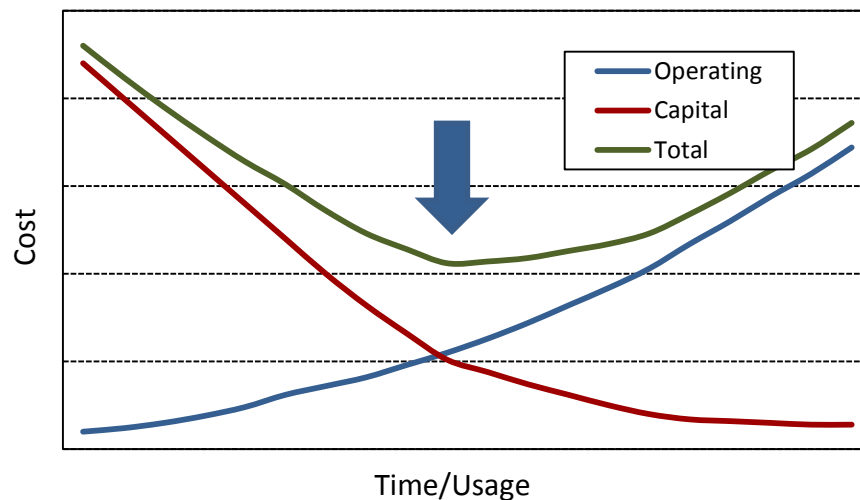
APPENDIX A: ECONOMIC THEORY OF VEHICLE REPLACEMENT

Economic Theory of Vehicle Replacement

The previous analysis used vehicle age as the sole measure of replacement timing. It can be argued that mileage, engine hours, and a variety of other factors could be used, as well.

A conceptual model that may be used when a replacement cycle is considered is the *Economic Theory of Vehicle Replacement*. The theory states that, as a vehicle ages, the cost of capital diminishes and its operating cost increases. The combination of these two costs produces a total cost curve. The model suggests the optimal time to replace any piece of apparatus is when the operating cost begins to exceed the capital costs. This optimal time may not be a fixed point, but rather a range of time. The flat spot at the bottom of the total curve in the following figure represents the replacement window.

Figure 131 : Economic Theory of Vehicle Replacement



Shortening the replacement cycle to this window allows an apparatus to be replaced at optimal savings to the department. If an agency does not routinely replace equipment in a timely manner, the overall reduction in replacement spending can result in a quick increase of maintenance and repair expenditures. Officials who assume that deferring replacement purchases is a good tactic for balancing the budget need to understand two possible outcomes that may happen because of that decision:

1. Costs are transferred from the capital budget to the operating budget.
2. Such deferral may increase overall fleet costs.

Regardless of its net effect on current apparatus costs, the deferral of replacement purchases unquestionably increases future replacement spending need.

Given the magnitude of the needs, no easily achievable solutions exist and the city does not have the financial resources on hand to achieve an adequate level of stability in terms of vehicle replacement.

Apparatus replacement costs are not the only financial deficits that the district is experiencing. Additional facility repair and replacement needs have been identified earlier in this report. Some opportunities exist to pursue grants or other options however, in reality; the city is likely to find it necessary to seek additional general fund, financing and or other revenue sources to actively address the capital replacement needs of the MFD.



APPENDIX B: TABLE OF FIGURES

Figure 1: Service Area Map 13

Figure 2: Citizen Planning Priorities 14

Figure 3: Citizen Service Priorities..... 15

Figure 4: Citizen Ranking of Staffing Levels 16

Figure 5: Citizen Ranking of Response Levels 16

Figure 6: Citizen Ranking of Cost of Services 17

Figure 7: Citizen Ranking of Preferred Response Time..... 18

Figure 8: Survey Table – Governance 22

Figure 9: Survey Table – Organizational Design..... 24

Figure 10: Organizational Chart 25

Figure 11: Survey Table – Service Area and Infrastructure..... 26

Figure 12: Survey Table – Operating Budget and Financial Resources..... 28

Figure 13: City of Modesto Net of Cost Allocations and Department Revenues, FY 2015-16 Proposed ... 29

Figure 14: Revenues and Expense Trends, 2010-2014 30

Figure 15: Revenues Trends, 2010-2014..... 30

Figure 16: Expense Trends, 2010-2014..... 31

Figure 17: Comparison of Cost per Capita (Summary) – FY 14/15 32

Figure 18: Comparison of Cost per Capita (Detailed) – FY 14/15 32

Figure 19: Baseline Revenue Forecast – FY 15/16 - 19/20 33

Figure 20: Baseline Expense Forecast – FY 15/16 - 19/20 33

Figure 21: Survey Table – Emergency Response Type and Frequency 34

Figure 22: MFD Service Demand, 2010 through 2014..... 35

Figure 23: Total Percent Change – 2010-2014..... 35

Figure 24: Total Incidents per 1,000 Population..... 36

Figure 25: Total Fires per 1,000 Population..... 36

Figure 26: Fire Loss per Capita 37

Figure 27: Criteria Used for Peer Group Selection..... 39

Figure 28: Distribution of PPC™ Points 40

Figure 29: Comparison of Potential Insurance Premium Savings 41

Figure 30: Residential Dollars Saved (%) per Property Value at Risk (2009-2013) 42

Figure 31: PPC™ points for Community Risk Reduction..... 43

Figure 32: PPC™ Points for Distribution of Companies..... 44

Figure 33: Commercial Property Sprinkler Adoption..... 44

Figure 34: PPC™ Points for Personnel..... 46

Figure 35: Number of Firefighters per 1,000 People 47

Figure 36: PPC™ Points for Training..... 48

Figure 37: Pre-Incident Planning Coverage..... 49

Figure 38: Average Age of Pre-Plans..... 50

Figure 39: List of Data Sources..... 51

Figure 40: Survey Table – Foundational Elements..... 53

Figure 41: Survey Table – Foundational Documents and Processes 55

Figure 42: Survey Table – Record Keeping and Documentation 59

Figure 43: Survey Table – Administrative and Support Staffing 61

Figure 44: Survey Table – Emergency Response Staffing 64

Figure 45: Firefighters per 1,000 Population 67

Figure 46: Service Delivery and Performance..... 69



Figure 47: MFD Service Demand, 2010 through 2014.....	71
Figure 48: MFD Percent Change by Incident Category, 2010-2014.....	72
Figure 49: Building Fires from 2010-2014.....	72
Figure 50: MFD Service Demand by Incident Category, 2014	73
Figure 51: MFD Service Demand by Month, 2014	74
Figure 52: MFD Service Demand by Day of the Week, 2014	74
Figure 53: MFD Service Demand by Hour of the Day	75
Figure 54: MFD Incident Density, 2014.....	76
Figure 55: MFD EMS Incident Density, 2014.....	77
Figure 56: MFD Fire Incidents, 2014	78
Figure 57: Modesto Fire Department Study Area.....	79
Figure 58: MFD Station Response Zones	80
Figure 59: MFD Study Area Population Density, 2010 Census Blocks	81
Figure 60: MFD Study Area Station Distribution, ISO Criteria	82
Figure 61: MFD Current Aerial Apparatus Distribution, ISO Criteria	83
Figure 62: MFD Travel Time Model, 4 and 8 Minutes Travel Time.....	85
Figure 63: MFD 2014 Service Demand and Travel Time	86
Figure 64: Current MFD ALS Resource Deployment, 8 Minutes Travel	88
Figure 65: Current MFD Battalion Chief 8 Minute Service Area (Station 1)	89
Figure 66: MFD Station Concentration, Current Stations	91
Figure 67: Station Concentration, MFD and Automatic Aid Stations	91
Figure 68: MFD Effective Response Force-4 Engines, 1 Aerial Apparatus, and BC.....	93
Figure 69: MFD Concurrent Incidents, 2014.....	94
Figure 70: MFD Unit Hour Utilization, 2014 Incidents.....	94
Figure 71: MFD Apparatus Workload-First Out Apparatus, 2014.....	95
Figure 72: MFD Station Workload, 2014.....	95
Figure 73: MFD Station Reliability, 2014 Emergency Incidents	97
Figure 74: MFD Overall Emergency Response Frequency, 2014.....	98
Figure 75: MFD Emergency Overall Response Time Performance, 2014	99
Figure 76: MFD Response Time Report-Fire and EMS Emergencies, 2014.....	99
Figure 77: MFD Turnout Time Performance by Station Area, 2014	100
Figure 78: MFD Turnout Time (Blue) and Response Performance (Red), 2014	100
Figure 79: MFD Emergency Travel Time Performance by Station Area, 2014	101
Figure 80: MFD Structure Fire Response Performance by Arrival Order, 2014	102
81: Survey Table – General Training Competencies	104
Figure 82 : Survey Table – Training Program Management and Administration	107
Figure 83 : Survey Table – Training Resources and Methodology.....	109
Figure 84: Fire Prevention Program Components	113
Figure 85 : Comparison of Fire Loss per Capital.....	114
Figure 86 : Survey Table – Fire Prevention Code Enforcement	115
Figure 87 : Survey Table – New Construction Plan Review and Inspection.....	117
Figure 88 : Survey Table – Existing Occupancy Inspection Program.....	118
Figure 89 : Survey Table – Fire Safety and Public Education	120
Figure 90 : Survey Table – Fire Investigation	121
Figure 91 : Survey Table – EMS Medical Control and Quality Assurance	123
Figure 92 : Survey Table – EMS System Integrity and Logistical Support Services	128
Figure 93 : Capital Assets per 1,000 Population	131
Figure 94 : Modesto Fire Department Station 1	132



Figure 95 : Modesto Fire Department Station 2	133
Figure 96 : Modesto Fire Department Station 3	134
Figure 97 : Modesto Fire Department Station 4	135
Figure 98 : Modesto Fire Department Station 5	136
Figure 99 : Modesto Fire Department Station 6	137
Figure 100 : Modesto Fire Department Station 7	138
Figure 101 : Modesto Fire Department Station 8	139
Figure 102 : Modesto Fire Department Station 9	140
Figure 103 : Modesto Fire Department Station 10	141
Figure 104 : Modesto Fire Department Station 11	142
Figure 105 : Major Apparatus Inventory.....	143
Figure 106 : Survey Table – Capital Assets and Capital Improvement Planning.....	145
Figure 107 : Apparatus Life Expectancies	147
Figure 108 : Apparatus Replacement Schedule	148
Figure 109 : City of Modesto Historical Population Change, US Census Data 1980-2015.....	150
Figure 110 : Modesto Population Growth, 2010-2015 California DOF Data	150
Figure 111 : MFD Study Area Population Projections 2015 through 2040	151
Figure 112 : MFD Study Area Service Demand Projection, 2015 through 2040.....	152
Figure 113 : MFD Study Area Population Density, 2010 Census Blocks	153
Figure 114 : MFD Study Area Population by Age, 2013 Census Data	154
Figure 115 : MFD Study Area Demographics, 2013 Census Data	155
Figure 116 : MFD Service Area Community Risk by Zoning and Land Use	156
Figure 117 : Sample of Critical Task Staffing by Risk.....	159
Figure 118 : Non-Structure Fire Critical Tasking	160
Figure 119 : Hazardous Materials Incident Critical Tasking	160
Figure 120 : Motor Vehicle Collision with Entrapment Critical Tasking	160
Figure 121 : Emergency Medical Incident Critical Tasking.....	161
Figure 122 : NFPA Performance Measurement Recommendations.....	162
Figure 123 : Additional NFPA Response Performance Objectives by Population Density Categories.....	162
Figure 124 : First Due Response Standard Example	163
Figure 125 : First Alarm Response Standard Example	163
Figure 126 : 3 rd Ladder Truck at Station 5, 8-Minute Travel Time	171
Figure 127 : 3 rd Ladder Truck at Station 5 Full First Alarm 8-Minute.....	172
Figure 128 : 3 rd Ladder Truck at Station 5 Commercial/Target Hazard Response 8-minute	173
Figure 129 : Single Battalion Chief Response from Station 1	175
Figure 130 : 2 nd Battalion Chief Located at Station 5 8-minute response	175
Figure 131 : Economic Theory of Vehicle Replacement	181