

Montgomery County Fire & Rescue Service



2024-2030 Master Plan

FEBRUARY 27, 2024

Presented and managed by the MCFRS Planning Section.

Resolution No.:	<u>20-414</u>
Introduced:	<u>January 30, 2024</u>
Adopted:	<u>February 27, 2024</u>

**COUNTY COUNCIL
FOR MONTGOMERY COUNTY, MARYLAND**

Lead Sponsor: County Council

SUBJECT: Approval of 2024-2030 Montgomery County Fire & Rescue Service Master Plan

Background

1. County Code Section 21-12 requires the Montgomery County Fire and Rescue Service (MCFRS) to maintain, review, and amend as necessary a Master Fire, Rescue, and Emergency Services Plan.
2. The existing Fire, Rescue, and Emergency Medical 2016-2022 Fire, Rescue, and Emergency Medical Services Master Plan, was adopted by the County Council on June 28, 2016, and extended twice through December 2023.
3. County Code Section 21-11(c) provides that the Master Plan must serve as a guideline for the Executive, Council, and Fire Chief in making decisions regarding the delivery of fire and rescue services. It does not have the force of law. It does not impose any legal obligations on the parties.
4. County Code Section 21(b) states that the Council may approve the Master Plan as proposed or with amendments.
5. County Code Section 21-12 (b) requires the Fire Chief to hold a public hearing on any significant amendments to the plan. The Fire Chief held a public hearing on October 12, 2023.
6. On October 30, 2023, the Public Safety held a briefing on the proposed Master Plan. The Public Safety Committee did not recommend or request any amendments to the Fire, Rescue, Emergency Medical Services, and Community Risk Reduction Plan.
7. On November 14, 2023, the Fire Chief transmitted to the Council the 2024-2030 Montgomery County Fire & Rescue Service Master Plan.
8. On January 30, 2024, the Council introduced the Montgomery County Fire & Rescue Plan.
9. On February 13, 2024, the Council held a public hearing. No testimony was provided.

10. The time frame for the new Master Plan is six years. The Fire Chief determined that a ten-year plan period, as was the case for the first two Master Plans, would be too long given the fast pace of change in the County's growth, demographics, service needs, and other characteristics. In addition, a six-year time frame is aligned with the County's six-year Capital Improvements Plan time frame. The new Master Plan will sunset on December 31, 2030.

Action

The County Council for Montgomery County, Maryland approves the following resolution:

The 2024-2030 Montgomery County Fire & Rescue Services Master plan is approved.

This is a correct copy of Council action.



Sara R. Tenenbaum
Clerk of the Council

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MCFRS Master Plan

2024-2030

Preface

In 1873, the Rockville town commission purchased additional fire equipment and by 1887, waterworks and hydrants were set up in Rockville, making access to water easier. A group of volunteer firefighters was organized and two black citizens, George Meads and Dibby Herbert, used the two hand-drawn hose reels. George Meads, "Chief" of the little volunteer group, alerted volunteers with the shot of a pistol. Rockville had been receiving assistance from the District of Columbia Fire Departments but after a disastrous fire on Montgomery Avenue, the Rockville Volunteer Fire Department was formed." [Montgomery County Historical Society](#)]

Behind each fire station and each piece of apparatus, there is a story of why someone thought that resource was necessary. The perceived need was rooted in a context and in the options available at the time. Once the resource was in place, it became an unquestioned part of the organization. Our context has changed and our ability to use data to describe that context has improved. While it is not prudent to dispense with the old [ways of doing things] wholesale, the time *is* right to update our understanding of context.

Montgomery County, Maryland is a large county. It is diverse in all aspects, including geography, demographics, socioeconomics, and the built environment. There are nearly 1.1 million people within the approximately 500 square miles of land mass, but most of the population is concentrated in a few key areas. Montgomery County's diversity is one of its key assets, and at the same time, also a complicating factor in the ability of the fire/rescue service to provide adequate public safety. Indeed, one of the assumptions of this plan is that we will continue to receive adequate funds to allow for the delivery of quality service to the public through continued operation of existing programs and services and initiation of new programs or services deemed essential.

Our organization is complex. Service is delivered through a combination of career staffing represented by the IAFF Local 1664, volunteers represented by the MCVFRA, civilian employees represented by MCGEO, and unrepresented uniformed and civilian employees. It is no small task to align the interests of each of these organizations in service to the mission. We have historically done so, and must extend that spirit of cooperation, coherence, and alignment into the future space.

The County will continue to grow, its population will age, and the department will face budget constraints. Rather than despairing about this reality, MCFRS has chosen to view this as a challenge and opportunity for innovation. We believe that we can improve what is already a

great service, but in order to do so, we must change the way we think about service provision, and we must change the language we use to talk about the challenges we face.

MCFRS envisions increased demand for services in the future, but we do not believe that demand will necessarily require capital-intensive projects to address. Incident response times are an important metric, but we are looking beyond the single metric of response times towards any number of ways that allow us to continue *adding value into our communities*.

The MCFRS Fire & Rescue Master Plan (hereinafter referred to as the Master Plan, or the plan) represents the earliest stages of movement away from inherently militaristic metaphors (narrow ways of thinking about how we imagine, arrange, and manage ourselves) and toward a new mindset rooted in teamwork, alignment, coherence, and cooperation. We accept that volatility, uncertainty, complexity, and ambiguity of the current and future social construct are real. We endeavor to build new ways of thinking that not only survive in that context, but also leverage those typically destabilizing ideas to build a more resilient department, in service to more resilient communities.

This plan presents a high-level thought process. This is the main plan under which subordinate planning will be considered and developed. The intent of this document is to outline the current state of the department, the current state of the operational environment, and provide a way of thinking about the likely problems that will emerge during the life of the plan.

To ensure adequate public safety, we need to notice, relate, and adapt. To *notice* speaks to building feedback mechanisms that are sensitive enough to warn us of impending change or deviations from the norm. If we don't notice, we can't help. To *relate* codifies the idea that we are not an organization in isolation. To be effective, we must be connected in meaningful ways to our partners in government and to our communities. This connectedness is the root of complexity and simultaneously, the only solution to operating well, despite it. Finally, to *adapt* acknowledges our historical structures as static, hierarchical monoliths focused narrowly on small segments of the County. Our future success requires a total integration of resources.

This plan imagines MCFRS service delivery as a fluid system attempting to equitably distribute value (expressed as adequate public safety). The new model modifies an older, more parochial thinking that considered fire station response areas as the focal point, independent of equity or other measures of value.

To be clear, this redefined approach does not imply that MCFRS has failed to meet the County Council-mandated goal of providing adequate public safety. However, we believe that without a fundamental shift in thinking, our ability to maintain this level of effort will likely diminish.

This advanced model affords new language to describe our contextual reality and approach. While all models have flaws, this fundamental shift in mindset opens the door to innovation and identifying new ways of adding value.

To prepare the organization, we must spend the next few years examining and adjusting how we think and how we can continue to define and deliver value across our network. We have, thanks to the County Executive and County Council, been able to add many new resources over the past two years, including additional transport units and staff for community risk reduction. We need some time to let these changes interact with the environment. Once we have studied the impact of these additional resources, we will be able to articulate additional needs and make valid recommendations.

The current budgetary environment means any plans for growth must be grounded in evidence, not based on spurious assumptions. We want to grow additional *value*. More people, apparatus, and stations are not the only answer. It is going to take a real investment in thinking and experimentation to settle on a way of seeing and being that is most appropriate to facilitate the continued efficacy of this organization. Learning takes time. In this case, it is best not to rush.

We are proud that this plan is firmly grounded in the convictions that **people come first, equity matters, community matters**, and the persistent spirit of **volunteerism matters**. We are proud to offer our communities a new view that positions us to **maximize value for the community, with emphasis on the most vulnerable**.

Who are we?

Introduction to MCFRS

The Montgomery County Fire and Rescue Service (MCFRS) is a combination (career and volunteer) all-hazards department that provides service to the most populous county in the state of Maryland. From the small, community-organized bucket brigades of the 1890's, MCFRS has evolved into a world-class, all-hazards, accredited agency with more than 1250 career personnel and 800 volunteers, supported by more than 100 professional staff and a significant number of volunteer administrative staff. These individuals come together to provide high quality emergency medical, fire suppression, heavy and technical rescue, arson and explosive investigations, hazardous materials mitigation, and community risk reduction services.

The legitimacy of MCFRS, including the organizational structure, administration, authority and responsibilities, legal considerations, and service delivery, is established in Montgomery County Code Chapters 2, 21, and 22. Montgomery County Code Chapters 2, 21, and 22 address the organization and regulations of fire and rescue services in the County.

Chapter 2 ([§2-39A](#)), amended by County Council [Bill 36-03](#) in 2004, establishes the structure of the County's fire and rescue service as a public-private partnership that comprises the Montgomery County Fire and Rescue Service (MCFRS), the Fire and Rescue Commission (now called the Fire and Emergency Services Commission, or FESC), and local fire and rescue departments (LFRD).

[Chapter 21](#) presents the legal framework of the fire department and sets the minimum standards and regulations for the operation of the Fire & Rescue Service. The County Council's intent was to ensure *adequate public safety, health and welfare through an integrated fire, rescue, and emergency medical services program that is highly competent, highly trained, efficiently delivered, equitably administered, and is provided by County, local fire and rescue department, and volunteer personnel*¹.

[Chapter 22](#) defines all the Montgomery County fire safety code regulations including building and fire codes; fire protection equipment; fire access and water supply; and licenses and permits, including those for hazardous materials.

Statutory Requirement for a Master Plan

[Chapter 21, Section 12](#) contains the statutory requirement for the Fire Chief to draft a master fire, rescue, and emergency medical services plan to serve as a guideline for the County Executive, County Council, and the Fire Chief in making decisions regarding delivery of fire

¹ Montgomery County Code, Chapter 21. Retrieved from <https://www.montgomerycountymd.gov/frs-ql/resources/files/swsj/policyprocedures/ops/01-01-chapter21.pdf>

and rescue services. County Code §21-12 defines the minimum requirements of the plan and provides a process for amendments to the plan.

It is within this framework that policies, procedures, and plans that apply to all MCFRS operations, administration, and personnel are developed, and from which the Fire Chief leads and manages the department.

Organizational Structure

The Fire-Rescue Service in Montgomery County is composed of several organizations working together with the common goal of providing quality emergency medical, fire, and rescue services to our communities. There are 19 independent, local [volunteer] fire-rescue departments (LFRDs) in Montgomery County. These LFRDs include Bethesda, Bethesda-Chevy Chase, Burtonsville, Cabin John Park, Chevy Chase, Damascus, Gaithersburg-Washington Grove, Germantown, Glen Echo, Hillandale, Hyattstown, Kensington, Laytonsville, Rockville, Sandy Spring, Silver Spring, Takoma Park, Upper Montgomery County, and Wheaton. The County Fire Chief is the uniformed department head of the MCFRS and has full authority over all medical, fire, and rescue services, including those provided by the LFRDs.

There have been minor changes to the organizational structure of the department over the last eight years. It still consists of the Office of the Fire Chief and five divisions: Operations, Volunteer Services, Support Services, Human Resources, and Fiscal Management. The Divisions are described below. The department's organizational chart can be found in [Appendix A](#).

Office of the Fire Chief

The Fire Chief has the ultimate responsibility for the overall management, direction, planning and coordination of all MCFRS programs and operations. The Fire Chief is responsible for implementing County laws, regulations, and policies to effectively administer the MCFRS.

In 2019, the Community Risk Reduction (CRR) Section was realigned from the Division of Volunteer Services (formerly known as the Division of Volunteer and Community Services) to the Office of the Fire Chief, to demonstrate the department's commitment to the process of risk reduction. In addition to CRR, the sections that comprise the OFC provide the following administrative and support activities:

- Promotes critical fire and life safety initiatives throughout the County to prevent injuries and deaths.
- Promulgates fire-rescue service policy, procedures, and General Orders and monitors legislative actions at local, state, and federal levels.
- Investigates complaints and serious violations of the personnel regulations and department policy.

- Oversees background investigations of applicants for firefighter-rescuer positions, as well as civilian positions.
- Conducts planning and performance management and oversees the accreditation process to support organizational improvement.
- Coordinates information requests by the media, community members, and other agencies and organizations, and management of the department's social media platforms.

Division of Operations

The Division of Operations is responsible for the day-to-day delivery of critical emergency services, including emergency medical services (EMS), fire suppression, rescue (extrication, water-ice rescue, and technical rescue), hazardous materials response, bomb squad services, and fire /explosives investigation services. This is the department's largest division, with 97% of the career uniformed positions.

The Division of Operations is headed by a Division Chief, a merit position reporting directly to the Fire Chief. The Operations Chief must meet the requirements of chief officer adopted under County Code, Chapter 21, Section 21-8. The Operations Chief has operational authority over fire, rescue, EMS, special operations, and communications as assigned by the Fire Chief. The Operations Chief, together with the Chief of the Division of Volunteer Services, promotes the integration of services provided by career and volunteer firefighter-rescuers and EMS providers.

The Division of Operations comprises the following sections, each under the authority of an Assistant Chief:

Emergency Medical and Integrated Healthcare Services (EMIHS). Renamed in 2019, EMIHS provides guidance and oversight for all pre-hospital care services provided by MCFRS. The Section performs and oversees EMS quality assurance, quality improvement, and EMS operational evaluation, liaison, and planning functions. The Medical Director (previously organized within the OFC), a board-certified EMS physician and a position mandated by the Code of Maryland (COMAR), Title 30, oversees all aspects of the MCFRS EMS program and provides credentialing to all EMS providers in the MCFRS. The Mobile Integrated Health program was established in 2017 to address the growing disparity between the volume of emergency 911 calls and the limited availability of EMS resources by working with frequent callers to meet their unfulfilled chronic needs.

Special Operations Section. This section provides specialized training, planning, technical support, and response in the areas of hazardous materials, technical rescue, water-ice rescue, passenger rail support, bomb/explosive incidents, fire and explosives investigations, and interoperable communications resources. The Special Operations Section also manages MCFRS efforts to support planned or special events, including

professional golf tournaments, the County Fair, and other mass gatherings. In addition, this section manages MCFRS coordination with the Montgomery County Police Emergency Services Unit (ESU) during ESU deployments and manages the staffing of the County Emergency Operations Center (EOC) fire desk when activated.

Communications Section. This section is responsible for quickly dispatching the proper response assignment, ensuring fire-rescue response personnel have adequate situational awareness of the dispatched event, and managing all response communications and technologies. Although the Emergency Communications Center (ECC) falls under the authority of the Montgomery County Police Department (MCPD), and they are supposed to assume full responsibility for all call taking and dispatching, delays in the transition necessitate MCFRS personnel continue to be responsible for the dispatch functions until at least 2025.

The Duty Operations Chiefs. These Assistant Chiefs are assigned to each 24-hour shift and responsible for overseeing delivery of emergency services during that period.

Division of Volunteer Services

This division provides support and volunteer advocacy, oversight, mediation, and enforcement of MCFRS policies, coordination and technical assistance, incentives, and administrative services to support the LFRDs. The division promotes consistent and balanced integration of the activities of volunteer and career firefighters and rescuers; promotes recruitment and retention of volunteers, assists LFRDs in training, risk management, formulation, and standardization of LFRD/MCFRS business plans, use and maintenance of fire and rescue apparatus, budget and grant preparation and administration, and formulating department-wide policy. The program makes recommendations to the Fire Chief, monitors legislative and regulatory actions involving volunteer activities, and informs the affected groups. This Division also administers the Length of Service Awards Program (LOSAP).

The Division Chief is a non-merit position reporting directly to the Fire Chief. This individual must meet the requirements of chief officer adopted under County Code, Section 21-8 and must have experience as a chief, deputy chief, or assistant chief in a LFRD in the County. The Division Chief has operational authority over fire, rescue, and EMS activities of the MCFRS as assigned by the Fire Chief. The Division Chief also serves as the highest-ranking volunteer officer in the County and coordinates the operations and administration of volunteer personnel and the LFRDs.

Volunteers serve their communities as firefighter/rescuer members, EMS-only members, and/or as administrative members. Those certified as firefighter/rescuers who appear on the current Integrated Emergency Command Structure (IECS) list are eligible to respond to fire, rescue, and EMS incidents and participate in emergency operations. Those having EMT or paramedic credentials, but not firefighter/rescuer certifications, are eligible to take part in EMS operations only. Administrative-only members are not authorized to participate operationally

but may perform any non-emergency administrative task or activity benefiting the LFRD and community, such as serving on the LFRD Board of Directors, LFRD committees, and/or participating in fund raising, fire safety and risk reduction educational activities, and other volunteer activities at the local or state level. Some LFRD members serve in both operational and administrative capacities.

The Community Emergency Response Team (CERT) is a group of volunteers drawn from all over the County. They provide a wide range of pre- and post-incident functions. The CERT team falls under the purview of this division but can also be activated for response by the Office of Emergency Management and Homeland Security. In recent years, the CERT team has expanded their participation by providing rehabilitation services on extremely hot weather days and assisting OEMHS on incidents where large numbers of people are displaced from their residences.

Division of Support Services

The Division Chief of Support Services is a merit position reporting directly to the Fire Chief. This division consists of the following sections:

Capital Improvements Program (CIP). This section, led by a civilian manager, is responsible for planning fire-rescue facilities that are designed, constructed, and maintained to enable MCFRS to meet its mission. This includes renovation of existing facilities, as well as construction of new facilities. In FY24, the Department of General Services (DGS) assumed responsibility for facility maintenance of all MCFRS worksites, regardless of ownership, while MCFRS continues to manage programmatic items.

Technology Services. This section, overseen by an Assistant Chief, provides timely and effective information technology (IT) and communications systems service and support, tailored to the department's business needs, to ensure the department is properly equipped to accomplish its core mission. Technology Services is responsible for planning, development, implementation, and ongoing support of all MCFRS technology needs, in accordance with the requirements of the County's Technology and Enterprise Business Solutions (TEBS, formerly known as the Department of Technology Services). Technology Services' personnel manage and oversee the MCFRS radio system; assist with computer-aided dispatch; maintain desktops, laptops, and other hardware used by MCFRS personnel, as well as the software and applications that are used (e.g., Fire App, the department's NFIRS-compliant record management system); and manage the MCFRS data warehouse. Website design and maintenance and technology training are other responsibilities that fall within this section.

Safety & Supply. In 2021, MCFRS realigned the Safety Section from within the Division of Human Resources to the Division of Support Services, merging it with Logistics to create the Safety and Supply Section, led by an Assistant Chief. This

allowed the department to streamline the oversight of several processes, such as the issuance and distribution of firefighting turnout gear. Several units manage the logistics of the uniform and personal protective equipment needs of MCFRS career and volunteer personnel and administer and oversee EMS logistics. Safety continues to ensure the occupational safety of personnel through management, accountability, and enforcement of safety policies and procedures in all aspects of fire-rescue activities. The program develops and promotes proactive prevention initiatives to reduce injuries to personnel and damage to property by engaging in root cause analysis and monitoring performance.

Fleet. This section is responsible for the design, specification, purchase, and maintenance of MCFRS apparatus and vehicles, and related tools and associated equipment. More than 250 specialized emergency vehicles are inspected and maintained at the Central Maintenance Facility. Oversight of ladder, pump, and hose testing is also provided by this section.

Division of Human Resources

The Division Chief of Human Resources is a merit position reporting directly to the Fire Chief. The sections comprising the Division of Human Resources include:

Administrative Services. This section is responsible for several personnel management functions, including recruitment and labor relations.

Health & Wellness. The health and wellness program includes medical, mental, and behavioral health components. The Fire-Rescue Occupational Medical Section (FROMS) provides entry level and annual physicals, injury care, return to work and fitness for duty exams, and follow-up evaluations as necessary. MCFRS personnel can receive clinical services through the mental health or Critical Incident Stress Management (CISM) teams.

Training. The Fire and Rescue Training Academy is responsible for the development and delivery of all fire, rescue, and emergency medical training for uniformed fire-rescue personnel. The Training Academy is a triple-accredited institution that provides entry- and advanced levels of training, education, and certification. All training programs comply with applicable county, state, and federal requirements. The training is conducted to ensure that each firefighter/rescuer has the necessary skills, competencies, and practical experiences required to effectively perform the duties of the position.

Division of Fiscal Management

The Division of Fiscal Management is headed by a civilian manager – a merit position reporting directly to the Fire Chief. The Division of Fiscal Management is responsible for preparation and management of the MCFRS operating budget and capital improvements

program (CIP) budget; management and oversight of the EMS Transport reimbursement program; procurement of goods and services required by the department; grant application and administration; and it functions as a liaison with the County Council's Office of Legislative Oversight (OLO).

Fire and Emergency Services Commission

The Fire and Emergency Services Commission (FESC) is a stand-alone advisory body within the Executive Branch of the County Government. The FESC is composed of seven voting members appointed by the County Executive and confirmed by the County Council. The membership comprises two career MCFRS employees, two members of local fire-rescue departments (LFRDs), and three public members (i.e., citizens having no personal, family, or business connection with any County volunteer or career fire-rescue organization).

In accordance with County Code, Section 21-2², the FESC must recommend how the County can achieve and maintain effective, efficient, and equitable fire, rescue, and emergency medical services and improve the policy, planning, and regulatory framework for all fire, rescue, and emergency medical services operations. In addition, the Commission may:

- (A) advise the Fire Chief, County Executive, and County Council on any matter relating to fire, rescue and emergency medical services, and review the performance of the County Fire and Rescue Service and any action taken or policy adopted by the Service;
- (B) advise the Chief, Executive, and Council on County-wide policies, standards, procedures, plans, and programs that should apply to all fire, rescue, and emergency services operations;
- (C) review and make recommendations regarding the master plan for fire, rescue, and emergency medical services as provided in Section 21-12;
- (D) recommend and comment on legislation, regulations, and policies that apply to or affect the Fire and Rescue Service;
- (E) review and recommend any appropriate changes in communications and dispatch procedures for emergency communications centers;
- (F) recommend guidelines for curriculum and programs of the Public Safety Training Academy and other training programs for fire and emergency services employees and volunteers;
- (G) recommend to the Chief, Executive, and Council a benefits program to provide financial protection for volunteers and their families if a volunteer becomes injured, disabled, or dies in the line of duty;
- H) after consulting the LFRD representative, recommend to the Chief, Executive, and Council policies and programs to recruit and retain volunteers; and
- (I) promote coordination with other County-wide, regional, state, and national emergency management agencies and activities.

² Montgomery County Code, Section 21-2. Fire and Emergency Services Commission. Retrieved from https://codelibrary.amlegal.com/codes/montgomerycounty/latest/montgomeryco_md/0-0-0-129941

The FESC must review and may approve or disapprove any Fire and Rescue Service policy or regulation proposed by the Fire Chief, or any regulation that may be issued by the County Executive under this Chapter.

Labor Organizations

IAFF Local 1664

The International Association of Fire Fighters (IAFF) Local 1664 is the sole and exclusive bargaining agent for uniformed personnel in the Montgomery County Fire and Rescue Service who are classified as Fire Fighter-Rescuer II and III, Master Fire Fighter-Rescuer, Fire/Rescue Lieutenant, and Fire/Rescue Captain and who are associated with fire suppression, rescue, emergency medical services, special operations, fire and explosive investigations, fire protection and prevention, communications, and/or training. Approximately 96% of all career firefighter-rescuers are IAFF Local 1664 members and are covered under the IAFF Local 1664 Collective Bargaining Agreement (CBA). The other 4% of career firefighters – those at the rank of Battalion Chief and above comprising MCFRS management - are unrepresented and therefore not covered under the CBA.

MCVFRA

The Montgomery County Volunteer Fire-Rescue Association (MCVFRA) has been designated as the “LFRD representative” in accordance with provisions of Chapter 21, Section 6, of the Montgomery County Code. In this role, the MCVFRA serves as the LFRDs’ exclusive representative for purpose of negotiating with the Fire Chief. The Fire Chief must consult with the MCVFRA on all major policy changes. LFRD members, numbering about 2,700 in 2023, including life members and all members receiving LOSAP benefits, are covered under the MCVFRA Directly Negotiated Agreement.

MCGEO

A large percentage of the 110 non-uniformed (“civilian”) Montgomery County employees are members of the United Food and Commercial Workers (UFCW) Local 1994 - Municipal and County Government Employee Organization (MCGEO) and are represented by MCGEO in the collective bargaining process. Almost 60% of civilian employees of MCFRS - those holding non-management positions - are represented by MCGEO and covered by the MCGEO Labor Agreement. The remaining civilian MCFRS employees, including managers, are unrepresented.

Resources

Career Personnel

The career staff of the MCFRS is composed of uniformed and professional (non-uniformed) personnel. The ratio of uniformed to professional staff is about eleven to one.

The uniformed career component of the MCFRS is composed of 1164 personnel³. Nearly 90% of the uniformed career staff are assigned to fire-rescue stations. The remaining uniformed career staff are assigned to other work sites, including Public Safety Headquarters, the Emergency Communications Center, Public Safety Training Academy, Scheduling Office, Fire-Rescue Occupational Medical Section, and Public Safety Logistics.

Most of the uniformed career force assigned to fire-rescue stations work a rotating 24-hour shift with 48 hours off. There are three shifts – A, B and C, each led by an Assistant Chief designated as the Duty Operations Chief. The remainder of the uniformed career force assigned to stations works day-only schedules at stations that are co-staffed by volunteers (primarily during evenings and weekends). Most uniformed career personnel assigned to work sites other than fire-rescue stations work daytime only schedules, but some work 24-hour shifts or rotating shifts covering day and night (i.e., personnel assigned to ECC, FEI, Safety Office, Scheduling Office).

Uniformed career personnel operate under a hierarchical structure that encompasses the ranks of Chief, Division Chief, Assistant Chief, Battalion Chief, Captain, Lieutenant, Master Firefighter, and Firefighter. While all uniformed career personnel must be certified Emergency Medical Technicians (EMT), others have attained the Cardiac Rescue Technician-Intermediate (CRT-I) or Paramedic (NRP) credentials. Many uniformed career personnel have received special training and certifications to serve in specialty roles with MCFRS special operations teams (i.e., hazmat, water-ice rescue, technical rescue, bomb squad). Others have attained instructor certifications that allow them to teach classes at the Fire-Rescue Training Academy or Maryland Fire & Rescue Institute.

Non-uniformed, professional personnel comprise approximately eight percent of the career MCFRS staff. These employees provide a broad spectrum of professional, technical, and administrative services to the MCFRS, including fiscal management, planning, policy development, performance assessment, human resources management and administration, public information/education, information technology, communications, geographic information system services, CIP and facility management, fleet maintenance, logistics, and other administrative services and support. Some of the civilian staff also serve as volunteer members of LFRDs and/or have had previous experience as career or volunteer firefighter-rescuers.

Volunteer Personnel

There are approximately 2700 volunteer members of the 19 independent LFRDs in Montgomery County. Approximately 800 volunteers are IECS-certified firefighters, emergency medical technicians, and/or paramedics. The remainder of LFRD volunteers are administrative members; they serve on the Board of Directors, staff canteens, assist with public outreach activities, support fundraising activities, and/or perform other administrative

³ FY24 authorized career positions = 1253. There were 89 vacancies at the time this was drafted (6/30/2023).

duties. Some LFRD members serve in both administrative and operational capacities, and some volunteers also serve in other area fire departments, or have served in Montgomery County, as career firefighters /rescuers.

Operational volunteer personnel participate in training at the County's Fire-Rescue Training Academy, as well as at the Maryland Fire-Rescue Institute and other fire-rescue service training facilities. Some classes are offered at night and on weekends to accommodate volunteers who work during the day/week; online training is also available for certain classes or portions thereof. Many LFRDs offer supplemental training to their operational volunteers directly at their stations.

Volunteers operate under the same hierarchical structure as their career counterparts, in accordance with MCFRS policies. Volunteers can attain the ranks of Chief, Deputy Chief, Assistant Chief, Battalion Chief, Captain, Lieutenant, Master Firefighter, and Firefighter. While all operational volunteers must be credentialed Emergency Medical Technicians (EMTs), some have attained additional credentials as paramedics or Cardiac Rescue Technicians-Intermediate. Operational volunteers who have attained specialized training and certifications are eligible to serve in special operations roles with the MCFRS special operations teams. Others have attained instructor certifications that allow them to teach classes at the Fire-Rescue Training Academy, Maryland Fire and Rescue Institute, or other training facilities. And some who have attained therapist or other mental health credentials assist with the department's mental health needs and teams.

The career and volunteer components of the combined Fire and Rescue Service work in an Integrated Emergency Command Structure (IECS) that defines the authority and responsibility for all members of the Fire and Rescue Service. Career employees comprise approximately 85% of the overall staffing of emergency apparatus and about 15% is provided by volunteers.

As FY24 begins, the minimum number of apparatus riding positions to fill countywide, across 37 fire-rescue stations, is 306. These positions are staffed by 297 career personnel and 9 volunteer personnel during the daytime, Monday through Friday. The staffing level on nights and weekends consists of 261 career personnel and 45 volunteer personnel to maintain the minimum countywide staffing level. An on-duty scheduler and Duty Operations Chief ensure that career personnel with the appropriate skills (e.g., officers, apparatus drivers, paramedics, hazmat technicians, rescue technicians, etc.) are always available to meet the minimum staffing complement. In addition to the riding positions, MCFRS must staff eight ECC positions and two fire and explosives investigators daily.

Facilities

MCFRS provides services from 37 fire and rescue stations and 10 other facilities including Public Safety Headquarters, the Fire-Rescue Training Academy, the Central Maintenance Facility, the Community Services Building, the Emergency Communications Center, the

alternate Emergency Communications Center, the Fire and Explosives Investigations annex, the Mental Health Suite, the Fire/Rescue Occupational Medical Section, and the Dover Road Warehouse ([see Appendix B](#)).

Although the 2016-22 Master Plan outlined a need for four new fire/rescue stations, fiscal constraints have limited the department in this capacity, and planners have been unable to identify suitable locations. Moreover, many of our existing stations are aged, and becoming physically and functionally obsolete. Financial resources will be needed to address these updates as they are identified in the capital improvements program (CIP) process.

Apparatus

The primary fleet of response apparatus includes 35 engines, 15 aerial units (ladder trucks or aerial towers), six heavy rescue squads, 11 Advanced Life Support (ALS) ambulances (i.e., medic units), and 30 Basic Life Support (BLS) ambulances. An additional four reserve ambulances are currently used for frontline deployment. MCFRS achieves a level of surge capacity through additional ready reserve units that can be placed in service with available volunteer or recalled career personnel to increase the overall response capability during times of special need (e.g., pandemics, severe weather events, special events, etc.). A complement of other apparatus, including brush engines/trucks, hazmat units, boats, utility vehicles, and mobile command units, are available to support emergency incidents as needed.

Planning for apparatus replacement occurs within the confines of the CIP budget. MCFRS considers age and mileage of apparatus for replacement and has been successful in maintaining a robust fleet to support service in the County. It will be crucial for the department to continue monitoring zoning and transportation infrastructure, both in support of the County's Vision Zero initiative and as development in Montgomery County becomes denser and pedestrian and bicyclist-friendly improvements are made to street networks.

In 2019, a multi-agency effort between the Maryland-National Capital Park and Planning Commission (M-NCPPC), the Department of Permitting Services (DPS), the Department of Transportation (DOT), and MCFRS resulted in the creation of the [Fire Department Access Performance Based Design Guide](#), a resource to assist engineers, developers, architects, planners, and other public agencies in designing communities that are accessible by MCFRS, while promoting safe intersections and streets that support people who walk, bike, and use transit. Around the same time, the Planning Board began working on the first-ever Pedestrian Master Plan to create safer, more comfortable pedestrian experiences. The Pedestrian Master Plan, still in draft form, contains the following recommendation: *(P-1b) Develop a strategy to purchase emergency vehicles that can navigate narrower streets and tighter curb radii while maintaining appropriate performance standards.* MCFRS acknowledges and respects this recommendation. Over the years, MCFRS has purchased engines with a shorter wheelbase; the length and width have also decreased. In fact, the Pierce Enforcer is comparable in size to the San Francisco pumpers, often benchmarked for compactness:

	Length	Width	Wheelbase	Height	Tank Capacity
2019 Pierce Enforcer	29'11"	96"	175"	9'5"	750
San Francisco pumper	28'2"	96"	169"	9'5"	500

Similarly, the size of MCFRS aerial apparatus has declined slightly; moreover, most of these large apparatuses are either tillers (highly maneuverable) or equipped with all-steer (i.e., the rear wheels assist with maneuvering). The MCFRS Fleet Section Chief and Apparatus Selection Committee will continue to monitor engineering and design improvements of fire apparatus to ensure the specifications of the MCFRS fleet serve the needs of the department, and align with broader County safety, zoning, and planning efforts. Likewise, the department is mindful of the County's climate action plan and is committed to reducing emissions. Electric vehicle (EV) technology for fire apparatus is still relatively new and not yet widespread, so there are many considerations on this front. Moreover, planning efforts will also need to consider station improvements to accommodate charging and perhaps the weight of electric apparatus. It is possible that planning for such improvements will occur over the life of this plan.

Partnerships

MCFRS relies on and coordinates with several local, state, and federal government agency partners, as well as other public and private organizations, to provide services and receive support in various ways. This plan hinges on our ability to leverage these and identify other key relationships and use them to build synergy to pump value back into the community.

Administrative/Support Partners

MCFRS relies on and coordinates with several County departments for administrative support of various functions required to keep the department running efficiently. These partners include:

- Montgomery County Office of Management & Budget (OMB)
- Montgomery County Office of Procurement (PRO)
- Montgomery County Department of Finance
- Montgomery County Office of Human Resources (OHR)
- Montgomery County Office of Labor Relations (OLR)
- Montgomery County Office of the County Attorney (OCA)
- Montgomery County Technology and Enterprise Business Solutions (TEBS)
- Montgomery County Department of General Services (DGS)
- Montgomery County Department of Health & Human Services (DHHS)
- Office of Racial Equity and Social Justice (ORESJ)

Response Partners

The high profile and interconnectedness of the National Capital Region has created a system of tightly knit public safety agencies, including police, fire-rescue departments, emergency management, health departments, and other agencies and organizations that support incident/disaster response and recovery operations. Over the years, local jurisdictions have established relationships and enacted mutual aid agreements that allow for seamless operations across jurisdictional boundaries. Mutual aid agreements are of two types – those that provide automatic aid and those that provide aid when requested, but not automatically.

Automatic agreements allow one jurisdiction to quickly obtain resources from another mutual aid jurisdiction without the need to obtain authorization from the other jurisdiction's command staff. This type of mutual aid agreement greatly expedites the dispatch and arrival of needed resources. The other type of agreement requires the jurisdiction in need of resources to contact the other jurisdiction each time assistance is needed. Specific resources must be requested, and the designated decision-maker has discretion as to whether the request will be granted under the terms of the agreement.

MCFRS has automatic mutual aid agreements with the following bordering counties' fire/EMS departments. The agreements with Prince George's, Loudoun, and Fairfax are covered under the MWCOG regional resource sharing agreement.

- Prince George's County, Maryland
- Howard County, Maryland
- Carroll County, Maryland
- Frederick County, Maryland
- Loudoun County, Virginia
- Fairfax County, Virginia

The MWCOG agreement also covers MCFRS and the District of Columbia (D.C.) Fire & EMS, yet mutual aid between both is not automatic. Specific resources must be requested, when needed, and permission given; rarely does either department deny a request for assistance.

MCFRS also has automatic mutual aid agreements with the following federal facilities located in Montgomery County:

- Walter Reed National Military Medical Center, Bethesda: On-site Fire Station 50 operates an engine and medic unit.
- National Institutes of Health, Bethesda: On-site Fire Station #51 operates an engine, aerial unit, ambulance, and hazardous materials unit.
- Naval Surface Warfare Center, Carderock: On-site Fire Station #52 operates an engine.

- National Institutes of Standards and Technology, Gaithersburg: On-site Fire Station #53 operates an engine, ambulance, brush truck and hazmat unit.
- Ft. Detrick Army Garrison, Silver Spring: On-site Fire Station #54 operates an engine and hazmat unit.

MCFRS' Fire & Explosives Investigations Unit may receive and provide support to the Office of the State Fire Marshal, the Federal Bureau of Investigation (FBI), and the Bureau of Alcohol, Tobacco, and Firearms (ATF).

Within the County, the Office of Emergency Management & Homeland Security (OEMHS) plans, prevents, prepares, and protects against all major hazards that may threaten, harm, disrupt, or destroy communities, and manages and coordinates the County's unified response, mitigation, and recovery from such disasters or emergencies should they occur. OEMHS coordinates the development of the County's Hazard Mitigation Plan and Continuity of Operations (COOP) plan. The OEMHS Director serves as the Disaster Manager for the Emergency Management Group and chairs the Local Emergency Planning Council.

Through the Emergency Management Group, and through activation exercises of the County's emergency operations center (EOC), MCFRS can coordinate and plan response/recovery operations with several partners, including, but not limited to:

- DHHS
- DPS
- TEBS
- OCA
- OMB
- Department of Finance
- Montgomery County Police Department (MCPD)
- Montgomery County Department of Transportation (MCDOT)
- Montgomery County Department of Environmental Protection (DEP)
- Montgomery County Department of Housing and Community Affairs (DHCA)
- Montgomery County Public Schools (MCPS)
- Municipal partners of Gaithersburg, Rockville, and Takoma Park
- Regional Services Centers
- American Red Cross – Montgomery County chapter
- Hospitals, including Adventist Healthcare White Oak Medical Center, Adventist Healthcare Shady Grove Medical Center, Suburban Hospital, Holy Cross Silver Spring, Holy Cross Germantown, MedStar Montgomery Medical Center, Washington Adventist Hospital, and the Germantown Emergency Center.
- Potomac Electric Power Company (PEPCO) and other electric/utility providers
- Washington Suburban Sanitary Commission (WSSC)
- City of Rockville Public Works – Water System

- Maryland Department of Emergency Management (MDEM)
- Federal Emergency Management Agency (FEMA)

At a regional level, the Metropolitan Washington Council of Governments coordinates planning activities among the 24 jurisdictions within the National Capital Region. MCFRS is an active partner in the Fire Chiefs Committee and the multitude of technical subcommittees, including Communications, EMS, HazMat, Technical Rescue, Health and Safety, and Rail Safety. This committee structure provides a forum for regional response planning and collaboration among the local fire-rescue departments, and on a broader scale, with other public safety partners through the MWCOG's Emergency Preparedness Council and Human Services and Public Safety Policy Committee.

Planning Partners

In addition to emergency response planning, it is important that MCFRS monitors planning at a broader County level to ensure that recommendations in any of the more than 60 master, sector, and functional plans developed by the Maryland-National Capital Park and Planning Commission (M-NCPPC), or municipal planning boards, do not create conflict or inflict a hardship on the department. This has historically enabled MCFRS' facility and resource needs to be documented. These plans create a comprehensive view of land use trends and future development; address historic preservation, housing, and environmental issues; and make recommendations that impact zoning, transportation, education, public amenities, and public safety.

Planning coordination and integration at this level is relatively new; only within the last 30 years have MCFRS and M-NCPPC collaborated to ensure that fire-rescue needs were considered as community master and sector plans were created and updated. The relationship between the agencies has strengthened in the last decade.

In 2019, M-NCPPC initiated preparations to update Montgomery County's General Plan and issued the first draft of [Thrive Montgomery 2050](#) in 2020. The Office of the County Executive coordinated a countywide review of the draft plan; MCFRS, along with colleagues from OMB, DEP, DGS, DOT, MCPD, and DHCA, participated in this review for two years, incorporating and deconflicting the final product with ongoing departmental planning efforts.

Prevention and Education Partners

MCFRS has an obligation to prepare and educate our communities about the numerous hazards they may encounter, specifically, fire and other life safety concerns, including car seat safety/installation, fall prevention, and drowning. The department relies on numerous internal (County government) and external (public and private) partners to help us meet this responsibility. With a growing list of more than 350 partners, MCFRS recognizes the following champions in this effort:

- Pepco
- Lowes
- Safe Kids
- Meals on Wheels
- Fitzgerald Auto Mall
- Rebuilding Together
- American Red Cross
- Montgomery County Department of Recreation
- MCPS
- MCPD
- DPS FCC
- DHHS
- Vision Zero

MCFRS will continue to nourish and leverage relationships with these partners to improve planning, training and education, and response and recovery efforts, and will seek to create new, innovative relationships to address the challenges of the future.

Montgomery County's Vision & Priority Outcomes

The County Executive has established a clear vision: a more equitable and inclusive Montgomery County. The work of MCFRS must be guided by this vision to the extent that we have a supporting role and can accelerate progress, while focusing on the seven priority outcomes. The priority outcomes represent the desired end state for the County and include:

- Thriving youth and families
- A growing economy
- A greener county
- Easier commutes
- An affordable and welcoming county
- Safe neighborhoods
- Effective, sustainable government

Equity

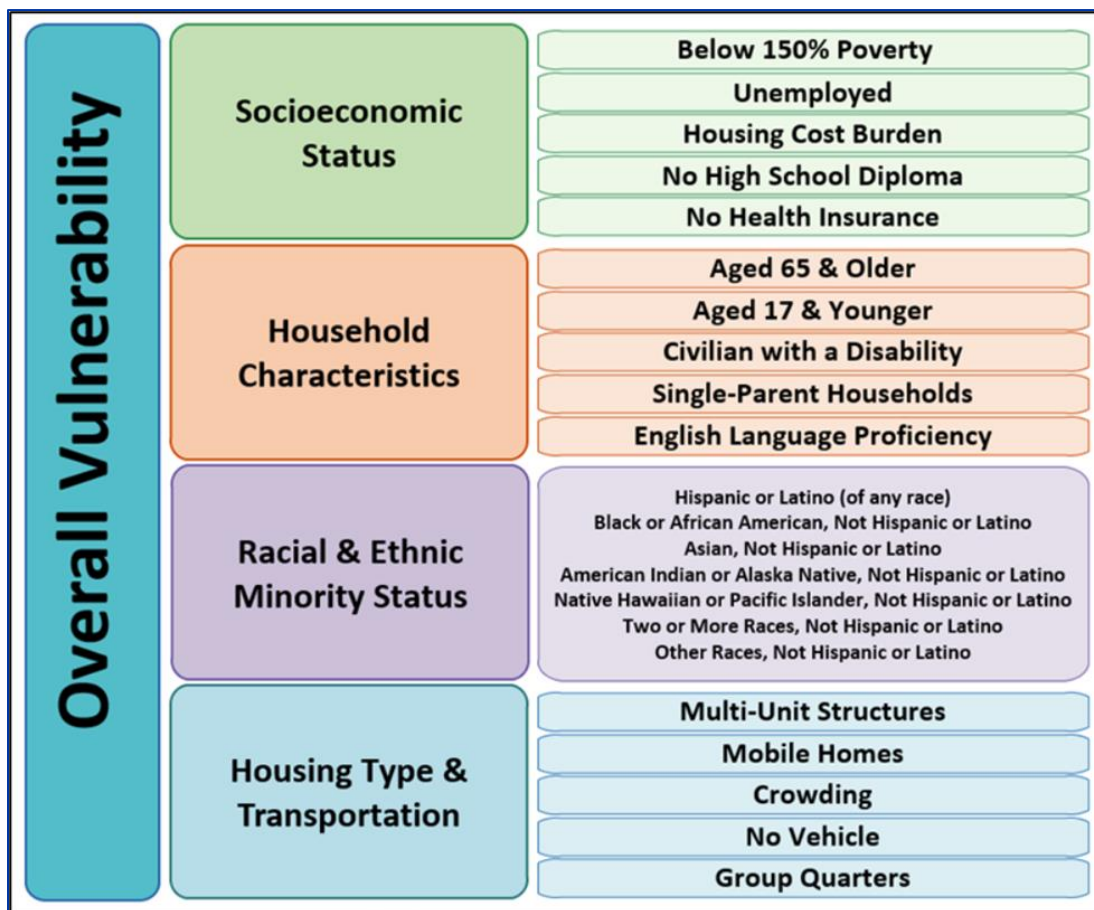
In 2019, the Montgomery County Executive and County Council established racial equity as a central guiding principle and priority for all government activities with the signing of the *Racial Equity and Social Justice Act*. The act requires all County departments to develop and apply to all endeavors an equity lens, which is effectively a frame of reference that enables each department to navigate the complexities of equity and develop the capacity to engage in purposeful action. The 2019 legislation created the Office of Racial Equity and Social Justice (ORESJ), a countywide office focused on advancing racial equity and dismantling structural racism within County government. While Montgomery County appears to epitomize wealth and opportunity, a closer examination has revealed significant disparities in education, housing, income, and transportation, which create burdens for marginalized communities and people of color. Thus, ORESJ has taken a systems approach to building capacity within our government to understand and advance racial equity within every County department. Montgomery County also joined the Government Alliance on Race and Equity (GARE) network, which recommends a three-pronged approach to systematically reduce and eliminate racial inequities in government: normalizing, organizing, and operationalizing. This Master Plan will be the first in which racial equity and social justice is a governing principle behind MCFRS planning.

MCFRS is firmly committed to adopting, advancing, and perfecting the racial equity and social justice framework expressed by the ORESJ. Over the last two years, MCFRS has begun work in this space; however, our understanding of the meaning and operationalization of advancing racial equity is in its nascent stages. Development of this capacity is a priority.

In the search to expand our knowledge and deepen our understanding of equity, the department has struggled to find research literature specific to municipal fire services. There is, however, an extensive body of work examining the nexus between social vulnerability and

equity, based on large scale disasters. Our existing work on vulnerability and resilience is informed by this natural disaster research.

Vulnerability describes the characteristics of an individual, an asset, a community, or a system, that makes it susceptible to the damaging effects of a hazard. Vulnerability arises from any variety of physical, social, economic, or environmental factors. The Centers for Disease Control and Prevention (CDC) and Agency for Toxic Substances and Disease Registry (ATSDR) have created a social vulnerability index (SVI) to help local officials identify communities that may need support before, during, or after disasters.⁴ The SVI indicates the relative vulnerability of every US census tract using 16 census variables organized into four themes/categories, illustrated in the chart below. A relative vulnerability score (for each tract, county, and state) is also calculated.



Vulnerability is tightly coupled with prevailing notions of racial and social equity. There are pre-conditions, expressed as lack of resilience, that are co-morbid with considerations of social vulnerability. Many of the same factors that make one socially vulnerable also increase vulnerability to fires, injury, and accidental death. The literature supports the notion that while

⁴ CDC/ATSDR Social Vulnerability Index. <https://www.atsdr.cdc.gov/placeandhealth/svi/index.html>

vulnerability and equity are not the same thing, vulnerability can be a valid proxy for equity. Thus, MCFRS sees the building of community resilience as an important supporting strategy for racial and social equity.

In 2019, to support the equity agenda for planning, the M-NCPPC - Montgomery Planning conducted an analysis to identify areas of the County that may experience the highest inequities in access to transportation, job opportunities, and other resources supporting a high quality of life. Montgomery Planning's analysis was based on three specific variables: household income, race and ethnicity, and the ability to speak English. The results indicated that approximately 26% of the County's population lives in what Planning called *Equity Focus Areas*, 56 census tracts characterized by high concentrations of lower-income, people of color, who may also speak English with varying degrees of difficulty. Recently, Montgomery Planning expanded their equity work and compiled additional demographic data that allows users to see the full spectrum of advantaged to disadvantaged neighborhoods, based on certain population characteristics⁵. MCFRS plans to leverage these planning tools as we work to incorporate the notion of vulnerability into our decision-making.

Our Vision, Mission, & Principles

The vision and mission of MCFRS have not changed over the years. However, the master plan workgroup recommended a change to how the vision and mission are expressed, to reduce barriers to understanding, foster a more adaptable mindset, and introduce the idea of adding *community value* as a driving force.

The vision of the Montgomery County Fire and Rescue Service is to be a learning organization consistently executing the mission while evolving to maximize value for our communities.

⁵ Community Equity Index Analysis and Explorer. [Community Equity Index Analysis and Explorer - Montgomery Planning](#)

The mission of the Montgomery County Fire and Rescue Service is to create and enhance public safety through measures to reduce vulnerability and improve resilience.

To achieve this mission, MCFRS is guided by the following values: a commitment to duty, integrity, and respect for others and the organization.

A commitment to duty requires:

- ✓ Being proficient in your job, both technically and as a leader.
- ✓ Making sound and timely decisions.
- ✓ Ensuring tasks are understood, supervised, and accomplished.
- ✓ Knowing yourself and seeking improvement.

Integrity requires:

- ✓ Accepting responsibility for your actions.
- ✓ Being honest.
- ✓ Setting a positive example.
- ✓ Acting in the best interest of the team and the communities we serve.

Respect for others requires:

- ✓ Ensuring that people always come first.
- ✓ Knowing your subordinates, keeping them informed and looking out for their well-being.
- ✓ Continually building the team at the unit, station, battalion, shift, and organizational levels.

These organizational values translate to these principles, which MCFRS is committed to:

- We acknowledge that in all things, people come first and for them, we will do the right thing.
- We will respect the fiscal, political, collegial, and other boundaries placed on our work.
- We will be prepared to serve and protect our communities.
- We will be professional, studious, and adapt to our context.
- We will maintain a capacity to respond.

Goals

Chapter 21 establishes six public policy goals of MCFRS, abbreviated here:

1. Maximize protection for life and property.
2. Maximize volunteer participation.
3. Optimize personnel practices.
4. Ensure accountability.
5. Continuously improve operations and administration.
6. Integrate with local, countywide, regional, state, and national emergency management plans.

Context here is important. These goals were established during a time of transition; MCFRS was evolving from a system largely governed by LFRDs and overseen by an Administrator, to a combined system under the authority of a Fire Chief. The explicit delineation of goals, in that context, provided a framework for mutual cooperation. However, writers of the goals did not foresee significant societal shifts, such as the emergence of racial equity and social justice as a driving force, nor did they foresee the significant technological advancements that simultaneously present threats and opportunities.

The MCFRS [Operational Doctrine Statement](#) (ODS) outlines the department's expectations for operations. A foundational principle of the ODS is a focus on the vulnerable and the role of MCFRS personnel as advocates for the vulnerable:

Many of the people assisted by MCFRS personnel are in a vulnerable position...they are unable to advocate for themselves. In some cases, personnel will need to act as a gateway to other agencies and services. In other cases, personnel will need to be advocates for those who cannot advocate for themselves. Personnel must never lose sight of their role as public servants and the importance of advocacy to that role.

The sentiment codified in the ODS is partly based on what MCFRS believes are the realistic, high-level expectations of County government, but also the expectations of those we directly serve. Montgomery County is a collection of communities that are unique in character and priorities; each deserves services that – to the extent practicable – meet those unique needs. Developing cultural competency across MCFRS is vital to achieving this. MCFRS believes there is a common set of community expectations for the organization, applicable across the enormity of the County:

1. Treat people and their property with respect.
2. Be experts in our domain.
3. Provide policy makers with a range of valid options.
4. Cultivate curiosity: learn about each community's needs and priorities.
5. Be good stewards of their tax dollars.

Planning Assumptions

The Master Plan will be the primary framework on which all fire, rescue and emergency medical services resource allocation, station location, service delivery, risk reduction, and business operations will be based.

This Master Plan, and amendments thereof, will not be superseded by any other plan prepared and used by the MCFRS. Only amendments approved by the County Council may modify this plan. Other MCFRS plans addressing select topics and shorter time frames will be consistent with broader language contained in the Master Plan and will include no content contrary to that appearing in the Master Plan. MCFRS implementation and deployment plans, for example, may contain greater detail and minor deviations from this Master Plan, yet are consistent with the intent of the plan.

The Master Plan is based on the following assumptions:

1. The MCFRS will continue as the County's provider of fire, rescue, and EMS services to the public during the six-year time frame (2024-2030) of this Master Plan.
2. The MCFRS will remain a combination system of career and volunteer personnel.
3. There is an upper limit to the response capability of MCFRS.
4. The MCFRS will receive adequate tax-funded appropriations from the County Council that will allow for delivery of quality service to the public through continued operation of existing programs/services and initiation of new programs/services deemed essential.
5. The MCFRS will continue to receive consistent levels of revenue from the EMS Transport Fee program, as well as from the State of Maryland Amoss Fund.
6. County government will be under pressure to reduce costs and/or adjust to unforeseen market fluctuations. There will be a need for MCFRS and the whole of government to reduce cost while maintaining quality. MCFRS hopes this will be a force for innovation, rather than diminishment.
7. Fiscal pressure, combined with land scarcity, will challenge MCFRS to find alternative resource deployment solutions.
8. The built environment will continue to change in ways that increase structure size and complexity, increasing the probability of incidents with large resource demands. Building density will continue to keep the threat and impact of large fires caused by rapid exterior fire salient. Less green space/more built space also increases the likelihood of flooding, particularly with climate change, which will add stress on the department.
9. While all age groups in the County will increase in number, the largest percentage increase will occur in the 65 years and over age group. This growth will outpace all other age groups by a sizable margin. The increase in the senior population will likely correlate with increased EMS demand. EMS calls currently comprise 75-80% of our dispatched call volume.

10. Racially and ethnically diverse communities in the County will continue to expand. Racial equity and social justice must continue to inform resource deployment.
11. Residential and business development throughout the County will continue to grow at a steady rate. Transportation infrastructure will continue to expand within the County, including the Purple Line and Bus Rapid Transit (BRT).
12. Climate change will have an impact on fire and emergency medical services, and may include more frequent responses to weather-related incidents, or more hazards related to green solutions implemented to mitigate climate change (e.g., solar photovoltaic systems, changes to electric distribution networks and battery storage technologies).
13. Regional risk related to terrorism will remain. MCFRS will continue its active role in the County's homeland security efforts to plan, prepare for, and respond to acts of terrorism.
14. Risk, or the threat of the sudden loss of command, control, and communications infrastructure remains high.
15. Planning and preparedness for, and response to, large-scale emergencies (e.g., natural disasters, major transportation incidents, etc.) occurring in Montgomery County or within the Washington D.C. metropolitan area will be managed through a regional approach. The MCFRS will continue its participation in and support of National Capital Region planning, preparedness, and response programs and initiatives.

What do we know?

Over the course of the last master plan, the department has experienced a gradual increase in the number of calls for service ([see Appendix C](#)). Emergency medical calls, which comprise an average of 78.3% of annual call volume, have increased 9.7%, and fire calls for service have increased 12.7% since 2016. Between FY16 and FY24, MCFRS has added more than 60 positions (FTEs) and the operating budget has increased 20.0%. Analysis of incident data and location indicates that MCFRS resources are mostly adequately placed, but the department, as a system, has limits. Stations are at or near capacity; increases in call volume will test our resiliency.

MCFRS believes that our future success hinges on being able to **notice, relate, and adapt** in service to our communities, while being tightly woven into the whole of government. There is a consensus the future will be characterized by the following attributes:

Complexity. Complexity, in this context, refers to two basic notions: [1] The interconnectedness of systems. One great example is the number of systems for home protection that rely on internet connections and electricity. It is not hard to imagine an event that cripples both the internet and the power grid. Such an event has the potential to also cripple the ability of MCFRS to dispatch calls for service, to communicate, and to meet the demand generated; [2] The idea of non-linearity builds on the notion of interconnectedness by acknowledging that in complex systems, relatively small inputs and/or insults can have outsized downstream impacts.

Novelty. Novelty speaks to the complexity of modern society and how it interacts with people and systems to generate problems that are fundamentally different and have the potential for outsized impact on our communities. This can be as dramatic as a hacker disrupting the electrical grid, which then results in a crisis for homebound community members dependent on home oxygen generators. Or this can be as simple as a rash of fires caused by lithium-ion batteries improperly stored in homes.

Uncertainty. The world is changing – fast. MCFRS will need to be agile – able to act quickly and decisively. We will need the ability to act, even in the face of uncertainty.

These environmental characteristics represent a challenge to organizations, teams, and leaders. Such an environment can overwhelm individuals and organizations, impact internal culture, paralyze decision-making processes, increase the chances of making bad decisions, and jeopardize developments and innovations. To navigate such an environment requires new skills, approaches, and behaviors responsive to new challenges and threats.

Existing Conditions

MCFRS must maintain awareness of the current social, economic, and political landscapes, as changes can have an impact on planning, decision making, and the delivery of services; changes affect our network in different ways. The updated General Plan, *Thrive Montgomery 2050* is clear: the County is facing new challenges and changing circumstances.

- Although Montgomery County’s population growth has slowed, forecasts indicate the County will add approximately 60,000 households over the next 30 years, yet 85 percent of the land is already developed or constrained.
- Housing costs and living expenses have become increasingly unaffordable. Montgomery County has an insufficient supply of affordable housing to meet the needs of current or future households.
- Social connectedness and cohesion are challenged throughout the county due to the size of the County and car-oriented land use.
- An aging population means lower household incomes and changing needs for social services.
- There is a growing need for a healthier lifestyle.
- Climate change threatens all aspects of life.

A summary of the changes occurring in Montgomery County, primarily those that MCFRS has incorporated into its risk assessment, is presented on the following pages. All demographic data was retrieved from the 2017-2021 American Community Survey (ACS) 5-Year Data Profile, unless otherwise noted.

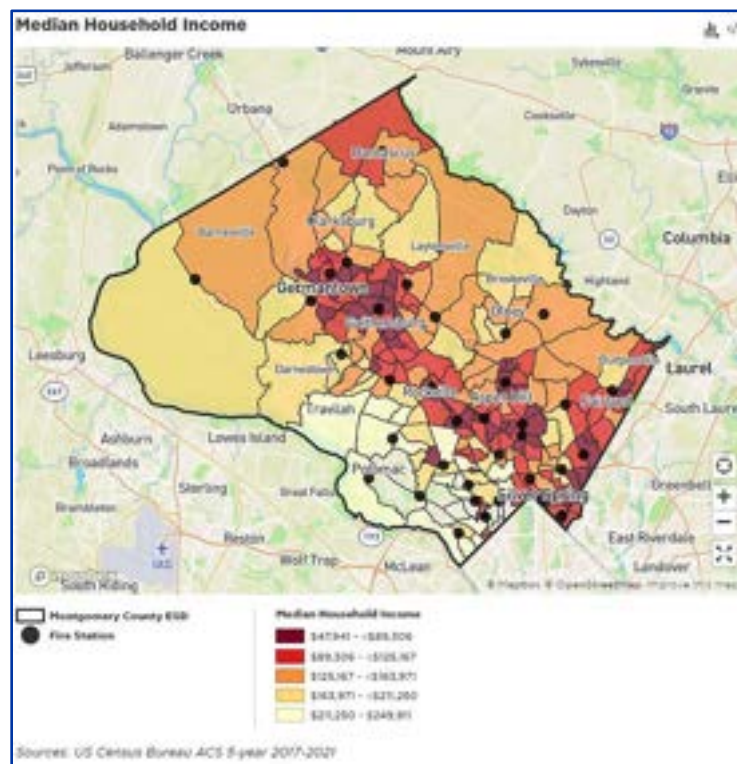
- According to the 2020 U.S. Census, Montgomery County’s population⁶ is 1,062,054, making it the 44th most populous County in the United States.⁷ Montgomery County has a large, slow growing population; the estimated population grew only 9.3% between 2010 and 2020, falling short of projected population growth for the same time frame. Population growth remains concentrated around the core centers and corridors. There are 401,942 housing units in Montgomery County. Between 2020 and 2050, Montgomery County is expected to add approximately 63,000 new households, both working households and non-working households, with new residents who are seniors or persons with disabilities.⁸ More than 50% of new housing is projected to be multifamily rental units.
- Residents are less likely to live in traditional family settings; the 2021 ACS estimates that only 54% of households were married, a decline from a high of 87% in 1960. Meanwhile “non-family” households are the fastest growing segment of the population, increasing from only 8% of households in 1960 to 31% in 2021.

⁶ Source: [United States Census Bureau Quick Facts](#), retrieved July 17, 2023.

⁷ Note: the 2022 Population Estimates Program shows an estimated decline in Montgomery County’s population, from 1,062,054 to 1,052,521, dropping it to the 45th most populous county in the US.

⁸ Source: *Thrive Montgomery 2050*

- The diversity of Montgomery County's residents is also shifting. Thirty-two percent of Montgomery County's population is foreign-born; the majority of the foreign-born residents are from Asia (36.7%) and Latin America (36.6%). By 2045, people of color are forecasted to make up 73% of the County's population, with a significant percentage earning less than \$50,000 a year. Montgomery County residents speak a multitude of languages: 41.5% of the population speak a language other than English.
- People in Montgomery County are educated; 59.8% of the population over the age of 25 has a bachelor's degree or higher. Of those people, nearly 50% have a graduate or professional degree.
- In 2000, the Census identified 11.2%, or 98,157 of Montgomery County's 873,341 people in the 65 years and older population. In 2020, the percentage of those 65 and older had increased approximately 5% to 16.1% of the estimated County population. Nearly 3% of this cohort lives alone; 26.3% have a disability. By 2045, it is anticipated that residents 65 years of age or older will comprise 21% of the population. The 65 and older cohort is the fastest growing segment of the County's population.
- The home ownership rate has declined to 65%. The number of households spending at least 30% of income on housing (mortgage or rent) has continued to grow.
- According to the ACS, 8.5% of Montgomery County's population is in poverty.
- Fifty percent of new households are classified as low-income.
- Nearly 7% of all Montgomery County residents do not have health insurance coverage.



[IMAGE: MCFRS CRAIG 1300, POVERTY AND AFFORDABILITY](#)

The Built Environment

It is worthwhile for MCFRS to consider the built environment in Montgomery County because changes can and do impact firefighting operations. In today's built environment, a small fire can impact hundreds of people, when historically, it would only affect dozens.

Age (of structure). Montgomery County's housing stock is aging; 50.2% of the housing stock was built prior to 1980, suggesting that a large percentage of homes have ongoing needs for repair or replacement of aging components and systems.

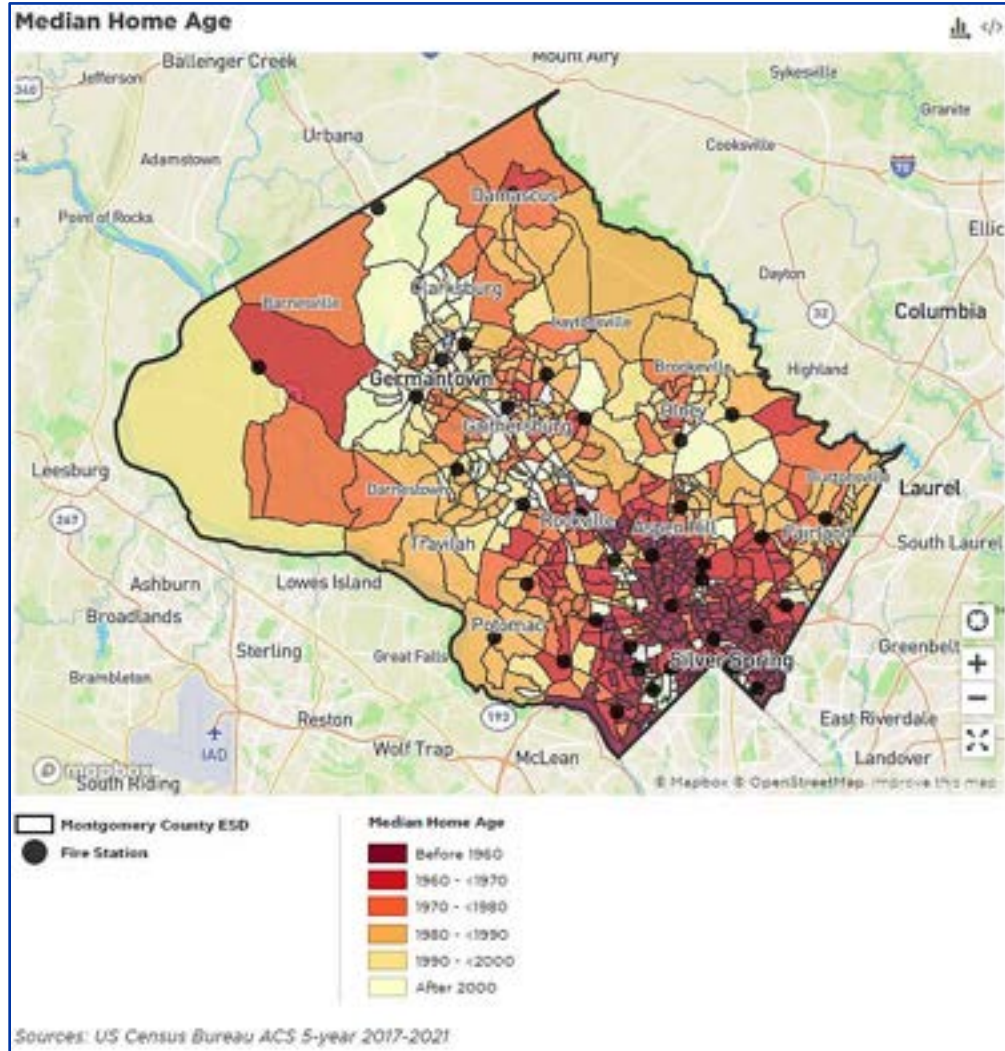


IMAGE: MCFRS CRAIG 1300, HOUSING CONDITIONS

Building materials. New structures are being built with engineered wood products, lightweight wood structural assemblies, and lightweight steel assemblies.

Complexity. Buildings are bigger and closer together, which limits fire department access and in turn, delays the time to impact (i.e., getting water on the fire).

Contents. Modern residential structures are full of synthetic materials, which burn hotter and faster than organic materials.

Geometry. Open floor plans allow for the rapid spread of heat, flames, and smoke throughout buildings; compartmentation, which was historically afforded by smaller rooms and doors between discrete spaces, is limited.

Radiant Heat Transfer. When a fire begins, heat energy is also transferred from the fire to surrounding structures via radiation. In dense, urban, or pseudo-urban spaces where structures are very close together, surrounding structures can absorb heat, causing damage, and in some cases, allow the fire to spread further.

Analysis of the Effectiveness of Fire Codes

On January 9, 1979, the fire department was alerted to a reported building fire at 8750 Georgia Avenue in Silver Spring. "The corridor door to the apartment of fire origin had been left open and upon arrival of the Silver Spring Fire Department at 0248, flashover had occurred in the apartment and smoke had completely saturated the second-floor corridor of both the "A" and "B" wings...Smoke permeated most of the building, being especially heavy on the second, seventh, ninth and eleventh floors. A total fire department response of four alarms was required to assure the evacuation of over 250 occupants. Approximately 21 occupants required emergency medical treatment, 17 for smoke inhalation. The fire was confined to the apartment of origin and the immediately exposed second floor corridor area."

On February 18, 2023, around 6 a.m., the MCFRS was alerted to a reported building fire at 8750 Georgia Avenue in Silver Spring. The incident would eventually require more than two-alarms worth of firefighters to perform rescues, treat the injured, and bring the fire under control. A third alarm was used to bring relief to exhausted crews. Many people were treated at hospitals and over 400 people were displaced as a result of this fire. The most tragic outcome was the death of Melanie Diaz, a young resident of the building.

Two eerily similar fires separated by 44 years are a clear reminder that, despite obvious progress, there remain significant hurdles to overcome. It is hardly possible to think about an analysis of the effectiveness of the fire code without thinking about the people who don't survive fires.

⁹ An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Georgia Towers on January 9, 1979 -NBSGCR -79-187

In response to the 2023 fatal fire, MCFRS visited every single residential high-rise without sprinkler protection. During the visits, firefighters distributed information about fire safety, escape plans, and other materials to residents. This was not a one-time effort. MCFRS intends to keep these non-sprinklered structures at the forefront of our thinking and action because, while the incidence of fires is relatively low, the impact can be substantial.

Currently, the single greatest fire hazard, in terms of potential for life loss, the stressing of emergency response capacity, and the complexities of hazard mitigation, is the residential high-rise without automatic sprinkler protection.

As noted in a 2019 report by the Maryland State Fire Marshal's office, "By declaring non-sprinklered residential high-rise buildings an inimical hazard, the Commission has gone on record as declaring the current level of safety in these buildings as 'unreasonable', requiring an increase in the provided level of safety. Defining what this increased level of safety should be, and how it should be achieved and paid for is the challenge."¹⁰

The fire code is just one part of a complexly interactive system charged with ensuring public safety. Much like fire suppression practices in general, the fire code is often driven by seminal events. Historically significant events, such as the Triangle Shirt Waist Factory fire in 1911 or the Our Lady of Angels School fire in 1958, shocked the collective consciousness of the country and pushed new fire codes into play. Montgomery County has not suffered such catastrophic loss which can, in part, be attributed to an effective fire prevention program.

It is important to think about the fire code¹¹ in the right context. Fire codes are adopted at the State level and then adopted again at the County level. During the County adoption, DPS creates amendments to the codes and codifies them through executive regulation. The local code includes all the State codes and amendments and creates any County-specific amendments that are needed to clarify certain provisions that may be left up to the authority having jurisdiction from the original code.

Fire Code Compliance (FCC), a function of the Department of Permitting Services since 2016, actively enforces existing codes. Fire codes are typically enforced for multi-family dwellings and commercial buildings. FCC has no jurisdiction over single family dwellings and even in the case of multi-family residential structures, their authority is limited to common areas. The Department of Housing and Community Affairs (DHCA) has some limited jurisdiction over code enforcement in individual rental units.

While most fires in Montgomery County involve single family dwellings (outside the control of both FCC and DHCA), multi-family dwellings contain large numbers of people. A large fire in a single-family dwelling typically only affects one- or two-family units, while a fire in a high-rise or other large building can affect hundreds.

¹⁰ <https://www.scribd.com/document/627983035/High-rise-Task-Force-Report>

¹¹ The use of the term *fire codes* in this document refers to both the "code" and "code compliance/enforcement."

Fire codes in Montgomery County are, a priori, effective to the extent that Montgomery County does not experience a large number of fires or a sustained high incidence of fire deaths. participates in the development and application of new codes. FCC's and DHCA's enforcement work employs a list of priorities based on level of exposure to hazards, then seeks to increase safety via safeguards.

Fire codes are clearly a part of the community resilience theme that weaves through this plan. Where fire safety is the presence of hazard controls and the capacity to respond, FCC (hazard controls) is a hyper-critical piece of the safety program. Effective fire codes align with our resilience notion of education and preparation. By placing controls in the environment, the fire codes are able to reduce not only the incidence of fire but also the severity of the fires that do occur.

There are three main hazards for which the fire codes and compliance account; these hazards are significant factors in the eventual outcome of a fire:

- Early notification. The spread of fire in the current built environment has reduced the time interval from “fire start” to “escape is no longer an option” to a mere few minutes. Early notification of a fire is critical to maximizing the ability for an occupant to escape.
- Early suppression. In this context, early suppression is represented by an automatic sprinkler. The sprinkler, once activated, sprays water onto adjacent surfaces, cooling them, preventing radiative feedback, and reducing the spread of fire and importantly, reducing the amount of noxious gasses produced by the fire.
- Compartmentation. A closed door is one of the simplest, most effective, ways to contain the spread of both fire and smoke. To the extent that the code requires fire doors, self-closing doors in multi-family dwellings and self-closing doors between living units and garages, the code provides time for people to survive, while also limiting the spread of damages.

The biggest challenge for fire safety is the impact of human behavior on the engineered safety systems. People make errors, people demonstrate poor judgment, and sometimes those errors and judgments combine in unexpected ways. It is not possible for the fire code to prevent all fires. Varying degrees of understanding, financial means, and other abilities are also contributing factors. While it is impossible to isolate whether a given failure (e.g., a fire or a fire death), can be attributed solely to a lack of code effectiveness, it makes sense that MCFRS can still have an increased positive impact by increasing the education and preparation of community members.

Because the built environment is in a constant state of change and because the code development process is cyclical, FCC must exercise discretion in the application of codes. FCC can and does allow for alternative methods of compliance and modifications of code to allow for new technologies and trade-offs when the code requirements are difficult to achieve. It is incumbent upon the building owner to hire a design professional to assist them through this

process and develop ideas for compliance, which is then reviewed and evaluated by a committee at DPS, which can approve or deny the modification. Code enforcement for existing buildings is performed by facilitating individual buildings and spaces toward compliance over time.

MCFRS does not express any concern with the effectiveness of the fire code. That said, we acknowledge there is an intersection between the effectiveness of the fire code and the ground level reality of a working fire in a large multi-family building, especially if that building is not equipped with an automatic sprinkler system to provide early suppression.

Over the life of this plan, MCFRS will:

- Conduct a comprehensive analysis of the threat environment posed by the residential high-rise that is not equipped with automatic sprinklers.
- Consider tools, training, and other response modifications that might increase occupant survivability in the event of a fire in a large residential building.
- Continue to improve our relationship with FCC (and DPS in general) to:
 - Deploy a reliable, system defect reporting tool (MCFRS notification to FCC and/DHCA)
 - Be involved with DPS in the conversation about alternative energy installations.
- Improve education and preparation, especially at large residential buildings.

Development in Montgomery County

Since the last MCFRS master plan was written, the County Council has approved and adopted 19 master plans and amendments, as well as the Thrive 2050 General Plan. There are currently five plans in review/update status, including the Great Seneca Plan, Takoma Park Minor Master Plan, Fairland and Briggs Chaney Master Plan, Rustic Roads Functional Master Plan, and the first ever Pedestrian Master Plan¹².

Significant residential and commercial development is occurring throughout the County.

¹² Montgomery County Council Master Plans.

https://www.montgomerycountymd.gov/COUNCIL/Master_Plans/index.html

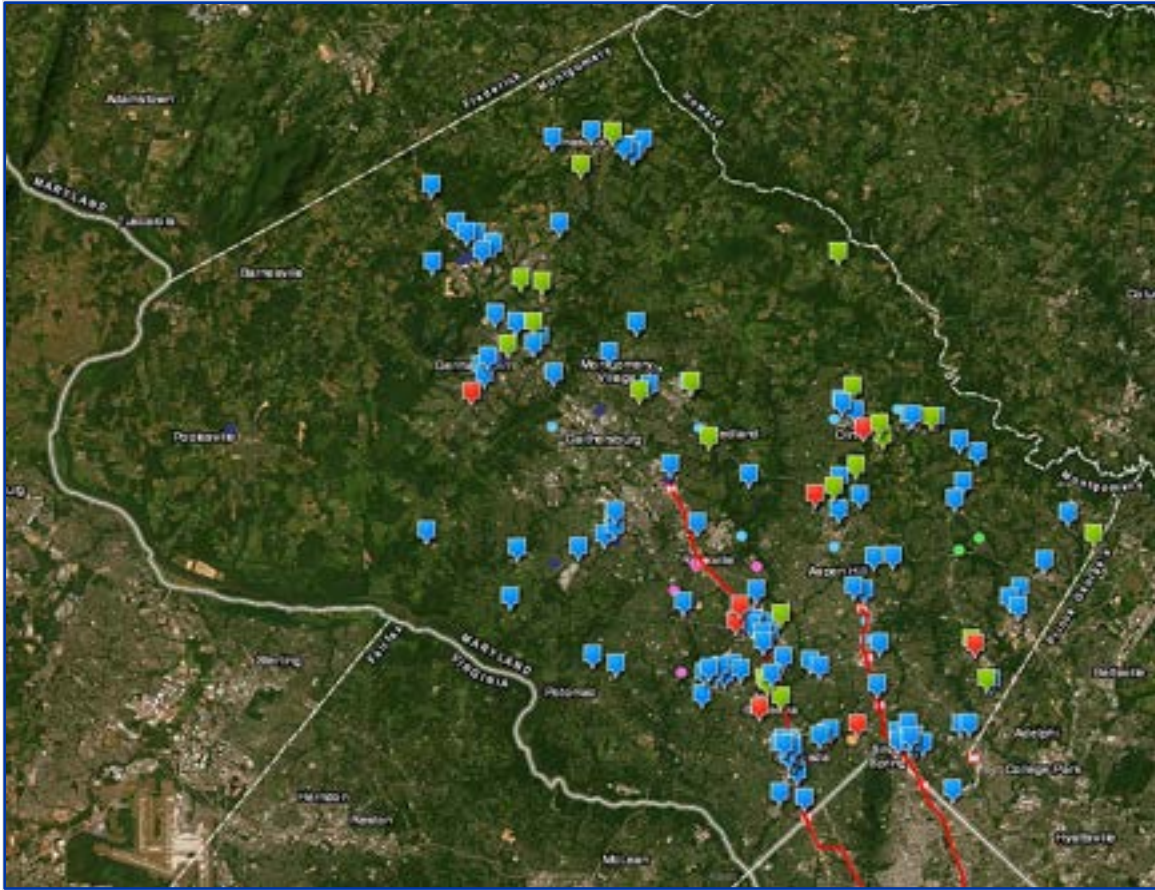


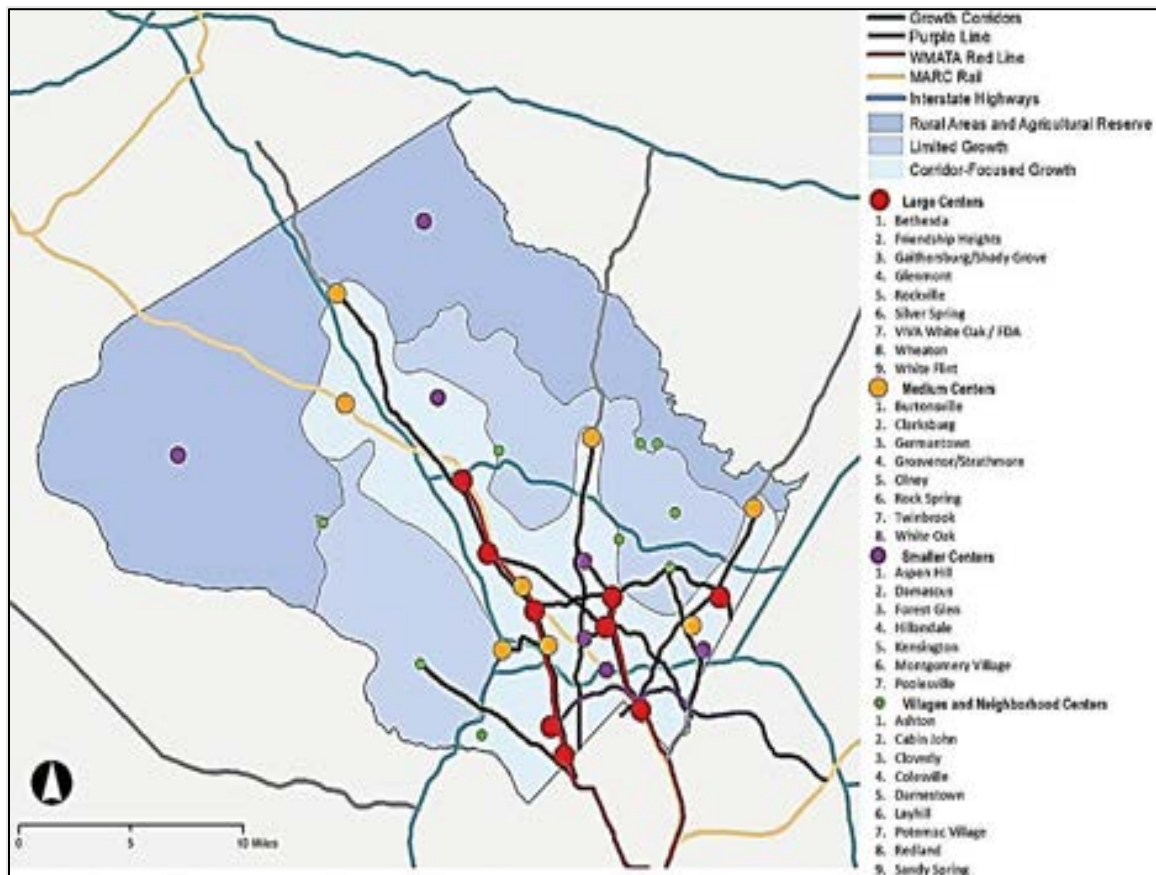
IMAGE: MC ATLAS SIGNIFICANT DEVELOPMENT ACTIVITY AS OF JULY 13, 2023.

The M-NCPPC's Development Information Activity Center reveals 290 preliminary and site plans (residential and commercial) in the pipeline.¹³ For the last twenty years, Montgomery County has been committed to smart growth and reduction of urban sprawl, sustainability, and environmental protection. Development has been concentrated along existing and future mass transit networks and Bus Rapid Transit corridors. Yet Montgomery County has an insufficient supply of housing, and more critically, affordable housing.

[Thrive Montgomery 2050](#) recommends expansion and diversification of housing stock to accommodate low income households by expanding opportunities to increase residential density, especially along major corridors (increased height); support of building code amendments that reduce costs by accommodating innovative construction methods and materials, including prefabricated housing and mass timber; and support of creative housing options, such as personal living quarters and/or micro units, tiny houses, cottages, duplexes, and multiplexes, shared housing, cooperative housing, co-housing, and accessory dwelling units.

¹³ https://www.mcatlas.org/Development_Info/CompletePlansList.aspx

[Thrive Montgomery 2050](#) also updates and recalibrates ideas about the role of mixed uses by adding Complete Communities and “15-minute living” as organizing principles for thinking about planning of neighborhoods and districts. Complete Communities are places that include a range of land uses, infrastructure, services, and amenities that allow them to meet a wide range of needs for a variety of people. They include housing suitable for different household types, income levels, and preferences, helping to support racial and socioeconomic integration. The specific mix of uses, amenities, parks, public facilities, and building types in Complete Communities vary depending on factors such as the size and location of the neighborhood or community; proximity to transit, variation in physical features such as topography and environmental resources; and other factors unique to the history and context of each place. We can expect to see continued development and population growth along the corridors identified here.



SOURCE: THRIVE MONTGOMERY 2050 GROWTH MAP

What are we trying to do?

Our revised mission statement is explicit: MCFRS wants to create and enhance public safety through measures that reduce vulnerability and improve resilience. Moreover, the vision conveys that we want to do so in a way that maximizes value for our communities.

MCFRS wants to deliver and maximize value, in the form of public safety, to those within the boundaries of Montgomery County¹⁴. At the most practical level, value is realized when an ambulance or a fire engine arrives at the scene of an emergency. Value, in this context, is defined as the ratio of quality to cost ($V=Q/C$), where quality loosely corresponds to “effectiveness,” and cost includes money, time, cognitive load, and any other system resource required to do the work. Given this relationship, there are two basic ways for MCFRS to add value: improve quality and/or lower costs.

Current MCFRS resource deployment is based on a series of historical choices about fire station location that were driven, with some exceptions, by significant fires. A significant fire occurred, and the community banded together to form a fire department. Where the fire department was located and what equipment it had was determined by the financial resources of the community and the availability of land at that time.

The original decisions about where to build a fire station and what kind of station to build continue to constrain MCFRS to this day.

As time progressed, the fire service, in general, began to adopt consensus standards, most notably those of the National Fire Protection Association (NFPA). The standards began establishing parameters around call handling, response times, crew size, and other measures of fire department behavior.

Emergency services have typically expressed value primarily in terms of response times (i.e., we get there fast). MCFRS planned stations and resources around response time benchmarks. The primacy of response times from a fire control perspective are based on the ability of the fire department to intervene to keep small fires small; that is, to prevent flashover¹⁵. However, when the NFPA created the response time standards, it made some generalizations based on consideration of compartment fires in structures up to 2500 square feet in size and assumed that fire department response (timeliness) would be able to prevent flashover. Today, changes in the built environment, specifically the widespread use of synthetic materials in home furnishing (contents) and large, open residential floor plans, create a situation where flashover

¹⁴ While we acknowledge the existence of mutual and automatic aid in the region, MCFRS’ primary responsibility is to Montgomery County.

¹⁵ Flashover is the point in the compartment fire development cycle where a rapid increase in fire growth occurs. It typically results in the full involvement of the entire compartment in flaming combustion.

is occurring within mere minutes from initial ignition. It is not feasible to deploy enough staffed fire engines with adequate geospatial coverage to prevent flashover; each new fire engine only provides diminishing marginal value in this regard. The objective now is to limit fire spread and subsequent damage.

Likewise, the value of response times as a quality metric with regards to emergency medical services are limited as well. While a certain fraction of all EMS responses is time-critical, we must acknowledge that these incidents are a fraction of the total. Additionally, addressing the time critical needs of the incident may be achieved by varying types of resources. By and large, a cardiac arrest patient needs CPR and defibrillation in the first few minutes. This notion does not diminish the importance of the advanced skills provided by a paramedic, but rather, it stratifies the time criticality of the resources we provide. In other cases, such as severe respiratory distress, advanced life support is the critical need; in severe trauma cases, the ability to rapidly move the patient to an operating room is the critical need. MCFRS should not be locked into a historical paradigm, largely devoid of nuance, that treats all calls for service homogenously.

However valid those standards were, the fire department's infrastructure remains relatively fixed. The original decisions about where to build a fire station and what kind of station to build continue to constrain MCFRS to this day.

To deliver value to the right place at the right time, the organization must be able to identify the need (what and where it is), develop/assemble the resources necessary, and then take action to address it. Historically, MCFRS has identified need through call volume and response time analyses, monitoring population growth projections, and conducting risk assessments and critical task analyses. In the 1990s, MCFRS began using projected population growth to justify and build stations (e.g., Germantown and Clarksburg). While this type of work still has its place in the organization, it has been necessary to more critically analyze and understand the surrounding environment and the factors that contribute to the need for fire/rescue services. Because the body of research on disaster response is so large, MCFRS has focused much of its attention on vulnerability.

Vulnerability and Resilience

In 2021, compelled by initial discussions regarding the future of MCFRS and conversations on equity, MCFRS embarked on an effort to improve its understanding of risk and how it was assessed in our communities. The definition of risk has not changed: it is a state where an entity (person or property) is exposed to a hazard, where a hazard is something that can cause harm.

Exposure to hazards is a natural part of the human condition. Those who live, work, and visit Montgomery County may encounter any number of different hazards:

- Fire (involving structures, vehicles, trains, aircraft, vegetation, other property)
- Illness, disease, bodily injury, and other medical conditions
- Hazardous materials, unconfined or maliciously used, including destructive/explosive devices
- Terrorism and other acts of violence
- Technological hazards, (e.g., utility disruptions)
- Mechanical hazards (e.g., falls and collisions)
- Natural/environmental hazards (e.g., thunderstorms, hurricanes, tornados, winter storms, floods, drought, temperature extremes)
- Social hazards (e.g., health epidemics, civil unrest)

In the past, MCFRS used a rather pragmatic approach to defining risk, whereas it was the probability of an event causing harm to people, damage to property or the environment, and/or business interruption, combined with the consequences or severity of the event, if it were to occur. MCFRS built upon that idea to better define the relationship between the variables and characterized risk as the product of threat, vulnerability, and consequence. Using a mathematical formula to express the relationship:

$$R \text{ (risk)} = T \text{ (threat)} \times V \text{ (vulnerability)} \times C \text{ (consequence)}$$

For more details related to the updated risk assessment process, please see [Appendix D](#).

If we consider threat to be synonymous with “probability”, and “consequence” to be synonymous with “severity”, **vulnerability** becomes a major driver of risk. Vulnerability speaks to the inherent qualities of a social system, which exist before events like disasters occur and contribute to the amount of risk exposure, as well as the degree of harm¹⁶. Vulnerability may be the result of social factors¹⁷, or it can be the result of resource scarcity (the inability of the fire department to respond to an emergency). The notion of vulnerability, the susceptibility of an entity to the adverse impacts of hazards, or the lack of capacity to absorb the “consequence” of hazard exposure and emerge intact (resilience), is proportional to risk.

Importantly, there is a correlation between social vulnerability and resilience. Bergstrand et. al., found that, “vulnerability and resilience tend to be correlated, indicating counties that are more susceptible to harm also lack the means to rebound effectively, while counties that are low on vulnerability also have resources that facilitate recovery. This is not surprising, as communities rich in resources are likely to have both protections from hazards, as well as

¹⁶ Cutter SL, Barnes L, Berry M, Burton C, Evans E, Tate E, et al. A place-based model for understanding community resilience to natural disasters. *Global Environmental Change*.

¹⁷ See the section on social vulnerability index.

capital that can be mobilized in response to threats, while resource-poor communities are likely to lack safety-nets in preparation for and response to hazards.”¹⁸

Vulnerability is a complex matter, but necessary to our understanding of risk in the sense that we acknowledge that risk not only depends on the severity of the hazard, or the number of people exposed, but is also a reflection of the susceptibility of people and assets to suffer loss and damage (their level of resilience). Some people experience higher levels of vulnerability than others. Vulnerable people/communities find it harder to recover or reconstruct their livelihoods following exposure to, or an experience of a hazard, thereby making them more vulnerable to the effects of subsequent hazard events.

MCFRS view resilience as an antidote to vulnerability. In other words, while we cannot directly impact the hazards present in the environment, we can help people to recognize those hazards, respond appropriately when those hazards appear to limit damages, and assist with recovery. Thus, MCFRS acknowledges that future resource allocation and deployment decisions must be firmly rooted in consideration of vulnerability. Vulnerability as a result of social factors or resource scarcity are both important considerations for future resource deployment.

However, MCFRS needs to develop a methodology that appropriately weighs the various vulnerability factors with respect to the prevailing community value structure, as well as racial equity. As stated in NFPA 551, “Guide for the Evaluation of Fire Risk Assessments”: *The perception of risk, and therefore the acceptance of risk, is influenced by the values of the stakeholders. Thus, the values of the stakeholders should be established in the risk metrics.*¹⁹

MCFRS is not alone in working to more effectively assess vulnerability and subsequent need. The Planning Commission’s Community Equity Index Technical Report²⁰ clearly indicates that planning for equity, resilience, and vulnerability requires more nuanced approaches than those currently in use.

Montgomery County, as a whole, values reducing community vulnerability, whether social vulnerability or response vulnerability. MCFRS’ approach to creating and enhancing public safety must also be focused on reducing vulnerability.

Social vulnerability is most easily identified using the CDC’s Social Vulnerability Index (SVI), which assesses vulnerability at the census tract level. MCFRS has begun developing the capability to evaluate its response metrics at the census tract level. This will allow the

¹⁸ Bergstrand K, Mayer B, Brumback B, Zhang Y. Assessing the Relationship Between Social Vulnerability and Community Resilience to Hazards. Soc Indic Res. 2015 Jun;122(2):391-409. doi: 10.1007/s11205-014-0698-3. Epub 2014 Jul 16. PMID: 29276330; PMCID: PMC5739329.

¹⁹ NFPA 551, 2020 Edition

²⁰https://montgomeryplanningboard.org/wp-content/uploads/2021/11/Intro-Community-Equity-Index-Briefing_PBitem5_12-9-21_Final.pdf

organization to make apples-to-apples comparisons about service delivery based on generally accepted vulnerability measures.

MCFRS has a wide range of responsibility, including emergency medical services, fire suppression, and specialized rescue. For that reason, any analysis of vulnerability or discussion of resilience must encompass each of those domains. The factors that go into a needs assessment are complex and always changing.

There is an upper limit to resource allocation for public safety and there is an upper limit to fire department performance. The fire department does not promise certain outcomes; it only promises to perform to the best of its ability and attempt to meet goals with high reliability. It is impossible to bring risk to zero. What is left after reasonable measures have been taken, residual risk, is a fact of life. That said, what residual risk is “acceptable” is a political decision, not a technical one.

Resilience is the ability to absorb, respond to, and recover from shocks. This definition is consistent with the disaster research literature. MCFRS considers four primary factors to be critical to the development of resilience: education, preparation, capacity for response, and assistance with recovery:

- Educating people about the hazards present in their environment;
- Preparing them to react appropriately when hazards are encountered;
- Maintaining a capacity for response; and
- Assisting in the initial, post-shock recovery.

Another way to express this is Resilience (R)= Education (E) + Preparation (P)+ Capacity (C) for response + Assistance (A) with recovery, or $R = E + P + C + A$.

Framing the relationship between the factors in this way, especially when considering them in the larger context of the value proposition, provides a starting point for thinking about building resilience.

One example of building resilience holistically to have positive impacts on social outcomes is the notion of bystander cardiopulmonary resuscitation (CPR). Bystander CPR is a very important factor in overall survivability of out-of-hospital cardiac arrest (OHCA). Receiving bystander CPR increases the chance that a person who suffers an OHCA will survive neurologically intact.

Imagine there is a community in the County where a significant number of persons experiencing OHCA do not get bystander CPR. MCFRS could respond to this information in a few different ways:

- MCFRS could respond by adding resources - facilities, vehicles, personnel, and equipment - in an effort to arrive at the scene of OHCA faster and thereby reduce the amount of time an OHCA patient goes without CPR. This approach focuses on the response factor of the resilience formula. It is a valid approach, although a costly one.

Or,

- MCFRS could respond by increasing its delivery of education and preparation in the affected area. This could involve interventions such as culturally aware education about the conditions that lead to OHCA, recognition of the OHCA, and understanding the importance of bystander CPR. Then MCFRS could deliver the appropriate CPR training in the affected area (preparation). Of course, MCFRS would still need to maintain the capacity to respond, but community resilience could be greatly improved at a much lower cost by focusing on education and preparation.

However, MCFRS has fallen short in dedicating resources to these efforts in the past. We must reimagine our community risk reduction (CRR) efforts if we wish to improve resilience in the community and increase value across the network. We can accomplish this with the following methods:

1. Embrace the language of resilience improvement and vulnerability reduction as guiding principles for CRR.
2. Using the SVI, our risk assessment, and other available health measures (HHS), focus efforts on the vulnerable.
3. Use data to identify and react to trends in injury and/or fire activity.
4. Use data to deploy targeted universalist²¹ approaches to vulnerability reduction as suggested by the Office of Racial Equity and Social Justice.
5. Improve the availability of education and prevention information in different languages and the means in which it is disseminated.
6. Improve data collection and analysis.
7. Develop performance measures that identify where successes can be amplified, and failure can be dampened.
8. Coordinate with other internal and external agents to identify opportunities for engagement and develop synergy around existing efforts.

²¹ A “Targeted Universalist” approach in which universal goals are established for all groups concerned; however, the strategies developed to achieve those goals are targeted, based on how different groups are situated within structures, culture, and across geographies to obtain the universal goal.

<https://www.montgomerycountymd.gov/ore/Resources/Files/23-57.pdf>

Organizational Resilience

The discussion of community resilience is critical. However, the past few years have demonstrated that organizational resilience is equally important. There are four basic threats to organizational resilience:

- Surges in service demand from multiple unrelated incidents.
- Sudden system drain from a large or complex incident, such as a train collision with injuries or a large fire.
- Resource draining externalities (e.g., long transfer times at the emergency department).
- Brittle support structures (e.g., logistics logjams or failures).

MCFRS must be able to absorb shocks to its system. MCFRS is in the process of self-examination with the intent of increasing organizational resilience by reducing the impact of the brittleness-inducing factors:

Outdated Approaches. Our plan to keep our approach current is to increase the pace and intensity at which we review our performance.

Working At Cross Purposes. Our plan is to increase the reliability of our feedback loops and get better at communicating our intent.

Decompensation. This is probably the most difficult factor to address. It is as imprudent to have excessive responsive system slack as it is to have no slack at all. The organization must find a way to balance robust staffing against the ability to scale in the presence of demand. This idea ties into the Woods'²² notion of graceful extensibility, e.g., the ability of the network to extend its capacity to adapt when surprise events challenge its boundaries.

MCFRS believes that our focus on building resilience, both at the organizational level and the community level, is the most important feature of this Master Plan. This focus, coupled with constant attention to the operational environment, proactive learning, and the willingness to adapt both means and methods when indicated provide the necessary extensibility to increase the likelihood of our continued success.

MCFRS is also fundamentally aware that the resilience of the workforce is a critical piece of our future. This plan speaks primarily to how MCFRS intends to pursue its operational objectives. MCFRS acknowledges that no plan will work well unless the workforce is mentally, emotionally, and physically prepared to respond. As an organization, we will continue our current efforts to build out our mental health and general wellness capacity as indicated.

²² *ibid*

Challenges to Overcome

MCFRS has leveraged advances in evidence-based medicine to the point that EMS clinicians can provide services for the most critical medical emergencies that provide for the immediate needs of the patient by bringing treatments to the scene rather than the patient to the treatment (hospital). Continued improvement in 911 call processing and increasingly better differentiation between time critical and non-time critical events put us in a situation where there is, again, diminishing marginal value for getting to places faster; the value added comes from being better when we arrive.

There remain constraints in the current infrastructure:

1. There is a limit to how many resources can be added to the system.
2. The type of incident and its magnitude are unpredictable.
3. Most incidents are independent. They occur without regard for other incidents.
4. While the likely area of a given incident is predictable, the location of the next incident is unpredictable.
5. How an incident unfolds in geographic space over time is often unpredictable.
6. Each fire/rescue station has the potential for multiple states (i.e., fully available, partially available, not available), but resource allocation is typically based on the assumption that the resource is available.
7. There are some incidents that require a significant resource draw (outliers).

How will we do it?

Our Focus Areas

Based on our assessment of the future space, we believe there are seven core requirements for continued success, where success is defined as meeting the six goals and the intent outlined by the County Council.

Being Concerned about the Well-Being of People

In support of MCFRS goal #1, “maximize protection for life and property”, MCFRS must maintain a focus on people. The well-being of those people includes the preservation of the things that matter to them, such as their property, their pets, items/places of cultural significance, and critical infrastructure.

Ensuring Value for our Communities

We are entrusted with the care of our communities and in return, our communities allow us to manage their resources, including financial resources. We have an obligation to our communities to use their resources in a way that maximizes value for them.

Building Capacity to Communicate with our Communities

MCFRS recognizes that it is in service to many different communities under the rubric of the governmental entity of Montgomery County. These communities are diverse in language, relationship to poverty, culturally, and in other meaningful ways. We have an obligation to build a capacity, whether organically or in partnership with others, to identify the core characteristics of a community and to develop ways to engage in a two-way conversation with those communities.

Building Capacity to Understand Racial Equity

Data disaggregation is an important concept in the GARE framework, but also represents a significant hurdle for MCFRS. One simple example is how we can accurately represent uncertainty: “Failure to properly communicate uncertainty is a problem with many data projects and can become an even bigger problem when using disaggregated data, especially owing to small sample sizes.” It is also no small feat to disaggregate while maintaining the privacy of patient information, which is a critical part of our EMS delivery.

Building Community Resilience

In this context, resilience is defined as the ability to suffer a shock and recover from it. Resilience is correlated to social vulnerability, the demographic and socioeconomic factors that shape a community's resilience. While emergency services functions are not typically considered in the context of building community resilience, part of our future approach is acknowledging that even with unlimited resources, we cannot respond to everywhere, every

time, fast enough. Part of our success is ensuring that, along with maintaining a capacity to respond, communities are educated about hazards and prepared to act appropriately when faced with hazards.

Building Adaptive Structures

MCFRS, as currently configured, is a large organization that is heavily reliant on costly machinery and equipment, and heavily reliant on fixed infrastructure as the platform from which services are provided. Furthermore, MCFRS still values hierarchical response and administrative paradigms. This Master Plan acknowledges that those paradigms may not be the best fit for the future space. We believe that future space will require more nimble structures, both operationally and administratively, along with the ability to reallocate resources (within infrastructure restraints) dynamically in response to changing operational context.

Fostering Relationships

The inclusion of relationships as an area of focus is an acknowledgement that MCFRS cannot be effective and simultaneously operate in a silo. While, for the foreseeable future, MCFRS must maintain certain critical organic capabilities, it will not be able to fully express or support its mission without effective engagement with partners. These partnerships can either be in a support capacity, i.e., MCFRS leveraging its resources in support of another agency's mission, or in a joint/collaborative capacity, i.e., MCFRS and others are both leveraging assets in support of common objectives.

Our Strategies

MCFRS has four main strategies for future context operations. While it is also possible to frame these strategies as system level outcomes, we prefer to consider them as our basic strategic approach.

Strategy One: Can Notice

We must configure our systems in such a way that we are able to notice even subtle changes in context. These changes may be changes in the built environment, changes in the fiscal climate, or changes in social norms, but either way, the organization must be able to notice. This will require us to have valid data and other forms of intelligence to be able to disambiguate conflicting information and elicit meaning.

Strategy Two: Can Adapt

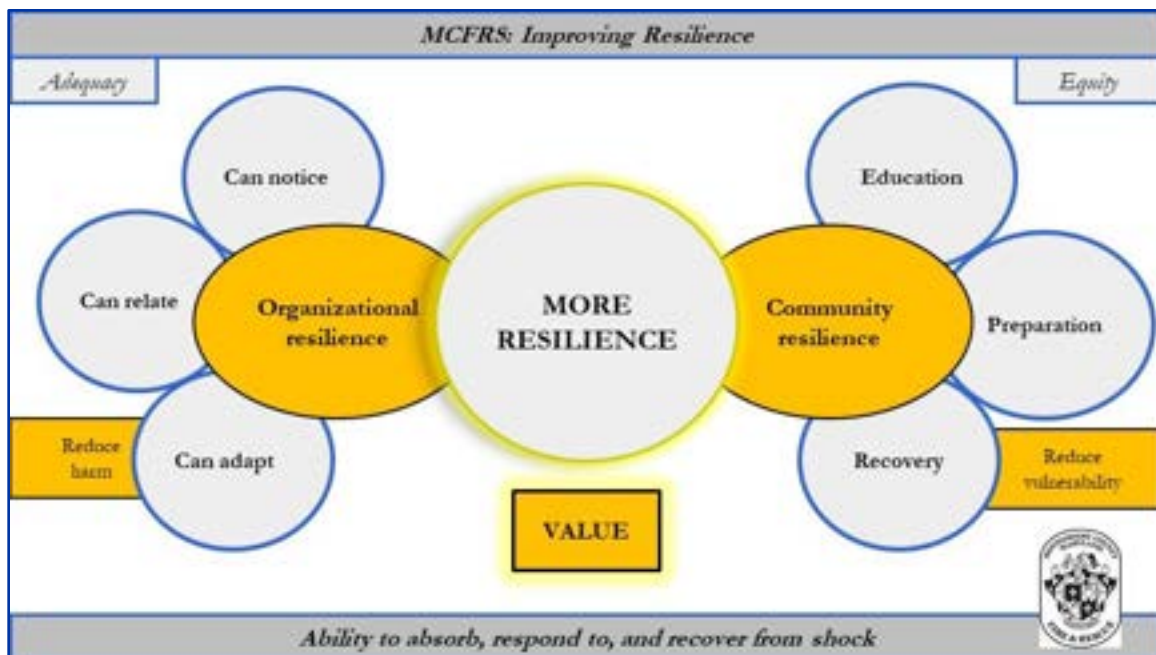
MCFRS must also build the capacity to adapt to change in response to what we notice. This will require an investment of resources to dampen our reliance on infrastructure and our reliance on strict hierarchical structures while amplifying our ability to change in response to the demands placed on us by our context.

Strategy Three: Can Relate

Once we have made meaning of context, we will have to be able to share that meaning, internally and externally. Furthermore, we have already acknowledged that we are not operating in a silo and that our success hinges in no small part on our ability to develop and maintain relationships with the right people, groups, and agencies. And to do this, we must develop a capacity to communicate effectively.

Strategy Four: Do No Harm

While there are any number of threats to our communities that are beyond our control, we must endeavor that no matter what we do, we don't add to the burden.



The Next Six Years

Unlike previous master plans that had fiscally ambitious intentions based on some loose correlations, the framework described in this plan outlines an improved way of thinking about the delivery of services, in the context of vulnerability and resilience. MCFRS must consider our needs in light of our objectives to reliably deliver the right service in the most cost-efficient manner and to deliver services in a way that increases community resilience and value.

Service/Program	Needs
Emergency medical services	Reliably deliver potentially lifesaving interventions (pLSI) across the network. Scale delivery in the presence of sustained, increased demand. Reliably differentiate incident severity.
Fire Suppression	To ensure the continued survival of occupants trapped in structure fires. To reliably deliver initial fire suppression aimed at containment. To reliably differentiate incident severity.
Education & preparation (prevention and risk reduction)	Increase outreach to vulnerable populations.

Arguably, MCFRS is meeting its needs for EMS and fire now, but we know it is not sustainable, given the issues and changes occurring around us. We also know that MCFRS must do more to improve the education and preparation component of our service delivery if we wish to increase value. We have taken some initial steps, as evident by the added personnel for MIH and CRR in the last two budgets. But there is more work to do, and it is part of the plan for the next six years.

The table at the end of this report outlines a series of action items, spread over the course of the next six years, that will guide MCFRS decision-making, staffing, and resource deployment. The list is not exhaustive; as MCFRS continues to monitor its programs, we must be able to notice and adapt quickly. Changes to action items listed in this plan will be discussed as budget preparation begins each year, and any modifications and updates will be communicated to internal and external stakeholders via the annual report and workplan.



This list does not contain any specific objectives related to MCFRS' focus on data. Reorganization of positions in FY23 allowed us to create a Performance Management and Data Analyst III position, which will be assigned to the Planning Section. This position will support analytical needs throughout the department, including performance measurement. One of the most significant issues confronting the department right now is the conversation surrounding the disaggregation of data, the ability to associate race and ethnicity with incidents, which would allow us to view service delivery with an equity lens.

Separately, and related to equity and vulnerability, is the department's need to eliminate the historically designated planning zones (the box areas) and implement census tracts as the foundation for all risk, vulnerability, and resilience analysis. The MCFRS approach considers "community" at various levels; first, from a "whole of County" perspective, then also from the perspective of individual communities. Resource deployment, e.g., a specific ambulance, is important at the whole of County level in that it provides system-wide capacity. We send the closest unit regardless of its geographic home. However, there are considerations for individual communities, especially with respect to racial equity and the idea that resources should be deployed, to the extent possible, to either reduce inequities or at the least, not create new inequities.

This represents a fundamental shift for MCFRS. We have historically considered risk using fire station box areas as the primary delimiter. This practice is problematic because box areas are artificial creations based on ancient technologies that could not provide a real time accounting for unit location and instead, based response order on a static imagining of space.

Furthermore, box areas are based on station locations, which were positioned solely on the judgment of the local fire and rescue departments and the availability of land at the time location decisions were made. Box areas do not define a community. Census tracts provide a more adequate definition of community because a census tract benefits from a more consistent rule set for delineation, more consistent application over time, and, most importantly, because the measures of demographics leading to social vulnerability are tied to them. There are technological challenges that must be overcome for us to fully transition to this method of analysis.

We also recognize that this list does not explicitly reflect actions or work on equity, either internal or external. The FY24 budget included funding for a Diversity, Equity, and Inclusion Officer. When that position is filled, our work will begin on evaluating and working toward implementation of the recommendations from the *Building Organizational Capacity for Diversity, Equity, and Inclusion in the Fire and Rescue Service* report prepared by the National Academy of Public Administration. Foremost in that effort is the development of a Racial Equity and Social Justice Action Plan, which will contain specific objectives and strategies related to building equity capacity. That is included in the list here.

Year	Action Items	Goal(s)	Equity	Learning	Education/ Prevention	Response/ Recovery
FY24/ 25	Forego additional EMS deployment changes for FY24 to study impact of ALS701, M732, & A718.	5		X		
	Define and track UHU ²³ for all units; let's answer "how much is too much?"; begin with UHU of 40% sustained over six months as metric to initiate review process.	5		X		
	Consider redeployment of personnel to cover areas of higher need (including community risk reduction).	1, 5	X	X	X	X
	Continue to plan using static deployment; explore methods to integrate more dynamic modeling.	5		X		
	Begin evaluation of MIH to identify service expansion opportunities; consider redeployment of personnel to enhance MIH early intervention (e.g., areas of high fall evaluation incidents).	5, 6	X		X	X
	Work with Labor to develop peak time EMS transport schedule.	1, 3	X	X		X
	Initiate work to tailor structure fire response to square footage and/or occupancy type.	1, 5	X	X		X
	Consider methods to reduce the impact of false fire alarms.	1, 5, 6		X		
	Improve methods to capture LFRD added capacity.	2, 5		X	X	X
	Develop core process measures for fire suppression.	4, 5		X		
	Develop community risk reduction strategy.	1, 5	X		X	
	Initiate work group to identify pinch points in volunteer operational progression.	2, 3		X		

GOALS

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|--|--|
| 1) Maximize protection for life & property | 4) Ensure accountability. |
| 2) Maximize volunteer participation | 5) Improve operations & administration |
| 3) Optimize personnel practices | 6) Integrate planning at all levels. |
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²³ Unit hour utilization (UHU): for any given unit, minutes commuting to calls divided by total minutes in service.

Year	Action Items	Goal(s)	Equity	Learning	Education/ Prevention	Response/ Recovery
FY24/ 25	Begin evaluation of non-operational personnel assets and activities to determine which should remain organic FRS functions and which are more appropriately handled by other County agencies via service agreements.	3		X		
	Begin work to improve our capacity to understand, normalize, and operationalize equity when the DEI officer position is filled in FY24. Prepare the Racial Equity Action Plan (due 2025).	3, 4	X	X		
	Service request enhancements based on data analysis for full year FY24 data.	5		X		
FY25/ 26	Begin using lessons learned from previous year to rewrite the MCFRS Standards of Cover, using the accepted theory (i.e., network, power grid, etc.).	5	X	X	X	X
	Consider increases to EMS supervision (EMS705, EMS701)	1, 5		X		
	Use prior year data to evaluate the effectiveness of ALS cars in general, as compared to ALS engines and medic units.	5		X		
	Finalize plans and policy work needed to make fire responses more "adaptive."	1, 5		X		X
	Institutionalize quarterly review of performance measures and corrective actions.	4, 5		X		
	Reevaluate need for additional CRR personnel (civilian FTEs).	5	X		X	
	Consider additional civilian employee to support Special Operations with focus on public policy related to alternative fuels, batteries, and other alternative energy sources.	5		X		X

GOALS

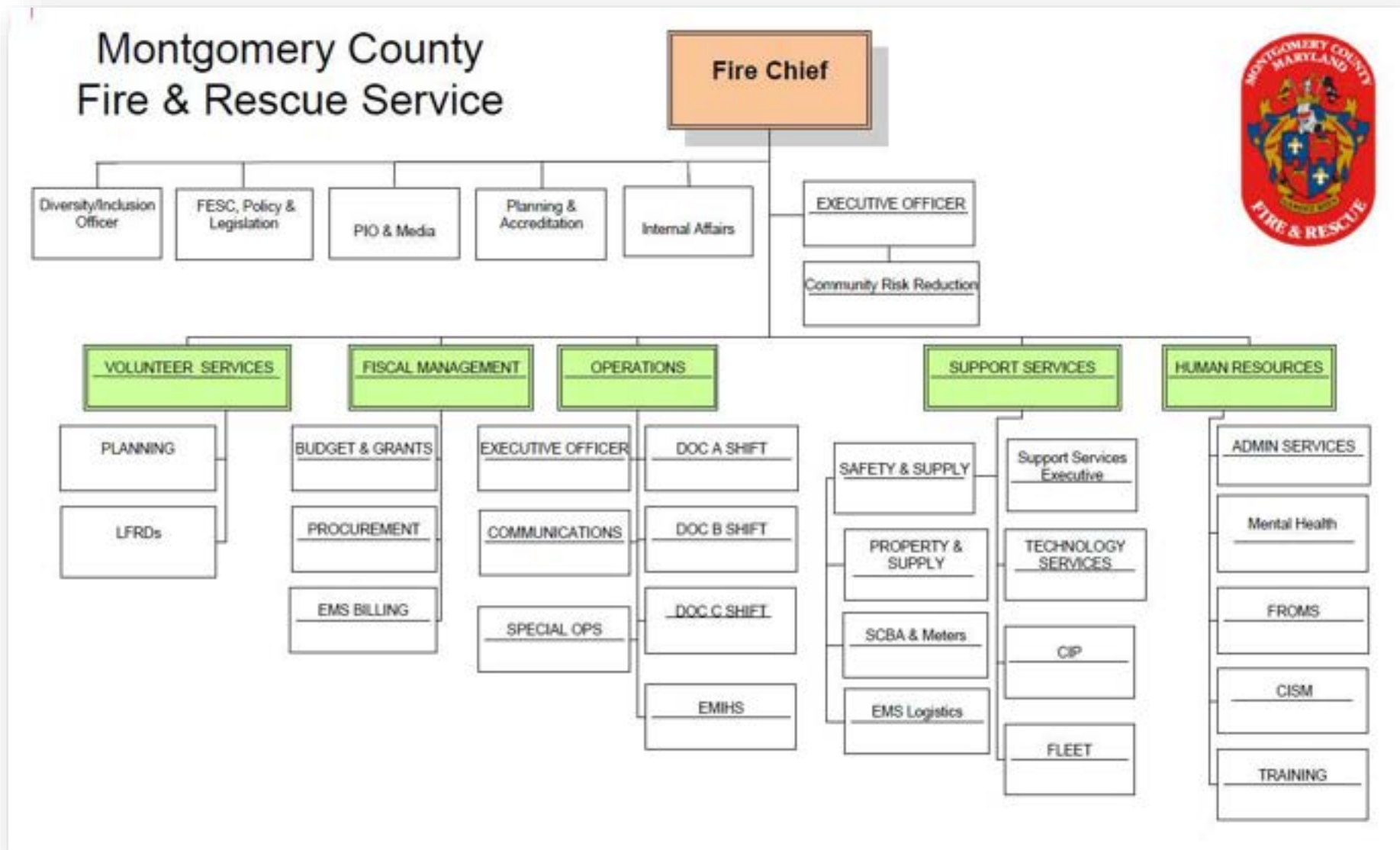
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|--|--|
| 1) Maximize protection for life & property | 4) Ensure accountability. |
| 2) Maximize volunteer participation | 5) Improve operations & administration |
| 3) Optimize personnel practices | 6) Integrate planning at all levels. |
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Year	Action Items	Goal(s)	Equity	Learning	Education/ Prevention	Response/ Recovery
FY25/ 26	Assess the staffing and deployment model of the PSTA (CPSE recommendation); study the impact of the COVID halt on training and explore how to increase throughput, even if temporarily, to increase the number of operational volunteers (LFRDs) available for response activities.	2, 3, 5		X		
	Reevaluate mental health staffing after FY24 positions are added to determine if additional services/staff are needed	3		X		
	Service request enhancements based on data analysis for full year FY25 data.	5		X		
FY26/ 27	Institute dynamic fire responses.	1, 5				X
	Reconsider needs for new FRS worksites [initiate CIP processes].	5	X	X		
	Reevaluate need for additional CRR personnel (civilian FTEs).	5	X	X		
	Reevaluate other non-operational program areas to determine needs.	5		X		
	Service request enhancements based on data analysis for full year FY26 data.	5		X		
FY27/ 28	Evaluate prior year's data.	4, 5		X		
	Service request enhancements based on data analysis for full year FY27 data.	5		X		
FY28/ 29	Evaluate prior year's data.	4, 5		X		
	Service request enhancements based on data analysis for full year FY28 data.	5		X		

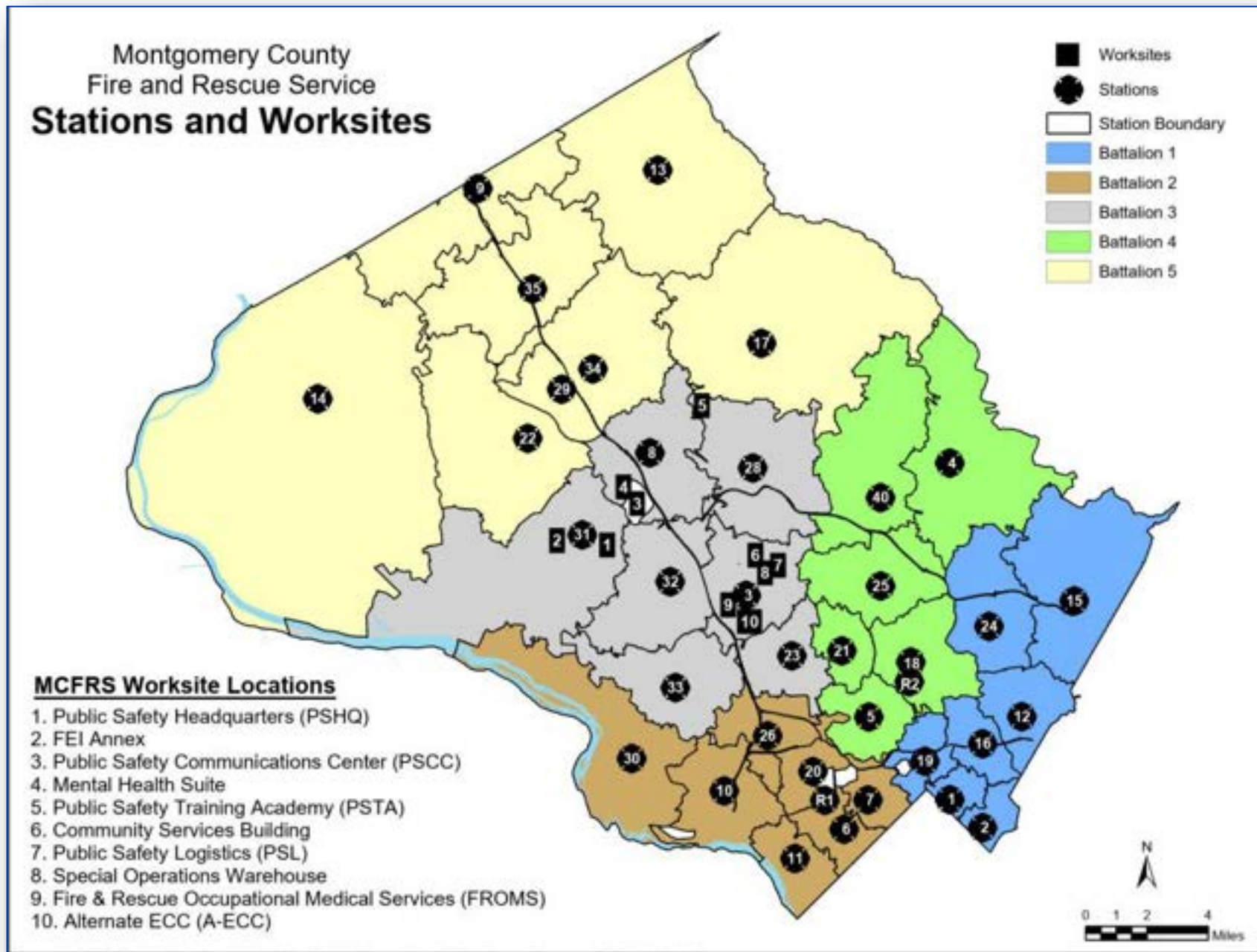
GOALS

- 1) Maximize protection for life & property
- 2) Maximize volunteer participation
- 3) Optimize personnel practices
- 4) Ensure accountability.
- 5) Improve operations & administration
- 6) Integrate planning at all levels.

Appendix A, MCFRS Organizational Chart



Appendix B, MCFRS Worksites



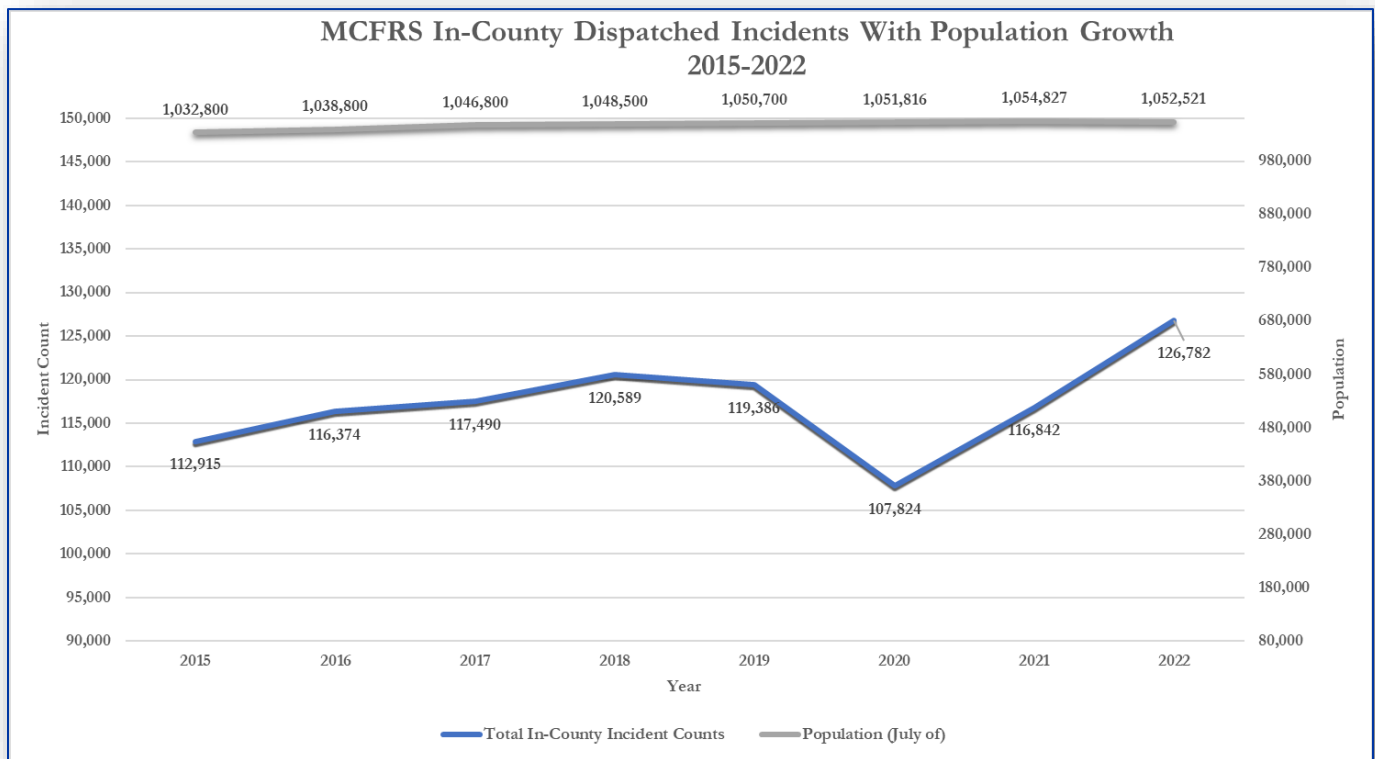
Appendix C, MCFRS Incident Data & Maps

Category	CY2016	CY2017	CY2018	CY2019	CY2020	CY2021	CY2022
Fire	17,388	16,719	18,642	17,715	16,455	17,758	19,592
EMS	94,513	95,897	96,435	95,920	88,450	95,963	103,708
Other	8,472	8,341	8,770	9,132	8,343	8,608	9,592
<i>Mutual Aid</i>	<i>3,999</i>	<i>3,468</i>	<i>3,257</i>	<i>3,378</i>	<i>5,424</i>	<i>5,487</i>	<i>6,108</i>
Total	120,373	120,957	123,847	122,767	113,248	122,329	132,892

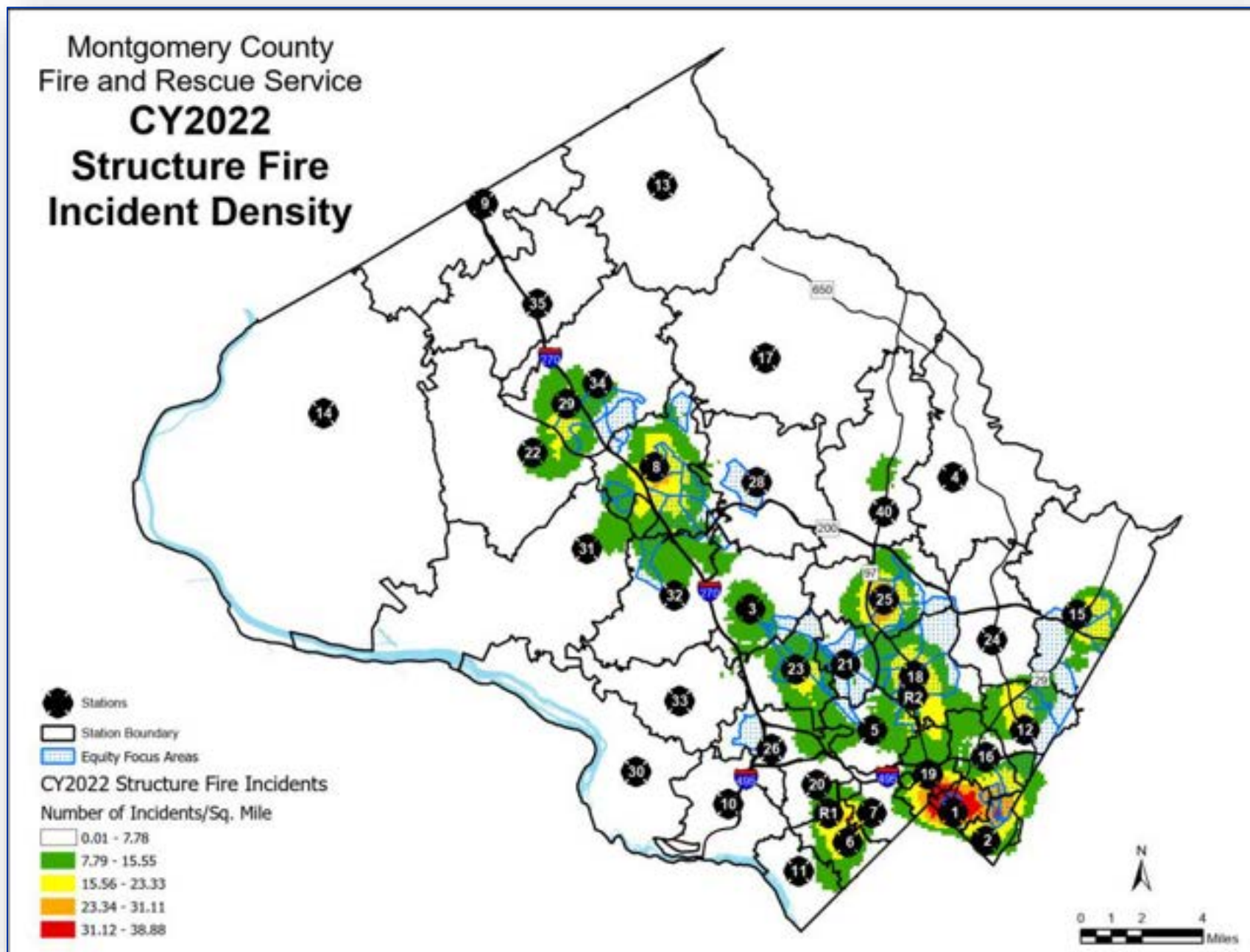
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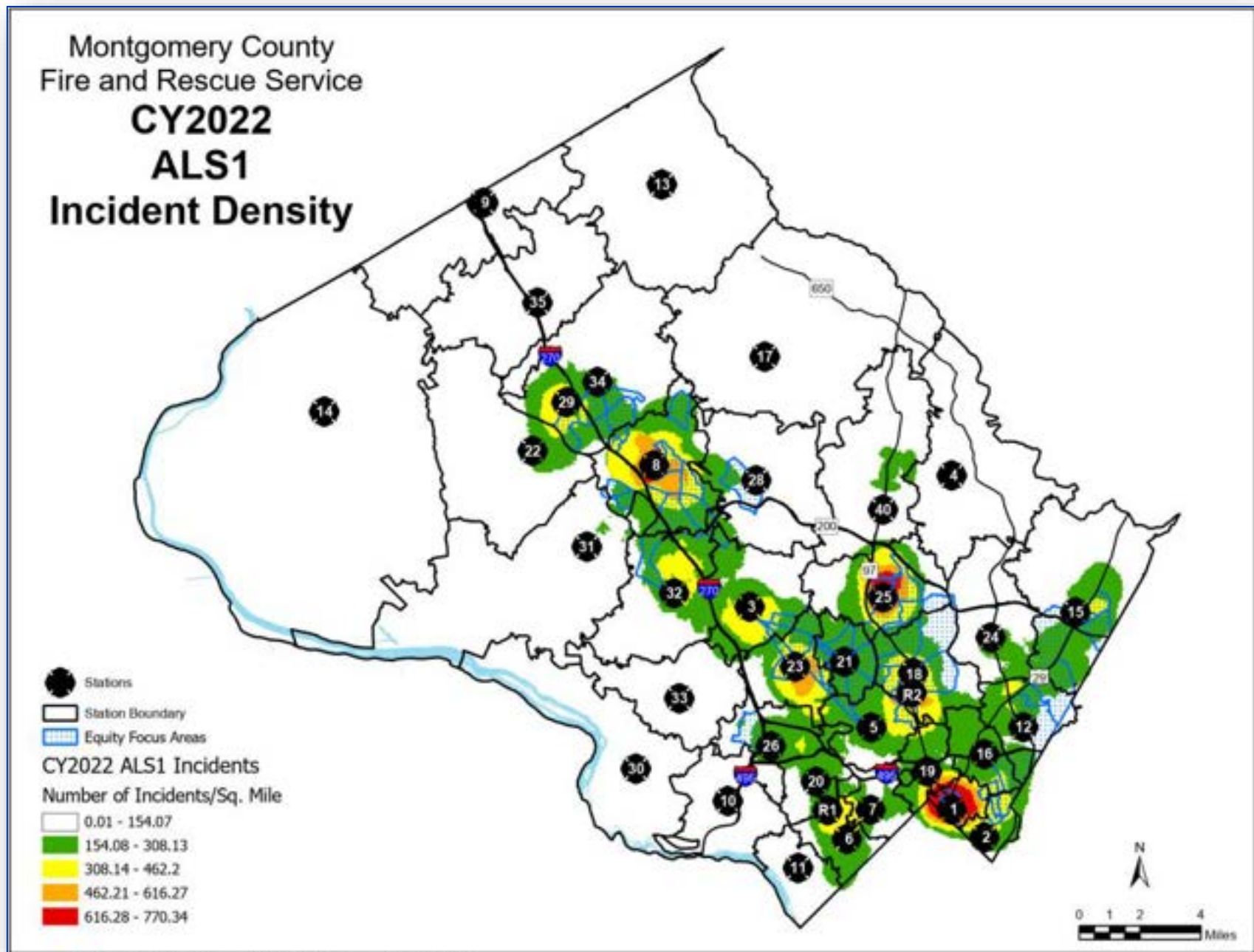
Other calls include special operations, service, and system calls.

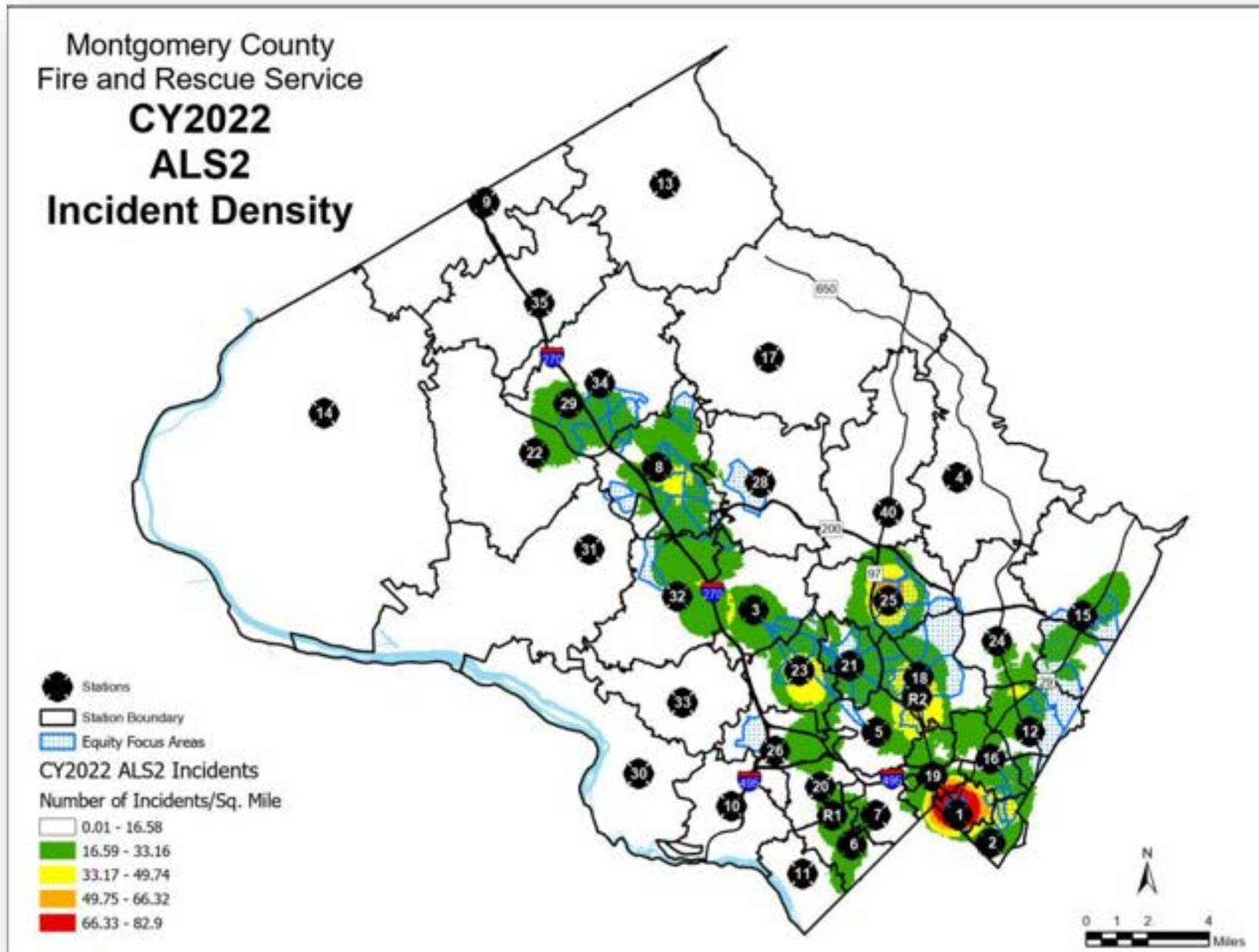
Mutual aid calls (outside Montgomery County) are included in the total number of each call type and total but are shown here to distinguish the workload.

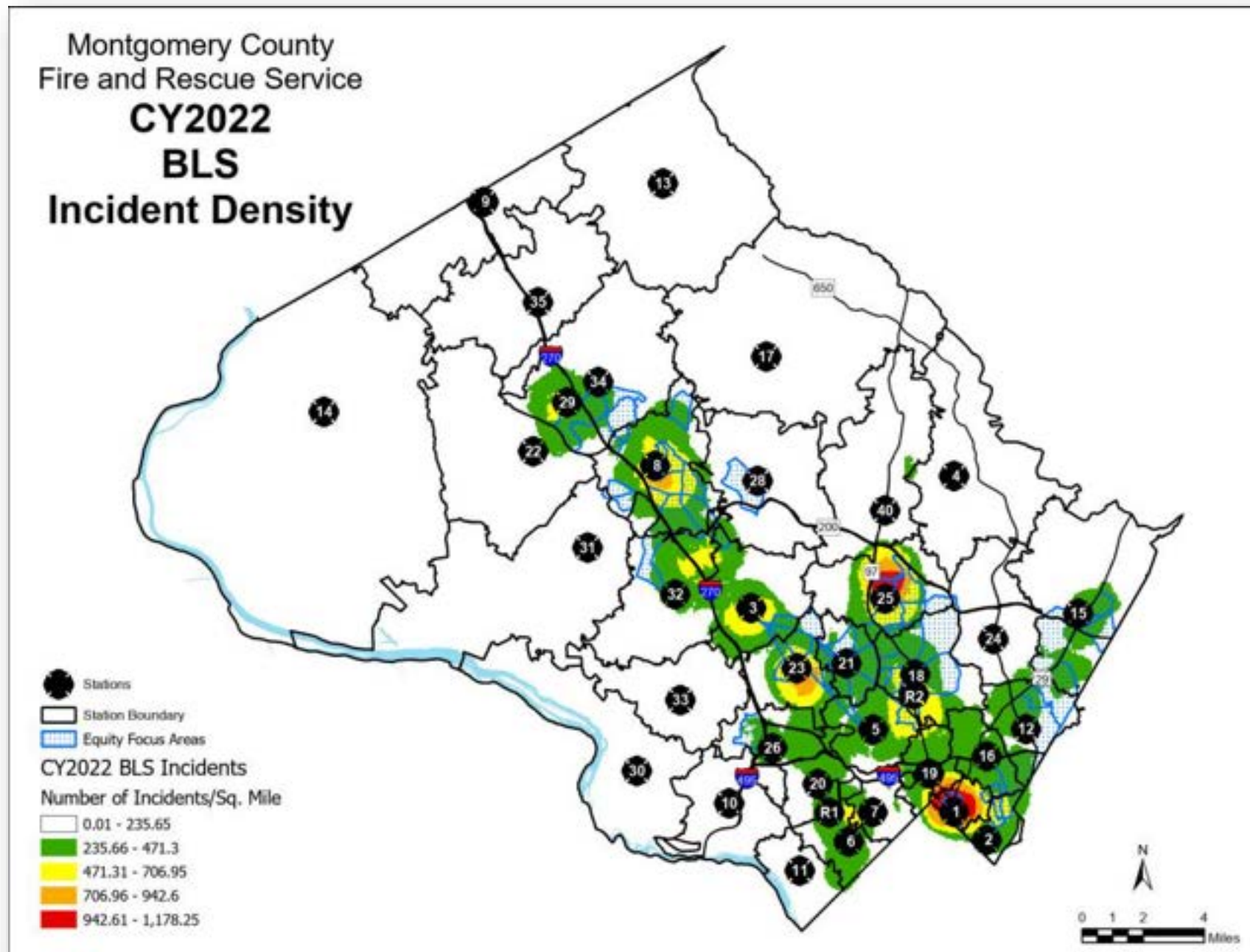


The maps on the following pages illustrate call volume per square mile; the response area is similar to the [FY14] maps in the last master plan and noticeably includes the designated equity areas. MCFRS must seek greater understanding of the factors contributing to the increasing call volume in those areas in order to improve service delivery, staffing, and deployment.









Appendix D, Risk in Montgomery County

In 2022, MCFRS revised and updated its assessment of risk in Montgomery County, driven by the notion that vulnerability is proportional to risk and the previous formula did not account for certain factors.

Rather than using a cumulative score based on likelihood and impact, as was done in the 2017 risk assessment, the Planning Section considered risk to be the quotient of the sum of a series of risk or aggravating factors (the conditions that increase vulnerabilities, whether physical, functional, or systemic) divided by the sum of mitigating factors (the physical characteristics present, and the actions taken by the department to reduce vulnerability). Mathematically, it looks like this:

$$\text{Risk} = \text{aggravating factors/mitigating factors } [R = R_{AF} / R_{MF}]$$

This mathematical formula is not perfect or without limitations, but it does provide a methodology for normalizing risk considerations across a diverse range of local circumstances. MCFRS assigned a subjective range of points to each aggravating and mitigating factor for each hazard category the department has a role in preventing and mitigating: structure fires, emergency medical services, hazardous materials, technical rescue, water/ice rescue, bombings/explosions, aircraft rescue/firefighting, and brush/wildland fires.

MCFRS still used the box areas as the designated risk management zones, but we recognize the limitations of using so many small geographical areas. There are 840 random, unique box areas. There are no consistent characteristics (e.g., size/area), so when extrapolating demographic data at this level, the numbers are often so small that some box areas receive no points for certain aggravating factors. Data representing the population and pertinent factors was obtained from the 2020 U.S. Census.

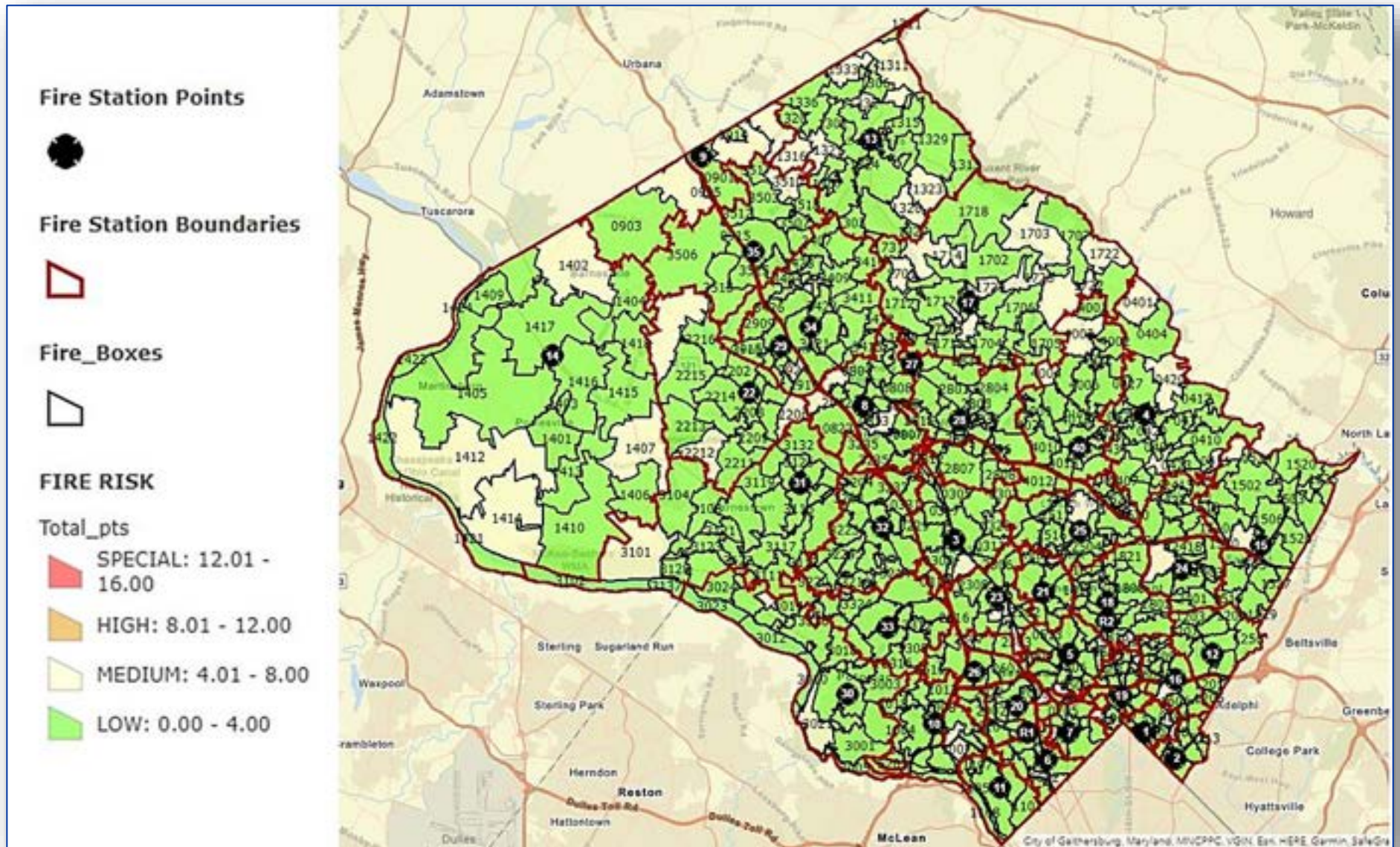
Once the risk quotient was determined for each risk management zone, the score was further categorized to define risk as low, medium, high, or special. The closer the risk quotient was to zero, the lower the risk in that box. Box areas with risk quotients that fell at the upper range of the score (furthest from zero) for the respective hazard types were classified as special risk.

The mathematical change in the “formula” to assign a score and categorize risk caused some changes to the appearance of the risk maps. The most significant changes occurred within the structure fires and emergency medical services categories, primarily due to the addition of new aggravating factors reflecting vulnerabilities within the population. However, the results were consistent when compared to the CDC SVI maps.

The maps on the following pages highlight the risk in Montgomery County for each hazard county MCFRS has responsibility for; the full report is available [here](#). Over this next planning cycle, MCFRS will be updating this to evaluate risk at the census tract level, and incorporating, as necessary, additional research and literature compiled by the Planning Board and others.

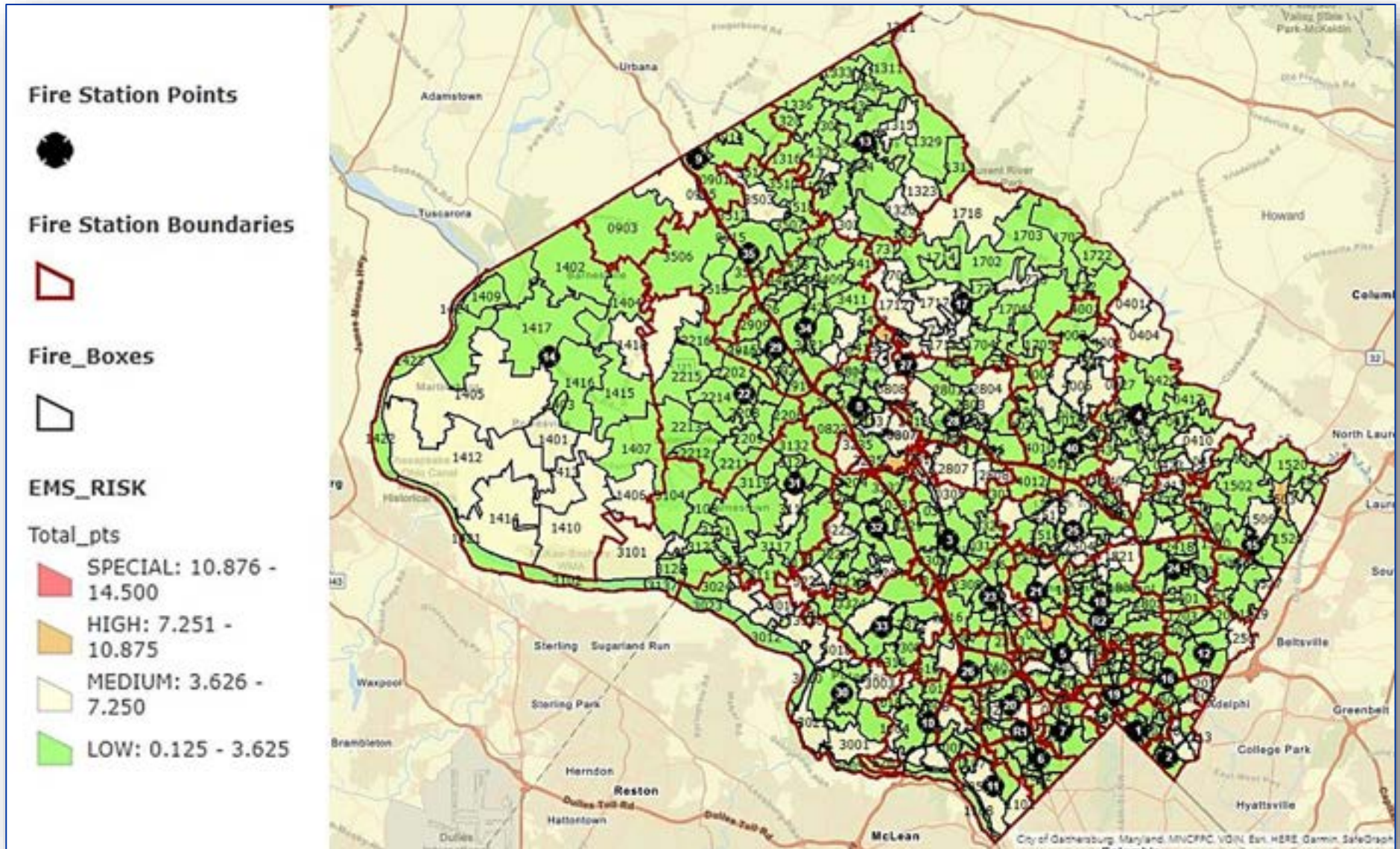
Appendix D, Risk in Montgomery County

Hazard: Fire



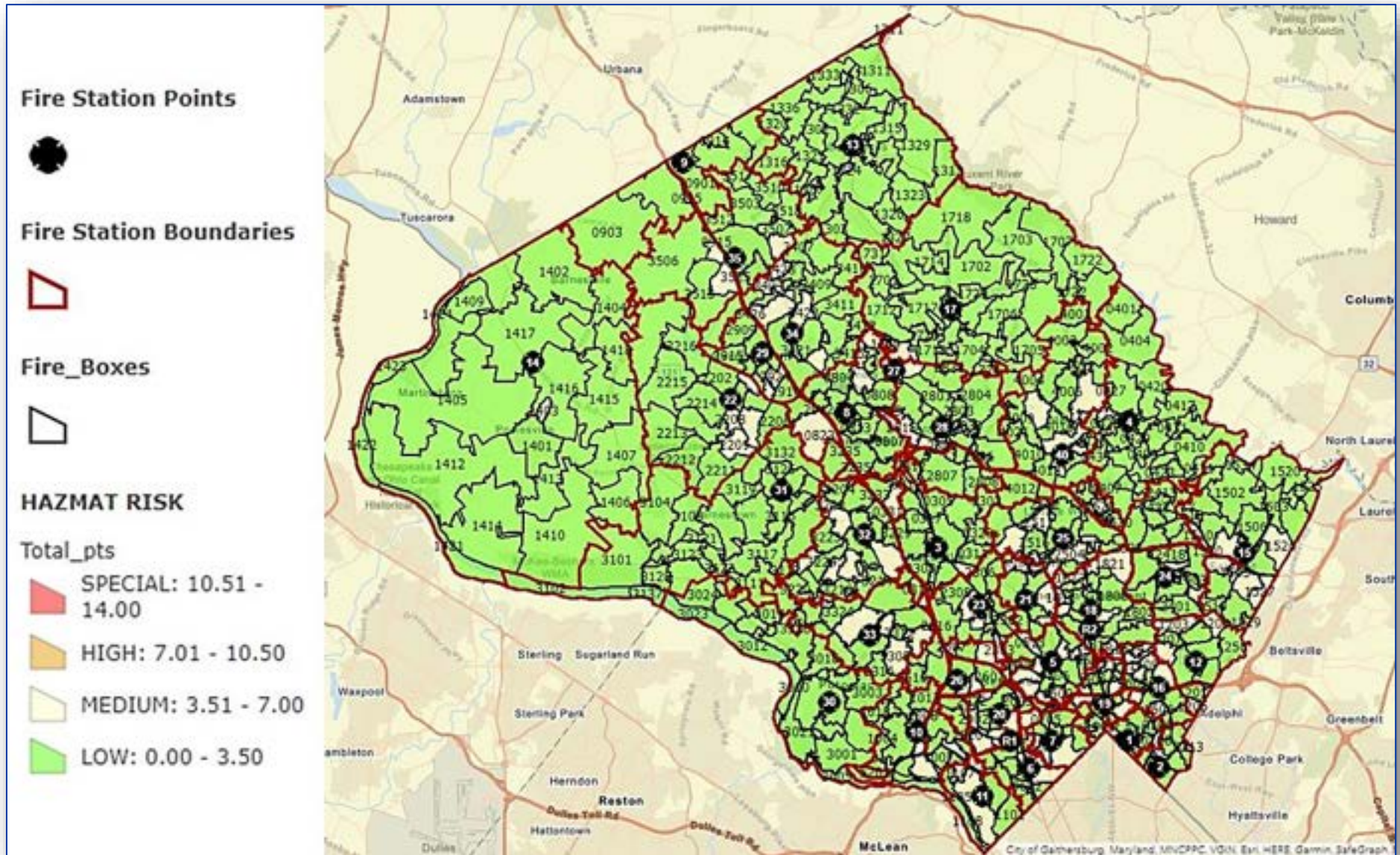
Appendix D, Risk in Montgomery County

Hazard: Emergency medical incidents



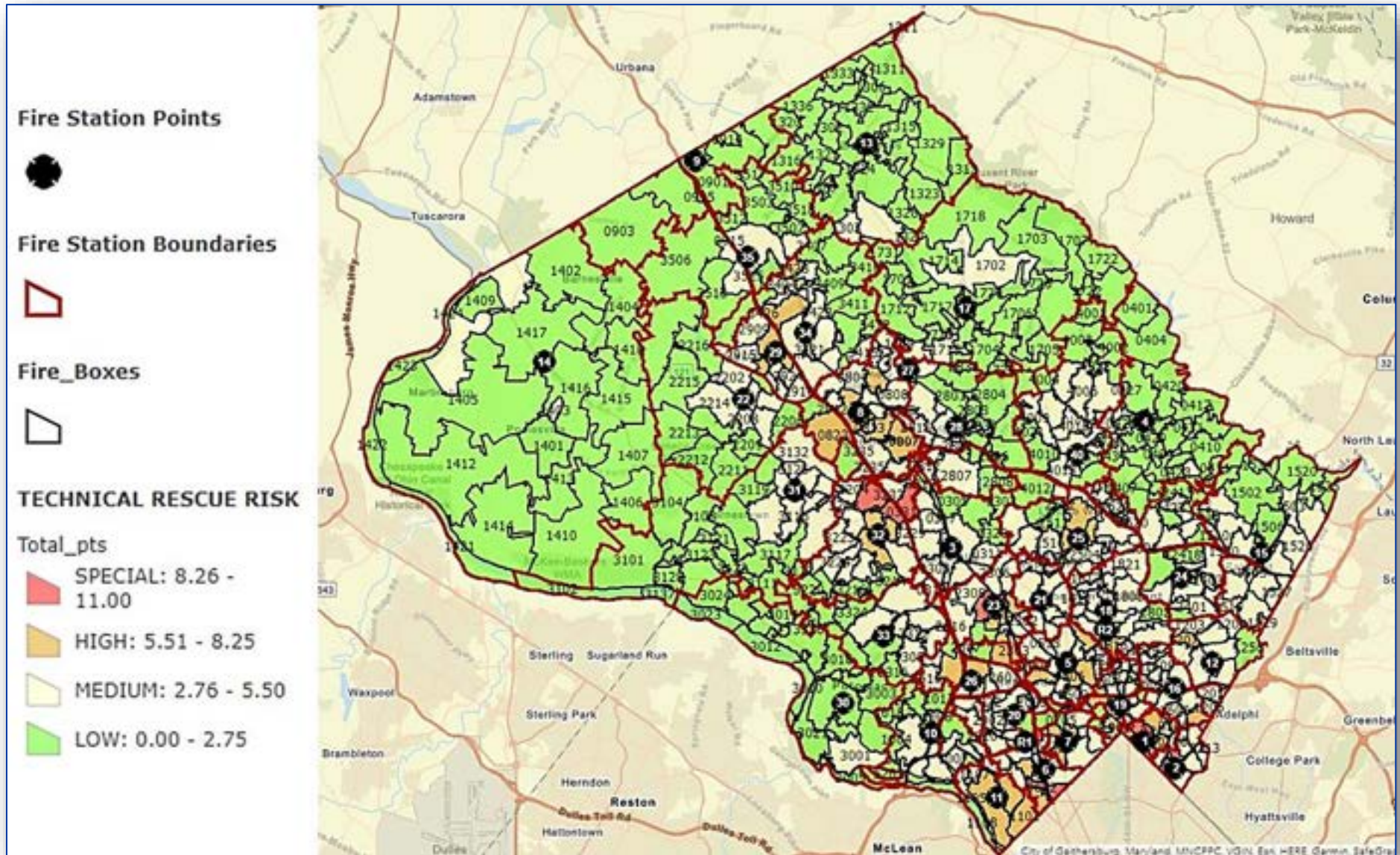
Appendix D, Risk in Montgomery County

Hazard: Hazardous Materials



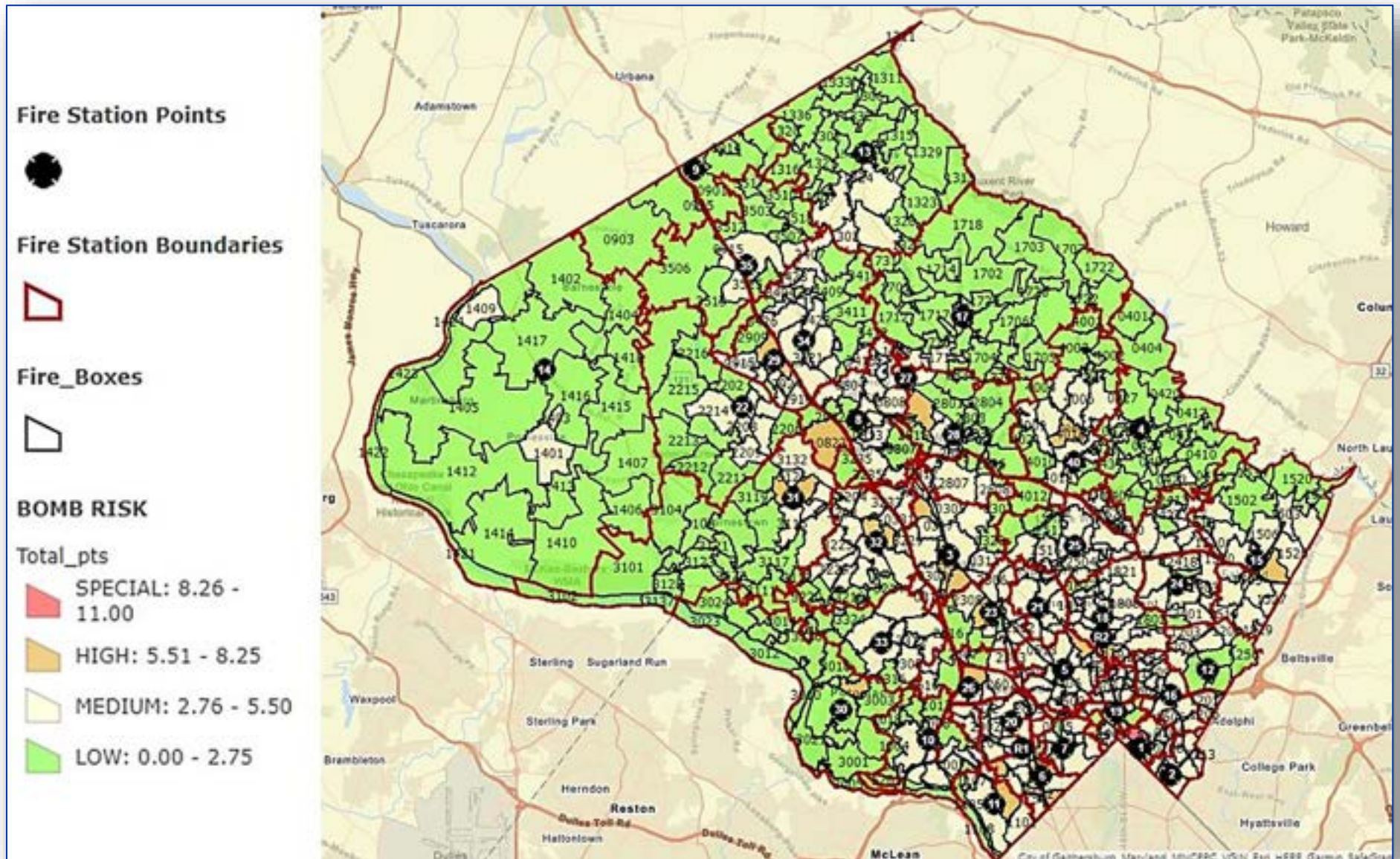
Appendix D, Risk in Montgomery County

Hazard: Technical Rescue



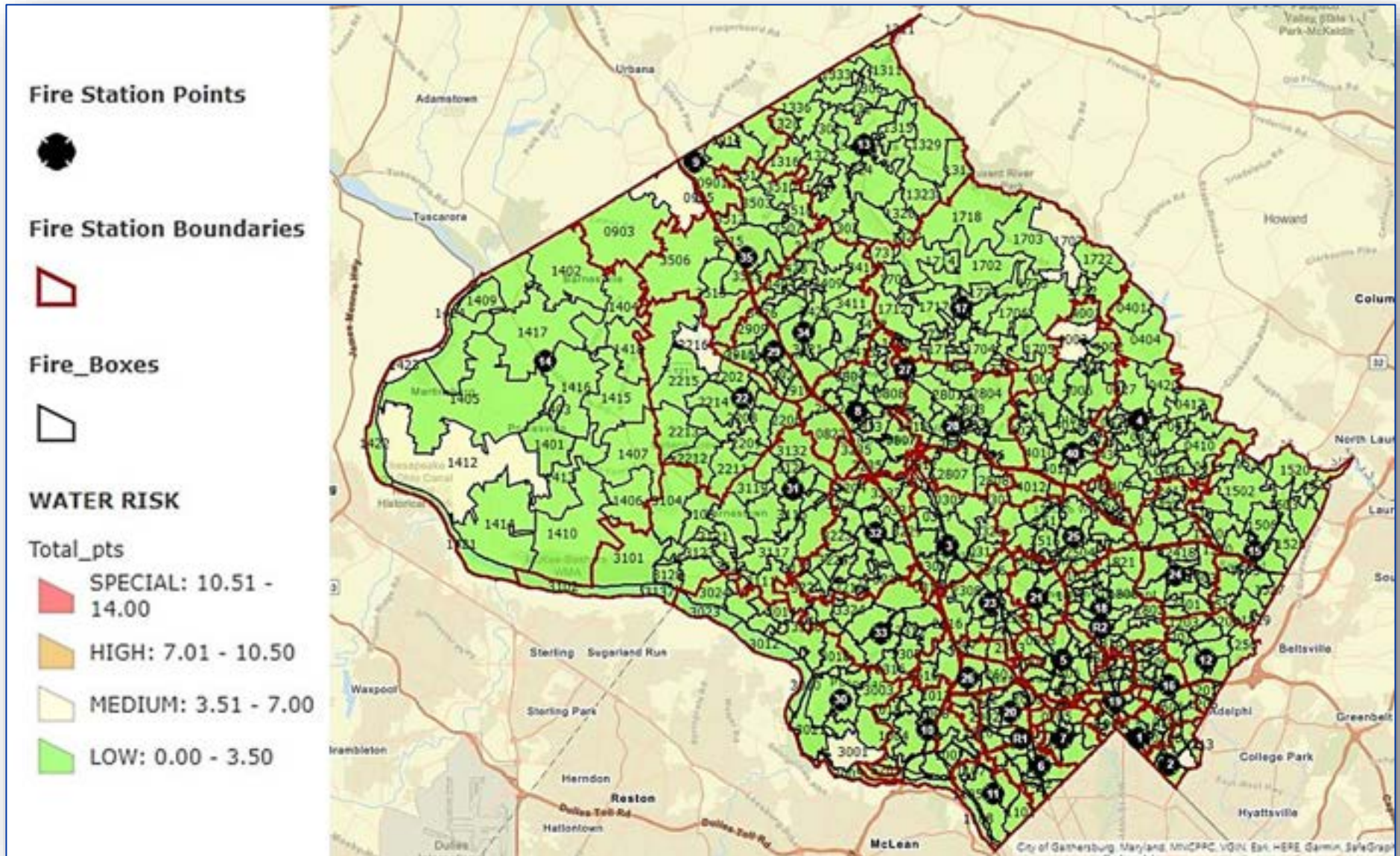
Appendix D, Risk in Montgomery County

Hazard: Explosion/Bombing



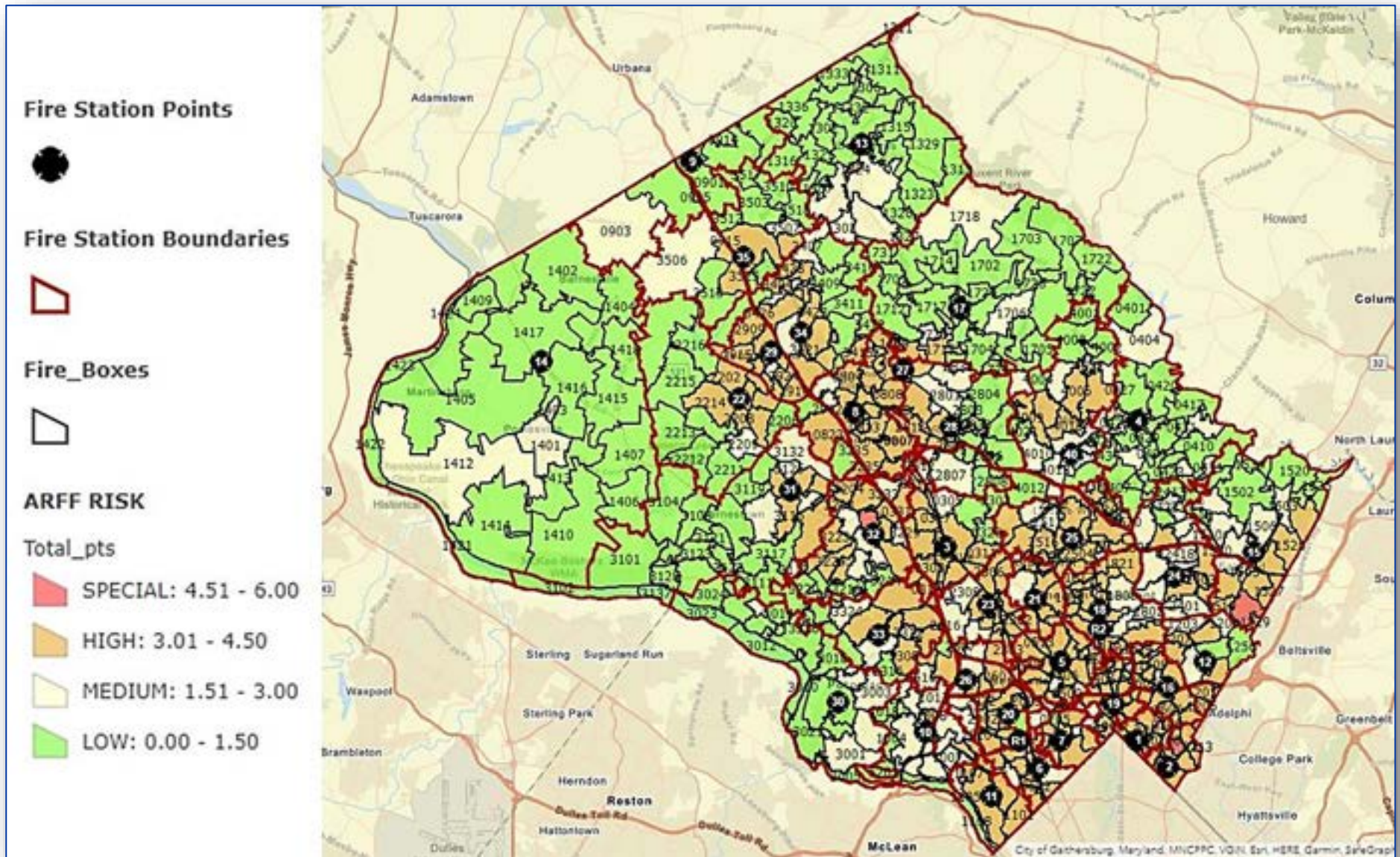
Appendix D, Risk in Montgomery County

Hazard: Water/Ice



Appendix D, Risk in Montgomery County

Hazard: Aircraft Rescue/Firefighting



Appendix D, Risk in Montgomery County

Hazard: Brush/Wildland Fires

