MANAGEMENT SOLUTIONS FOR EMERGENCY SERVICES

EXPERT ADMINISTRATIVE RISK REDUCTION

EMS Strategic Analysis
For
Buncombe County, NC

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Section One – Engagement Overview

The table below provides an overview of the engagement.

Prepared For	Buncombe County Administration
Organization Scope	Buncombe County's EMS and Fire Departments.
Period of Assessment	January 1st, 2017 through December 31st, 2017 *2013 to 2016 data was used as a comparison and historical benchmark.*
Type of Testing and Analysis	Management Solutions for Emergency Services conducted the following: • Review of EMS and Fire Department documentation • Review of EMS Billing System Data • Analysis of key data elements reported to NEMSIS
Considerations	The information gathered findings and recommendations in this report are subject to inherent limitations. (e.g., time limitations and sampling) and accordingly, weaknesses, errors or irregularities may not have been detected.

Section Two—Scope and Methodology:

The objective of this study was to review the County EMS systems basic key service indicators and make a recommendation regarding a possible addition of ambulances to the current system. To address the objective—data was collected from Buncombe County, its corresponding EMS and Fire Departments, and their sub-contractors for ambulance billing, EMS Management & Consultants, Inc and Andres Medical Billing, Ltd. The study addresses chute and response times while excluding event identification and dispatch times. The scope of the study includes a review of the subcontractors' billing resulting from Advance Lifesaving Support (ALS) medical condition dispatched trips provided in the 2017 calendar year and excludes BLS medical condition dispatches within the same time frame. In addition, a review of a separate sample of trips within Buncombe County from January 2013 through December 2016 was performed to compare historical response times. Data was compiled from the County's billing systems and from County and Fire Department budget documents as well as data from the Nation Emergency Medical Services Information System (NEMSIS) database.

Section Three – Executive Summary

Based on review of all the data reviewed within the scope of this study, Management Solutions for Emergency Services (MSFES) determined that adding more ambulances to the current system would cost the County more funding without adding to any enhanced service level to the citizens. In the study, MSFES identified no value to adding ambulances because there is already unused ambulance within the system that has already been obtained by County tax dollars but is not being used currently to provide protection. MSFES noted that there were at least two (2) ambulances that are not being staffed fully because of low call volume (Skyland Fire Department) and staffing budget needs (Buncombe County Rescue Squad).

At this time, MSFES advises that adding other ambulances to the EMS system that are not a part of the current system would only be depriving the current system of federal funding for EMS services provided as well as tax funds. MSFES limited its review to how the addition of ambulances would affect the current system and did not review any data or information regarding the possibility of another EMS provider joining the current EMS system. Based on the current resources, MSFES recommends the County focus on how to improve use of its current resources.

Section Four – Observations and Recommendations

Analysis of EMS and calls dispatched within the County and corresponding response times by the county-owned EMS system and Fire Departments that provide ambulance coverage.

Emergency service providers have been and continue to be judged on their performance by measuring how fast they respond to emergencies. Response time certainly is one of many important (arguably much more important) measures of an EMS system's performance, so timely response must continue to be one element of an EMS system's appraisal. In fact, scrutinizing an EMS system's response time performance is still one of the few tangible methods of demonstrating the quality of service delivery to the community and provides a way for politicians to hold the system accountable.

One EMS performance yardstick that is nationally accepted and available for municipal and career fire departments is the National Fire Protection Association's (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). Representatives from a variety of fire agencies and the International Association of City/County Managers formulated the standard. As applied to EMS response, the standard establishes a five-minute period which includes a turnout time (60 seconds) plus the responding time (240 seconds) for the arrival of a unit staffed with a first responder or higher-level capability at an emergency medical incident. This objective is to be met 90% of the time. If ALS service is dispatched (paramedic, AED equipped), the standard specifies the arrival of an ALS company within a nine-minute time frame (60-second turnout plus 480-second response) to incidents 90% of the time. In this ALS circumstance, the five-minute first responder initial response must still be met.

These NFPA 1710-time parameters are not arbitrary. They are primarily based on the fact that specific clinical intervention is necessary if a cardiac arrest is to be survived. Cardiac arrest can result in brain (permanent) death within 4 to 6 minutes. The American Heart Association explains that cardiac arrest may be reversible if treated quickly with an electric shock and ALS intervention to restore a normal heartbeat. This standard has been verified by studies showing that a victim's chances of survival are reduced by 7%–10% with every minute that passes without defibrillation and advanced life support intervention. Few attempts at resuscitation succeed after 10 minutes.

Based on available data, for the purpose of this report MSFES defines the "response time" as that being from the time of station (or unit) notification to the time the EMS vehicle arrives on the scene of the emergency (wheels stopped) as indicated via radio transmission to dispatch (i.e., 60 second "turnout" or "chute" time included). Time taken by communication personnel and dispatchers to process the 911call (call intake to dispatch) is outside the scope of this study is not addressed by this report.

Prior to the advent of computer-aided dispatch (CAD), emergency units recommended for dispatch to addresses were based on the location of the closest fire station, an area referred to as their "first due." With CAD and incorporating automatic vehicle locator (AVL) technology, dispatch recommendations are now made based on an emergency unit's actual location and the one determined closest to the emergency address is sent. This technology is why response times within zip codes are used in this study rather than station response data.

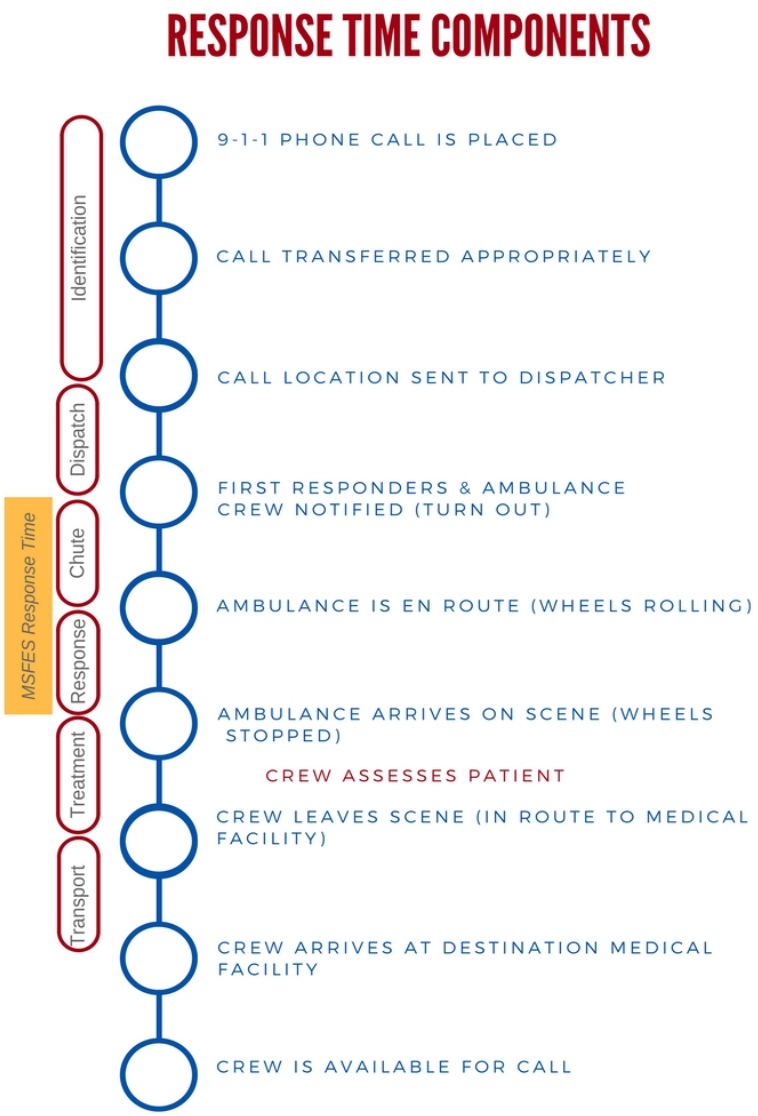

Figure 1: 9-1-1 Response Time Graphic

The following maps depict call for service locations and response time[1]

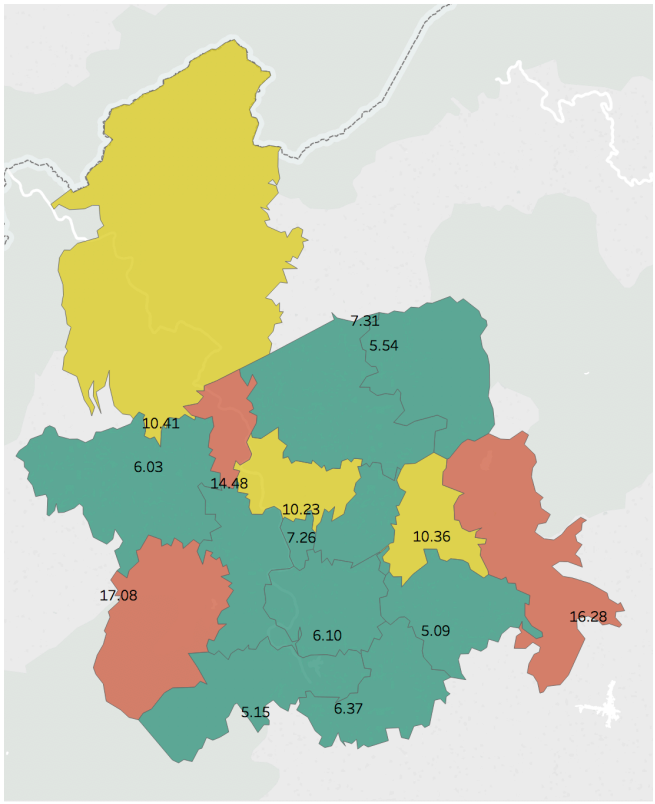

Figure 3: Fire Department Response Times

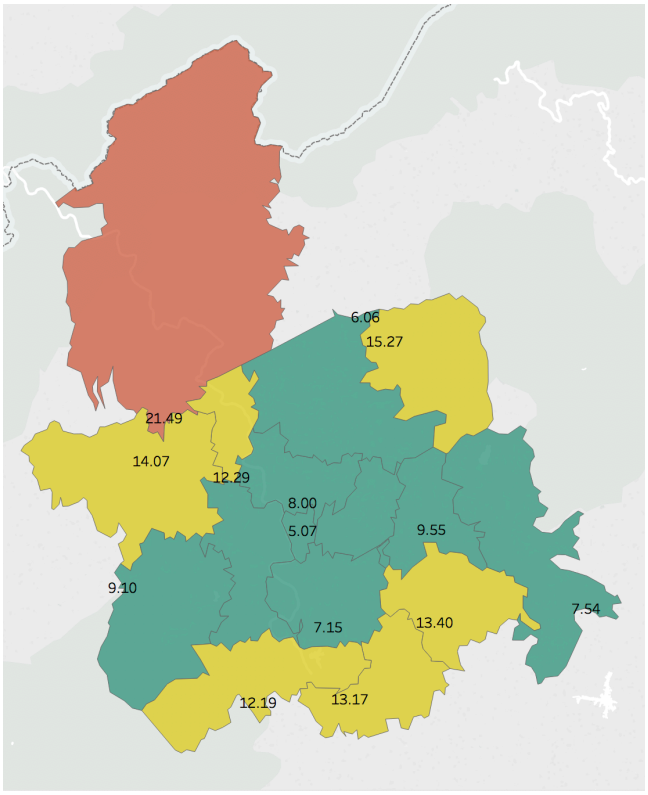

Figure 2: EMS Response Times

Fire Department Response Times (NFPA 1710 540 Seconds or Less) 2017				
Zipcode	CHUTE	RESPONSE	BOTH	90%
28701	01:00.0	14:48.1	15:48.1	11:22.0
28704	01:09.9	05:14.5	06:24.4	06:48.7
28709	01:22.2	05:53.6	07:15.7	07:17.0
28711	01:08.8	16:28.3	17:37.1	09:07.3
28715	00:40.5	17:07.5	17:47.9	12:04.2
28730	01:08.9	05:09.0	06:17.9	07:01.8
28732	01:09.5	06:36.8	07:46.3	08:02.2
28748	01:35.1	06:02.6	07:37.7	07:31.2
28753	02:12.6	10:41.4	12:54.0	10:19.5
28778	01:03.8	10:36.1	11:39.8	08:41.8
28787	01:14.7	07:32.1	08:46.8	08:03.3
28801	00:34.1	07:26.4	08:00.5	07:49.3
28803	01:04.8	06:10.4	07:15.2	07:49.0
28804	01:02.4	10:23.1	11:25.5	08:28.3

Figure 4: Avg. Fire Department Response Times

EMS Response Times (NFPA 1710 540 Seconds or Less) 2017				
Zipcode	CHUTE	RESPONSE	BOTH	90%
28701	02:07.0	12:29.0	14:36.2	10:20.3
28704	01:52.6	12:19.4	14:12.0	09:00.1
28709	02:14.3	15:27.3	17:41.6	10:17.2
28711	01:58.4	07:53.9	09:52.3	08:35.8
28715	01:56.4	09:10.2	11:06.5	08:35.2
28730	01:47.0	13:40.2	15:27.2	09:13.4
28732	01:27.0	13:16.9	14:43.8	08:59.8
28748	01:59.6	14:06.8	16:06.5	09:09.6
28753	01:57.8	21:48.5	23:46.4	21:44.4
28778	02:07.0	09:55.0	12:02.0	08:29.1
28787	01:56.2	06:05.5	08:01.7	07:36.9
28801	02:20.8	05:07.3	07:28.1	06:56.4
28803	01:57.9	07:14.7	09:12.7	07:53.3
28804	02:06.0	07:59.8	10:05.7	08:07.1

Figure 5: Avg. EMS Response Times

[1] Response times were calculated using only ALS condition codes. ALS condition codes were cross walked to 'nature of dispatch' data provided by the county. Management Solutions for Emergency Solutions used nature of dispatch instead of end result conditions/ICD10/HCPCS codes as responders only know situational information based on what dispatch has provided prior to arrival.

EMS response times vary greatly across the county in no uniform manner, as seen in figures 2 and 3. (However, calls for service in areas near town centers and the Asheville suburbs had an overall shorter response time than more rural parts of the County. This response time was not unexpected. A nationwide study published by JAMA Surgery in 2017 analyzed 1.7 million EMS responses in the US. It was found that the average wait time (initiation of the 911 call to arrival) for EMS to arrive in suburban and urban areas was 6 minutes, while the average wait time in rural areas was more than double that, at 13 minutes. Nearly one in ten 911 calls in rural zip codes resulted in wait times of nearly 30 minutes. The researchers defined rural areas as having <2500 residents, suburban areas as having 2500 to 50,000 residents, and urban areas as having >50,000 residents.

The following table documents response data by zip code.

Area	Zip Code	Population	Pop/sq mi	Total Trips	% of Total County Calls	<8 min # of trips	<8 mins %	<10 mins # of trips	<10 mins %	>10 mins # of trips	>10 mins %	Total Trips <10 mins
Alexander	**28701**	3635	204	298	1%	63	21%	45	15%	191	64%	108
Arden	**28704**	18821	571	802	3%	481	60%	72	9%	249	31%	553
Barnardsville	**28709**	2225	42	230	1%	196	85%	5	2%	30	13%	201
Black Mountain	**28711**	13209	132	1659	6%	1012	61%	100	6%	557	34%	1112
Candler	**28715**	24582	316	2416	9%	1377	57%	315	13%	725	30%	1692
Fairview	**28730**	9133	184	554	2%	465	84%	22	4%	72	13%	487
Fletcher	**28732**	16491	386	255	1%	186	73%	26	10%	43	17%	212
Leicester	**28748**	11334	134	967	4%	629	65%	77	8%	262	27%	706
Marshall	**28753**	11670	44	60	0%	11	18%	13	22%	36	60%	550
Swannanoa	**28778**	10381	302	809	3%	372	46%	178	22%	251	31%	550
Weaverville	**28787**	19718	248	1483	6%	1142	77%	133	9%	222	15%	1275
Asheville	**28801**	15019	2955	3691	14%	3285	89%	221	6%	185	5%	3506
Asheville	**28803**	28693	749	3614	14%	2722	75%	199	6%	693	19%	2921
Asheville	**28804**	20507	772	1796	7%	1167	65%	269	15%	359	20%	1436
Asheville	**28805**	17620	679	2557	10%	1995	78%	307	12%	281	11%	2302
Asheville	**28806**	38550	1015	4849	19%	3443	71%	630	13%	776	16%	4063
County		**242767**		**26040**	**100%**	**18546**		**2612**		**4932**		**21674**

Figure 6: Trip and Response data by Zip Code

Summary of data.		
Total County EMS dispatches	35360	
Total critical care dispatches	26040	
County wide response times less than 8 minutes	18546	76.4%
County wide response times 9 minutes or less	21158	77.7%
Suburban (and urban cluster) total dispatches	16507	
Response times less than 8 minutes	12612	71.2%
Response times 9 minutes or less	14238	86.3%
Rural area total dispatches	9533	
Responses times less than 8 minutes	5934	62.2%
Response times 9 minutes or less	6920	72.6%

While distance needed to be traveled is certainly a critical factor in the response time, other factors will influence that time such as traffic and road conditions, time of day and weather. Also, multiple calls for service in the same time frame depletes nearby units requiring EMS vehicles from

areas further away to respond. Response areas with a traditionally higher volume of calls will better meet that demand with a greater number of assigned vehicles than lower demand areas with fewer units assigned. This increased concentration of resources allows for more capacity to better handle multiple calls for service.

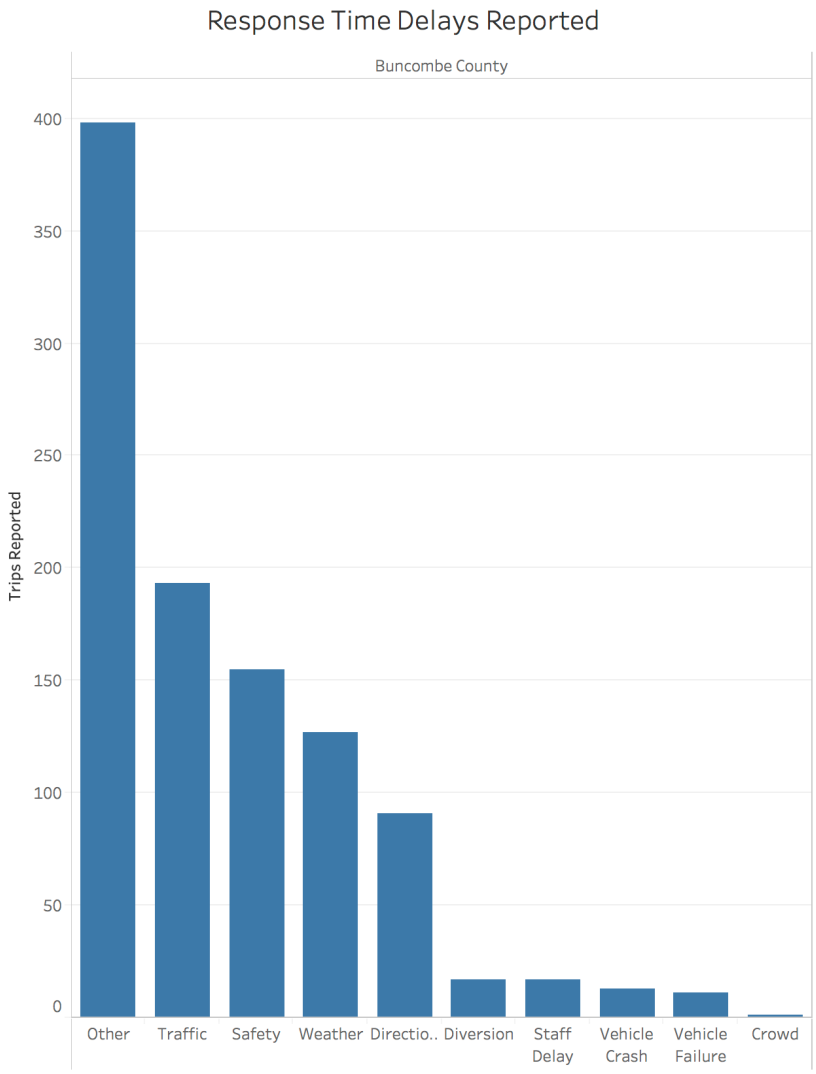

Figure 7: Reported Response Time Delays

Analysis of whether the current EMS system including fire departments that bill ambulance services within the County is meeting county goals and national standards of care and response times.

Strengths

i. **Resource Component.** MSFES found that the current EMS system in Buncombe County, is a well-planned and well thought out system. The County EMS has a fleet of fourteen (14) ALS ambulances, with ten (10) of those ambulances staffed and staged throughout the County ready to respond to emergencies. Barnardsville Fire Department, Leicester Fire Department, Reems Creek Fire Department, and Riceville Fire Department each provide one (1) ALS ambulance.

   a. Fairview Fire Department has developed a system that allows them to respond one (1) ambulance with two (2) paramedics to the first medical call. Upon arrival at the scene and assessment of the patient, the paramedics establish if they both are needed. If not needed, one (1) of the paramedics responds back to the Fire Department and staffs the second ambulance. This seems to be excellent resource allocation and provides more service to the community.

   b. In 2013, the Skyland Fire Department added a paramedic level ambulance to its fleet of fire apparatus and within two (2) years they added another 24/7 ambulance due to call volume. The Skyland Fire Department has recently cut their response back to one ambulance 24/7 due to the County EMS Agency adding another unit to the system, thus reducing the local call volume and revenue. The Skyland Fire Department is continuing to evaluate the call volume and is willing to staff both ambulances to necessary levels when the call volume rises again to the level that justifies the need for both ambulances.

   c. Buncombe County Rescue Squad provides one (1) staffed ambulance that can respond to calls from 0900 to 2100, which covers high call volume time frames. They also have a second unit to put in service when staffing is available and dependent upon truck repair issues. With the vast number of resources, the County could be protected by as many as twenty-four (24) ALS ambulances at one time.

ii. **Response Times.** As seen in this report in figure 6(pg. 8), the system is providing a well-respected response time. The system provides response times below the national and state averages and holds a better average response time than the two most closely populated counties.

   a. The system does not fully meet all of the requirements for response times addressing EMS ambulance response outlined in the National Fire Protection Association (NFPA) 1710 Standard. However, this standard is a guideline for agencies to build upon and for which to strive. To date, MSFES is not aware of any emergency

agency that is totally compliant with all NFPA applicable standards. The cost for an agency to be in complete compliance with all applicable standards is simply not feasible.

iii. **Automatic Vehicle Location Systems (AVL)**. Each of the twenty-four (24) ambulances are equipped with AVL that allows the County Communication Center to see the location of all units at all times. When a medical call for service is received by the Communication Center, the system sends the closest geographical ambulance. This measure helps to cut response times to citizens and cuts overall costs by shortening response distance.

iv. **EMS Fleet.** The County replaced its entire fleet of ambulances last year and works to replace all ambulances that are either four (4) years old or those that have 100,000 miles of service life. These measures help to ensure newer and up-to-date equipment serve the citizens of Buncombe County.

v. **Working Relationships**. The working relationship between the County and the non-profit emergency organizations they partner with are worthy of praise. With this type of relationship and the AVL system, these organizations have eliminated district boundaries, allowing for a better service to citizens. This type of working relationship is not the norm and should be commended, as many areas across the State still have well defined and guarded boundaries and district lines.

vi. **County Demographics.** As comparison data for Buncombe County, we looked at the two closest counties to Buncombe that were relative to size in population. The counties chosen were Durham County and Union County.

Population	
Buncombe County	244,461
Durham County	282,081
Union County	208,498

Square Miles	
Buncombe County	660mi²
Durham County	298mi²
Union County	640mi²

Ambulance Staffing Capabilities	During Peak Times	Non-Peak Times
Buncombe County	19	17
Durham County	19	10
Union County	14	11

Emergency Medical Calls Responded to in 2017	
Buncombe County	35,000
Durham County	46,000
Union County	28,000

Figure 8: Comparative Demographic Data[2]

[2] Population size was obtained from the 2016 national census reports.

This data indicates that Buncombe County is within normal staffing limits of ambulances within similar systems used for comparison. In Figure 8, the number of "Calls Responded to in 2017" shows *every* EMS call received by the communication centers. There were 26,150 EMS calls dispatched to Buncombe County in 2017 warranting an emergency response (i.e., lights and sirens). MSFES could not obtain data at the level of detail needed from the other counties for this comparison to be shown, as it was not available due to privacy concerns.

Weaknesses

i. **Response Times -** Your organization covers a significant square-mile radius. The chart below identifies and outlines geographical areas where you could improve, and improvement would allow for your County to comply with NFPA 1710. It is important to note that this standard was designed for career fire departments dispatching EMS, not rural volunteer fire departments dispatching EMS, which you have.

Fire Department Response Times (NFPA 1710 540 Seconds or Less) MM:SS:ms					
	2017	2016	2015	2014	2013
28701	15:48.1	18:42.0	17:12.4	17:48.0	23:36.2
28704	06:24.4	05:54.2	06:22.0	07:08.3	19:55.9
28709	07:15.7	07:55.3	07:39.8	07:26.3	07:29.8
28711	17:37.1	17:46.2	18:09.5	18:08.9	18:37.5
28715	17:47.9	18:32.3	18:21.3	20:19.3	19:48.8
28730	06:17.9	06:11.4	05:59.0	05:55.3	22:34.9
28732	07:46.3	06:58.2	07:23.8	08:15.9	21:44.0
28748	07:37.7	07:35.5	07:56.8	09:14.9	08:19.3
28753	12:54.0	13:06.5	12:12.7	12:38.8	12:01.0
28778	11:39.8	11:33.8	11:02.3	11:42.1	12:42.4
28787	08:46.8	08:37.4	08:38.8	08:42.1	08:41.9
28801	08:00.5	08:55.7	09:09.4	09:54.2	08:54.6
28803	07:15.2	06:58.0	07:34.4	09:16.7	13:17.2
28804	11:25.5	11:48.0	11:42.1	11:45.6	12:21.1

Figure 10: Avg. Fire Department Response Times

EMS Resposne Times (NFPA 1710 540 Seconds or Less) MM:SS.ms					
	2017	2016	2015	2014	2013
28701	14:36.2	14:27.5	15:48.9	15:56.7	16:31.4
28704	14:12.0	12:29.4	10:28.3	09:04.5	10:05.4
28709	17:41.6	14:19.6	13:38.3	15:02.6	16:23.4
28711	09:52.3	09:52.9	10:30.3	10:12.0	10:10.0
28715	11:06.5	11:12.3	10:33.7	10:59.6	11:25.6
28730	15:27.2	18:25.5	15:01.5	14:18.5	14:37.6
28732	14:43.8	33:05.4	14:28.5	12:34.0	13:20.9
28748	16:06.5	15:29.4	15:49.4	15:44.7	14:51.0
28753	23:46.4	22:46.8	21:36.8	21:14.1	23:11.0
28778	12:02.0	11:51.3	11:51.5	11:45.9	11:37.5
28787	08:01.7	08:32.9	08:37.8	09:01.3	09:02.4
28801	07:28.1	06:50.4	06:36.8	06:58.1	06:35.6
28803	09:12.7	09:08.0	08:50.3	08:11.9	08:50.5
28804	10:05.7	09:37.7	09:38.1	10:37.9	10:30.9

Figure 9: Avg. EMS Response Times

Buncombe County has already implemented a respectable system that is larger than other counties of like kind. To improve response times, the most economical solution would be to move resources into the 28701, 28715, 28753, 28778, and 28804 zip codes. An increase of 9% in these areas should allow you to meet the NFPA 1710 Standard. [3]

When speaking with the Skyland Fire Chief, we found that he had downgraded his staffing of a second ambulance due to the County adding another ambulance into the system and the current call volume not supporting the economic feasibility of a second 24-hour shift. Relocating a County ambulance, or one of Skyland's ambulances may help to achieve lower response times in the above-indicated areas. If you were to relocate one of the County ambulances during the day or 24/7 into one of the above locations, and then allow Skyland FD to return their second ambulance to a 24-hour response, you might

[3] Note: These numbers were pulled from data provided by the county and are from 2017. MSFES chose to use zip-codes instead of district lines, as your organizations use AVL and district lines would not be useful. Zip-codes allowed MSFES to focus on identifying areas with deficiencies.

be able to achieve the NFPA 1710 standard. It certainly seems the most beneficial solution with the least financial impact.

ii. **Chute Times or Couch Times –** NFPA 1710 also addresses the times between when your agencies are notified of a call to when they are in-route to the call. This time is called "Chute" or "Couch" times, and NFPA 1710 sets a standard of 60 seconds for this period. When MSFES reviewed your County's 2017 data, we identified that the fire departments are almost meeting the standard of 60 seconds overall, but the County EMS agency is not and most of their couch times are almost 2 minutes.

In MSFES's staff's experience as former fire chiefs, they recommended standards of 60 seconds during the day and 90 seconds at night for employees to be out the door, with wheels rolling. These standards provided firefighters with a good goal, but also insured their safety by providing additional time to ensure they were fully awake when responding at night. MSFES believes that the fire departments and County EMS agency could improve on the couch times, as their high call volume is during the day and there should be no problem in meeting the 60 second standard during the daylight hours.

MSFES feels that with management pushing for quicker couch times, your County should automatically see quicker overall response times. This strategy is by far is the cheapest fix to improving the current system and would help you meet the NFPA 1710 standard.

Analysis of the strengths and weakness of the current system and how the current system can gain efficiencies.

i. Effect on Response Times. When it comes to improving response times, there are two options. The first option would be to move existing resources to areas that show a deficiency. This option assumes that you have the resources to keep up with the demand or call volume currently. Option 2 would be to add more resources to the system.

When speaking with county staff, we found that there is an external company that wants to join your system and add resources. The addition of an external company would equate to the second option, as adding ambulances in the right areas would help the system reduce response times. MSFES would not recommend that the external company provide county-wide coverage, but instead be used to target areas with lower response times, such as Alexander (28701) and Marshal (28573). The County could quickly meet the NFPA 1710 Standard by doing this. However, a for-profit company may not want to be restricted to providing service to a less densely populated area such as the 28701-zip code with only 204 people per square mile. The data received from the County only shows 298 trips from that area in 2017.

In MSFES's opinion, trying to make a profit from that number would be almost impossible. Using Leicester Fire Department's numbers, which is the closest resource to the 28701-zip code, if the company were to provide the transport to all 298 trips, they would only receive approximately $80,000 in payments. We do not feel that would not generate enough income to support an ambulance alone, running less than one call per day. An outside company may help to reduce response times in deficient areas; however, there may not be enough profit for such a company to sustain the economic costs of business.

ii. Level of Care. The level of care provided could be the same as it is currently, so long as the County's service agreement holds an external company to the same standard of care as is currently being provided by the County agency and other non-profits within the system. Such agreement would need to define expectations and qualitative/quantitative measures, and the County could audit an external company to ensure the current standard of care is being upheld. The County already has this process in place with existing non-profits.

The County would have to monitor an external company to ensure that profits are not the driving force behind the level of patient care being provided and that "quick turnaround" and "high trip areas" are not abused to allow for higher profit margins. Integrating a for-profit company into a non-profit system may be a challenge but could provide desired results. We would caution the County if allowing an external company to enter, to follow a strict service agreement and to make it clear that quicker response times to citizens is the overall goal, not profits.

iii. Economic Impact. In the emergency service field, there is always an economic impact to service levels. Government agencies are constantly evaluating their service level and how to provide a better service at a cost acceptable to the citizens. Placing an ambulance on every corner would mean that citizens could have their very own response team within seconds. This step would surely improve the survival rates of patients; however, communities and agencies simply cannot afford to do this or are not willing to pay for it.

We want the County to understand how EMS funding works. The EMS system bills for services. As such, it is called a "self-supported" program or division within the government agency or non-profit agency. To identify who pays the bills, we look at what is called a "Payer Mix." This data shows us who is paying for the service, as detailed in the table below:

Entity	Medicare	Medicaid	Insurance	Patient	Facility Contract
Barnardsville	34%	9%	34%	22%	0%
County EMS Agency	38%	13%	30%	19%	0%
Fairview	58%	12%	18%	13%	0%
Rescue Squad	56%	10%	25%	10%	0%
Leicester	35%	18%	31%	14%	2%
Reems Creek	47%	7%	30%	15%	0%
Riceville	45%	11%	26%	16%	3%
Skyland Fire and Rescue Corp	42%	9%	33%	15%	1%

Figure 12: Payer Mix Break Down by the Organization[4]

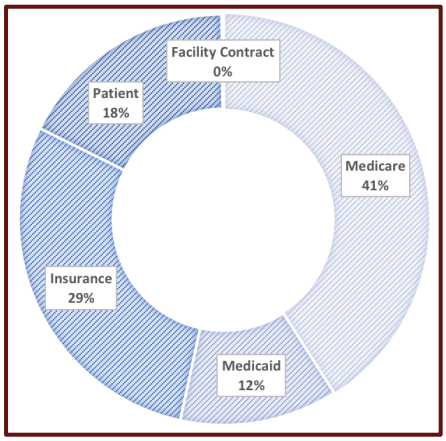

Figure 11: Overall Payer Mix Breakdown

As an example, we'll use the County's EMS agency. The County is being reimbursed by Medicare for 41% of its total income received from the billing process. The Payer Mix can also be used to recognize other trends, such as poverty areas and aging populations. As an example, Fairview Fire Department has a 58% Medicare reimbursement over Bernardsville Fire Department's 34%. This may indicate that Fairview's population is an aging population. Leicester Fire Department's Medicaid rate of 18% and 35% Medicare rate of reimbursement, may indicate a younger population with more poverty.

All of these numbers relate back to billing and payments received. Another number constantly monitored is "Collection Rate." The organization providing service may send a bill, and people simply do not pay or pay less than the billed amount. The data chart below, shows how your County EMS system is being financially supported:

Entity	Trips	Net Charges	Payments	CPT	PPT	Net Coll. %
Barnardsville	303	$128,655.03	$91,954.09	$424.60	$303.48	71%
County EMS Agency	29014	$12,580,416.40	$8,298,890.19	$433.60	$286.03	66%
Rescue Squad	3870	$1,430,019.96	$1,045,847.42	$369.51	$270.24	73%
Fairview	830	$392,051.29	$262,367.15	$472.35	$316.11	67%
Leicester	645	$320,297.83	$205,032.09	$496.59	$317.88	64%
Reems Creek	1288	$385,573.13	$288,042.82	$299.36	$223.64	75%
Riceville	1276	$530,694.83	$350,044.70	$415.91	$274.33	66%
Skyland Fire and Rescue	2388	$1,111,800.00	$782,241.39	$465.58	$327.57	70%
Totals	**39614**	**$16,879,508.47**	**$11,324,419.85**	**$422.19**	**$289.91**	**69%**

Figure 13: Billing and Collections breakdown[5]

A collection rate of 70% is average or above average throughout North Carolina. MSFES asked Henderson County Rescue and Transylvania County for their collection rates. Henderson County had an approximate collection rate of 80% while Transylvania County had

[4] Note: Percentages were pulled from data collected from the organizations billing companies and may change if someone pays a bill, even years from the date of this report.
[5] Calculations vary on net collections percentages across the county as billing companies can use either net or gross charges in the calculations. MSFES used Net Charges within all net collections formulas

an approximate collection rate of 81%. Henderson County Rescue uses the same billing company as your County EMS Agency. Transylvania County provides billing in-house.

To better understand an economic impact, MSFES looked at Fairview Fire Department. Fairview had 830 trips they billed for in 2017. Out of those trips, they billed a total of $392,051.29, but only received 67% of the billed funds. This means that Fairview Fire Department, who provides two ambulances, only received $262,367.15 to support the cost of providing two ambulances. The costs to Fairview for those two ambulances would include the normal salary range of someone trained to the level of a paramedic, the medical supplies used, the equipment used, annual wear and tear on the vehicle, and the cost of replacing the ambulances. Fairview Fire Department is most likely close to or currently supplementing its EMS service with fire taxes.

If an external company arrived today and started running calls in the Fairview district, running half of the 830 trips would take approximately $131,000 from Fairview's income. If this were to happen, Fairview would most likely need to cut its second ambulance and terminate staff. This change wouldn't provide any more of a service than is in place now. It would simply reduce the resources used by Fairview Fire Department and allow the external company to provide a service. The second option would be for the County to allow Fairview to increase its tax rate by one cent to cover the loss of income. This increase in the tax would allow for more resources, though not needed in that area, but may result in a reduction in response times.

Analysis of how engaging a for-profit company to provide county-wide EMS coverage would affect response times, level of care and the economic impact to the current system.

i. **Response Times –** As stated before in this study, there is no doubt that allowing another company to add more staffed ALS ambulances to the current EMS system would reduce response times within the County. If the goal of the County is to reduce response times and it is not concerned about cost, then not only allowing the external company to run calls but allow your fire departments and rescue squads to staff and respond all of their ambulances as well. Allowing such a vast number of groups to respond would result in a huge reduction in response times and will set records when comparing response times with other counties of like kind.

ii. **Level of Care –** As stated in this study, if the County allows for the external company to start providing ALS services, the County needs to enter into a service agreement. The agreement should set key performance indicators and minimum requirements on the level of care required. The county should inspect the new organization periodically throughout the year to ensure that they are providing such level of care as detailed and required within the service agreement.

iii. **Economic Impact -** To believe simply allowing another EMS provider to join the existing system would not add cost to the County is not correct. Every call the new provider would run is pulled from an agency already in place to respond. At this time, the new provider would not be added to keep up with increasing call volumes, as you have fire departments and rescue squads within the County reducing resources when ambulances are added to the County fleet already. MSFES recommends that you consider the following questions in making your decision:

I. If you allowed an external company to add multiple ambulances into the system, would you require the non-profit organizations in the current system to reduce staff and resources already in place?

OR

II. Would you allow an increase in taxes to offset the loss of revenue by your non-profit organizations and your County EMS agency?

Section Five – Closing Statement

Management Solutions for Emergency Services would like to thank Buncombe County for allowing us to prepare this study of its EMS System. As you can see with the above suggestions, comments, and data, your County has built a good medical delivery system, and you should be proud of it. It is not every day that MSFES see counties working as efficiently as you do with fire departments and rescue squads. This partnership or working relationship has built and sustained your system and allows it to be one of the best we have seen.

With the success of the current system, MSFES are hesitant to suggest allowing an external company to enter the system. The data clearly shows that you do not have a need for them at this time and should you see an increase in call volume we would recommend you allow your current system to expand to it fullest extent first, before adding to it.

As in any system, if you add something to it, it will change the current system. The biggest recommendation from MSFES is that before you add something new to your system, make sure you determine the possible impacts to the system and that those are the desired outcomes.

**********END OF STUDY**********

Appendix A – Supplemental Data Analysis

Entity	Medicare	%	Medicaid	%	Insurance	%	Patient	%	Facility Contract	%
Barnardsville	104	34%	28	9%	104	34%	67	22%	0	
EMS	11083	38%	3830	13%	8559	30%	5542	19%	0	
Rescue Squad	2148	56%	392	10%	960	25%	372	10%	0	
Fairview VFD	481	58%	100	12%	149	18%	108	13%	0	
Leicester	223	35%	122	19%	202	31%	91	14%	11	2%
Reems Creek	611	47%	100	8%	381	30%	198	15%	0	
Riceville	576	45%	140	11%	327	26%	198	16%	36	3%
Skyland	1010	42%	222	9%	778	33%	356	15%	21	1%
Total Trips	**16236**		**4933**		**11461**		**6931**		**68**	

Entity	Trips	Net Charges	Payments	CPT	PPT	Net Coll. %
Barnardsville	303	$128,655.03	$91,954.09	$424.60	$303.48	71%
County EMS Agency	29014	$12,580,416.40	$8,298,890.19	$433.60	$286.03	66%
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Fairview	830	$392,051.29	$262,367.15	$472.35	$316.11	67%
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Riceville	1276	$530,694.83	$350,044.70	$415.91	$274.33	66%
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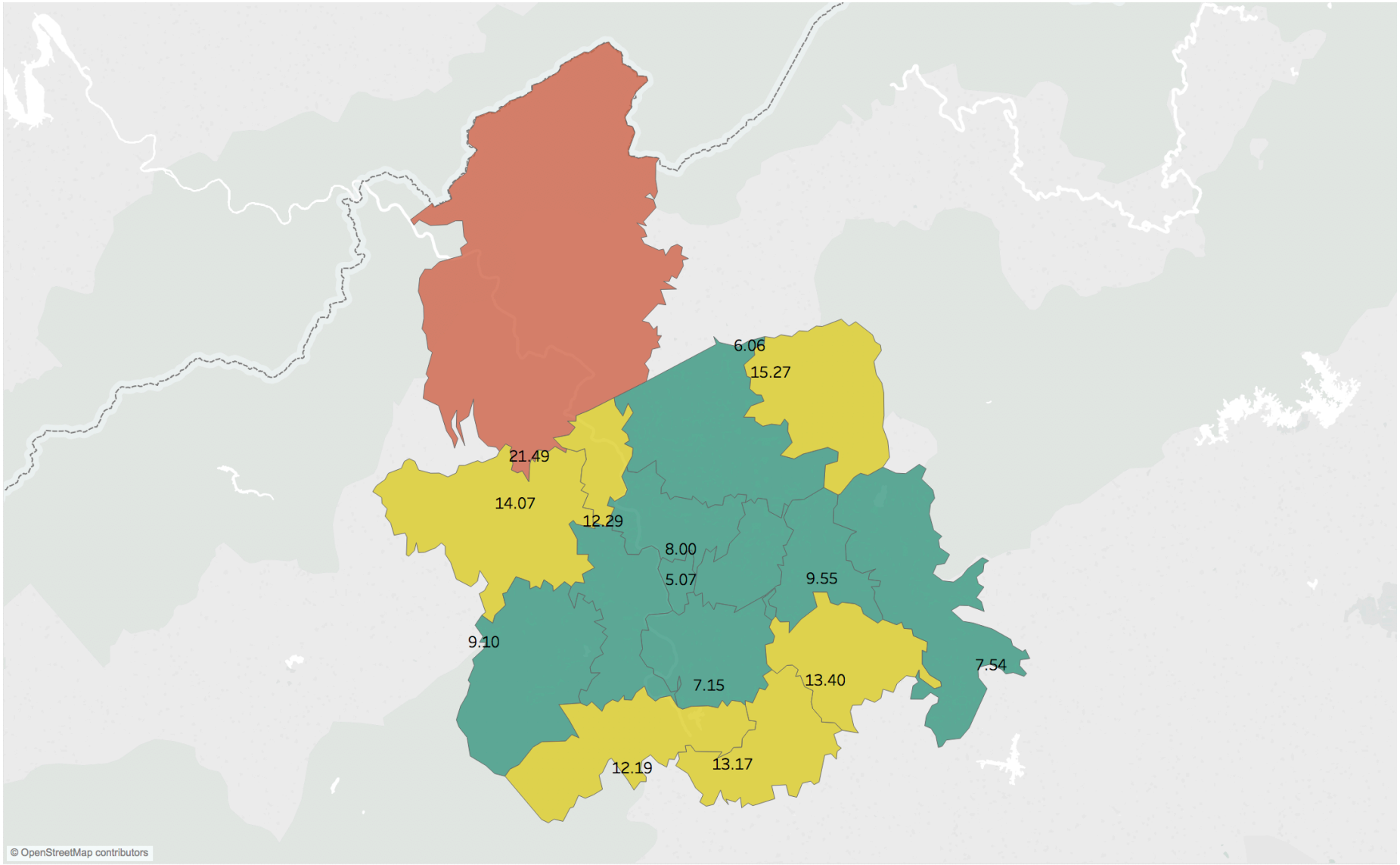
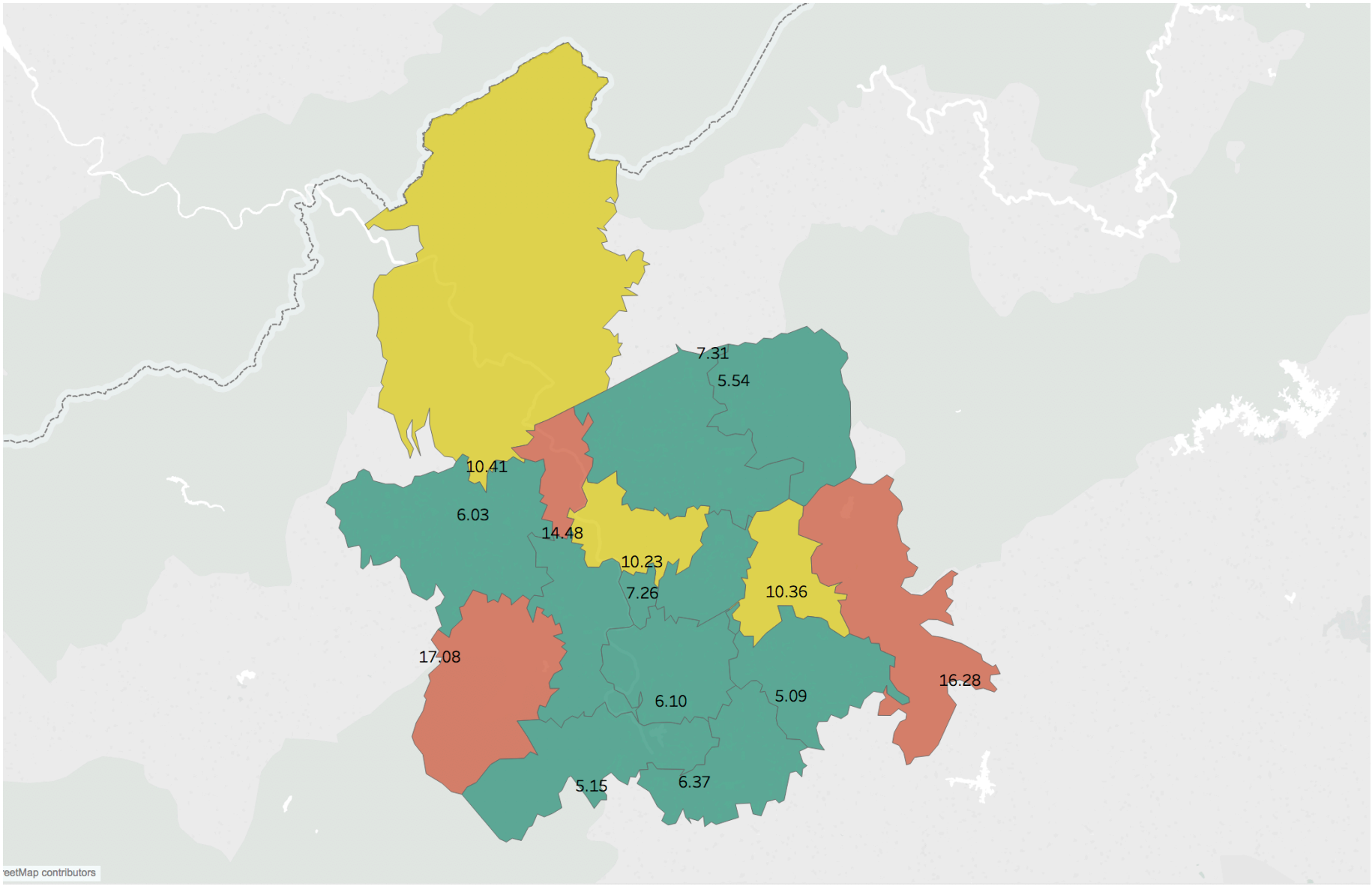
Totals	**39614**	**$16,879,508.47**	**$11,324,419.85**	**$422.19**	**$289.91**	**69%**

EMS Response Time Averages



Fire Department Response Time Averages



Fire Department Response Times (NFPA 1710 540 Seconds or Less) 2017				
Zipcode	CHUTE	RESPONSE	BOTH	90%
28701	01:00.0	14:48.1	15:48.1	11:22.0
28704	01:09.9	05:14.5	06:24.4	06:48.7
28709	01:22.2	05:53.6	07:15.7	07:17.0
28711	01:08.8	16:28.3	17:37.1	09:07.3
28715	00:40.5	17:07.5	17:47.9	12:04.2
28730	01:08.9	05:09.0	06:17.9	07:01.8
28732	01:09.5	06:36.8	07:46.3	08:02.2
28748	01:35.1	06:02.6	07:37.7	07:31.2
28753	02:12.6	10:41.4	12:54.0	10:19.5
28778	01:03.8	10:36.1	11:39.8	08:41.8
28787	01:14.7	07:32.1	08:46.8	08:03.3
28801	00:34.1	07:26.4	08:00.5	07:49.3
28803	01:04.8	06:10.4	07:15.2	07:49.0
28804	01:02.4	10:23.1	11:25.5	08:28.3

EMS Response Times (NFPA 1710 540 Seconds or Less) 2017				
Zipcode	CHUTE	RESPONSE	BOTH	90%
28701	02:07.0	12:29.2	14:36.2	10:20.3
28704	01:52.6	12:19.4	14:12.0	09:00.1
28709	02:14.3	15:27.3	17:41.6	10:17.2
28711	01:58.4	07:53.9	09:52.3	08:35.8
28715	01:56.4	09:10.2	11:06.5	08:35.2
28730	01:47.0	13:40.2	15:27.2	09:13.4
28732	01:27.0	13:16.9	14:43.8	08:59.8
28748	01:59.6	14:06.8	16:06.5	09:09.6
28753	01:57.8	21:48.5	23:46.4	21:44.4
28778	02:07.0	09:55.0	12:02.0	08:29.1
28787	01:56.2	06:05.5	08:01.7	07:36.9
28801	02:20.8	05:07.3	07:28.1	06:56.4
28803	01:57.9	07:14.7	09:12.7	07:53.3
28804	02:06.0	07:59.8	10:05.7	08:07.1

		2017				2016			2015			2014			2013		
Zipcode	Entity	Chute	Response	Total	NFPA 90%	Chute	Response	Total	Chute	Response	Total	Chute	Response	Total	Chute	Response	Total
28701	EMS	02:07.0	12:29.2	14:36.2	10:20.3	02:00.7	12:26.9	14:27.5	01:51.5	13:57.4	15:48.9	02:07.2	13:49.5	15:56.7	01:58.6	14:32.8	16:31.4
28701	FIRE	01:00.0	14:48.1	15:48.1	11:22.0	00:50.8	17:51.2	18:42.0	00:55.3	16:17.1	17:12.4	00:56.3	16:51.6	17:48.0	00:54.3	22:42.0	23:36.2
28704	EMS	01:52.6	12:19.4	14:12.0	09:00.1	01:33.9	10:55.5	12:29.4	01:28.7	08:59.5	10:28.3	01:35.3	07:29.2	09:04.5	01:36.2	08:29.1	10:05.4
28704	FIRE	01:09.9	05:14.5	06:24.4	06:48.7	00:51.7	05:02.5	05:54.2	00:52.3	05:29.6	06:22.0	00:55.7	06:12.6	07:08.3	00:46.5	19:09.4	19:55.9
28709	EMS	02:14.3	15:27.3	17:41.6	10:17.2	01:55.2	12:24.5	14:19.6	01:44.0	11:54.2	13:38.3	01:56.4	13:06.2	15:02.6	02:07.0	14:16.4	16:23.4
28709	FIRE	01:22.2	05:53.6	07:15.7	07:17.0	01:26.5	06:28.7	07:55.3	01:40.3	05:59.5	07:39.8	01:18.8	06:07.5	07:26.3	01:42.4	05:47.4	07:29.8
28711	EMS	01:58.4	07:53.9	09:52.3	08:35.8	01:53.8	07:59.1	09:52.9	01:48.1	08:42.1	10:30.3	01:44.9	08:27.1	10:12.0	01:48.0	08:21.9	10:10.0
28711	FIRE	01:08.8	16:28.3	17:37.1	09:07.3	01:01.7	16:44.4	17:46.2	01:07.5	17:02.0	18:09.5	01:24.6	16:44.3	18:08.9	01:19.3	17:18.1	18:37.5
28715	EMS	01:56.4	09:10.2	11:06.5	08:35.2	01:53.2	09:19.1	11:12.3	01:42.7	08:51.0	10:33.7	01:44.5	09:15.1	10:59.6	01:46.0	09:39.6	11:25.6
28715	FIRE	00:40.5	17:07.5	17:47.9	12:04.2	00:32.1	18:00.2	18:32.3	00:36.3	17:45.1	18:21.3	00:52.6	19:26.7	20:19.3	00:53.7	18:55.1	19:48.8
28730	EMS	01:47.0	13:40.2	15:27.2	09:13.4	02:16.2	16:09.3	18:25.5	01:49.1	13:12.5	15:01.5	01:56.3	12:22.1	14:18.5	01:51.3	12:46.3	14:37.6
28730	FIRE	01:08.9	05:09.0	06:17.9	07:01.8	01:17.3	04:54.1	06:11.4	01:06.9	04:52.1	05:59.0	01:02.4	04:52.8	05:55.3	00:48.3	21:46.6	22:34.9
28732	EMS	01:27.0	13:16.9	14:43.8	08:59.8	01:15.7	31:49.8	33:05.4	01:58.8	12:29.7	14:28.5	01:51.1	10:42.9	12:34.0	01:33.5	11:47.4	13:20.9
28732	FIRE	01:09.5	06:36.8	07:46.3	08:02.2	01:04.9	05:53.3	06:58.2	00:59.9	06:23.9	07:23.8	00:59.7	07:16.2	08:15.9	00:36.8	21:07.2	21:44.0
28748	EMS	01:59.6	14:06.8	16:06.5	09:09.6	01:42.5	13:47.0	15:29.4	01:47.9	14:01.5	15:49.4	01:50.4	13:54.3	15:44.7	01:51.5	12:59.5	14:51.0
28748	FIRE	01:35.1	06:02.6	07:37.7	07:31.2	01:23.1	06:12.4	07:35.5	01:24.1	06:32.7	07:56.8	01:27.9	07:47.0	09:14.9	01:14.0	07:05.2	08:19.3
28753	EMS	01:57.8	21:48.5	23:46.4	21:44.4	02:39.0	20:07.8	22:46.8	02:00.6	19:36.1	21:36.8	02:07.2	19:06.9	21:14.1	01:42.8	21:28.2	23:11.0
28753	FIRE	02:12.6	10:41.4	12:54.0	10:19.5	01:34.5	11:32.0	13:06.5	01:24.0	10:48.7	12:12.7	01:39.6	10:59.2	12:38.8	01:12.4	10:48.7	12:01.0
28778	EMS	02:07.0	09:55.0	12:02.0	08:29.1	02:01.3	09:50.0	11:51.3	01:51.7	09:59.9	11:51.5	01:53.9	09:51.9	11:45.9	01:51.7	09:45.8	11:37.5
28778	FIRE	01:03.8	10:36.1	11:39.8	08:41.8	00:57.0	10:36.8	11:33.8	00:55.1	10:07.3	11:02.3	01:05.2	10:36.9	11:42.1	01:08.1	11:34.3	12:42.4
28787	EMS	01:56.2	06:05.5	08:01.7	07:36.9	01:54.4	06:38.5	08:32.9	01:49.4	06:48.3	08:37.8	01:46.5	07:14.8	09:01.3	01:39.7	07:22.7	09:02.4
28787	FIRE	01:14.7	07:32.1	08:46.8	08:03.3	01:10.1	07:27.3	08:37.4	01:08.0	07:30.7	08:38.8	01:05.5	07:36.6	08:42.1	01:08.7	07:33.2	08:41.9
28801	EMS	02:20.8	05:07.3	07:28.1	06:56.4	01:45.2	05:05.2	06:50.4	01:36.2	05:00.6	06:36.8	01:43.3	05:14.7	06:58.1	01:41.5	04:54.2	06:35.6
28801	FIRE	00:34.1	07:26.4	08:00.5	07:49.3	00:30.9	08:24.8	08:55.7	00:34.9	08:34.5	09:09.4	00:37.1	09:17.1	09:54.2	00:40.8	08:13.8	08:54.6
28803	EMS	01:57.9	07:14.7	09:12.7	07:53.3	01:52.8	07:15.2	09:08.0	01:49.5	07:00.8	08:50.3	01:37.7	06:34.2	08:11.9	01:37.5	07:13.0	08:50.5
28803	FIRE	01:04.8	06:10.4	07:15.2	07:49.0	00:45.2	06:12.8	06:58.0	00:49.5	06:44.9	07:34.4	00:56.4	08:20.4	09:16.7	00:53.0	12:24.2	13:17.2
28804	EMS	02:06.0	07:59.8	10:05.7	08:07.1	02:02.5	07:35.2	09:37.7	01:51.2	07:46.9	09:38.1	01:53.3	08:44.6	10:37.9	01:51.5	08:39.4	10:30.9
28804	FIRE	01:02.4	10:23.1	11:25.5	08:28.3	00:55.3	10:52.7	11:48.0	00:51.4	10:50.7	11:42.1	00:59.2	10:46.4	11:45.6	00:46.0	11:35.1	12:21.1
28805	EMS	01:46.6	07:00.2	08:46.8	09:01.2	01:53.9	07:00.5	08:54.4	01:52.0	07:12.3	09:04.3	01:52.4	07:06.4	08:58.8	01:49.0	07:08.9	08:57.8
28805	FIRE	01:26.1	07:33.0	08:59.2	07:35.5	01:21.8	07:35.6	08:57.4	01:13.6	07:26.8	08:40.4	01:18.6	07:40.2	08:58.8	01:26.3	07:55.8	09:22.1
28806	EMS	01:51.8	07:41.2	09:33.0	07:56.0	01:48.5	07:32.7	09:21.3	01:37.4	07:35.6	09:13.0	01:43.1	07:25.9	09:09.0	01:40.6	06:48.0	08:28.7
28806	FIRE	00:45.9	07:12.1	07:58.0	07:36.3	00:33.4	09:13.3	09:46.6	00:34.2	09:18.4	09:52.6	00:42.0	09:46.9	10:28.9	00:45.0	10:56.8	11:41.8