

Consideration of a Paramedic Program for the Sparks Fire Department



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OVERVIEW

The Sparks Fire Department (SFD) has been tasked by City Manager Steve Driscoll to explore the possibility of SFD providing Paramedic level emergency medical service (EMS) for the citizens and visitors to the City of Sparks. In order to do this, fire department staff spent several months analyzing response data to determine whether or not a Paramedic level of service is justified and, if it is, the best method for implementing this level of service. The report that follows sets forth the data and analysis used in the making this determination.

BACKGROUND

The Sparks Fire Department is an all-risk response agency with core emergency services of fire suppression, rescue, hazardous material, and EMS response. Regionally, SFD participates in a two-tiered EMS response system. Responders from the fire department traditionally make up the first-tier response, providing rapid access and initial assessment and treatment to citizens and visitors of the City who have accessed the 911 system to report a medical emergency. The private ambulance company, REMSA, traditionally makes up the second-tier response, providing Paramedic level service and transport to local hospitals. This two-tiered system allows the community to take advantage of strategically placed fire resources to provide rapid initial assessment and treatment in order to stabilize and ready patients for transport. Another benefit of the two-tier EMS response is that this arrangement allows for longer response time standards for the ambulance provider, requiring less ambulance resources needed to meet their response time requirements. In theory, fewer ambulances needed in the system effectively controls transport costs to the lowest levels possible.

Because of the differences in the number and placement of fire vs. ambulance resources, fire responders usually arrive on scene first a greater percentage of time as compared to the ambulance resources. Since first-tier resources are tasked with initial assessment, treatment, and stabilization of patients, several factors have influenced the EMS certification levels of fire department responders. Historically, as the overall percentage of EMS calls has increased, the fire department has evaluated the need to increase its EMS certification levels. For example, in 1986 EMS was approximately 45% of the department's overall call volume. At that time, fire personnel only received basic First Responder certification with skills in bleeding control, basic splinting, spinal immobilization, and oxygen therapy. By the year 2000, EMS calls had increased to 74% of overall call volume, and EMS certification was upgraded to the Advanced EMT level. This certification not only provided basic care but also some advanced care protocols, including intravenous needle placement, advanced airway interventions, and limited medication administration. Currently, EMS calls account for just less than 81% of the department's overall call volume. The department is now considering an upgrade to the Paramedic level of EMS certification.

Another factor influencing an increase in EMS certification is the relative differences in patient care protocols between the first-tier responders and REMSA. In the year 2000, SFD personnel

were certified to the Advanced EMT level and REMSA to the Paramedic level. In the last sixteen years, significant changes have occurred to the Paramedic scope of practice, expanding this scope with new technology, medications, and treatment. The scope of practice for the Advanced EMT, however, has remained relatively unchanged, leading to a widening of the gap between the two certification levels. A clear example of this is the capabilities of the 12-Lead EKG Cardiac Monitor/Defibrillator. This monitor allows the care provider the opportunity to 'detect' a heart attack earlier in the assessment process, including ST-Elevation Myocardial Infarction (STEMI), effectively shortening the time from recognition to definitive hospital care. This monitor/defibrillator can also provide manual defibrillation, transcutaneous pacing, and electronic cardioversion, allowing the EMS provider to immediately address a variety of life threatening cardiac dysrhythmias. Additionally, technology in the form of End Tidal CO₂ (ETCO₂) measurement, also known as capnography, has become the standard in airway placement confirmation, a critical component in airway management. ETCO₂ is also used as an assessment tool, measuring the effectiveness of certain airway treatments, and is a critical tool during the management of cardiac arrests. SFD's upgrade to Paramedic level service can close the current gap in EMS care, enabling the fire department to provide a higher level of patient care at the time of initial contact.

Given the increase in the number of EMS calls the department responds to, providing medical care at the Paramedic level should provide additional opportunities for SFD responders to positively affect patient outcomes.

DETAILED RESEARCH

Question: Is Paramedic level EMS service needed in the Sparks Fire Department?

In order to answer this question, the following items must be addressed:

1. Does the fire department arrive on scene to EMS calls prior to REMSA's arrival?
2. When the fire department is first to arrive, do they have to wait for REMSA long enough to have adequate time to deliver Paramedic level interventions?
3. On those EMS calls where the fire department arrives first and waits for REMSA's arrival, is the nature of the medical emergency urgent enough to warrant that the fire department personnel initiate Paramedic level interventions?
4. Do medical recommendations or standards exist that indicate Paramedic level interventions should be started immediately with the arrival of the first responders?
5. Do other reasons exist that indicate Paramedic level service should be considered for the Sparks Fire Department?
6. If opportunities to improve patient care can be demonstrated, do these opportunities justify the expense to implement and operate a Paramedic program in the Sparks Fire Department?

Item 1 – *Does the fire department arrive on scene to EMS calls prior to REMSA's arrival?*

In order to determine how often the fire department arrives on scene to EMS calls prior to REMSA's arrival, response time data from both agencies needed to be matched and analyzed. Historically this type of data had not been available to either the fire department or REMSA. With the renegotiation of the ambulance franchise agreement in 2014 however, the requirement to submit and share this data by both agencies was implemented. To assist and coordinate this data submission and sharing, the Washoe County EMS Oversight Program was also created in 2014. Through an Interlocal Agreement between the cities of Sparks and Reno, and the Truckee Meadows Fire Protection District, authority was granted to the Oversight Program to monitor the response and performance of all agencies and to recommend regional standards and protocols.

To determine how often SFD arrived to EMS calls prior to REMSA, 'matched data' spreadsheets from the Washoe County EMS Oversight Program were requested. These spreadsheets consist of response time data for all EMS calls from the fire department and from REMSA. Each agency submits data for each calendar month, which the Oversight Program staff then matches to produce one combined database. For the purposes of

Table 1 - Sparks Fire First on Scene Percentages				
District	SFD First	SFD Second	Total	% SFD First
E11	1496	919	2415	61.9%
E12	1565	1134	2699	58.0%
E21	1745	995	2740	63.7%
E31	737	513	1250	59.0%
L41	441	561	1002	44.0%
E51	721	264	985	73.2%
Total	6705	4386	11091	60.5%

this study, fifteen months of data were analyzed, from January 1, 2015 through March 31, 2016. In that period, SFD responded to and reported 12,062 EMS calls to the Oversight Program. Of this total, 11,091 calls were able to be matched to a corresponding REMSA EMS call. Analysis indicated that SFD arrived first to 6,705 of those 11,091 calls, an on scene first percentage of 60.5% (see Table 1 – Sparks Fire First on Scene Percentages).

Item 2 – *When the fire department is first to arrive, do they have to wait for REMSA long enough to have adequate time to deliver Paramedic level interventions?*

Using these same matched data spreadsheets, further analysis was conducted to determine wait time. Data was sorted to provide a single spreadsheet containing each of the 6,705 EMS calls where SFD arrived first. The time difference between Fire’s arrival and REMSA’s arrival was then calculated for each of these calls. These time differences were grouped into three categories – Wait Times 0 to 5 Minutes, Wait Times 5 to 10 Minutes, and Wait Times More Than 10 Minutes. Further analysis was done to calculate the average wait time in the fifteen month period, the maximum wait time, and the median (middle) wait time. Results of these wait times are depicted in Table 2 – Wait Times for Fire Department. Analysis calculated that the average wait time for REMSA to arrive was 3 minutes and 24 seconds, with a maximum wait time of 1 hour, 9 minutes and 25 seconds. Of note in that fifteen month period, SFD waited between 5 and 10 minutes for REMSA to arrive 922 times – just more than twice per day, and SFD waited more than 10 minutes for REMSA’s arrival 373 times – almost once per day. This analysis demonstrated that SFD arrives first a significant percentage of time and routinely experiences wait times long enough to initiate Paramedic interventions.

Table 2 - Wait Times for Fire Department	
Wait Times 0 to 5 Minutes	5410
Wait Times 5 to 10 Minutes	922
Wait Times More Than 10 Minutes	373
Total Calls where SFD Waited	6705
Average Wait Time	0:03:24
Maximum Wait Time	1:09:25
Median Wait Time	0:02:18
Count of Matched EMS Calls	11091
% of Time SFD First on Scene	60.5%

Further analysis was performed to determine the wait time averages in specific districts within the City (see Diagram 1 – Wait Times in Districts). From this analysis it was determined that wait times increased as EMS calls occurred further away from the core of the City (the core is generally considered the Victorian Square portion of Sparks). This was expected, as REMSA generally places a greater number of its resources where the majority of EMS calls are anticipated. Further in-depth analysis was made for each district in the City (see Tables 3 through 8). It should be noted that in District E51, which includes the Wingfield Springs area of Sparks, the

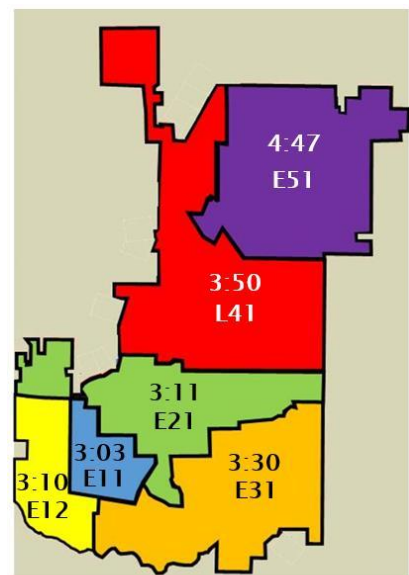


Diagram 1 – Wait Times in Districts

average wait time was notably higher than the rest of the City, an average of 4 minutes and 47 seconds. This was almost a minute longer than the next highest average district, District L41, with an average of 3 minutes and 50 seconds. Also of note, District E51 had the highest percentage of wait times in the 5 to 10 Minute and the More Than 10 Minute categories, with just less than 35% of all EMS calls falling in these two categories. Significant opportunity exists in this district for the first responders to have adequate time to perform Paramedic level interventions.

Table 3 - Wait Times for District E11	
Calls with Wait Times 0 to 5 Minutes	1275
Calls with Wait Times 5 to 10 Minutes	162
Calls with Wait Times More Than 10 Minutes	59
Total Calls where SFD Waited	1496
Average Wait Time	
Average Wait Time	0:03:03
Maximum Wait Time	
Maximum Wait Time	1:09:25
Median Wait Time	
Median Wait Time	0:02:04

Table 4 - Wait Times for District E12	
Calls with Wait Times 0 to 5 Minutes	1325
Calls with Wait Times 5 to 10 Minutes	166
Calls with Wait Times More Than 10 Minutes	74
Total Calls where SFD Waited	1565
Average Wait Time	
Average Wait Time	0:03:10
Maximum Wait Time	
Maximum Wait Time	1:06:55
Median Wait Time	
Median Wait Time	0:02:06

Table 5 - Wait Times for District E21	
Calls with Wait Times 0 to 5 Minutes	1429
Calls with Wait Times 5 to 10 Minutes	240
Calls with Wait Times More Than 10 Minutes	76
Total Calls where SFD Waited	1745
Average Wait Time	
Average Wait Time	0:03:11
Maximum Wait Time	
Maximum Wait Time	0:46:58
Median Wait Time	
Median Wait Time	0:02:15

Table 6 - Wait Times for District E31	
Calls with Wait Times 0 to 5 Minutes	595
Calls with Wait Times 5 to 10 Minutes	101
Calls with Wait Times More Than 10 Minutes	41
Total Calls where SFD Waited	737
Average Wait Time	
Average Wait Time	0:03:30
Maximum Wait Time	
Maximum Wait Time	0:42:02
Median Wait Time	
Median Wait Time	0:02:20

Table 7 - Wait Times for District L41	
Calls with Wait Times 0 to 5 Minutes	317
Calls with Wait Times 5 to 10 Minutes	87
Calls with Wait Times More Than 10 Minutes	37
Total Calls where SFD Waited	441
Average Wait Time	
Average Wait Time	0:03:50
Maximum Wait Time	
Maximum Wait Time	0:27:17
Median Wait Time	
Median Wait Time	0:02:26

Table 8 - Wait Times for District E51	
Calls with Wait Times 0 to 5 Minutes	469
Calls with Wait Times 5 to 10 Minutes	166
Calls with Wait Times More Than 10 Minutes	86
Total Calls where SFD Waited	721
Average Wait Time	
Average Wait Time	0:04:47
Maximum Wait Time	
Maximum Wait Time	0:40:34
Median Wait Time	
Median Wait Time	0:03:22

Item 3 - *On those EMS calls where the fire department arrives first and waits for REMSA's arrival, is the nature of the medical emergency urgent enough to warrant that the fire department personnel initiate Paramedic level interventions?*

SFD arrives first on scene to 60.5% of all EMS calls and routinely waits long enough for Paramedic interventions to be initiated. The question remains, however, are the EMS calls with these two characteristics 'urgent' in nature? In other words, does the medical emergency where SFD arrives first and waits for REMSA's arrival warrant Paramedic level interventions by the fire department?

To accomplish this analysis, each incident where SFD arrived first was populated with information from the department's patient care reports, specifically the Provider Primary Assessment field. This field is the care provider's determination of the medical problem found based on the patient assessment. Of the 6,705 calls where SFD arrived first, 2742 of these calls were classified as 'urgent' in nature (see Table 9 – Urgent EMS Call Volume). This total of 2742 calls equates to approximately six urgent calls per day that the fire department arrives first and waits for REMSA. Of note, 408 of these calls were cardiac-related, 353 were respiratory-related, 671 were related to altered level of consciousness and stroke, and 897 were trauma-related. These specific medical groups were further analyzed to determine specific wait times for each group of emergency (see Tables 10 through 13). Wait time analysis for cardiac events, for example, averaged 3 minutes and 9 seconds, with the longest wait time of 27 minutes and 30 seconds. Of note in that fifteen month period, SFD waited between 5 and 10 minutes for REMSA to arrive to cardiac-related calls 55 times and waited more than 10 minutes 13 times. Similar statistics were observed for respiratory, altered/stroke, and trauma-related groups. In these four categories of urgent EMS calls, there were 524 calls where the fire department had to wait longer than five minutes for REMSA's arrival, an average of just more than one occurrence per day.

Table 9 - Urgent EMS Call Volume	
Provider Primary Assessment	Number of EMS Incidents
Airway obstruction	24
Allergic reaction	35
Altered level of consciousness	421
Cardiac arrest	74
Cardiac rhythm disturbance	51
Chest pain / discomfort	283
Diabetic symptoms (hypoglycemia)	114
Hyperthermia	6
Hypothermia	2
Hypovolemia / shock	16
Poisoning / drug ingestion	35
Pregnancy / OB delivery	16
Respiratory arrest	3
Respiratory distress	326
Seizure	189
Stroke / CVA	66
Syncope / fainting	184
Traumatic injury	897
Total	2742

Table 10 - Cardiac Wait Times	
Calls with Wait Times 0 to 5 Minutes	340
Calls with Wait Times 5 to 10 Minutes	55
Calls with Wait Times More Than 10 Minutes	13
Total Calls where SFD Waited	408
Average Wait Time	
Average Wait Time	0:03:09
Maximum Wait Time	0:27:30
Median Wait Time	0:02:32

Table 11 - Respiratory Wait Times	
Calls with Wait Times 0 to 5 Minutes	293
Calls with Wait Times 5 to 10 Minutes	46
Calls with Wait Times More Than 10 Minutes	14
Total Calls where SFD Waited	353
Average Wait Time	
Average Wait Time	0:03:23
Maximum Wait Time	0:35:28
Median Wait Time	0:02:13

Table 12 - Altered / Stroke Wait Times	
Calls with Wait Times 0 to 5 Minutes	526
Calls with Wait Times 5 to 10 Minutes	108
Calls with Wait Times More Than 10 Minutes	37
Total Calls where SFD Waited	671
Average Wait Time	0:03:45
Maximum Wait Time	0:34:35
Median Wait Time	0:02:44

Table 13 - Trauma Wait Times	
Calls with Wait Times 0 to 5 Minutes	646
Calls with Wait Times 5 to 10 Minutes	170
Calls with Wait Times More Than 10 Minutes	81
Total Calls where SFD Waited	897
Average Wait Time	0:04:30
Maximum Wait Time	0:46:42
Median Wait Time	0:03:05

Wait time analysis for these four urgent call types was then performed for each district, although for brevity only data for District E51 has been included. Although the volume of calls is not as great in this district, it has significantly longer wait times as compared to the other districts. In District E51, average wait times for these four urgent call types are in the five to six minute range. Of special concern are the long wait times for Trauma-related calls. District E51 contains a nationally recognized complex, the Golden Eagle Regional Park. According to the 2015 Golden Eagle Regional Park Annual Report, delivered at the July 11 City Council meeting, this facility attracted over one million participants and spectators for league and tournament games in 2015. Participants travel from across the county to enjoy this state-of-the-art facility, and expect state-of-the-art medical services when they get injured. The lack of any immediate and effective method of providing pain management is a major limitation of our current Advanced EMT scope of care. Paramedic pain management protocols would ensure that all participants who are injured at this sports complex are provided the level of care they deserve.

Table 14 - District E51 Cardiac Wait Times	
Calls with Wait Times 0 to 5 Minutes	30
Calls with Wait Times 5 to 10 Minutes	11
Calls with Wait Times More Than 10 Minutes	7
Total Calls where SFD Waited	48
Average Wait Time	0:05:25
Maximum Wait Time	0:20:15
Median Wait Time	0:04:22

Table 15 - District E51 Respiratory Wait Times	
Calls with Wait Times 0 to 5 Minutes	26
Calls with Wait Times 5 to 10 Minutes	8
Calls with Wait Times More Than 10 Minutes	4
Total Calls where SFD Waited	38
Average Wait Time	0:05:07
Maximum Wait Time	0:16:32
Median Wait Time	0:03:57

Table 16 - District E51 Altered/Stroke Wait Times	
Calls with Wait Times 0 to 5 Minutes	43
Calls with Wait Times 5 to 10 Minutes	27
Calls with Wait Times More Than 10 Minutes	6
Total Calls where SFD Waited	76
Average Wait Time	0:04:53
Maximum Wait Time	0:13:16
Median Wait Time	0:04:24

Table 17 - District E51 Trauma Wait Times	
Calls with Wait Times 0 to 5 Minutes	41
Calls with Wait Times 5 to 10 Minutes	20
Calls with Wait Times More Than 10 Minutes	14
Total Calls where SFD Waited	75
Average Wait Time	0:06:03
Maximum Wait Time	0:22:00
Median Wait Time	0:04:19

Item 4 - *Do medical recommendations or standards exist that indicate Paramedic level interventions should be started immediately with the arrival of the first responders?*

In order to make a recommendation of whether Paramedic level EMS is needed in the fire department, Item 4 is the most important to answer in detail. Items 1 through 3 demonstrated that the fire department arrives on scene first to the majority of EMS calls, that SFD routinely waits long enough to start Paramedic interventions, and that approximately six times per day SFD responders find themselves in this situation and caring for a patient with an urgent medical condition. However, even though REMSA will arrive at some point in time and be able to provide Paramedic interventions, are there medical reasons recommending that Paramedic interventions should be started by the first tier responders?

As noted previously, Sparks Fire Department has provided EMS at the Advanced EMT level since the year 2000. Since that time, there have been significant advances in technology and medical practices, yet the Advanced EMT scope of practice has remained relatively unchanged. In the meantime, the Paramedic level scope of practice has certainly expanded with new technology, medications and treatments. This has led to a widening gap between the two EMS provider levels. Closing this gap by adding Paramedics to our first tier response has the potential to positively affect patient outcomes.

One example of this opportunity comes with the capabilities of the 12-Lead EKG Cardiac Monitor/Defibrillator in the Paramedic scope of practice. Not all cardiac patients present with typical symptoms. This explains why in a Paramedic protocol manual there are 29 separate protocols for adult medical complaints and 24 of those protocols recommend considering or obtaining a 12-Lead EKG (protocols obtained from the Clark County EMS System). The 12-Lead EKG can allow the EMS provider to detect a myocardial infarction (MI), also known as a “heart attack”, that may otherwise go unrecognized by EMS providers. There is no sound argument against early recognition nor relying on the second-tier for recognition of an MI given current standards of care.

Per the American Heart Association (AHA), “evidence exists that expeditious restoration of flow in the obstructed infarct artery after the onset of symptoms in STEMI (ST-Elevation Myocardial Infarction) patients is a key determinant of short and long term outcomes”. The AHA recommends medical systems should strive to reduce the time frame from STEMI recognition to reperfusion at the hospital by as much time as possible. There is opportunity to reduce this time frame by a significant percentage with the addition of Paramedics and the 12-Lead EKG in the fire department. Described in the simplest of terms by cardiologists and the AHA, “time is heart muscle”.

The 12-Lead EKG also plays an important part in the appropriate treatment of a “heart attack” by EMS at the emergency scene. Historically, all cardiac chest pain patients received the same treatment outside of the hospital which included Nitroglycerine. As mentioned above, technology and best medical practices have changed. The AHA now advises using Nitroglycerine with caution for inferior MI and contraindicates its use in right sided ventricular

infarction because it may lead to severe hypotension. However, Nitroglycerine is still indicated and beneficial for other types of MI. EMS agencies without 12-Lead EKG capabilities are unable to tailor protocols to reflect these recommendations and continue to use the former standard of giving nitroglycerine rather than withhold it. Having a Paramedic provider arrive on scene first providing the current standard of care for acute coronary syndrome emergencies is in the best interest of the patient.

Further, our current defibrillator capabilities are limited to patients already in cardiac arrest. A Paramedic with the expanded capabilities of manual defibrillation, transcutaneous pacing, and electrical cardioversion can immediately address a variety of life threatening cardiac dysrhythmias. Examples include Bradycardia (a heart beating too slow), Tachycardia (a heart beating too fast), as well as the ability to apply the appropriate dose of energy in pediatric V-fib/V-tach cardiac arrests. Additionally, with manual defibrillation, ETCO₂, and integrated chest compression data capabilities, interruptions in chest compressions are minimized and immediate feedback is available. This provides for higher quality resuscitation efforts, without any delays, when the first EMS provider arrives on scene. These concepts align with the AHA's chain of survival that puts an emphasis on chest compressions, rapid defibrillation, and early advanced care.

Similar to heart attacks, another AHA initiative revolves around neurological emergencies that are commonly referred to as strokes. The AHA promotes early assessment, treatment, and transport to appropriate treatment centers for stroke patients. With the addition of Paramedics in our first tier, again there is an opportunity to reduce this time frame with early recognition and assessment, allowing patient transport to be initiated more rapidly to definitive treatment at the hospital.

Other types of life threatening conditions include respiratory and airway emergencies. Brain death can begin after 4 minutes without oxygen. As with cardiac emergencies, a significant gap exists between the Advanced EMT and Paramedic involving airway procedures and treatments for serious respiratory emergencies. Because of their very nature, outcomes in medical conditions that involve the airway and respirations can be determined by the timeliness of appropriate treatment. In unstable patients, an adequate airway is almost always the priority. Having a Paramedic on scene allows for a wider range of airway options. Another advantage is having multiple Paramedics on scene, which becomes a possibility with Paramedics in the first and second tier. This allows for multiple critical interventions to be performed simultaneously.

Also pertaining to the airway is technology in the form ETCO₂ measurement, which has become the gold standard in airway placement confirmation. Ventilating a critical patient ineffectively for even a couple minutes because an airway was not placed correctly, or became dislodged, can be devastating. ETCO₂ reduces the potential of this occurring. ETCO₂ is also used as an assessment tool to measure the effectiveness of certain airway treatments and ventilation, and is a useful tool during the management of cardiac arrests as noted above. The benefits and wide range of uses of ETCO₂ add significant advantages to a Paramedic's capabilities and their value in the first tier.

Lastly, a significant percentage of patients requesting EMS do so because of a traumatic event or medical complaint involving pain. There are many benefits to advanced pain management which can result in better patient outcomes. In some cases it may be necessary to move or reposition patients for medical purposes or safety reasons. The Advanced EMT has limited options to treat and prepare patients for transport who are in significant pain. At the Paramedic level, pain can be treated and managed with medication prior to manipulating the patient for packaging or other movement when indicated and necessary.

The items discussed here are often identified as “Core Measures” and “Quality Assurance Criteria” in EMS systems. These are only some of the benefits of expanding the role the fire department’s EMS providers to the Paramedic level. There are more measurable benefits and certainly more intangible benefits not listed here. Simply put, the goal is to provide better patient care.

Item 5 – *Do other reasons exist that indicate Paramedic level service should be considered for the Sparks Fire Department?*

Along with the medical justifications for a Paramedic program in the Sparks Fire Department, there exist several other reasons to implement this program. These reasons include:

1. Implementation of the program will allow us to move forward with the Enhanced Automatic Aid Agreement with the Truckee Meadows Fire Protection District (TMFPD).
2. There is an over-reliance on REMSA to deliver Paramedic service to the citizens and visitors of Sparks. With a Paramedic program within the fire department, there will be a back-up plan to deliver this service when REMSA is delayed or unable to respond.
3. Sparks is a full-service, progressive City and should provide the best level of EMS care possible to the community.

1. Enhanced Automatic Aid Agreement. Since July 1, 2012, SFD has participated in a very robust automatic aid agreement with the TMFPD. This agreement is all-risk, meaning that every incident type is eligible for automatic aid. In the four year period of this agreement, 1,680 automatic aid calls have been dual-responded to by both departments including 1,078 EMS calls and 98 fire calls. There are two reasons for having an automatic aid agreement, one to ensure that the closest fire resource responds to the call, and two, to assemble an adequate number of resources on scene faster when multiple resources are required.

For the first three years of this agreement, SFD and TMFPD operated on different computer aided dispatch (CAD) systems. Because of this difference, each dispatch center was unable to determine if the resources of the other fire department were available for automatic aid calls. This necessitated that both departments be requested to respond to each call, ensuring that at a minimum, the department requesting aid would be responding. More often than not, the result was a duplication of resources, at least for EMS calls, because two engines would be dispatched to an EMS call that usually only needed one.

Different CAD systems also resulted in a very inefficient and slow process to request automatic aid. After the dispatch center receiving the 911 call dispatched their fire department, a phone call had to be made to the other dispatch center requesting that it dispatch the automatic aid resource. This sometimes resulted in a one to two minute delay in dispatching the automatic aid resource, which frequently was the closest resource to the incident address.

In October 2015 however, this all changed as both dispatch centers migrated to the Tiburon CAD system. Sparks and Washoe County dispatch centers now have the ability to monitor the status of the other fire department's resources. With specific CAD programming and implementation of an Enhanced Automatic Aid Agreement, the dispatch center taking the 911 call could dispatch both departments at the same time, and even dispatch a resource to respond by itself into the other department's jurisdiction. With this change resources could be dispatched quicker and duplication eliminated. By eliminating duplication, the benefit to each department would be savings from less fuel usage and wear and tear on the apparatus, an overall reduction in call volume, and more resources left available for subsequent calls.

The roadblock to implementing this Enhanced Automatic Aid agreement is the different EMT certification levels between the two departments. TMFPD's engines are staffed with Paramedics while SFD engines are staffed with Advanced EMT personnel. County residents pay for and expect Paramedic level service when fire engines arrive on scene. With Enhanced Automatic Aid, there would be numerous occasions when an SFD engine would respond by itself to an EMS call located in the county. TMFPD Staff is concerned that this arrangement delivers a reduced level of EMS service to their citizens. Implementation of Enhanced Automatic Aid, and all benefits associated with it, will not be realized unless and until SFD transitions to Paramedic level service.

An Enhanced Automatic Aid agreement is beneficial to Sparks for two other reasons. One is that it demonstrates how neighboring fire departments can optimally assist each other without the need for full consolidation. The second reason is to provide Sparks additional time to prepare for growth in the northwest corner of the city by delaying the need for Fire Station 6. Because of the anticipated growth in the Kiley Ranch and Stonebrook developments, and the fact that these developments are not within the six minute response areas of either Station 4 on Disc Drive, or Station 5 on Vista Boulevard, the City has been discussing the need for a new fire station. TMFPD Station 17, located on LaPosada Drive, would be able to cover the majority of these two developments within the six minute response time standard, and TMFPD has already agreed to respond to these areas, as long as they can handle the increased call volume. As noted above, the adoption of an Enhanced Automatic Aid agreement will result in an overall reduction in call volume for both departments and would allow TMFPD to respond into the northwest corner of the city for a longer period of time before the increased call volume would necessitate building Fire Station 6.

2. Over-reliance on REMSA to deliver Paramedic level service. Because SFD does not provide Paramedic level service, all patients needing this level of care must wait for the arrival of REMSA to receive it. This happens frequently, but SFD has no back-up plan to provide this care

when REMSA is delayed or unable to respond. Sparks crews often find themselves in situations where Paramedic interventions are warranted, but without the equipment, medications, and training to deliver these interventions.

During extreme situations fire crews can find themselves waiting an excessive amount of time for REMSA’s arrival. REMSA is allowed, per the franchise agreement, to apply for an ‘Exemption’ for extreme weather, declared emergencies, system overload (more calls than REMSA staffing can handle), construction, and Status 99 (when patients cannot be off-loaded at hospitals because the hospitals unable to accept additional patients). An exemption temporarily suspends the response time requirements for REMSA until the situation is corrected. In the last fifteen months, REMSA declared the following exemptions:

Date	Exemption Reason
February 6, 2015	Wind event / overload
May 29, 2015	System overload
August 6, 2015	Construction
November 11, 2015	Weather
November 13, 2015	Weather
December 13, 2015	Weather
December 24, 2015	Weather
January 6, 2016	Weather

Three times in this same fifteen month period REMSA was also out of ambulances and had to request the Storey County Fire Department to respond an ambulance into the City of Sparks. These requests occurred on December 7, 2015, January 1, 2016, and February 23, 2016.

Exemptions and running out of ambulances result in extended on-scene times for the fire department. If the medical emergency is urgent, there is no alternative but to provide the best possible care under the Advanced EMT scope of practice, and wait for REMSA or Storey County to arrive. Clearly, Paramedic level service in the fire department would provide fire crews the ability to deliver the highest level of patient care available during those times when REMSA is not immediately available.

3. Full-service City. Sparks fire crews found themselves on scene with patients having urgent medical conditions, and waiting for REMSA to arrive, 2742 times in the last fifteen months. Not being able to immediately provide the care these patients need because of the lack of equipment, medications, and training is not only harmful to the patient but extremely frustrating for SFD personnel. The City of Sparks prides itself on being a progressive, full-service city, and this is no way to conduct business. Sparks’ Advanced EMT service provides a substantially lower level of care to its community than that of its neighbors, Reno and Washoe County, both of which provide Paramedic level service within their fire departments. Clearly, a city our size needs to ensure that Paramedic level service is available to the community with the arrival of the first responders, whether this be REMSA or the fire department.

Item 6 - *If opportunities to improve patient care can be demonstrated, do these opportunities justify the expense to implement and operate a Paramedic program in the Sparks Fire Department?*

The volume of calls where the fire department is arriving first to urgent EMS emergencies and waiting a significant time for REMSA's arrival, plus the fact that medical recommendations exist that Paramedic interventions should be started with the arrival of the first responders, prove that there are numerous opportunities to improve patient care by implementing a Paramedic program. These opportunities justify a recommendation that City Council should seriously consider a Paramedic program for the Sparks Fire Department.

To assist Council with this decision, the expenses to implement and maintain this program have been calculated. To reduce the fiscal impact to the lowest amount possible, Fire Staff recommends a multi-year implementation of the program. Two multi-year plan options have been provided for consideration.

Implementation Plans

Plan A. Plan A is designed to convert the entire department to Paramedic level service within a five year period of time, with a pre-defined schedule of when additional districts would transition to this new service level. This plan would necessitate a relatively aggressive funding commitment by City Council, but would result in the shortest transition time possible.

In general, Plan A would be as follows:

- Phase 1 – Implement Paramedic level service in two of the department's seven daily staffed engine companies by the end of FY17. This implementation can be accomplished by using the current compliment of SFD personnel who already have their Paramedic certification. The two companies slated for immediate implementation would Ladder 41 (District L41) and Engine 51 (District E51). Even though these two districts don't have as high of a call volume as some of the other districts, the two reasons they were selected is that they wait a significantly longer time for REMSA's arrival and because implementation in these districts will allow the department to move forward with the Enhanced Automatic Aid Agreement with the Truckee Meadows Fire Protection District.
- Phase 2 – After revising the Firefighter Job Description to require new applicants to have Paramedic certification as part of the minimum qualifications, fill all future department vacancies with employees who are already Paramedic certified. The department anticipates four vacancies by the end of calendar year 2016 and possibly more in 2017. With the addition of these new employees, convert a third engine company to Paramedic level service by January 1, 2018. Engine 21 (District E21) would be the next company selected to be Paramedic staffed because it has the department's highest EMS call volume.
- Phase 3 – Each succeeding January 1 convert one additional engine company to be staffed with Paramedics. Staffing requirements indicate that at least five additional

personnel with Paramedic certification are needed in order to staff an engine company for all shifts. The strategy to obtain these personnel would be a combination of attrition/new hires and of sponsoring current firefighters to attend Paramedic school.

The order of conversion is recommended as follows:

- January 1, 2019 – Engine 12 (District E12)
- January 1, 2020 – Engine 11 (District E11)
- January 1, 2021 – Engine 31 (District E31)
- January 1, 2022 – Truck 11

By January 1, 2022, the conversion to Paramedic level service would be complete.

Plan B. Plan B is also designed to convert the entire department to Paramedic level service but over a much longer period of time and without a pre-determined schedule of transitioning new districts. The cornerstone of this plan is that the department would not sponsor current firefighters to attend Paramedic School but rather use attrition and replacement to add new Paramedic personnel to the department. Since five additional personnel with Paramedic certification are needed in order to staff an engine company for all shifts, in order to transition a new district there would need to be at least five employees retire and five new employees hired. Since attrition rates are variable, full conversion to Paramedic level service would take much longer, possibly five to ten years. The benefit of this plan, however, is the fiscal savings. The two largest expenditures in Plan A are Paramedic School and the purchase of defibrillators. The cost to sponsor employees to Paramedic School would be eliminated if we use the attrition/new hire process, and the longer conversion period would allow the department time to accrue funding in the department's Capital Equipment Replacement Program to purchase defibrillators.

In general, Plan B would begin exactly like Plan A, but take an alternate path starting with Phase 3. Plan B would be as follows:

- Phase 1 – Implement Paramedic level service in two of the department's seven daily staffed engine companies by the end of FY17. This implementation can be accomplished by using the current compliment of SFD personnel who already have their Paramedic certification. The two companies slated for immediate implementation would Ladder 41 (District L41) and Engine 51 (District E51). Even though these two districts don't have as high of a call volume as some of the other districts, the two reasons they were selected is that they wait a significantly longer time for REMSA's arrival and because implementation in these districts will allow the department to move forward with the Enhanced Automatic Aid Agreement with the Truckee Meadows Fire Protection District.
- Phase 2 – After revising the Firefighter Job Description to require new applicants to have Paramedic certification as part of the minimum qualifications, fill all future department vacancies with employees who are already Paramedic certified. The department anticipates four vacancies by the end of calendar year 2016 and possibly more in 2017. With the addition of these new employees, convert a third engine company to Paramedic level service by January 1, 2018. Engine 21 (District E21) would be the next

company selected to be Paramedic staffed because it has the department's highest EMS call volume.

- Phase 3 – Convert new districts as personnel retire and new employees with Paramedic certification are hired. New districts would be converted with every five new employees hired. The order of conversion is recommended as follows:
 - Engine 12 (District E12)
 - Engine 11 (District E11)
 - Engine 31 (District E31)
 - Truck 11

By January 1, 2018, the conversion to Paramedic level service in the three most critical districts, District L41, E51, and E21, would be complete.

Detailed Paramedic Program Costs

In general, the costs for a Paramedic program in the Sparks Fire Department can be grouped into Start-up Expenses and Annual Operating Expenses.

Start-up Expenses include the following:

- Equipment acquisition – This includes the specialized equipment needed to provide Paramedic level interventions. Included in this category are the 12-Lead EKG Cardiac Monitor/Defibrillators.
- Medication acquisition – This includes the specialized medications and lockable storage devices for the apparatus and stations in order to secure narcotic medications.
- Patient reporting software – The Zoll EPCR program is suggested because this platform will be consistent with other EMS providers in the region. The use of similar software will allow for information sharing in a regional Quality Assurance process. This software is a one-time expense with the initial implementation of the program and is estimated at \$15,000.
- Implementation Committees – To implement this program, several committees will need to be formed to study and plan for specific challenges. These include:
 - Protocol Committee
 - Equipment Procurement and Supply Committee
 - Medication Procurement and Narcotic Storage Committee
 - Patient Care Reporting Committee
 - Cardiac Monitor Committee
 - Program Coordination Committee

These committees are a one-time expense with the initial implementation of the program.

- Training – Training expenses fall into two categories:
 - Refresher training for the current personnel with Paramedic certification to ensure they are still proficient with their EMS skills. This would be a one-time expense with the initial implementation of the program.

- Paramedic School for current firefighters without this certification. In Plan A, the goal would be to increase the compliment of personnel with Paramedic certification by five each year. This expense would vary each year based on the number of new employees that could be hired through attrition within the fire department.

Annual Operating Expenses include the following:

- Equipment replacement – Expense to replace expired, damaged, or equipment used for patient care.
- Medication replacement – Expense to replace medications that have expired or were used for patient care.
- Defibrillator maintenance – Expense to maintain, calibrate and repair the 12-Lead EKG Cardiac Monitor/Defibrillators. This is a yearly expense estimated at \$1,500 per year per defibrillator.
- Zoll EPCR Maintenance and Support – Yearly software support and maintenance. This is a yearly expense estimated at \$1,500 per year.
- City of Sparks Liability Insurance – Additional expense to liability insurance because of more invasive medical interventions. This is a yearly expense estimated at \$500 per year.
- Paramedic Continuing Education Training – Yearly training requirements for skill and knowledge maintenance.
- Special Assignment Pay – Incentive pay for each Paramedic to obtain, maintain, and provide specialized EMS skills.

Additional Explanation on Start-up Expenses

Estimated Medications and Equipment Purchase Costs. Table 18 lists the start-up expenses for medications and Table 19 lists the start-up costs for equipment. The yellow cells are the start-up costs for Districts L41 and E51, and the blue cells indicate the start-up costs for each additional engine company and each additional fire station inventory. It should be noted that for every district converted to Paramedic level service, there are equipment and medications needed for the first-in engine, equipment and medications needed for a back-up engine, and an inventory of re-stocking equipment and medications needed at the fire station. To start-up Paramedic level service in District L41 and District E51, there are three engines (two first-in engines and one back-up engine) and two fire stations that need to be stocked.

It should also be noted that funding for the largest equipment expense, the monitor/defibrillator, has already been set aside for the initial implementation phase of the program. This funding comes through the department's Capital Equipment Replacement Program, where \$200,000 has already accrued for replacement of the department's SCBA, radios, and defibrillators. The department has also applied for an Assistance to Firefighter

Grant (AFG) through FEMA to purchase eleven of these defibrillators although the department has not yet been notified if the grant has been approved.

Table 18 - Start-up Expenses for Medications								
Paramedic Medications	Packaging	Qty	Unit Cost	Ext Cost	Quantity Each Additional Apparatus	Cost Each Additional Apparatus	Inventory Quantity Each Additional Station	Inventory Cost Each Additional Station
Acetylsalicylic Acid (Aspirin)	81mg tablets	3	5.88	17.64	1	5.88	1	5.88
Acetaminophen (Tylenol)	120mg Suppositories (Box of 6)	3	8.60	25.80	1	8.60	1	8.60
Adenosine	6 mg, 2 ml vial	25	6.64	166.00	5	33.20	10	66.40
Afrin	Nasal Spray	3	4.00	12.00	1	4.00	1	4.00
Albuterol	2.5mg/3ml (pack of 5)	10	1.15	11.50	1	1.15	5	5.75
Amiodarone	150 mg 3 ml Vials	20	2.88	57.60	4	11.52	8	23.04
Atropine	1mg/ 10 ml syringe	15	12.77	191.55	3	38.31	6	76.62
Benedryl	50mg/ml Vial	10	1.04	10.40	1	1.04	7	7.28
Calcium Chloride	1gm , 10ml Luer-jet	5	12.77	63.85	1	12.77	2	25.54
50% Dextrose	25g/50ml Syringe	10	11.28	112.80	2	22.56	4	45.12
Dopamine	400 mg/5dw 250 ml bag	5	17.12	85.60	1	17.12	2	34.24
Epinephrine	1:10,000 1mg, 10 ml	30	8.49	254.70	5	42.45	15	127.35
Epinephrine	1:1000 1mg/1ml Vial	5	4.29	21.45	1	4.29	2	8.58
Fentanyl	100mg/2ml	25	2.12	53.00	6	12.72	6	12.72
Furosemide	40 mg, 4 ml	5	9.25	46.25	1	9.25	2	18.50
Glucagon	1 mg, 1ml Vials	5	233.52	1,167.60	1	233.52	2	467.04
Haldol	5 mg, 1ml Vials	10	4.24	42.40	2	8.48	4	16.96
Hydroxocobalamin (Cyanokit)	5gm Vial	1	1,049.99	1,049.99	0	0.00	1	0.00
Ipratropium Bromide (Atrovent)	.02%, 2.5ml (Box 25)	2	6.08	12.16	0	0.00	1	6.08
Lidocaine 2%	100 mg, 5 ml syringe	15	5.03	75.45	3	15.09	6	30.18
Lidocaine 0.4%	D5W 500 ml bag, 2 gm	5	11.49	57.45	1	11.49	2	22.98
Magesium Sulfate	1 gm, 2 ml Vial	20	3.06	61.20	4	12.24	8	24.48
Metoprolol	5mg, 5ml Vial	10	7.84	78.40	1	7.84	7	54.88
Midazolam (Versed)	5mg/1ml	25	1.40	35.00	4	5.60	4	5.60
Morphine Sulfate	10mg/1ml	25	1.20	30.00	4	4.80	4	4.80
Narcan	2mg, ml min-i-jet	12	40.95	491.40	2	81.90	6	245.70
Nitroglycerin	.4 mg	5	19.09	95.45	1	19.09	2	38.18
Ondansetron (Zofran)	4mg, 2ml Vial	20	1.03	20.60	2	2.06	8	8.24
Promethazine (phenergan)	25 mg, 1ml	12	1.84	22.08	1	1.84	9	16.56
Proparacaine (alcaine)	15ml	5	18.91	94.55	1	18.91	2	37.82
Racemic Epinephrine	2.25% .5ml (box of 10)	2	38.92	77.84	0	0.00	2	77.84
Sodium Bicarbonate	8.4%, 50 ml Luer Jet	5	14.59	72.95	1	14.59	2	29.18
Sodium Chloride IV Sol	0.9% 100ml Bag	20	3.36	67.20	2	6.72	2	6.72
Thaimine	200 mg, 2 ml	5	14.09	70.45	1	14.09	2	28.18
Vassopressin	20u/vial	5	9.15	45.75	1	9.15	2	18.30
Pitocin	10u/1ml Vial	5	2.64	13.20	1	2.64	2	5.28
Total Start-up for Districts L41 and E51 - 3 engines and 2 stations				4,811.26				
Total Start-up for additional engine and station						694.91		\$ 1,614.62

Table 19 - Start-up Expenses for Equipment								
Disposable vs Non-Disposable	Equipment	Qty	Unit cost	Total	Quantity Per or Each Additional Apparatus	Cost Per or Each Additional Apparatus	Quantity Per or Each Additional Station	Cost Per or Each Additional Station
D	Zoll CPR Stat-Padz Electrode	20	75.00	1,500.00	2	150.00	5	375.00
D	Zoll Pedi Padz II Electrodes	10	83.11	831.10	2	166.22	2	166.22
D	CONMED POSITRACE RTL Electrode (Box = 10 pk/4)	CS-15	131.00	131.00	0	0.00	1	131.00
D	X Series Thermal Paper Plain 80mm (pack of six)	2	31.20	62.40	0	0.00	1	31.20
Capital	Zoll X Model 12 Lead-EKG Cardiac Monitor/Defibrillator	3	34,045.05	102,135.15	1	34,045.05	0	0.00
ND	Sensor Rainbow DCIP Pedi Reuseable	5	625.00	3,125.00	1	625.00	0	0.00
D	CapnoLine FilterLine Set	25	10.82	270.50	2	21.64	10	108.20
D	CapnoLine Plus Oral Nasal Cannula with O2 Adult	25	12.15	303.75	2	24.30	10	121.50
D	Bougie-To-Go ET Tube Introducer	10	7.66	76.60	1	7.66	4	30.64
D	ARS for Needle Decompression, 10ga x 3.25"	8	14.89	119.12	1	14.89	2	29.78
D	Emergency Cricothyrotomy Kit, 5.5mm	6	24.50	147.00	1	24.50	2	49.00
ND	King Vision KIT	3	1,281.25	3,843.75	1	1,281.25	0	0.00
D	O2-Max 3 Set Adjustable CPAP with Adult Med Mask & Neb	10	48.80	488.00	1	48.80	4	195.20
ND	O2 CAREvent Handheld Resuscitator	3	1,664.78	4,994.34	1	1,664.78	0	0.00
ND	Welch Allyn FlexiPort Reuseable 1-tube BP Cuff Child	6	22.69	136.14	1	22.69	1	22.69
ND	Welch Allyn FlexiPort Reuseable 1-tube BP Cuff Adult	6	27.07	162.42	1	27.07	1	27.07
ND	Vacuum Splint Kit (Hartwell with pump)	3	253.13	759.39	1	253.13	0	0.00
D	Mucosal Atomization Device	25	4.93	123.25	5	24.65	5	24.65
D	IV Microdrip Set, 60 drop	48	3.11	149.28	3	9.33	5	15.55
D	NG Tubes	Box 10	89.70	89.70	0	0.00	1	89.70
ND	Trama Bag	3	404.99	1,214.97	1	404.99	0	0.00
ND	Airway Bag	3	260.99	782.97	1	260.99	0	0.00
ND	Lock Box for Engine & 2 Stations	5	1,544.00	7,720.00	1	1,544.00	1	1,544.00
	Total to Start-up 3 engines and 2 stations (with defibrillators)			129,165.83				
	Total to Start-up 3 engines and 2 stations (without defibrillators)			27,030.68				
	Total Start-up for additional engine and station (with defibrillator)					40,620.94		2,961.40
	Total Start-up for additional engine and station (without defibrillator)					\$ 6,575.89		\$ 2,961.40

Estimated Implementation Committees Costs. We have identified core areas that need to be addressed to develop a capable and well-performing program. Below is a list of suggested subcommittees, their focus, and estimated overtime commitment (estimates assume some work will be completed on shift):

- **Protocol Committee (30 hours):** Paramedic protocols, which define the practice and standing orders of Sparks Fire EMS providers, will need to be developed and formatted in coordination with the Medical Director.
- **Equipment Procurement and Supply Committee (20 hours):** In coordination with the Protocol Committee this committee will work on testing and procuring the necessary equipment and supplies to provide the patient care as prescribed by the Medical Director.
- **Medication Procurement and Narcotic Storage Committee (20 hours):** A Paramedic service is responsible for a sizable increase in medications within the scope of practice. Work will be done in coordination with the Protocol committee to identify the best process for procuring these supplies. Further, there are very specific regulations on the handling of Narcotics that will be within our scope of practice. This committee will put a lot of focus on how to procure, store and dispense these regulated substances.
- **Patient Care Reporting Committee (50 hours):** A key component of EMS is documentation and the ability to access accurate data. A more robust patient care reporting program would need to be added to our current incident reporting software, and training developed and delivered on the use of this new program.
- **Cardiac Monitor Committee (20 hours):** A cornerstone of Paramedic care is the Cardiac Monitor. This equipment has hardware and software that every provider will be training on. However, designated individuals will need to be intimately familiar with ongoing maintenance and managing of the equipment.

- **Program Coordination Committee (60 hours):** Because many of the above tasks are intimately related it is anticipated that there will be a need for larger combined meetings to ensure coordination.

The average overtime rate for all ranks in the fire department is calculated at approximately \$40.00. Multiplied by the number of overtime hours needed for committee work indicates that approximately \$8,000 is needed for this part of the implementation process (see Table 20 – Committee Expenses).

Table 20 - Committee Expenses			
Committees	Project Time/Hours	Average Overtime Rate for all Ranks	Cost
Protocols	30	40.00	1,200.00
Equipment	20	40.00	800.00
Medications	20	40.00	800.00
Reporting	50	40.00	2,000.00
Cardiac Monitors	20	40.00	800.00
Coordination Committee	60	40.00	2,400.00
Total	200	40.00	8,000.00

Estimated Refresher Training Costs. SFD currently has sixteen personnel in different ranks that are certified Paramedics, fifteen of which that in ranks that staff fire engines. It is anticipated that by dynamically staffing these fifteen personnel, Districts L41 and E51 could be converted to Paramedic level service without the need to train or hire new Paramedics.

For several years now we have supported the Continuing Education of these personnel in order to maintain their certification. However, it is unrealistic to think these personnel could immediately begin performing as a Paramedic without additional training on SFD specific Paramedic protocols and equipment. It’s also important that we validate their knowledge and skills. The success of our Paramedic program will rely on the fact that our providers are highly competent from day one.

To accomplish this we propose an intense one week training course conducted by a third-party EMS educator and audited by the SFD Medical Director. The associated costs are as follows:

- Estimated cost of course preparation and instruction - \$5,000.
- Estimated cost in staffing - \$24,000 (see Table 21 – Training Refresher Expenses).
- Total cost for refresher training - \$29,000.

Table 21 - Training Refresher Expenses					
Shift	Rank	Name	Average Overtime Rate for all Ranks	Refresher Course Hours	Estimated Cost
C	FF	Case, Patric	40.00	40	1,600.00
A	FF	Egan, Timothy	40.00	40	1,600.00
A	FF	Foster, Mike	40.00	40	1,600.00
B	FF	Gonzalez, Jason	40.00	40	1,600.00
B	FAO	Joseph, Matthew	40.00	40	1,600.00
C	CAPT	Klaich, Nicholas	40.00	40	1,600.00
A	CAPT	Matteoni, Matteoni	40.00	40	1,600.00
D	CAPT	McDonald, Edward	40.00	40	1,600.00
A	FF	Morin, Wilfred	40.00	40	1,600.00
A	FF	Palmer, Jacob	40.00	40	1,600.00
B	FAO	Porter, Micheal	40.00	40	1,600.00
B	FF	Stewart, Jarrod	40.00	40	1,600.00
B	CAPT	Sullivan, Jeff	40.00	40	1,600.00
C	FF	VanWalraven, Joseph	40.00	40	1,600.00
B	FF	Vega, Landon	40.00	40	1,600.00
Total				560	24,000.00

Estimated Paramedic School Costs. Based on the how quickly we decide to transition additional districts to Paramedic level service and the attrition rate in the fire department, there may be a need to send current employees to Paramedic School (Plan A only). The Truckee Meadows Community College (TMCC) offers a traditional yearly (two semester) program to provide Paramedic certification. The traditional program begins in August each year, with classes meeting on Tuesdays, Wednesdays and Thursdays. The total hours committed to attendance are listed in Table 22 – Paramedic School Expenses. Completion of the program would likely occur in the late summer of the following year however, there are variables that can prolong this process.

Assigning an employee into this process would result in overtime, regardless of whether the employee is on or off shift, due to coverage needs. To ensure the longest investment, only personnel in the rank of Firefighter would be selected for the program. Based on attrition rates for the fire department, it is anticipated that two to three personnel would need to be trained each year in order to transition a new district each January. Paramedic School is anticipated to be the largest implementation expense in Plan A.

Table 22 - Paramedic School Expenses			
Cost Area	Hours	Average Firefighter Overtime Rate	Anticipated Costs
TMCC Fees	N/A	N/A	6,442.00
Didactic	672	35.00	23,520.00
Clinical	300	35.00	10,500.00
Internship	480	35.00	16,800.00
Testing	24	35.00	840.00
Total			58,102.00

Additional Explanation on Annual Operating Expenses

Estimated Equipment and Medications Replacement Costs. The estimation of annual operating expenses proved to be a more difficult task than calculating start-up costs. Projections had to

been made as to how often these items would be used in patient care, how often these items might expire prior to use, and how often equipment might be damaged or so contaminated as to need replacement. For calculations, a percentage of initial start-up costs were defined for medications, disposable equipment, and for non-disposable equipment. The percentages used were as follows:

- Estimated annual operating costs to replace medications and equipment used for patient care:
 - Medications – 100% of start-up cost.
 - Disposable equipment – 75% of start-up cost.
 - Non-disposable equipment (due to damage/contamination) – 20% of start-up cost.
- Estimated annual operating costs to replace expired medications and equipment:
 - Medications – 40% of start-up cost.
 - Disposable equipment – 20% of start-up cost.
 - Non-disposable equipment – N/A.

Table 23 lists the annual operating costs for the initial implementation of Paramedics in Districts L41 and E51. Table 24 lists the annual operating costs for additional engines to the program, and Table 25 lists the annual operating costs for additional stations to the program.

Table 23 - Projected Increase in EMS Operating Costs for District L41 and E51 (3 Engines & 2 Stations)				
Type of Supplies	Start-up Cost	Cost to Replace Expired Meds and Equip (estimation by % of start-up cost: meds - 40% and disposable equip - 20%)	Cost to Replace Used Meds and Equip (estimation by % of start-up cost: meds - 100%, disp equip - 75%, cap equip - 20%)	Total Estimated Increase In Operating Costs
Medications	4,811.26	1,924.50	4,811.26	6,735.76
Equipment - Disposable	4,291.70	858.34	3,218.78	4,077.12
Equipment - Non-Disposable	22,738.98		4,547.80	4,547.80
Defibrillator Maintenance and Repairs				4,500.00
Total Estimated Increase in Operating Costs				19,860.68

Table 24 - Projected Increase in Operating Cost for Each Additional Engine				
Type of Supplies	Start-up Cost	Cost to Replace Expired Meds and Equip (estimation by % of start-up cost: meds - 40% and disposable equip - 20%)	Cost to Replace Used Meds and Equip (estimation by % of start-up cost: meds - 100%, disp equip - 75%, cap equip - 20%)	Total Estimated Increase In Operating Costs Per Engine
Medications	694.91	277.96	694.91	972.87
Equipment - Disposable	491.99	98.40	368.99	467.39
Equipment - Non-Disposable	6,083.90		1,216.78	1,216.78
Defibrillator Maintenance and Repairs				1,500.00
Total Estimated Increase in Operating Costs Per Engine				4,157.04

Table 25 - Projected Increase in Operating Cost for Each Additional Station				
Type of Supplies	Start-up Cost	Cost to Replace Expired Meds and Equip (estimation by % of start-up cost: meds - 40% and disposable equip - 20%)	Cost to Replace Used Meds and Equip (estimation by % of start-up cost: meds - 100%, disp equip - 75%, cap equip - 20%)	Total Estimated Increase In Operating Costs Per Station
Medications	1,614.62	645.85	1,614.62	2,260.47
Equipment - Disposable	1,367.64	273.53	1,025.73	1,299.26
Equipment - Non-Disposable	1,593.76		318.75	318.75
Defibrillator Maintenance and Repairs				
Total Estimated Increase in Operating Costs Per Station				3,878.48

Estimated Paramedic Continuing Education Costs. Paramedics must document 40 hours of continuing education every two years to maintain their State of Nevada certification and 72 hours if they are maintaining their National Registry EMS certification. Additionally, to renew either certification, providers must maintain Advanced Cardiac Life Support Certification (ACLS), Pediatric Advanced Life Support Certification (PALS), International Trauma Life Support Certification (ITLS) and Basic Life Support (BLS) CPR certification. There is also a Paramedic Skills Verification component to the renewal process.

Currently, all Advanced EMT continuing education is covered in-house, although this model, may not be the most economical or logistically best option for SFD to provide all necessary training at the Paramedic level. The BLS CPR certification and Paramedic Skills Verification are already conducted and will continue with no additional cost to the EMS budget. It is also conceivable that all or most of the 40 hours of continuing education required for Paramedic recertification could be attained in-house for minimal additional cost. This leaves “the alphabet classes,” ACLS, PALS & ITLS. There are three known Paramedic refreshers offered in the area each year. Registration for a refresher is estimated at \$500 a person, and overtime hours are calculated at ten hours per course, or thirty hours total to attend off-duty or to be covered to attend on-duty. At an average overtime rate of \$40.00, the cost per student to attend a thirty hour course is \$1,200.

Estimated Special Assignment Pay Costs. A Paramedic certification is very difficult to obtain, requiring hundreds of hours of study and skill development. It also requires substantial continuing education and practice in order to maintain the skills and knowledge needed to effectively and safely perform the invasive interventions required in the scope of practice. The additional requirements to acquire and maintain the skills and knowledge justify special assignment pay appropriate for employees with this certification.

Personnel wages are a negotiable item. Typical wage negotiations utilize “comparables” to determine appropriate compensation. Currently, both the Reno Fire Department (RFD) and the TMFPD have Paramedic incentive pay. RFD’s incentive pay is 7% of a Captain’s base pay, while TMFPD uses 6% of base pay per rank. To determine an estimated figure for SFD, a percentage in the middle of these two comparables was used. For planning purposes, 6.5% of a firefighter’s base pay will be utilized for cost estimates. This percentage would result in an increase over the current Advanced EMT incentive pay of \$2,914.24 for each employee with Paramedic certification. This amount includes additional wages and PERS contributions.

Specific Cost Estimates for Plans A and B

Plan A - Funding Needed per Fiscal Year from Start of Program to Full Implementation

Fiscal Year 2017. Initial implementation of the Paramedic program in the Sparks Fire Department. Paramedic level service implemented in District L41 and E51. Projected start date of the program – July 1, 2017. Total funding needed for FY17 is **\$84,341.94** (see Table 26). Funding to implement the program has already been placed in the Fire Department’s FY17 budget (Program 100401, Account 603525).

Table 26 - Fiscal Year 2017 - Funding Needed		
Start-up Expenses		
	Description of Expense	Cost
	Medications to Purchase - for Ladder 41, Engine 51, Reserve Engine 4, Station 4 and Station 5	4,811.26
	Equipment to Purchase - for Ladder 41, Engine 51, Reserve Engine 4, Station 4 and Station 5	27,030.68
	Defibrillators to Purchase - for Ladder 41, Engine 51, Reserve Engine 4	102,135.15
	Patient Reporting Software to Purchase	15,000.00
	City Liability Insurance Increase	500.00
	Committee Work	8,000.00
	Refresher Training	29,000.00
	Total (defibrillators removed as they are funded through the Capital Equipment Replacement Program)	84,341.94

Fiscal Year 2018. Full fiscal year of Paramedic service in District L41 and E51 requiring operating expenses. District E21 transition to Paramedic on January 1, 2018 requiring start-up costs and half-year of operating expenses. Total funding needed for FY18 is **\$302,165.38** (see Table 27).

Table 27 - Fiscal Year 2018 - Funding Needed		
Start-up Expenses		
	Description of Expense	Cost
	Medications to Purchase - for Engine 21, Reserve Engine 2, and Station 2	3,004.44
	Equipment to Purchase - for Engine 21, Reserve Engine 2, and Station 2	16,113.18
	Defibrillators to Purchase - for Engine 21, Reserve Engine 2	68,090.10
	New Paramedic Training (training 3 firefighters as to be ready for new district implementation in January 2020)	174,306.00
	Subtotal (defibrillators removed as they are funded through the Capital Equipment Replacement Program)	193,423.62
Annual Operating Expenses		
	Description of Expense	Cost
	Medication Replacement - full year for Districts L41 and E51, half year for District E21	8,838.87
	Equipment Replacement - full year for Districts L41 and E51, half year for District E21	11,118.09
	Defibrillator M&R - for L41, E51 and RE4	4,500.00
	Zoll EPCR Patient Reporting Software Support	1,500.00
	City Liability Insurance Increase	500.00
	Paramedic Continuing Education Training - for 20 employees	24,000.00
	Special Incentive Pay - for 20 employees	58,284.80
	Subtotal	108,741.76
	Total Fiscal Year Funding Needed	302,165.38

Fiscal Year 2019. Full fiscal year of Paramedic service in District L41, E51 and E21 requiring operating expenses. District E12 transition to Paramedic on January 1, 2019 requiring start-up costs and half-year of operating expenses. Total funding needed for FY19 is **403,019.25** (see Table 28).

Table 28 - Fiscal Year 2019 - Funding Needed	
Start-up Expenses	
Description of Expense	Cost
Medications to Purchase - for Engine 12, Reserve Engine 1, and Station 1	3,004.44
Equipment to Purchase - for Engine 12, Reserve Engine 1, and Station 1	16,113.18
Defibrillators to Purchase - for Engine 12, Reserve Engine 1	68,090.10
New Paramedic Training (training 3 firefighters as to be ready for new district implementation in January 2021)	174,306.00
Subtotal	261,513.72
Annual Operating Expenses	
Description of Expense	Cost
Medication Replacement - full year for Districts L41, E51 and E21, half year for District E12	13,045.09
Equipment Replacement - full year for Districts L41, E51 and E21, half year for District E12	16,104.44
Defibrillator M&R - for L41, E51, RE4, E21 and RE2	7,500.00
Zoll EPCR Patient Reporting Software Support	1,500.00
City Liability Insurance Increase	500.00
Paramedic Continuing Education Training - for 25 employees	30,000.00
Special Incentive Pay - for 25 employees	72,856.00
Subtotal	141,505.53
Total Fiscal Year Funding Needed	403,019.25

Fiscal Year 2020. Full fiscal year of Paramedic service in District L41, E51, E21 and E12 requiring operating expenses. District E11 transition to Paramedic on January 1, 2020 requiring start-up costs and half-year of operating expenses. Total funding needed for FY20 **\$386,623.38** (see Table 29).

Table 29 - Fiscal Year 2020 - Funding Needed	
Start-up Expenses	
Description of Expense	Cost
Medications to Purchase - for Engine 11	694.91
Equipment to Purchase - for Engine 11	6,575.89
Defibrillators to Purchase - for Engine 11	34,045.05
New Paramedic Training (training 3 firefighters as to be ready for new district implementation in January 2021)	174,306.00
Subtotal	215,621.85
Annual Operating Expenses	
Description of Expense	Cost
Medication Replacement - full year for Districts L41, E51, E21 and E12, half year for District E11	15,634.63
Equipment Replacement - full year for Districts L41, E51, E21 and E12, half year for District E11	19,439.70
Defibrillator M&R - for L41, E51, RE4, E21, RE2, E12, and ER1	10,500.00
Zoll EPCR Patient Reporting Software Support	1,500.00
City Liability Insurance Increase	500.00
Paramedic Continuing Education Training - 30 employees	36,000.00
Special Incentive Pay - for 30 employees	87,427.20
Subtotal	171,001.53
Total Fiscal Year Funding Needed	386,623.38

Fiscal Year 2021. Full fiscal year of Paramedic service in District L41, E51, E21, E12 and E11 requiring operating expenses. District E31 transition to Paramedic on January 1, 2021 requiring start-up costs and half-year of operating expenses. Total funding needed for FY21 **\$417,866.88** (see Table 30).

Table 30 - Fiscal Year 2021 - Funding Needed	
Start-up Expenses	
Description of Expense	Cost
Medications to Purchase - for Engine 31 and Station 3	2,309.53
Equipment to Purchase - for Engine 31 and Station 3	9,537.29
Defibrillators to Purchase - for Engine 31	34,045.05
New Paramedic Training (training 3 firefighters as to be ready for new district implementation in January 2022)	174,306.00
Subtotal	220,197.87
Annual Operating Expenses	
Description of Expense	Cost
Medication Replacement - full year for Districts L41, E51, E21, E12 and E11, half year for District E31	17,737.74
Equipment Replacement - full year for Districts L41, E51, E21, E12 and E11, half year for District E31	21,932.87
Defibrillator M&R - for L41, E51, RE4, E21, RE2, E12, RE1 and E11	12,000.00
Zoll EPCR Patient Reporting Software Support	1,500.00
City Liability Insurance Increase	500.00
Paramedic Continuing Education Training - for 35 employees	42,000.00
Special Incentive Pay - for 35 employees	101,998.40
Subtotal	197,669.01
Total Fiscal Year Funding Needed	417,866.88

Fiscal Year 2022. Full fiscal year of Paramedic service in District L41, E51, E21, E12, E11 and E31 requiring operating expenses. Truck 11 transition to Paramedic on January 1, 2022 requiring start-up costs and half-year of operating expenses. Total funding needed for FY22 **\$308,296.72** (see Table 31).

Table 31 - Fiscal Year 2022 - Funding Needed	
Start-up Expenses	
Description of Expense	Cost
Medications to Purchase - for Truck 11 and Reserve Truck 1	1,389.82
Equipment to Purchase - for Truck 11 and Reserve Truck 1	13,151.78
Defibrillators to Purchase - for Truck 11 and Reserve Truck 1	68,090.10
Subtotal	82,631.70
Annual Operating Expenses	
Description of Expense	Cost
Medication Replacement - full year for Districts L41, E51, E21, E12, E11 and E31, half year for T11/RT1	20,327.29
Equipment Replacement - full year for Districts L41, E51, E21, E12, E11 and E31, half year for T11/RT1	25,268.13
Defibrillator M&R - for L41, E51, RE4, E21, RE2, E12, RE1, E11 and E31	13,500.00
Zoll EPCR Patient Reporting Software Support	1,500.00
City Liability Insurance Increase	500.00
Paramedic Continuing Education Training - for 40 employees	48,000.00
Special Incentive Pay - for 40 employees	116,569.60
Subtotal	225,665.02
Total Fiscal Year Funding Needed	308,296.72

Fiscal Year 2023 and Forward. In Fiscal Year 2023 and afterwards, there will be no further implementation expenses and only annual operating expenses (see Table 32).

Table 32 - Fiscal Year 2023 and Forward - Funding Needed	
Annual Operating Expenses	
Description of Expense	Cost
Medication Replacement - full year for Districts L41, E51, E21, E12, E11, E31 and T11/RT1	21,300.16
Equipment Replacement - full year for Districts L41, E51, E21, E12, E11, E31 and T11/RT1	26,952.31
Defibrillator M&R - for L41, E51, RE4, E21, RE2, E12, RE1, E11, E31, T11 and RT1	16,500.00
Zoll EPCR Patient Reporting Software Support	1,500.00
City Liability Insurance Increase	500.00
Paramedic Continuing Education Training - for 40 employees	48,000.00
Special Incentive Pay - for 40 employees	116,569.60
Total Fiscal Year Funding Needed	231,322.07

Plan B - Funding Needed per Fiscal Year

Fiscal Year 2017. Initial implementation of the Paramedic program in the Sparks Fire Department. Paramedic level service implemented in District L41 and E51. Projected start date of the program – July 1, 2017. Total funding needed for FY17 is **\$84,341.94** (see Table 33). Funding to implement the program has already been placed in the Fire Department’s FY17 budget (Program 100401, Account 603525).

Table 33 - Fiscal Year 2017 - Funding Needed	
Start-up Expenses	
Description of Expense	Cost
Medications to Purchase - for Ladder 41, Engine 51, Reserve Engine 4, Station 4 and Station 5	4,811.26
Equipment to Purchase - for Ladder 41, Engine 51, Reserve Engine 4, Station 4 and Station 5	27,030.68
Defibrillators to Purchase - for Ladder 41, Engine 51, Reserve Engine 4	102,135.15
Patient Reporting Software to Purchase	15,000.00
City Liability Insurance Increase	500.00
Committee Work	8,000.00
Refresher Training	29,000.00
Total (defibrillators removed as they are funded through the Capital Equipment Replacement Program)	84,341.94

Fiscal Year 2018. Full fiscal year of Paramedic service in District L41 and E51 requiring operating expenses. District E21 transition to Paramedic on January 1, 2018 requiring start-up costs and half-year of operating expenses. Total funding needed for FY18 is **\$127,859.38** (see Table 34).

Table 35 - Fiscal Year 2018 - Funding Needed	
Start-up Expenses	
Description of Expense	Cost
Medications to Purchase - for Engine 21, Reserve Engine 2, and Station 2	3,004.44
Equipment to Purchase - for Engine 21, Reserve Engine 2, and Station 2	16,113.18
Defibrillators to Purchase - for Engine 21, Reserve Engine 2	68,090.10
Subtotal (defibrillators removed as they are funded through the Capital Equipment Replacement Program)	19,117.62
Annual Operating Expenses	
Description of Expense	Cost
Medication Replacement - full year for Districts L41 and E51, half year for District E21	8,838.87
Equipment Replacement - full year for Districts L41 and E51, half year for District E21	11,118.09
Defibrillator M&R - for L41, E51 and RE4	4,500.00
Zoll EPCR Patient Reporting Software Support	1,500.00
City Liability Insurance Increase	500.00
Paramedic Continuing Education Training - for 20 employees	24,000.00
Special Incentive Pay - for 20 employees	58,284.80
Subtotal	108,741.76
Total Fiscal Year Funding Needed	127,859.38

Fiscal Year 2019 and Forward. In Fiscal Year 2019 and afterwards, there will only be annual operating expenses. Table 35 shows these annual operating expenses. No additional start-up expenses will be needed until five SFD employees retire and five new employees are hired with Paramedic certification. For planning purposes, Table 36 shows the start-up costs for additional engines and stations, and Table 37 shows what the increase in annual operating expenses would be if an additional engine and station were converted to Paramedic.

Table 35 - Fiscal Year 2019 and Forward - Funding Needed	
Annual Operating Expenses	
Description of Expense	Cost
Medication Replacement - full year for Districts L41, E51 and E21	10,941.98
Equipment Replacement - full year for Districts L41, E51 and E21	13,611.26
Defibrillator M&R - for L41, E51, RE4, E21 and RE2	7,500.00
Zoll EPCR Patient Reporting Software Support	1,500.00
City Liability Insurance Increase	500.00
Paramedic Continuing Education Training - for 20 employees	24,000.00
Special Incentive Pay - for 20 employees	58,284.80
Total Fiscal Year Funding Needed	116,338.04

Table 36 - Start-up Costs Per Engine and Per Station		
Description of Expense	Cost per Engine	Cost per Station
Medications to Purchase	694.91	1,614.62
Equipment to Purchase	6,575.89	2,961.40
Defibrillators to Purchase (funded through the Capital Equipment Replacement Program)	34,045.05	0.00
Total Start-Up Funding Needed From City (less defibrillator)	7,270.80	4,576.02

Table 37 - Annual Operating Costs Per Engine and Per Station		
Description of Expense	Cost per Engine	Cost per Station
Medication Replacement	972.87	2,260.47
Equipment Replacement	1,684.17	1,618.01
Defibrillator M&R - per engine	1,500.00	N/A
Paramedic Continuing Education Training - for 5 employees	6,000.00	N/A
Special Incentive Pay - for 5 employees	14,571.20	N/A
Total Fiscal Year Funding Needed	24,728.24	3,878.48

CONCLUSION / RECOMMENDATION

Based on the preceding analysis, fire department staff believes the number of calls where the fire department is arriving first to urgent EMS emergencies and waiting a significant period of time for REMSA's arrival, plus the fact that medical recommendations exist stating that Paramedic interventions should be started with the arrival of the first responders, indicate there are numerous opportunities to improve patient care by implementing a Paramedic program at SFD. Council has also been provided with three supplemental reasons to implement this program; that an Enhanced Automatic Aid Agreement with TMFPD could be implemented; that there will be a back-up plan to provide Paramedic care when REMSA is delayed; and that a Paramedic program is appropriate for a full-service city like Sparks. Therefore, fire department staff recommends that City Council implement Paramedic level service in the Sparks Fire Department.

The expense required to implement and maintain this program will need to be approved and supported by City Council, and dedicated funding should be earmarked for this purpose. Concerns have been raised that the funds needed for a Paramedic program may delay projects, programs, and expansion in other City departments. Fire department staff understands these concerns and is fully aware of the fiscal challenges facing the City. To reduce the fiscal impact to the lowest amount possible, allowing for other priorities within the City to be considered, but still addressing the community's need for Paramedic level service in SFD, fire department staff recommends a multi-year implementation of the program. In order to further address fiscal concerns, two options were provided for Council to consider.

Plan A is designed to transition the entire department to Paramedic level service within five years, with a pre-defined schedule of when additional districts would be staffed at the Paramedic level. This plan would necessitate a relatively aggressive funding commitment by City Council, but would result in the shortest transition time possible. Plan A's estimated cost is **\$1,902,313.55** through 2022 and **\$231,322.07** in subsequent years (in today's dollars).

Plan B is also designed to transition the entire department to Paramedic level service, but over a much longer period of time, and without a pre-determined schedule to staff additional

districts. Using attrition and the new-hire process to add Paramedic staffing to the department, plus allowing for adequate funding to accrue in the department's Capital Equipment Replacement Program before purchasing new defibrillators, substantial savings as compared to Plan A can be realized. The total cost to implement Plan B is **\$84,341.94** in FY17 (funding already budgeted for), **\$127,859.38** in FY18, and **\$116,338.04** in FY19. Fiscal year funding would remain at this level (approximately \$116,000 in today's dollars) until five new Paramedics could be hired through attrition in the fire department. At that time, sufficient Paramedic staffing would exist to allow for another district to be converted to Paramedic level service. Total cost to implement Paramedic service in the City's three most critical districts (District L41, E51, and E21) - **\$328,539.36**.

The need for this Paramedic program cannot be overstated, but neither can the need for new programs and staffing increases in other City departments. Fire department staff firmly believes a Paramedic program for the fire department is important and needed for this community, but understands there are other needs in the city that are important as well. For this reason, fire department staff recommends that City Council approve of the implementation of Paramedic level service in the Sparks Fire Department and that either Plan A or Plan B is acceptable. Although speed of implementation is a concern, the primary consideration is to have a plan to increase the level of patient care in the community and to put this plan in action. Although Plan B will take longer for full transition, it will immediately result in increasing the level of care in the City's three primary districts of concern, lead to the implementation of Enhanced Automatic Aid, provide a back-up plan when REMSA is delayed, and support the concept of Sparks as a full-service city.