Spartanburg County
South Carolina

INDEPENDENT FIRE STUDY
2020

ESCI Emergency Services Consulting International

Providing Expertise and Guidance that Enhances Community Safety

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Executive Summary

Background

On March 9, 2020, the County of Spartanburg, South Carolina, contracted Emergency Services Consulting International (ESCI) to produce an Independent Fire Study of the Fire Protection in Spartanburg County. The purpose of the study was threefold:

1. Evaluate current operational service delivery.
2. Identify future service delivery needs.
3. Provide recommendations for operational service delivery.

It should be noted that the scope of work for this project was for a county-wide analysis; as such, individual fire districts were not evaluated independently but rather as part of the county-wide system.

Summary Findings

1. **Spartanburg County has arrived at a critical decision point for the future of fire service delivery within the County.**

   The 35 separate fire departments within Spartanburg County operate on budgets that are supported by taxes levied within their identified coverage areas. The differences among these fire departments are many and varied:

   - The taxes levied in these areas vary from 3.3 mils to 45.9mils.
   - The coverage area for these fire departments ranges from 0.9 to approximately 140 square miles.
   - The areas protected by these fire departments range from large industrial parks to areas with virtually no industry or mercantile and only moderate to low income housing.
   - While all fire departments within Spartanburg County respond to fires, they have varying levels of staffing; only some of the departments provide additional services such as medical first response, extrication, hazardous materials, and/or technical rescue response.
   - The administrative and financial burdens associated with fire departments have become increasingly more complex over time.
   - The volunteer/combination fire departments within Spartanburg County have faced challenges in maintaining membership. Some of these departments have opted for consolidation to ensure continued quality service within their response areas. Accordingly, in 1990, there were 46 fire departments within Spartanburg County. Now, in 2020, that number has declined 23.91% to 35 fire departments.

2. **The existing governance structure and management of the various Fire Districts potentially exposes Spartanburg County to liability.**

The inconsistencies in fire service delivery within the County include levels of service, staffing, training, and varying levels of compliance with laws, regulations, national standards, and industry best practices. ESCI's review of the various forms of fire service delivery within Spartanburg County revealed that all non-municipal or federal fire districts in the County represent a potential liability for the County in some form or another.

Special Purpose Districts are stand-alone public bodies according to South Carolina law. Despite the Special Purpose Districts being, for all practical purposes, independent in their governance and management, Spartanburg County still has some legal authority over the Special Purpose Districts, which could impact the governance and management. This includes, but is not necessarily limited to, the ability to enlarge and diminish the Special Purpose District area and determine whether millage rates can be increased for general obligation bonds. The action or inaction of the County in these regards has the potential to impact the Special Purpose District and could open the County up to liability for any issues that might arise, which are related to how the Special Purpose District is governed or managed.

The Fire Service Areas were originally established with the intention of creating separate entities; however, the creation, administration, financial approvals, purchasing policies, and ownership of capital assets for the Fire Service Areas by the County are consistent with the creation and oversight of other traditional County departments. These practices establish a relationship that can subject the County to the same liabilities of other subdivisions of County government, except that little to no oversight is provided to these departments by the County. Spartanburg County would most likely have little to no ability to shield itself from indemnification or current statutory requirements within the State of South Carolina should mismanagement, malfeasance, or a traumatic injury or death occur as a result of the actions by a particular Fire Service Area. This responsibility is instead delegated to the Fire Service Areas. Ultimately, the County is responsible for providing for fire and rescue services within these areas, whether a Fire Service Area is present or not.

Fire Service Areas that surround municipalities are an issue in regards to liability for the County in several aspects: first, the County still is responsible for setting a millage in the area as well as approving a budget for the service in the area; and second, at present, no contracts are currently in place for the provision of fire protection services from the municipalities to those surrounding fire service areas, which opens the County to liability should the municipality choose to no longer service the area for any reason as the County is ultimately responsible for providing fire service in these unincorporated and non-Special Purpose District areas.

Action Item

Spartanburg County Council must decide how the County wishes to proceed with the delivery of fire and rescue services within the County. It is important to understand that no matter which option is selected, Spartanburg County Council will always be involved in decisions regarding fire and rescue. Additionally, any option selected will require several years or more of County Council involvement, including policy decisions and potential future funding assistance.

At this time, the Fire Service in Spartanburg County requires policy direction from the Spartanburg County Council to proceed forward with planning for the future fire service needs of the county's fire service delivery. Options include:

1. **The Council may choose to pursue the active consolidation or merger of individual Fire Service Areas to Special Purpose Districts or municipalities to reduce County liabilities and provide more uniform fire rescue services throughout Spartanburg County.**
2. **The Council may choose to establish a County-wide fire department, or subdivision of the County, to provide fire rescue services to Fire Service Areas and any other fire jurisdiction within the County that can no longer support operations.**
3. **The Council may choose to maintain the status quo.**

The authority to create a new department, modify current Special Purpose District or Fire Service Area service boundaries, appoint or remove board members from specific board types, set millage rates, and ultimately determine the future landscape of fire rescue services lies with Spartanburg County Council. The Fire Advisory Board, as its name implies, is purely advisory in nature; as such, it is not within the purview of the Fire Advisory Board to make these policy decisions.

The County Council should also be advised that if a Fire Service Area is merged with a Special Purpose District or municipality, the County would surrender the ability to set millage rates in the affected area. Depending upon multiple variables, any consolidation or merger would require specific analysis to determine how this action would ultimately affect tax rates experienced by businesses and residents. As this is a countywide overview of operational service delivery and future needs, specific analysis of this type is outside of the scope of this study. ESCI suggests that any future consolidations or mergers should be considered on a case-by-case basis, analyzed individually to determine the ultimate impact upon mil rates and annual revenues to support operations, and that this action should either be approved or rejected by County Council as required.

This report offers multiple recommendations on how the Spartanburg County fire service may improve service delivery, both individually and countywide. First and foremost, however, a Council decision on the aforementioned Action Item is necessary as it will dramatically affect how the recommendations contained within this report are implemented. It is for this reason that ESCI suggests that the Spartanburg County Council provide policy direction as to how to proceed in this regard. Following formal County Council direction, the recommendations for improvements contained within this report can then be selected and implemented as part of the Strategic Planning Process based on the direction provided.

Recommended Option

1. **The Council may choose to pursue the active consolidation or merger of individual Fire Service Areas to Special Purpose Districts or municipalities to reduce County liabilities and provide more uniform fire rescue services throughout Spartanburg County.**

   Should Spartanburg County adopt the recommendation to initiate the process to merge and consolidate fire districts as appropriate, ESCI recommends that the County work with the affected jurisdictions to determine the feasibility and sustainability of these actions. As there are currently 35 separate fire departments within the County with multiple forms of governance, tax structure, tax base, location within the County, capital equipment, facilities, and willingness to cooperate, the individual participants will impact the results and success of any merger or consolidation. Although this process has already begun between some departments within the County, a countywide change to fire and rescue deployment, structure, and governance will take several years and most likely require Council involvement. Even with willing participants, it is likely that a consolidation or merger of two departments could take as much as several months to a year or more to accomplish, depending on the complexity and differences between the jurisdictions.

   ESCI suggests that if this option is selected, that a Strategic Planning Process be initiated and the County assists consolidating or merging districts as needed to accomplish this action between willing jurisdictions first. Subsequent or concurrently, Council may also consider other actions, such as increasing or diminishing of service area boundaries, to ensure the success of these new consolidations or mergers. Depending upon the results of these voluntary consolidations or mergers, County Council may be required to take more direct action in the future to ensure the success and sustainability of the remaining jurisdictions.

   Finally, due to the need for County involvement for the foreseeable future, the County would be well-served to hire a Fire Service Coordinator. No matter which option is selected, a Fire Service Coordinator would be well-positioned to lead the County's efforts in working to merge and consolidate some fire districts pursuant to strategic planning and to coordinate the activities of the remaining fire departments.[1]

[1] *Refer to the Recommended Future Delivery System Models beginning on page 59.*

ALTERNATIVE OPTIONS

ESCI has identified the following alternative options if the primary recommendation is not pursued. These options are not recommended for the reasons explained as follows.

2. **The Council may choose to establish a County-wide fire department, or subdivision of the County, to provide fire rescue services to Fire Service Areas and any other fire jurisdiction within the County that can no longer support operations.**

   Spartanburg County has established the structure for a County fire department with the creation of the Trinity Fire Department. The County could aggressively work with the fire departments in the County to consolidate fire service areas and special purpose districts that lack adequate funding into one single Spartanburg County Fire Department.

   The creation of the Spartanburg County Fire Department could occur easily as the Trinity Fire Department is a current subdivision of the County. In this option, the County would be required to fund the department and would most likely operate across a noncontiguous service area in the future that would be comprised of rural areas with a decreased ability to generate revenues through taxes. This option would also require the hiring or appointment of a Fire Chief and command staff, as well as additional firefighters to staff County run locations.

   ESCI Does Not Recommend This Option: Spartanburg County is not well-positioned at this time to take on the added responsibilities associated with a single County-wide fire department. Funding deficiencies with respect to the operations of the Communications Center and Fire Marshal's Office, and coordination between the County and the 35 fire departments should all be addressed before the County considers expanding its public safety role.

3. **The Council may choose to maintain the status quo.**

   There always exists the option to allow current operating practices to continue unchanged. While this option requires less attention by County Council initially, over time as volunteer or combination departments within Spartanburg County become insolvent, the County will be statutorily required to provide fire services in some manner. This option will likely result in future action by the County in which either the Council facilitates the consolidation or merger of failing jurisdictions to other SPDs or municipalities, the funding of annual contracts for services by another agency, or the creation of additional subdivisions of County government to provide services.

   ESCI Does Not Recommend This Option: The existing methods for fire service delivery potentially expose Spartanburg County to varying, and sometimes significant, risk for liability. It is not in the best interest of the residents of Spartanburg County, its firefighters, or the County itself to continue the status quo.

Introduction

ACKNOWLEDGMENTS

ESCI would like to thank all of the elected and appointed officials within Spartanburg County for their assistance with the Spartanburg County Independent Fire Study. This project would not have been possible without their support.

County Council
Manning Lynch, Chairman
David Britt *Whitney Farr* *Roger Nutt*
Michael Brown *Jack Mabry* *Bob Walker*

Fire Advisory Board
Barry Frost, Chairman
Phil Caruso *Scott Miller* *Mike Comer*
Warren Ashmore *Dale Worthy* *Troy Beaudoin*

Fire Chief Association Executive Board
Scott Garrett, President
Shawn Harter *Scott Miller* *Richard Farr*

County Staff
Cole Alverson, County Administrator
Ginny Dupont, County Attorney *Mike Flynn, Communications Director*
Bill Hall, Fire Marshal *Chris Massey, ESA Director*

Emergency Services Consulting International Team

The ESCI Team for the Spartanburg County Independent Fires Study was comprised of the following members:

Stuart McCutcheon, *Director of Business Intelligence*

Mary-Ellen Harper, *Director of Operations*

Andrea Hobi, *Business Manager*

Melissa Vazquez Swank, *Quality Assurance Specialist*

Charles Berdan, *Associate*

Karie Reynolds, *Associate*

PROJECT METHODOLOGY

Spartanburg County, South Carolina, contracted ESCI to conduct a global examination of the 35 individual fire departments within the County to assist in the planning and financial decisions related to the provision of fire services.

Using organizational, operational, staffing, and geographic information system (GIS) models, this evaluation provides a comprehensive appraisal of the emergency operations of Spartanburg County as it was found at ESCI's completion of fieldwork and data collection in July 2020. ESCI based this evaluation on data provided by the County and collected during ESCI's fieldwork. It must be noted that data collection was a limiting factor in this project. ESCI encountered a variety of challenges relating to the collection, accuracy, and timeliness of some of the data provided by various stakeholders. While ESCI re-ran multiple analyses to include as much of the delinquent data as possible, the timeline for this project required that ESCI conduct some analyses with less than 100% of the requested data.

ESCI then evaluated the information that was collected against a combination of South Carolina State Laws and Regulations, National Fire Protection Association (NFPA) standards, Commission on Fire Accreditation International (CFAI) self-assessment criteria, health and safety requirements, federal and state mandates relative to emergency services, and generally accepted best practices within the emergency services community, as well as the experience of ESCI's consultants.[2, 3]

Each section in the following report provides the reader with general information about that element, as well as observations and analyses of any significant issues or conditions.

[2] *NFPA, National Fire Protection Association is a standard developing organization. Standards developed by NFPA are "voluntary consensus standards," created through procedures accredited for their consensus decision-making, openness, balance of interests represented, and fairness by the American National Standards Institute (ANSI).*

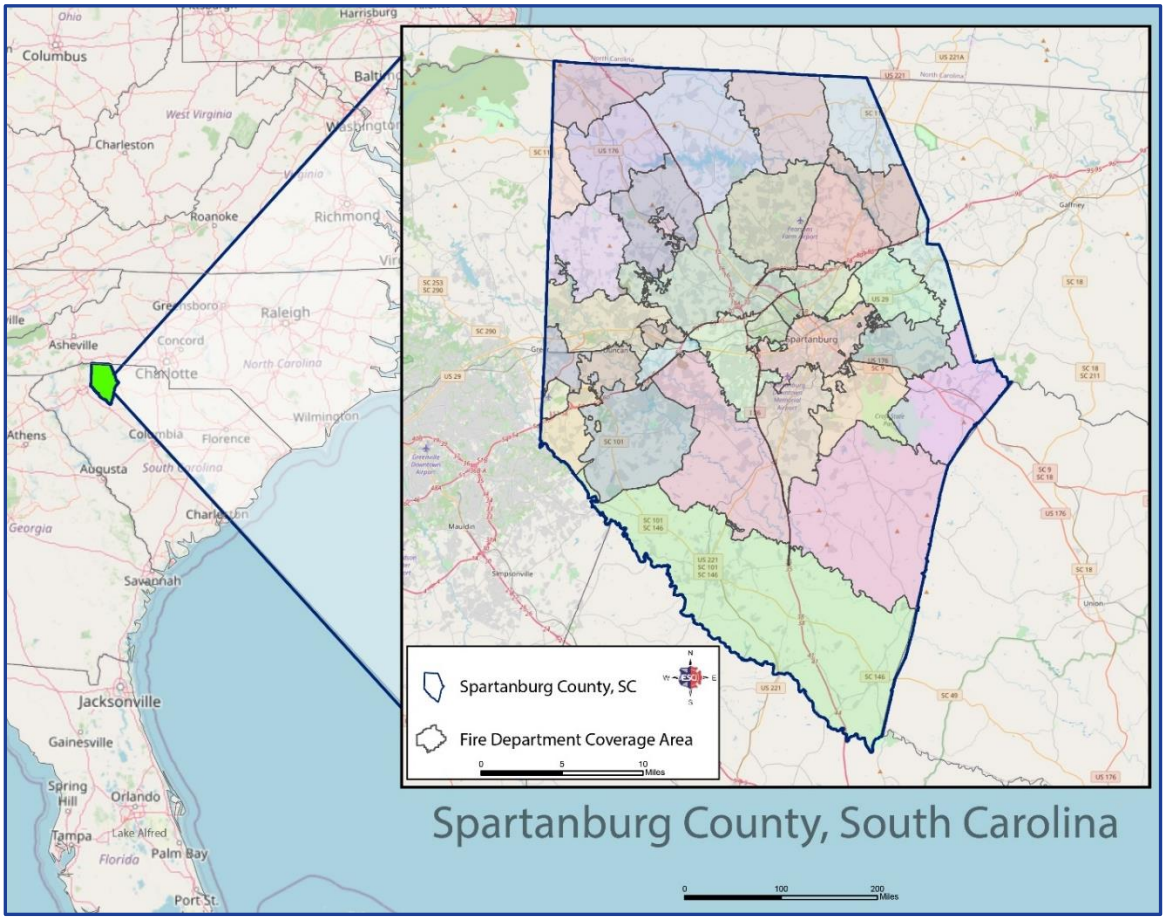
[3] *The CFAI organization is now a subsection of the Center for Public Safety Excellence (CPSE) but maintains its prime function of accrediting fire agencies.*

Community Profile

Spartanburg County

Spartanburg County was named for the Spartan Regiment, a local militia unit that fought in the Revolutionary War. It was formed in 1785, and spans 811 square miles in northwest South Carolina along the North Carolina Border. Spartanburg County borders Rutherford County, North Carolina, to the north, Cherokee County to the east, Union County to the southeast, Laurens County to the west, and Polk County, North Carolina, to the northwest. The County is 98 miles northwest of Columbia, 80 miles west of Charlotte, North Carolina, and 190 miles northeast of Atlanta.

Figure 1. Location of Spartanburg County



Spartanburg County is part of a 10-county region of northwest South Carolina that is known as "The Upstate." The population was 319,785 based on the 2019 census, making Spartanburg the fifth most populous county in South Carolina. Spartanburg County is comprised of seven cities, seven towns, 17 census-designated areas, and nine unincorporated communities.

Figure 2. Composition of Spartanburg County

Cities	
Chesnee (partly in Cherokee County)	Greer (mostly in Greenville County)
Inman	Landrum
Spartanburg (County seat)	Wellford
Woodruff	
Towns	
Campobello	Central Pacolet
Cowpens	Duncan
Lyman	Pacolet
Reidville	
Census-Designated Places	
Arcadia	Boiling Springs
Clifton	Converse
Cross Anchor	Enoree
Fairforest	Fingerville
Glendale	Gramling
Inman Mills	Mayo
Roebuck	Saxon
Southern Shops	Startex
Valley Falls	
Unincorporated Communities	
Cashville	Drayton
Little Africa	New Prospect
Moore	Pauline
Switzer	Una
White Stone	

GOVERNANCE

A Council-Administrator form of government governs Spartanburg County. Under this form of government, the County Administrator is appointed by the County Council and is assisted by a Deputy Administrator. The County Council is comprised of six council members who each represent a district within Spartanburg County, and a Council Chairman who is elected at large. Council members are elected for four-year terms.

The County Administrator is responsible for carrying out the policies and ordinances of the County Council, for overseeing the day-to-day operations of the County, and for appointing all non-elected and non-appointed County department heads.

LINES OF AUTHORITY

Chapter 34, Article IV, Sections 34 of the Code of the County of Spartanburg, South Carolina, established the "County Fire Prevention and Protection Advisory Committee," referred to hereafter in this report as "The Advisory Committee." This Advisory Committee is comprised of seven members, six members who whom are "either a Chief or Assistant Chief of a fire department and shall be appointed by county council from the geographical areas comprising county single member district numbers 1, 2, 3, 4, 5, and 6, with each of such areas having a member on the committee." The remaining one member of the committee is appointed at large by the Chairman of the County Council from a fire department and shall be a Chief or Assistant Chief of a fire department. Members are appointed for two-year terms and serve until their successors are appointed and qualified.

The Advisory Committee is charged with the following duties and responsibilities in addition to other functions as may, from time to time, be assigned to it by the County Council:

- The Committee shall advise the County Council on issues that occasionally come before the Council, which relate to the delivery of fire protection services within the County.
- The Committee shall help coordinate the efforts of all concerned agencies, organizations, and officials in the implementation of the County Fire Protection Master Plan.
- The Committee, through the adoption of a County Fire Protection Master Plan, shall assist in the development of a set of minimum standards to be adopted by County Council, including, but not limited to, those related to personnel, equipment, and training, under which the County's fire departments would operate.
- The Committee shall develop written procedures and guidelines which shall provide for a fair and equitable method of distributing supplemental funding that would help to ensure that each fire department in the County could comply with the established set of minimum standards contained in the County Fire Protection Master Plan.
- The Committee shall analyze the need for training, equipment, services, and facilities that could be provided by the County for common use by the various fire departments; and develop a prioritization schedule for such shared use.
- The Committee shall review the Fire Protection Master Plan as needed and recommend any amendments to the County Council.
- The Committee shall review requests for bond and/or debt service millage increases as allowed by state law from fire service areas within the County and make recommendations to County Council as to the reasons for and need of the requesting area to assist the County Council in making an informed decision regarding the necessary or mandatory or advisory referendums.

The Advisory Committee does not have taxing authority. An annual general fund tax levy in an amount determined by the County Council is utilized to provide supplemental funding to fire departments. The supplemental funding shall be administered by the Committee. The purpose of the supplemental funding is to assist fire departments in obtaining adequate and required equipment, structure, training, and services for fire protection services in all areas of the County. This shall include those costs incurred by fire departments which the Committee determines are necessary at the time requested and are essential to their operation and which are of a reoccurring nature to include hose testing, ladder testing, pump testing, SCBA flow testing, and physicals. Supplemental funding is also used to operate and maintain equipment used by or assists fire departments which is not otherwise provided in the budget of a County Department.

In order to receive funds administered through the fire prevention and protection advisory committee, fire departments must meet the following eligibility requirements:

1. The department must be in good standing with all County reporting requirements.
2. The department must be following the minimum standards set by the Fire Protection Master Plan.
3. Those fire departments that are prohibited from receiving funding through State Statute shall not be eligible for funds allocated through the Committee.

Organizational Design of Fire Protection in Spartanburg County

Fire Protection Services within Spartanburg County were provided by municipal fire departments and mill fire departments until the mid-1950s. If these fire departments did not respond, the property would be consumed by fire. In the late 1950s and early 1960s, there was a demand for fire protection by several communities, which resulted in the formation of Special Purpose Districts to provide fire protection by Acts of the State Legislature. Special Purpose Districts (SPDs) are governed by a Board of Commissioners who are recommended by the Spartanburg County Delegation and appointed by the Governor or which are elected via a public election within the fire district. Funding for SPDs is provided through taxes that are set by voter referendums held in each separate fire district.

The aforementioned method of forming fire districts continued into the mid-1970s when the State Legislature passed "the Home Rule Act." This Act gave the local government, including County Councils, the authority to form Fire Service Areas (FSAs) in which fire protection could be provided. Within Spartanburg County, the County Council sets the tax millage within the FSAs based on budgets that are submitted by the commissioners of the fire service areas. These commissioners are appointed by the County Council. Some Fire Service Areas surround municipalities and County Council has contracted with the municipality to provide fire protection in a County Council created fire service taxing area. Municipal fire departments in two municipalities provide fire protection within only their corporate limits.

In 1990, there were 46 fire departments within Spartanburg County, however, more than 20% of the land within the County was outside of the service boundaries of a fire department. In that year, the County Council adjusted fire district and fire service area boundary lines and placed all land parcels in Spartanburg County within the coverage area of a fire department. In 2020, there are 35 fire departments within Spartanburg County, 22 of which are Special Purpose Districts.

Figure 3. Makeup of the Fire Service in Spartanburg County

State Legislatively Created Special Purpose Districts	
Boiling Springs	Cherokee Springs
Converse	Croft
Drayton	Glendale*Includes Draper
Glen Springs-Pauline	Gowensville
Greenville-Spartanburg Airport	Hilltop
Holly Springs	Landrum
Mayo	New Prospect
North Spartanburg	Pacolet
Pelham-Batesville	Reidville
Roebuck	Startex
Westview-Fairforest	Whitney
County Council Created Fire Service Tax Areas with Advisory	
Chesnee Community	Cooley Springs-Fingerville
Inman Community	Poplar Springs
Tyger River	Una
Municipalities Surrounded by a County Council Created Fire Service Tax Areas	
Campobello	Cowpens
Duncan	(East) Greer
Municipal Fire Departments Providing Fire Protection Within Their Corporate Limits	
City of Inman* also has a small FSA area	City of Spartanburg
County Council Created Fire Department	
Trinity	

It should be noted that three Special Purpose Districts—Landrum, Gowensville, and Pelham-Batesville—are fire districts that provide services both in Spartanburg and Greenville County.

Commissioners are selected in the following ways:

Figure 4. Commissioner Selection

Special Purpose District Commissioners Recommended by the County Legislative Delegation and then Appointed by the Governor	
Boiling Springs	Converse
Croft	Drayton
Glendale	Glen Springs
GSP Airport	New Prospect
North Spartanburg	Pacolet
Pelham-Batesville	Reidville
Roebuck	Startex
Westview-Fairforest	Whitney
Special Purpose District Commissioners Elected via Public Election within the Fire District	
Cherokee Springs	Gowensville
Hilltop	Holly Springs
Landrum	Mayo
Fire Service Advisory Board Commissioners Appointed by the Spartanburg County Council	
Chesnee Community	Cooley Springs
Poplar Springs	Tyger River
Una	
Commissioners Who Are Appointed by the Membership of the Fire Department	
Inman Community	
Elected Commissioners in Fire Service Areas that Surround a Municipality within Spartanburg County and County Council Contracts for Fire Protection in the Fire Service Taxing Area	
Campobello	Cowpens
Duncan	Greer
Elected Commissioners that Protect only their Municipality	
Inman	Spartanburg
County Council Created Taxing Area with Temporary Oversight by the County Fire Prevention and Protection Advisory Committee	
Trinity	

Community Risk Assessment

The following section describes the risks and potential associated impacts to Spartanburg County. Mitigation of risks through internal and external resources is developed over time, improving the response, recovery, and resilience of the community.

The community risks detailed within this section were evaluated at the County level. While the risks described within this section will potentially impact all of the fire departments, the degree of the potential impact within each department will vary significantly across the County. This varying impact means that fire departments will have different risk priorities, which should result in department-level planning of where to locate resources to provide an effective response to emergency incidents. Appendix A includes a template that can be used for each fire department to conduct a Fire Department Community Risk Assessment.

At-Risk Populations

The *Journal of General Internal Medicine* defines "Populations at Risk" very broadly. The definition includes the poor, frail, disabled, economically disadvantaged, homeless, racial, and ethnic minorities, as well as people with low literacy.[4] The National Fire Protection Association (NFPA) *Urban Fire Safety Report* further reinforces the "at-risk" groups as:[5]

- Males
- Children under 5 years of age
- Adults over the age of 65 years
- Persons with disabilities
- Persons with language barriers
- Persons in low-income communities

Individuals within these "at-risk" population groups can reasonably be anticipated to have an increased need for fire and emergency medical services. As such, it is prudent to identify and quantify these populations within a community risk assessment to project future demand for service. As EMS represents the majority of calls for service within Spartanburg County, County departments should consider how current and future response to EMS incidents will impact their departments and communities.

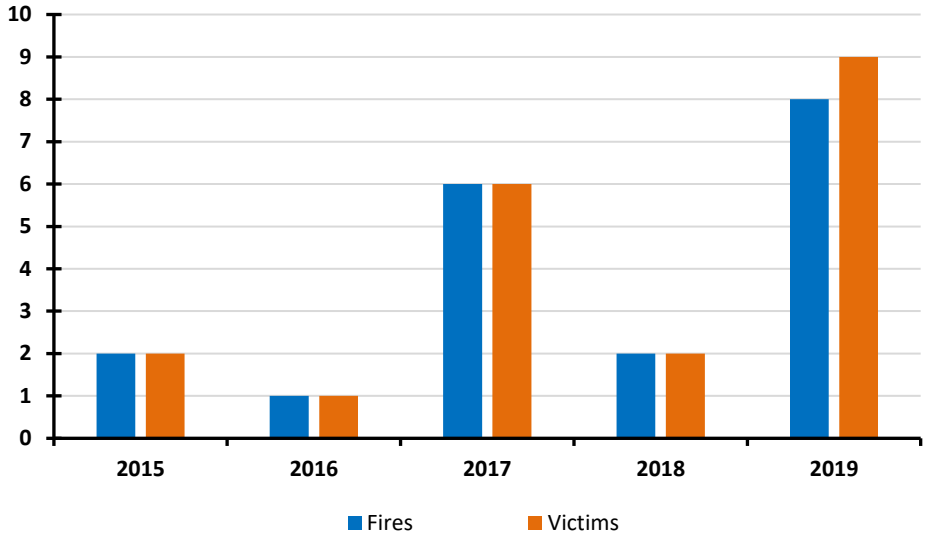
Unless otherwise identified, the figures in this section are adapted from the Environment System Research Institute (ESRI). The findings are illustrated in the following sections.

The Coroner for Spartanburg reported that there were a total of 24 fire deaths within Spartanburg County since 2015. Extenuating circumstances existed with some of these fire deaths, including intentional deaths that were not accidents. The South Carolina Office of the State Fire Marshal reports that 19 people have died in 19 different fires within Spartanburg County since 2015.

[4] *Populations at Risk. A Critical Need for Research, Funding, &75 Action. Journal of Internal Medicine (2005).*

[5] *Community Risk Reduction: Doing More with More. NFPA Urban Fire Life Safety Task Force (2016).*

Figure 5. Fire Deaths in Spartanburg County, 2015–2019[6]

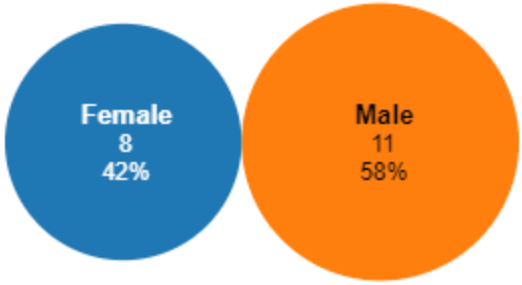


Males

Males, especially those under 25 years of age, are more prone to engage in risky activities and may require higher levels of emergency response. Additionally, males are 1.7 times more likely to die in fires than females.

Within Spartanburg County, 48.6% of the population is male. This is consistent with the state of South Carolina, of which 48.4% of the population is male and the population of the United States which is 49.2% male. Of the fire deaths in Spartanburg County since 2015, 58% were male.

Figure 6. Fire Deaths in Spartanburg County by Gender, 2015–2019[7]



[6] *https://public.tableau.com/profile/scfirs#!/vizhome/MultiYearDashboard/Dashboard1-PUBLISH*

[7] *Ibid.*

Persons by Age

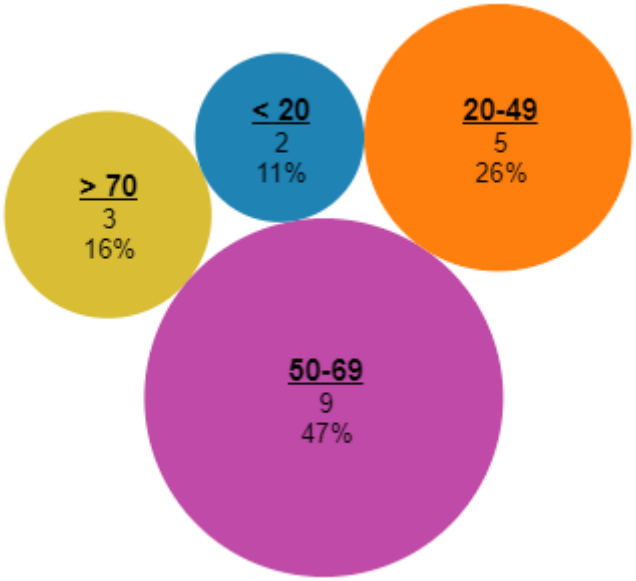
There is an increase in demand for service as a community ages. As such, there is also a corresponding increase in community risk. Quality of life issues and increased reliance on assisted living by the elderly could affect service delivery and the number of resources required due to an increase in service demand for emergency medical services.

At the opposite end of the spectrum from the elderly, the very young also represent a vulnerable population. Children often lack the ability to escape a structure fire and have an increased susceptibility to serious medical ailments such as asthma, traumatic events, choking, or injury from vehicular accidents.

Within Spartanburg County, 17.1% of the population is 65 years of age or older. This is slightly lower than the State of South Carolina, which has a population with 18.2% of its residents over the age of 65; and slightly higher than the United States, of which 16.5% of the population is over the age of 65. The age demographic of the population is an indicator that Spartanburg County can expect to see a continued and likely increased demand for emergency medical services in the coming years.

Within Spartanburg County, 63% of the people who died in fires between 2015 and 2019 were 50 years of age or older.

Figure 7. Fire Deaths in Spartanburg County by Age, 2015–2019[8]



Persons with Disabilities

Persons living with a disability may have difficulty or be incapable of self-preservation during an emergency. In Spartanburg County, there are 122,705 households. More than one quarter—27.6%, or 33,890 of these households—include at least one member with a disability.

[8] *https://public.tableau.com/profile/scfirs#!/vizhome/MultiYearDashboard/Dashboard1-PUBLISH.*

Persons Living in Poverty

Persons living in poverty experience an increased risk from fire and medical emergencies due to the age and condition of their housing, inability to pay for routine medical care, lack of medical insurance, and general health conditions. Sometimes, a lack of access to transportation leads to increased use of emergency medical care and transport. Those living below the poverty line are the most at-risk. The low-income category is often combined with other factors such as education, disability, and work status.

In the October 2018 edition of *Health Briefs*, a peer-reviewed publication supported by the Robert Wood Johnson Foundation, published "Culture of Health." The article highlighted a strong link between health and income. The key findings were that there are significant morbidity disparities between the lower- and upper-income brackets in the United States, leading to gaps in life expectancy of as much as 15 years for men and 10 years for women. The publication stated that, "Poor health also contributes to reduced income, creating a negative feedback loop sometimes referred to as the health-poverty trap."

Within the Spartanburg County, 16,164 households exist below the poverty level. This represents 13.17% of the households within Spartanburg County.

Persons with a Language Barrier

According to the NFPA, "Language barriers, cultural differences, and inexperience with unfamiliar home technologies are factors that mark the challenges of helping newcomers live safely from the threat of fire in the home." By itself, speaking a language other than English at home does not directly contribute to a higher risk of emergencies; however, if a person has difficulty speaking English, it may contribute to negative outcomes during an emergency.

Within Spartanburg County, a language other than English is spoken in 10.1% of the households.

Land Use

Current and future land use plans have a direct impact on risk within a community. For example, open space zoning and low-density residential development are considered low-risk. Moderate risk zoning would include medium-density residential development, low-intensity retail, and professional office or business. High-risk zoning includes mixed-use areas, high-density residential, industrial, warehousing, and large retail, or mercantile centers.

Spartanburg County currently operates under two land use ordinances—the Performance Zoning Ordinance in the Southwest Planning Area and the Unified Land Development Ordinance that is in place throughout the rest of the County. Unlike traditional Euclidean zoning ordinances, neither the Performance Zoning nor the Unified Land Development ordinance assigns a zoning classification such as residential or commercial.

Housing Type and Density

An important indicator of the risk in the community involves property value, occupancy rate, and ownership status of homes in the community's neighborhoods. Often, homes with lower value, vacant homes, and rental properties are maintained and repaired less often than those in higher value categories. Conversely, owner-occupied homes are often repaired and maintained more often, with owners seeking to maintain and improve property value.

According to NFPA, the top five causes of fatal fires (which account for 90% of fire deaths) are cooking, heating, electrical, intentional, and smoking. Fires of these types occur in all residence types and should be foundational in fire prevention campaigns aimed at homeowners and renters alike.

Fire suppression systems (fire sprinklers) are proven life-saving devices, with more than 125 years of empirical data serving to document their effectiveness. However, in the United States, fire sprinkler systems remain elusive in residential properties, especially in one-and two-family dwellings.

In residential properties, 36.6% are heated with natural gas, propane, or wood. These residences face increased risks of carbon monoxide poisoning compared to all-electric homes found in much of the community. Education programs regarding carbon monoxide poisoning prevention, heating and cooking appliance maintenance, and carbon monoxide detector use would benefit these residents.

The median home value in Spartanburg County is $150,992, but 78% of the homes in Spartanburg County are valued at $250,000 or more. This information is important to the overall understanding of the community as it provides insight into the income and preferences of the community's residents.

Among the residential housing units in Spartanburg County, almost 74% were constructed prior to the year 2000, the year when widespread smoke detector installation requirements were launched in model construction codes. Statistics show that smoke detectors improve human survival in residential fires by at least 50%, proving the program is worth the effort.

Target Hazards/Critical Infrastructure and Key Resources

FEMA defines Target Hazards as "facilities in either the public or private sector that provide essential products and services to the general public, are otherwise necessary to preserve the welfare and quality of life in the community, or fulfill important public safety, emergency response, and/or disaster recovery functions." The NFPA further breaks these down into four risk categories for occupancies.

- **High-Risk Occupancy:** An occupancy that has a history of a high frequency of fires, high potential for loss of life or economic loss, or that has a low or moderate history of fires or loss of life but the occupants have a high dependency on the built-in fire protection features or staff to assist in evacuation during a fire or other emergency.
- **Moderate-Risk Occupancy:** An occupancy that has a history of a moderate frequency of fires or a moderate potential for the loss of life or economic loss.
- **Low-Risk Occupancy:** An occupancy that has a history of a low frequency of fires and minimal potential for life or economic loss.
- **Critical Infrastructure:** The assets, systems, and networks, whether physical or virtual, that are so vital to the community that their damage or destruction would have a debilitating effect.

Examples of critical infrastructure or target hazards can include the following:

- Hospitals
- Assisted living centers
- Community shelters
- Schools
- Airports
- Important government offices and buildings
- Assembly Occupancies
- Hazardous materials sites
- Roadways
- Utilities

Critical Infrastructure and target hazards within Spartanburg County include the following:

Hospitals

- Spartanburg Medical Center
- Pelham Medical Center
- Spartanburg Hospital for Restorative Care
- Gibbs Cancer Center & Research Institute
- Bearden-Josey Center for Breast Health
- Medical Group of the Carolinas
- Regional HealthPlus
- Woodruff Manor
- The Sports Medicine Institute

Schools

Spartanburg County is served by the Spartanburg County School System, which is divided into seven districts. Some of the districts share a vocational school, and also share the McCarthy Teszler School, a special education school.

Colleges and universities within Spartanburg County include:

- Converse College
- Edward Via College of Osteopathic Medicine
- Sherman College of Chiropractic
- Spartanburg Community College
- Spartanburg Methodist College
- University of South Carolina Upstate
- Wofford College

Government Offices and Buildings

Spartanburg County's government consists of more than 80 facilities that accommodate everything from core County services to State agencies required to be housed by the County as per State statute. This includes:

- **Emergency Operations:** Communications/9-1-1, Emergency Management Services, Emergency Services Academy, Radio Towers
- **Community Services:** Courthouse, Department of Juvenile Justice, Detention, Probation, Parole and Pardons, Sheriff
- **Public Works:** Parks and Recreation, Environmental Enforcement, Fleet Services, Traffic Division, Sign Shop, Wellford Landfill, Solid Waste Building, Collection Centers
- **Public Health:** Nurse and Health Departments

Employers with 500 or More Employees

The following companies within Spartanburg County employ 500 or more employees:

Figure 8. Companies in Spartanburg County with 500 or More Employees[9]

Employers (Listed Alphabetically)
1. Adidas Store
2. America Fujikura Ltd.
3. BMW Manufacturing
4. Charles Lea Ctr.
5. City of Spartanburg
6. Greenville Spartanburg Intl.
7. Kohler Co.
8. Lea Center
9. Milliken & Co.
10. Pelham Medical Ctr.
11. Sage Automotive Interiors
12. Sealed Air Corp.
13. Spartanburg County
14. Spartanburg Medical Ctr.—Mary
15. Spartanburg Regional
16. Spartanburg Steel Products Inc.
17. State-SC School for the Deaf
18. Sylvan Chemical Co. Inc.

[9] *https://jobs.scworks.org.*

Transportation Systems

Railroads

Railroads and interstate highways are both community risks affecting the majority of the service area. Rail service in Spartanburg County is provided by CSX Transportation, Norfolk Southern Corporation, and Amtrak. CSX Transportation operates the longest track routes in South Carolina. Norfolk South Corporation operates the second-longest track routes within the state in cooperation with the South Carolina Port Authority operates an inland port in Greer, South Carolina.

Train derailments within the County will disrupt services for not just the fire department, but also other emergency services and the general public. Depending on the commodity involved in a derailment, it may require considerable outside assistance to mitigate the situation. Reported train incidents occurred within Spartanburg County in 2011 and 2015.

Interstates

The road network within Spartanburg County includes four interstates—26, 85, 85 Business, and 585. The following figure includes a description of each of these interstates.

Figure 9. Interstates in Spartanburg County

Interstate	Description
Interstate 26	Interstate 26 runs east-west from near Landrum, in Spartanburg County, to U.S. Route 17, in Charleston, South Carolina. It is the longest interstate highway in South Carolina.
Interstate 85	Interstate 85 runs northeast-southwest through Upstate South Carolina and connects regionally with Atlanta, Georgia, and Charlotte, North Carolina.
Interstate 85 Business	Interstate 85 Business is a business loop of the Interstate Highway System; it is the only freeway to connect with Interstate 585, which is now an isolated piece of the Interstate Highway System.
Interstate 585	Interstate 585 is a spur route of I-85, which connects Spartanburg, South Carolina.

Airports

There are two public airports located within Spartanburg County—the Greenville-Spartanburg International Airport and the Spartanburg Downtown Memorial Airport. The Greenville-Spartanburg International Airport serves more than 2.6 million passengers each year. The airport hosts five major airlines that average 50 nonstop daily departures to 17 U.S. cities. In addition to passenger flights, the Greenville-Spartanburg International Airport is home to a 120,000 square-foot FedEx facility, a 110,000 square-foot Cerulean cargo facility with a 13-acre apron, which accommodates up to three Boeing 747-800 freighter aircraft simultaneously and a UPS cargo facility.

The City of Spartanburg owns the Spartanburg Downtown Memorial Airport. The airport is staffed by eight full-time and one part-time employee and serves more than 100 local aircraft and 5,000 general aviation airports throughout the U.S., as well as corporate jets from many of Spartanburg's largest companies.

Multiple hazards are associated with the airports and the areas that are immediately adjacent to the airports. Potential issues include terrorism, communicable diseases, or an airplane crash during approach or departure. Aboveground fuel storage tanks are located on airport property, and a fire or spill could affect the population near the airport. Two plane incidents occurred within Spartanburg County within the last decade—one in 2013 and the other in 2015.

Utilities

Electric service in Spartanburg County is provided by Duke Energy, Broad River Electric Cooperative, Laurens Electric Cooperative, Lockhart Power Company, and Greer Commission of Public Works. Duke Energy is the largest of these providers.

The largest water provider within Spartanburg County is the Spartanburg Water Commission. Water within the County is also provided by Greer CPW, Meansville Riley, and Blue Ridge Rural Water Company, the Startex-Jackson-Wellford-Duncan Water District, Woodruff-Roebuck Water District, and the Inman-Campobello Water District.

Natural and Human-Made Hazards

It is possible to prepare and improve resiliency, which historically has led to improved recovery and reduced effects or impacts to the extent feasible from natural and human-made disasters. Preparatory examples include levee systems, elevating or burying critical infrastructure, training systems, policy reform, early warning, and mass notification systems, interlocal agreements, and related efforts.

Climate and Weather Patterns

The Federal Emergency Management Agency (FEMA) assists states, counties, and localities that experience significant hardship during and after a natural disaster. Accordingly, FEMA maintains a database that documents federally supported and declared disasters. FEMA reports 16 declared disasters within Spartanburg County since 1977. These disasters include six hurricanes/tropical storms, four severe ice/winter storms, four severe storms, a drought, and a biological event. The following figure lists each of the FEMA declared disasters in Spartanburg County.

Figure 10. FEMA Declared Disasters in Spartanburg County[10]

Year	FEMA Declared Disaster
1977	Drought
1990	Severe Storms and Flooding
2000	Severe Winter Storm
2003	Severe Ice Storm
2004	Tropical Storm Frances
2005	Hurricane Katrina Evacuation
2006	Severe Ice Storm
2014	Severe Winter Storm
2015	Severe Storms and Flooding
2015	Severe Storms and Flooding
2016	Hurricane Matthew
2017	Hurricane Irma
2018	Hurricane Florence
2019	Hurricane Dorian
2020	COVID-19 Pandemic
2020	Severe Storms, Tornadoes, Straight-Line Winds and Flooding

Spartanburg County last updated its Multi-Jurisdictional Hazard Mitigation Plan in April 2017. This plan was prepared in coordination with FEMA Region IV and the South Carolina Emergency Management Division to ensure compliance with all applicable FEMA and state requirements.

The Spartanburg County Multi-Jurisdictional Hazard Mitigation Plan was designed to focus is on those hazards that, following a risk assessment and scoring process, were determined to be "high" and "moderate." This prioritization allows Spartanburg County and the participating jurisdictions to deploy resources in a way that has the most impact on preserving lives and property. As part of this plan, Spartanburg County was found to be at risk for the following high and moderate-risk hazards.

[10] *https://www.fema.gov/data-visualization-disaster-declarations-states-and-counties.*

High-Risk Hazards

Winter Storm and Freezes

Winter storms create an increased risk of car accidents, hypothermia, frostbite, carbon monoxide poisoning, and heart attacks from overexertion. Winter storms can bring extreme cold, freezing rain, snow, ice, and high winds. While winter in Spartanburg County is normally moderate with low temperatures in the 30s, these temperatures do allow for snow and ice. There have been 76 recorded winter events within the County since 1996.

Severe Thunderstorm/High Winds

Dangers associated with thunderstorms include tornadoes, strong winds, hail, and flash flooding. There have been 491 severe thunderstorm/high wind events reported in Spartanburg County since 1955.

Floods

A flood is "two or more acres of dry land or two or more properties that are covered by water temporarily." There have been 62 flood events recorded in Spartanburg County since 1996.

Hazardous Materials Incidents

In accordance with the Superfund Amendment and Reauthorization Act of 1986, each county in South Carolina was directed to establish a Local Emergency Planning Committee, composed of certain elements of both government and private industry, as well as the media and local environmental organizations. The mission of the Local Emergency Planning Committee is to protect the community from harmful and possibly life-threatening effects of a hazardous materials release by developing and implementing policies and procedures.

Any fixed facility with an Extremely Hazardous Substance (EHS) at the Threshold Planning Quantity (TPQ), or 500 pounds, whichever is less, as identified in the US EPA Title III consolidated list of lists, is required to report. An example of the TPQ/500 pounds requirement is sulfuric acid, which has a TPQ of 1,000 pounds that drops to 500 pounds for Tier II reporting. Any fixed facility with 10,000 pounds, or more, of a material with a Material Safety Data Sheet (MSDS) that indicates an OSHA communicated health hazard, is required to report.

There have been 611 reported hazardous materials incidents within Spartanburg County since 1971. Forty-three of these incidents were reported as serious. These incidents resulted in eight deaths and 11 injuries.

Tornadoes

FEMA defines a tornado as a violently rotating column of air that extends from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of one mile wide and 50 miles long. There have been 29 recorded tornado events reported in Spartanburg County since 1952.

Moderate-Risk Hazards

Droughts

FEMA defines a drought as being a period without substantial rainfall that persists from one year to the next. Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of anticipated natural precipitation reduction over an extended period, usually a season or more in length. There have been two years since 2006 where drought conditions have been reported as extreme in Spartanburg County.

Wildfires

FEMA defines a wildfire is a large, destructive fire that spreads quickly over woodland or brush. There is an average of 35 fires per year reported in the County.

Heat Wave/Extreme Heat

Extreme heat is characterized by a combination of exceptionally high temperatures—usually ten degrees or more above average—and humidity. When these conditions persist over a period, it is called a heat wave. Although heat can damage buildings and facilities, it presents a more significant threat to the safety and welfare of residents.

According to the National Weather Service, heat is one of the leading weather-related killers in the United States, resulting in hundreds of fatalities each year and even more heat-related illnesses. Individuals who are subject to extreme heat are encouraged to drink plenty of cool fluids, wear lightweight clothing, and to limit physical activity. There have been three recorded extreme heat events since 1996. Future occurrences are possible.

Lightning

In the United States, an average of 300 people are injured and 80 people are killed each year by lightning. Although most lightning victims survive, people struck by lightning often report a variety of long-term, debilitating symptoms. There have been 32 recorded lightning events since 1996. Two deaths and 12 injuries occurred from these events.

Evaluation of Fire Service Current Conditions

The Evaluation of Current Conditions provides a summary of agency composition, configuration, and services provided by Spartanburg County. ESCI analyzed data provided by the staff and representatives of Spartanburg County. In addition, ESCI combined interviews with line personnel, supervisory and administrative staff, and elected/appointed officials, with information collected during ESCI's fieldwork and subsequent research to develop the following overview.

The purpose of this section is two-fold. First, it verifies the accuracy of baseline information along with ESCI's understanding of the agency's composition and operations. This section provides the foundation from which ESCI developed the Independent Fire Study. Secondly, the overview serves as a reference for the reader, who may not be fully familiar with the details of the County's operations.

The following evaluation and analysis of data and other information is based primarily on the internal data provided by Spartanburg County, the County's demographic information, and other external resources. The Current Conditions section compares the Fire Service in Spartanburg County and its operations to industry best practices, National Fire Protection Association (NFPA) standards, Commission on Fire Accreditation International (CFAI) self-assessment criteria, health and safety requirements, national mandates relative to emergency services, and generally accepted best practices within the emergency services community.

Stakeholder Assessments

ESCI team members conducted 21 different listening sessions over three days in May and July 2020. The purpose of these sessions was for ESCI to understand the expectations that exist for the fire service within Spartanburg County. Stakeholder groups included Fire Chiefs from throughout the County, as well as both elected and appointed County officials.

ESCI found the listening session participants to be a group of individuals that were dedicated to delivering quality fire and emergency medical response within Spartanburg County. Throughout the course of the three days of listening sessions, however, ESCI also found that these dedicated individuals had many concerns about the sustainability, infrastructure, staffing, and funding of the current fire service delivery model.

Appendix B and C provide a summary of the meetings with the Fire Chiefs.

Appendix I provides a summary of the two different processes that were used to validate the current conditions identified in this report and to allow for stakeholder questions and feedback.

Financial Analysis

Financial analysis is an important part of determining the long-term financial health and sustainability of Spartanburg County and its ability to maintain an acceptable level of service. ESCI has reviewed current financial information, including tax mil rates, capital equipment, contracts, and the sustainability of the current system.

ESCI suggests that the current model for fire protection delivery in Spartanburg County is financially inefficient. The results of the Financial Evaluation are included in this report as Appendix D.

Management and Staffing

Spartanburg County's greatest asset is its people. Special attention must be paid to managing human resources in a manner that achieves maximum productivity while ensuring a high level of job satisfaction for the individual. Consistent management practices combined with a safe working environment, equitable treatment, the opportunity for input and recognition of the work force's commitment, and sacrifice are key components impacting job satisfaction.

Effective fire department management is a complicated and expanding challenge for every fire service leader. With increasing complexity comes increased costs. Today's fire rescue agency must address management complexities that include an effective organizational structure, setting and measuring levels of service, staying abreast of new technologies and methods, evaluation and maintenance of a qualified force, staff development for effective succession, and financial sustainability for the future.

ESCI noted significant inconsistencies in fire service delivery within the County, including levels of service, staffing, training, and varying levels of compliance with laws, regulations, national standards, and industry best practices. Interactions between the fire departments, the Communications Center, and the Fire Marshal's Office were also reported to be often inefficient and unproductive. ESCI further suggests that there are too many fire departments in Spartanburg County to be effectively staffed by the current number of paid and part-time firefighters that are presently employed within the County and that volunteer firefighters are not a sustainable workforce in Spartanburg County.

The results of the Management Components and Staffing Evaluation are included in this report as Appendix E.

Capital Improvement Programs

Capital assets include the facilities and apparatus that are dedicated to achieving the mission of Spartanburg County.

ESCI's review of the surveys submitted by the fire departments within Spartanburg County identified fire stations in varying degrees of building age, condition, and operational efficiency. Additionally, the geographic locations of some fire stations are not ideal for the delivery of fire and emergency services, as is detailed within the Fire Station Location and Optimization Analysis section of this report.

ESCI further noted that when comparing the number of firefighters on duty to the number of apparatus, Spartanburg County is heavy on apparatus. The cost of maintaining apparatus places a significant burden on a fire department's operating budget in addition to the burden that replacement costs incurred on the capital budget.

The Capital Improvements Evaluation is included in this report as Appendix F.

Support Services

Support services are those functions that "support" the operational efforts of the fire service. The Support Services Section of the Spartanburg County Independent Fire Study includes evaluations of the following components:

- Training
- Emergency Medical Services
- Fire Prevention
- Hazardous Materials Services and Support Response Capability
- Technical Rescue Services and Support Response Capability
- Emergency Communications Center

ESCI's evaluation of the Support Services within Spartanburg County identified specific opportunities for performance improvement with respect to all six of the aforementioned components.

The Support Services Evaluation is included in this report as Appendix G.

Analysis of Service Delivery and Performance

The most important—and usually the most visible—element of operations for an emergency services organization is the ability to deliver service in a timely fashion. Before goals for the efficiency and effectiveness of the organization can be set, it is imperative to first establish an understanding of how the service is currently organized, deployed, and managed.

The study of Service Delivery and Performance allows an organization to evaluate multiple facets of their system. Evaluation points include:

- When and where incidents are most likely to occur,
- How often incidents occur in a given location, and
- Areas where resources are unable to reach that location in a given period of time.

ESCI used data supplied by the Spartanburg County ECC to analyze how multiple variables throughout the service delivery system affected the fire departments' ability to deploy emergency resources, as well as to provide baseline performance metrics for service delivery. The information reported was obtained directly from the ECC and reflected the data contained within that database. ESCI recognizes that this may differ from data reported at an individual department level; however, an in-depth analysis of every fire department's RMS data for comparison and performance analysis is outside the scope of this study. All Spartanburg County departments should consider a further evaluation of their own individual response data to ensure the accuracy of the information collected and provide training to those individuals who create internal incident reports.

Service Demand Zones

Within Spartanburg County, a wide range of variations in capabilities is found from department to department. While some departments serve predominately urban jurisdictions with all career staff, others service suburban and rural areas with a mix of career, combination, and fully volunteer firefighters.[11] Because of this range of diversity, one standard alone is not appropriate for measuring performance capabilities. In Figure 11, a table outlining NFPA 1720: *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments* is shown to provide a foundation for expectations of these diverse fire departments and the areas they provide service.

[11] *A combination fire department is a department comprised of not more than 85% of career or volunteer membership.*

Figure 11: NFPA 1720 Staffing and Response Time

Demand Zone	Demographics	Minimum Staff to Respond	Response Time (minutes)	Meets Objective
Urban Area	> 1,000 people/mi²	15	9	90%
Suburban Area	500–1,000 people/mi²	10	10	80%
Rural Area	< 500 people/mi²	6	14	80%
Remote Area	Travel distance ≥ 8 mi	4	Directly dependent on travel distance	90%
Special Risks	Determined by AHJ	Determined by AHJ based on risk	Determined by AHJ	90%

Within this table, population density is used to account for varying levels of capabilities expected for different types of service areas. For example, in urban areas, it would be expected that a larger number of firefighters would be available for response in a faster amount of time than would be possible for a department serving rural or remote areas due to the number of people and population densities of the jurisdiction. Additionally, the ability to fund larger operations is typically easier in areas with high populations and commercial or industrial occupancies than communities comprised of sparsely populated residential housing. In urban population densities, the standard for response is nearly identical to the requirements for career departments outlined in 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*, which will be addressed in the resource distribution section.

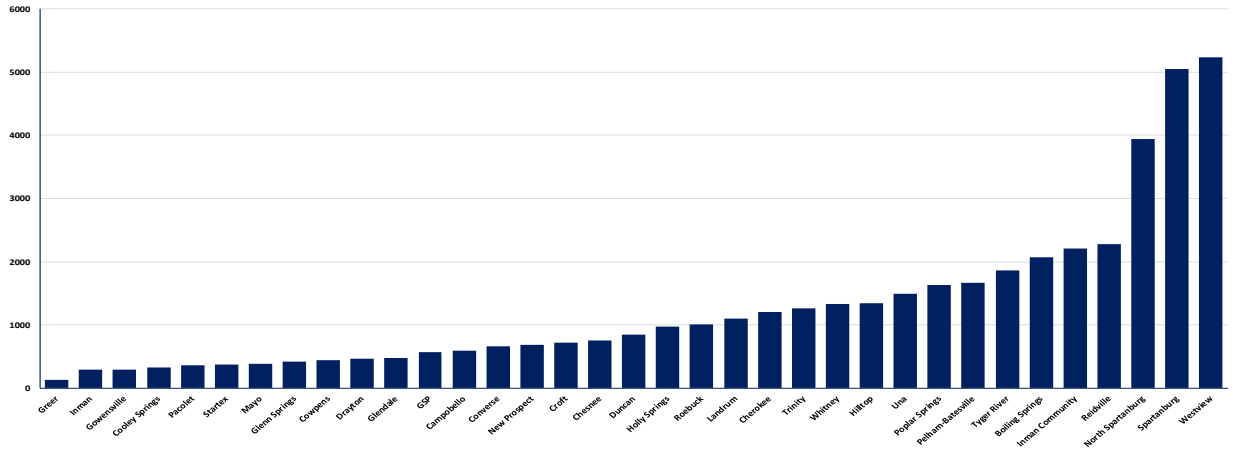
ESCI suggests that Spartanburg County fire departments use NFPA 1710 and 1720 as a benchmark for establishing performance goals for their respective jurisdictions. This will allow each department to account for the expectations and funding abilities of their communities.

Service Demand Analysis

Annual calls for service provide a foundation for discussion on service demand trends for each fire department within Spartanburg County.

The following figure displays total service demand for the previous two calendar years (2018–2019). The incidents displayed below represent all incident types dispatched within the given jurisdiction. Also included within these figures are departments that primarily operate in other counties such as Greer, Gowensville and Pelham-Batesville. The numbers presented in these figures are specific to dispatches from Spartanburg County Emergency Communications Center and not reflective of the total service demand.

Figure 12. Total Service Demand, 2018–2019



To provide a more detailed view of the numbers and types of service demands within each jurisdiction, Figure 13 provides a breakdown of incident types by department and year for 2018–2019. Also included is the County-wide total calls for response assistance. Categories used in this analysis are based upon the National Fire Incident Reporting System (NFIRS) guidelines for grouping of incident types. Within the NFIRS classifications, the following incident types are grouped within the corresponding series:

- 100 Fires
- 200 Overheat/Overpressure
- 300 EMS
- 400 Hazardous Conditions
- 500 Service Call
- 600 Good Intent
- 700 False Alarms
- 800 Severe Weather
- 900 Special Incident

Figure 13. Service Demand by Department, Year, and NFIRS Type

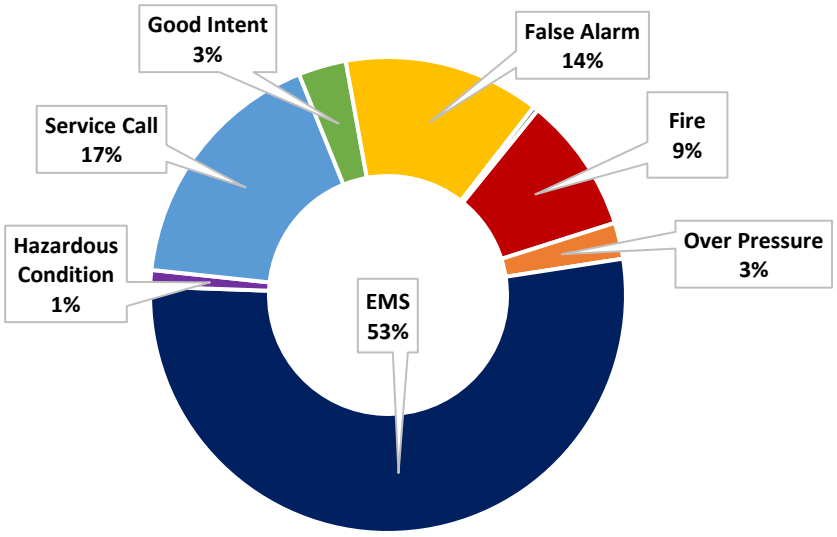
	2018									2019								
	Fire	Over Pressure	EMS	Hazardous Condition	Service Call	Good Intent	False Alarm	Severe Weather	Special Incident	Fire	Over Pressure	EMS	Hazardous Condition	Service Call	Good Intent	False Alarm	Severe Weather	Special Incident
Fire County Wide	33	1	44	5	42	2	9	1	5	39	2	21	2	17	0	12	0	2
Boiling Springs	116	29	428	10	278	26	128	0	9	100	22	392	6	362	24	139	0	5
Campobello	28	17	178	12	34	10	34	0	1	17	14	176	10	33	2	19	0	1
Cherokee	43	8	392	6	49	25	42	0	1	45	4	461	5	59	16	46	0	1
Chesnee	52	23	144	18	113	15	25	0	6	72	14	97	6	116	19	21	0	9
Converse	45	24	102	11	84	21	22	0	1	41	18	112	10	105	11	55	0	2
Cooley Springs	42	5	57	14	43	5	13	0	1	26	7	45	1	38	12	14	0	0
Cowpens	45	25	80	6	72	3	20	0	0	23	8	72	4	55	6	17	0	1
Croft	39	18	101	9	102	17	83	0	2	39	20	108	4	83	17	75	0	1
Drayton	17	6	44	2	39	24	103	0	2	19	1	44	0	53	16	91	0	0
Duncan	49	30	161	11	88	29	47	0	1	55	16	177	2	93	32	52	0	0
Glendale	27	25	69	5	64	8	41	0	0	28	16	72	8	55	4	57	0	0
Glenn Springs	36	13	63	8	40	13	29	0	0	42	4	65	7	58	10	25	0	0
Gowensville	15	7	113	7	10	1	6	0	0	8	5	109	0	6	1	3	0	0
GSP	8	0	191	22	13	2	34	0	3	5	1	221	20	9	3	21	0	11
Hilltop	30	7	527	3	58	10	35	0	1	38	4	495	1	73	21	33	0	2
Holly Springs	39	18	334	11	78	8	21	0	6	40	18	292	3	76	2	27	0	1
Inman	22	8	35	6	55	3	28	0	0	13	9	28	5	51	4	17	0	2
Inman Community	77	24	798	11	92	16	25	0	0	59	19	907	4	106	18	50	0	0
Landrum	50	30	342	22	75	7	39	0	8	55	18	303	16	98	9	28	0	1
Mayo	20	4	76	7	68	9	6	0	1	23	7	91	2	54	2	8	0	1
New Prospect	63	23	115	23	88	7	27	0	1	62	9	105	6	107	5	34	0	5
North Spartanburg	130	27	1370	12	231	44	186	0	3	141	25	1317	11	210	44	182	0	5
Pacolet	26	10	68	8	47	2	28	0	2	29	11	53	4	50	1	18	0	0
Pelham-Batesville	60	15	683	8	88	28	170	0	2	48	7	298	2	53	26	175	0	1
Poplar Springs	54	21	343	5	112	18	98	0	3	65	20	563	10	125	20	173	0	2
Reidville	87	10	762	10	132	20	157	0	7	81	11	713	10	144	19	110	0	5
Roebuck	58	33	180	9	113	23	73	0	1	58	23	189	7	114	26	98	0	1
Spartanburg	329	134	862	24	422	83	764	0	7	269	112	766	19	417	121	716	0	5
Startex	16	2	55	2	20	32	76	0	0	16	2	55	2	19	19	60	0	1
Trinity	94	32	229	18	136	37	102	0	2	89	26	215	17	157	39	66	0	2
Tyger River	51	25	642	11	216	29	64	0	1	63	17	356	8	229	37	106	0	2
Una	67	13	470	6	102	11	53	0	4	88	8	516	9	96	4	44	0	0
Westview	144	28	1849	10	235	134	278	0	1	156	16	1710	20	284	106	258	0	2
Whitney	53	18	388	6	145	17	53	0	4	50	20	388	1	138	13	40	0	1

* The City of Greer internally provides dispatch and is not included with Spartanburg County ECC statistics.

The highest levels of demand in Spartanburg County occur within the City of Spartanburg and to the north and west of the City. Additionally, when compared to each other, EMS related calls represent most responses for agencies with the greatest levels of demand.

Overall, county-wide demand by incident type provides support to EMS, representing most of the demand for Spartanburg County fire departments. Figure 14 illustrates call types based on NFIRS classifications County-wide in 2019.

Figure 14. Frequency of Incident Types within Spartanburg County, 2019

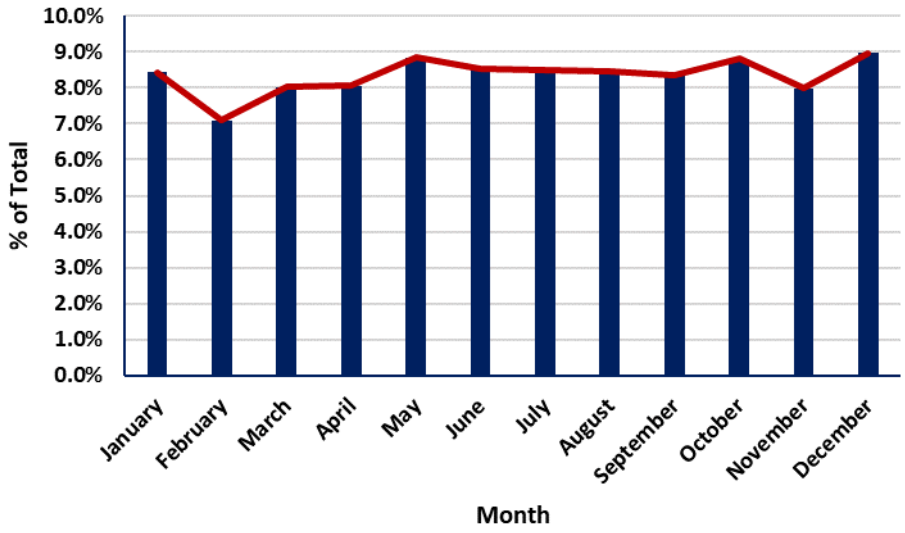


As displayed in this figure, responses to EMS incidents are over half of the service demand within the County. Additionally, responses to non-emergency type incidents, such as good intent, false alarms, and service calls, made up approximately one-third (33.8%) of fire department responses in 2019. Due to the diversity of service areas, size of the County, and number of individual fire departments, it would be difficult for Spartanburg County to reduce the number of resources committed to nonemergent responses; however, differences or errors in data collection and reporting may also be a contributing factor to the abnormally high levels of non-emergency responses by fire departments within the County.

Temporal Variation

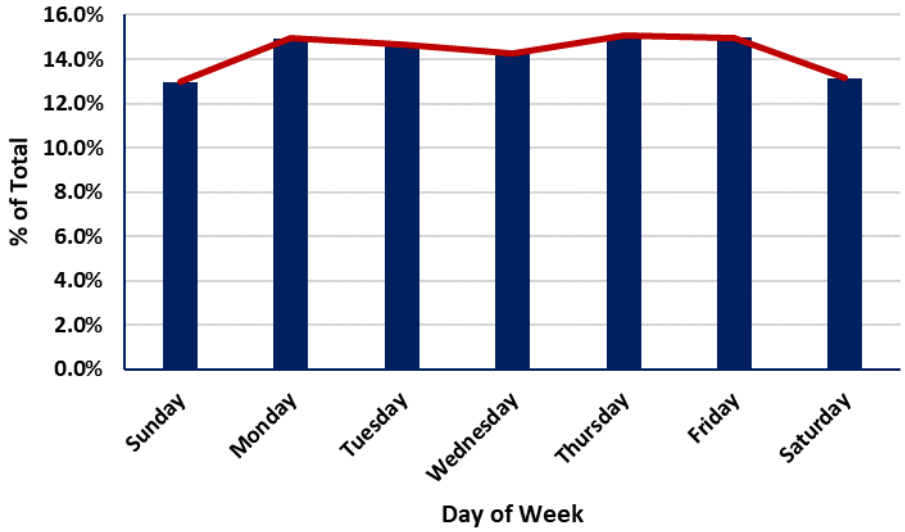
Temporal variation analyses are the patterns of activity occurring within certain periods of time. In this section, these patterns are displayed by month, day, and hour to provide Spartanburg County with insights as to when increases and decreases in service demand based on historical patterns are anticipated. In Figure 15, the temporal variation by the month of the year for Spartanburg County is shown.

Figure 15. Service Demand by Month, 2018–2019



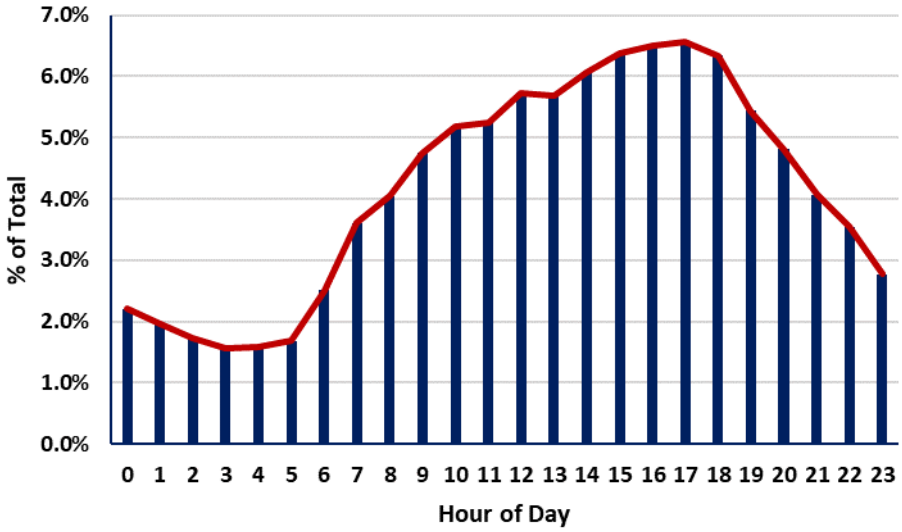
The demand for fire rescue services is fairly consistent across the year, with December representing the greatest levels of service demand and February the least. In the next figure, service demand patterns are displayed by the day of the week for 2018 through 2019.

Figure 16. Service Demand by Day of Week, 2018–2019



Within the County, service demand increases during the work week and decreases on the weekends. This is a typical pattern seen across the U.S. and suggests that increased levels of activity, such as weekday commuter traffic during the work week, will result in higher levels of demand for fire departments. Finally, the demand for services by the hour of the day is examined.

Figure 17. Service Demand by Hour of Day, 2018–2019



Once again, service demand within Spartanburg County increases during the period of the day when people are most active, from approximately 8 a.m. through 8 p.m., with the greatest levels of activity occurring around the afternoon commute from 4 p.m. to 6 p.m.

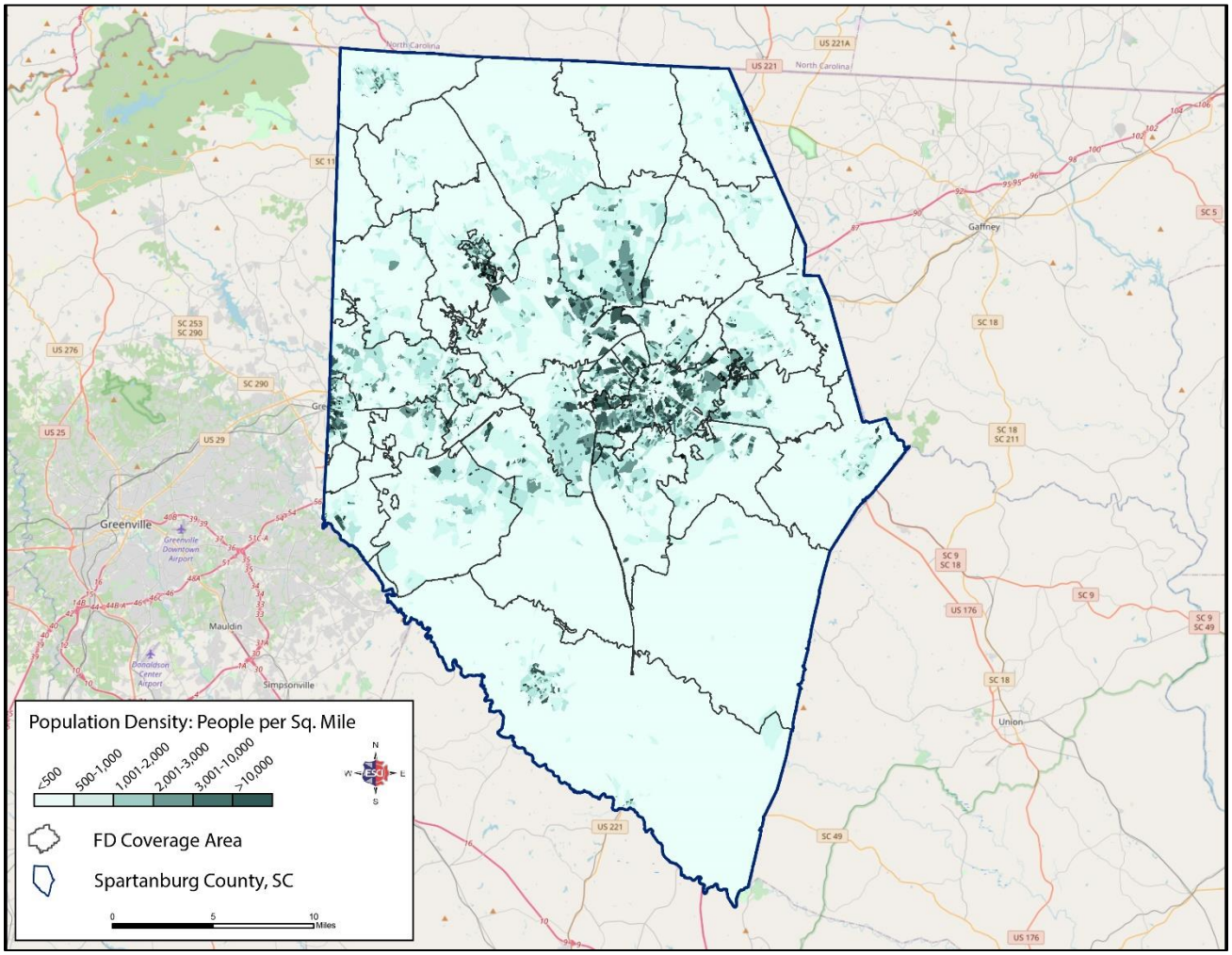
Of note is that while demand is lower in the early morning hours, fatal residential fires occur most frequently late at night or in the early morning. From 2014 to 2016, fatal residential fires were highest between 1:00 a.m. to 2:00 a.m. The 8-hour peak period (11:00 p.m. to 7:00 a.m.) accounted for 48% of fatal residential fires.

Population Density and Geographical Demand

A major contributing factor to the levels of service demand experienced by fire departments within Spartanburg County is the population densities of the areas served within each jurisdiction. For example, the City of Spartanburg is an urban municipality, with many of its developed areas exceeding population densities of 3,000 people per square mile while areas within Glenn Springs are largely rural in nature.

Figure 18 displays population density by U.S. Census blocks, the smallest unit of division available from the census bureau. Using proprietary software by Esri, population density information for 2020 was compiled by census blocks and displayed. Detailed census block information from the U.S. Census is updated every ten years following the completion of the U.S. Census survey.

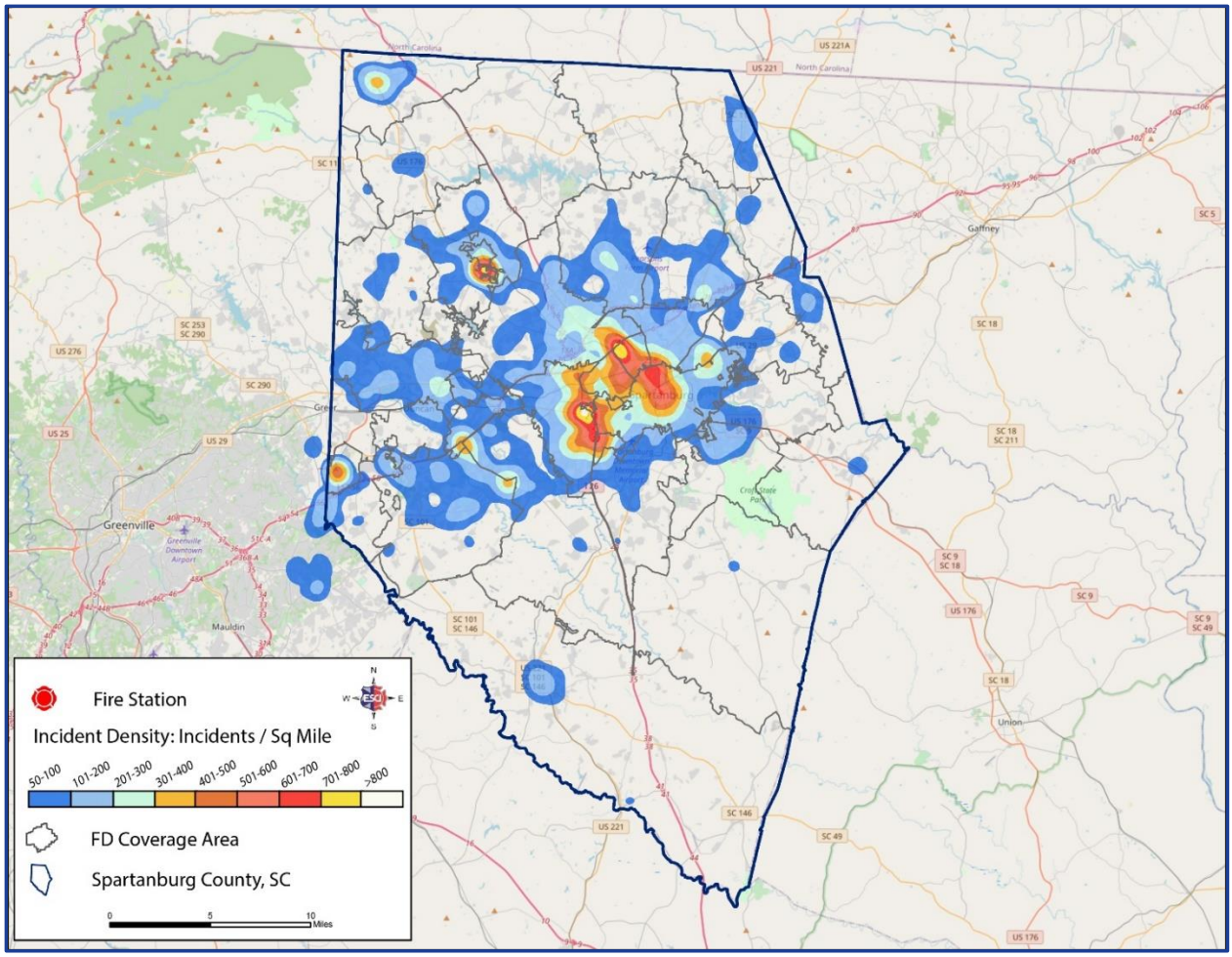
Figure 18. Population Densities of Spartanburg County, SC, 2020



The highest concentrations of people within Spartanburg County live in and around the City of Spartanburg, with populations expanding westward towards the City of Greer. Although dense pockets of the population exist in Spartanburg County, generally, the County could be described as possessing a rural population with pockets of development. It is for this reason that the current manner in which fire services are funded and provided should warrant additional consideration. Those jurisdictions lacking commercial or industrial occupancies with predominantly rural populations will find it more difficult to fund effective fire rescue activities at a rate equivalent to neighboring jurisdictions possessing a stronger tax base. Without the ability to fund effective fire services, Spartanburg County may find that additional jurisdictions within the County will no longer have the ability to provide services, requiring the County to create or assume fire rescue responsibilities.

Next, ESCI analyzes incident density using two years of fire rescue response data from January 1, 2018, through December 31, 2019. This analysis, commonly referred to as a Hot Spot Mapping, calculates areas of greatest demand based on the density of incidents within an area. This analysis does not indicate how many calls actually occurred within each ring, but instead provides a way to compare each area to one another. In this analysis, each ring is calculated to display incidents per square mile and provides a range of how densely located calls for service were to each other.

Figure 19. Incident Density Analysis, 2018–2019



Similar to the population density map, when incident density is examined, the central core of activity exists within and to the west of the City of Spartanburg, with the central third of the County presenting clustered incident activity extending towards the western border.

RESOURCE DISTRIBUTION

To determine how Spartanburg County's current deployment model affects coverage throughout the County, the current performance capabilities of the multiple fire departments must first be evaluated. Using fire service industry standards to include the National Fire Protection Association (NFPA) standards and Insurance Services Office (ISO) criteria, Spartanburg County's overall deployment model and performance were evaluated.

In the first section, NFPA criteria specific to fire department performance were applied to the 35 fire departments serving Spartanburg County and their performance evaluated. While it is recognized that Spartanburg County is comprised of career, combination, and predominately volunteer departments, this section evaluated Spartanburg County as a whole to provide an equal measure of performance capabilities.

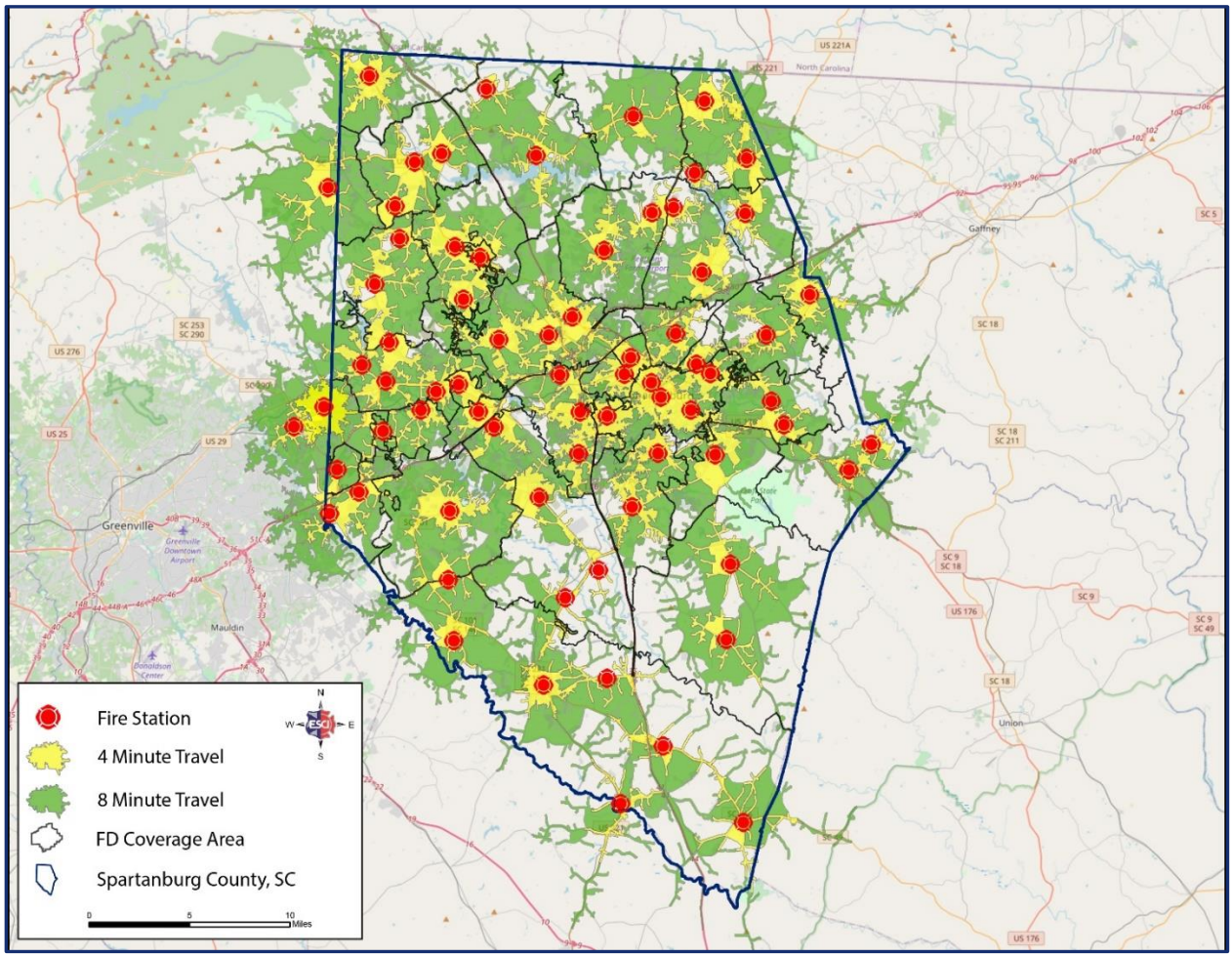
NFPA 1710 Criteria

The National Fire Protection Association (NFPA) is an industry trade association that develops and provides standards and codes for fire departments and emergency medical services for use by local governments. One of these standards, 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*, serves as a national consensus standard for career fire department performance, operations, and safety. Within this standard, a travel time of 240 seconds, or 4 minutes, is identified as the benchmark for career departments to reach emergency calls within their jurisdiction with the first arriving unit. Additionally, the balance of the response (called the effective response force) is required to arrive to the incident within 480 seconds or 8-minutes.

Unlike ISO standards, NFPA standards address all aspects of fire rescue missions and the All Hazards approach to the delivery of fire and rescue services. Topics such as Emergency Medical Services (EMS), technical rescue, hazardous materials response, health and safety, and apparatus requirements are examples of topics discussed by various NFPA standards. Additionally, all ISO standards are adapted directly from NFPA, but presented as quantifiable measurements that do not change with department type.

Figure 20 provides a synopsis of Spartanburg County's ability to meet these standards based on predicted travel times using historical traffic data from Esri for traffic patterns at 8 a.m. on Monday mornings. Unshaded pockets indicate that the area falls outside of the model's maximum extension from the road network.

Figure 20. NFPA 1710 4 and 8-Minute Travel



With the current deployment configuration of 69 fire stations within Spartanburg County, the majority of areas within the County lie within an 8-minute travel time of a fire station; however, unless these stations are staffed with a sufficient number of firefighters to effectively mitigate an incident, and these units are in service at the station and ready to deploy, actual wait times for those experiencing an emergency may be extended.

In urban and suburban areas, it is ideal to have overlapping coverage of fire stations so that an Effective Response Force (ERF) can be established. An ERF describes an agency's ability to assemble the minimum number of firefighters to a given incident or hazard within a prescribed timeframe to mitigate the event effectively and safely. The NFPA recognizes differences in deployment models and capabilities for career, combination, and volunteer fire departments, and the standard for performance and establishment of an ERF varies by agency type. Fire department ERFs will be covered in more detail later in the Resource Reliability section.

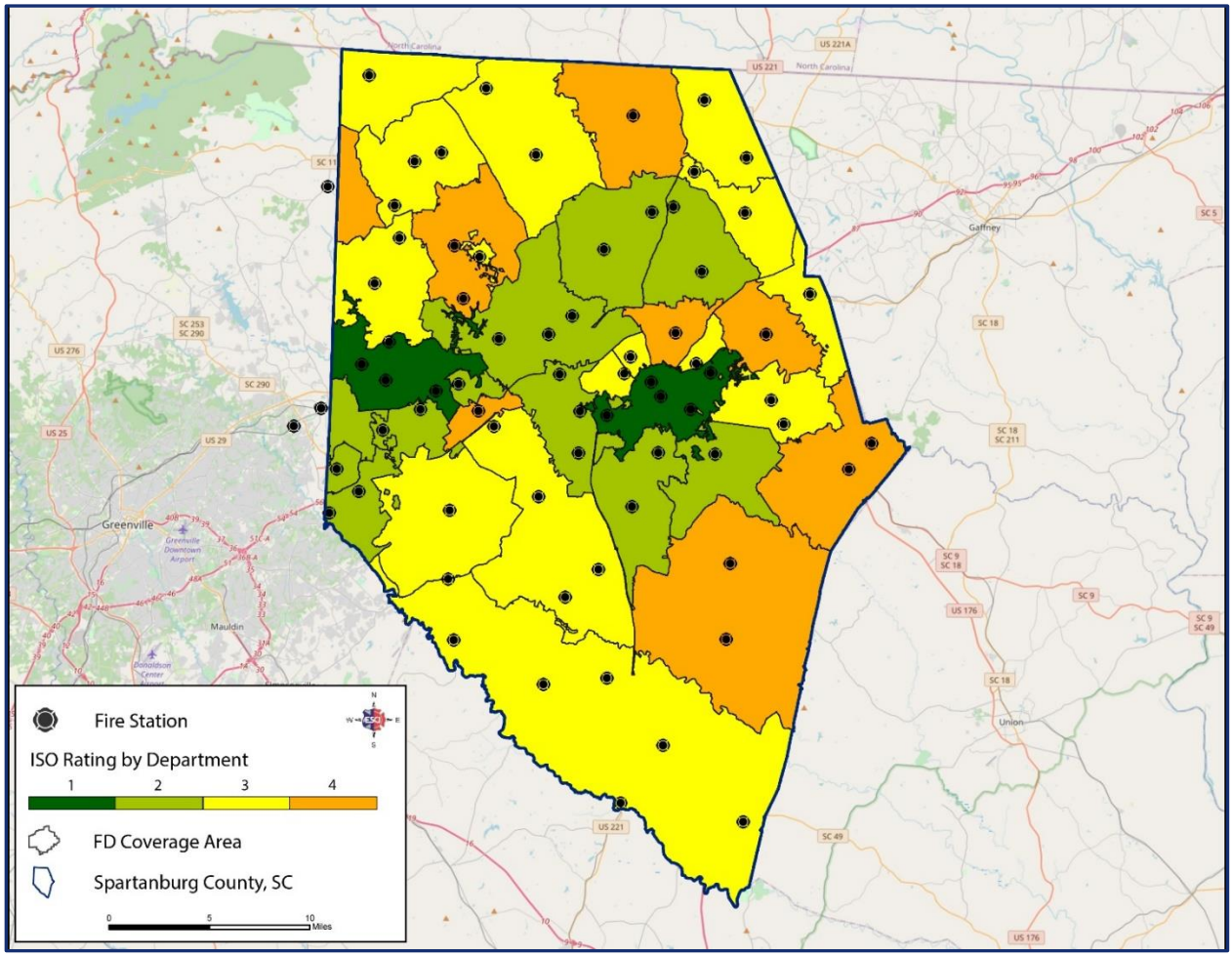
ISO Criteria

The Insurance Services Office (ISO), a subsidiary of Verisk Analytics, is a national data analytics provider that evaluates fire protection for communities across the country. According to ISO's Public Protection Classification program, or PPC, its rating "is a proven and reliable predictor of future fire losses." All other factors being equal, commercial property insurance rates are expected to be lower in areas with lower (better) ISO PPC Class rating.

The ISO Fire Suppression Rating Schedule (FSRS) measures four major categories of a community's fire protection system: **Emergency Communications** (max 10 points); **Water Supply and Distribution** capabilities (max 40 points); **Fire Department** (max 50 points); and **Community Risk Reduction** activities (5.5 points) for a maximum possible total of 105.5 points. After the points are accumulated, the ISO then assigns a grade using a scale of 1 to 10, with Class 1 representing the highest level of fire protection, and Class 10 is a fire suppression program that does not meet ISO's minimum criteria.

In Figure 21, the various ISO ratings by fire department within Spartanburg County are illustrated.

Figure 21. Spartanburg County ISO Ratings by Department

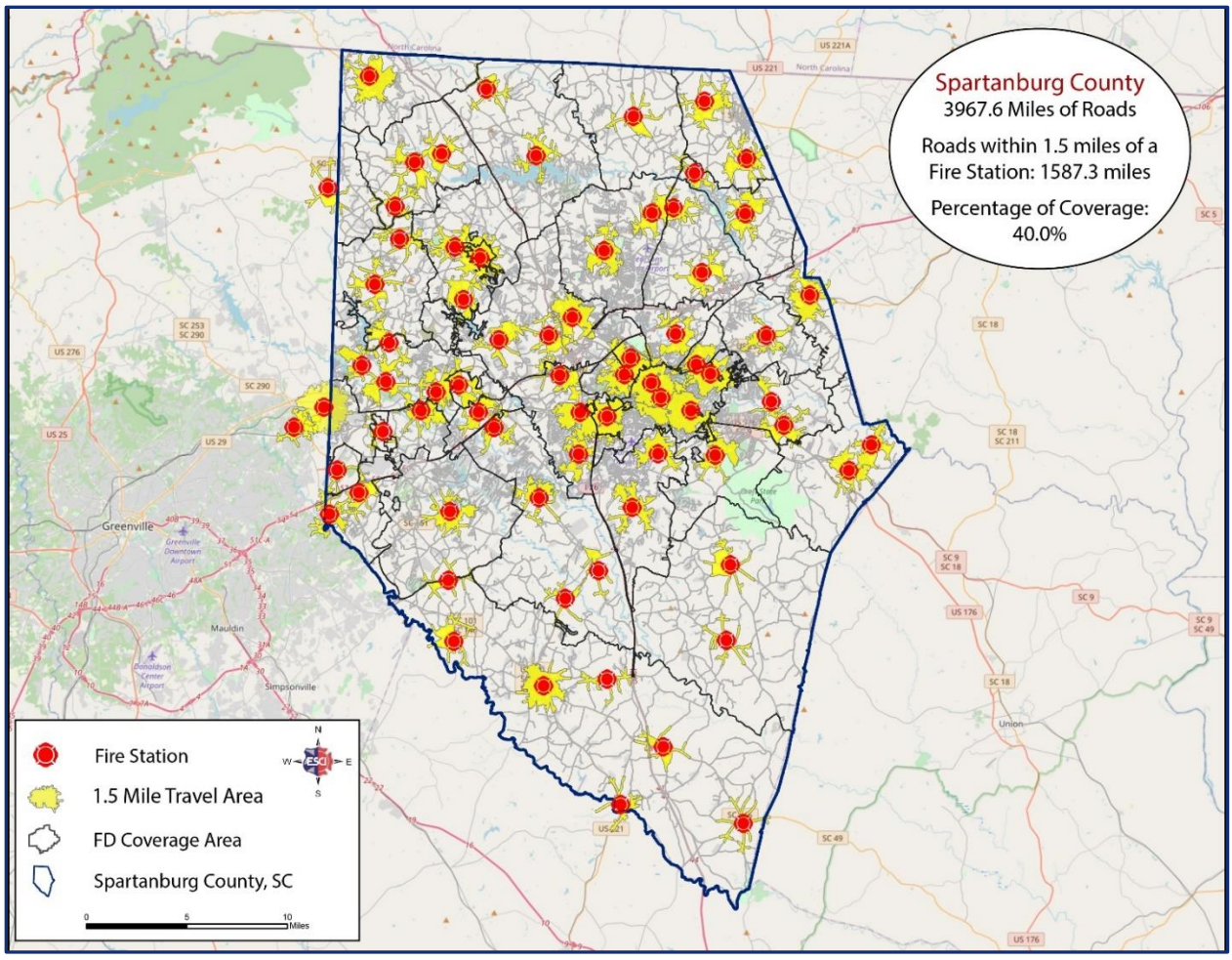


ISO ratings by department in Spartanburg County presents a range of performance. Multiple factors impact each department's rating, and a simple explanation of the wide degree of variation is not possible. For example, as a person travels across the center of the County, it should be anticipated that levels of service provided will change dramatically and will occur multiple times over relatively short distances.

Engine Company Performance

A key area of credit towards a jurisdiction's PPC® score is the degree to which structures protected by the fire department fall within a 1.5 road-mile service area of a fire station. This 1.5 road-mile standard is used to estimate a 4-minute travel time for first responding units as required by NFPA 1710. In Figure 22, an analysis was completed for current fire stations with areas in yellow indicating those structures within a 1.5-mile drive. This analysis is presented at the County-wide level for informational purposes to provide general information as to the overall coverage within Spartanburg County. While the actual ISO analysis is conducted in the same manner, it is specific to a fire department's jurisdiction, and any coverages that extend into other areas outside of the given boundary are not awarded credit. Based on the ISO engine company travel criteria, approximately 39.2% of Spartanburg County is included within the 1.5-mile travel distance.

Figure 22. Consolidated 1.5-Mile Engine Company Coverage



This overview provides a view of first due coverage areas and gaps at a County-wide level. An important consideration for engine company deployment is the personnel requirements for engine and ladder companies. To receive full credit, ISO requires six firefighters per engine company and 12 firefighters per ladder company. With 69 fire stations in Spartanburg County, 414 firefighters would be needed daily and on a 24-hour basis to receive full credit for engine companies alone. Since this number approaches the total combined number of career and part-time firefighters currently within the County, meeting ISO requirements for full credit in staffing would not be possible without a reduction in the number of engine companies/fire stations within Spartanburg County.

As an example of an alternative approach to staffing and deployment considerations, the current deployment model requires that at least 35 reserve fire engines, one per department, be located and maintained to be used when needed as a frontline apparatus. If, through mergers or consolidations, the same number of fire stations within the County were coalesced to form to nine departments, only nine reserve engines would be required. Using a conservative estimate of $250,000 per equipped engine company, the savings through consolidation could be as much as $6.5 million or more.

Ladder Company Performance

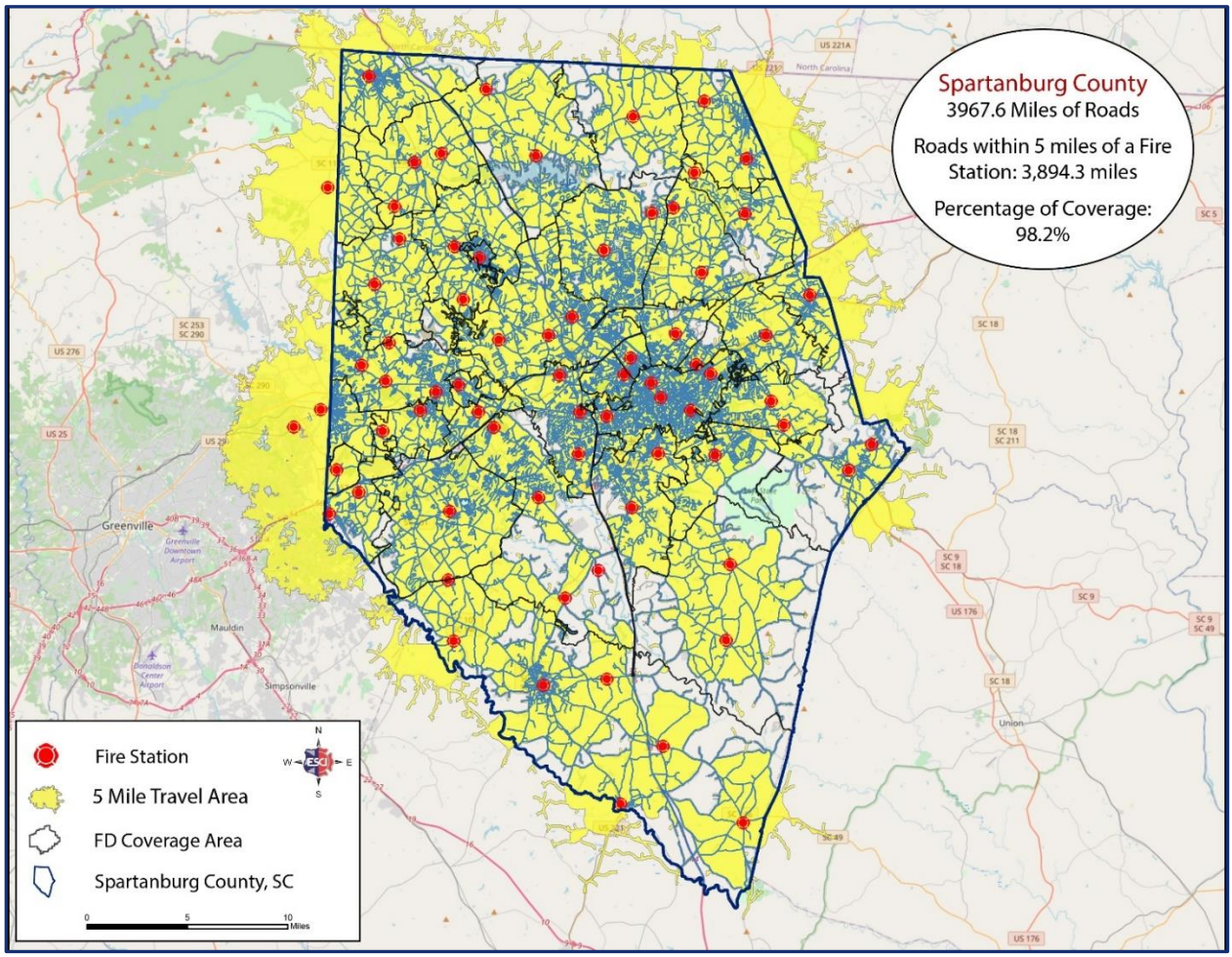
As described in the engine company section, ladder companies require 12 firefighters available at the fire station 24 hours per day to receive full credit. The specific locations of ladder companies were not available at the time of the study, but there are 23 frontline ladder/aerial units within Spartanburg County. For comparative purposes, according to Spartanburg County Property Assessor data, within the County, there are three high rise buildings (7 stories or more), 27 midrise buildings (4 to 6 stories), and 38 3-story buildings, which is where the ISO requirement for ladder companies begins. This provides a ratio of approximately one ladder company for every three buildings three stories in height or greater within Spartanburg County.

Currently, only the City of Spartanburg and the Westview Fairforest, North Spartanburg, and Croft fire departments staff a frontline ladder company.

ISO Fire Station Coverage

To receive an ISO PPC® rating that indicates fire coverage is available from a fire department, structures must generally be located within 5-miles of a fire station. Areas outside of 5-miles are subject to receiving a PPC® rating of 10, meaning that no fire department coverage is available. Within Spartanburg County, the majority of areas (98.2%) lie within 5-miles of a fire station and are eligible to receive a rating based upon the performance of the fire department.

Figure 23. ISO 5-Mile Service Area



As illustrated in this figure, nearly all roadways within Spartanburg County lie within 5 miles of a fire station and are eligible to receive an ISO rating. For comparative purposes, the next figure displays the same 5-mile coverage map using current Spartanburg County fire stations but seeks to determine a minimum number of stations needed to achieve a similar 5-mile coverage result. It should be noted that reductions in overlapping coverage of fire stations will result in an inability to assemble an effective response force unless sufficient resources are housed at each station. Additionally, roadway speed estimates provided through Esri proprietary software were used to develop this figure, much in the same way other mapping services provide real-time best route apps for navigation. While ISO provides "Rule of Thumb" estimates for departments lacking this capability internally, when actual analyses are performed, this is the methodology used.

In this example, the City of Spartanburg was excluded as it is a large municipality with an urban makeup which differs from most of the County. Additionally, some station overlap was allowed surrounding the City of Spartanburg and areas to the western portion of the County to compensate for the need to maintain additional resources in the suburban areas surrounding the city and in other populated areas. Finally, it is recognized that not all locations identified as fire stations within the data provided are suitable for continuous habitation or 24-hour operations; however, data distinguishing the suitability of sites was not available at the time of this analysis. For the purposes of the following figure, all sites identified as fire stations were included in the model.

Figure 24. Example ISO 5-Mile Coverage with Reduced Numbers of Fire Stations

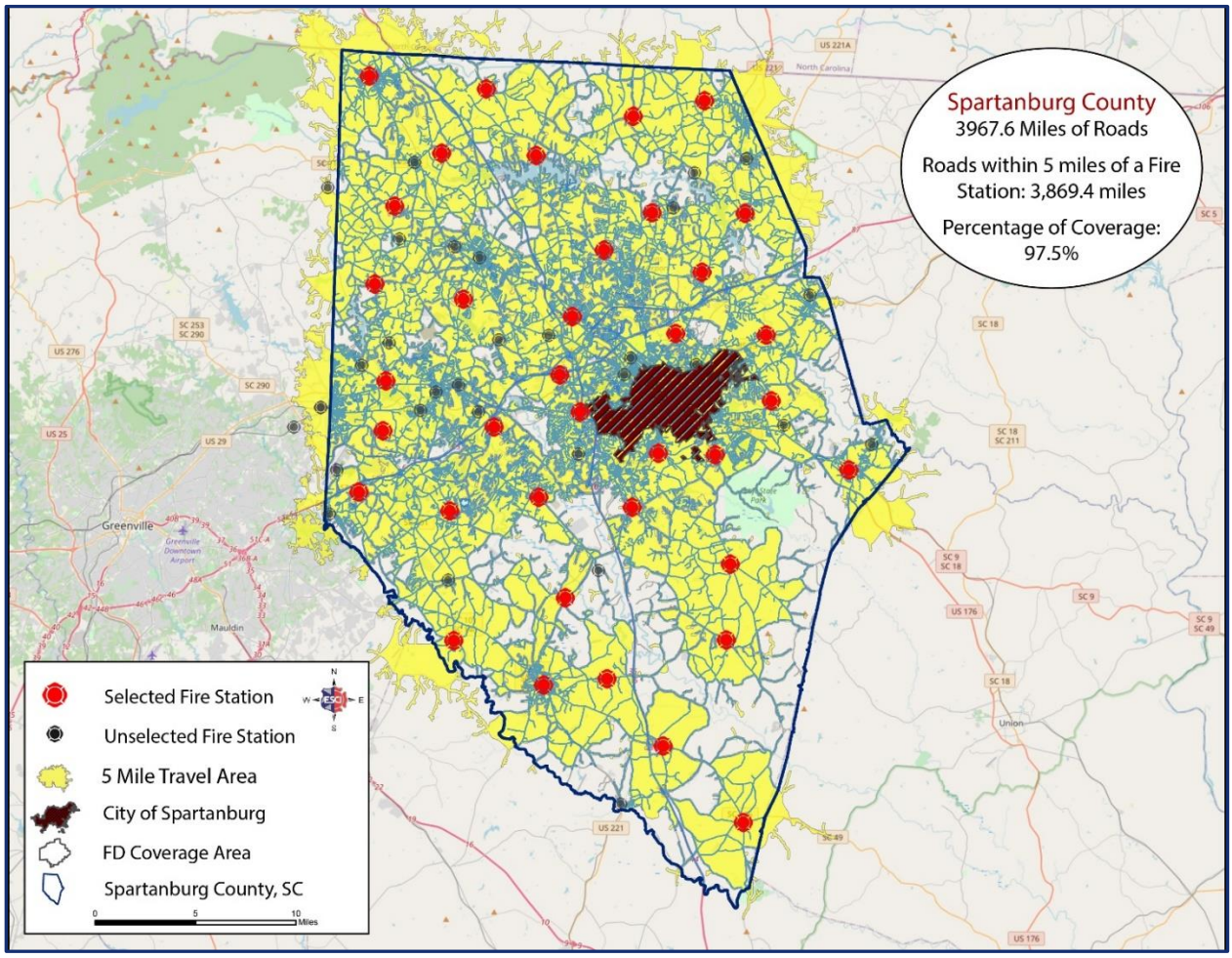


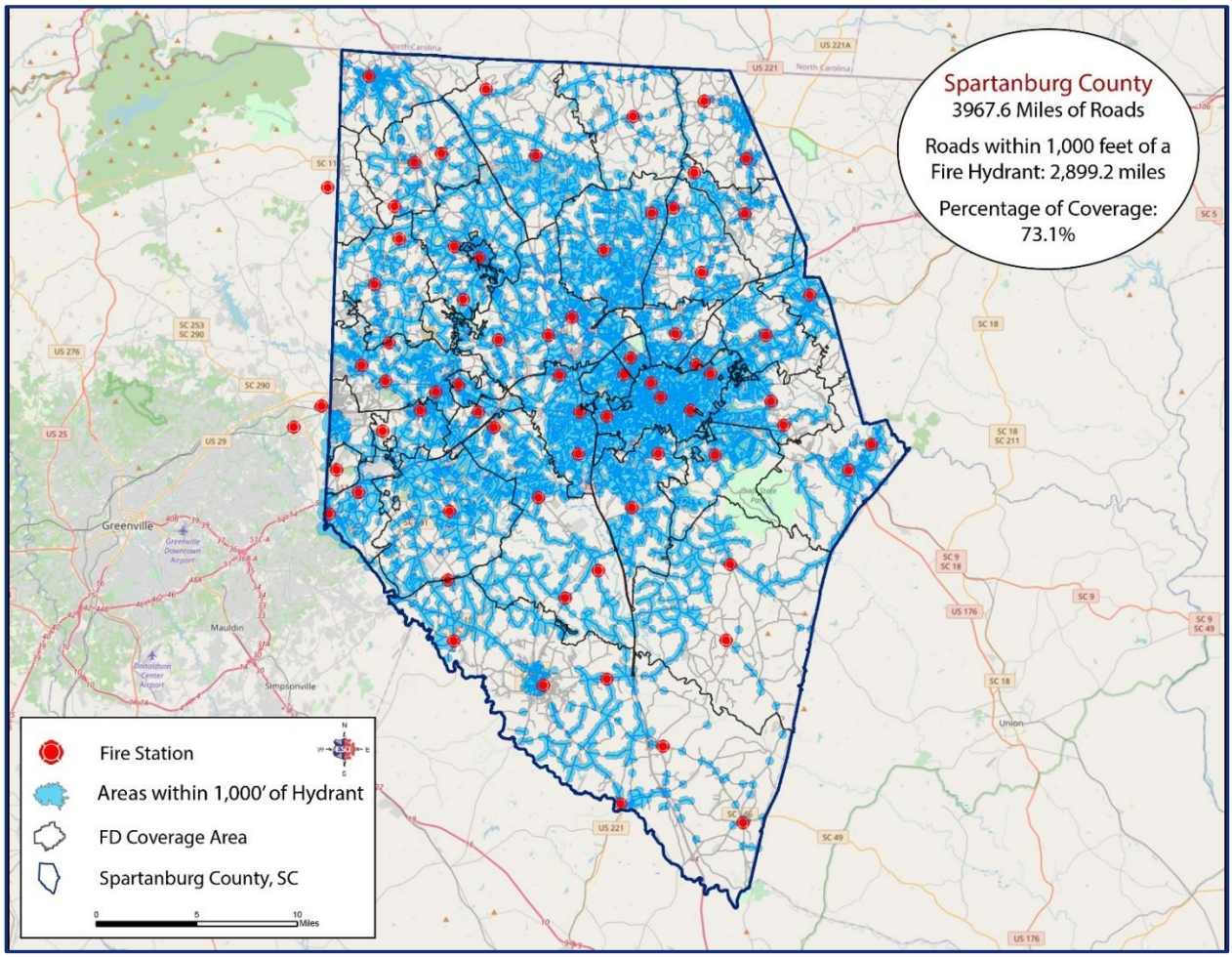
Figure 24 provides an example demonstrating that the number of fire stations within the County could be reduced and still maintain similar coverage when only using the ISO 5-mile criterion to evaluate coverage. In this example, and excluding the City of Spartanburg, the number of fire stations within the County are reduced from 64 to 37, a reduction of 27 engine companies. While ESCI does not recommend deployment decisions based upon a sole criterion, this figure is provided as an example that some areas of the County may benefit from the consolidation of resources while still maintaining current capabilities.

Water Supply and Hydrant Locations

Access to water is a fundamental requirement for fire suppression. Without an adequate supply of water, fire suppression operations are challenging. Additionally, the access point for this water supply must be located close enough to the structure to allow for rapid access by the fire department.

Next, fire hydrant coverage within Spartanburg County is displayed using the ISO requirement that structures must be located within 1,000 feet of a fire hydrant or other reliable water source.

Figure 25. ISO Fire Hydrant Coverage



With access to water across nearly three-quarters of the County, many structures within the County possess the minimum requirements to receive an ISO rating. For those areas outside of water supply coverage, the local fire departments should identify the affected structures and develop a plan for establishing tanker shuttle operations to those locations should a fire occur.

General ISO Considerations

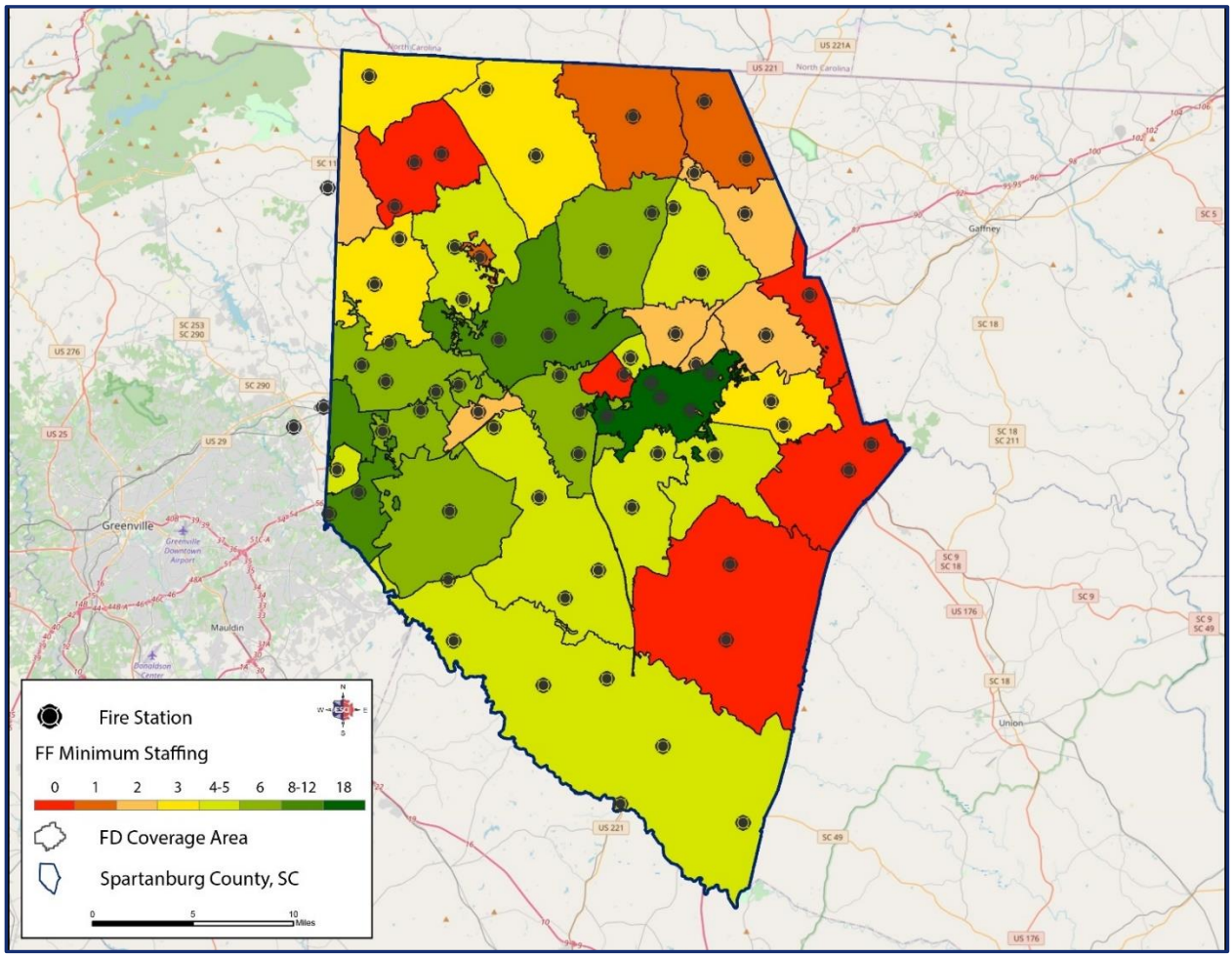
ISO assessments are used to evaluate a specific area within the overall mission of most fire departments—the department's ability to protect insured properties. The same criteria are applied whether the department under evaluation is a metropolitan with a career department or a rural volunteer county. As such, some criteria are more applicable to urban and suburban career departments, and factors such as low population densities, economic constraints, or other missions, such as EMS service delivery, are not evaluated. While ISO provides a tool to evaluate a fire department's performance, this should not be the only factor used to make decisions. Local factors such as community expectations, desired levels of service, and the ability to pay for those services should be considered and factored into the decision-making process to ensure that the needs of the community are met. Every community is different, and the best decision can be reached at the local level when all factors are considered.

Resource Reliability

In this section, resource reliability is evaluated using metrics to establish a global perspective on Spartanburg County's ability to provide sufficient responding resources to meet service demands within each fire department's service area.

First, staffing configurations for each department are illustrated in Figure 26. In this figure, minimum staffing during nights and weekends, or when personal time off reduces staffing to its minimum levels, are displayed by department to provide an understanding of each department's capabilities to respond to a moderate risk event, such as a single-family residential structure fire in a 2,000-square-foot home. Although many of the departments provide additional staffing during the weekdays, as mentioned previously, most fatal residential fires occur late at night or in the early morning and that from 2014 to 2016, fatal residential fires were highest between 1:00 a.m. to 2:00 a.m. The 8-hour peak period (11:00 p.m. to 7:00 a.m.) accounted for 48% of fatal residential fires.

Figure 26. Minimum Staffing by Fire Department



In this figure, the deficiencies in staffing, or lack thereof, can be observed. Particularly in the northern and eastern sides of the County, staffing to provide fire department coverage is relatively nonexistent. Although traditionally departments relied heavily on volunteer firefighters to respond to emergencies, participation throughout the County is limited at best. Should a fire occur in the northern or eastern portions of Spartanburg County between the 15-hour period from 5 p.m. and 8 a.m., the 63-hour period representing the weekends, or during any holiday, as many as 4 to 6 departments may be required to commit all available resources to provide enough staffing to achieve two-in/two-out for interior fire suppression operations and multiple more agencies may be required to achieve an effective response force, if it occurs at all.

While the majority of responses within Spartanburg County are EMS in nature and are typically handled by one to two units, some incidents require large numbers of resources and personnel to mitigate the emergency condition and reduce loss safely and effectively. The ability of the fire department to effectively deploy multiple units to an incident scene in a timely manner will often make the difference between minor damage and a total loss. An effective response force is defined as "the minimum amount of staffing and equipment that must reach a specific emergency zone location within a maximum prescribed total response time and is capable of initial fire suppression, EMS, and/or mitigation. The ERF is the result of the critical tasking analysis conducted as part of a community risk assessment."

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* requires a minimum of 16 firefighters arrive on scene within a 9-minute, 20-second response and 17 firefighters when a ladder company is deployed to establish an ERF, while NFPA 1720*: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments* provides a range from 4 to 15 firefighters depending upon the population densities within the jurisdiction or response zone.

Each fire department within the County should work to ensure that policies are in place outlining compliance with OSHA 29 CFR 1910.134(g)(4)(i) also referred to as two-in/two-out, as well as providing for the general safety of firefighters while operating in environments that are Immediately Dangerous to Life and Health (IDLH).

Response Performance

The most visible element of a fire department is its response performance. How quickly units arrive on-scene and the efficiency with which they resolve an emergency situation are typically the only interaction most residents will have with the fire department. To evaluate each fire department's performance, the NFPA 1710 90th percentile performance standard was selected as this is the standard used by NFPA, ISO, and the Center for Public Safety Excellence (CPSE).

Historically, fire rescue service providers have used the performance measurement of the average response to describe the levels of performance. The average is a commonly used descriptive statistic, also called the mean of a data set. Averages may not accurately reflect the performance for the entire data set because the average can be significantly skewed by data outliers, especially in small data sets. One extremely good or bad value can skew the "average" for the entire data set. Percentile measurements are a better measure of performance since they show that most of the data set has achieved a particular level of performance. The 90th percentile means that 90% of responses were equal to or better than the performance identified, and that the other 10% can be attributed to data outliers, inaccurate data, or situations outside of normal operations that delayed performance. This can be compared to the desired performance objective to determine the degree of success in achieving the goal.

An important consideration when evaluating fractile performance is that the results of each category are not additive, meaning that the sum of two or more constituent metrics cannot be simply added together to find the sum. This is because each dataset is discrete and, as such, must be observed individually, particularly when data quality is an issue. For example, if a metric, such as response time, possesses the majority of its data points, while turnout time is not accurately documented, a significant difference can exist between the response time calculated using the fractile descriptive and the sum of turnout and travel times.

Data Assumptions

In evaluating the various response time components using the fractile analysis method, each component must be evaluated and quantified separately, as the available data—and the quality of the data—may vary significantly.

To provide an analysis of performance for emergency calls within Spartanburg County, the following assumptions were made:

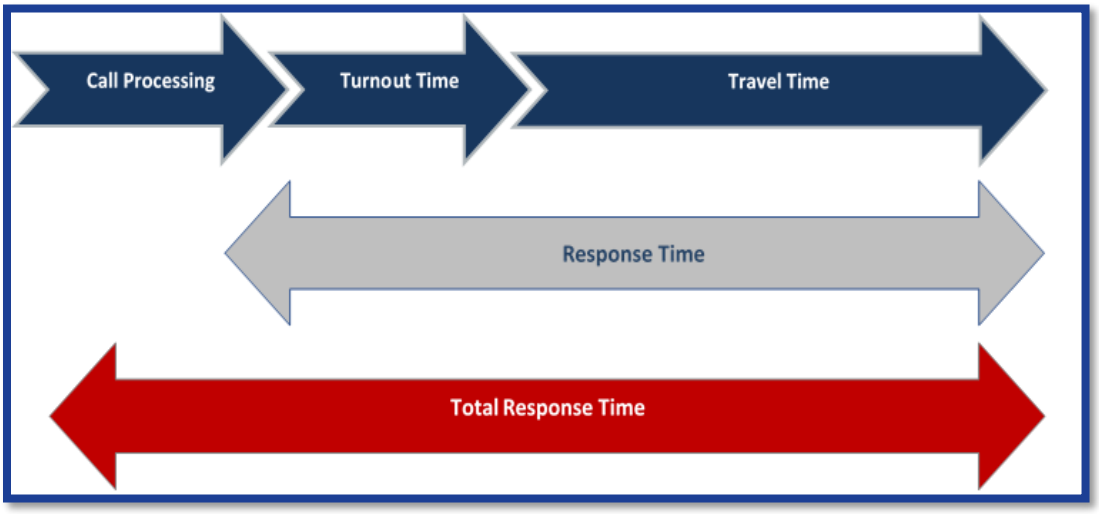
- Non-emergency incident types were removed.
- Mutual and auto aid given were removed.
- Other aid given were removed.
- NFIRS call types within the 500, 600, 800, and 900 series were removed.
- Cells containing zeros or no value were removed.

Response Time Continuum

Response time performance is comprised of the following components:

- **Call-Processing Time:** The amount of time between when a call is answered by the 9-1-1 Primary Public Safety Answering Point, or dispatch center, and when resources are dispatched. The industry standard for call processing (or alarm handling) is NFPA 1221: *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems*. This standard provides for communication centers to have processing times of not more than 60 seconds, 90% of the time. For special operations, calls requiring translation, or other factors described in the standard, times should not exceed 90 seconds at the 90th percentile.
- **Turnout Time:** The time interval between when units are notified of the incident and when the apparatus responds. The second component of the response continuum, and one that is directly affected by response personnel, is turnout performance. NFPA 1710 calls for a 90th percentile turnout performance of 80 seconds for fire and special operations calls and 60 seconds for EMS incidents.
- **Travel Time:** The amount of time the responding unit spends on the road traveling to the incident until arrival at the scene. This is a function of speed and distance. The third component of the response continuum is travel time. It is important to understand that travel time is not specifically a factor of speed as much as it is the result of proper placement of fire stations from which emergency response begins. Travel time is the amount of time between when the apparatus departs for the call and when it arrives on the scene and measured at the 90th percentile. NFPA 1710 requires that the first due fire or EMS unit arrives on the scene within a 4-minute, or 240-second, travel time.
- **Response Time:** This time is calculated from the time the fire department is dispatched to the arrival of the first apparatus. Response time equals the sum of "turnout time" and "travel time." Although this is a combination of turnout and travel time, response time is the metric in which NFPA 1720 provides a performance standard.
- **Total Response Time:** This is the most apparent time to the caller requesting emergency services. Total response time is the amount of time that occurs from the time they place the emergency call until units arrive. This time often includes factors both within and outside the control of the fire department, particularly when another agency provides dispatch services.

Figure 27. Total Response Time Continuum



Tracking the individual components of response time will enable Spartanburg County and its fire departments to identify deficiencies and areas for improvement. Once department leaderships understand the current performance for call processing, turnout time, and travel time, this information can be used to develop response goals and standards that are both relevant and achievable. Fire service best practices recommend that fire service organizations monitor and report the components of total response time.

The Time Continuum is comprised of the three elements described above—call processing, turnout time, and travel time. Total response time is the sum of all of the times, starting with the call processing time, and then adding turnout time and travel time.

Response Performance for Spartanburg County Departments

Due to the number of departments within Spartanburg County, the performance by each department and metric is presented in tabular form in the following figure. Additionally, charts are used to provide a visual comparison of how departments performed relative to one another. The data to compile this analysis was taken from the first unit to reach a given metric within the service area identified by CAD data.

Figure 28. Response Performance for Spartanburg County Fire Departments, 2018–2019

	Call Processing		Turnout	Travel	Response
	90th Percentile	Average			
Boiling Springs	03:13	01:51	02:39	08:01	09:57
Campobello	03:29	02:09	04:02	13:38	15:37
Cherokee	03:42	02:16	03:02	10:08	12:24
Chesnee	03:27	01:49	02:40	08:34	10:24
Converse	03:20	01:56	03:39	07:52	10:10
Cooley Springs	03:26	01:50	02:49	10:54	12:58
Cowpens	03:29	01:53	04:15	07:55	11:14
Croft	03:29	02:09	02:40	06:27	08:14
Drayton	03:05	01:50	02:30	05:12	06:53
Duncan	03:25	01:58	02:05	07:11	08:36
Glendale	03:24	02:03	02:55	07:07	09:15
Glenn Springs	03:37	02:05	05:10	09:59	13:02
Gowensville	03:34	02:22	03:19	09:40	11:28
GSP	02:22	01:08	02:03	04:56	06:25
Hilltop	03:26	02:06	02:40	04:14	06:12
Holly Springs	03:37	02:11	02:54	08:00	10:10
Inman	03:04	01:47	02:28	05:08	06:59
Inman Community	03:34	02:16	03:12	07:44	09:48
Landrum	03:40	02:14	02:50	07:30	09:36
Mayo	03:21	01:51	02:42	10:15	11:52
New Prospect	03:35	01:55	02:28	09:51	11:14
North Spartanburg	03:34	02:11	02:59	07:08	09:14
Pacolet	03:39	02:05	06:20	09:48	15:11
Pelham-Batesville	03:14	01:43	02:40	07:07	08:49
Poplar Springs	03:16	02:05	03:00	07:53	09:48
Reidville	03:39	02:12	03:01	08:28	10:47
Roebuck	03:25	01:58	02:16	06:12	07:45
Spartanburg	03:15	01:59	02:30	05:35	07:13
Startex	03:09	01:48	02:09	06:37	08:15
Trinity	03:29	01:59	03:28	10:10	12:45
Tyger River	03:41	02:09	02:29	06:46	08:27
Una	03:36	02:10	06:01	05:51	10:25
Westview	03:45	02:18	02:48	07:18	09:20
Whitney	03:53	02:07	02:10	06:45	08:12

Within Figure 28, the calculated call processing times exceed NFPA 1710 standards by several minutes. When the overall call processing time countywide is calculated, call processing performance is 3 minutes, 31 seconds. To provide some clarification to the wide range of call processing times, further explanation is required.

- The higher the number of calls for service received annually, the greater the reliability of the results will be. For departments running very low call volumes, the number of times an outlier can occur without affecting the result will be much less than those responding to much higher service demands. This can also be observed by the countywide call processing time reported of 3 minutes, 31 seconds, when all incidents are included in the calculation.
- The ECC does not dispatch all departments to EMS calls. While some departments respond to fire and rescue events, others respond to only fire. For departments responding to EMS calls, which represent approximately half of all incidents in the County, the ECC does not currently have the capability to benchmark when the decision to dispatch a fire department unit was reached. It is possible that for a given call, an ambulance was dispatched several minutes prior to the decision was reached to dispatch a fire-based unit. Because the ECC cannot collect the timestamp at this time, that data will skew the call processing time and should be flagged as an invalid data point.
- Spartanburg County fire departments represent approximately 10% of the ECC's annual workload. The majority of the ECC's workload is the dispatching of law enforcement and EMS transport providers. For these groups, a standardized system of dispatching units is available and dramatically decreases the time required to process the incident and dispatch the appropriate unit. In the case of the fire departments, a dispatcher must navigate multiple dispatching configurations and which departments respond to certain call types, as with those who do not respond to EMS calls. This system creates an inordinately large workload on the ECC for a relative few number of calls overall and results in higher call processing times. ESCI suggests that the Fire Chiefs Association consider standardizing as much as possible dispatch matrices to assist the ECC in improving call processing performance.

Finally, ESCI recognizes that some information may differ from specific agency data; however, the individual analysis of each fire department's internal RMS data was outside the scope of this project.

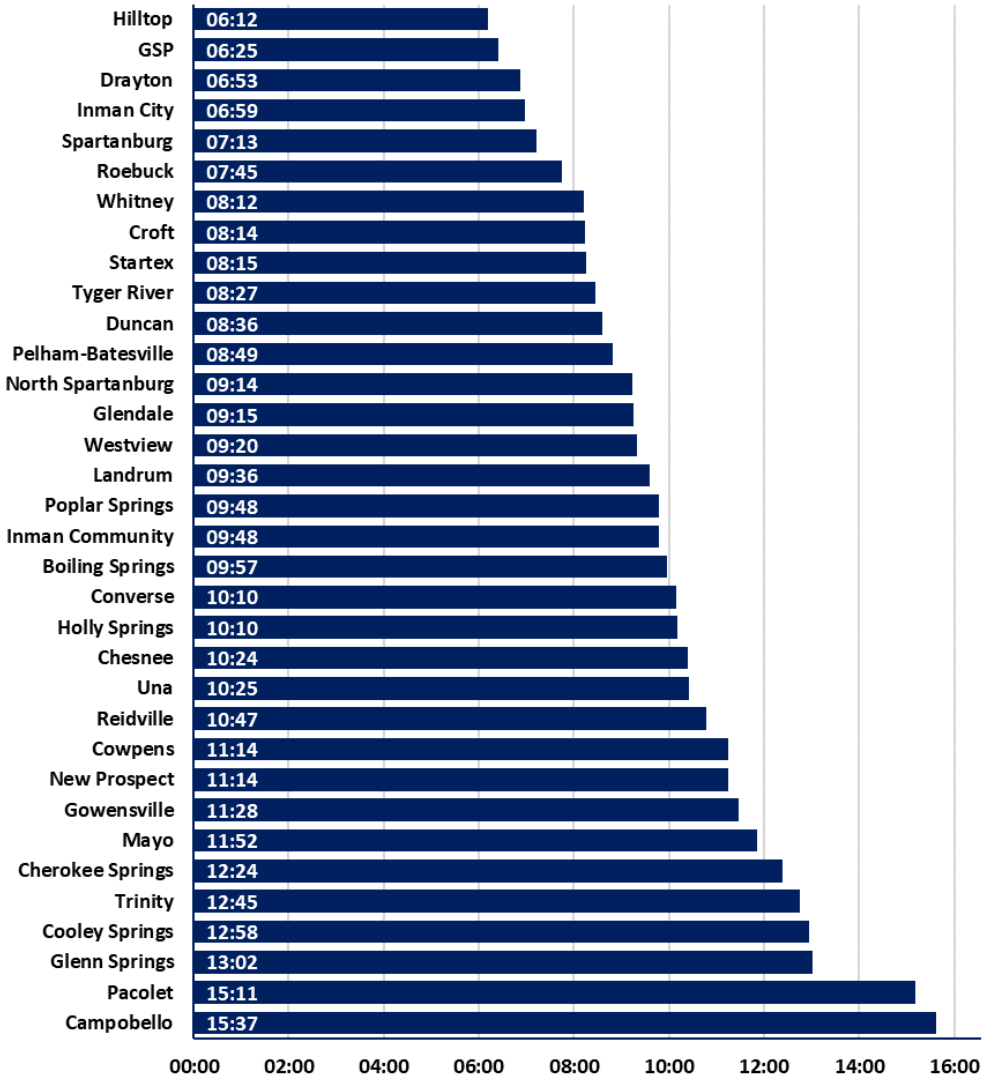
Response Time Performance

As previously discussed, Spartanburg County is comprised of multiple types of fire departments providing coverage to a diverse area. To assist in the review of response time performance, the performance table from NFPA 1720 is once again displayed for reference. Turnout and travel times, when combined together, equal response time, which is the metric provided for combination and volunteer departments. Turnout times for career departments per NFPA 1710 and is 80 seconds for fires and special operations and 64 seconds for EMS incidents, and travel time is 4 minutes to all emergency responses.

Figure 29: NFPA 1720 Staffing and Response Time

Demand Zone	Demographics	Minimum Staff to Respond	Response Time (minutes)	Meets Objective
Urban Area	> 1,000 people/mi²	15	9	90%
Suburban Area	500–1,000 people/mi²	10	10	80%
Rural Area	< 500 people/mi²	6	14	80%
Remote Area	Travel distance ≥ 8 mi	4	Directly dependent on travel distance	90%
Special Risks	Determined by AHJ	Determined by AHJ based on risk	Determined by AHJ	90%

Figure 30. Response Time Performance by Department, 2018–2019
(Turnout + Travel Time)



* ESCI chose not to include Greer Fire Department within this table as it provides its own emergency dispatch, and information available did not accurately portray current conditions.

Mutual and Automatic Aid Systems

Few, if any, organizations possess all the resources needed to mitigate all possible types of incidents. Additionally, when mutually beneficial agreements are possible, particularly when they occur at little cost to the organizations, good governance suggests that these opportunities should be seized to provide higher service levels to the communities involved. Two types of agreements are discussed in this section, mutual and automatic aid agreements. In mutual aid agreements, two or more organizations agree that, when requested, they will supply the other agency with the requested resources if available. For emergency services, this request typically occurs through the request on responding or on-scene personnel. The other type of agreement, automatic aid, occurs as the name implies, automatically. When an emergency call is received by the dispatch center, all available resources are examined based on the appropriate unit type and their proximity to the call, typically with the closest unit responding regardless of the jurisdiction in which the incident occurred.

In Spartanburg County, several automatic aid agreements exist that first dispatch other fire department units based upon run cards selected by the fire department that are independent of whether or not the selected unit is the closest or is an available asset at the time of the incident (run cards). After the initial dispatch, if additional units are needed or if a resource was unavailable, the closest resource is then deployed by the dispatch center. Una Fire Department chooses not to receive this automatic aid.

The method of automatic aid has developed in Spartanburg County most likely because of a lack of staffing. A goal for County-wide automatic aid would be to standardize unit staffing to a minimum threshold, such as a three-person engine company, and dispatch the closest unit to incidents requiring multiagency responses or when the primary resource is unavailable.

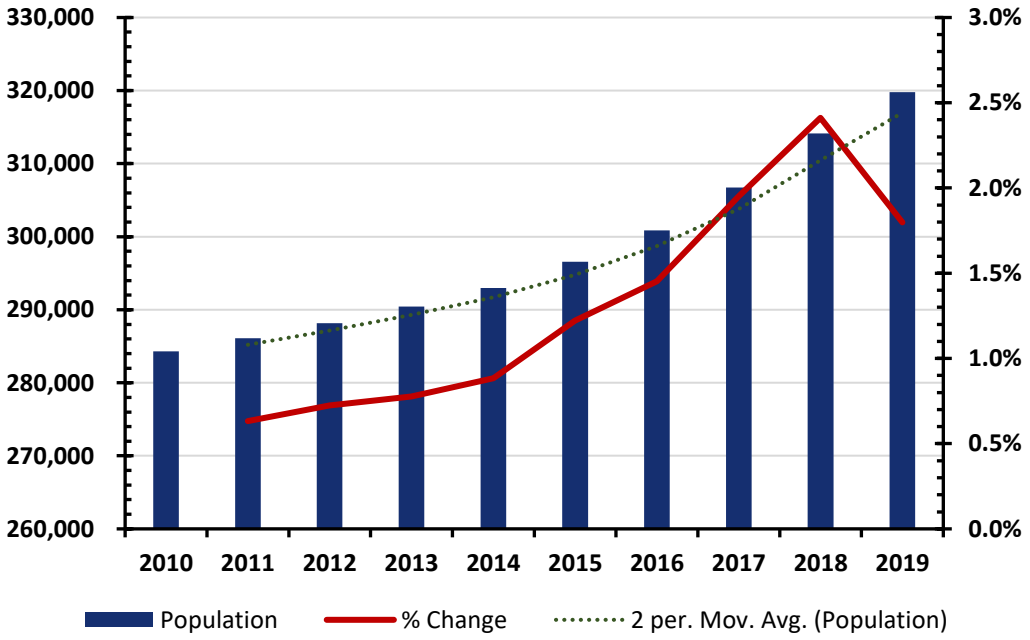
Future System Demand Projections

Understanding how the community is predicted to change in the future is an essential part of the planning process. Without some understanding of how Spartanburg County's current levels of service will be affected over time, today's capital purchase and staffing deployment plans may or may not be adequate in future years. The types and intensity of change, where change occurs, and the amount of time these changes occur within should all be considered in current planning and budgeting.

Population Growth Projections

Over the last 10 years, Spartanburg County has grown consistently from year to year, with an overall increase in population of 12.5% from 2010 through 2019. This is slightly higher than the rate of growth for the State, which saw an 11.1% increase during the same period. Because service demand is linked to changes in population and demographics over time, a historical perspective on the rate of population change establishes the foundation for future predictions in Spartanburg County. In Figure 31, changes in annual population within the County, as well as the percentage of annual change, are illustrated with a moving average projection overlying to indicate how changes in population have occurred from 2010 through 2019.

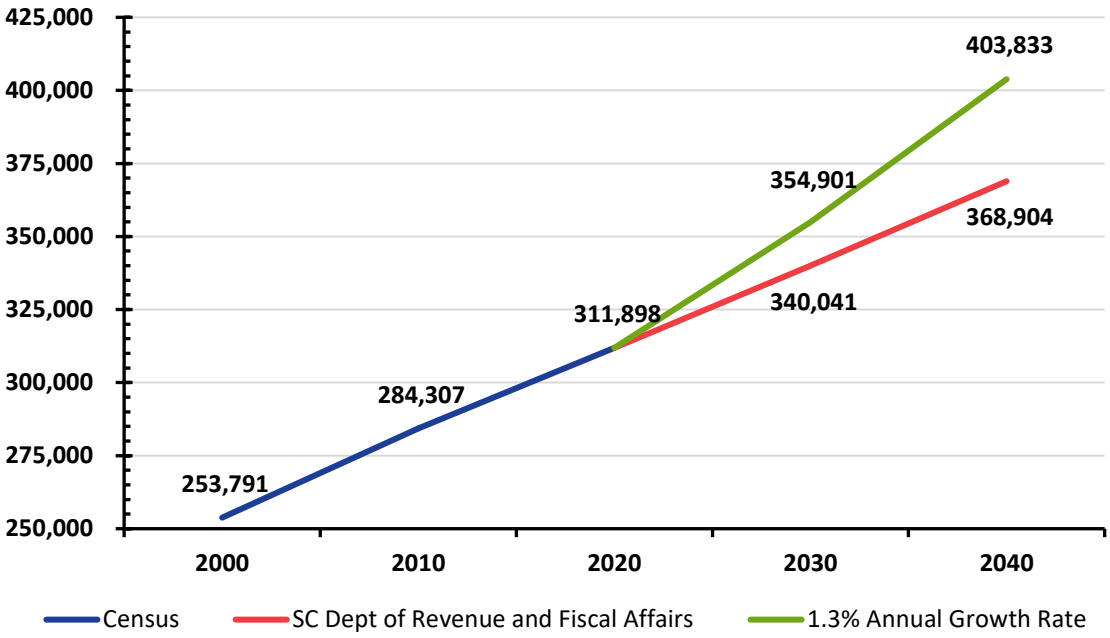
Figure 31. Population Rate and Change, U.S. Census Estimates, 2010–2019



On average, the population of Spartanburg County increased by 1.3% per year between the 2010 Census count and the 2019 ACS estimates. This rate of growth is slightly higher than the State's and is generally interpreted as a positive indicator. In addition to the percentage growth, the actual number of people contributing to this increase must be considered as well. From 2010 to 2019, the number of people in Spartanburg County increased by 35,481.

To provide an estimate of how Spartanburg County's population will change into the future, population estimates were generated based upon the historical census counts and estimates, as well as data and projections from the South Carolina Department of Revenue and Fiscal Affairs used in the 2018 Spartanburg County Comprehensive Plan. In Figure 32, population estimates are provided based on a linear projection using census data of 1.3% growth annually and the Department of Revenue and Fiscal Affairs estimates.

Figure 32. Population Projections for Spartanburg County, SC



Between 2010 and 2019, the average annual growth rate in Spartanburg County was 1.3%. Using this annual growth rate as a foundation for the linear model for years beyond 2020 using census counts and estimates, the findings for the total population for years 2030 and 2040 are compared. When compared with the Department of Revenue and Fiscal Affairs estimates, the population of Spartanburg County will most likely approach 400,000 people over the next 20 years.

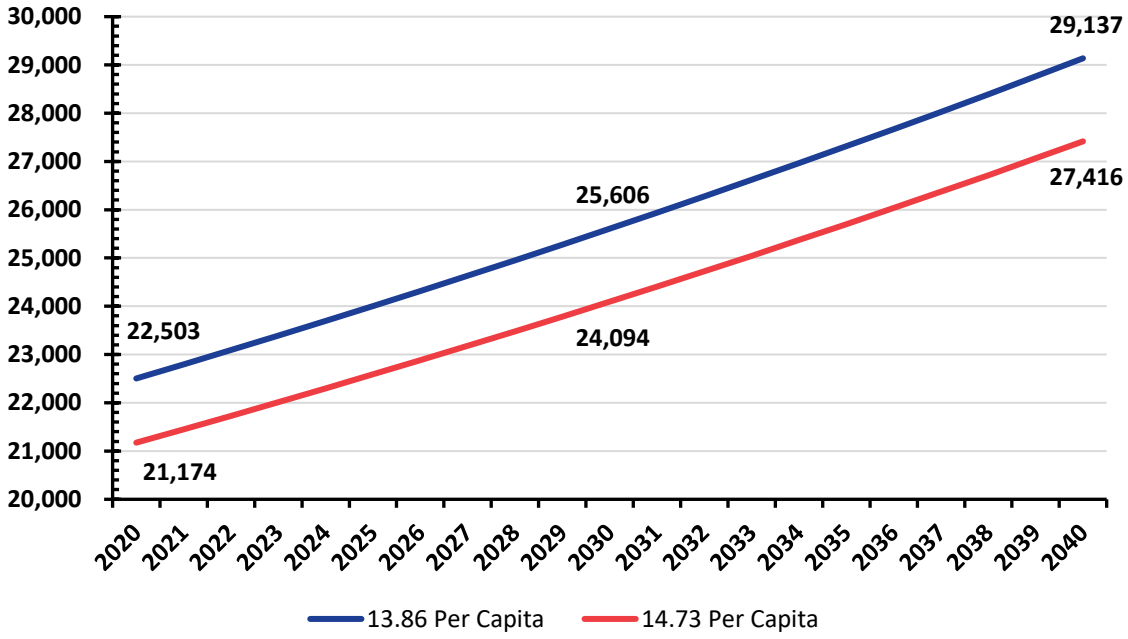
Many factors can influence how quickly or slowly a population will change over time. Additionally, the demographic makeup of future populations will influence the demand for services. Next, ESCI provides future service demand projections based on population estimates.

Service Demand Projections

Demand for services is often tied to the size of the population served. Other factors such as age, access to medical care, general health, and economic stability can all influence how frequently emergency services are requested. In Spartanburg County, the average per capita rate of service demand for 2018 and 2019 was 13.86 incidents and 14.73 incidents, respectively. Based on ESCI's experience, this per capita rate is high and would typically be expected to lie within the 8 to 12 per capita range.

In Figure 33, service demand projections are provided using the average per capita rate of demand for 2018 through 2019 rates of 13.86 and 14.73 per capita.

Figure 33. Service Demand Projections based on Per Capita Rates



Using the historical per capita rates of service demand from 2018 through 2019, Spartanburg County could experience service demands of 27,416 to 29,137 calls for service annually by 2040. As the majority of the calls will most likely be EMS in nature, future planning for resources and staffing should be considered accordingly. Additionally, as this per capita rate appears to be high, based on ESCI's observations of other departments, a leveling off or a decrease in demand year to year could occur.

Recommended Future Delivery System Models

The Spartanburg County Independent Fire Study concludes with strategies that are intended to place Spartanburg County in a position to manage the risk within the community successfully and to respond to the future demand for service effectively. ESCI developed the following recommendations with the specific intent of identifying options that can deliver the desired levels of service at the most efficient cost.

- **Short-Term Strategies** are decisions that should be made by Spartanburg County within the next year or less.
- **Mid-Term Strategies** vary in complexity and financial impacts. While future drivers of service demand are considered, these recommendations tend to be based on current conditions of an organization and strategic objectives obtainable in one to three years.
- **Long-Term Strategies** are typically associated with timeframes over three years. Future drivers of increased service demand are often critical components to be considered when identifying long-term strategies. These recommendations vary in complexity and financial impacts.

Short-Term Strategies

1. *Spartanburg County should consider mergers and/or consolidation of fire districts within the County, which would include the Fire Service Area form of governance.*

   Should Spartanburg County adopt the recommendation to initiate the process to merge and consolidate fire districts as appropriate, ESCI recommends that the County work with the affected jurisdictions to determine the feasibility and sustainability of these actions. As there are currently 35 separate fire departments within the County with multiple forms of governance, tax structure, tax base, location within the County, capital equipment, facilities, and willingness to cooperate, the individual participants will impact the results and success of any merger or consolidation. Although this process has already begun between some departments within the County, a countywide change to fire and rescue deployment, structure, and governance will take several years and most likely require Council involvement. Even with willing participants, it is likely that a consolidation or merger of two departments could take as much as several months to a year or more to accomplish, depending on the complexity and differences between the jurisdictions.

   ESCI suggests that if this option is selected, that a Strategic Planning Process be initiated and the County assist consolidating or merging districts as needed to accomplish this action between willing jurisdictions first. Subsequent or concurrently, Council may also consider other actions, such as increasing or diminishing of service area boundaries, to ensure the success of these new consolidations or mergers. Depending upon the results of these voluntary consolidations or mergers, County Council may be required to take more aggressive actions in the future to ensure the success and sustainability of the remaining jurisdictions.

2. *It should be noted that as part of the Strategic Planning Process, steps can be taken to protect and maintain medical benefits, accrued general leave time, and compensation of individual firefighters who work for departments that are merged, consolidated, or otherwise affected by this process. Spartanburg County should consider hiring a Fire Services Coordinator position.*

   Due to the need for County involvement for the foreseeable future, the County would be well-served to hire a Fire Service Coordinator. A Fire Service Coordinator would be well-positioned to lead the County's efforts in working to merge and consolidate some fire districts pursuant to strategic planning and to coordinate the activities of the remaining fire departments.

   If Spartanburg County adopts the recommendation to take steps to merge and consolidate some fire districts, ESCI recommends that the County engage the appropriate stakeholders to begin the Strategic Planning Process. The process of consolidating fire districts will require buy-in from the Fire Districts in Spartanburg County. As such, a series of meetings will be necessary to construct a plan or plans that take into consideration the geographic locations, service areas, mill rates, staffing, facilities, and equipment of the fire departments that are potential candidates to regionalize.

3. *Develop a Strategic Plan for the Spartanburg County Fire Service, spanning a three-to-five-year period as a follow-up to this Independent Fire Study.*

   Spartanburg County has contracted ESCI to facilitate a Customer-Centered Strategic Planning Process upon completion of this Independent Fire Study. ESCI recommends that the Strategic Planning Process commence soon after the adoption of the Independent Fire Study.

MID-TERM STRATEGIES

Financial Considerations

4. *The current way fire services are funded and provided within Spartanburg County should warrant additional consideration.*

   The current model of fire protection service delivery in Spartanburg County is financially inefficient. Significant financial resources within Spartanburg County are dedicated to funding fire stations, apparatus, and equipment. As detailed in the Service Delivery section of this report, in some areas of the County, this financial burden does not necessarily translate to improved delivery of fire protection. Additionally, a lack of coordination of the fire service at the County-level contributes to missed opportunities for bulk-purchasing discounts, as well as the lack of standardized specifications, apparatus, and equipment. Finally, the Fire Advisory Board and Fire Chiefs Association should continue to work with legislators to enable the ability for SPDs to reset their millage rates pending a consolidation or merger to ensure financial stability in the future. Spartanburg County should engage and actively work with its State Legislators to legislatively purse options that will assist with these efforts.

Management and Staffing

5. *Each fire department within Spartanburg County should conduct a department-level community risk assessment.*

   The community risks that can reasonably be anticipated to impact Spartanburg County are many and varied. The degree of the potential impact of each risk within each department will vary significantly across the County. This varying impact means that fire departments will have different risk priorities, which should result in department-level planning of where to locate resources to provide an effective response to emergency incidents. Appendix A includes a template that can be used for each fire department to conduct a Fire Department Community Risk Assessment.

6. *Spartanburg County should take an active role in advocating for programs and legislation at the federal, state, and local levels in an effort to improve the likelihood of a sustainable volunteer fire service.*

   While the number of volunteer firefighters is on the decline both nationally and in Spartanburg County, volunteer firefighters still play a very vital role in the delivery of fire service within the County.

7. *The current staffing configuration deploys too few firefighters from too many different fire stations. As part of the Strategic Planning Process for the future merger and consolidation of fire departments, consideration should be given to staffing crews consisting of more firefighters and deploying them from a few strategically-located fire stations.*

   With the existing staffing configuration, a fire in a strip mall or apartment would require all firefighters in two of the County's quadrants and all firefighters plus mutual aid firefighters in the other two quadrants. Drawing firefighters from this many fire departments has the potential to create extended travel times and to delay fire suppression. Deploying crews consisting of more firefighters from fewer strategically placed fire stations creates a safer working environment for the firefighters and allows them to immediately commence fire suppression operation upon arrival on-scene provided that the crew consists of four or more firefighters.

Emergency Medical Services

8. *Encourage the County to take the lead to work with all fire departments to implement a data-driven approach to meeting the future EMS demands of the County.*

   This data-driven review of system demand should result in a coordinated county-wide approach to answering EMS calls in Spartanburg County in an efficient and cost-effective manner that is sustainable for the fire departments as well as the county.

Training

9. *Create minimum training requirements for structural firefighters and support personnel.*

A County-wide fire service job description with minimum initial and ongoing training requirements, outlining the duties that each position is authorized to perform, should be created. The purpose of this is twofold. First, this will enhance the standardization of training requirements countywide, improving firefighter safety. Second, by providing non-structural firefighting positions, combination and volunteer fire departments will be better able to recruit and retain volunteers, as there are many positions on the fire ground that do not include interior firefighting or incident command. While it is reasonable to require paid firefighters to perform fire suppression activities within Immediately Dangerous to Life and Health (IDLH) environments and to attend the training that is required to perform those duties, some volunteers do not have the desire to enter IDLH environments or to perform fire suppression activities and could be utilized in support roles.

As Spartanburg County has seen a decline in the number of volunteer firefighters in recent years, it would benefit the County to create specific job functions with associated training and ongoing training requirements that can be more easily satisfied by volunteers. As OSHA requires that training be commensurate with duties, the more specific a job function is, the simpler it is to establish specific and ongoing training requirements for that position.

10. *An Annual Training Calendar should be created in collaboration with the South Carolina Fire Academy.*

This calendar of training classes should satisfy the quarterly and annual training requirements and place a priority on high-risk/high-frequency operations, such as emergency vehicle operations, as well as have a focus on high-risk/low-frequency operations, such as fire suppression including firefighter accountability, to ensure competency during dangerous evolutions. Annual countywide training, in conjunction with the South Carolina Fire Academy, will allow for the scheduling of an appropriate number of classes that the County can reasonably anticipate being able to fill with at least 12 students per class that are geographically distributed throughout the County. This annual calendar will further allow for advanced planning by the fire academy, fire departments, and the firefighters.

ESCI commends Spartanburg County for recognizing NFPA 1021 as the standard for Fire Officers and further suggests that understanding the increasingly complex demands placed upon the leaders of today's fire service, that the County recognize the various levels of Fire Officers that exist within NFPA 1021 for midlevel and department Chief Officers.

Countywide Fire Prevention and Planning Efforts

11. *Spartanburg County should work with County fire departments to improve the code enforcement process within the County.*

    As local fire departments do not have enforcement authority, and Spartanburg County does not provide fire inspection or fire plans review services to Special Purpose Districts and Fire Service Areas, they are reliant on the County to correct violations. While Spartanburg County provides inspections and plans review for new construction and permitted renovations, annual inspections of occupancies lacking a permit are currently outside of the County's scope of services. The fire department representatives repeatedly reported to ESCI that they get "very little help, if any" from the County in this regard. The fire department representatives also repeatedly expressed concerns that there is "very little accountability" when there is a change of occupancy in a building. This is a serious safety concern for both the occupants as well as firefighters who respond to emergencies in these buildings.

12. *Spartanburg County should take a more aggressive role in coordinating fire prevention throughout the County.*

    ESCI's interviews with representatives of the various fire departments within Spartanburg County consistently revealed that the fire departments desired for there to be a county-wide approach to fire prevention. Specific requests included having the annual county-wide fire prevention messages, providing educational materials, and coordinating with the Community Risk Reduction Committee.

13. *A Countywide Pre-Plan standard should be used to enhance firefighter safety and coordination.*

    There exist varying levels of pre-plan inspections throughout the County in the number of occupancies that have been pre-planned, to include the level of detail and frequency of updates. Fire pre-planning is an important part of the safe and effective mitigation of a structure fire. These plans provide building layouts, alarm panel locations, known hazards, hydrant locations, and other critical information during an emergency. This is another area of the fire service that could benefit from coordination. ESCI suggests that a County-wide pre-planning program would better assist the County's firefighters and the residents they serve.

Hazardous Materials and Technical Rescue Responses

14. *Spartanburg County should take a stronger role in the coordination of the Hazardous Materials Team and their response.*

    ESCI's interviews with representatives of the various fire departments within Spartanburg County consistently revealed that the fire departments desired the County to take a more aggressive role in coordinating hazardous materials and technical rescue teams within the County. Specific requests included using a data-driven approach to deploy resources based on local risk assessments as well as a County-led approach to staffing, training, and funding these teams.

Emergency Communications Center

15. *A Communications Center study should be conducted to identify areas of improvement and align Spartanburg County with the most efficient and effective use of communications infrastructure purchased and installed.*

    A full Communications Study to evaluate the operations and technology in place within the ECC should occur to best position the ECC to meet the future communications demands of Spartanburg County.

16. *A comprehensive review of current policies and procedures and the standardization of fire department dispatch procedures should be accomplished.*

    With 32 of the 35 fire departments in Spartanburg County to dispatch, it is imperative that, as much as possible, the agencies follow a standard set of policies and procedures. A comprehensive review of current policies and procedures would need to be completed, and agreements made to standardize as much as possible. As fire dispatch only makes up approximately 10% of the overall workload within the ECC, the current menagerie of dispatch procedures, which are as varied as the individual departments, dramatically slows the ECC's ability to process calls for service efficiently.

17. *A Countywide decision as to which radio system will be primary should be reached, as well as the minimum standards for radios operating on this system.*

    The fire agencies need to determine if they want to remain on VHF and make improvements to the coverage or switch over to the Palmetto 800 trunked radio system. Additionally, the practice by some departments of purchasing generic or off-brand equipment further leads to communication issues within the County.

18. *Spartanburg County should consider increasing staffing levels to allow a dispatcher to be assigned to high life risk events such as working fires.*

    It was noted that the Center does not assign a dispatcher to a specific event when requested from the field. The NFPA 1221: *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems* states that "When requested by the Incident Commander, a telecommunicator shall be dedicated to the incident and relieved of other duties within the communications center."[12] While this is a necessary safety procedure for field personnel, currently, if someone is pulled from answering 9-1-1 calls or handling another radio channel, the safety of the public and other public safety personnel will also be at risk. It is incumbent on the ECC to ensure adequate staffing, but that may not include extra staff at any particular time. It is up to ECC management to make every effort possible to dedicate a dispatcher to an event when requested.

[12] *National Fire Protection Association, 1221 Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems, 2019 Edition, Chapter 7, Section 7.3.2.*

Service Delivery

19. *Spartanburg County should develop a Standards of Cover for Fire Service Delivery, including Response Standards and Targets.*

    ESCI suggests that there are too many fire departments to be effectively staffed by the current number of paid and part-time firefighters presently employed within the County, and that volunteer firefighters are not a sustainable workforce in Spartanburg County. The development of a County-wide Standards of Cover, including response standards and targets, will permit stakeholders to have the necessary conversations to determine the levels of service that will be delivered in the various response areas within the County, which will, in turn, allow for the deployment of the appropriate resources.

    Appendix H, Development of Response Standards and Targets, is included at the end of this report for reference.

20. *A Fire Station Location and Optimization Analysis should be conducted following the decision to merge or consolidate jurisdictions.*

    The Service Delivery section of this report provides specific examples of ways that the number of fire stations within Spartanburg County can be reduced while potentially improving the delivered level of fire protection. Due to the complexities and regional factors present within the County, additional analysis will be conducted based upon stakeholder feedback during the strategic planning process, which will occur following the presentation of this report.

21. *A Countywide initiative should be conducted to standardize the deployment of automatic aid.*

    The current method of automatic aid has developed in Spartanburg County most likely because of a lack of standardization or reliability from department to department. A goal for County-wide automatic aid would be to standardize unit staffing to a minimum threshold, such as a three-person engine company, and dispatch the closest unit to incidents requiring multiagency responses or when the primary resource is unavailable.

Long-Term Strategies

22. *The fire departments within Spartanburg County should develop and adopt Fire Facilities, Apparatus, and Support Equipment Capital Improvement Plans.*

The development of the Fire Facilities Capital Improvement Plan that identifies necessary fire stations to serve the population within Spartanburg County should be developed and adopted. Once the number and location of fire stations have been determined, the number and types of apparatus that will best serve the jurisdiction and County can be established. Following the development and the adoption of both the Fire Facilities and Fire Apparatus Capital Improvement Plans, County fire departments could then develop the Support Equipment Capital Improvement Plan to deploy the appropriate number and types of equipment.

ESCI noted that when comparing the number of firefighters on duty to the number of apparatus, Spartanburg County is heavy on apparatus. The cost of maintaining apparatus places a significant burden on a fire department's operating budget in addition to the burden that replacement costs incur on the capital budget. ESCI recommends a County-wide evaluation of all the apparatus in the fleet with a goal of eliminating apparatus that does not see regular use and does not serve a specific and necessary need.

Conclusion

The ESCI project team began collecting information about Spartanburg County in March 2020. The team members recognize that this report contains a large amount of information, and ESCI would like to thank the Spartanburg County officials and local Fire Chiefs for their efforts in bringing this project to fruition.

It is ESCI's sincere hope the information contained in this report is used to its fullest extent, and that its implementation will improve the emergency services Spartanburg County provides to its citizens and in the surrounding area.

Appendix A: Fire Department Community Risk Assessment Template

The following template is based on Vision 20/20's *Community Risk Assessment: A Guide for Conducting a Community Risk Assessment*. This template can be used in conjunction with the Spartanburg County Fire Services Independent Fire Study 2020 and the April 2017 Spartanburg County Multi-Jurisdictional Hazard Mitigation Plan to facilitate Fire Department Community Risk Assessments.

Vision 20/20 recommends a six-step planning cycle for the development of a Community Risk Reduction Plan.

Figure 34. Community Risk Reduction Planning Cycle

Steps one through three of the Community Risk Reduction Planning Cycle comprise the Community Risk Assessment and will be addressed by this template:

Figure 35. Steps for Completing a Community Risk Assessment

STEP 1: IDENTIFY RISKS

The following risks were identified and described within the Community Risk Assessment section of this report.

Figure 36. Risks and Risk Factors Identified Within Spartanburg County

Risks and Risk Factors Identified Within Spartanburg County
1. Males
2. Children under 5 years of age and adults over the age of 65 years
3. Persons with disabilities
4. Persons with language barriers; and
5. Persons in low-income communities
6. Housing Type and Density
7. Target Hazards/Critical Infrastructure and Key Resources
8. Transportation Systems
9. Utilities
10. Winter Storm and Freezes
11. Severe Thunderstorm/High Wind
12. Floods
13. Hazardous Materials Incidents
14. Tornado
15. Drought
16. Wildfire
17. Heat Wave/Extreme Heat
18. Lightning

STEP 2: PRIORITIZE RISKS

Each risk can be evaluated for the likelihood of occurrence, the impact of such an occurrence, and the associated level of risk.

Step 2A: Determine the Likelihood

Step 2A is to identify the likelihood of an occurrence within the community. The following figure illustrates the rating schedule that ESCI recommends to measure the likelihood of each risk.

Figure 37. Qualitative Measures of Risk Likelihood[13]

Qualitative Measures of Risk Likelihood		
Level	**Description**	**Characteristics**
A	Almost Certain	▪ Event is expected to occur. ▪ High level of recorded incidents and/or very strong anecdotal evidence. ▪ Strong likelihood event will re-occur. ▪ Strong opportunity, reason, or means to occur.
B	Likely	▪ Event will probably occur. ▪ Regular recorded incidents and strong anecdotal evidence. ▪ Considerable opportunity, reason, or means to occur.
C	Possible	▪ Event should occur at some time. ▪ Few infrequent, random recorded incidents, or little anecdotal evidence. ▪ Very few incidents in associated organizations or comparable facilities. ▪ Some opportunity, reason, or means to occur.
D	Unlikely	▪ Event could occur at some time. ▪ No recorded incidents or any anecdotal evidence. ▪ No recent incidents in associated organizations or facilities. ▪ Little opportunity, reason, or means to occur.
E	Rare	▪ Event may occur only in exceptional circumstances.

Step 2B: Determine the Vulnerability

Step 2B of the assessment and prioritization process is to determine vulnerability in relation to each risk. *Vulnerability* is the susceptibility to suffer harm from an incident or event. Vulnerability may vary based on a variety of factors, including the level of preparedness and capabilities of emergency services providers. A community's ability to resist the impacts and effects of various hazards must be determined. The following figure is used as a qualitative measure to describe the consequences or impact of a particular risk or event.

[13] *City of Manningham (Victoria, Australia) Community Emergency Risk Management Plan (2009).*

Figure 38. Qualitative Measures of Risk Consequence of Impact[14]

Qualitative Measures of Risk Consequence of Impact		
Level	**Description**	**Characteristics**
1	Insignificant	▪ No injuries or fatalities. Small number or no people displaced, and only for short duration. Little or no personal support required (not financial). ▪ Inconsequential or no damage. Little or no disruption to the community. ▪ No measurable impact on the environment. ▪ Little or no financial loss.
2	Minor	▪ Small number of injuries, but no fatalities. Minor medical treatment required. Some displacement of people (less than 24 hours). Some personal support required. ▪ Some damage. Some disruption (less than 24 hours). ▪ Small impact on environment with no lasting effects. ▪ Some financial loss.
3	Moderate	▪ Medical treatment required, but no fatalities. Some hospitalization. Localized displacement of people who return within 24 hours. Personal support satisfied through local arrangements. ▪ Localized damage, which is rectified by routine arrangements. Normal community functioning with some inconvenience. ▪ Some impact on the environment with no long-term effects, or small impact on environment with long term effect. ▪ Significant financial loss.
4	Major	▪ Extensive injuries, significant hospitalization, large number displaced (more than 24 hours duration). Fatalities. External resources required for personal support. ▪ Significant damage that requires external resources. Community only partially functioning, some services unavailable. ▪ Some impact on environment with long term effects. ▪ Significant financial loss—some financial assistance required.
5	Catastrophic	▪ Large number of severe injuries requiring hospitalization. Significant fatalities. General displacement for extended duration. Extensive support. ▪ Extensive damage. Community requires significant support. ▪ Significant impact on environment and/or permanent damage. ▪ Huge financial loss—unable to function without significant support.

[14] *City of Manningham (Victoria, Australia) Community Emergency Risk Management Plan (2009).*

Step 2C: Determine the Level of the Risk

Step 2C is to determine a level of risk using the results from part one (Likelihood) and part two (Vulnerability). The following figure cross references the first two scores to determine the level of risk for each hazard.

Figure 39. Qualitative Measures of Risk Analysis: Levels of Risk[15]

Qualitative Risk Analysis Matrix: Level of Risk					
Likelihood	**Insignificant (1)**	**Minor (2)**	**Moderate (3)**	**Major (4)**	**Catastrophic (5)**
A (Almost Certain)	HR	HR	ER	ER	ER
B (Likely)	MR	HR	HR	ER	ER
C (Possible)	LR	MR	HR	ER	ER
D (Unlikely)	LR	LR	MR	HR	ER
E (Rare)	LR	LR	MR	HR	HR

Categories of Risk	
Level	**Description**
Extreme Risk (ER)	Detailed research and management planning required at senior levels. Action must be taken to reduce consequences or likelihood.
High Risk (HR)	Chief officer or senior management attention required; further research might be required. Some action must be taken.
Moderate Risk (MR)	Management responsibility must be specified, specific monitoring or response procedures required.
Low Risk (LR)	Manage by routine procedures

[15] *City of Manningham (Victoria, Australia) CERM Plan (2009).*

Step 2D: Calculate the Level of Risk

Step 2D is to calculate the Level of Risk at the fire department level for each of the risks identified within this report using the following tables.

Figure 40. Level of Risk: At-Risk Population (Males)

Risk	At-Risk Populations: Males
Likelihood	
Vulnerability	
Level of Risk	

Figure 41. Level of Risk: At-Risk Population (Age Level)

Risk	At-Risk Populations: Age-Risk* *Children under 5 years of age and Adults over 65 yes of age.
Likelihood	
Vulnerability	
Level of Risk	

Figure 42. Level of Risk: At-Risk Population (Persons with Disabilities)

Risk	At-Risk Populations: Persons with Disabilities
Likelihood	
Vulnerability	
Level of Risk	

Figure 43. Level of Risk: At-Risk Population: (Persons with a Language Barrier)

Risk	At-Risk Populations: Persons with a Language Barrier
Likelihood	
Vulnerability	
Level of Risk	

Figure 44. Level of Risk: At-Risk Population (Persons Living In Poverty)

Risk	At-Risk Populations: Persons Living In Poverty
Likelihood	
Vulnerability	
Level of Risk	

Figure 45. Level of Risk: Housing Type and Density

Risk	Housing Type and Density
Likelihood	
Vulnerability	
Level of Risk	

Figure 46. Level of Risk: Target Hazards/Critical Infrastructure and Key Resources

Risk	Target Hazards/Critical Infrastructure and Key Resources
Likelihood	
Vulnerability	
Level of Risk	

Figure 47. Level of Risk: Transportation Level of Risk

Risk	Transportation
Likelihood	
Vulnerability	
Level of Risk	

Figure 48. Level of Risk: Utilities

Risk	Utilities
Likelihood	
Vulnerability	
Level of Risk	

Figure 49. Level of Risk: Winter Storm and Freezes

Risk	Winter Storm and Freezes
Likelihood	
Vulnerability	
Level of Risk	

Figure 50. Level of Risk: Severe Thunderstorm/High Wind

Risk	Severe Thunderstorm/High Wind
Likelihood	
Vulnerability	
Level of Risk	

Figure 51. Level of Risk: Floods

Risk	Floods
Likelihood	
Vulnerability	
Level of Risk	

Figure 52. Level of Risk Hazardous Materials Incidents

Risk	Hazardous Materials Incidents
Likelihood	
Vulnerability	
Level of Risk	

Figure 53. Level of Risk: Tornadoes

Risk	Tornadoes
Likelihood	
Vulnerability	
Level of Risk	

Figure 54. Level of Risk: Drought

Risk	Drought
Likelihood	
Vulnerability	
Level of Risk	

Figure 55. Level of Risk: Wildfires

Risk	Wildfires
Likelihood	
Vulnerability	
Level of Risk	

Figure 56. Level of Risk: Heat Wave/Extreme Heat

Risk	Heat Wave/Extreme Heat
Likelihood	
Vulnerability	
Level of Risk	

Figure 57. Level of Risk: Lightening

Risk	Lightening
Likelihood	
Vulnerability	
Level of Risk	

Step 2E: Record the Level of Risk

Step 2E is to list the identified Level of Risk on the following table for each of the Risks and Risk Factors.

Figure 58. Community Risks by Level

Risks and Risk Factors	Level of Risk
1. Males	
2. Children under 5 years of age and adults over 65 years of age	
3. Persons with disabilities	
4. Persons with language barriers	
5. Persons in low-income communities	
6. Housing Type and Density	
7. Target Hazards/Critical Infrastructure and Key Resources	
8. Transportation Systems	
9. Utilities	
10. Winter Storm and Freezes	
11. Severe Thunderstorm/High Winds	
12. Floods	
13. Hazardous Materials Incidents	
14. Tornados	
15. Droughts	
16. Wildfires	
17. Heat Wave/Extreme Heats	
18. Lightning	

Step 3: Develop Strategies & Tactics to Mitigate Risks

Step 3 is the development of strategies and tactics to mitigate the risks. As the fire departments within Spartanburg County do not have unlimited funding, personnel, and resources, ESCI recommends that planning efforts should begin with the Extreme and then the High Risks within each fire department to ensure the best use of the available resources.

This template is intended to assist the fire departments within Spartanburg County with the development of department-level Community Risk Assessments. It is not intended to replace a full Community Risk Assessment: Standards of Cover. ESCI recommends that Spartanburg County consider the development of a Countywide Community Risk Assessment: Standards of Cover.

Appendix B: First Series of Listening Sessions with Fire Chiefs

ESCI conducted 13 different listening sessions with the Fire Chiefs and their designees on Wednesday and Thursday, May 20 and 21, 2020. Due to the COVID-19 Pandemic, these meetings were designed by zone and included groups of 10 or fewer people per session to allow for social distancing.

All of the Fire Chiefs and their designees were very forthcoming with ESCI. They share a common desire to provide quality fire protection throughout Spartanburg County. All of the members expressed concerns about the future sustainability of the current combination system.

Three major concerns consistently emerged during all 13 meetings with the Fire Chiefs. These concerns were the Spartanburg County Communications Center, Coordination of the Fire Service in Spartanburg County, and Funding.

It should be noted that all of the concerns listed below were the personal opinions of those individuals who attended the listening sessions. These concerns are listed below to identify the themes that emerged during the 13 different sessions. Inclusion on this list does not validate or invalidate the concern; it simply identifies the concern. ESCI used these concerns as a starting place to conduct the analyses that are included elsewhere in the report.

Concern 1: Spartanburg County Communications Center

The Communications Center in Spartanburg County was unanimously identified as the single biggest concern for the fire service by everyone that met with ESCI on May 20 and 21. Listening Session Participants recognized that the County was actively working to address staffing issues within the Communication Center. There was widespread fire service support for a full Communications Center Study to be conducted by an independent company.

Concern 2: Coordination of the Fire Service in Spartanburg County

The next most common concern after the Communications Center was the coordination of the fire service in Spartanburg County. The Fire Chiefs voiced frustration that the communications that did occur were inconsistent, with some fire departments receiving more frequent, current, and detailed information than others.

Concern 2A: Training

A subcategory within the Coordination of the Fire Service in Spartanburg County was Training. There was a strong desire by the Fire Chiefs to see more coordinated approach to firefighter training in Spartanburg County.

Concern 3: Funding of the Fire Service in Spartanburg County

The third major concern identified during the meetings with the Fire Chiefs was Funding.

Concern 3A: Staff

The first subcategory within the Funding of the Fire Service in Spartanburg County was Staffing. Fire Chiefs throughout the county had concerns about the current staffing levels in some areas of the county.

Concern 3B: Equipment

A second subcategory within the Funding of the Fire Service in Spartanburg County was Equipment. Many of the Fire Chiefs reported concerns related to funding equipment for their fire departments.

Appendix C: Second Series of Listening Sessions with Fire Chiefs

ESCI conducted four different listening sessions with the Fire Chiefs and their designees on Tuesday, July 21, 2020. Due to the COVID-19 Pandemic, these meetings were designated by zone and allowed for social distancing.

ESCI followed the same set of talking points for each of the four listening sessions. Those talking points were as follows:

ESCI's Process for Facilitating the Independent Fire Study in Spartanburg County

1. May Listening Sessions
2. Review of Survey Tables and Service Delivery Data submitted by both the Fire Departments and Spartanburg County
3. July Listening Sessions
4. Submission of a Draft Report
5. In-Person Review of Draft Report in Charleston in September
6. Submission of Final Report
7. Presentation of Final Report to the Spartanburg Board of County Council
8. Adoption of the Final Report or a variation of the Final Report
9. Initiation of the Strategic Planning Process
10. Strategic Planning Session
11. Submission of the Draft Strategic Planning Report
12. Submission of the Final Strategic Planning Report
13. Presentation of the Final Report to the Spartanburg Board of County Council
14. Implementation of the Strategic Plan

Discussion of ESCI's Initial Findings in Spartanburg County

1. There appears to be a lack of coordination of the fire service at the County level within Spartanburg County.
   A. Varying levels of service delivery
   B. Varying levels of OSHA compliance
   C. Varying levels of staffing
2. The Communications Center was repeatedly and consistently identified as a concern during every meeting that ESCI conducted with members of the Spartanburg County Fire Service.
   A. As a result of that feedback, ESCI added a Communications Center Subject Matter Expert to our Spartanburg County Team to review the operations of the Communications Center.
   B. As part of the July site visit, the ESCI team would be touring the Communications Center and meeting with the Director.

3. Resource Deployment within Spartanburg County does not appear to be as efficient as it could be.
   A. Alternative deployment models could better position Spartanburg County to assemble Effective Firefighting Forces more consistently and quickly.
   B. Alternative deployment models could better position Spartanburg County to respond to concurrent calls more effectively.
4. The existing governance structure and management of Special Purpose Districts and Fire Service Areas potentially expose Spartanburg County to varying, and sometimes significant, risks for liability.

ESCI encouraged all Listening Session Participants to agree, disagree, and ask questions about each of the findings that were presented. While participants had varying levels of agreement and different ideas about ideal outcomes, there was unanimous consensus among all listening session participants that ESCI's initial findings were relevant to the future planning needs of the Spartanburg County Fire Service.

Appendix D: Financial Analysis

The 35 separate fire departments within Spartanburg County operate on budgets that are supported by taxes levied within their identified coverage areas. The differences among these fire departments are many and varied:

- The taxes levied in these areas vary from 3.3 mils to 45.9 mils.
- The coverage areas for these fire departments range from 0.9 to approximately 140 square miles.
- The areas protected by these fire departments range from large industrial parks to areas with virtually no industry or mercantile and only moderate to low income housing.
- While all fire departments within Spartanburg County respond to fires, they have varying levels of staffing; only some of the departments provide additional services such as medical first response, extrication, hazardous materials, and/or technical rescue response.
- The administrative and financial burdens associated with fire departments have become increasingly more complex over time.
- The volunteer fire departments within Spartanburg County have faced challenges in maintaining membership. Some of these departments have opted for consolidation to ensure continued quality service within their response areas. Accordingly, in 1990, there were 46 fire departments within Spartanburg County. Now, in 2020, that number has declined by 23.91% to 35 fire departments.

The current system creates a significant disparity among the fire departments within Spartanburg County. Some fire departments have adequate funding available to staff and equip their fire stations, whereas others struggle. When Spartanburg County Council formed the Fire Advisory Committee in September 1992, one of the tasks for this committee was to identify a means to assist fire departments in obtaining adequate and required equipment for fire protection services in all areas of the County.

The highest concentrations of people within Spartanburg County live in and around the City of Spartanburg, with populations expanding westward towards the City of Greer. Although dense pockets of the population exist in Spartanburg County, generally, the County could be described as possessing a rural population with pockets of development. It is for this reason, the current manner in which fire services are funded and provided should warrant additional consideration. Those jurisdictions lacking commercial or industrial occupancies with predominantly rural populations will find it more difficult to fund effective fire rescue activities at a rate equivalent to neighboring jurisdictions possessing a stronger tax base. Without the ability to fund effective fire services, Spartanburg County may find that additional jurisdictions within the County will no longer have the ability to provide services, requiring the County to create or assume fire rescue responsibilities.

The current model of fire protection delivery in Spartanburg County is financially inefficient. Significant financial resources within Spartanburg County are dedicated to funding fire stations, apparatus, and equipment. As detailed in the Service Delivery section of this report, in some areas of the County, this financial burden does not necessarily translate to improved delivery of fire protection. Additionally, a lack of coordination of the fire service at the County level contributes to missed opportunities for bulk-purchasing discounts, as well as the lack of standardized specifications, apparatus, and equipment.

Evaluation of Service Contracts

The existing governance structure and management of Special Purpose Districts and Fire Service Areas potentially expose Spartanburg County to varying, and sometimes significant, risks for liability. The inconsistencies in fire service delivery within the County include levels of service, staffing, training, and varying levels of compliance with laws, regulations, national standards, and industry best practices.

Fire Service Areas

Commissioners who are appointed by the Spartanburg County Council

Chesnee Community, Cooley Springs, Poplar Springs, Tyger River, and Una Fire Service Areas are governed by Commissioners who are appointed by the Spartanburg County Council.

Commissioners who are appointed by the membership of the Fire Department

Inman Community is governed by Commissioners are appointed by the membership of the Fire Department.

Finding: While these fire service areas may have been established with the intention of creating separate entities, the creation, administration, financial approvals, purchasing policies, and ownership of capital assets for the Fire Service Areas by the County is consistent with the creation and oversight of other County departments. These practices establish a relationship that can subject the County to the same liabilities of other subdivisions of County government, except that the County provides little to no oversight. This responsibility is instead delegated to the Fire Service Areas. Ultimately, the County is responsible for providing for fire and rescue services within these areas, whether a Fire Service Area is present or not.

County Council Created Taxing Area/Department of the County

The Trinity Fire Department is considered a department of the County under the supervision and control of the County Administrator.

Finding: Whether or not direct oversight and management of this fire department are exercised by the County, the County is liable for the actions and inactions of this department in the same way that it is liable for other County departments and Fire Service Areas.

Elected Officials Fire Service Areas that Surround a Municipality

Campobello, Cowpens, Duncan, and Greer are governed by elected officials for the municipality within Spartanburg County; County Council contracts for fire protection in these Fire Service Taxing Areas.

Finding: In addition to being subject to the potential liability that is associated with Fire Service Areas, the County is further exposed to potential increased liability in these districts because the County's contract with these Fire Service Areas has expired.

Special Purpose Fire Districts

The 22 Special Purpose Districts within Spartanburg County are governed by commissioners who are either recommended by the County Legislative Delegation and then appointed by the governor, or who are elected via public election within the fire district.

Finding: The County has the ability to approve bonds and other items for the Special Purpose Districts. These practices establish a relationship that could potentially subject the County to liability related to both the actions and inactions of the Special Purpose Districts.

Municipal Entities

Within the County, there exist municipal departments that are governed by elected officials who are charged with protecting only their own municipality.

Finding: These municipal fire departments are independent of the County.

Appendix E: Staffing and Management

Volunteer, part-time, and full-time firefighters staff the fire departments in Spartanburg County. A wide variety of stakeholders repeatedly and consistently identified the management, coordination, and staffing within the Spartanburg County fire service as critical areas for improvement. Through its review of survey tables and onsite interviews, ESCI noted significant inconsistencies in fire service delivery within the County, including levels of service, staffing, training, and varying levels of compliance with laws, regulations, national standards, and industry best practices. Interactions between the fire departments, the Communications Center, and the Fire Marshal's Office were also reported to be oftentimes inefficient and unproductive.

STAFFING

Administrative and Support Staffing

While each of the fire departments within the County has its own established administration, there is no single point of contact for the County's 35 fire departments to interact with the Spartanburg County Government. The result is that the various fire departments interact with different representatives of the County, receiving varying levels of responsiveness and sometimes even different information.

Through its review of the fire department organizational models within Spartanburg County, ESCI found that with perhaps the exception of the municipal fire departments, the County could be held liable for the actions of the other fire departments within the County, and most particularly within Fire Service Areas as well as the areas protected by the Trinity Fire Department. For this reason, Spartanburg County should be more actively and directly involved in managing fire service delivery within the County or work to consolidate or merge some fire districts within the County.

Volunteer Firefighters

During interviews with ESCI, most of the fire departments reported dwindling numbers of volunteer firefighters and increased challenges in recruiting new volunteer firefighters. This is entirely consistent with trends within the volunteer fire service across the nation. In February 2020, NFPA published its 2018 U.S. Fire Department Profile report.[16] The report, which is based on data collected via a national survey of fire departments, estimated that there were 745,000 volunteer firefighters in the United States in 2018.

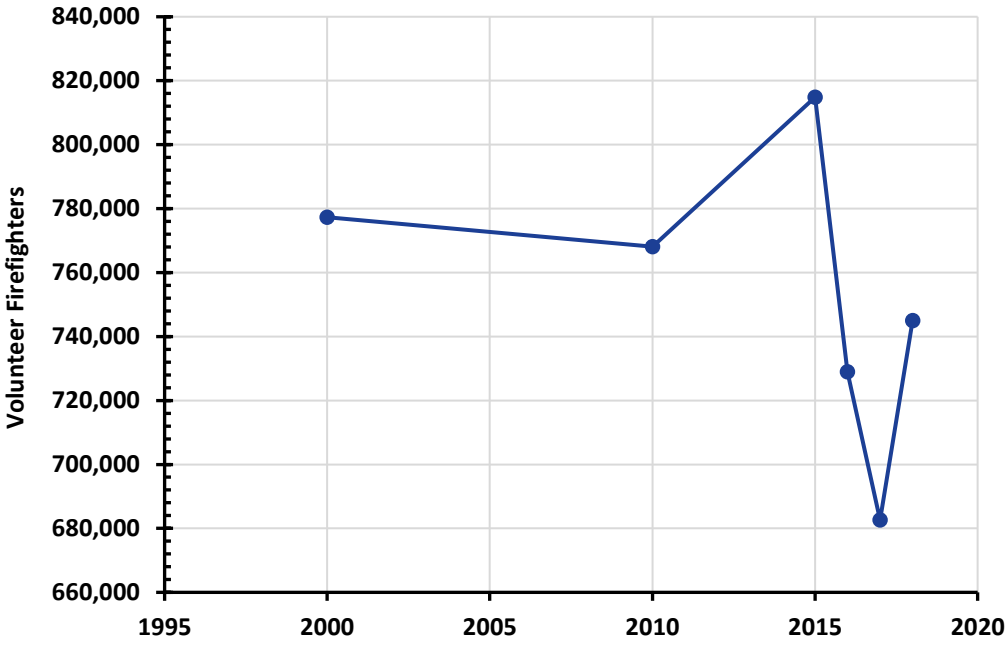
[16] *https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/Emergency-responders/osfdprofile.pdf.*

Figure 59. Volunteer Firefighters in the U.S., 2000–2018

Year	# of Volunteer Firefighters	Annual Change (%)
2000	777,350	
2010	768,150	-1.18
2015	814,850	6.07
2016	729,000	-10.54
2017	682,600	-6.36
2018	745,000	9.14
2018 Compared to 2000		**-4.16**

While there are still 745,000 volunteer firefighters in the country—an increase of 9% from 2017—the number of volunteer firefighters has declined by 4.16% since 2000.

Figure 60. Volunteer Firefighters in the U.S., 2000–2018



In Spartanburg County, this decline in volunteer firefighters was one of the factors that have encouraged some of the County's fire departments to consolidate. In 1990, there were 46 fire departments within Spartanburg County. Now, in 2020, that number has declined by 23.91% to 35 fire departments. The remaining 35 fire departments are increasingly relying on part-time and full-time firefighters to provide fire service within their districts.

Operational Staffing

Number of Firefighters

One of the issues that became apparent during the course of ESCI's fieldwork in Spartanburg County is that there was not a single master list of all firefighters in Spartanburg County. While each fire department had a list of its own firefighters, it is common within Spartanburg County for firefighters to work full-time, part-time, and volunteer for as many as four different fire departments.

ESCI compiled a master list of all members of all of the fire departments in Spartanburg County that were reported on the survey tables.

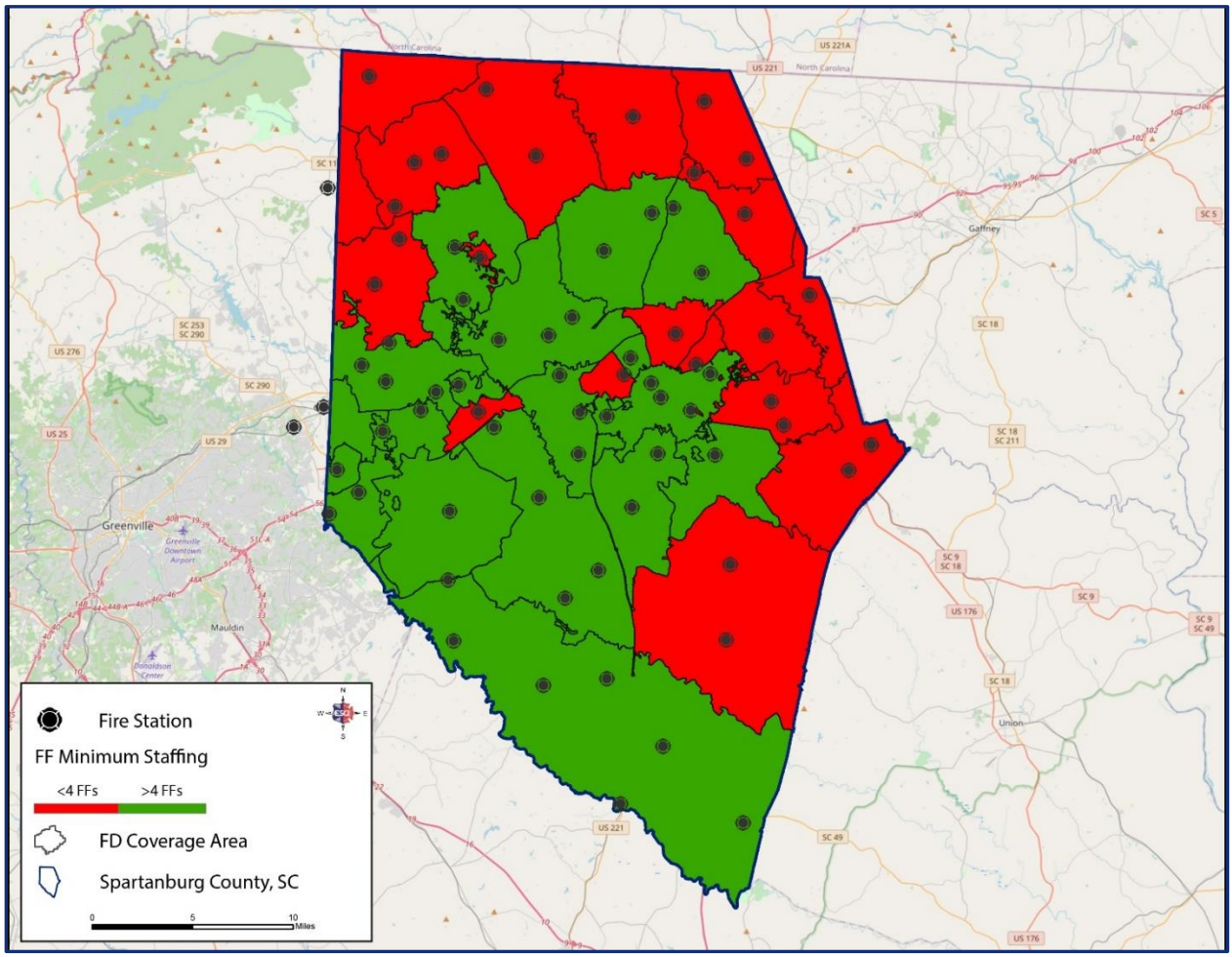
ESCI first took all of the rosters that were submitted and created a master list. This list counted each person and position separately, so if someone worked full-time for one department and part-time for a second department, they appeared on the list twice. The list included 1,161 total positions reported among the 35 fire departments. ESCI then reduced this list to the total number of individuals by identifying those people that hold positions in multiple fire departments. This list included 851 different individuals.

Volunteer firefighters perform an absolutely vital role within the Spartanburg County Fire Service. Spartanburg County would not be able to deliver its current level of service without the dedicated cadre of volunteer firefighters, many of whom have volunteered for decades. While volunteer firefighters perform critical functions within the Spartanburg County Fire Service, a fire department typically is initially dependent on its on-shift staffing for the first-arriving fire apparatus, with volunteer firefighters arriving thereafter. It is for this reason that the fire department staffing calculations within this study are based on the firefighters who are on-shift to reflect the number of firefighters that can reasonably and consistently be expected to immediately arrive on the scene. As such, for the next step in this analysis, ESCI quantified the number of individuals who serve Spartanburg County in either a full-time or part-time role. Individuals that serve multiple departments were only counted once for this calculation. ESCI calculated 568 total firefighters who could work full or part-time within the county. It should be noted that of these 568 individuals, that 310—or almost 55%—serve more than one fire department. This is significant because a single firefighter being injured, quarantined, or otherwise unavailable to work can negatively impact multiple fire departments within Spartanburg County.

Minimum Staffing

The following map illustrates the minimum staffing level within each fire department in Spartanburg County. As this is a department staffing level, for fire departments with multiple stations, this number of firefighters is divided among the stations within that district. For this calculation, minimum staffing was determined using the lowest number of firefighters on-shift in each department at any point in time, including nights, weekends, and holidays. The purpose of this calculation was to determine the minimum guaranteed number of firefighters that are on shift and available to respond. As there is no guarantee of a response from volunteer firefighters, they are not included within this calculation.

Figure 61. Minimum Staffing Map by Department



More than half of the fire departments in Spartanburg County—18 out of 35—have a minimum level of staffing that is less than four firefighters per shift. A staffing level of four firefighters is a significant benchmark because OSHA 29 CFR 1910.134(g)(4)(i) and NFPA 1500: *Standard on Fire Department Occupational Safety, Health, and Wellness Program* require that at least two firefighters enter together into an IDLH atmosphere and remain in visual or voice contact with one another at all times and that two additional firefighters be assigned in case the interior firefighters require assistance. The exception to this requirement is that firefighters may enter an IDLH atmosphere prior to the assembly of four firefighters if there is a reasonable expectation of making a human rescue.

As a result of their current staffing levels, more than half of the fire departments in Spartanburg County rely on volunteer firefighters and/or firefighters from other fire departments in order to initiate interior fire suppression activities. It must again be noted that this standard does not prohibit the commencement of rescue activities prior to the assembly of four firefighters. While NFPA standards are not mandated unless specifically adopted into law or statute, they are considered to represent best practices and, in many cases, are viewed as a standard of care. OSHA regulations are laws that must be followed in South Carolina.

The following figure lists the minimum staffing levels of each of the fire departments in Spartanburg County.

Figure 62. Minimum Staffing List by Department

Fire Department	Minimum Staffing
1. Campobello	0
2. Cowpens	0
3. Glenn Springs	0
4. Pacolet	0
5. Una	0
6. Chesnee Community	1
7. Cooley Springs	1
8. Inman	1
9. Gowensville	2
10. Mayo	2
11. Startex	2
12. Converse	2
13. Drayton	2
14. Whitney	2
15. Holly Springs	3
16. Landrum	3
17. New Prospect	3
18. Glendale	3
19. Cherokee Springs	4
20. Inman Community	4
21. Croft	4
22. Hilltop	4
23. Poplar Springs	4
24. Roebuck	4
25. Trinity	4
26. GSP	5
27. Boiling Springs	6
28. Duncan	6
29. Tyger River	6
30. Reidville	6
31. Westview	6
32. North Spartanburg	8
33. Greer	12
34. Pelham-Batesville	11
35. Spartanburg	18

Spartanburg County is geographically divided into quadrants by Interstate 26 and Interstate 85. Interstate 26 runs north and south through the County, and Interstate 85 runs east and west. Using these natural boundaries, with accommodations to keep departments entirely within a single quadrant, ESCI calculated the following number of firefighters within each quadrant of the County. For the purposes of this evaluation, the City of Spartanburg was not included in the quadrant calculations.

Figure 63. Minimum Staffing Per Quadrant

Northwest	#FFs	Northeast	#FFs	Southwest	#FFs	Southeast	#FFs
Campobello	0	Chesnee	1	Poplar Springs	4	Cowpens	0
Inman	1	Cooley Springs	1	Trinity	4	Glenn Springs	0
Gowensville	2	Mayo	2	Reidville	6	Pacolet	0
Startex	2	New Prospect	3	Westview	6	Una	0
Holly Springs	3	Boiling Springs	6	Pelham-Batesville	11	Converse	2
Landrum	3	Cherokee	4			Drayton	2
Inman Community	4	North Spartanburg	10			Whitney	2
Duncan	6					Glendale	3
GSP	5					Croft	4
Tyger River	6					Hilltop	4
Greer	12					Roebuck	4
#FFs Per Quad.	**44**		**27**		**31**		**21**

Standards of Coverage and Staffing Performance for Incidents

As noted in the *Analysis of Service Delivery and Performance* section of this study, best practices for standards of cover and staffing performance can be found in the most current edition of NFPA 1710 (for career fire departments) and NFPA 1720 (for volunteer departments). Both standards were published in 2020.

NFPA 1710 defines a "Career Fire Department" as "A fire department that utilizes full-time or full-time-equivalent (FTE) station-based personnel immediately available to comprise at least 50 percent of an initial first alarm assignment."[17] NFPA 1720 states that "The authority having jurisdiction determines if this standard is applicable to its fire department."[18]

Both NFPA 1710 and 1720 address firefighter staffing, and both do so in relation to the efficiency and effectiveness of a firefighting (or emergency) force, "...sufficient to perform the necessary firefighting operations given the expected firefighting conditions." Both NFPA 1710 and NFPA are applicable in Spartanburg County; the appropriate standard is dictated by the makeup of the fire department that serves the response district.

[17] *NFPA 1710 3.3.13*

[18] *NFPA 1720 1.3.1**

NFPA 1720

In reference to volunteer fire departments, NFPA 1720 4.3.1 states that "The fire department shall identify minimum staffing requirements to ensure that a sufficient number of members are available to operate safely and effectively." The standard further sets forth Table 4.3.2 for the Authority Having Jurisdiction (AHJ) "to determine staffing and response time objectives for structural firefighting, based on a low-hazard occupancy such as a 2,000 ft² (186 m²), two-story, single-family home without basement and exposures and the percentage accomplishment of those objectives for reporting purposes as required in 4.4.2."

Again, according to NFPA 1720, "The authority having jurisdiction determines if this standard is applicable to its fire department."[19]

Figure 64. NFPA 1720 Table 4.3.2 Staffing and Response Time

Demand Zone	Demographics	Minimum Staff to Respond	Response Time (minutes)	Meets Objective
Urban Area	> 1,000 people/mi²	15	9	90%
Suburban Area	500–1,000 people/mi²	10	10	80%
Rural Area	< 500 people/mi²	6	14	80%
Remote Area	Travel distance ≥ 8 mi	4	Directly dependent on travel distance	90%
Special Risks	Determined by AHJ	Determined by AHJ based on risk	Determined by AHJ	90%

NFPA 1710

In reference to career fire departments, NFPA 1710 addresses apparatus staffing, response time, and the effective firefighting force (also referred to as the effective response force), which is the minimum number of firefighters to carry out essential fireground tasks. As previously noted, NFPA 1710 defines a "Career Fire Department" as "A fire department that utilizes full-time or full-time-equivalent (FTE) station-based personnel immediately available to comprise at least 50 percent of an initial first alarm assignment."[20]

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

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

[19] *NFPA 1720 1.3.1**

[20] *NFPA 1710 3.3.13*

The following figure describes initial full alarm assignments for a residential structure fire, open-air shopping center fire, and an apartment fire. All three of these type of occupancies are common throughout Spartanburg County. These are generalizations representative of different types of structures and risks. Each department may handle these types of fires with fewer or more personnel; however, this describes the work functions that must take place for the handling of a fire.

When a fire escalates beyond what can be handled by the initial assignment, the fire has unusual characteristics such as a wind-driven fire, or has been accelerated with a highly flammable compound, additional personnel will be needed. There are also types of scenarios that may not be fires, but mass casualty incidents, explosions, tornadoes, etc., that may require additional staffing. It is difficult or impossible to staff for these worse case incidents. These require a strong mutual aid or automatic aid plan for assistance.

NFPA 1710 states that in response zones with high-number incidents, geographical restrictions, geographical isolations, or urban areas the engine and truck staffing should be increased to five, while in response zones with tactical hazards, high-hazard occupancies, or dense urban areas, the staffing should be increased to six. The standard defines the term *geographical isolation* as areas where over 80% of the response area is outside of a 10-minute response of the next closest fire suppression unit, and *geographical restriction* as being where there are predictable response delays.

Figure 65. NFPA 1710 Initial Full Alarm Assignments

2,000 SF Residential Structure Fire		Open-Air Shopping Center (13,000 SF to 196,000 SF)		1,200 SF Apartment (3-story garden apartment)	
Incident Commander	1	Incident Commander	2	Incident Commander	2
Water Supply Operator	1	Water Supply Operators	2	Water Supply Operators	2
2 Application Hose Lines	4	3 Application Hose Lines	6	3 Application Hose Lines	6
1 Support Member per line	2	1 Support Member per line	3	1 Support Member per line	3
Victim Search and Rescue Team	2	Victim Search and Rescue Team	4	Victim Search and Rescue Team	4
Ground Ladder Deployment	2	Ground Ladder Deployment	4	Ground Ladder Deployment	4
Aerial Device Operator	1	Aerial Device Operator	1	Aerial Device Operator	1
Rapid Intervention Crew	4	Rapid Intervention Crew	4	Rapid Intervention Crew	4
		EMS Care	2	EMS Care Crew	2
Total	**17**	**Total**	**28**	**Total**	**28**

The minimum response to the benchmark structures is 17 firefighters for a residential structure, 28 for an open-air shopping center, and 28 for an apartment. The previous standard was 15 members. The two additional positions required in the 2020 standard result from an increase in the recommended size of the rapid intervention crew (RIC). As previously noted, both NFPA 1500 and OSHA 29 CFR 1910.134(g)(4) require a minimum of a team with at least two members located outside an immediately dangerous to life and health (IDLH) atmosphere to monitor and provide emergency rescue for responders until a more formalized rapid intervention crew is created; this is generally referred to as "two-in/two-out." The four-person RIC outlined in the revised standard must consist of an officer and three firefighters.

ESCI compared the minimum firefighter staffing by quadrant to the NFPA 1710 recommended number of firefighters for each a residential structure, open-air strip shopping center, and an apartment to calculate the percent of firefighters in each quadrant that would need to be committed to the fire in order to satisfy the standard. The specific range was calculated by ordering the fire departments within each quadrant by their minimum firefighter staffing and then determining the best-case and worst-case staffing scenarios.

Best-Case Scenario: If the fire occurred in an area of the quadrant where the fire departments with the most firefighters on shift were located, thus requiring the dispatch of the fewest number of fire departments in order to satisfy the standard.

Worst-Case Scenario: If the fire occurred in an area of the quadrant with the fewest, or even zero, firefighters on shift, thus requiring the dispatch of a larger number of fire departments to satisfy the requirement.

In reviewing the following comparison, three realities become readily apparent:

1. **Minimum staffing levels in the Southeast Quadrant of Spartanburg County, exempting the City of Spartanburg, is inferior to the staffing levels in the other three quadrants.** Minimum staffing in the Southeast Quadrant is 22.2% less than in the Northeast Quadrant, 32.3% less than in the Southwest Quadrant, and 52.3% less than in the Northwest Quadrant.

2. **Staffing levels in the Northwest, Northeast, and Southwest Quadrants can require 72–100% of on-duty firefighters to meet NFPA 1710 requirements for a residential structure fire.** Not only does this leave limited or no firefighters available to protect the rest of the quadrant, drawing from this many fire departments creates a situation where the firefighters have extended travel times to arrive at the scene of the fire, thuspotentially delaying fire suppression activities.

3. **A fire in an open-air strip mall or apartment can reasonably be anticipated to require all firefighters on duty within an entire quadrant; two of the quadrants, or half the County, will need to rely on mutual aid from outside of the quadrant to satisfy the recommended staffing requirements.** Again, drawing from this many fire departments has the potential to create extended travel times and delay fire suppression. Additionally, as there is a very reasonable expectation that all available firefighters within the quadrant can be committed to a single incident, there should be a well-organized plan in place to backfill that quadrant systematically and automatically with additional firefighters without leaving any of the other quadrants of the County unprotected.

Figure 66. NFPA 1710 Initial Full Alarm Assignments By Quadrant

NFPA 1710 Initial Full Alarm Assignments By Quadrant	NFPA 1710 Required # FFs	% oFDs in Quadrant Required Northwest	% of FDs in Quadrant Required Northeast	% of FDs in Quadrant Required Southwest	% of FDs in Quadrant Required Southeast
# of Firefighters in Quadrant		44	27	31	21
2,000 SF Residential Structure Fire	17	18–73%	43–86%	40–80%	45–91%
Open Air Strip Shopping Center (13,000 SF to 196,000 SF)	28	36–91%	100%+ Mutual Aid	1.00	100%+ Mutual Aid
1,200 SF Apartment (3-story garden apartment)	28	36–91%	100%+ Mutual Aid	1.00	100%+ Mutual Aid

MANAGEMENT COMPONENTS

On its website, South Carolina OSHA lists the following examples of citations that are commonly issued to fire departments within the state.

Figure 67. South Carolina OSHA Examples of Citations Issued to Fire Departments[21]

Examples of Citations Issued to Fire Departments Provided by South Carolina OSHA
Failure to have a written respiratory program
Failure to provide bloodborne pathogen post-exposure evaluation and follow-up
Failure to provide proper machine guarding
Failure to provide hazard communication training
Failure to provide the proper respirators for IDLH atmospheres
Failure to provide respirator fit testing
Failure to provide proper protective clothing for fire department personnel
Failure to provide a written statement for the organization of the fire department
Failure to provide proper hazard communication labeling and signs for hazardous chemicals
Failure to mark exits with signs
Failure to provide medical evaluations to wear a respirator
Failure to provide proper respirator inspections and charge cylinders
Failure to provide proper electrical equipment grounding

As previously noted, ESCI suggests that, particularly within the Fire Service Areas, the County could be held liable for the actions of the fire departments despite having a hands-off management approach toward these departments. Spartanburg County would be better-positioned to avoid these common fire department OSHA citations if it were more actively and directly involved in managing fire service delivery within the County.

Planning

The planning process within Spartanburg County has satisfied the County's needs to date. While the community has grown and developed, the fire departments have consistently provided the level of service desired by the community.

Spartanburg County is now facing several challenges related to the delivery of fire service within the County that will require more focused planning efforts between the various fire departments and the County. ESCI's discussions with the Spartanburg County leaders and the local Fire Chiefs revealed that both groups share many of the same unanswered questions: Where does the County's current service delivery stand in relation to the needs of the community, what should the County look like in 5 and 10 years, and how do "we" get from here to there?

[21] *http://www.scosha.llronline.com/pdfs/fire.pdf.*

To be truly effective, the Spartanburg County must consider planning on four distinct levels:

Figure 68. Planning for the Future

Planning Level	Description
1. Tactical Planning	The development of strategies for potential emergency incidents.
2. Operational Planning	The organization of day-to-day activities, as primarily outlined by standard operating guidelines and procedures. This includes the integration of the agency into other local, regional, or national response networks.
3. Master Planning	Preparation for the long-term effectiveness of the agency as the operating environment changes over time.
4. Strategic Planning	The process of identifying an organization's mission, vision, and values and prioritizing goals and objectives for things that need to be accomplished in the near future.

Tactical Planning

A firefighter's first visit to a building often occurs when the building is involved in a fire or another emergency. This is also the point in time where the internal environment is at its worst. Contrary to movie portrayals of the inside of a building on fire, visibility is at or near zero due to smoke. A lack of familiarity with a building can easily lead a firefighter to become disoriented or injured by an unfamiliar internal layout, or by equipment or other hazards that might be encountered.

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

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

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

Pre-plan efforts throughout the County vary in percent of occupancies that have been pre-planned, level of detail, and frequency of updates. NFPA 1620 is the fire service industry standard for the development and use of pre-incident plans and should be used as a reference. Once pre-incident plans are established or updated, training should be provided to all personnel who may respond to an incident at those locations. In addition, copies of pre-incident plans and drawings should be available on each response vehicle and incorporated into dispatch procedures. While this is not a specific function of the County Fire Marshal's Office, this office is ideally positioned to take the lead on this initiative.

Operational Planning

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

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

- Identification of potential risk types;
- Determination of resources needed to mitigate an incident affecting the particular risk type; and
- A methodology of ensuring that adequate resources are dispatched to an incident via 9-1-1 center protocols.

Operational planning efforts throughout the County vary in quality, quantity, and frequency of updates. Similar to pre-planning efforts, once operational plans are established or updated, training should be provided to all personnel. In addition, copies of operational plans should be available for reference by all personnel.

Master Planning

ESCI recommends that long-term master plans address a planning period of 10–15 years. Spartanburg County last updated its Fire Protection Master Plan in 1998, making the plan 22 years old. This plan is no longer current as Spartanburg County has seen increases in population, development, and service demand as well as a decline in the number of fire departments during the last two decades. The following is a list of the goals that were established in the 1998 Master Plan and their current status 22 years later as of July 1, 2020.

Figure 69. Status of 1998 Master Plan Goals, July 1, 2020

1998 Master Plan Goal	Status as of July 1, 2020	Spartanburg County Notes
1. Highest ISO classification for any fire district or service area of a 6 by the end of the year 2000. This classification should cover the entire district/service area.	Not Achieved	This goal was not achieved due to funding issues and lack of coordination.
2. Written SOPs for every fire department with training for all department personnel by the end of 1998.	Not implemented County-wide.	Written guidelines for SOPs were distributed, the County was not able to report how many departments adopted them.
3. County-wide computer system being utilized by all fire departments by the end of 1997.	Not implemented County-wide.	A computer program was created by ACOG and distributed to every fire department. The use of the program was voluntary.

1998 Master Plan Goal	Status as of July 1, 2020	Spartanburg County Notes
4. Minimum pumper specifications for new apparatus upon adoption of plan. Upgrading of water supply hose to 5-inch on pumpers currently in service by the end of the year 2005.	Not implemented County-wide.	Minimum specifications on pumpers were adopted, and apparatus purchased by the Advisory Committee met the specifications. 5-inch supply hose was voluntary; the County was not able to report how many departments had adopted this standard.
5. Minimum tanker specifications for new apparatus upon adoption of plan. Upgrading equipment carried by the end of the year 1998.	Not implemented County-wide.	Minimum specifications on tankers were adopted, and apparatus purchased by Advisory Committee met specifications. Departments that chose to purchase their own tankers were not held to this specification.
6. Implementation of Officer/Firefighter Qualifications upon adoption of plan. Present Chiefs and Assistant Chiefs would have until the end of the year 2000, Captains and Lieutenants would have until the end of the year 1999, and firefighters and drivers would have until the end of the year 1998.	Not implemented County-wide.	Minimum qualifications for ranking positions were created by the Advisory Committee and distributed to every fire department. The use of the qualifications was voluntary.
7. Color coding water flow ranges of all public hydrants by the end of the year 2000. All structures within 2 miles of a public hydrant, dry hydrant, or water supply drafting point by the end of the year 2000, with this distance reduced to 1 mile by the end of the year 2005.	Not implemented County-wide.	Color coding was accomplished. The distance between hydrants is determined by individual water districts with no input from local code officials.
8. County-wide annual pump testing sites with scheduled dates and equipment supplied for test, by the end of the year 1997.	Not achieved.	
9. Individual written and adopted fire department preventive maintenance programs by the end of the year 1996.	Not achieved.	
10. Identification of methods of providing financial assistance to fire districts/service areas that operate in underfunded areas.	Not implemented County-wide.	
11. Consideration for municipalities who border fire districts/service areas to contractor fire protection services during annexing.	Not implemented County-wide.	

1998 Master Plan Goal	Status as of July 1, 2020	Spartanburg County Notes
12. Fire prevention efforts should reach all age groups throughout the fire department's coverage area. The degree of inspections will depend on the number of facilities which need to be inspected.	Not implemented County-wide.	
13. The amount and type of services a fire department provides will dictate the amount and type of training the members of that fire department will need to effectively provide those services.	Not implemented County-wide.	

The review of the 1998 Master Plan Goals indicates that most of the goals established 22 years ago were not achieved; furthermore, none of the achieved goals were actually implemented County-wide.

A proposal was made in 2009 to update the 1998 Master Plan; however, that project was never completed because of funding constraints. At that time, the fire departments' top three concerns were staffing, equipment, and capital facilities.

Figure 70. Top Fire Department Concerns, 2009

Critical Issues Identified in 2009
Staffing
Equipment
Capital Facilities

In September 2009, Spartanburg County facilitated a two-day strategic meeting to discuss the Spartanburg County Fire Service's current issues. Attendees at that meeting included the Fire Advisory Board, the Executive Committee of the Fire Chief's Association, the County Attorney, the County Fire Marshal, the Director of the Emergency Services Academy, and the Director of the Communications Center. Meeting attendees participated in an assessment of the strengths, weaknesses, opportunities, and threats (SWOT) facing the Spartanburg County Fire Service.

Figure 71. SWOT Critical Issues, September 2019

Critical Issues Identified September 2019 SWOT Analysis
Staffing
Level of Service(s)
Training
Communications

The following is a summary of the five most common critical issues that were listed on the fire department surveys submitted to ESCI in June and July 2020.

Figure 72. Critical Issues Reported on Fire Department Surveys, 2020

Critical Issues
Funding
Management and Coordination
Staffing
Communications
Training

ESCI commends Spartanburg County for recognizing the need to update the Master Plan in 2020. In March 2020, Spartanburg County contracted with ESCI to conduct an Independent Fire Study. The critical issues reported to ESCI on the fire department surveys in the spring of 2020 very closely mirror the three major concerns that consistently emerged during the 13 listening sessions that ESCI conducted in person with the Fire Chiefs on May 20 and 21, 2020. These issues also very closely mirror the issues that were consistently reported in all of the workshops dating back to the 1998 Master Plan.

Figure 73. Critical Issues Reported During ESCI Listening Sessions

Critical Issues
Spartanburg County Communications Center
Coordination of the Fire Service In Spartanburg County, including Training
Funding of the Fire Service in Spartanburg County, including Staffing and Equipment.

Appendix B includes a summary of the feedback that was received by ESCI during listening sessions.

Spartanburg County has wisely recognized the need for a long-range planning effort by undertaking this Independent Fire Study. The Independent Fire Study will give the County a clear idea of where it is today based on the Evaluation of Current Conditions. The Independent Fire Study will also project Spartanburg County's future needs, including recommended strategies for meeting those needs. This Independent Fire Study is designed to provide a view of the County fire service in a 15-year time frame.

As previously noted, the review of the 1998 Master Plan goals indicated that most of the goals established 22 years ago were not achieved, and those that were achieve were not implemented County-wide. During the project site visits, ESCI recommended that in order to avoid a similar unsuccessful outcome for the 2020 Independent Fire Study, that Spartanburg County should consider following the Independent Fire Study with a Strategic Plan that would allow for the various stakeholders to come together and prioritize the initiatives that are identified within the Independent Fire Study and then to assign goal managers and deadlines.

Strategic Planning

A strategic plan involves a three- to five-year planning window and establishes prioritized goals and objectives for the organization. The planning approach is particularly important when a master plan has been completed. The reason for a strategic plan is that a master plan identifies multiple recommendations and future strategies, which then require evaluation and prioritization within the strategic plan.

Establishing a customer-oriented strategic plan accomplishes the following:

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

A strategic plan is a dynamic tool that, when kept current, can be used to assist in guiding an agency. It provides not only a defined sense of purpose and direction, but also a map to chart the course for the agency moving forward.

Spartanburg County has contracted ESCI to facilitate a Customer-Centered Strategic Planning Process upon completion of this Independent Fire Study. ESCI recommends that the Strategic Planning Process commence soon after the adoption of the Independent Fire Study. Following the completion of the Strategic Plan, Spartanburg County should then determine whether they have the internal resources available to dedicate to the successful implementation and ongoing management of the Strategic Plan, or if there is a need to engage outside resources to facilitate the implementation.

Appendix F: Capital Improvement Programs

FACILITIES

Fire stations play an integral role in the delivery of emergency services for many reasons. To a large degree, a station's location will dictate response times to emergencies. A poorly located station can mean the difference between confining a fire to a single room and losing the structure. Fire stations must also be designed to adequately house equipment and apparatus, as well as meet the needs of the organization and its career and volunteer personnel, including administrative support staff.

Consideration should be given to a fire station's ability to support the mission as it exists today and into the future. The activities that take place within a fire station should be closely examined to ensure the structure is adequate in both size and function. Examples of these functions may include the following:

- The housing and cleaning of apparatus and equipment; including decontamination and disposal of biohazards
- Residential living space and sleeping quarters for on-duty personnel (all genders)
- Kitchen facilities, appliances, and storage
- Bathrooms and showers (all genders)
- Administrative and management offices; computer stations and office facilities for personnel
- Training, classroom, and library areas
- Firefighter fitness area
- Public meeting space

The survey of fire stations identified fire stations in varying degrees of building age, condition, and operational efficiency. Less than half—only 15 of the 36 fire departments within Spartanburg County—reported having a Facilities Capital Improvement Plan in place to ensure the ongoing maintenance and repair of the buildings. Additionally, the geographic locations of some fire stations are not ideal for the delivery of fire and emergency services, as was detailed within the Fire Station Location and Optimization Analysis section of this report. ESCI recommends that Spartanburg County develop a Fire Facilities Capital Improvement Plan that identifies necessary fire stations to serve the population within Spartanburg County. Specific to the identified fire stations, the plan should also identify the necessary repairs and improvements and a funding source for each building.

APPARATUS

There exists within Spartanburg County a sizeable fleet of response vehicles, totaling 380 units as reported by the fire departments that completed ESCI's Survey Tables.

Figure 74. Summary of Fire Apparatus in Spartanburg County

Apparatus Type	Frontline	Reserve	Total by Type
Engines and Tankers	115	29	**144**
Aerials	21	2	**23**
Brush Trucks	37	3	**40**
All Other Vehicles	164	9	**173**
Total Frontline/Reserve	**337**	**43**	
Total Spartanburg County Fire Apparatus			**380**

The following are the fire apparatus and vehicles that were reported on the survey tables. The vehicles are listed alphabetically by department and separated into frontline and reserve categories. The tables are divided into Engines and Tankers, Aerials, Brush Trucks, and All Other Apparatus and Vehicles.

Figure 75. Spartanburg County Engines and Tankers

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
1. Boiling Springs	Engine 2	Engine	Pierce	2010	Good	Frontline	53,015
2. Boiling Springs	Tanker 1	Pumper/Tanker	Pierce	2012	Good	Frontline	28,395
3. Boiling Springs	Engine 1	Engine	Pierce	2019	Good	Frontline	7,950
4. Campobello	Engine 3	Engine	Pierce	1999	Good	Frontline	
5. Campobello	Tanker 1	Tanker	Red Diamond	2000	Good	Frontline	
6. Campobello	Eng. 4	Engine	Pierce	2004	Good	Frontline	
7. Campobello	Tanker 2	Tanker		2008	Excellent	Frontline	
8. Campobello	Engine 1	Engine	Pierce	2009	Excellent	Frontline	
9. Cherokee Springs	Engine 1	Engine	Pierce	2013	Good	Frontline	58,500
10. Cherokee Springs	Engine 2	Engine	Pierce	2015	Good	Frontline	53,500
11. Cherokee Springs	Engine 3	Engine	E-One	2021	Excellent	Frontline	Delivery Summer 2021
12. Chesnee-Community	Engine 1	Engine	KME	1999	Good	Frontline	31,013
13. Chesnee-Community	Engine 3	Engine	Peirce	2010	Good	Frontline	48,095
14. City of Spartanburg	E63	Engine	Pierce	2012	Good	Frontline	55,124
15. City of Spartanburg	E64	Engine	Pierce	2012	Good	Frontline	73,908
16. City of Spartanburg	E62	Engine	Pierce	2018	Excellent	Frontline	12,797
17. City of Spartanburg	E65	Engine	Pierce	2018	Excellent	Frontline	19,743
18. Converse	Tanker -2	Tanker	E-One	1984	Good	Frontline	
19. Converse	Engine 3	Engine	E-One	1993	Good	Frontline	
20. Converse	Tanker -1	Tanker	Red Diamond	1998	Good	Frontline	
21. Converse	Engine 1	Engine	Pierce	2004	Good	Frontline	
22. Converse	Engine 2	Engine	Pierce	2019	Excellent	Frontline	
23. Cooley Springs-Fingerville	Tanker - 1	Tanker	Red Diamond	2000	Good	Frontline	12,982
24. Cooley Springs-Fingerville	Engine 3	Engine	LaFrance	2006	Good	Frontline	
25. Cooley Springs-Fingerville	Engine 4	Engine	Taynf	2009	Good	Frontline	27,520
26. Croft	Engine 24	Engine	Pierce	2019	Excellent	Frontline	11,281

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
27. Cowpens		Engine	Pierce	2013	Good	Frontline	19,470
28. Cowpens		Engine	Pierce	1994	Good	Frontline	39,328
29. Cowpens		Engine	Pierce	2004	Good	Frontline	19,314
30. Cowpens		Mini Pumper	GMC/Pierce	2008	Good	Frontline	16,980
31. Drayton	Engine 2	Engine	Pierce	1993	Good	Frontline	39,654
32. Drayton	Engine 3	Engine	Pierce	2003	Good	Frontline	2,055
33. Drayton	Engine 4	Engine	Pierce	2018	Excellent	Frontline	11,258
34. Duncan	Engine 113	Engine	Pierce	2000	Excellent	Frontline	43,530
35. Duncan	Engine 13	Engine	Pierce	2015	Excellent	Frontline	39,657
36. Duncan	Engine 81	Engine	Pierce	2015	Excellent	Frontline	29,610
37. Glendale	Engine 1	Engine	Pierce	1995	Good	Frontline	21,379
38. Glendale	Tanker 3	Water Tender	Red Diamond	2009	Good	Frontline	1,891
39. Glendale	Engine 2	Engine	Pierce	2012	Good	Frontline	12,461
40. Glenn Springs Pauline	Engine 11	Engine	Pierce	1999	Good	Frontline	47,020
41. Glenn Springs Pauline	Engine 21	Engine	Pierce	2002	Good	Frontline	49,000
42. Glenn Springs Pauline	Tanker 21	Tanker	Central States	2007	Good	Frontline	8349
43. Gowensville	391	Engine		2005		Frontline	40,550
44. Gowensville	394	Engine		2010		Frontline	11,060
45. Gowensville	393	Engine		2017		Frontline	12,059
46. Greer	EN41B	Engine	Pumper	2002	Fair	Frontline	48,144
47. Greer	EN41A	Engine	Metro Star	2006	Fair	Frontline	59,117
48. Greer	EN41	Engine	Star Pumper	2008	Good	Frontline	62,472
49. Greer	EN42	Engine	Spartan	2014	Good	Frontline	40,306
50. GSP	Engine 40	Engine	Pierce	2004	Good	Frontline	27476.3
51. Hilltop	Engine 15	Engine	Ferrara Fire	2018	Excellent	Frontline	13,770
52. Holly Springs	Engine 37	Engine	Pierce	2004	OK	Frontline	
53. Holly Springs	Squad 36	Engine	Pierce	2016	Great	Frontline	
54. Inman City	Engine 1	Engine	Pierce	1998	Good	Frontline	18,000

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
55. Inman City	Engine 2	Engine	Pierce	2005	Good	Frontline	21,000
56. Inman City	Engine 4	Engine	Pierce	1985	Good	Frontline	13,000
57. Inman Community	Engine 3	Engine	Pierce	1993	Good	Frontline	41,311
58. Inman Community	Engine 4	Engine	Pierce	2007	Good	Frontline	39,504
59. Inman Community	Tanker 1	Tanker		2010	Good	Frontline	7,995
60. Inman Community	Engine 1	Engine	Pierce	2020	Good	Frontline	
61. Landrum	Engine 5	Engine	KME	1996	Fair	Frontline	22427
62. Landrum	Engine 2	Engine	Pierce	2017	New	Frontline	11,685
63. Landrum	Engine 1	Engine	Pierce	2018	New	Frontline	2,959
64. Mayo	Engine 3	Engine	EVS/Spartan	2013	Good	Frontline	50,000
65. Mayo	Engine 2	Engine	EVS/Spartan	2013	Good	Frontline	15,000
66. Mayo	Tanker 1	Tanker	Oilmans	1990	Fair	Frontline	37,000
67. Mayo	Tanker 2	Tanker	Red Diamond	2005	Good	Frontline	11,000
68. New Prospect	Engine 4	Engine	Pierce	2001	Good	Frontline	44,556
69. New Prospect	Engine 3	Engine	Pierce	2012	Excellent	Frontline	29,153
70. New Prospect	Tanker 1	Tanker	Pierce	2013	Excellent	Frontline	6,740
71. New Prospect	Engine 1	Engine	Pierce	2018	Excellent	Frontline	8,653
72. North Spartanburg	E-20	Engine	Saber	2004	Good	Frontline	105,071
73. North Spartanburg	E-22	Engine	Contender	2009	Good	Frontline	82,570
74. Pacolet	Brush 1	Mini Pumper	Pierce	1986	Fair	Frontline	31,894
75. Pacolet	Engine 2	Engine	Pierce	1994	Good	Frontline	33,645
76. Pacolet	Engine 4	Engine	Pierce	2005	Good	Frontline	12,910
77. Pacolet	Engine 1	Engine	Pierce	2017	Excellent	Frontline	2,541
78. Pacolet	Engine 3	Engine	Pierce	2020	Excellent	Frontline	
79. Pelham-Batesville	E-55	Engine	Pierce	1997		Frontline	
80. Pelham-Batesville	E-57	Engine	Pierce	2008		Frontline	84,126
81. Pelham-Batesville	E-58	Engine	Pierce	2008		Frontline	69,488
82. Pelham-Batesville	E-56	Engine	Pierce	2018		Frontline	13,925

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
83. Poplar Springs	Engine 3	Engine	Central States	1998	Good	Frontline	48,641
84. Poplar Springs	Engine 5	Engine	Central States	1998	Good	Frontline	56,498
85. Poplar Springs	Tanker 1	Tanker	Kenworth	2008	Excellent	Frontline	11,708
86. Poplar Springs	Engine 1	Engine	Pierce	2018	Excellent	Frontline	19,949
87. Poplar Springs	Engine 2	Engine	Pierce	2018	Excellent	Frontline	17,128
88. Reidville	E-3	Engine	KME	2009	Good	Frontline	66,757
89. Reidville	E-4	Engine	Pierce	2014	Good	Frontline	57,898
90. Reidville	T-1	Tanker/Tender	Pierce	2015	Good	Frontline	5,850
91. Roebuck	Tanker 27	Tanker/Pumper	Pierce	2007	Excellent	Frontline	9,084
92. Roebuck	E27	Engine	Sutphen	2018	Excellent	Frontline	20,342
93. Startex	Engine 88	Engine	Crimson	2005	Good	Frontline	
94. Startex	Engine 29	Engine	Pierce	2019	Great	Frontline	
95. Trinity	Engine 10	Engine	E-One	1992		Frontline	15,908
96. Trinity	Engine 4	Engine	Sutphen	1998		Frontline	37,439
97. Trinity	Engine 3	Engine	E-One	2002		Frontline	27,058
98. Trinity	Tanker 1	Tanker	Seagrave	2006		Frontline	15,850
99. Trinity	Engine 1	Engine	Sutphen	2009		Frontline	57,120
100. Trinity	Engine 2	Engine	Sutphen	2010		Frontline	46,195
101. Trinity	Tanker 2	Tanker	E-One	2011		Frontline	5,200
102. Trinity	Squad 1	Mini Pumper		2015		Frontline	13,542
103. Tyger River	Engine 53	Engine	Pierce	2004	Excellent	Frontline	55,248
104. Tyger River	Tanker 51	Tanker	Pierce	2005	Excellent	Frontline	20,296
105. Tyger River	Engine 151	Engine	Pierce	2010	Excellent	Frontline	58,065
106. Tyger River	Engine 152	Engine	Pierce	2013	Excellent	Frontline	41,181
107. Una	Engine 2	Engine	Pierce	1994	Good	Frontline	48,473
108. Una	Engine 3	Engine	Pierce	1994	Good	Frontline	34,505
109. Una	Engine 1	Engine	Pierce	2002	Good	Frontline	27,405
110. Westview-Fairforest	Engine 33	Engine	Pierce	2014	Good	Frontline	49,227

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
111. Westview-Fairforest	Engine 32	Engine	Pierce	2020	Excellent	Frontline	1409
112. Westview-Fairforest	Engine 31	Engine	Pierce	2013	Good	Frontline	49,347
113. Whitney	Engine 1	Engine	Quality	1992	Good	Frontline	42,222
114. Whitney	Tender 1	Tanker	Freightliner	2001	Good	Frontline	18,029
115. Whitney	Engine 3	Engine	KME	2018	Excellent	Frontline	19,635
1. Cherokee Springs	Engine 4	Engine	KME	1994	Fair	Reserve	76,380
2. Chesnee-Community	Engine 2	Engine	American	1991	Fair	Reserve	21,676
3. Chesnee-Community	Engine 4	Engine	Spartan	1993	Good	Reserve	28,484
4. City of Spartanburg	E66	Engine	Central States	2000	Fair	Reserve	104,538
5. City of Spartanburg	E61	Engine	Pierce	2002	Fair	Reserve	79,352
6. Cooley Springs-Fingerville	Engine 1	Engine	American	1992	Fair	Reserve	28,194
7. Croft	Engine 10	Engine	Pierce	2003	Good	Reserve	77,079
8. Croft	Engine 124	Engine	Pierce	2008	Good	Reserve	49,792
9. Drayton	Engine 1	Engine	Pierce	1985	Good	Reserve	30,900
10. Duncan	Engine 189	Engine	Pierce	1997	Good	Reserve	73,412
11. Glendale	Engine 6	Engine	Pierce	1991	Good	Reserve	66,321
12. Hilltop	Engine 4	Engine	Pierce	1994	Fair	Reserve	40,959
13. Holly Springs	Engine 38	Engine	Pierce	1995	Ok	Reserve	
14. Holly Springs	Engine 36	Engine	Pierce	2006	Ok	Reserve	
15. Landrum	Engine 3	Engine	KME	1993	Fair	Reserve	21,984
16. Mayo	Engine 1	Engine	E-One	1995	Good	Reserve	27,000
17. New Prospect	Engine 2	Engine	Pierce	1992	Fair	Reserve	36,325
18. North Spartanburg	E-05	Engine	Saber	1994	Good	Reserve	
19. Pelham-Batesville	Reserve	Engine	Pierce	1999		Reserve	110,115
20. Reidville	E-1	Engine	KME	1996	Good	Reserve	121,346
21. Reidville	E-5	Engine	KME	1996	Good	Reserve	114,272
22. Roebuck	E2	Engine	Pierce	1995	Good	Reserve	53,730

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
23. Roebuck	E1	Engine	Pierce	2005	Good	Reserve	58,396
24. Startex	Engine 89	Engine	E-One	1995	Good	Reserve	
25. Trinity	Engine 9	Engine	Pierce	1989		Reserve	77,053
26. Trinity	Engine 6	Engine	Sutphen	1991		Reserve	88,804
27. Trinity	Engine 7	Engine	Pierce	1999		Reserve	23,814
28. Westview-Fairforest	Engine 86	Engine	Pierce	2003	Fair	Reserve	95,304
29. Whitney	Engine 2	Engine	Ward	1985	Poor	Reserve	18,216

Figure 76. Spartanburg County Aerials

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
1. Boiling Springs	Ladder 1	75" Ladder		2004	Good	Frontline	14,847
2. Campobello	Ladder 1	Ladder/Engine	E-1	1998	Good	Frontline	
3. Cherokee Springs	Aerial 1	Aerial/Platform	Simon Duplex	1996	Fair	Frontline	29,995
4. City of Spartanburg	T61	Ladder	Pierce	2006	Good	Frontline	39,839
5. City of Spartanburg	T62	Ladder/Engine	Pierce	2015	Good	Frontline	30,190
6. Croft	Ladder 10	Truck	Pierce	2019	Excellent	Frontline	7,299
7. Croft	Ladder 101	Truck	Pierce	1998	Fair	Reserve	
8. Duncan	Tower 81	Ladder Tower	Pierce		Excellent	Frontline	17,483
9. Glendale	Ladder 1	Ladder	Pierce	1997	Good	Frontline	6,620
10. Greer	Tower 41	Ladder	Pierce	2020	Excellent	frontline	900
11. Hilltop	Ladder 15	Ladder Truck	E-One	2020	Excellent	Frontline	0
12. Inman City	Ladder 1	Ladder Truck	Pierce	2007	Good	Frontline	8,000
13. North Spartanburg	TK-03	Quint	Arrow XT	2016	Good	Frontline	33,392
14. Pelham-Batesville	Service Truck 57	Truck	Hackney	1991		Frontline	21,107
15. Pelham-Batesville	P-55	Ladder	Pierce	2003		Frontline	4,516
16. Poplar Springs	Ladder 1	Truck	Central States	2005	Excellent	Frontline	11,333
17. Reidville	A-1	Aerial	KME	2001	Good	Frontline	22,197
18. Trinity	Tower 34	Truck	Pierce	2005		Frontline	21,855
19. Tyger River	Ladder 52	Quint	E-One	1997	Good	Frontline	28,860
20. Una	Ladder 1	Ladder	Pierce	1989	Good	Frontline	75,738
21. Westview-Fairforest	Ladder 32	Ladder	Pierce	2018	Good	Frontline	13,555
1. North Spartanburg	Truck 3	Quint	E-One	2000	Good	Reserve	13,611
2. Westview-Fairforest	Tower 32	Platform	Pierce	1989	Fair	Reserve	18,033

Figure 77. Spartanburg County Brush Trucks

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
1. Boiling Springs	Brush 1	Brush Truck		1998	Fair	Frontline	227,333
2. Campobello	Brush 4	Brush Truck	CBE	1998	Good	Frontline	
3. Campobello	Brush 5	Brush Truck	CBE	2002	Excellent	Frontline	
4. Campobello	Brush 3	Brush Truck	CBE	2006	Good	Frontline	
5. Cherokee Springs	Brush 7	Brush Truck			Good	Frontline	
6. Chesnee-Community	Squad 1	Brush Truck	Palmetto	2015	Good	Frontline	6,279
7. Chesnee-Community	Brush 1	Brush Truck	Chevy	1980	Fair	Frontline	130,836
8. City of Spartanburg		Brush Truck	Ford	2014	Good	Frontline	
9. Converse	Brush -2	Brush Truck	Ford	2006	Good	Frontline	
10. Cooley Springs-Fingerville	Brush 3	Brush Truck	CWS	1992	Good	Frontline	
11. Cooley Springs-Fingerville	Squad 47	Brush Truck	CWS	2006	Good	Frontline	165,155
12. Cowpens		Brush Truck	Ford	2019	Good	Frontline	4,150
13. Drayton	Brush 1	Brush Truck	Red Diamond	1999	Good	Frontline	19,623
14. Duncan	Brush 13	Brush Truck	General Fire	2012	Excellent	Frontline	7,131
15. Glendale	Brush 1	Brush Truck	Chevy	1986	Good	Frontline	41,113
16. GSP	Brush 40	Brush Truck	NA	1985	Fair	Frontline	76149.4
17. Holly Springs	Brush 36	Brush Truck		1985	Ok	Frontline	
18. Inman City	Brush 1	Brush Truck	Hummer	2010	Good	Frontline	850
19. Inman Community	Brush - 2	Brush Truck	Hummer	1994	Good	Frontline	24,069
20. Inman Community	Brush - 1	Brush Truck	Hummer	1994	Good	Frontline	9,940
21. Landrum	Brush 6	Brush Truck	Ford	1997	Fair	Frontline	37,039
22. Mayo	Brush 1	Brush Truck	NA	1986	Fair	Frontline	49,000
23. Mayo	Brush 2	Brush Truck	NA	2006	Good	Frontline	42,000
24. Mayo	Mayo 10	Command	Chevy	2009	Excellent	Frontline	25,000
25. Mayo	Rescue 19	Rescue	Hacnkey	2004	Excellent	Frontline	19,000
26. New Prospect	Squad 1	Brush Truck	Dodge/FES	2015	Excellent	Frontline	20,765
27. Pelham-Batesville	B-58	Brush Truck	Ford	1999		Frontline	155,426

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
28. Poplar Springs	Brush 1	Brush Truck	Ford	2010	Excellent	Frontline	48,781
29. Reidville	B-1	Brush Truck		1996	Good	Frontline	256,378
30. Roebuck	Brush 27	Brush Truck	Dodge	1996	Good	Frontline	90,902
31. Startex	QRV 29	Brush Truck	Red Diamond	2003	Good	Frontline	
32. Trinity	Brush 3	Brush Truck		1993		Frontline	27,243
33. Trinity	Brush 2	Brush Truck		1996		Frontline	85,535
34. Trinity	Brush 1	Brush Truck		2002		Frontline	131,406
35. Una	Brush 1	Brush Truck		1989	Good	Frontline	21,859
36. Westview-Fairforest	Brush 32	Brush Truck	Ford Fair	2001	Good	Frontline	84,084
37. Whitney	Brush 1	Brush Truck	Dodge	1992	Good	Frontline	17,471
1. Croft	Brush 10	Brush Truck	Hummer	1991	Fair	Reserve	27,021
2. New Prospect	Brush 1	Brush Truck	Chevy	1985	Good	Reserve	49,763
3. Reidville	B-2	Brush Truck		1996	Fair	Reserve	193,928

Figure 78. All Other Spartanburg County Fire Vehicles

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
1. Boiling Springs	Car 5	Fire Marshall	Ford F-350	2003	Good	Frontline	97,451
2. Boiling Springs	Car 8	Shift Officer	Chevrolet Tahoe	2015	Good	Frontline	53,451
3. Boiling Springs	Car 10	Fire Chief	Ram 1500	2019	Good	Frontline	21,000
4. Campobello	M-11	Medical	CBD	2000	Excellent	Frontline	
5. Campobello	Rescue 1	Service	Pierce	2009	Excellent	Frontline	
6. Campobello	C-10	Chief	Chevrolet	2015	Good	Frontline	96,000
7. Campobello	Utility 21		Chev.	2017	Excellent	Frontline	

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
8. Cherokee Springs	Rescue 1	Heavy Duty Rescue/Service	Spartan	2007	Good	Frontline	27,500
9. Cherokee Springs	Car 8	Fire Marshal/ Training Division	Ford F150	2013	Good	Frontline	150,241
10. Cherokee Springs	Car 9	Deputy Chief	Ford Explorer	2017	Good	Frontline	51,500
11. Cherokee Springs	Car 10	Fire Chief	Chevy Tahoe	2019	Good	Frontline	32,750
12. Cherokee Springs	FIT 1	Fire Invest.Trailer					
13. Chesnee-Community	Rescue 1	Service/Rescue	Pierce	2007	Good	Frontline	14,995
14. Chesnee-Community	M-1	Officer	Ford F-250	2007	Good	Frontline	91,510
15. City of Spartanburg	R60	Rescue	Pierce	2006	Fair	Frontline	41,252
16. City of Spartanburg	Utility 60	Pick up	Ford	2008	Fair	Frontline	
17. City of Spartanburg	UTV 60	ATV	Arctic Cat	2017	Good	Frontline	
18. City of Spartanburg	B60	Command Vehicle	Ford F250	2011	Good	Frontline	
19. City of Spartanburg	Chief 60	Chief	Chevrolet Tahoe	2019	Excellent	Frontline	
20. City of Spartanburg	Chief 61	Chief	Ford Explorer	2015	Good	Frontline	
21. City of Spartanburg	Chief 62	Chief	Ford Explorer	2015	Fair	Frontline	
22. City of Spartanburg	Chief 63	Chief	Ford F150	2019	Excellent	Frontline	
23. City of Spartanburg	Pool Truck 1	Support	Ford Explorer	2012	Fair	Reserve	
24. City of Spartanburg	Pool Truck 2	Support	Ford F150	2012	Fair	Reserve	
25. City of Spartanburg	Mechanic Truck	Support	Ford F350	2013	Good	Frontline	
26. City of Spartanburg	FM 64	Fire Marshal	Ford F150	2013	Good	Frontline	
27. City of Spartanburg	FM 65	Deputy Fire Marshal	Chevy Silverado 1500	2016	Good	Frontline	
28. City of Spartanburg	FM 66	Deputy Fire Marshal	Ford F150	2017	Excellent	Frontline	
29. Converse	Rehab -1	Support	E-One	1988	Good	Frontline	
30. Converse	Rescue -1	Rescue	Pierce	2012	Good	Frontline	
31. Converse	Truck -1	Support	Ford	2015	Good	Frontline	
32. Converse	Car - 10	Command	Ford Explorer		Good	Frontline	
33. Cooley Springs	Car 9	David Goldman	Chevy Suburban 4x4	2004	Good	Frontline	131,224

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
34. Cooley Springs	Car 10	Chuck White	Dodge 1500 4x4	2006	Good	Frontline	32,480
35. Cooley Springs-Fingerville	Service - 1	Rescue	Lafrance	2002	Good	Frontline	14,861
36. Cooley Springs-Fingerville	R+V 8	Polaris			Good	Frontline	
37. Cowpens		Command Vehicle	Dodge	2017	Good	Frontline	110,499
38. Cowpens		ATV	Polaris	2008	Good	Frontline	649
39. Cowpens		Cargo Trailer	Wells	2010	Good	Frontline	
40. Cowpens		Boat	Avon	2008	Good	Frontline	
41. Croft	Foam 3	Support	Fire One	2009	Good	Frontline	
42. Croft	Car 10		Chevrolet	2009	Good	Frontline	119,157
43. Croft	Foam 1	Support	Williams Fire		Good	Frontline	
44. Croft	Foam 2	Support			Good	Frontline	
45. Drayton	Utility 1	Station/Chief	Ford F -250	2007	Good	Frontline	58,136
46. Drayton	ATV-1	75 Gallon Tank		2010	Good	Frontline	
47. Duncan	Truck 8	Station 81	Chevy 2500	2008	Good	Frontline	87,945
48. Duncan	Bat - 13	Station 13	Chevy Tahoe	2008	Good	Frontline	111,473
49. Duncan	Rescue 13	Rescue	Pierce	2009	Excellent	Frontline	29,670
50. Duncan	ATV81		Ranger	2012			
51. Duncan	Car 9	Deputy Chief	Chevy 1500	2015	Excellent	Frontline	21,618
52. Duncan	Boat 13			2018			
53. Duncan	Car 10	Chief	Chevy Tahoe	2021	Excellent	Frontline	
54. Glendale	M - 1	Multi-purpose	Red Diamond	2000	Good	Frontline	5,215
55. Glendale	Club Cart RX	Off Road Vehicle		2009			
56. Glendale	Inflatable Boat		Saturn	2011			
57. Glendale	Truck 14	Chief	1FT7W2BT6KEC82148	2019	Good	Frontline	8,816
58. Gowensville	R -39	Rescue		2000	first out	Frontline	122,500
59. Gowensville	B -39	F-350		2004	first out	Frontline	70,125
60. Greer	R41	Rescue	Big Easy	2005	Fair	Frontline	58,872
61. Greer	U42	SUV	Durango	2013	Good	Frontline	101,986

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
62. Greer	FM42	SUV	Interceptor	2014	Good	Frontline	50,709
63. Greer	DC42	SUV	Interceptor	2015	Good	Frontline	39,190
64. Greer	U41	SUV	Expedition	2015	Good	Frontline	35,815
65. Greer	FM41	SUV	Interceptor	2016	Good	Frontline	45,391
66. Greer	DC41	SUV	Interceptor	2017	Good	Frontline	20,692
67. Greer	CH41	SUV	Interceptor	2020	new	Frontline	0
68. Greer	BAT41	SUV	Tahoe 4WD SUV	2020	new	Frontline	1,498
69. GSP	Crash 2	ARFF	Striker/OshKosh	2004	Good	Frontline	
70. GSP	Crash 3	ARFF	Titan/E-One	2005	Good	Frontline	
71. GSP	Crash 4	ARFF	Titan/E-One	1992	Good	Frontline	
72. GSP	QRV 40	QRV	KME	2010	Good	Frontline	20,614.4
73. GSP	Rescue 40	Rescue	Freightliner/Mickey	2017	Good	Frontline	2,821
74. GSP	Battalion 40	Shift Battalion Chief	Ford F-250 Extended	2016	Good	Frontline	14,067.5
75. GSP	Utility 40	Station	Ford F-150	2019	Good	Frontline	6,032
76. GSP	Chief 40	Chief	Dodge Durango		Good	Frontline	74,898
77. Hilltop	Car 8	Command/Medical	Chevy	2012	Excellent	Frontline	33,668
78. Hilltop	Car 9		Command	Ford	Excellent	Frontline	
79. Hilltop	Car 10		Command	Ford	Excellent	Frontline	
80. Holly Springs	Rescue 36	Rescue	Hackney	2000	Ok	Frontline	
81. Holly Springs	Truck 1	Station	Dodge Ram	2004	bad	Frontline	
82. Holly Springs	Car 10	Chief	Chevy Tahoe	2020	Great	Frontline	
83. Holly Springs	Car 9	Asst. Chief	Chevy Tahoe	2013	Ok	Frontline	
84. Inman City	Car 8			2005	Good	Frontline	
85. Inman City	Car 10		F150	2016	Good	Frontline	37,000
86. Inman Community	Utility Truck	Utility Truck		2014	Good	Frontline	84,396
87. Inman Community	Car 9	Asst. Chief	Ford F-250	2017	Good	Frontline	36,340
88. Inman Community	Squad 1	Squad		2018	Good	Frontline	19,826
89. Inman Community	Car 10	Chief	Ford F-150	2020	Good	Frontline	2,000

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
90. Landrum	ATV81			2007			
91. Landrum	Rescue 4	Service	AM Lafrance	2008	Fair	Frontline	10,273
92. Landrum	Special Ops	Titan Trailer	Bendron	2011	Good	Frontline	
93. Landrum	RTV-1	ATV	Kubota	2007	Good	Frontline	
94. Landrum	Truck 17	Fire Marshal	Ford F-150 Fx4 4x4	2016	new	Frontline	41,812
95. Landrum	Squad 17	Truck	Ford	2017	New	Frontline	28,097
96. Landrum	Car 10	Fire Chief	Ford F-250 Fx4 4x4	2019	new	Frontline	5,665
97. New Prospect	M-11	Service Truck	Department	2006	Good	Frontline	63,751
98. New Prospect	Car 10	Chief	Chevrolet	2013	Good	Frontline	92,000
99. New Prospect	Truck 1	Utility	Chevrolet	2014	Excellent	Frontline	9,681
100. New Prospect	ATV1	ATV	Kubota	2013	Excellent	Frontline	57 hrs.
101. North Spartanburg	C-10	Chief	Chevrolet	2008	Poor	Frontline	113,998
102. North Spartanburg	C-03	Fire Investigator	Chevrolet	2010	Fair	Frontline	118,724
103. North Spartanburg	M-22	ATV	Ranger	2011	Good	Frontline	
104. North Spartanburg	C-02	Training Officer	Ford	2012	Fair	Frontline	76,426
105. North Spartanburg	C-09	Asst. Chief	Chevrolet	2015	Good	Frontline	83,937
106. North Spartanburg	S-22	MVP-Brush	F-550	2016	Good	Frontline	12,619
107. North Spartanburg	S-20	MVP-Foam	F-650	2017	Good	Frontline	7,359
108. North Spartanburg	C-05	Fire Marshal	Ford	2019	Good	Frontline	11,975
109. North Spartanburg	BA-20	Duty BC	Ford	2019	Good	Frontline	9,903
110. Pacolet	Utility 1	Utility	N/A	2004	Fair	Frontline	119,815
111. Pacolet	Utility 2	Utility Command	N/A	2015	Good	Frontline	26,138
112. Pacolet	Command Unit						
113. Pacolet	Polaris						
114. Pacolet	Rescue Boat						
115. Pacolet	Kayaks						
116. Pelham-Batesville	U-58	Shop	F-450	2000		Frontline	23,623
117. Pelham-Batesville	U-56	Support	F-250	2005		Frontline	125,379

	Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
118.	Pelham-Batesville	EM-55	Hart	Explorer	2011		Frontline	139,870
119.	Pelham-Batesville	R-55	Truck	Pierce	2013		Frontline	23,300
120.	Pelham-Batesville	BAT-55	Captains	Expedition	2013		Frontline	75,982
121.	Pelham-Batesville	U-55	Fire Prevent	F-150	2014		Frontline	46,012
122.	Pelham-Batesville	C-56	Ballew	Explorer	2017		Frontline	44,011
123.	Pelham-Batesville	TR-55	Training	F-250	2020		Frontline	6,280
124.	Poplar Springs	U-1	Utility		2008			
125.	Poplar Springs	C-10	Chief's Car	Dodge Charger	2014	Good	Frontline	72,700
126.	Poplar Springs	Car 8	Captain on Duty	F-250	2015	Good	Frontline	53,600
127.	Reidville	Batt-26	Command		2008	Good	Frontline	131,786
128.	Reidville	FM-26	Command		2014	Good	Frontline	109,896
129.	Reidville	C-10	Command		2019	Good	Frontline	12,213
130.	Reidville	C-9	Command		2019	Good	Frontline	8,130
131.	Roebuck	Battalion 27	Command	Dodge	2020	new	Frontline	0
132.	Startex	Rescue 29	Rescue	Hackney	1998	Good	Frontline	
133.	Startex	Car 10	Chief	Ford F-150	2016	Great	Frontline	90,341
134.	Startex	Flat Bottom Boat						
135.	Startex	Dive Truck	F350					
136.	Trinity	Reserve 21	Heavy Rescue	Woltington	1997		Frontline	111,412
137.	Trinity	Car 3	Training Chief	Dodge pick-up	2005	Good	Frontline	138,668
138.	Trinity	Trinity 9	Deputy Chief	Chevy Tahoe	2012	Good	Frontline	184,000
139.	Trinity	Trinity 10	Fire Chief	Chevy pick-up	2014	Good	Frontline	145,000
140.	Trinity	ATV-2						
141.	Tyger River	M1078 Army Truck	High Water, Military Truck		1994			
142.	Tyger River	Rescue 52	Serv/Rescue	Hackney	1997	Good	Frontline	35,082
143.	Tyger River	C-7	Maint. Veh.	Ford	2005	Fair	Frontline	105,614

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
144. Tyger River	QRV 51	Water Rescue and Boat Equipment Trl/QRV	KME	2010	Excellent	Frontline	30,495
145. Tyger River	TR-10	Fire Chief	Chevy Tahoe	2015	Excellent	Frontline	50,250
146. Tyger River	TR-9	Deputy Chief	Ford F-150	2016	Excellent	Frontline	44,712
147. Tyger River	Batt 151 and Fire Inspector	Battalion on Duty	Ford F-250	2019	Excellent	Frontline	3,255
148. Tyger River/ Co-Owned by Lyman City		UTV 6x6	Polaris	2014	Excellent	Frontline	
149. Tyger River		10' inflatable boat for rivers					
150. Tyger River		Low Center Console Boat for lakes					
151. Una	Car 10	Chief	Ford	2014	Good	Frontline	56,400
152. Una	Rescue 1	Rescue	EVI	2005	Good	Frontline	46,254
153. Una	Utility 1	Utility		2017	Excellent	Frontline	8,088
154. Una	Squad 1	Type 6 Engine	BFX	2019	Excellent	Frontline	1,113
155. Westview-Fairforest	Utility 32		Ford F350	2015	Good	Frontline	28,391
156. Westview-Fairforest	Car 9	Asst. Chief	Ford F350	2016	Good	Frontline	38,310
157. Westview-Fairforest	Car 10	Chief	Ford F350	2017	Good	Frontline	25,709
158. Westview-Fairforest	Car 32		Chevy Tahoe	2010	Fair	Frontline	117,030
159. Westview-Fairforest	TRT-32	Rescue Trailer		2014	Excellent	Frontline	
160. Whitney	C2	FM	Chevrolet	2010	Good	Frontline	121,460
161. Whitney	Rescue 2	Rescue	Pierce	2011	Excellent	Frontline	10,705
162. Whitney	UTV			2015			
163. Whitney	Utility 1	P/U	Ford	2019	Excellent	Frontline	20,186
164. Whitney	C10	Chief	Chevrolet	2020	Excellent	Frontline	4,500

Fire Department	Radio Call Sign	Apparatus Type (engine, truck, etc.)	Apparatus Manufacturer	Year	Condition	Status (Frontline/ Reserve)	Mileage
1. Chesnee-Community	Squad 2	Service	? 130X	1992	Fair	Reserve	21,786
2. Croft	Rescue 10	Rescue	Hackney	2005	Good	Reserve	4,018
3. Croft	Battalion 10		Chevrolet	2013	Good	Reserve	45,172
4. Croft	Battalion 10	Command	Chevrolet	2013	Good	Reserve	45,172
5. Holly Springs	Squad 37	Rescue	Anchor-Richy	2009	Ok	Reserve	
6. North Spartanburg	BA-3	On call BC	Chevrolet	2015	Fair	Reserve	64,837
7. Reidville	S-1	Service	Hackney	1999	Good	Reserve	54,794
8. Roebuck	Car 7	Command	Ford	2013	Good	Reserve	42,705
9. Whitney	Service	Service	Utility Master	1992	Good	Reserve	15,630

ESCI was impressed with the appearance and general condition of the apparatus throughout Spartanburg County, which is indicative of the culture of pride and ownership within each of the fire departments. Beyond the basic station-level maintenance of fire apparatus, however, the Fire Service within Spartanburg County operates with a large number of vehicles that are not centrally managed for maintenance, and do not adhere to a consistent standard for specifications or operational readiness.

ESCI evaluated the age of the fleet of apparatus within Spartanburg County, finding that the units range from a high of 40 years of age, which includes reserve apparatus and utility vehicles, to a low of just one year. Thirty-eight percent, or 136, of vehicles for which a date of manufacture was reported, are 15 years old or older.

ESCI noted that when comparing the number of firefighters on duty to the number of apparatus, Spartanburg County is heavy on apparatus. The cost of maintaining apparatus does place a significant burden on a fire department's operating budget in addition to the burden that replacement costs incur on the capital budget. ESCI recommends a County-wide evaluation of all the apparatus in the fleet with a goal of eliminating apparatus that does not see regular use and does not serve a specific and necessary need.

Apparatus Maintenance and Replacement Planning

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

As vehicles age, repairs tend to become more frequent, parts more difficult to obtain, and downtime for repair increases. Given the emergency mission that is so critical to the community, this factor of downtime is one of the most frequently identified reasons for apparatus replacement.

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

NFPA 1901: *Standard for Automotive Fire Apparatus* is a nationally recognized industry standard for the design, maintenance, and operation of fire suppression apparatus. The standard recommends that fire apparatus 15 years of age or older be placed into reserve status, and apparatus 25 years or older should be replaced.[22]

[22] *NFPA 1901: Standard for Automotive Fire Apparatus; Section D.3.*

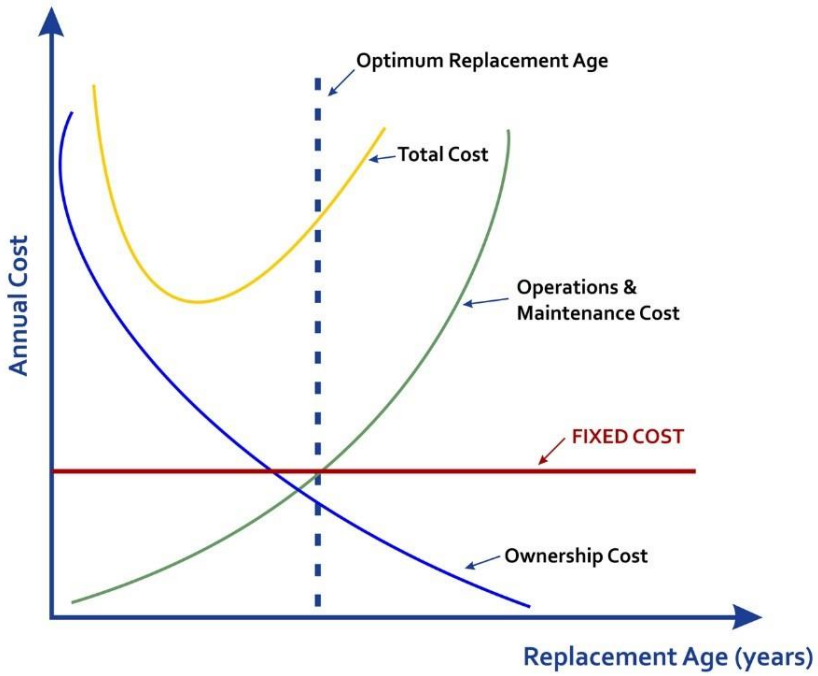
This is a general guideline, and the standard recommends using the following objective criteria in evaluating fire apparatus lifespan:

- Vehicle road mileage.
- Engine operating hours.
- The quality of the preventative maintenance program.
- The quality of the driver-training program.
- Whether the fire apparatus was used within its design parameters.
- Whether the fire apparatus was manufactured on a custom or commercial chassis.
- The quality of workmanship by the original manufacturer.
- The quality of the components used in the manufacturing process.
- The availability of replacement parts.

It is important to note that age is *not* the only factor for evaluating serviceability and replacement. Vehicle mileage and pump hours on engines must also be considered. A two-year-old engine with 250,000 miles may need replacement sooner than a 10-year-old one with 2,500 miles. The following figure represents a relatively simple example that Spartanburg County could use for determining the condition of fire apparatus and vehicles.

A conceptual model that may be used when a replacement cycle is considered is the *Economic Theory of Vehicle Replacement*. The theory states that *as a vehicle ages, the cost of capital diminishes and its operating cost increases*. The combination of these two costs produces a total cost curve. The model suggests the optimal time to replace any piece of apparatus is when the operating cost begins to exceed the capital costs. This optimal time may not be a fixed point but rather a range over time. The flat spot at the bottom of the total curve in the following figure represents the replacement window.

Figure 79. Economic Theory of Vehicle Replacement



Shortening the replacement cycle to this window allows for an apparatus to be replaced at optimal savings to the department. If the department does not routinely replace equipment in a timely manner, the overall reduction in replacement spending can result in a quick increase in maintenance and repair expenditures. Officials who assume that deferring replacement purchases is a good tactic for balancing the budget must understand that two events may occur:

1. Costs are transferred from the capital budget to the operating budget.
2. Such deferral may increase overall fleet costs.

Regardless of its net effect on current apparatus costs, the deferral of replacement purchases unquestionably increases future replacement spending needs.

ESCI advises clients that the day that a new piece of fire apparatus is delivered, the agency should start to set funds aside for its replacement. Each piece of fire apparatus and the related support equipment has a predictable expected useful service life, based on a practical balance of use and maintenance cost. By analyzing age, projected service life, and replacement costs with an inflation factor, a replacement schedule can be established that looks farther into the future than simply the annual budget process, enabling the agency to forecast future financial demands and plan more effectively for them.

Various factors can have either a positive or negative impact on the life expectancy of an emergency response apparatus. Fire trucks and aerial devices located in "busy" portions of a jurisdiction can realize an even shorter life-cycle as the units are exposed to more harsh operations. These units often experience increased breakdowns due to wear and tear, which reduces apparatus availability and increases maintenance costs. The following figure provides an alternate evaluation process that can be used as a guide to assist with fleet replacement decisions.

Figure 80. Evaluation Components and Points for Apparatus Replacement

Evaluation Components	Points Assignment Criteria	
Age	One point for every year of chronological age, based on in-service date	
Miles/Hours	One point for each 10,000 miles or 1,000 hours	
Service	1 point for Light Duty use 3 points for Normal Duty use 5 points for Severe Duty use Example: Fire Pumpers are classified as severe duty service.	
Condition	1 point: Excellent 2 points: Good 3 points: Fair 4 points: Poor 5 points: Severe accident or major component replacement This category takes into consideration body condition, interior condition, accident history, anticipated repairs, etc. The better the condition, the lower the points assignment.	
Reliability	1 point: In the repair shop once every three months or less 3 points: In the repair shop once every month 5 points: In the repair shop two or more times per month	
Point Ranges	**Condition Rating**	**Condition Description**
Under 18 points	Condition I	Excellent
18 to 22 points	Condition II	Good
23–27 points	Condition III	Consider Replacement
28 points or higher	Condition IV	Immediate Replacement

ESCI recommends that Spartanburg County conduct a County-wide review of its current apparatus inventory as well as the apparatus life cycle with a goal of eliminating apparatus that does not see regular use and does not serve a specific and necessary need. This review should be based on industry best practices and ensure that the current inventory, as well as the life cycle of apparatus, meets both the operational and financial requirements of the fire departments within the County.

Sample Apparatus Replacement Schedule

The following is a sample apparatus replacement schedule. ESCI recommends that Spartanburg County first determine the vehicles that will remain in service and then establish a replacement schedule for those vehicles. The vehicle life expectancies used are those used throughout the industry for front line operation. Heavy urban usage and low rural demand both effect the actual lifespan of a piece of apparatus. In city areas of high demand, the engine may operate less than 10 years, while in a rural setting with low demand and good maintenance, it may last longer than the expected 20 years. The replacement costs are based on recent purchase experience but can fluctuate with added features and options.

This schedule uses a 4% inflation figure to calculate the replacement cost of apparatus based on the remaining life expectancy. ESCI recommends that Spartanburg County collaborate with each of the fire departments to modify this schedule to meet the needs of the County and each of the fire departments, identify a funding source to support the plan, and have it adopted by all of the authorities having jurisdiction.

Figure 81. Fire Apparatus Life Expectancy and Replacement Cost

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

Figure 82. Fire Apparatus Life Average Age and Inflation Rate

Current Year:	Average Age:	Inflation:
2020	(To Be determined after the future fleet is identified)	4.0%

Based on the previous criteria, the future Spartanburg County Fire Apparatus fleet could then be scheduled for planned replacement using the following table.

Figure 83. Spartanburg County Apparatus Replacement Schedule

Type	Unit	Year	Base Replacement Cost	Replacement Cost w/ Inflation	Current Cash Requirements	Annual Cash Requirements	Current Age	Life Expectancy	Replacement Year	Years to Replacement
	Total/Average									

SUPPORT EQUIPMENT

Support Equipment includes self-contained breathing apparatus (SCBA), radios, rescue equipment, and other assorted high-value equipment. ESCI observed that the support equipment in service throughout Spartanburg County was generally well-maintained and in good condition.

Spartanburg County does not have a replacement schedule in place for support equipment. To assure an inventory of equipment that is in good general repair, Equipment Replacement Plans should be established and adopted to ensure the scheduled replacement of SCBA, radios, rescue equipment, and other high-value equipment. Development of the Support Equipment Plan should identify a funding source for the plan.

Within the Capital Improvement Program section of this report, ESCI made specific recommendations regarding the development and adoption of plans for fire facilities, apparatus, and equipment. ESCI recommends that these plans be approached in the following order:

1. The development of the Fire Facilities Capital Improvement Plan that identifies necessary fire stations to serve the population within Spartanburg County be developed and adopted first.
2. Once the number and location of fire stations have been determined, the County will be well-positioned to determine the number and types of apparatus that will best serve the County.
3. Following the development and the adoption of both the Fire Facilities and Fire Apparatus Capital Improvement Plans, the County could then develop the Support Equipment Capital Improvement Plan to deploy the appropriate number and type of equipment.

Appendix G: Support Services

TRAINING

South Carolina operates an Occupational Safety and Health Administration (OSHA) approved State Plan that applies to all private and public sector workplaces within the state with the exception of: private sector maritime activities; employment on military bases; Savannah River and Three Rivers Solid Waste Authority private sector employment; federal government workers; and the United States Postal Service. Pursuant to this authority, the Director of the South Carolina Department of Labor, Licensing, and Regulation has put into force and made public certain OSHA standards that are identical to those enforced by the Secretary of Labor, United States Department of Labor. These standards are known as the Occupational Safety and Health Rules and Regulations of the State of South Carolina and have been published as Article VI.[23] Firefighters in Spartanburg County are subject to the requirements of South Carolina OSHA. Specific to Fire Brigade Training, South Carolina OSHA has established the following requirements:

Figure 84. South Carolina OSHA Fire Brigade Training Requirements

Standard	Requirement
1910.156(c)(1)	The employer shall provide training and education for all fire brigade members commensurate with those duties and functions that fire brigade members are expected to perform. Such training and education shall be provided to fire brigade members before they perform fire brigade emergency activities. Fire brigade leaders and training instructors shall be provided with training and education, which is more comprehensive than that provided to the general membership of the fire brigade.
1910.156(c)(2)	The employer shall ensure that training and education are conducted frequently enough to assure that each member of the fire brigade is able to perform the member's assigned duties and functions satisfactorily and in a safe manner so as not to endanger fire brigade members or other employees. All fire brigade members shall be provided with training at least annually. In addition, fire brigade members who are expected to perform interior structural firefighting shall be provided with an education session or training at least quarterly.
1910.156(c)(3)	The quality of the training and education program for fire brigade members shall be similar to those conducted by such fire training schools as the Maryland Fire and Rescue Institute; Iowa Fire Service Extension; West Virginia Fire Service Extension; Georgia Fire Academy, New York State Department, Fire Prevention and Control; Louisiana State University Firemen Training Program, or Washington State's Fire Service Training Commission for Vocational Education. (For example, for the oil refinery industry, with its unique hazards, the training and education program for those fire brigade members shall be similar to those conducted by Texas A & M University, Lamar University, Reno Fire School, or the Delaware State Fire School.)
1910.156(c)(4)	The employer shall inform fire brigade members about special hazards such as storage and use of flammable liquids and gases, toxic chemicals, radioactive sources, and water reactive substances, to which they may be exposed during fire and other emergencies. The fire brigade members shall also be advised of any changes that occur in relation to the special hazards. The employer shall develop and make available for inspection by fire brigade members, written procedures that describe the actions to be taken in situations involving the special hazards and shall include these in the training and education program.

[23] *http://www.scosha.llronline.com/pdfs/fire.pdf.*

The following figure lists the maximum penalty amounts, with the annual adjustment for inflation, that may be assessed after January 15, 2020, for violations of OSHA Standards.

Figure 85. Maximum OSHA Penalties

Type of Violation	Maximum Penalty
Serious	$13,494 per violation
Failure to Abate	$13,494 per day beyond the abatement date
Willful or Repeated	$134,937 per violation

Minimum Training Standards

In the State of South Carolina, the Fire Chief is the Authority Having Jurisdiction (AHJ) that determines the minimum training requirements for the department. As such, each Fire Chief certifies to what level an individual may operate within a particular fire department. The 2010 Spartanburg County Fire Protection Minimum Funding Requirements proposed the following minimum training requirements to assist Fire Chiefs in Spartanburg County in designing their department training programs.

Figure 86. South Carolina and Spartanburg County Firefighter Training Requirements

Level of Training	Spartanburg County Requirements[24]
Firefighter I	• NFPA 1001 Firefighter I • NFPA 1072 Haz-Mat Operations
Engineer/Driver Operator	• NFPA 1002 Driver Operator
Aircraft Rescue Firefighters	• NFPA 1003 Airport Firefighter
Wildland Firefighters	• NFPA 1051 Wildland Firefighters
Company Officer	• NFPA 1021 Fire Officer

While the Fire Chief of each department has the authority to determine the minimum training levels, OSHA does require that the training be commensurate with those "duties and functions that fire brigade members are expected to perform." OSHA further requires that "…training and education are conducted frequently enough to ensure that each member of the fire brigade is able to perform the member's assigned duties and functions satisfactorily and in a safe manner so as not to endanger fire brigade members or other employees. All fire brigade members shall be provided with training at least annually. In addition, fire brigade members who are expected to perform interior structural firefighting shall be provided with an education session or training at least quarterly."

[24] *Spartanburg County Fire Protection Minimum Funding Requirements; 5/4/10.*

Another factor that must be considered in relation to firefighter training is ISO. The following is a summary of the items that ISO considers when reviewing a community's firefighter training program.

Figure 87. ISO Firefighter Training Requirements[25]

Training Component	Description
Training Facilities	Drill tower Live fire training structure (including smoke room) 2-acre training area
Use of Facilities	18 hours per year per firefighter (for maximum credit)
Company Training	Company training at fire stations, 16 hours per member per month (for maximum credit)
Classes for Officers	Certification of all officers 12 hours per year of continuing education for all officers (for maximum credit)
New Driver and Operator Training	Classes for new drivers and operators, 60 hours (for maximum credit)
Existing Driver and Operator Training	Classes for existing drivers and operators, 12 hours per year (for maximum credit)
Training on Hazardous Materials	6-hour session per member per year (for maximum credit)
Recruit Training	240 hours per recruit in the first year (for maximum credit)

Even though the Insurance Services Office (ISO) requires specific detailed required training for department personnel, training programs must go beyond simply fulfilling mandatory hours. Training administrators and instructors must ensure that firefighters, EMS personnel, and officers are not only competent but also self-confident in the variety of skills necessary to perform effectively in high-stress situations.

In an effort to streamline firefighter training within Spartanburg County, ESCI suggests that there be established County-wide fire service job positions inclusive of minimum initial training requirements and ongoing training requirements based on the duties that each position is authorized to perform. While it is reasonable to require paid firefighters to perform fire suppression activities within Immediately Dangerous to Life and Health (IDLH) environments and to attend the training that is required to perform those duties, some volunteers do not have the desire to enter IDLH environments or to perform fire suppression activities.

[25] *https://www.isomitigation.com/ppc/technical/training/.*

As OSHA requires that training be commensurate with duties, the more specific a job function is, the simpler it is to establish specific training requirements and ongoing training requirements for that position. As Spartanburg County has seen a decline in the number of volunteer firefighters in recent years, it would benefit the County to create specific job functions with associated training and ongoing training requirements that can be more easily satisfied by volunteers. The following is a sample list of job positions and the associated training and ongoing training requirements that would be appropriate for each position based on industry best practices, NFPA standards, and ISO requirements.

Figure 88. Sample Fire Service Job Positions and Proposed Required Training

Position	Proposed Required Training	Ongoing Training Requirements Per Firefighter
Support Member (Non-IDLH)	• NFPA 1072 Haz-Mat Awareness	• All fire brigade members shall be provided with training at least annually • 6-hours of haz-mat training per year
Firefighter	• NFPA 1001 Firefighter I • NFPA 1072 Haz-Mat Operations • 240 hours per recruit in the first year	• Fire brigade members who are expected to perform interior structural firefighting shall be provided with an education session or training at least quarterly • 18 hours per year at a training facility • 16 hours per month company training at fire stations • 6-hours of hazmat training per year
Engineer/ Driver Operator	• NFPA 1072 Haz-Mat Awareness • Emergency Vehicle Driver Training • Classes for new drivers and operators, 60 hours	• All fire brigade members shall be provided with training at least annually • Classes for existing drivers and operators, 12 hours per year • 6-hours of hazmat training per year
Aircraft Rescue Firefighters	• NFPA 1003 Airport Firefighter	• Fire brigade members who are expected to perform interior structural firefighting shall be provided with an education session or training at least quarterly
Wildland Firefighters	• NFPA 1051 Wildland Firefighters	• All fire brigade members shall be provided with training at least annually

ESCI further recommends that following the development of job positions, associated training, and ongoing training requirements, that Spartanburg County develop an Annual Training Calendar in collaboration with the South Carolina Fire Academy. This calendar of training classes should satisfy the quarterly and annual training requirements and place a priority on high-risk/high-frequency operations, such as emergency vehicle operations, as well as have a focus on high-risk/low-frequency operations, such as fire suppression including firefighter accountability to ensure competency during dangerous evolutions. The creation of annual County-wide training in conjunction with the South Carolina Fire Academy will allow for the scheduling of an appropriate number of classes that the County can reasonably anticipate being able to fill with at least 12 students per class that are geographically distributed throughout the County. This annual calendar will further allow for advanced planning by the fire academy, fire departments, and the firefighters.

Officer Training

OSHA Requires that fire brigade leaders and training instructors shall be provided with training and education, which is more comprehensive than that provided to the general membership of the fire brigade.

While not consistently followed by all of the fire departments within the County, the 2010 Spartanburg County Fire Protection Minimum Funding Requirements recommend that fire officers be trained to the level of NFPA 1021 Fire Officer. ISO further requires 12 hours per year of continuing education for all officers. ESCI commends Spartanburg County for recommending NFPA 1021 as the standard for Fire Officers and further suggests that understanding the increasingly complex demands placed upon the leaders of today's fire service, that the County recognizes the various levels of Fire Officers that exist within NFPA 1021 for midlevel and department chief officers.

Figure 89. NFPA 1021 Fire Officer Levels

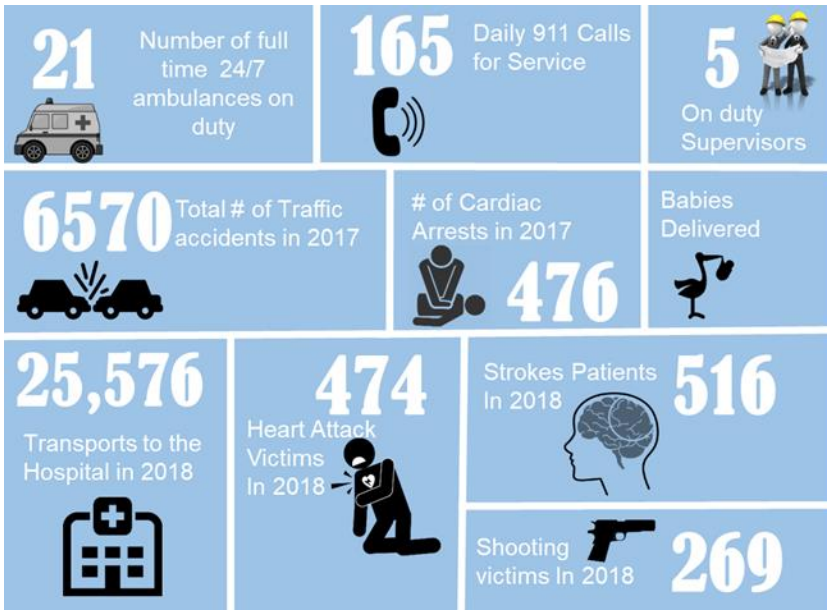
Level	Description
Fire Officer I	First-line supervisory officer who has met all the job performance and certification requirements of Firefighter II as defined in NFPA 1001: *Standard for Firefighter Professional Qualifications*, and Fire Instructor I as defined in NFPA 1041: *Standard for Fire Service Instructor Professional Qualifications*.
Fire Officer II	Mid-level supervisor who performs both supervisory and first-line managerial functions who has met all the job performance and certification requirement of Fire Officer I as defined in NFPA 1021.
Fire Officer III	Midlevel supervisor who performs both supervisory and first-line managerial functions who has met all the job performance and certification requirements of Fire Officer II as defined in NFPA 1021: *Standard for Fire Officer Professional Qualifications*.

While NFPA 1021 also recognizes Fire Officer IV as an upper level supervisor who performs both supervisory and first-line managerial functions who has met all the job performance and certification requirements of Fire Officer III as defined in NFPA 1021, South Carolina does not currently recognize that level of training.

Emergency Medical Services

Since 1984, Spartanburg County has contracted with Spartanburg Regional Hospital to manage Emergency Medical Services throughout the County. This arrangement is completely independent of the fire services within Spartanburg County. Interviews with County and fire department officials unanimously indicated that this arrangement provides excellent service to the residents in Spartanburg County.

Figure 90. Summary of Spartanburg EMS[26]



The fire departments in Spartanburg County provide varying levels of emergency medical services, with some departments providing first responder service and other departments not providing emergency medical response services. ESCI suggests that the County take the lead to work with all fire departments to implement a data-driven approach to meeting the County's future EMS demands. This data-driven review of system demand should result in a coordinated county-wide approach to answering EMS calls in Spartanburg County in an efficient and cost-effective manner that is sustainable for the fire departments as well as the County.

Office of the Fire Marshal

Fire prevention should be the cornerstone of all activities performed by a fire department. The prevention of fire and loss of life, human suffering (injuries to civilians and firefighters), environmental harm, and property damage is the optimum return on investment for fire agencies. Proactive involvement in construction, code enforcement, educating the public to prevent destructive fires, and training the public to survive them is the best accomplishment of fire prevention.

[26] *http://www.spartanburgems.org/what-we-do.*

Seven fundamental components work together to create an effective fire prevention program:

- Code enforcement activities
- New construction inspection and involvement
- General inspection programs
- Fire and Life-Safety public education programs
- Fire investigation programs
- Pre-incident planning
- Statistical collection and analysis

Code Enforcement Activities & General Inspection Program

The Building Codes Fire Inspectors in Spartanburg County are charged with conducting plan reviews, construction inspections, and certificate of occupancy inspections on all new commercial construction that occurs within the unincorporated areas in Spartanburg County.

Spartanburg County has adopted the following codes for construction within the County:

- 2018 International Building Code (Commercial Buildings)
- 2018 International Fire Code (Commercial Buildings)
- 2018 International Plumbing Code (Commercial Buildings)
- 2018 International Mechanical Code (Commercial Buildings)
- 2018 International Fuel Code (Commercial Buildings)
- 2018 International One/Two Family Dwelling Code (Residential Only)
- 2006 Property Maintenance Code (Existing Housing and Property)
- 2017 National Electrical Code NEC
- 2009 International Energy Code

Fire Inspections are required for the following within Spartanburg County:

- Sprinkler Inspections
- Fire Alarm Inspections
- Kitchen Hood Suppression System Inspections
- Building and Site Inspections

The majority of the fire departments within Spartanburg County receive annual funding from the "the One Percent Fund" as specified by South Carolina State Law Sections 23-9-310 through 23-9-470, which establishes the Firemen's Insurance and Inspection Fund. These funds are supervised by the South Carolina State Firemen's Association and represent an amount equal to one percent of the property insured within a fire department's response area. Section 23-9-360 requires that fire departments that receive these funds conduct inspections and turn in quarterly inspection reports to the State Fire Marshal's Office. Spartanburg County has traditionally maintained a "hands off" approach with regards to this program, using the planning assumption that since most fire departments within the County receive these funds, that they are performing the required inspections.

ESCI's interviews with representatives of the various fire departments within Spartanburg County revealed that most, if not all, of the fire departments saw a need for increased communication with the Spartanburg County Building Department and Fire Marshal's Office as well as a need for increased enforcement by the aforementioned offices. As the local fire departments do not have enforcement authority, they are reliant on the County to correct violations. The fire department representatives repeatedly reported to ESCI that they get "very little help, if any" from the County in this regard. The fire department representatives also repeatedly expressed concerns that there is very little accountability when there is a change of occupancy in a building. This is a serious safety concern for both the occupants as well as the firefighters who respond to emergencies in these buildings.

Fire and Life-Safety Public Education Programs

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

The purpose of public fire and life safety education is to minimize the number of emergencies by training the community to take appropriate actions should an emergency occur. Fire and life safety education provides the best chance for minimizing the effects of fire, injury, and illness to the community. Additionally, public education can correlate to firefighter safety. As an example, arriving at the scene of a house fire, the first arriving fire officer finds that the residents have all evacuated safely and are accounted for in a meeting location. Their actions have accomplished the priority of the fire department, life safety, and the firefighters can concentrate on fire suppression.

Public fire and life safety can be simple or an in-depth program covering a variety of topics. Example topics include fire extinguisher training, smoke detector education, and installation, CPR, first aid courses, fall prevention, home fire safety, fire prevention materials in multiple languages, fire brigade training for businesses, and many others. Even the largest departments cannot cover all fire and life safety topics, and so a fire department needs to decide where to direct resources.

ESCI's interviews with representatives of the various fire departments within Spartanburg County consistently revealed that the fire departments desired for the County to take a more aggressive role in coordinating fire prevention throughout the County. Specific requests included having the Spartanburg County Fire Marshal's Office establish annual County-wide fire prevention messages as well as providing speaking points and associated educational materials.

Fire Investigation Programs

According to NFPA 921: *Guide for Fire and Explosion Investigations,* there are four determinations when investigating the causes for fire:

- Accidental fire cause
- Natural fire cause
- Incendiary fire cause
- Undetermined fire cause

Accurately determining the cause of fires often provides clues to preventing future incidents. Identifying fires that are set intentionally (incendiary), along with the identification and/or prosecution of the responsible parties, can prevent additional fires. If the cause of a fire is natural or accidental, it is also of great value in knowing and understanding its origin. It is of value in identifying where to direct fire prevention and public education efforts to reduce or prevent reoccurrences.

The Spartanburg County Fire Investigation Team was placed in service in May of 2001 but is no longer active. The County Fire Marshal responds to investigate fires when requested.

Hazardous Materials and Technical Rescue and Response Capability

The Spartanburg County Fire Marshal's Office is responsible for training and coordinating those involved with pre-identified Special Purpose Response Teams throughout the County. Fire Marshal personnel are on duty around the clock to monitor significant emergency events that may adversely affect the residents of Spartanburg County. Some of the departments' key responsibilities include, but are not limited to, the following:

- Provide the Spartanburg County Community with Specialized Emergency Response Teams/Functions (FIT Team, HazMat, Spartanburg Unified Command Post)
- Manage County-wide outdoor warning system
- Conducts training and exercise programs for their respective teams
- Manages and trains the County's FIT, Haz-Mat, & Command Center teams
- Assumes OEM on-call responsibilities at certain designated times

Spartanburg County EMS sponsors several specialized response teams, including Water Rescue, Rope Rescue, Regional Medical Assistance, Tactical Medic, and Bike Teams.

ESCI's interviews with representatives of the various fire departments within Spartanburg County consistently revealed that the fire departments desired for the County to take a more aggressive role in coordinating hazardous materials and technical rescue teams within the County. Specific requests included using a data-driven approach to deploy resources based on local risk assessments as well as a County-led approach to staffing, training, and funding these teams.

Emergency Communications Center

ESCI analyzed information provided by the management staff of the Center. In addition, ESCI conducted an interview with the Chairperson of the Communications Committee to develop the following overview.

The purpose of this section is two-fold. First, it verifies the accuracy of baseline information along with ESCI's understanding of the Center's composition and operations. This section provides the foundation from which ESCI developed its evaluation of the Center. Secondly, the overview serves as a reference for the reader, who may not be fully familiar with the details of the Center's operations.

The following evaluation is based primarily on information provided by the Center and other external resources. This section compares the Center and its operations to National Fire Protection Association (NFPA) standards, National Emergency Number Association (NENA) and Association of Public-Safety Communications Officials, International (APCO) best practices, national mandates relative to public safety communications, and generally accepted best practices within the public safety communications community.

Center Overview

The Center is the primary Public Safety Answering Point (PSAP) for law enforcement, fire, rescue, emergency medical, and emergency management services within all of Spartanburg County. The Center is an independent County department, reporting to the County Administrator. The department provides emergency communication services to more than 80 public safety agencies in Spartanburg County. Its primary goal is to provide the most effective emergency communications possible for the citizens, visitors, and public safety agencies of Spartanburg County.

The Center dispatches law enforcement, fire, and emergency medical services, and is the only PSAP in Spartanburg County. The Center dispatches 32 of the 35 fire services in Spartanburg County. One smaller PSAP in Greenville County (Greer Police Department) dispatches resources to a small area in western Spartanburg County. The Center is authorized to have 75 total positions, including 49 Dispatchers, seven 9-1-1 Operators, four Shift Supervisors, and four Assistant Shift Supervisors. There are 8.5 management/support positions. The dispatchers work 12-hour shifts. The dispatchers are not represented by a labor organization. The Center receives its funding through a 9-1-1 surcharge, wireless reimbursements, and from the County General Fund.

For the purposes of this report, ESCI concentrated on the fire services aspects of the Center's operation, but be aware that fire dispatching is less than 10% of the workload of the Center.

Communications Infrastructure

Facility

The Center has 18 work positions, with an additional four overflow/training positions. The positions are designed for ergonomic safety in mind, allowing personnel to adjust for comfort, and allow for them to stand for periods of time. The facility is equipped with cameras, and access card control for gate entry, building entry, lobby entry, dispatch area, and server rooms. There is a backup facility with 13 positions.

Radio

Spartanburg County consists of low foothills with river valleys. Areas of the south county are leveler ground. These valleys and ridges can prove to be a challenge for radio propagation, which prefers to travel in a straight line. The solution for hilly terrain is to locate multiple radio towers on high sites that can look down into the river valleys and over ridge tops. One particular area of concern is the Pacolet River/Clifton Beach. County radio shop has placed a mobile repeater on a pole in Clifton Beach to try to improve coverage, but there are still dead spots in the area.

Spartanburg County fire agencies operate on a VHF radio system. It was improved to a simulcast system in 2013. There are six frequencies: one dispatch outbound only, one operations channel, and four tactical channels. There are four simulcast transceiver sites, but Spartanburg County has money set aside for another simulcast tower. The County is currently looking for a suitable site for the tower. Each agency purchases its own radios, so there is an assortment of brands, models, and ages of radios.

Each fire agency has been assigned a 100-watt mobile repeater to place in an appropriate vehicle. When turned on, this repeater will take the transmission from the 3-watt portable radios (and from the Center) and boost the signal, improving reception. It was reported that the mobile repeaters are not always used, whether through a lack of familiarity with its use or personnel forgetting to turn it on when they are in a questionable area for radio coverage.

The South Carolina State-wide 800 MHz Radio and Mobile Data System, known commonly as Palmetto 800, is used by a majority of the public safety agencies in the state. The system controller is located in Columbia, South Carolina. This system is a cost-shared public/private partnership between the state government, local governments, power utilities, and Motorola Solutions, Inc. The system is a Motorola P25 - 7.71 Core. There are only two tower sites in Spartanburg County today, but there are approximately five other tower sites outside of Spartanburg County that are used inside the County. There are plans to add another site to the system, but not inside Spartanburg County, but within range for use.

There were comments that the Palmetto 800 system experiences some of the same dead spots as the VHF system, most notably in the Pacolet River/Clifton Beach area. It was noted that one or two more towers on the Palmetto 800 system in Spartanburg County would greatly improve radio reception, but there are no plans for expansion in the County at this time. It has already been determined that this trunked system could handle 500 or more users without difficulty.

The fire agencies are the only ones in the County not on the statewide 800 trunked system, although some agencies do have 800 portables for interoperability. The fire agencies are weighing the pros and cons of joining Palmetto 800. A prime concern today is the cost of new radios on the 800 system, plus the $40 per month per radio user fee. Radio shop personnel feel that the coverage on 800 is better than VHF.

The fire agencies need to determine if they want to remain on VHF and make improvements to coverage or switch over to the Palmetto 800 trunked radio system. Advantages and disadvantages of making the change include the following.

Figure 91. VHF Compared to the Palmetto 800 System

Advantages of Staying On VHF
▪ The fire agencies have complete control of the VHF system.
▪ Lower cost of radios, no recurring maintenance fees.
▪ Training on the use of the mobile vehicle repeaters may improve communications.
Disadvantages of Staying on VHF
▪ Additional VHF tower sites need to be created, which includes purchase or lease of lands, construction of towers, and installation of radio equipment to make the sites operational.
▪ FCC radio licensing restrictions related to available frequencies and transmitter propagations may create issues if they want to expand.
Advantages of Moving to the Palmetto 800 System
▪ Radio coverage on the Palmetto 800 system is better than the VHF system.
▪ More opportunities for interoperability.
▪ The Palmetto 800 system can handle the additional radios to the system without infrastructure improvements.
Disadvantages of Moving to the Palmetto 800 System
▪ High start-up costs for new base, mobile, and portable radios, plus monthly maintenance fees for the 800 system.
▪ The fire agencies can only request changes to the system—they will not have control of the system.

Computer-Aided Dispatch (CAD)

The Center operates on a Motorola Premier One CAD system that was installed in 2017. Previously, the Center was on an older Motorola P-CAD) system. Fire is the smallest customer, with 22,767 dispatched events in 2019. Spartanburg County Sheriff's Office is largest with approximately 200,000 events, then Spartanburg Police Department with 80,000 events per year. Emergency Medical Services (EMS) ran 53,713 events in 2019.

There are 33 fire departments with 52 stations in the system, with the other two departments dispatched by Greenville County. There are 32 ambulances. All the fire agencies are considered one agency, with the smaller fire agencies grouped together in CAD.

CAD Configuration

Dispatching to approximately 80 agencies creates a need for as much standardization as possible, not necessarily for software limitations, but to allow dispatchers not to have to memorize 80 different ways of doing things based on the event location or jurisdiction. There were two major issues presented:

1. **Resource/Asset Allocation**
   A major concern for both the Center and the fire agencies is how and when resources are assigned to an event. The Center wants as much standardization as possible but recognizes that each agency is configured differently, and each jurisdiction has unique response needs. The fire agencies want to make sure that the right units are dispatched consistently.

The first challenge is resource availability. Most fire stations have more apparatus than they have people to staff them. The challenge for dispatch is to know what is available at all times; and for the fire agencies, is to know who can respond in which apparatus at the time of dispatch. Currently, many fire agencies are dispatched with a generic unit, usually the name of the agency or the station number. Station or volunteer personnel then decide which apparatus they will take. This then requires the Center to add the unit identifier to the event. Meanwhile, there are more pieces of apparatus still at the station, and perhaps no one to staff them.

The CAD system at the Center can identify which specific apparatus should respond to an event, based on how the response plans are configured. Configuration of the response plans should be a collaboration of the fire agency and the Center. This can take a fair amount of work on both sides, but it is usually a one-time job, with occasional minor changes.

The next challenge is to utilize the capabilities in the CAD system to know how many personnel are at the station and how many would be needed to take out each type of apparatus. Once the number of personnel at the station is depleted, then CAD knows that the remainder of the apparatus is out of service until additional personnel report to the station. This will require the configuration of CAD on crew levels, and it will require the stations to let the Center know when the crew level changes outside of a response.

2. **Geographical Needs**

   Each fire agency has unique local circumstances that require a special response—bridges with limited weight limits, areas without hydrants, common place names, special addressing issues, etc. These situations may require a separate response plan from the surrounding area, or a note on the street address, or a way to route units around a bridge, for example. Again, this requires a collaboration between the fire agencies and the Center to get this information into CAD. This is another time-consuming project, but necessary for getting the proper response.

9-1-1

Spartanburg County implemented Enhanced 9-1-1 in 1988. They are currently on an Intrado Viper 9-1-1 system, with an Emergency Services IP Network (ESINet) through AT&T.

Figure 92. Enhanced 9-1-1 and 7-Digit Emergencies

System	Year	Totals
9-1-1	2017	235,524
	2018	231,037
	2019	230,721
7-Digit Emergency	2017	Incoming 163,829/Outgoing 161,441
	2018	Incoming 157,974/Outgoing 159,122
	2019	Incoming 156,692/Outgoing 157,250

Mobile Data

Some fire agencies are using mobile data computers connected to the CAD system, but only on some front-line apparatus. All EMS units are equipped with mobile data computers and automatic vehicle location (AVL).

Fire Station/Personnel Notification

Stations and other personnel notifications are accomplished by 2-tone paging over the VHF radio system, with the addition of text messaging from the CAD system.

Logging Recorder

Recording of telephone and radio circuits is performed on an Eventide Logging Recorder.

Center Capabilities and Methods

Workflow

There are 18 dispatch consoles plus four overflow positions in the Center. Dispatchers can sign on anywhere, but five specific console pods are routinely used for fire dispatch. The Center routinely staffs the fire pod with two fire dispatchers and one EMS dispatcher. There are seven 9-1-1 Operator/Call Taker Positions authorized. These individuals question the caller, enter the information into CAD, and dispatch the event on the radio. With 33 fire agencies, it is not possible to have 33 different ways of doing things, so the Center tries to standardize procedures as much as possible.

Emergency Medical Dispatch (EMD)

The Center uses Priority Dispatch's EMD protocols. Dispatchers do not send fire agencies on all EMS calls; they use the EMD determinants to decide the level of EMS response. There are no plans to become an Accredited Center of Excellence for the National Academies of Emergency Dispatch; however, the ECC is CALEA accredited.

Mutual Aid

With the number of small fire agencies in the County and national standards for firefighter safety, mutual aid has become increasingly complex. A structure fire may require up to seven departments for the response. While the CAD system can be configured for recommending units, most of the dispatch recommendations are not for specific units, but rather use a generic agency or station name. It is up to the agency to then decide which units are going to respond. As is common with volunteer agencies, or even full or part-paid departments, there are more units in the station than there are firefighters to staff them. It becomes difficult to know when units are staffed or not, even with some of the crew-level features in modern CAD systems. This results in extra work for the dispatchers to determine if they have enough resources on a response or need to call up additional resources.

The Center complies with NENA guidelines for call answering, with an average call answering time of 9 seconds. Call processing standards are self-imposed, but it is unknown if they follow the NFPA 1221 standards due to a lack of data provided by Spartanburg County to conduct this evaluation. The Center follows prescribed EMD protocols and has a quality assurance program, but the Center has not pursued accreditation by the International Academies of Emergency Dispatch.

As of June 2020, the Center finished their most recent CALEA reaccreditation. It first received accreditation in 2002. The Center reports that they track performance standards for call answering and call processing but have had issues with the data coming from ECaTS, its current 9-1-1 data collection provider. The Center is in the process of purchasing a management information system from Intrado in hopes of getting better data. Both the NFPA and NENA have performance recommendations for call answering at 10 seconds 90 percent of the time.[27]

Center Staffing

The fire service represents less than 10% of the total workload of the Center. The Center is authorized 75 full-time employees. At this time, almost all employees are cross-trained for law, fire, and EMS duties. There are seven positions that have call-taking responsibilities only. They do have some part-time employees, but those positions are slowly being eliminated due to the technical requirements of the job and a part-time employee's ability to maintain competence.

Dispatchers work 12-hour shifts—either 0600 to 1800, or 1800 to 0600, hours on one of four teams. The schedule results in 88 hours worked in a two-week period. There is a minimum of seven dispatchers on duty, depending on the hour of the day.

Being short-staffed in dispatch is a national problem—the stresses of the job combined with less than ideal work hours and traditionally low pay have contributed to this problem. The number of personnel needed in a communications center can be determined in two ways: predictive models based on historical data or by assessing current performance compared to national standards. Assessing current performance is a more realistic measure of staffing. Predictive models cannot consider variables such as other duties assigned to the dispatch staff, technical and software limitations of current dispatch systems, and policies and procedures that affect the dispatcher's ability to process events.

Currently, the Center has approximately eight openings, plus a need to fill three new dispatch call-taking positions being created at the first of the 2020–21 fiscal year. It was noted that the Center does not assign a dispatcher to a specific event when requested from the field. In an 80-agency multi-discipline dispatch center, fire dispatch is less than 10% of the Center's workload. While the law enforcement workload is usually very steady and constant throughout the day, fire events tend to pop up after periods of inactivity and require significant staff resources for a relatively short period of time. It is also a given that a fire in a jurisdiction will involve not only the fire agency, but law and EMS as well.

[27] *National Fire Protection Association, 1221 Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems, 2019 Edition, Chapter 7, Section 7.4.3.*

NFPA 1221: *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems* states that "When requested by the Incident Commander, a telecommunicator shall be dedicated to the incident and relieved of other duties within the communications center."[28] While this is a necessary safety procedure for field personnel, reality may be that if someone is pulled from answering 9-1-1 calls or handling another radio channel, that the safety of the public and other public safety personnel will also be at risk. It is incumbent on the Center to ensure adequate staffing, but that may not include extra staff at any particular time. It is up to Center management to make every effort possible to dedicate a dispatcher to an event when requested.

[28] *National Fire Protection Association, 1221 Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems, 2019 Edition, Chapter 7, Section 7.3.2.*

Appendix H: Development of Response Standards and Targets

There are three main factors the lead to the successful mitigation of emergencies; sufficient numbers of well-trained *personnel,* arriving on reliable and well-equipped *apparatus* appropriate to the task at hand, *quickly enough* to make a positive difference in property preserved or lives saved. The previous sections of this report have laid out the current staffing levels, facilities and equipment, and response performance for Spartanburg County. The following describes the consequences of failing to deliver sufficient personnel and equipment early enough to mitigate the emergency addressed.

Dynamics of Fire in Buildings

Most fires within buildings develop in a predictable fashion unless influenced by highly flammable material. Ignition, or the beginning of a fire, starts the sequence of events. It may take several minutes or even hours from the time of ignition until a flame is visible. This smoldering stage is very dangerous, especially during times when people are sleeping, since large amounts of highly toxic smoke may be generated during this phase.

Once flames do appear, the sequence continues rapidly. Combustible material adjacent to the flame heat and ignite, which in turn heats and ignites other adjacent materials if sufficient oxygen is present. As the objects burn, heated gases accumulate at the ceiling of the room. Some of the gases are flammable and highly toxic.

The spread of the fire from this point continues quickly. Soon the flammable gases at the ceiling as well as other combustible material in the room of origin reach ignition temperature. At that point, an event termed "flashover" occurs; the gases and other material ignite, which in turn ignites everything in the room. Once flashover occurs, damage caused by the fire is significant, and the environment within the room can no longer support human life. Flashover usually occurs about five to eight minutes from the appearance of flames in typically furnished and ventilated buildings. Since flashover has such a dramatic influence on the outcome of a fire event, the goal of any fire agency is to apply water to a fire before flashover occurs.

Although modern codes tend to make fires in newer structures more infrequent, today's energy-efficient construction (designed to hold heat during the winter) also tends to confine the heat of a hostile fire. In addition, research has shown that modern furnishings generally ignite more quickly and burn hotter (due to synthetics). In the 1970s, scientists at the National Institute of Standards and Technology found that after a fire broke out, building occupants had about 17 minutes to escape before being overcome by heat and smoke. Today, that estimate is as short as three minutes.[29] The necessity of effective early warning (smoke alarms), early suppression (fire sprinklers), and firefighters arriving on the scene of a fire in the shortest span of time is more critical now than ever.

[29] *National Institute of Standards and Technology, Performance of Home Smoke Alarms, Analysis of the Response of Several Available Technologies in Residential Fire Settings, Bukowski, Richard, et al.*

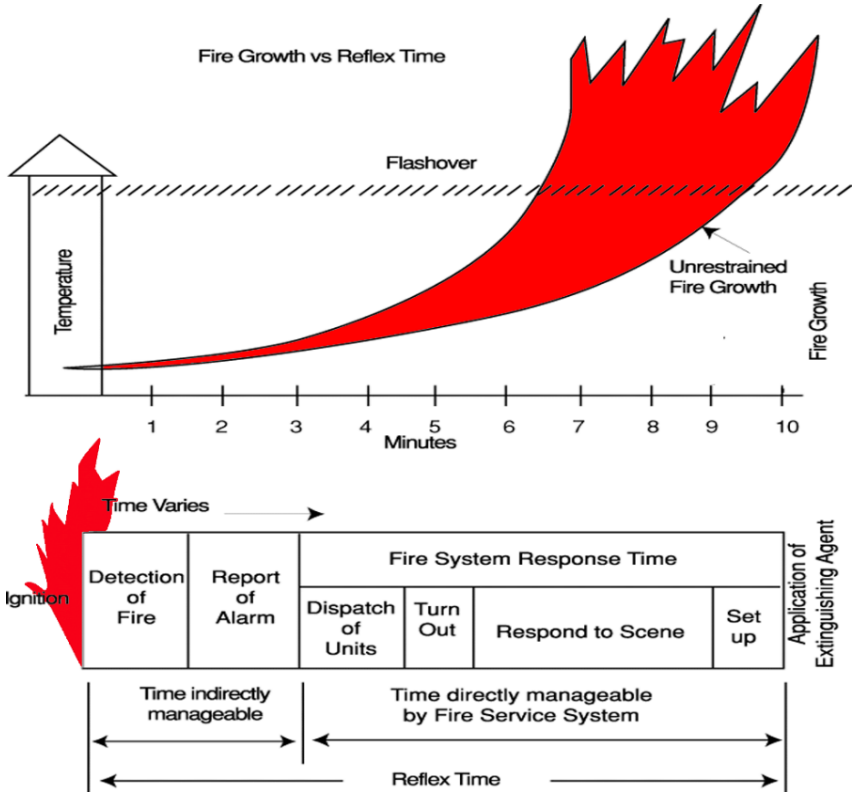
The prompt arrival of at least four personnel is critical for structure fires. Federal regulations (CFR 1910.120) require that personnel entering a building involved in fire must be in groups of two. Further, before personnel can enter a building to extinguish a fire, at least two personnel must be on-scene and assigned to conduct search and rescue in case the fire attack crew becomes trapped. This is referred to as the two-in, two-out rule. However, if it is *known* that victims are trapped inside the building, a rescue attempt can be performed without additional personnel ready to intervene outside the structure. Further, there is no requirement that all four arrive on the same response vehicle. Many fire departments rely on more than one unit arriving to initiate an interior fire attack.

Perhaps as important as preventing flashover is the need to control a fire before it does damage to the structural framing of a building. Materials used to construct buildings today are often less fire-resistive than the heavy structural skeletons of older frame buildings. Roof trusses and floor joists are commonly made with lighter materials that are more easily weakened by the effects of fire. "Light weight" roof trusses fail after five to seven minutes of direct flame impingement. Plywood I-beam joists can fail after as little as three minutes of flame contact. This creates a dangerous environment for firefighters.

In addition, the contents of buildings today have a much greater potential for heat production than in the past. The widespread use of plastics in furnishings and other building contents rapidly accelerate fire spread and increase the amount of water needed to effectively control a fire. All of these factors make the need for early application of water essential to a successful fire outcome.

The next figure illustrates the sequence of events during the growth of a structure fire over time.

Figure 93. Fire Growth vs. Reflex Time



As is apparent by this description of the sequence of events, the application of water in time to prevent flashover is a serious challenge for any fire department. It is critical, though, as studies of historical fire losses can demonstrate.

The National Fire Protection Association found that fires contained to the room of origin (typically extinguished prior to or immediately following flashover) had significantly lower rates of death, injury, and property loss when compared to fires that had an opportunity to spread beyond the room of origin (typically extinguished post-flashover). As evidenced in the following figure, fire losses, casualties, and deaths rise significantly as the extent of fire damage increases.

Figure 94. Fire Extension in Residential Structures, United States, 2011–2015

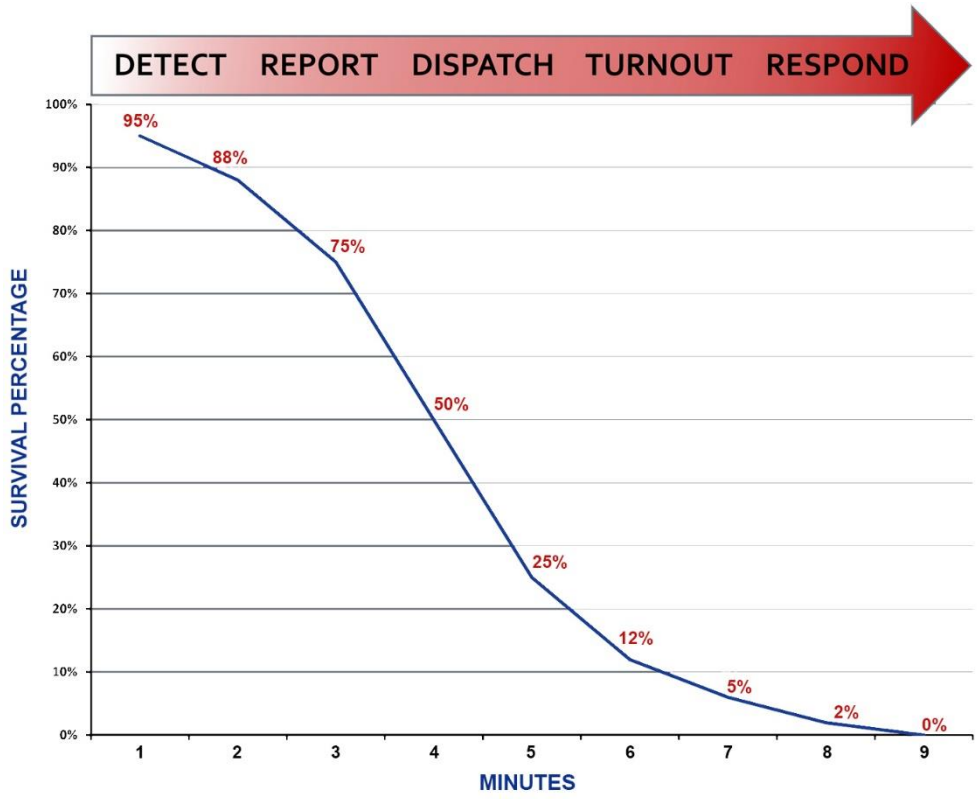
Fire Extension	Rates per 1,000 Fires		
	Civilian Deaths	Civilian Injuries	Average Dollar Loss Per Fire
Confined to room of origin or smaller	1.8	24.8	$4,200
Confined to floor of origin	15.8	81.4	$36,300
Confined to building of origin or larger	24.0	57.6	$67,600

Source: National Fire Protection Association

Emergency Medical Event Sequence

Cardiac arrest is the most significant life-threatening medical event in emergency medicine today. A victim of cardiac arrest has mere minutes in which to receive lifesaving care if there is to be any hope for resuscitation. The American Heart Association (AHA) issued a set of cardiopulmonary resuscitation guidelines designed to streamline emergency procedures for heart attack victims, and to increase the likelihood of survival. The AHA guidelines include goals for the application of cardiac defibrillation to cardiac arrest victims. Cardiac arrest survival chances fall by 7 to 10 percent for every minute between collapse and defibrillation. Consequently, the AHA recommends cardiac defibrillation within five minutes of cardiac arrest. As with fires, the sequence of events that lead to emergency cardiac care can be graphically illustrated, as in the following figure.

Figure 95. Cardiac Arrest Event Sequence



The percentage of opportunity for recovery from cardiac arrest drops quickly as time progresses. The stages of medical response are very similar to the components described for a fire response. Recent research stresses the importance of rapid cardiac defibrillation and administration of certain medications as a means of improving the opportunity for successful resuscitation and survival.

People, Tools, and Time

Time matters a great deal in the achievement of an effective outcome to an emergency event. Time, however, is not the only factor. Delivering sufficient numbers of properly trained, appropriately equipped personnel within the critical time period completes the equation.

For medical emergencies, this can vary based on the nature of the emergency. Many medical emergencies are not time-critical. However, for serious trauma, cardiac arrest, or conditions that may lead to cardiac arrest, a rapid response is essential. Equally critical is delivering enough personnel to the scene to perform all of the concurrent tasks required to deliver quality emergency care. For a cardiac arrest, this can be up to six personnel; two to perform CPR, two to set up and operate advanced medical equipment, one to record the actions taken by emergency care workers, and one to direct patient care. Thus, for a medical emergency, the real test of performance is the time it takes to provide the personnel and equipment needed to deal effectively with the patient's condition, not necessarily the time it takes for the first person to arrive.

Critical Tasks, Risk, and Staffing Performance

The goal of any fire service organization is to provide adequate resources within a period of time to reasonably mitigate an emergency event. However, all emergency events inherently carry their own set of special circumstances and will require varying levels of staffing based upon factors surrounding the incident. Properties with high fire risk often require greater numbers of personnel and apparatus to effectively mitigate the fire emergency. Staffing and deployment decisions should be made with consideration of the level of risk involved. Common risk categories used in the fire service are:

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

Fire emergencies are even more resource critical. Again, the true test of performance is the time it takes to deliver sufficient personnel to initiate the application of water to a fire. This is the only practical method to reverse the continuing internal temperature increases and ultimately prevent flashover. The arrival of one person with a portable radio does not provide fire intervention capability and should not be counted as "arrival" by the fire department. The Management and Staffing Section of this report detailed the NFPA 1710 critical tasks expected to be performed by firefighters concurrently, referred to as the "effective response force" (ERF), and compared that to the number of Spartanburg County firefighters that are initially deployed for structure fires.

Response Time Performance Objectives

To initiate the process of developing performance objectives, several items must be considered. Although the specific information needed to complete this process will vary with each organization, the following items will generally need to be addressed during this process. Historical call data must be collected and analyzed to determine current performance baselines and identify any gaps in data required; response zones must be established based on agreed-upon criteria (i.e., population zones, geographic boundaries, etc.); and benchmarks established as goals for these demand zones.

Current Response Goals

ESCI emphasizes the importance of establishing and regularly monitoring performance metrics for the deployment of resources. These metrics serve as the foundation for determining whether or not the organization is meeting the expectations of the community that it serves. Without regular and consistent performance evaluation, it is impossible to set and achieve goals established to meet community expectations.

Response standards established by the County must originate from the community served to create a balance between what is desired and what can be afforded. Because of this, ESCI cannot establish baseline and benchmark performance metrics for a given organization. However, recommendations based upon the analysis conducted throughout this report may be helpful in serving as a starting point for these discussions with the community served, or may serve as a reevaluation tool for the organization's current standards. Response standards are individual to each organization. Multiple factors such as staffing, financial constraints, size of the service area, and political will influence each department's ability to set achievable goals and objectives for response.

Appendix I: Study Validation

Review of Draft Report

Each of the fire departments within Spartanburg County was given the opportunity to review the current conditions established within the Independent Fire Study during the week of August 31–September 7, 2020. The fire departments each received an email inviting them to pick up and sign for a thumb drive containing a copy of the report. The departments were advised that the purpose of this review was for each fire department to verify that the report accurately depicts current conditions, including but not limited to operations, staffing, apparatus, etc. Fire Departments were further advised that departments that did not return any written comments by this date will be considered as being in agreement with the current conditions represented within the study.

Charleston Independent Fire Study Retreat

ESCI facilitated a two-day retreat in Charleston on Wednesday and Thursday, September 8 and 9, 2020, that the following people attended:

Name	Department	Rank
Warren Ashmore	Landrum	Chief
Troy Beaudoin	Una	Assistant Chief
Philip Caruso	New Prospect	Chief
Michael Comer	Drayton	Chief
Ginny Dupont	Spartanburg County	County Attorney
Richard Farr	Reidville	Deputy Chief
Barry Frost	Duncan	Chief
Scott Garrett	Westview-Fairforest	Chief
Chris Massey	Emergency Services Academy	Director
Mike Flynn	Communications /9-1-1	Director
Scott Miller	Poplar Springs	Chief
Dale Worthy	Pacolet	Chief

The goals for this retreat were as follows:

1. Introduction to the Independent Fire Study Scope of Work and Project Methodology.
2. Section-by-Section Review of the Independent Fire Study, including opportunity for questions and answers.
3. Presentation of the Independent Fire Study Recommendations.
4. Identification of the next steps to move the Independent Study forward.

All four of the goals for the Charleston Retreat were satisfied during the two days of meetings.

Appendix J: Table of Figures