



COMMUNITY RISK ASSESSMENT Standards of Cover



Submitted for Agency Consideration to the
Centers for Public Safety Excellence Commission
on Fire Accreditation International, Inc.



City of Hickory (NC) Fire Department Standard of Cover Development Team

Matt Hutchinson, Fire Chief

Chad Fisher, Deputy Fire Chief – Operations

Jason Lowrance, Deputy Fire Chief – Administrative

Stephen Craig, Fire Marshal – Fire & Life Division

Marcus Scott, Fire Captain – Accreditation Manager

Daniel Ezzell, GIS Analyst – City of Hickory

City of Hickory (NC) Elected Officials

Hank Guess, Mayor

Tony Wood, Councilor – Ward 1

Charlotte Williams, Councilor – Ward 2

Danny Seaver, Councilor – Ward 3

Rev. Dr. Anthony Freeman, Councilor – Ward 4

David Zagaroli, Councilor – Ward 5

Jill Patton, Councilor – Ward 6

INTRODUCTION

This report reflects the Community Risk Assessment (CRA) and Standards of Cover (SOC) for the Hickory Fire Department (HFD). The information and data collected for this document represents the identified risks to the community of Hickory, North Carolina as well as the resources and level of coverage available from the HFD along with surrounding agencies to help prevent, mitigate, and recover from risks to the community. The Commission on Fire Accreditation International (CFAI) establishes the need to conduct a risk assessment for the community to identify vulnerabilities to life and property. As risks to the community are identified, the ability to respond to these risks must be assessed to verify the department's level of service in meeting the needs of its citizens. To complete such a task, it is necessary to conduct a significant amount of research and provide a thorough analytical evaluation of the findings. These findings must not be limited to the department and its practices but must also include many different aspects of the community.

The following report contains an overview of the city, fire department services, all hazard/risk assessment for the community, current deployment and performance data, critical tasking for effective response force determinations, and a plan for maintaining and improving response capabilities. This is meant to serve as a living document for the citizens of Hickory and the members of the Hickory Fire Department.

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ORGANIZATIONAL BACKGROUND

The city of “Hickory Tavern” was established in 1863 and was changed to the city of Hickory in 1873. What was once a small city known as a trading center on the Western North Carolina Railroad and a thriving twentieth-century manufacturing center for furniture, hosiery, and textiles is now a city that enjoys a strong future while continuing to honor its rich heritage. After World War II, Hickory continued growing and became a center for furniture factories, hosiery mills, and many other manufacturing industries.

Today, the city is still a key point for furniture production, although the market is not as strong as in the past. Technology has also become part of the area, with Hickory being home to large data centers for Apple and Google. The city boasts a growing economy and demographic within its 29.8 square miles.



The Hickory Fire Department has a vast history that has evolved into a career department that meets the needs within the community. Today, the Hickory Fire Department operates from 7 fire stations with 135 members.

The service delivery of quality fire and life-safety programs is the cornerstone of the agency’s organizational practices. The department engages members of the community in proactively ensuring Hickory is a safe place to raise a family and own a business, which is essential to the department’s community outreach. An established fire prevention program is in place providing educational opportunities and inspections to safeguard the community. The department embraces excellence in the other programs that provide for or support an all-hazards approach to a safe community to include, including administration, fire suppression, private industry training,

emergency medical services, community emergency response team (CERT) training, technical rescue response, hazardous materials operations, as well as other services.

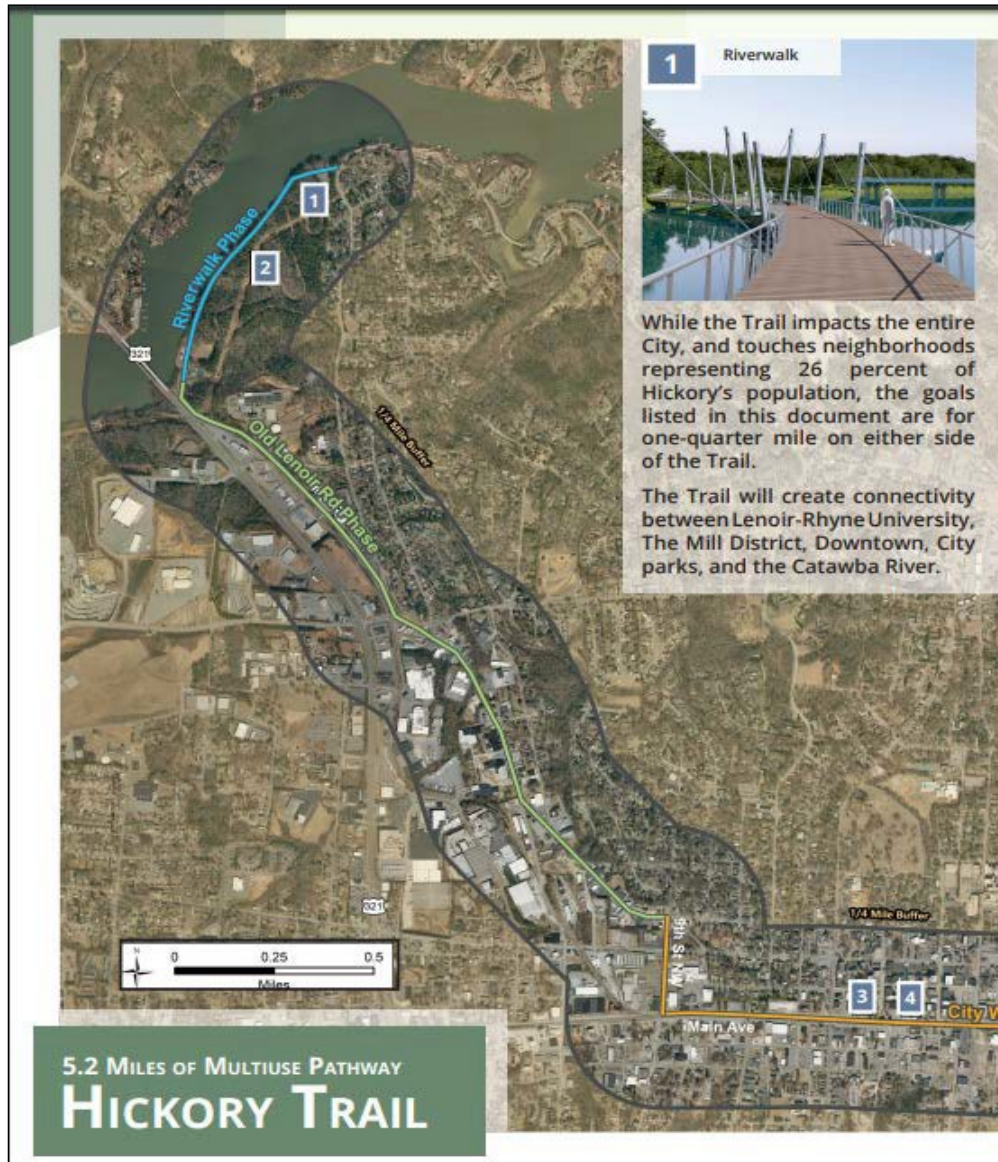
Hickory, North Carolina, is nestled at the foot of the Blue Ridge Mountains along I-40 between Charlotte and Asheville. According to the U.S. Census Bureau, the City of Hickory has a total area of 29.8 square miles. Lake Hickory lies along the city's northern edge. The lake provides a reliable water source and a site for boating, fishing, and other recreational water activities.

The U.S. Census Bureau estimates Hickory's population to be 43,532, which is an increase of 40 percent since 1995. The city is in Catawba County, North Carolina, and is the principal city in the Hickory-Lenoir-Morgantown metropolitan statistical area (MSA), which has a population of 365,497.

The furniture industry, which once dominated the area's economy, continues to be an important part of the local economy. Hickory's economy has diversified to include fiber-optic cable and pressure-sensitive tape manufacturers, as well as data centers. The corporate headquarters of Transportation Insight, a third-party logistics provider, is located in downtown Hickory, and Apple has a billion-dollar data center campus just south of the city. Principal industries include wholesale grocery, retail trade, communications, utilities, health care, textiles, real estate, and furniture.

The City of Hickory has made major investments in recreation and downtown improvements. The biggest project is the Hickory Trail Project (Figure 2-1), which includes four major components: The City Walk, Streetscapes and Gateways, Riverwalk, and a Class A advanced manufacturing component (the Trivium Corporate Center). In 2014, citizens voted to approve a \$40 million bond referendum. The Hickory Trail intends to create linkages to city destinations, cultural and recreational centers, businesses, and Lenoir-Rhyne University.

The City Council recently approved the plans for renovating Union Square and enhancing the streetscapes downtown to better coordinate with City Walk plans. Construction on the Riverwalk phase, which is anticipated to begin in 2019, is intended to provide economic development and public access to the lake. All told, the projects are expected to bring 8,000 new jobs to Hickory, with a population increase of 3,500 and an increase in 1,760 new housing



units.

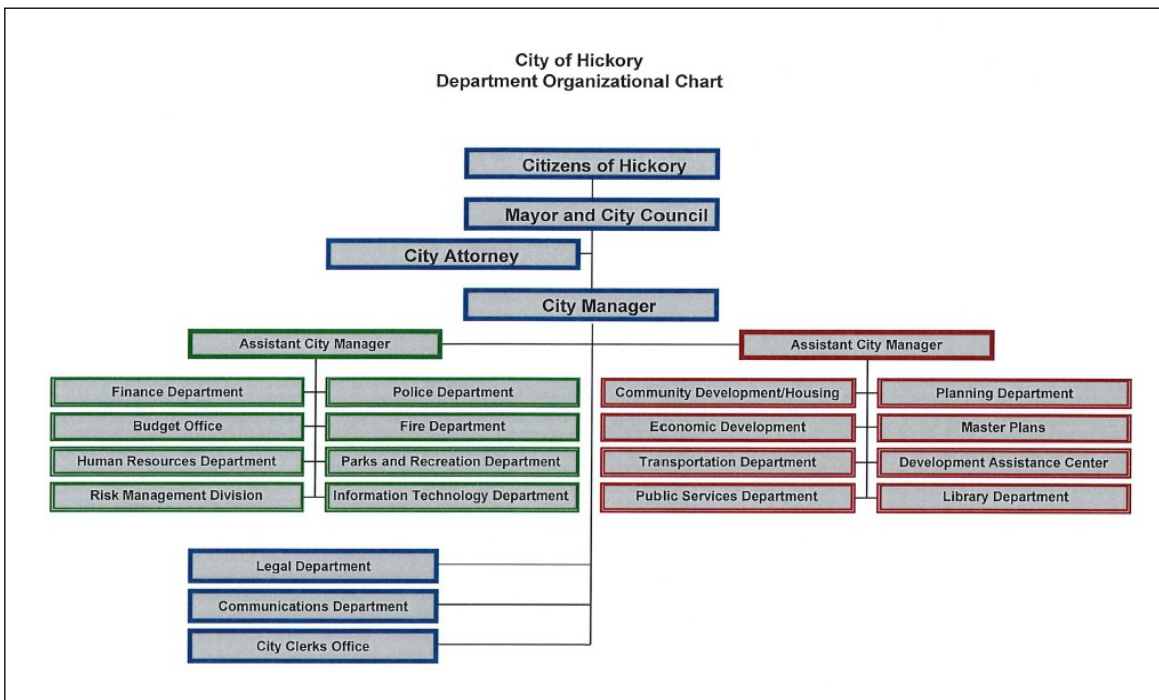
GOVERNANCE

The City of Hickory has operated under a council-manager form of government since 1913 when citizens voted for this form of government as part of the new city charter. Hickory was the second city in the nation (after Staunton, Virginia) and the first in North Carolina to create and exercise the council-manager system. The council-manager form of government combines the political leadership of elected officials and the administrative experience of a professional manager. Hickory's City Council is composed of six Alderman and a Mayor, who appoint the City Manager.

The City Manager's office conducts the overall administration of the city, coordinates all activities, and carries out the policies and actions of the City Council. The current city manager is Warren Wood, who has served in this position since April 2017. Wood is a native of Hickory and had been with the City of Hickory for 22 years before assuming the position of Town Manager of Waxhaw, North Carolina. The City of Hickory also has two assistant city managers: Rick Beasley and Rodney Miller.



The city of Hickory has 677 full-time employees. The day-to-day operations of city government are conducted through 45 departments and divisions. The organizational chart shows the organization and division of departments among the city manager and assistant managers.



Fire Department Organizational Structure

The City of Hickory is served by seven fire stations. The HFD is a first-responder agency in support of Catawba County EMS and responds to all medical calls within the city.

There are 139 authorized positions in the Fire Department. The department is divided between the Administration and Operations divisions. The administrative staff consists of a Fire Chief, two Deputy Chiefs, a Battalion Chief, Accreditation Manager, and two Administrative Assistants. Chief Matthew Hutchinson serves as the department's Fire Chief.

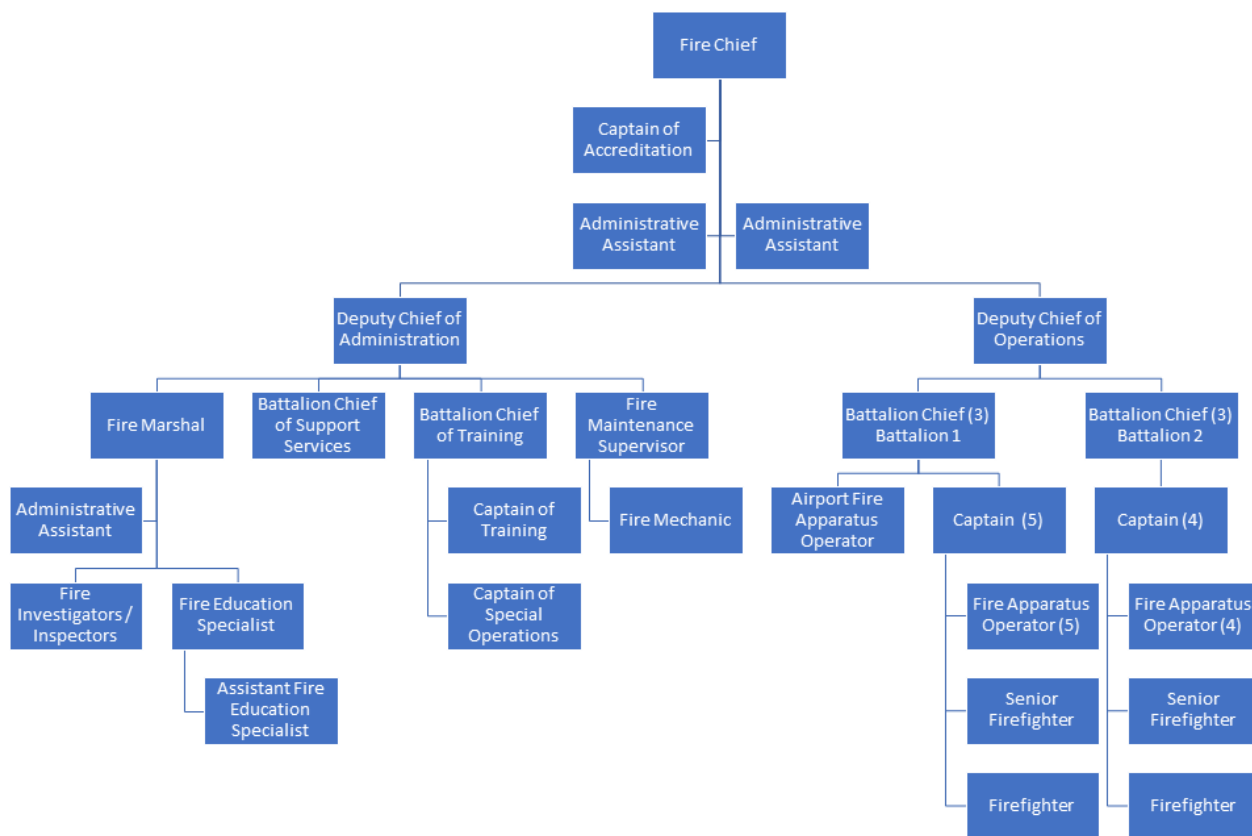
The Operations Division is the largest division within the HFD. It is divided into three shifts, each supervised by two Battalion Chiefs. Each battalion consists of 39 officers and firefighters. Firefighters work an average of 56 hours per week. The Operations Division, in addition to responding to fire and EMS calls for service, test the 2,370 fire hydrants within the city limits, conducts station tours and fire education programs.

Hickory Fire Department Community Risk Assessment-Standards of Cover

HFD currently deploys:

- 6 engine companies.
- 2 ladder companies.
- 1 rescue truck.
- 1 airport crash/fire/rescue truck.
- 2 Battalion Chiefs (Battalion 1; Battalion 2)

Resources are staffed 24 hours a day, 365 days a year. Additional apparatus includes a reserve ladder, two engine companies, two tankers, and an equipment truck.



STRATEGIC PLANNING

Strategic planning is a disciplined effort with the goal of producing fundamental decisions and actions that shape and guide what an organization is, what it does, and why it does it. In the fire service, as well as other municipal functions, this process helps to ensure that an adequate and appropriate level of resources, including staffing and equipment, are allocated to meet the community's needs for the services delivered by the fire department as efficiently as possible.

Defining clear goals and objectives for any organization establishes the structure that ensures success or failure. Each program area must (1) define its goals; (2) translate the goals into measurable indicators of goal achievement; (3) collect data on the indicators for those who have utilized the program; and (4) compare the data on program



participants and controls in terms of goal criteria.³ Objectives should be SMART: specific, measurable, ambitious/attainable, realistic, and time-bound. This statement is an example: “To increase the number of working smoke detectors in homes by 5 percent within the next fiscal year.”

The plan should consist of typical introductory elements of a strategic plan (mission, vision, values, core services, and the planning process outline), but does not include the essential elements of strategic initiatives, measurable outcomes, and definable time periods during which the initiative would be implemented (short-term, mid-term, long-term). Fire and EMS operational and support programs need to be planned and managed to achieve specific, agreed-upon results. Determining how well an organization or program is doing requires that these goals or strategic initiatives be measurable, that they are measured against desired



results, and that they outline the strategies and costs, if any, to achieve the goals or satisfy an initiative. This is the goal of performance measurement and the strategic planning process. To achieve and/or maintain the highest level of professionalism and efficiency on behalf of those it serves, the Hickory Fire Department contracted with the Center for Public Safety Excellence (CPSE) to facilitate a method to document the department's path into the future via a "Community-Driven Strategic Plan." The strategic plan was written in accordance with the guidelines set forth in the Commission on Fire Accreditation (CFAI) *Fire & Emergency Service Self-Assessment Manual* and was intended to guide the organization within established parameters set forth by the authority having jurisdiction.



The community-driven strategic planning process went beyond just the development of a document. It challenged the department's members to critically examine paradigms, values, philosophies, beliefs, and desires, and challenged individuals to work in the best interest of the "team." It

further provided the department with an opportunity to participate in the development of its organization's long-term direction and focus. Members of the organization's community and department stakeholders' groups demonstrated commitment to this important project and remain committed to the document's completion and plan execution.

Community Priorities

To best dedicate time, energy, and resources to services most desired by its community, the Hickory Fire Department needs to understand what the customers consider to be their priorities. With that, the community stakeholders were asked to prioritize the programs offered by the department through a process of direct comparison. The results were as follows:

Programs	Ranking	Score
Fire Suppression	1	159
Emergency Medical Services	2	157
Technical Rescue	3	106
Hazardous Materials Mitigation	4	92
Emergency Management	5	83
Fire Inspection/Plan Review	6	68
Fire Investigation	7	67
Public Fire and Life Safety Education	8	54
Aviation Rescue and Firefighting	9	42

Mission

The purpose of the mission is to answer the questions:

- Who are we?
- Why do we exist?
- What do we do?
- Why do we do it?
- For whom?

Hickory Fire Department's mission is to provide our community with quality life safety, incident stabilization, and property conservation through professionalism and the continual pursuit of excellence.

Values

Values embraced by all members of an organization are extremely important, as they recognize the features that make up the personality and culture of the organization. A workgroup met to revisit the existing values and proposed a revision that was discussed, enhanced further, and agreed upon by the entire group:

Forward Thinking
Integrity
Resilience
Excellence Through Service

The mission and values are the foundation of this organization. Thus, every effort will be made to keep these current and meaningful so that the individuals who make up the Hickory Fire Department are guided by them in the accomplishment of the goals, objectives, and day-to-day tasks.

SWOT Analysis

Through a SWOT analysis (strengths, weaknesses, opportunities, and threats), an organization candidly identifies its positive and negative attributes. The SWOT analysis also provides an opportunity for an organization to evaluate its operating environment for areas in which it can capitalize, as well as those that pose a danger. Department stakeholders participated in this activity to record HFD's strengths and weaknesses, as well as the possible opportunities and potential threats. Information gathered through this analysis provides guidance toward the larger issues and gaps that exist within the agency. The information gleaned will assist the agency in finding its broader critical issues and service gaps.

Critical Issues and Service Gaps

Following the identification and review of the department's SWOT, two separate groups of department stakeholders met to identify themes as primary critical issues and service gaps. The critical issues and services gaps identified by the stakeholders provide further guidance toward the identification of the strategic initiatives, which will ultimately lend direction for the development of goals, objectives, critical tasks, and timelines.

Strategic Initiatives

Based upon all previously captured information and the determination of critical issues and service gaps, the following strategic initiatives were identified as the foundation for the development of goals and objectives.

Hickory Fire Department’s Strategic Initiatives			
Staffing	Organizational Practices		Health and Wellness
Technology	Succession Planning	Specialized Training	Community Outreach

Goals and Objectives

To continuously achieve the mission of the Hickory Fire Department, seven (7) realistic goals and thirty-nine (39) objectives with timelines for completion were established. Those objectives were further broken down into over 200 critical tasks. These will serve to enhance strengths, address identified weaknesses, provide a clear direction, and address the concerns of the community. These should become a focus of the department’s efforts, as they will direct the organization to its desired future while reducing the obstacles and distractions along the way. Leadership-established work groups should meet and manage progress toward accomplishing these goals and objectives and adjust timelines as needs and the environment change. Regular reports of progress and changes should be shared with the HFD’s leadership.

Vision

“Vision is knowing who you are, where you’re going, and what will guide your journey”

Ken Blanchard

Hickory Fire Department’s 2024 Vision

is to be widely known for always providing quality life safety, incident stabilization, and property conservation, while embodying all core values we will become a leader in the delivery of all-hazard responses and services. The

futurity of our organization, this vision, will be a reality if we all endeavor to accomplish our goals. **We will become this future by...**

Following opportunities to show we are forward-thinking and being better positioned to answer the call for which we exist. As we embrace the greater exploration and use of technology, we will realize more efficient and effective ways to serve. By broadening our department's abilities with comprehensive specialized training, we will be prepared now and in the future, for any challenges we may encounter. Through all of this, we will embrace the resulting innovation that continuously provides a return for all stakeholders.

Illuminating our commitment to integrity, as we work toward greater efficacy through enhanced organizational practices. Additionally, our initiatives in community outreach will bridge any gaps with our public, demonstrate our dedication, and further bolster our relationships.

Remembering our commitment to resilience as we invest in our most important asset, our members. With our emphasis on staffing and succession planning, we will ensure we remain mission-focused and resourced with a cadre of professionals now and tomorrow. By striving to invest in the health and wellness of our members, we will guarantee their longevity, while providing a return to our citizens. In the course of these efforts, Hickory will be a safer and better place to live, work, and play, while striving to be the best of the best.

Embracing excellence through service and remembering our history, we will always be persevering for future change. With this focus, together we will unceasingly do what is best for our community in all that we do while striving to bring this vision to fruition.

COMMUNITY RISK ANALYSIS

Fire and rescue services agencies that protect communities generally have a common overall mission, that is, the protection of life and property. However, they have different community profiles in which they operate. These dissimilarities create very different operational needs based on a unique community risk profile, service demands, and stakeholder expectations.

A community risk assessment is a comprehensive process to identify the hazards, risks, fire and life safety problems, and demographic characteristics of those at risk in a community. In each community, there are numerous hazards and risks to consider. For each hazard, there are many possible scenarios and potential incidents that could be encountered, depending on the timing, magnitude, and location of the hazard or incident. A thorough risk analysis provides insight into the worst fire and life safety problems and the people who are affected. The results of the analysis create the foundation for developing risk-reduction and community education programs. Conducting a community risk analysis is the first step toward deciding which fire or injury problem or problems that need to be addressed. Risk analysis is a planned process that must be ongoing, as communities and people are constantly changing.

Too often, an objective and systematic community risk analysis is a step that is overlooked in the community education process. Many emergency service organizations address risks based on a perceived need for service that isn't there. This approach can be costly, leading to misdirected resources, continued property loss, injuries, or deaths). In short, a good community risk assessment will produce a picture of what the hazards and potentials for incidents are, identify who is at risk, and attempt to quantify the expected impacts.

A risk assessment provides information to identify hazards that impact the community. The following provides an overview of the Hickory Fire Department's response area risks. The following section describes the community, including those at highest risk, land use and future growth, and target hazards. The assessment reviews natural hazards, critical infrastructure, and community risk reduction. The demographic data is from the 2019 American Community Survey (ACS) 5-year estimates and the 2020 U.S. Census.



Understanding the definition of hazards and risk is critical to the risk assessment process. Hazards are physical sources of danger that can create emergency events. Hazards can be items such as buildings, roadways, weather events, fires, etc. Risk relates to the probability of a loss due to exposure to a hazard. People and property can be at risk. Consequences to the community are also factors to consider. Each of these factors is assessed during the community risk process.

Community risk and vulnerability assessment are essential elements in a fire department's planning process. A fire risk assessment is performed by assessing such factors as the needed fire flow, probability of an incident, consequences of an incident, and occupancy risk. The "score" established is then utilized to categorize the area, or even individual properties, as one of low, moderate, or high risk. This categorization can assist the department with establishing fire risk/demand areas or zones. Having this information readily available provides the community and the fire department with a better understanding of how fire stations, response run cards, and staffing patterns can be used to provide a higher concentration of resources for higher-risk scenarios or, conversely, fewer resources for lower levels of risk. The community fire risk assessment may also include determining and defining the differences in fire risk between a detached single-family dwelling, a multifamily dwelling, an industrial building, and a high-rise building by placing each in a separate category.

The community risk and vulnerability assessment evaluates the community as a whole, and regarding property, measures all property and the risk associated with that property and then segregates the property as either a high, medium, or low hazard. According to the NFPA *Fire Protection Handbook*, these hazards are defined as:

- **High-hazard/risk occupancies:** Schools, hospitals, nursing homes, explosives plants, refineries, high-rise buildings, and other high life-hazard or large fire-potential occupancies.
- **Medium-hazard occupancies:** Apartments, offices, and mercantile and industrial occupancies not normally requiring extensive rescue by firefighting forces.
- **Low-hazard occupancies:** One-, two-, or three-family dwellings and scattered small business and industrial occupancies.

The fire service further assesses the relative risk of properties based on several factors. Properties with high fire and life risk often require greater numbers of personnel and apparatus to effectively mitigate a fire emergency. Staffing and deployment decisions should be made with consideration of the level of risk within each area of a community.

- **Low Risk** – Minor incidents involving small fires (fire flow less than 250 gallons per minute), single patient non-life-threatening medical incidents, minor rescues, small fuel spills, and small brush or outside fires.
- **Moderate Risk** – Moderate risk incidents involving fires in single-family dwellings and equivalently sized commercial office properties (needed fire flow generally between 250 gallons per minute to 1,000 gallons per minute), life-threatening medical emergencies, and hazardous materials emergencies requiring specialized skills and equipment, technical rescues involving specialized skills and equipment, and larger brush and outside fires particularly if structures are exposed.
- **High Risk** – High-risk incidents involving fires in larger commercial properties (fire flows more than 1,000 gallons per minute), multiple patient medical incidents, major releases of hazardous materials, and high-risk technical rescues.

The NFPA also identifies a key element of assessing community vulnerability as fire department operational performance, which is comprised of three elements: resource availability/reliability, department capability, and operational effectiveness. These elements are:

- Resource availability/reliability: The degree to which the resources are ready and available to respond.
- Department capability: The ability of the resources deployed to manage an incident.
- Operational effectiveness: The product of availability and capability. It is the outcome achieved by the deployed resources or a measure of the ability to match resources deployed to the risk level to which they are responding.

The implementation of successful community risk reduction strategies after completion of a community risk assessment is linked directly to the prevention of civilian and firefighter line-of-duty deaths and injuries. They directly address goals found in firefighter Life Safety Initiatives 14 and 15. Virtually every risk reduction program in the fire and emergency services will have elements of what is called *“The 5 E’s of Community Risk Reduction.”* These are:

- Education.
- Enforcement.
- Engineering.
- Economic incentives.
- Emergency response.

Understanding and addressing only one element will not lead to a successful program. All five “E’s” must be integrated into every program for it to be effective. Strong fire prevention codes have been shown to be extremely effective means to reduce risk in a community. Fire alarm and sprinkler system mandates for not only commercial buildings, but all occupancies including single-family dwellings, dramatically reduce fire risk and increase life safety. Code implementation that does not require these mandates creates an increased risk. Strong code provisions and enforcement have demonstrated a greater ability to decrease fire problems than continuing to acquire more traditional fire department resources.

A final important factor in determining a community's risk profile is to determine the type and quality of resources a community has available to mitigate, prevent, and respond to hazards. The ISO collects data for more than 48,000 communities and fire districts throughout the country. National statistical data on structural fire insurance losses bears out the relationship between excellent fire protection and low fire losses.

The ISO Public Protection Classification (PPC) program using the Community Grading Fire Suppression Rating Schedule (FSRS) measures the principal elements of a community's fire suppression system. These are:

Emergency Communications: Fire alarm and communication systems, including telephone systems, telephone lines, staffing, and dispatching systems.

Fire Department: The fire department, including equipment, staffing, training, and geographic distribution of fire companies.

Water Supply: The water supply system, including the condition and maintenance of hydrants and the amount of available water, compared to the amount needed to suppress fires.

Fire Prevention: Programs that contain plan reviews; certificate of occupancy inspections; compliance follow-up; inspection of fire protection equipment; and fire prevention regulations related to fire lanes on area roads, hazardous material routes, fireworks, barbeque grills, and wildland-urban interface areas.

The schedule is performance-based, assigning credit points for each of the three main areas of a community's fire suppression system for a total score from 0 to 105.5 (new 2013 edition). The fire department section of the schedule provides a maximum of 50 points of the overall score.

Water supply provides a maximum of 40 points and emergency communications consist of a maximum of 10 points. The 5.5 points above 100 recognize additional community efforts to reduce losses with, for example, fire prevention, fire safety public education, and fire investigations.

In 2020 the numerical grade or Public Protection Classification for the City of Hickory evaluation was determined to be a Class 1. The classification applies to properties with a needed fire flow of 3,500 GPM or less that are within five road miles of a fire station and within 1,000 feet of a fire hydrant or alternative water supply. Properties that require more than 3,500 GPM are evaluated separately and are assigned an individual classification. The second number is the class that applies to properties within five miles of a fire station but beyond 1,000 feet of a credible water supply. In general, property insurance rates are based on a community's ISO classification with a major determining factor being the access to water for fire suppression.

A Class 1 rating is a significant achievement for a community the size of Hickory and is a tribute to the fire department, the 911 communication system, and the water utility system. As of 2020, only 14 agencies in North Carolina received a Class 1 rating. This puts the City of Hickory in the top 1% percent of those agencies reviewed by ISO.

The previous grading of the city's fire insurance classification was a class 3/9s rating; thus, the most recent rating could result in a significant decrease in some commercial property insurance rates. The department received an overall score of 92.12; 90 or more points is the threshold for a Class 1 designation. This was a notable improvement from the 2006 score of 70.49.

It is important to note that the Hickory Fire Department has an opportunity to improve its scoring by increasing the number of credits it receives for company personnel or the average number of existing firefighters and company officers available to respond to reported first-alarm structure fires in the city (10.51 out of a possible 15 credits) and by receiving additional credits for water supply system (26.09 out of 30 credits), specifically the improvement of water system infrastructure in low-flow areas. It is important to note that an ISO review and evaluation is a community snapshot. As development occurs and a community grows, service level objectives should be monitored to maintain the distinguished Class 1 Rating.

Health and Safety Program (Risk Management)

In addition to examining risks faced by the community at large, the department must examine internal risks in order to protect all assets, including personnel, resources, and property. This concept is not new to the fire service and can be an excellent tool for strengthening existing health and safety guidelines. The National Fire Protection Association's *Standard for a Fire Department Occupational Safety and Health Program* (NFPA 1500) requires the development of a separate risk management plan for fire departments, that is, separate from those incorporated in an overall local government risk management plan.

A fire department risk management plan is developed and implemented to comply with the requirements of NFPA 1500. For this process to be effective, the following components must be included in the risk management plan:

- Risk identification: Actual or potential hazards.
- Risk evaluation: The potential of occurrence of a given hazard and severity of its consequences.
- Prioritizing risk: The degree of a hazard based upon the frequency and severity of occurrence.
- Risk control: Solutions for elimination or reduction of real or potential hazards by implementing an effective control measure.
- Risk monitoring: Evaluation of effectiveness of risk control measures.

A comprehensive Department Health and Safety program was outlined and is being implemented in order to supplement, but not supersede, Citywide risk management efforts. The following elements are the cornerstones of the Hickory Fire Department's risk management plan:

- Designation of a Department Health & Safety Officer (HSO)
- Communicable diseases
- Respiratory protection program

- Emergency Action Plan
- Personal Protective Equipment
- Walking-Working Surfaces
- Hazard Communication

This risk management plan establishes a standard of safety for the daily operations of the department. This standard of safety establishes the parameters in which the department conducts activities during emergencies and non-emergency operations. The intent is for all members to operate within this standard or plan of safety and not deviate from this process.

Hazards

Natural Hazards

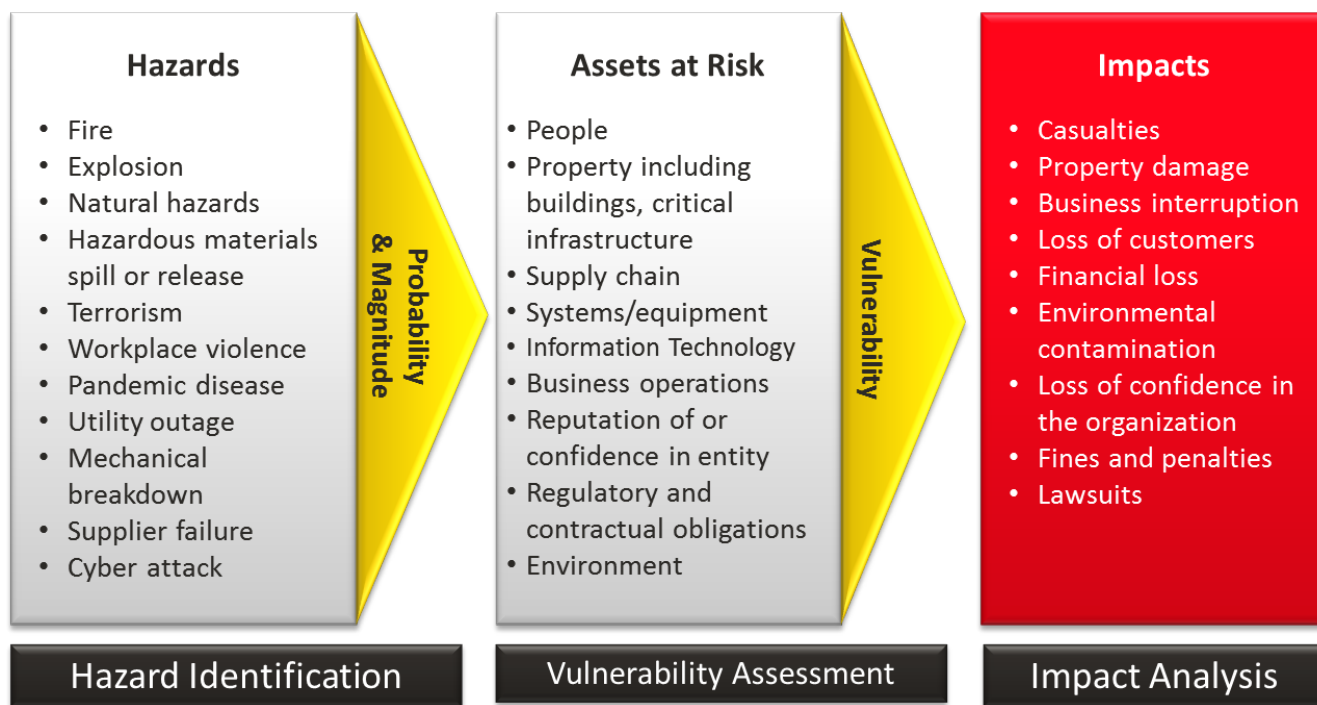
- **Meteorological** -Flooding, Dam/Levee Failure, Severe Thunderstorm (Wind, Rain, Lightning, Hail), Tornados, Windstorms, Hurricanes, and Tropical Storms, Winter Storm (Snow/Ice)
- **Geological** -Earthquake, Tsunami, Landslide, Subsidence/Sinkhole, Volcano
- **Biological** - Pandemic Disease, Foodborne Illnesses

Human-Caused Hazards

- **Accidents** -Workplace Accidents, Entrapment/Rescue (Machinery, Water, Confined Space, High Angle), Transportation Accidents (Motor Vehicle, Rail, Water, Air, Pipeline), Structural Failure/Collapse, Mechanical Breakdown
- **Intentional Acts** - Labor Strike, Demonstrations, Civil Disturbance (Riot), Bomb Threat, Lost/Separated Person, Child Abduction, Kidnapping/Extortion, Hostage Incident, Workplace Violence, Robbery, Sniper Incident, Terrorism (Chemical, Biological, Radiological, Nuclear, Explosives), Arson, Cyber/Information Technology (Malware Attack, Hacking, Fraud, Denial of Service, etc.)

Technological Hazards

- **Information Technology** - Loss of Connectivity, Hardware Failure, Lost/Corrupted Data, Application Failure
- **Utility Outage** - Communications, Electrical Power, Water, Gas, Steam, Heating/Ventilation/Air Conditioning, Pollution Control System, Sewage System
- **Fire/Explosion** - Fire (Structure, Wildland), Explosion (Chemical, Gas, or Process failure)
- **Hazardous Materials** -Hazardous Material spill/release, Radiological Accident, Hazmat Incident off-site, Transportation Accidents, Nuclear Power Plant Incident, Natural Gas Leak Supply
- **Chain Interruption** - Supplier Failure, Transportation Interruption



<https://www.ready.gov/risk-assessment>

Core Programs of the Hickory Fire Department		
Fire Suppression	Emergency Medical Services	Technical Rescue
Hazardous Material Mitigation	Emergency Management	Aviation Rescue and Firefighting
Fire Inspection/Plan Review	Fire Investigation	Public Fire and Life Safety Education

Community Risk Assessment Analysis

Each community needs to closely evaluate the hazards and risks that exist and ensure that the proper levels of protection are in place to mitigate those risks. With this information, Hickory can better understand the needs of the people they serve and protect. Furthermore, the use of this data can assist Hickory in better prioritizing resources to mitigate risks. As growth trends occur, this risk assessment data helps explain many of the “whys” for types of calls and the fire and rescue needs of the Hickory community.

A demographic analysis of fire protection-related issues in Hickory demonstrates that Hickory is about at the same percentage of residents age 65+, youth less than 5 years old, and populations with a disability as the North Carolina averages. However, Hickory has a noticeably higher (4%) number of persons speaking a language other than English than the North Carolina state average. These at-risk groups demand additional attention and outreach to mitigate fire and life safety issues.

Unfortunately, fire often follows poverty. In Hickory, 17.1% of the population is in poverty, which is higher than the state average of 14.7%. Overall median household income levels for Hickory are lower than the North Carolina average by \$6,950. Community education levels can also impact safety and the need for the fire department’s community risk reduction programs. However, Hickory is very near the North Carolina average in both high school graduate level and bachelor’s degree or higher level. Hickory is also very near the North Carolina average with the percentage of people without health insurance. Often, persons without insurance use 9-1-1 when they have a medical need/emergency because they have no other course of action.

When assessing homeownership, Hickory also has a somewhat more mobile population as the number of renter-occupied properties in Hickory is higher than the state average (45.2% versus 34.8%), and the number of owner-occupied housing in Hickory is slightly lower than the state average (54.8% versus 65.2%). Collectively, the above components help to “paint a clearer picture” of the fire and rescue needs and challenges for the Hickory Fire Department moving forward and to better understand how to prioritize community risk reduction services for people served.

Planned and projected growth for Hickory is significant, with approximately 7,602 additional residents expected at the buildouts of planned development from 3,487 planned housing units. These projects and future development will cause the fire and rescue service delivery system to change as the population increases and response patterns potentially shift within the city. The current occupancy rate for multifamily housing is 3%. Thus, the continued growth of this housing type is expected to continue.

The Hickory Fire Department conducts pre-incident surveys for all commercial buildings annually. These surveys identify target hazards throughout the response area. As the community continues to grow, risks will change based on demographics. The department needs to develop and maintain a community risk reduction plan that includes the operations division to mitigate or prevent emergency incidents. The Hickory Fire Department is committed to fire and life safety education, and that commitment will be continued. Many of these efforts also receive credit under the “community risk reduction” section of the insurance rating (ISO) grading schedule.

Documentation of Area Characteristics

Our Fire Department

Our fire department is a foundation of the community and members work hard to protect lives and property every day. Whether rivers, roads, or rails, they know the nooks and crannies of our service area from corner to corner. The members of our fire department help residents prevent emergencies and they are equipped to respond when the need arises.

 **44,204**
Population Protected
Hickory Fire Department

43
Square Miles
Hickory Fire Department

 **7**
Stations
Hickory Fire Department

Our Community

There is no community without people. It is vital to understand the needs of those we serve and where those people are located in our community. These sections provide information on who lives and works in our community. It also includes where they are from, where they work, the different types of housing people live in, and more. Hickory has not experienced a large influx of population over the last twenty years there have been years of increase along with a decrease in population. There are not any known facts about how the next ten years affect the population, but the city has seen an uptick in commercial construction for job creation.

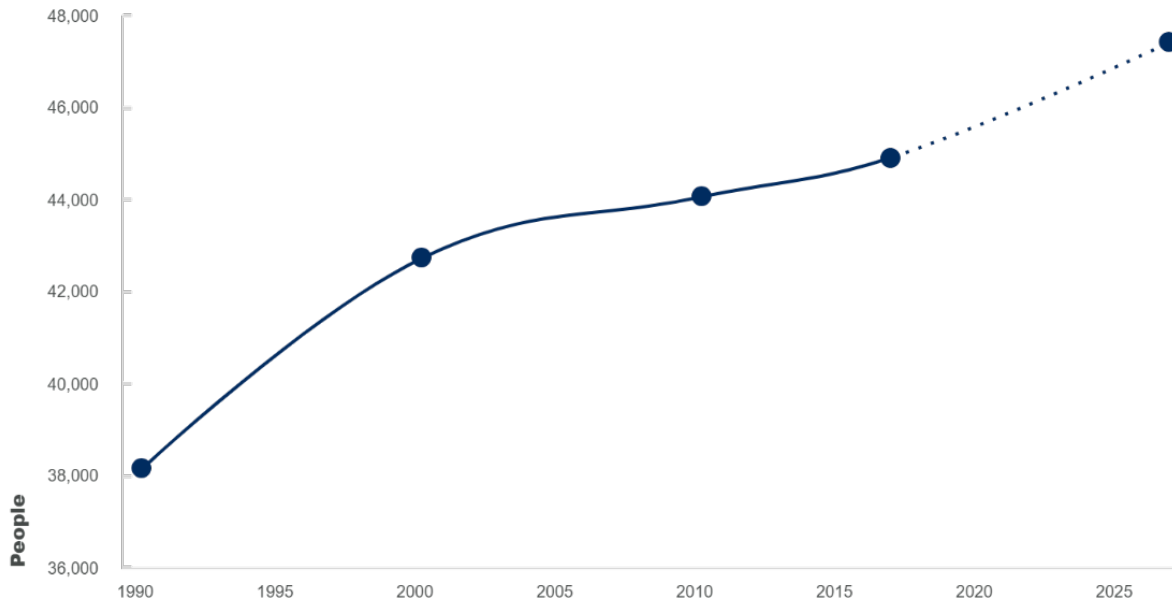
Our People

The following information provides estimated population decreases and increases since 2011. The ACS 5-year estimates show an increasing population and a 15.8% since the 2010 Census, as shown below. The estimated population in 2020 is 43,490.

Hickory Fire Department
Community Risk Assessment-Standards of Cover

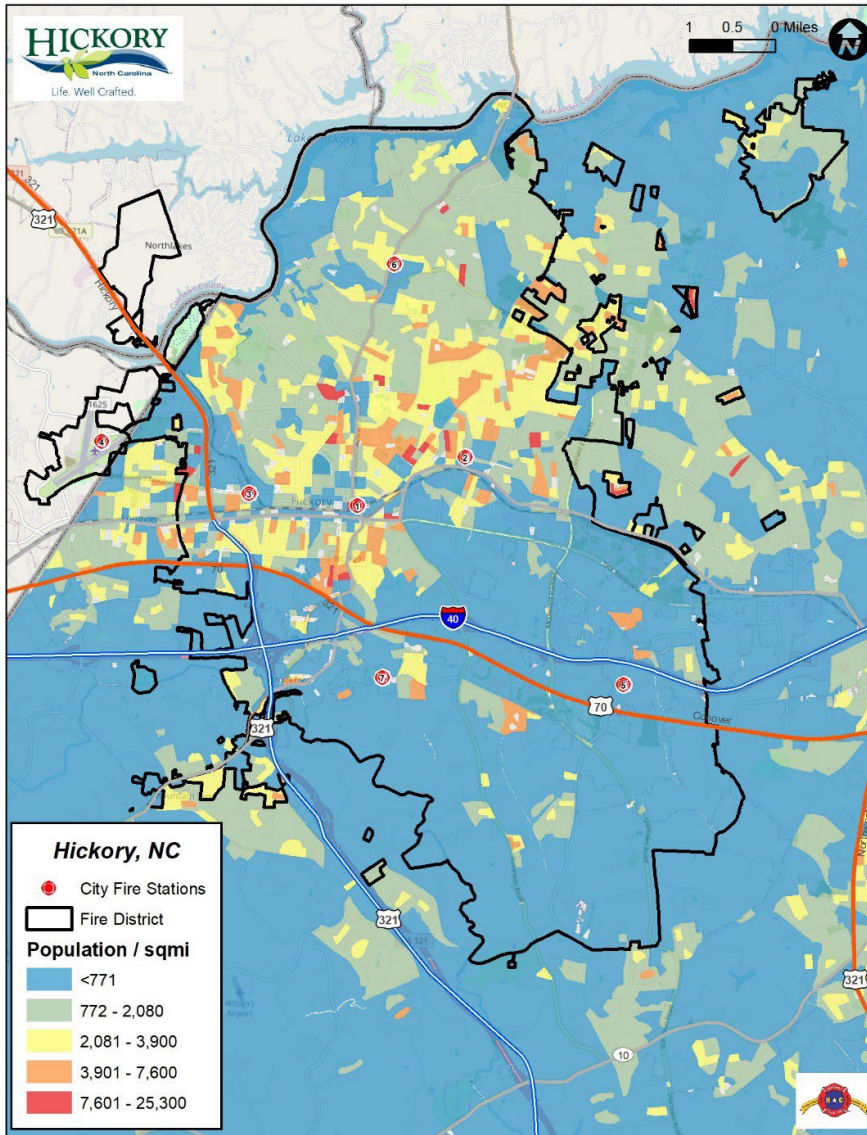
<i>Current Population</i> 44,904 Hickory, NC	<i>2010 Population</i> 44,055 Hickory, NC
10,264,876 North Carolina	9,535,483 North Carolina

Population Change Over Time



Population Density

The higher concentrations of population surround the central core of the fire district. A drawback of examining population coverage alone is that it does not consider the risk that commercial and industrial properties (with no residential



population) pose to a community. The population of Hickory is 44,204 which is spread across 18 census tracts. The most densely populated census tracts are 104.02, 104.03, and 104.04. 53% percent of the population are males, and the remaining are females. Census tracts 103.02, 104.03, 109, and 110 have the highest density of high-risk populations.

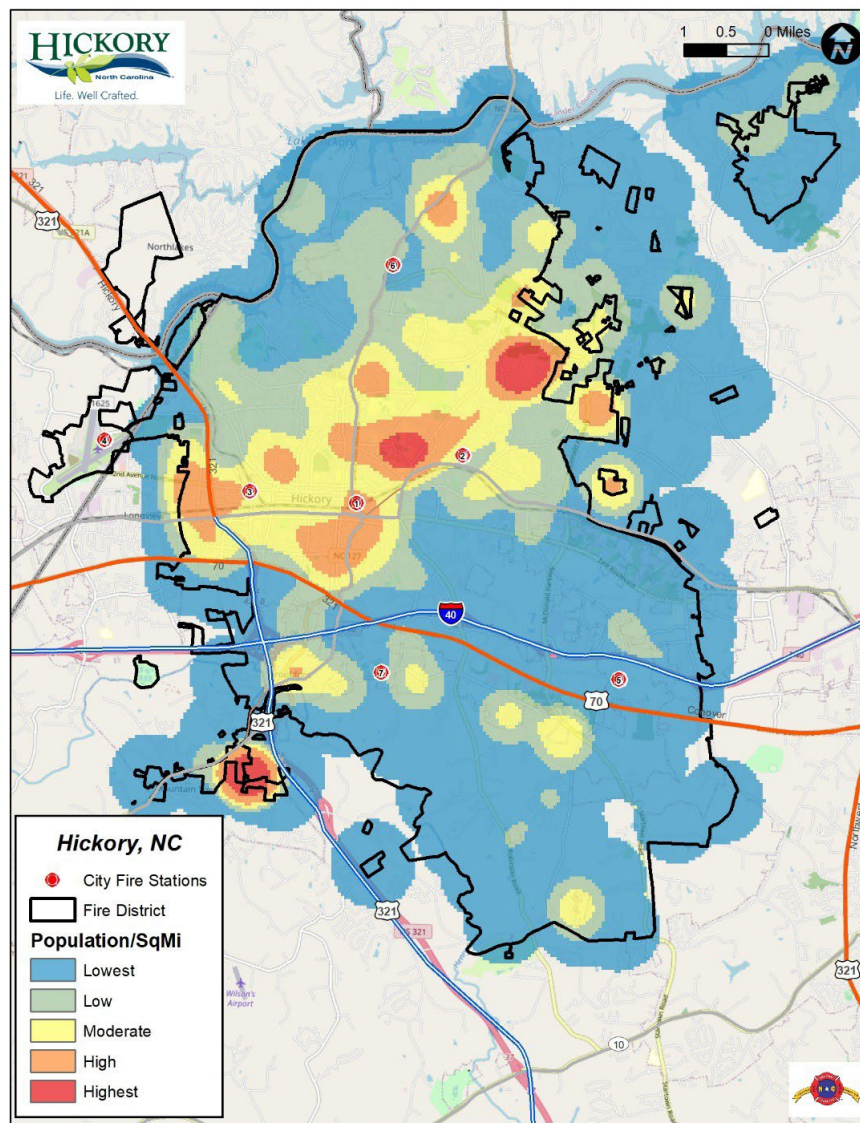
Future Development

There is planned development in several different areas of the fire district. Most of it is commercial, however, data for the residential developments included the number of units expected.

Population Changes

The number of units (3,487) was multiplied by the overall persons per household from the US Census Bureau (2.18) to estimate the population within each development. 7,602 additional residents are expected at the buildout. These figures were added to the existing residential population to create a population density of future development.

Future Population

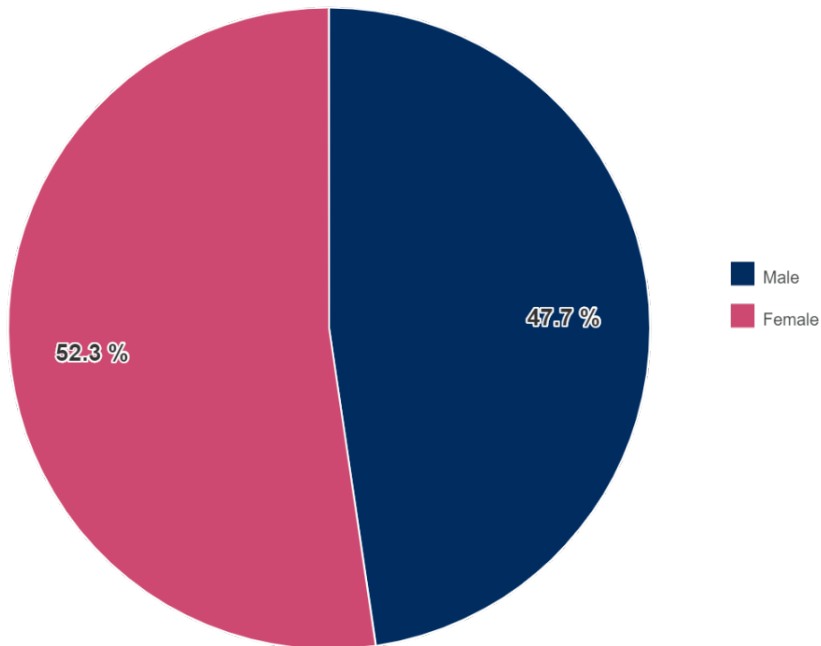


Subtle changes can be noted in areas where the residential developments are planned. The impact depends upon the number of planned units and is negatively influenced by the scattered locations of the development upon the map representation.

Our Backgrounds

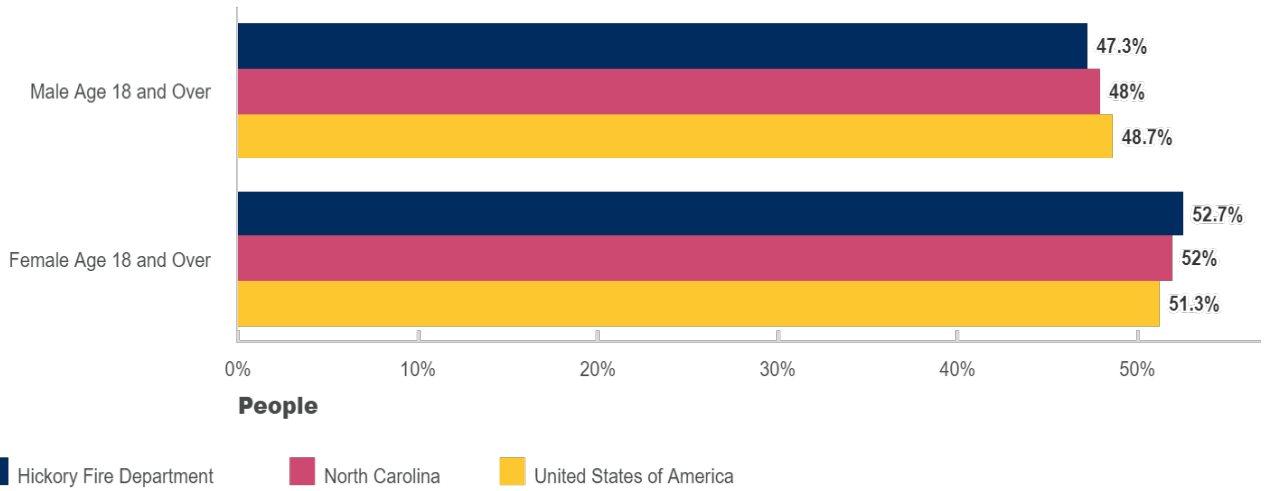
Our residents come from varying demographics and educational levels. The workforce of the Hickory Fire Department is currently 94.9% male and 94.2% white. Understanding the diversity of our community is important when providing services and interacting with the people we serve.

Male & Female Population



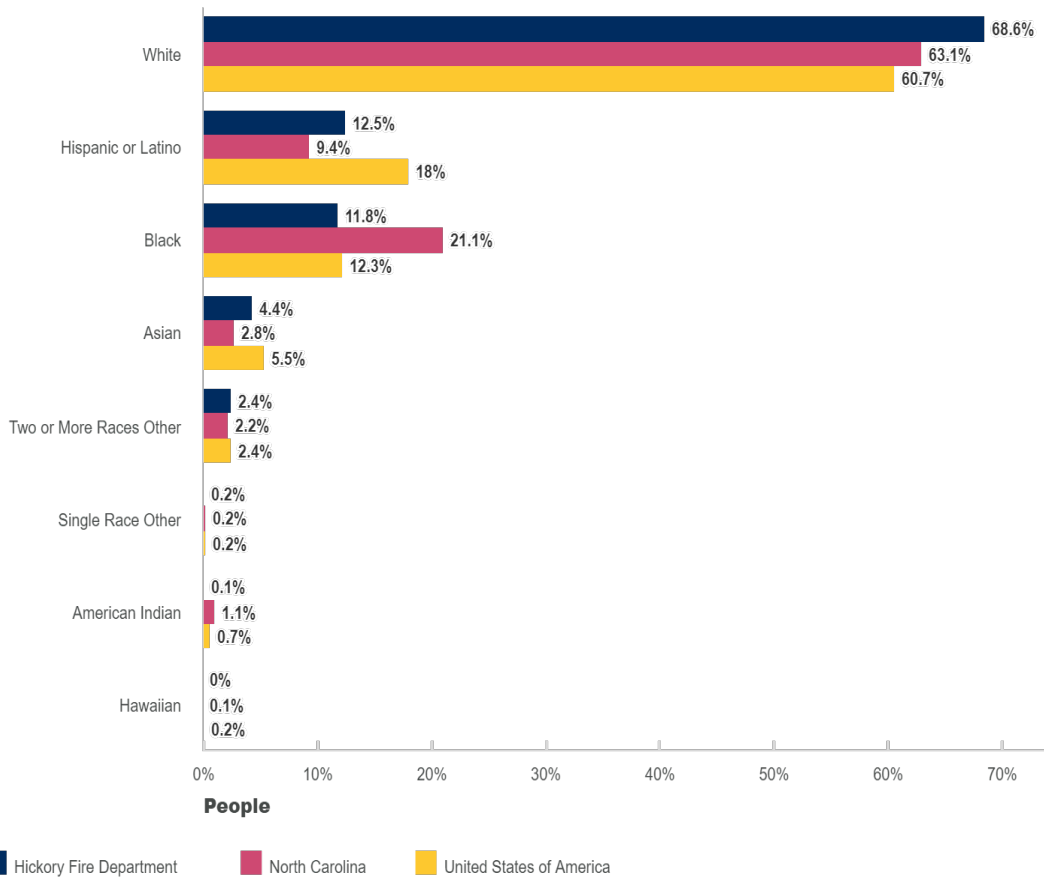
Sources: US Census ACS 5-year

Population Age 18 and Over by Sex



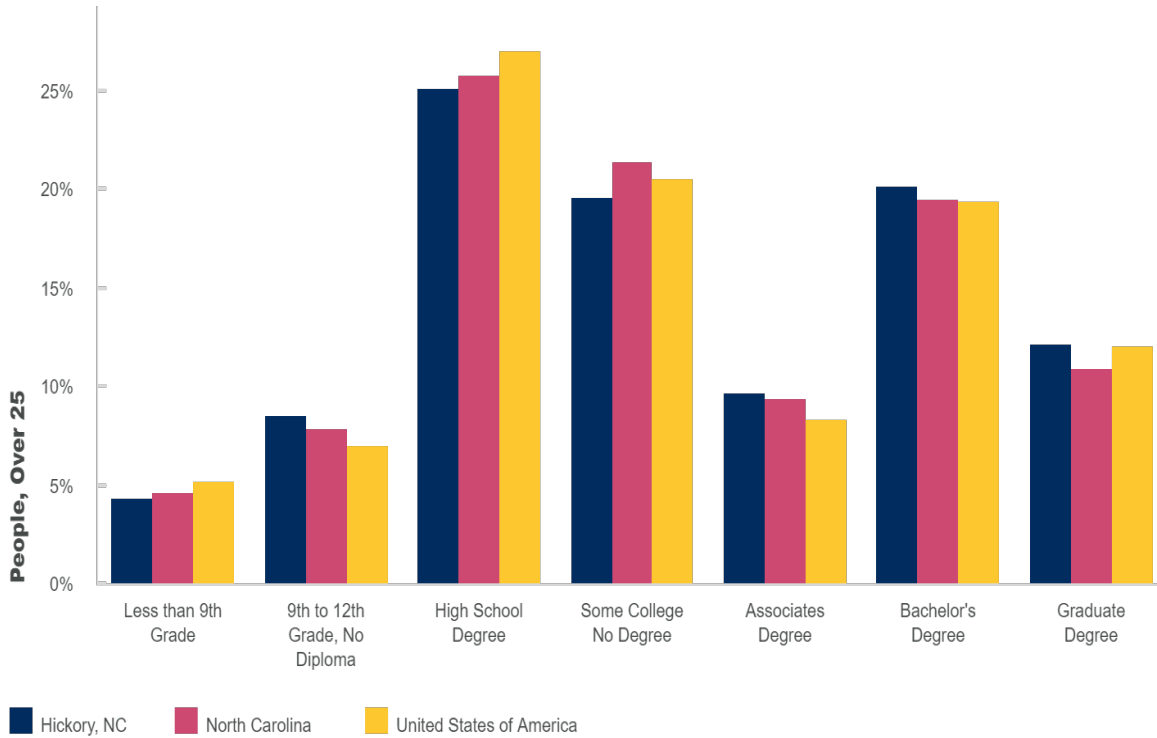
Sources: US Census ACS 5-year

Race/Ethnicity Totals



Sources: US Census ACS 5-year. Values for Black, Hawaiian, White, Asian, American Indian, Single Race Other, and Two or More Races are all not Hispanic or Latino

Highest Level of Educational Attainment



Sources: US Census ACS 5-year

Our Generations

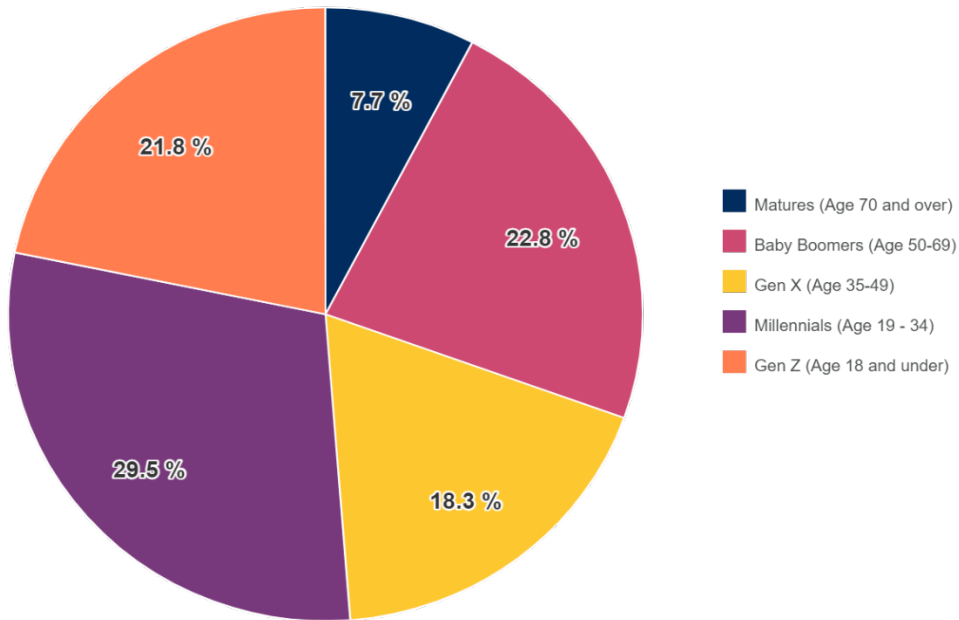
Our community includes people of all ages. Each generation requires different services and has different needs. This section provides insight into the generational makeup of our community to better understand who lives here.

<p>Median Age 41 Hickory Fire Department</p> <hr/> <p>39 North Carolina</p> <hr/> <p>38 United States of America</p>	<p>Age Dependency Ratio 66.6% Hickory Fire Department</p> <hr/> <p>61.9% North Carolina</p> <hr/> <p>62% United States of America</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Sources: US Census ACS 5-year. Age dependency ratio is a comparison of the number of dependents (people younger than 18 or older than 64) to the working age population (age 18 to 64).

Hickory Fire Department Community Risk Assessment-Standards of Cover

Generations

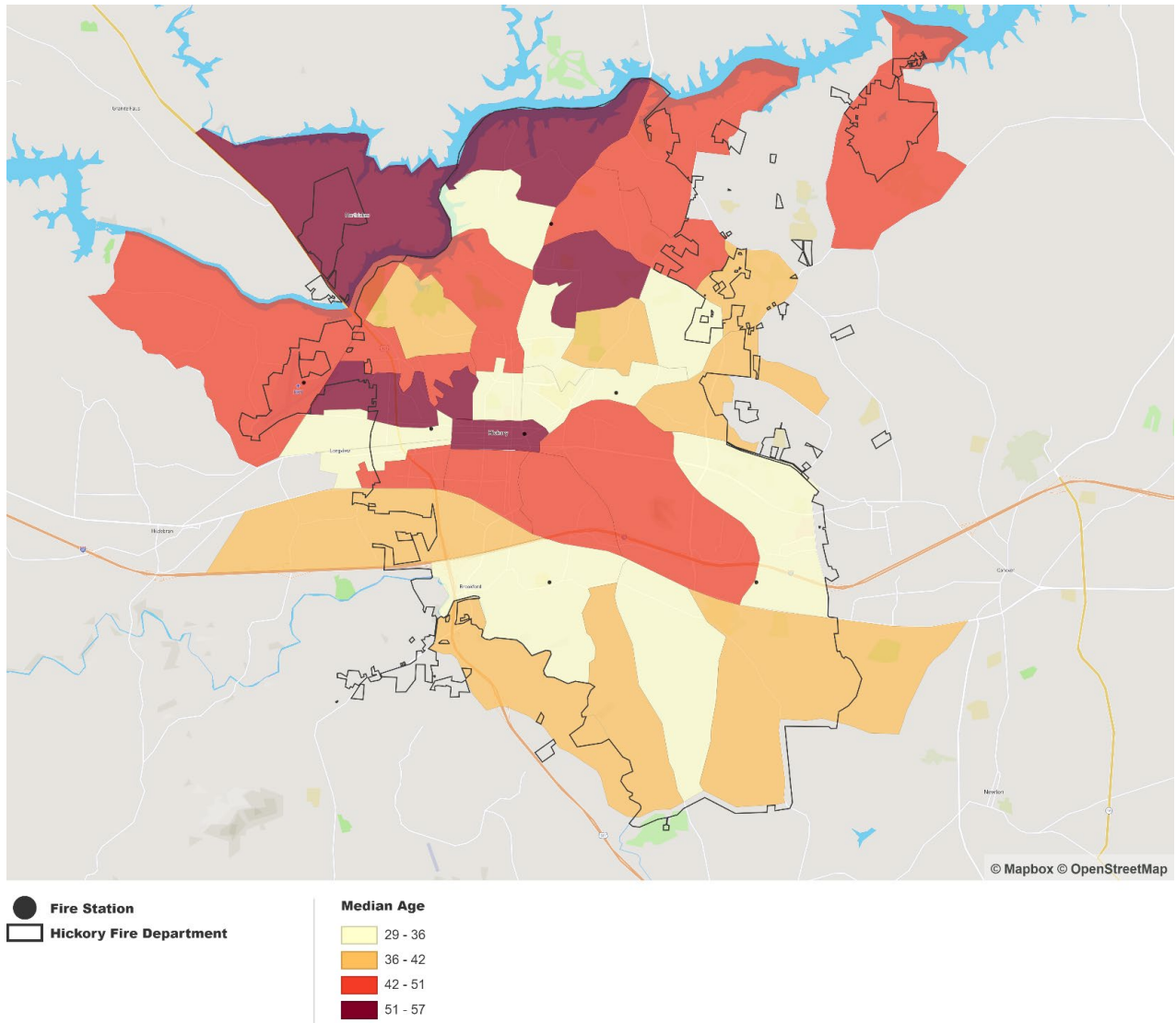


Hickory Fire Department

Sources: US Census ACS 5-year

People older than 70 years old make up 7.7% of the population. Baby boomers are 22.8%, Generation X is 18.3%, and Millennials have the highest percentage at 29.5%. Generation Z comprises 21.8%. People living with disabilities total 12.8% and households with language isolation total 3%. People living below the poverty rate comprise 17.11% of the population

Median Age



Sources: US Census ACS 5-year

Where We Are From

Not everyone in our community was born here. Those coming to us from other regions may have different educational and cultural backgrounds. This might mean they have specific needs from our department. By understanding residents' geographic backgrounds, we can better plan for language and cultural barriers.

Native Born

36,992
People

Hickory, NC

9,442,112
People

North Carolina

Foreign Born

3,642
People

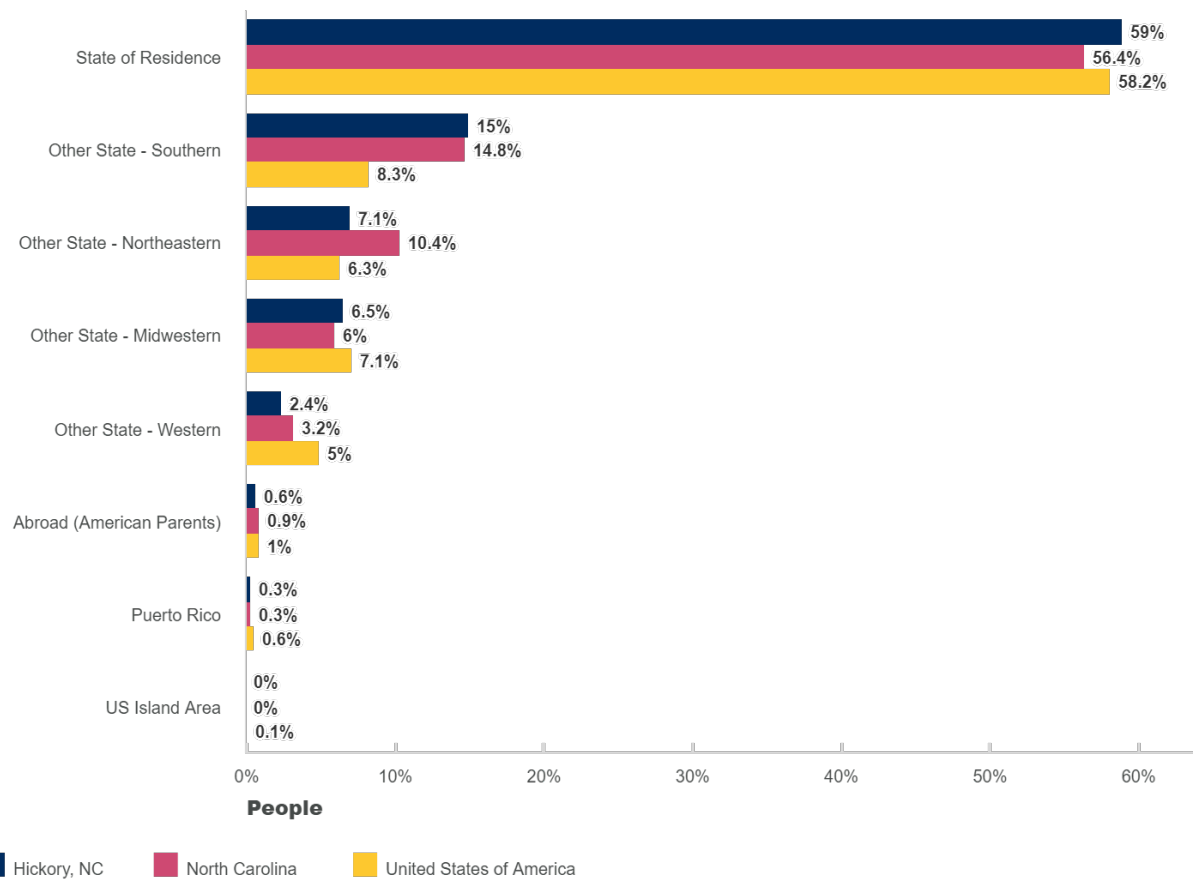
Hickory, NC

822,764
People

North Carolina

Sources: US Census ACS 5-year

Region of Birth for Our Native Born Residents

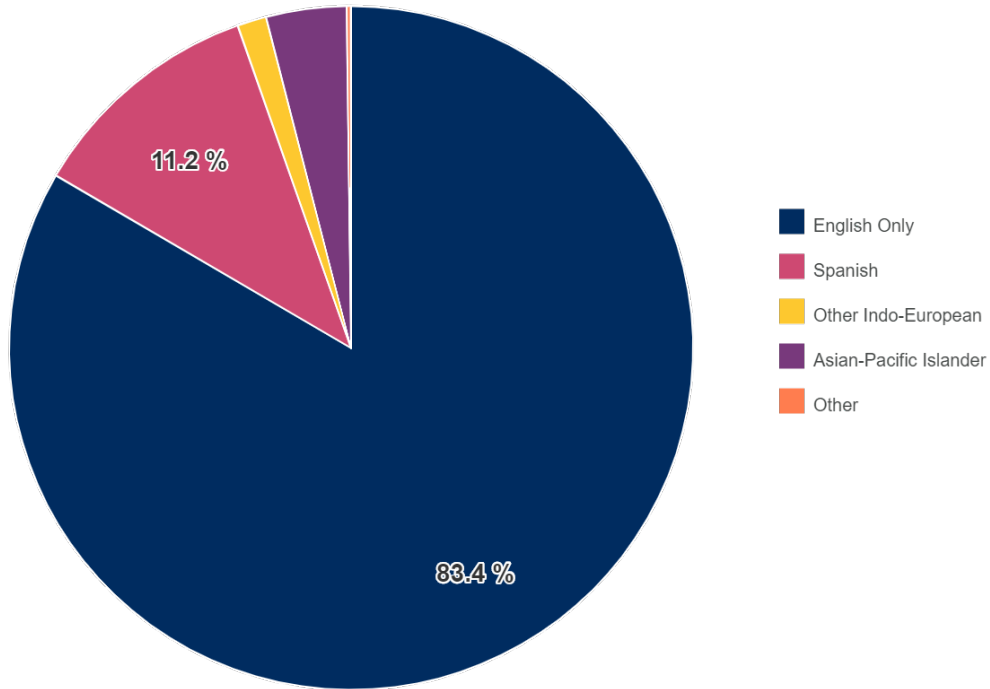


Sources: US Census ACS 5-year

Our Spoken Languages

Our origins tell us a lot, and so do the languages we speak.

Language Spoken at Home



Hickory Fire Department

Sources: US Census ACS 5-year

Our New Residents

Some of our residents have lived in the same house for generations. Others might be new to our community. Identifying how long residents have lived in the same residence or in our community provides insight into possible services or needs they may have.



Median Year Moved into Housing Unit

2010

Hickory, NC

2009

North Carolina

2009

United States of America

Residents Lived in the Same House Over Past Year

84%

Hickory, NC

85%

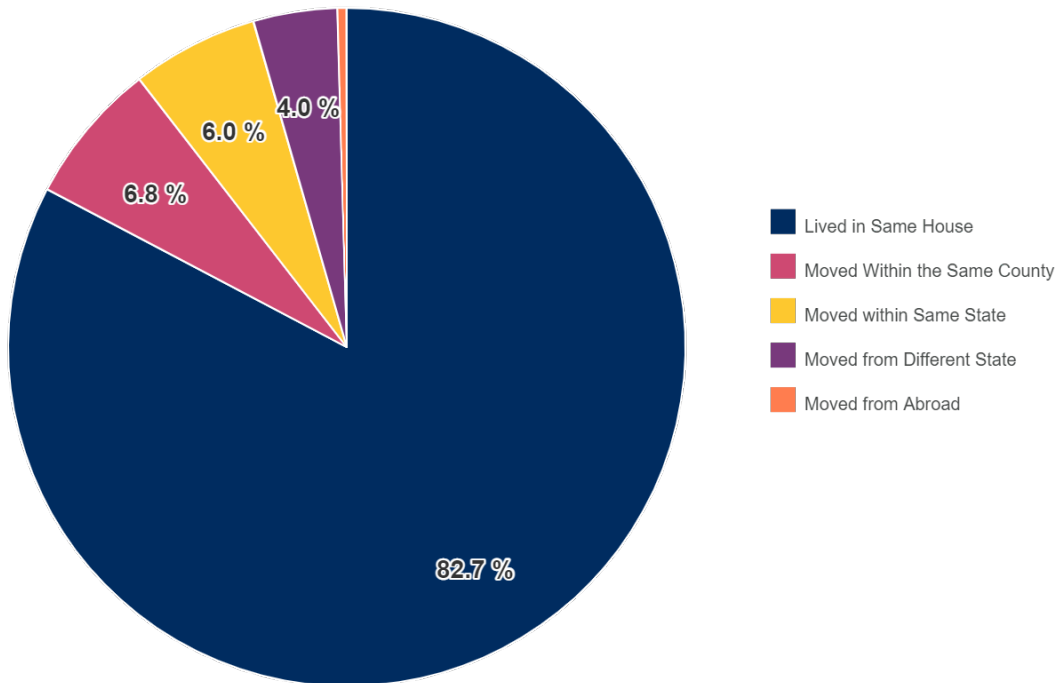
North Carolina

86%

United States of America

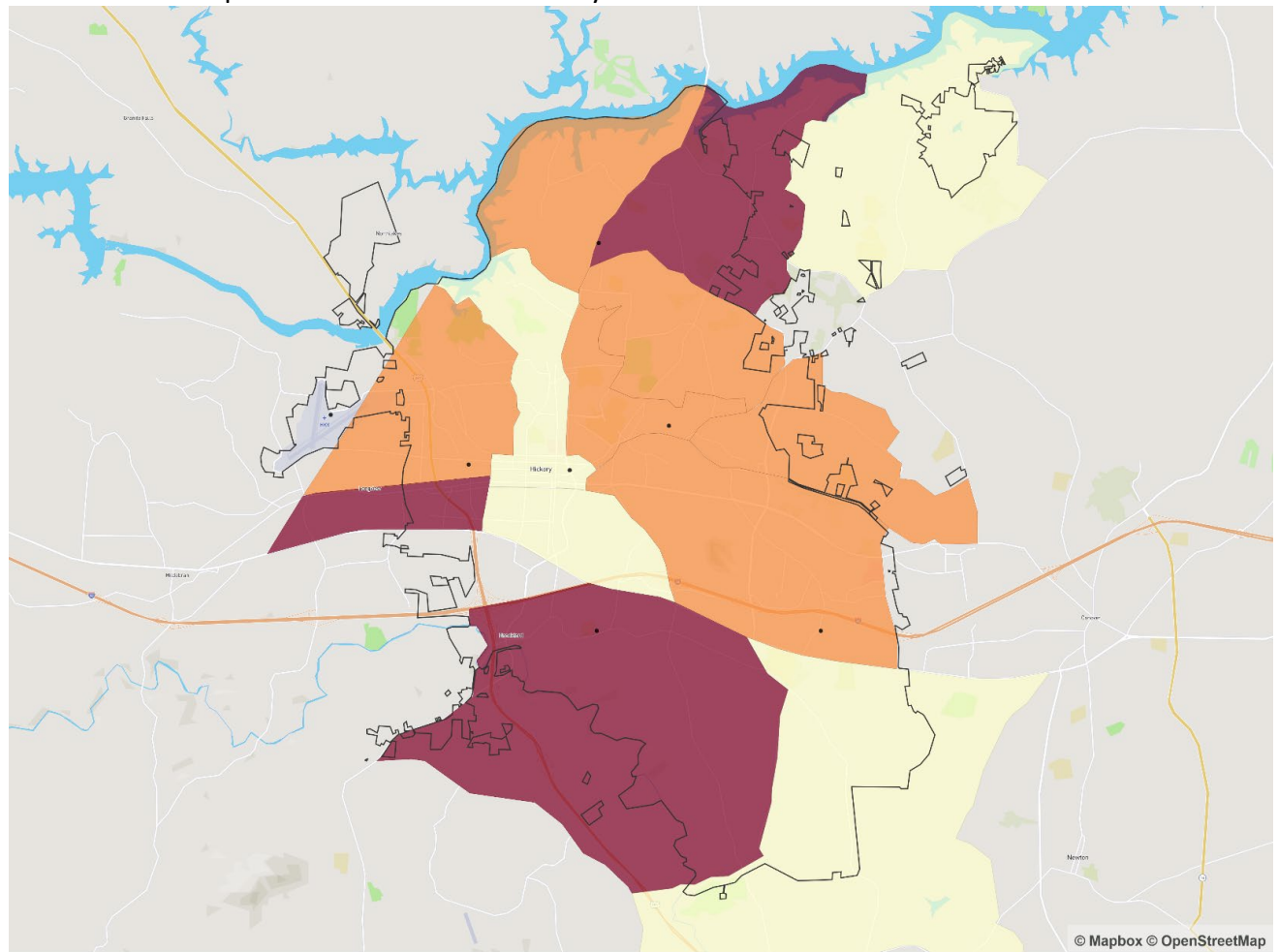
Sources: US Census ACS 5-year

Place of Residence Over Past Year



Sources: US Census ACS 5-year

Households & Population That Moved Recently



● Fire Station
▭ Hickory Fire Department

Households That Recently Moved To Current Location (2015 or Later)

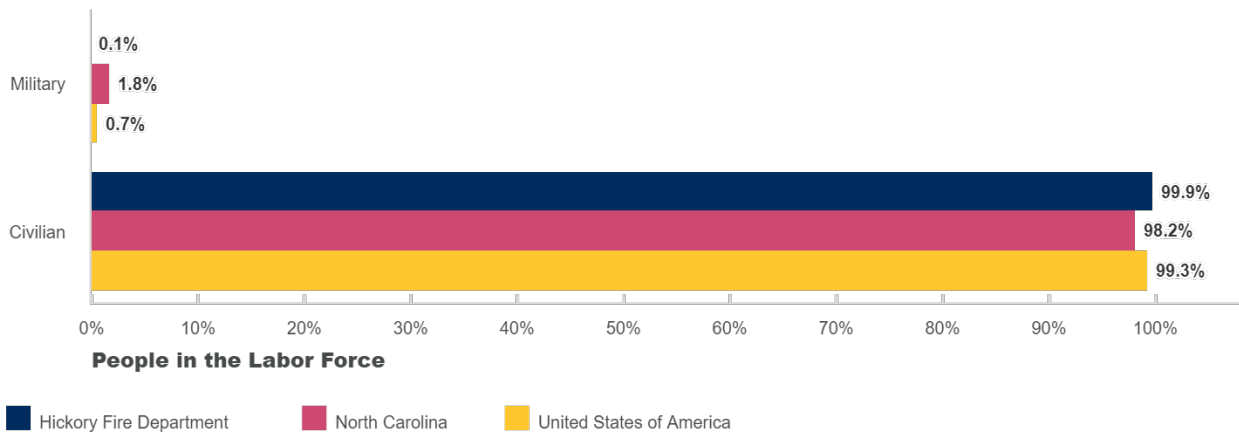
5.4% - 9.1%
9.1% - 12.8%
12.8% - 16.5%

Sources: US Census ACS 5-year

Where We Work

Our residents work in a variety of occupations unique to our community. Non-residents also come to our community for work. This information helps us understand where people are during the workday and what jobs and industries exist here. Hickory is the home of several top-end employers that include but are not limited to Corning, Shurtape, Hickory Springs, and Merchant Distributors. Most workers are from within Catawba County, making up 80.7% of the workforce. People who live outside of Catawba County make up 18.6%, while people that reside out of state are 0.7%. The city has an unemployment rate of 8.7%. The highest number of jobs in Hickory are medium-wage jobs at 45.2%. Low and high-wage jobs are 27.5% and 27.3% respectively. The median household income for the city is \$52,130. The highest number of jobs are in the manufacturing category.

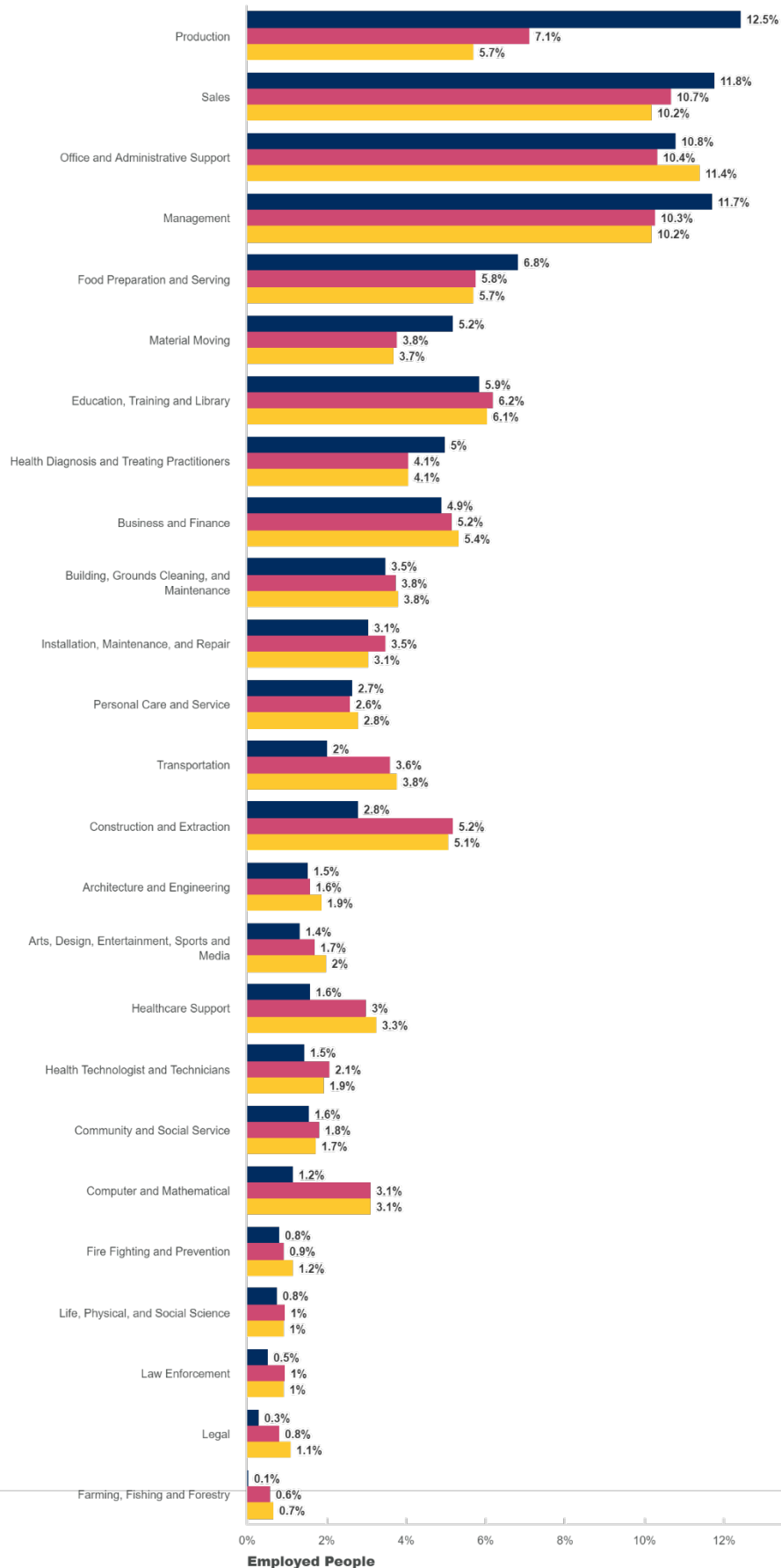
People in the Labor Force by Civilian & Military



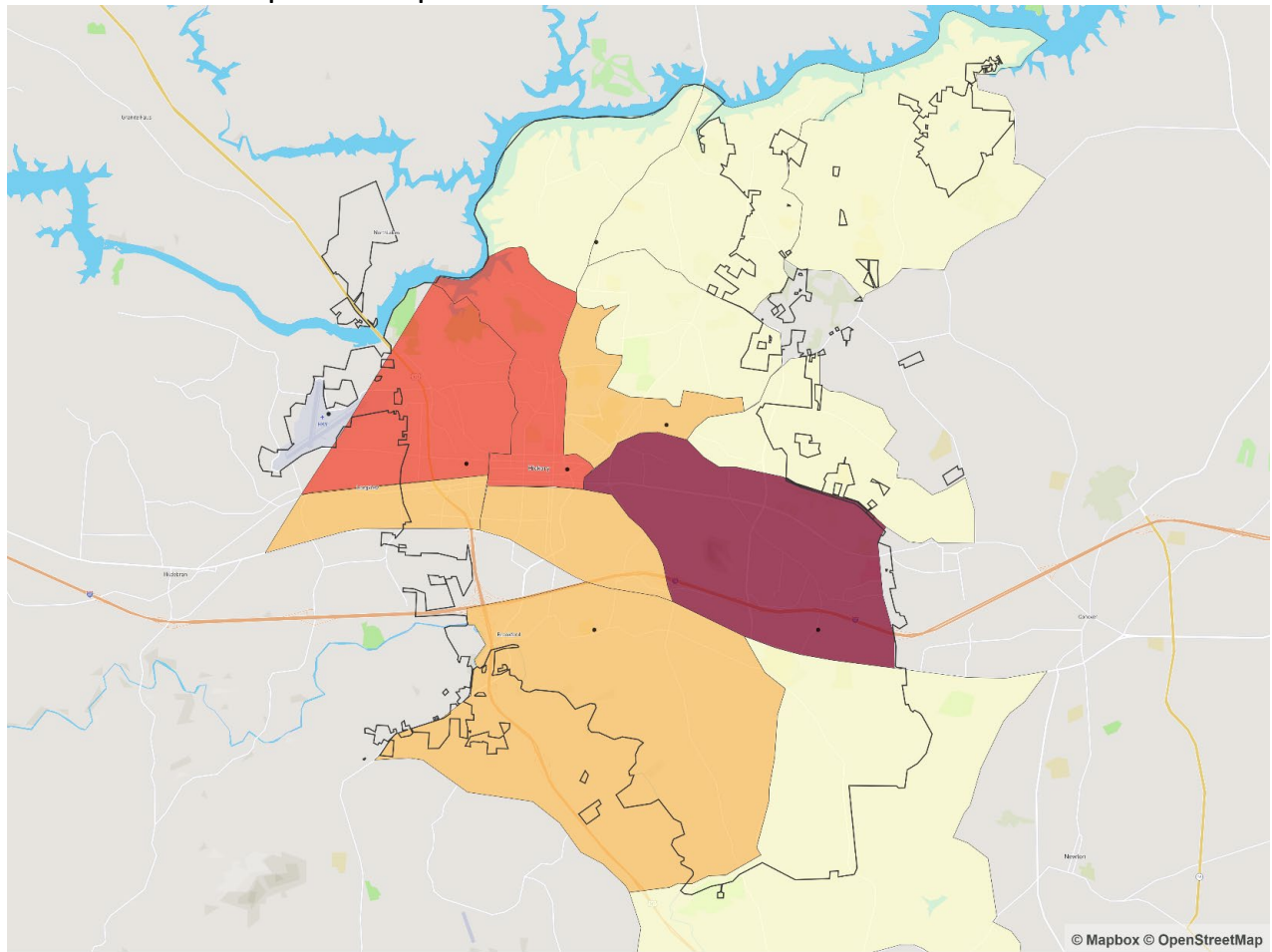
Sources: US Census ACS 5-year

Hickory Fire Department Community Risk Assessment-Standards of Cover

Employment by Occupation



Workers Based Upon Workplace Location



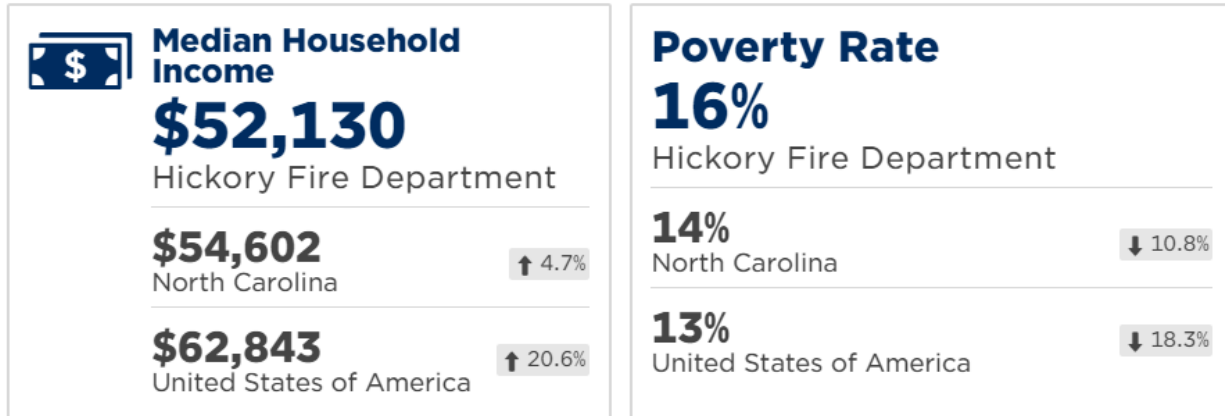
● Fire Station
□ Hickory Fire Department

Daytime Worker Population

- 520 - 2,534
- 2,534 - 4,259
- 4,259 - 9,957
- 9,957

Income

Our residents have a variety of income levels. Lack of adequate income can impact their ability to purchase and maintain preventative products.



*% Diff. shows the *percentage increase or decrease* as compared to the original geography.

Sources: US Census ACS 5-year

Household Income



mySidewalk.com - Sources: US Census ACS 5-year

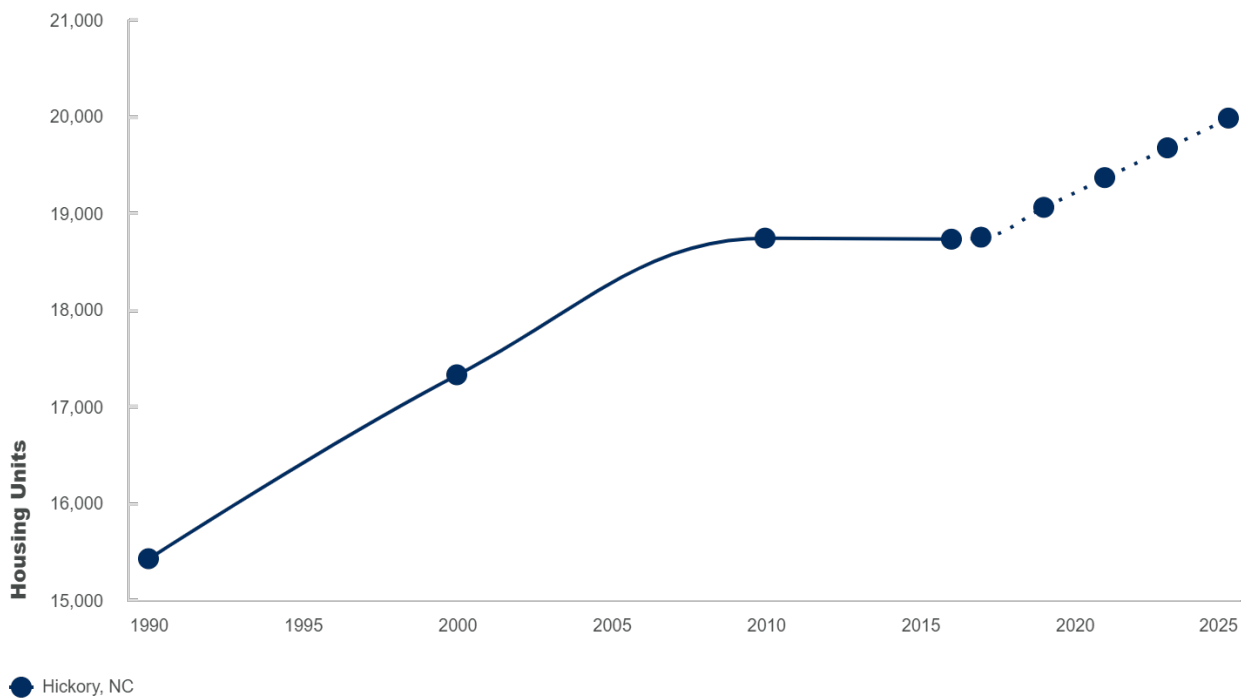
Our Homes

Many of our calls for service will occur in a home. By making residents safer in their homes we can help ensure a higher quality of life. This section provides insight into where our population lives, the types of homes they reside in, and the people that reside within those homes.



Sources: US Census ACS 5-year; US Census 2010

Housing Units Change Over Time



Sources: US Census 1990, 2000, 2010; US Census ACS 5-year

Social Vulnerabilities

Understanding the challenges faced by those in our community can help us better assist the people we serve. Vulnerability comes in many forms: economic, health, educational, social, and environmental. It's important to have a deep understanding of our community's social vulnerabilities that put them at higher risk for emergencies.

Social Vulnerability Index

The Centers for Disease Control (CDC) released a social vulnerability index that uses U.S. Census data to determine risks by census tract levels. The 2014–2018 ACS data combines the following information to determine the ranking. The higher the ranking, the higher the risk.

Socioeconomic

- Poverty
- Unemployed
- Per Capita Income
- No High School Diploma

Household Composition/Disability

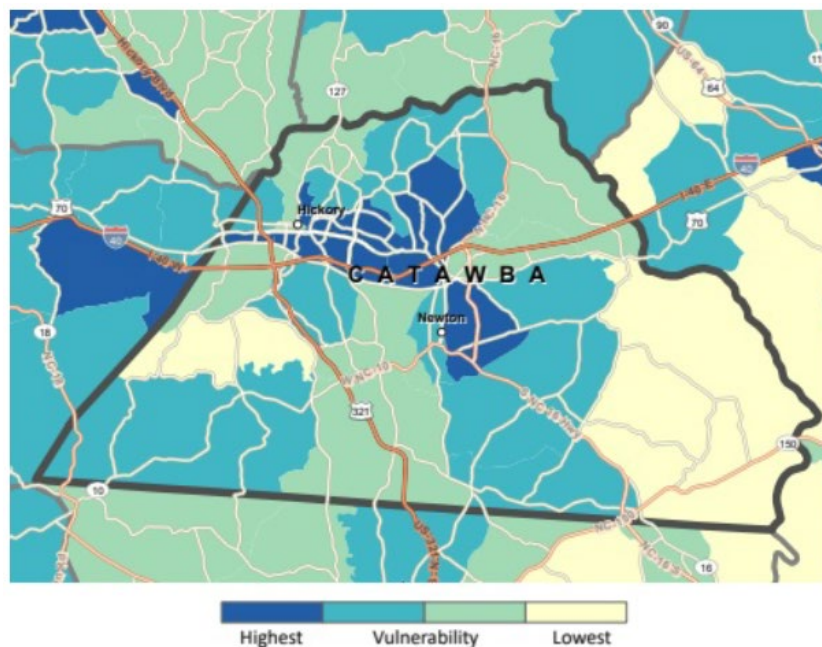
- Aged 65 and Over
- Aged 17 and Younger
- Single-parent Household
- Aged 5 and over with a Disability

Housing Type/Transportation

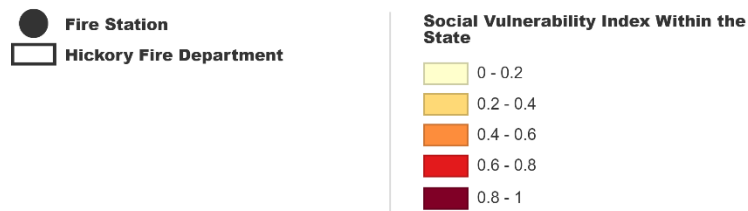
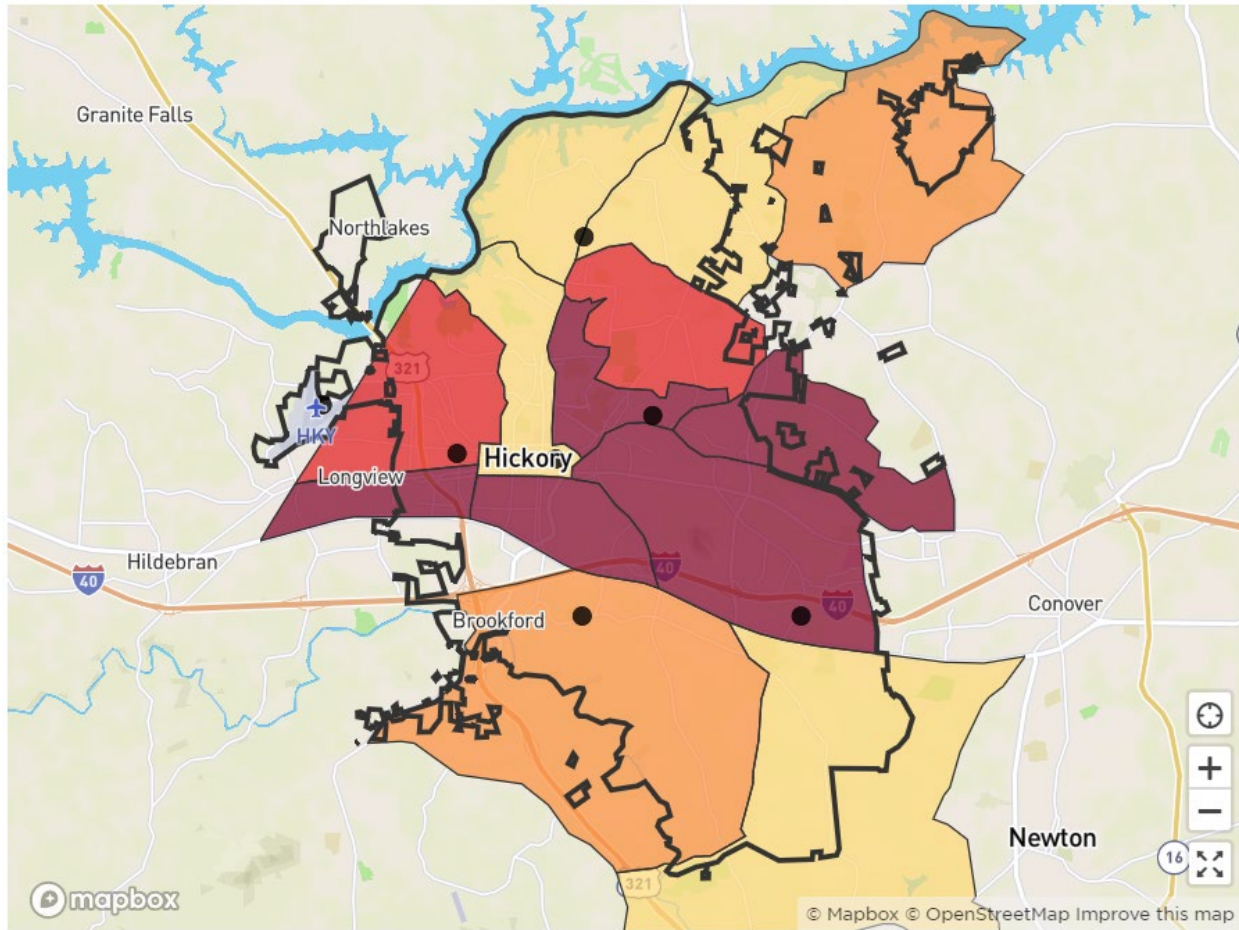
- Multi-unit
- Mobile Homes
- Crowding
- No Vehicle
- Group Quarters

Race/Ethnicity/Language

- Minority
- English Language Ability



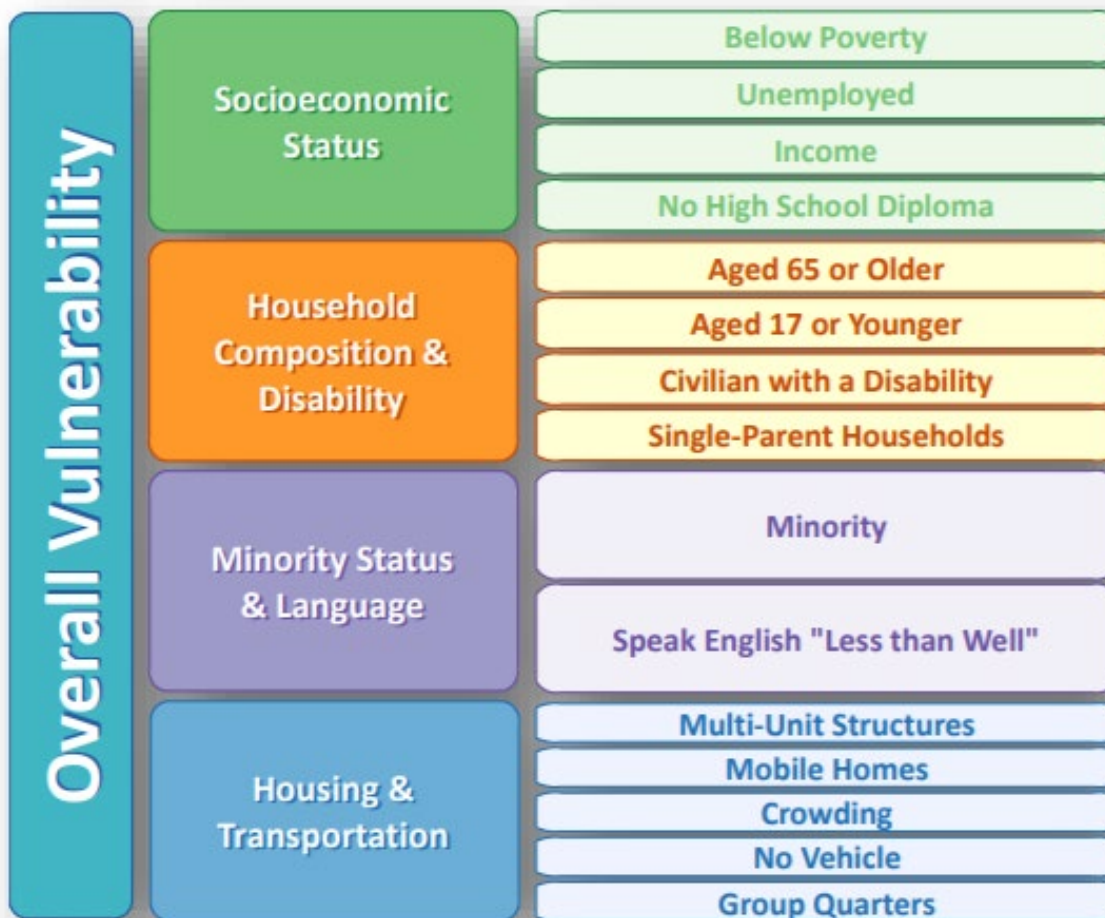
Housing and Transportation Social Vulnerability Within the State



Sources: CDC ASTDR SVI. This dataset represents the relative housing and transportation social vulnerability of a census tract/county, ranking them against all census tracts/counties within a state. The values are percentile rankings on a scale from 0 to 1, where values near 1 indicate high housing and transportation social vulnerability and values near zero indicate low housing and transportation social vulnerability.

At-Risk Populations

At-risk populations can place additional workloads on an organization, thus increasing service demands. The National Fire Protection Association has identified them as groups at a higher risk of being injured or killed in a fire.



CDC (2018). SVI 2016 Documentation. Available at:

https://svi.cdc.gov/Documents/Data/2016_SVI_Data/SVI2016Documentation.pdf



Employment and Job Access

Employment and job access impact socio-economic status, traffic, access to healthcare, and overall health - all of which are tied into community safety.

Unemployment in the community

Unemployment presents a dramatic shift in a family's circumstances. Their priorities might change as a result. Things like changing batteries in a fire alarm, refilling necessary prescriptions, or even finding safe housing, may take a backseat to basic necessities. People who are unemployed also might not seek medical care when needed until it becomes an emergency.

Unemployment Rate

8.7%

Hickory Fire Department

5.6%

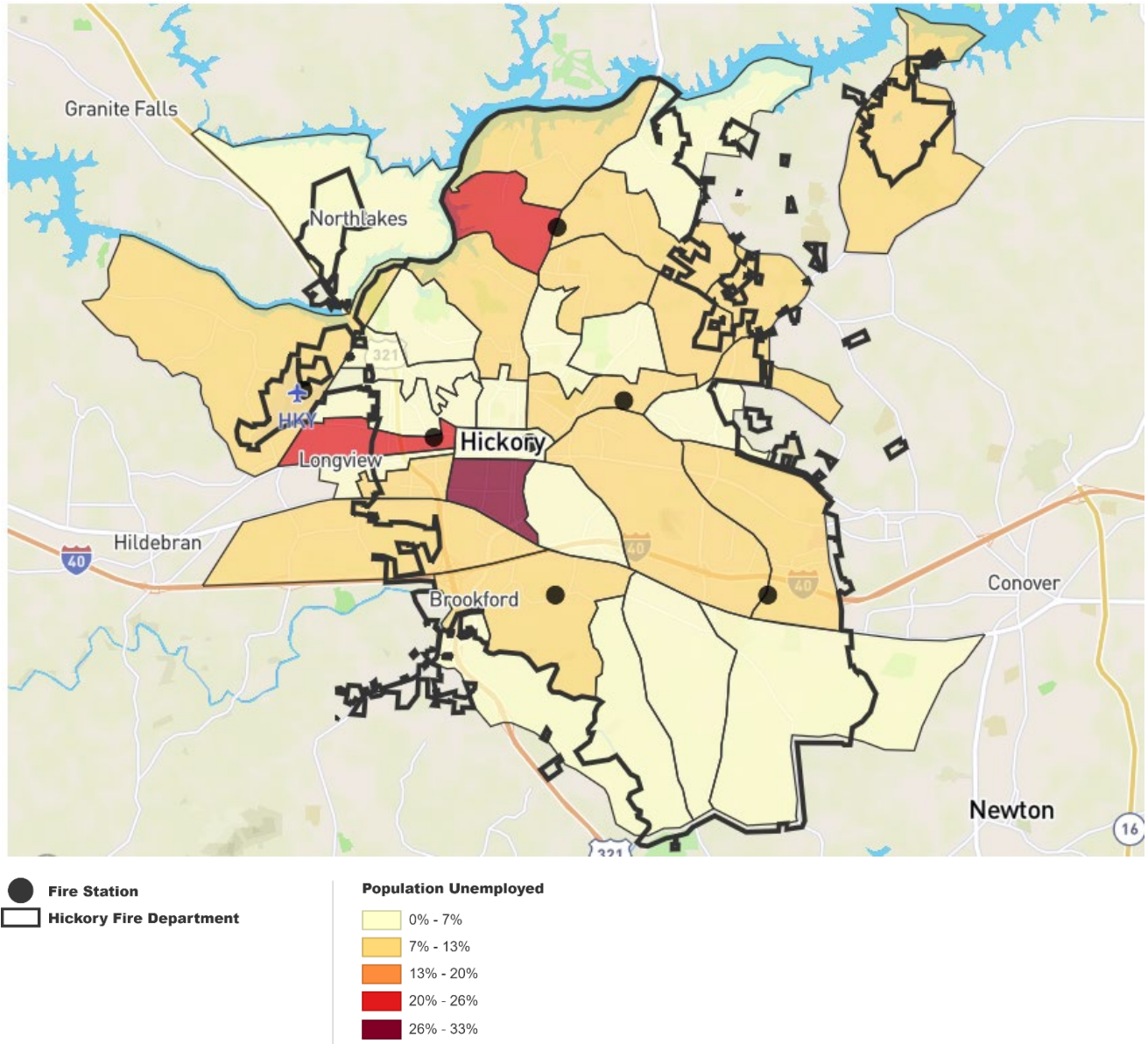
North Carolina

5.3%

United States of America

Sources: US Census ACS 5-year. Unemployment Rate are civilian unemployed population age 16 and over divided by the total civilian labor force age 16 and over.

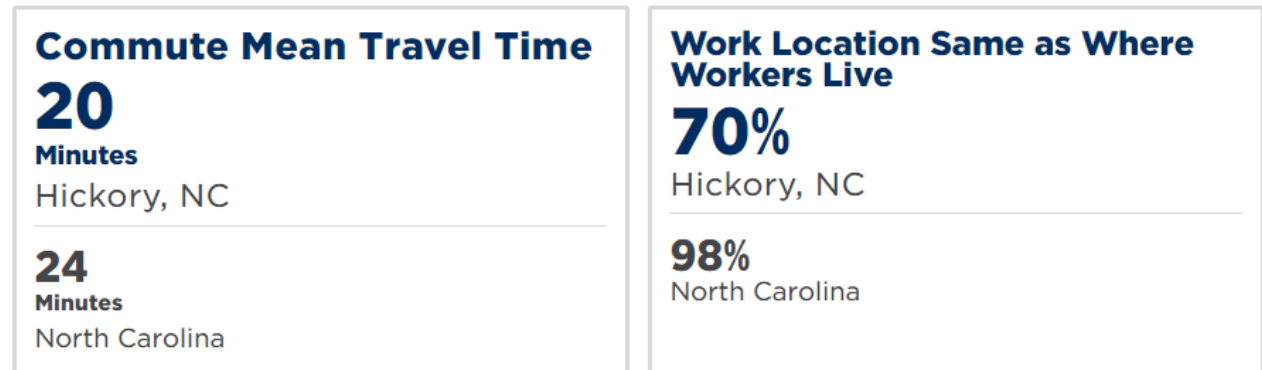
Percent Unemployed



Sources: US Census ACS 5-year

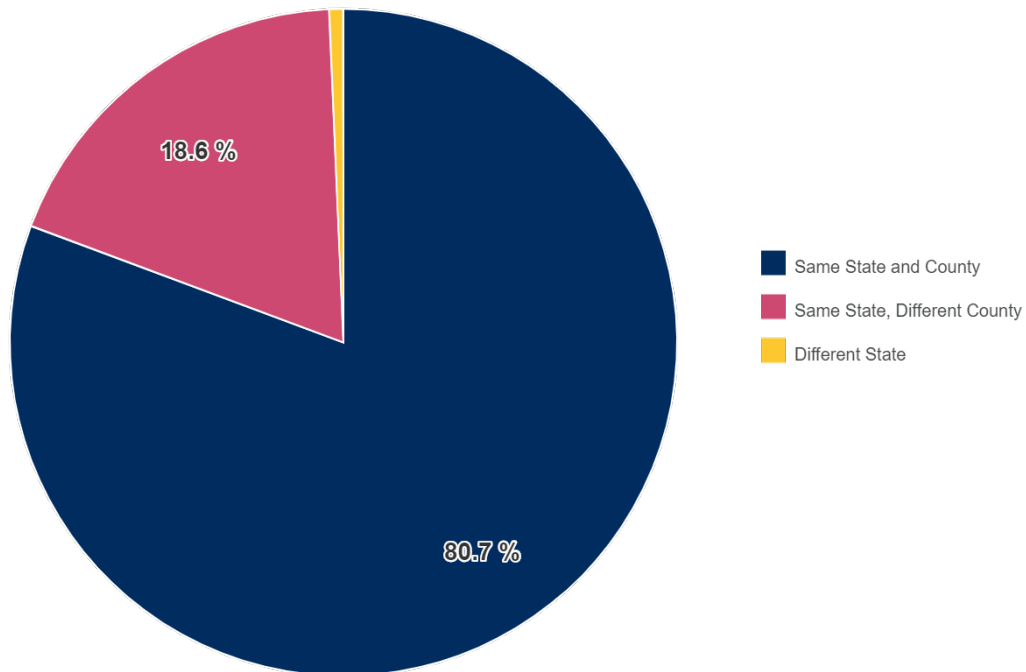
Where do our residents work?

Commuters traveling to and from work create a lot of the traffic in a community. When people live and work in the same area, it may foster a greater sense of belonging which can strengthen Community Risk Reduction initiatives. This section provides details about residents' commutes to work.



Sources: US Census ACS 5-year; CTPP

Work Location Relative to Residence Location

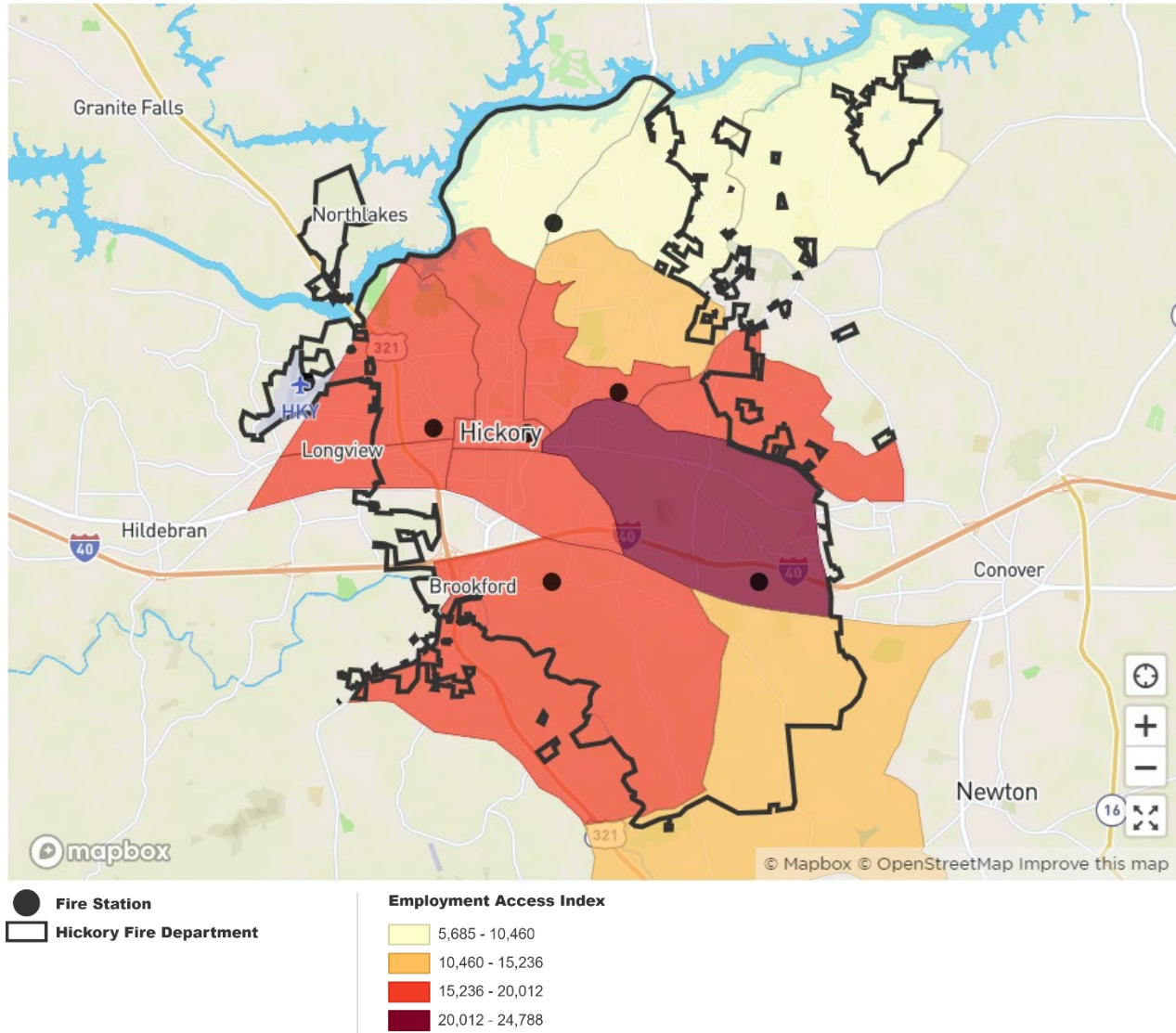


Sources: US Census ACS 5-year

Employment Access Index

The Employment Access Index is a handy resource used to visualize the distance to areas with a high concentration of jobs. Higher numbers indicate better access.

Access to Employment

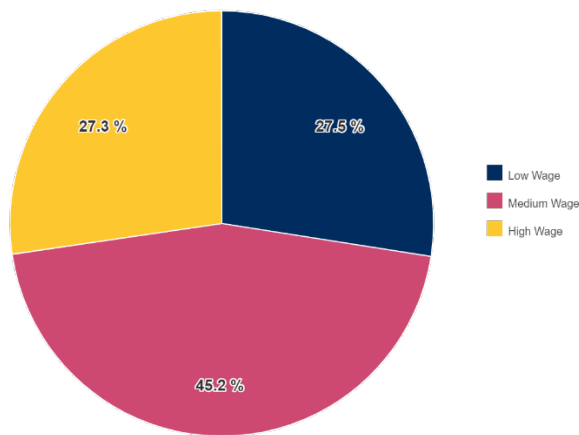


Sources: US HUD & DOT, LAI V3.0, LODES Version 7.3 The employment access index is calculated as the summation of the total number of jobs divided by the distance in square miles to those jobs. The higher the index, the greater the degree of job opportunities in a for a given geography. For more information <https://www.hudexchange.info/programs/location-affordability-index/>

What kind of jobs exist in our community?

Middle-skill jobs usually require workers to have significant training. These jobs include plumbers, electricians, construction, and administrative positions. Often starting wage is a living wage. Some of those workers are responsible for ensuring the places where we live and work are safe. Per capita income is the total income in an area divided by the number of people living in that area.

Wage of Workers



Sources: US Census 2010, LEHD, etc.; US Census 2010, LEHD High wage workers earn \$3333/month or more. Medium wage workers earn more than \$1250/month but less than \$3333/month. Low wage workers are defined as workers earning \$1250/month or less.

Middle-Skill Jobs

3,427

People

Hickory Fire Department

2,993

People

Hickory, NC

909,424

People

North Carolina

30,340,930

People

United States of America

Retail Job Density

0.2

Jobs per acre

Hickory, NC

0.1

Jobs per acre

North Carolina

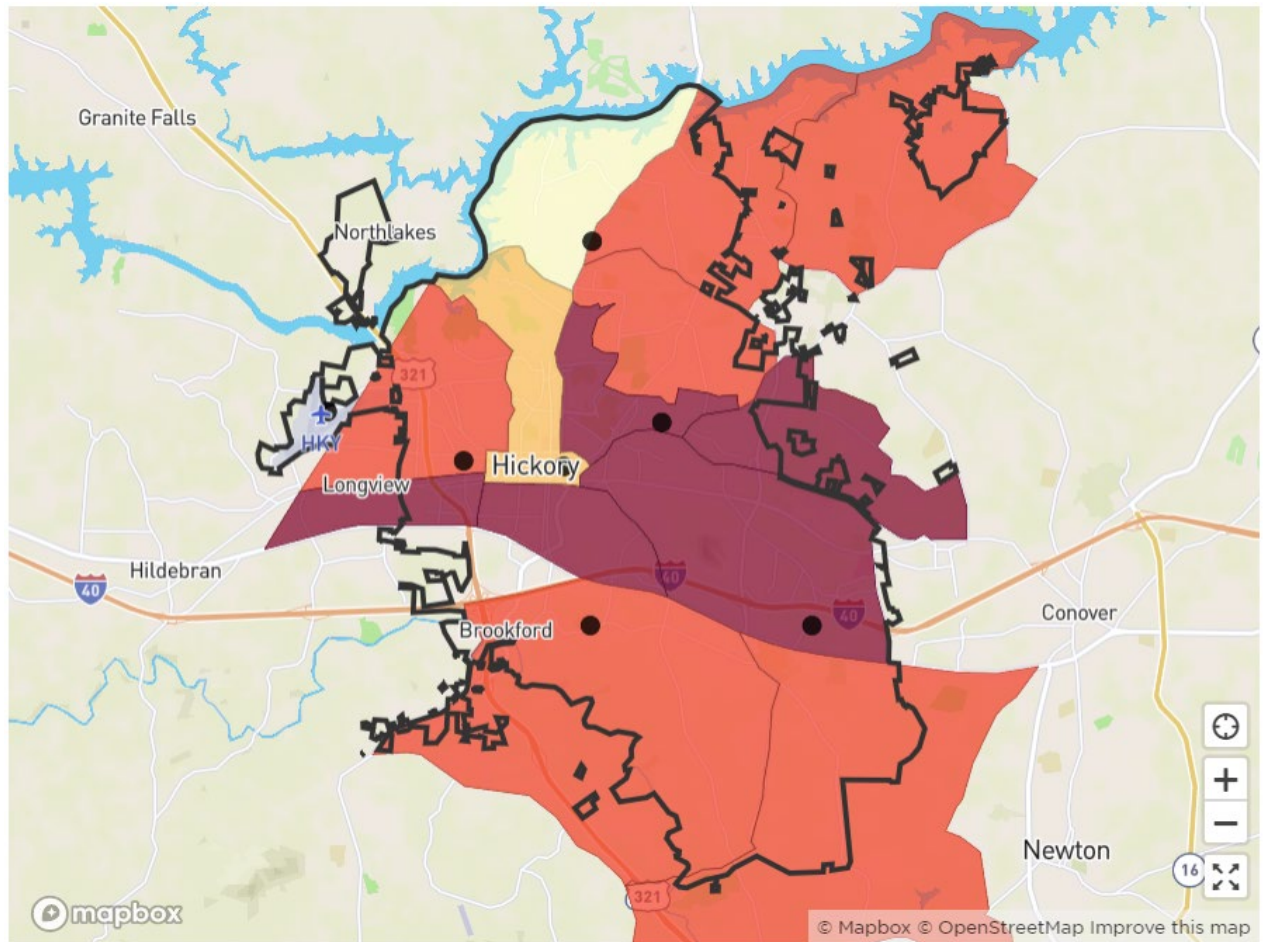
0.4

Jobs per acre

United States of America

Sources: US Census ACS 5-year; US HUD & DOT, LAI V3.0 Middle skill occupations are defined here as office/administrative support, construction/extraction, and installation/maintenance/repair. Retail job density is the average number of retail jobs (NAICS Sector 44-45) per acre in a given geography.

Per Capita Income



Sources: US Census ACS 5-year

Poverty and Affordability

Risk factors associated with poverty are not necessarily related to a community or an individual's lack of knowledge or motivation. More often they are associated with a lack of access to resources, and poverty can limit this access. Poverty is also correlated with lower levels of health. Residents living in poverty may not have access to health

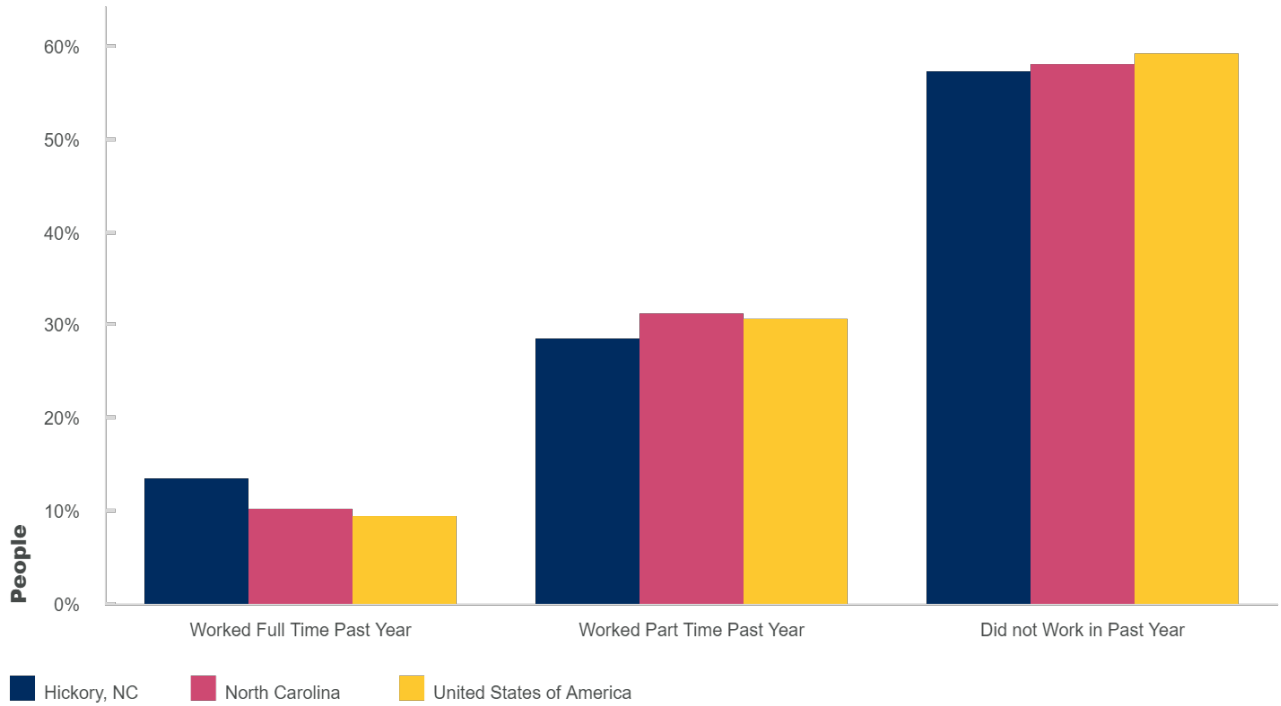


clinics, health insurance, or healthy food. Additionally, when the cost of living in a community is high and a large portion of a household's income is dedicated to meeting basic needs, residents become limited in their choices when it comes to safety. For example, a family may forego the approved car seat to keep the lights on at home. Since poverty and affordability limit access to resources and make residents more vulnerable, it is important to understand poverty in our community so safety advocates can meet residents where they are.



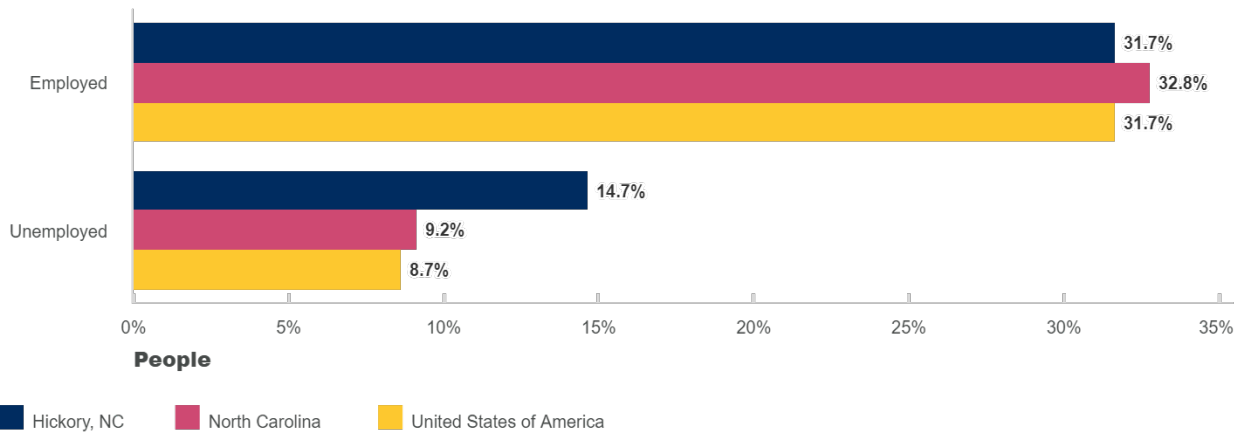
Without sufficient wages, the number of people in poverty increased. In Hickory, the percentage of people in poverty is 17.1%, which is greater than the state at 14.7%. Combined with other risks such as education levels, disabilities, and inability to work, poverty can increase risks to this population, as shown in the following figure.

Income Below Poverty Level & Work Experience



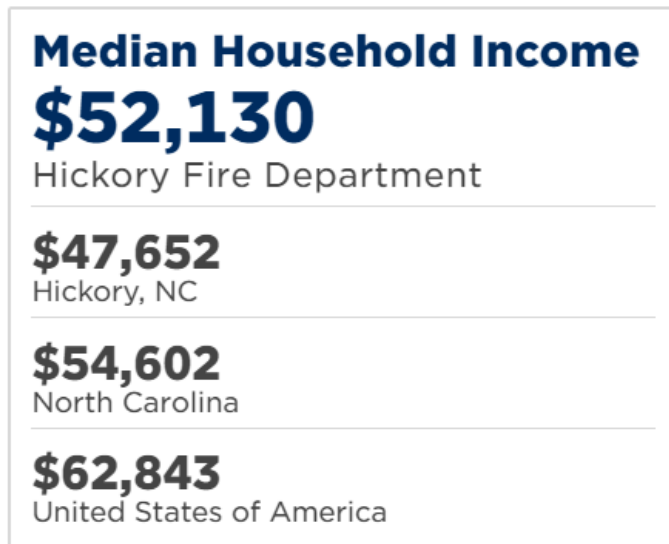
Sources: US Census ACS 5-year

Below Poverty Level by Employment Status

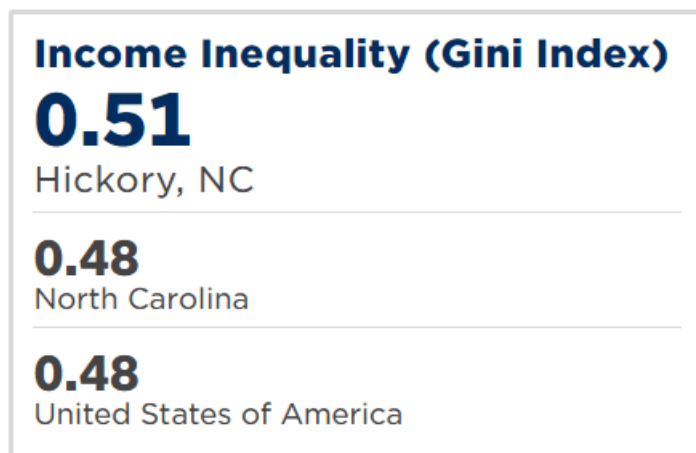


Income

Income is strongly linked to the quality of life. While income is not the only indicator of vulnerability, it is a good overall indicator of the financial well-being of a community.



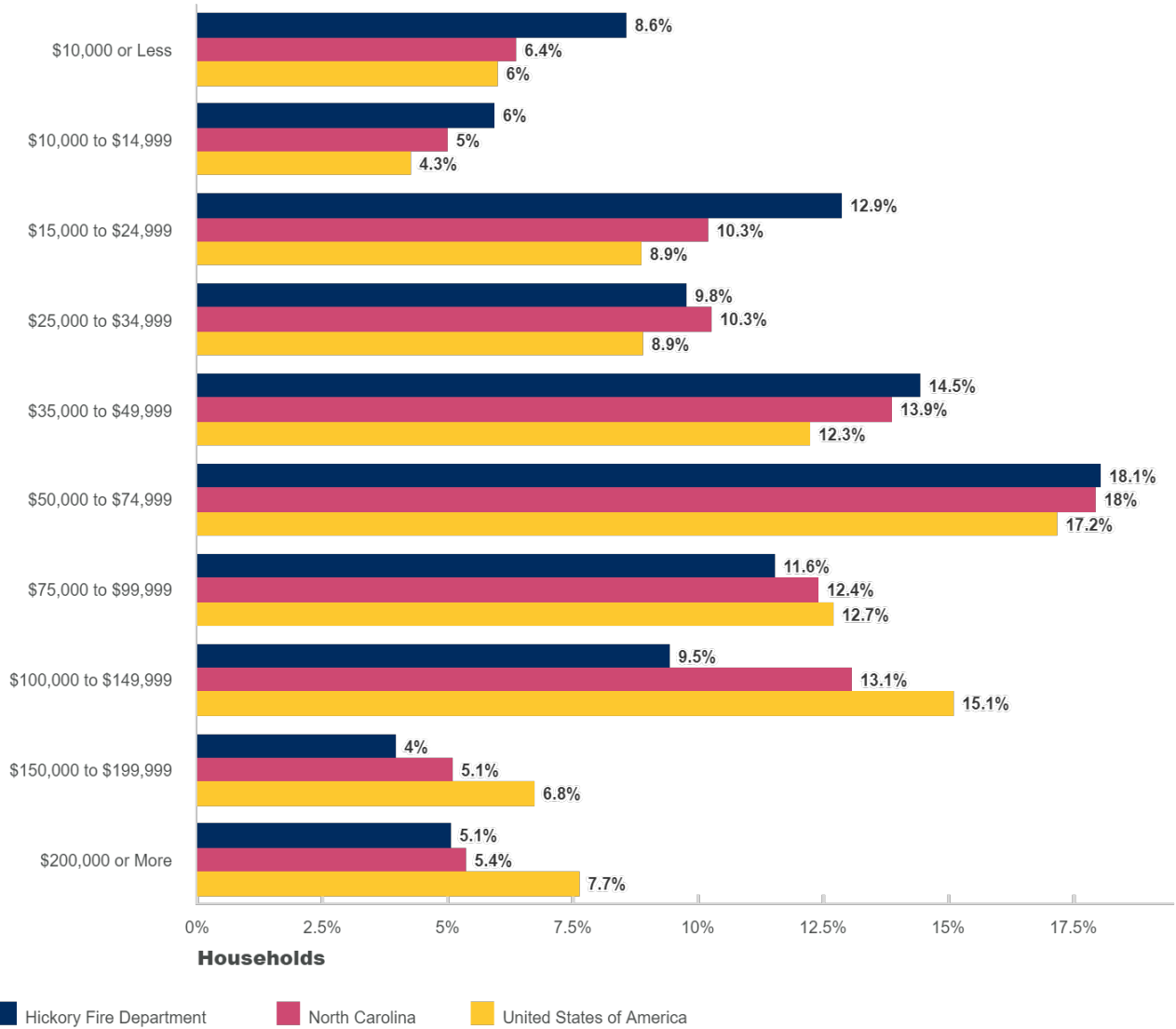
The lack of higher incomes increases the risk for fires and medical emergencies because of their age, inability to receive adequate medical services because of no health insurance, failure, or inability to pay a doctor, and housing conditions. The median household income in the Hickory Fire Department response area is \$52,130 compared to North Carolina at \$54,602.



Sources: US Census ACS 5-yearThe Gini Index is a measure of income inequality. The values range from 0 to 1, with values near 1 being high inequality and values near 0 being low inequality.

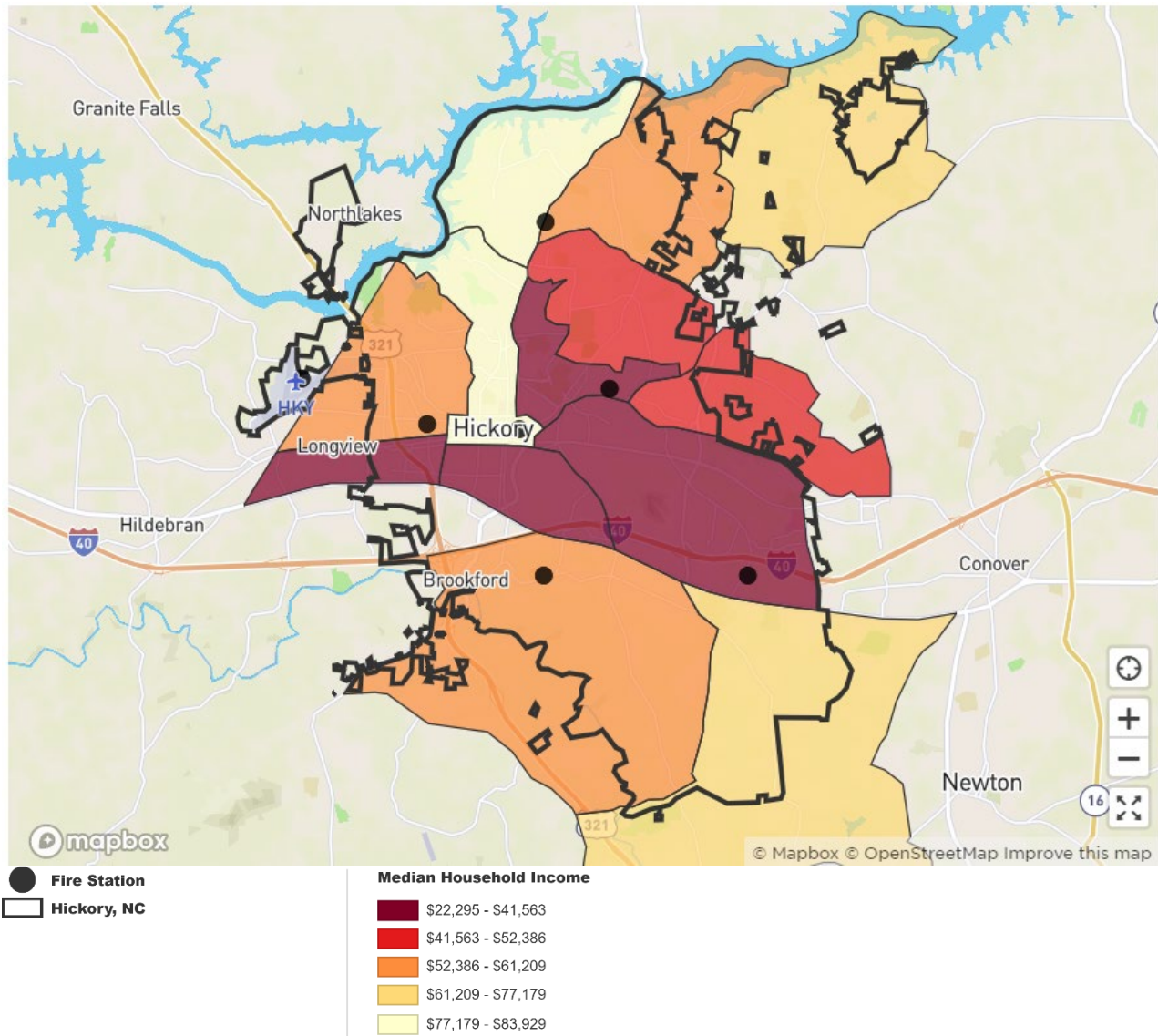
Hickory Fire Department Community Risk Assessment-Standards of Cover

Household Income



Sources: US Census ACS 5-year

Median Household Income



Sources: US Census ACS 5-year

Affordability

Housing can be one of the largest expenses a person or family can face. Income tells only one part of the financial narrative of our residents. The cost of housing provides more insight. Households not traditionally considered below poverty may struggle financially when they live in high-cost areas. When residents must spend a larger percentage of income on securing housing, other needs may become impossible to meet.

Homeowners Spending 30% or More on Housing Costs

18.3%

Hickory Fire Department

19.9%

North Carolina

22.3%

United States of America

Renters Spending 30% or More on Housing Costs

40.5%

Hickory Fire Department

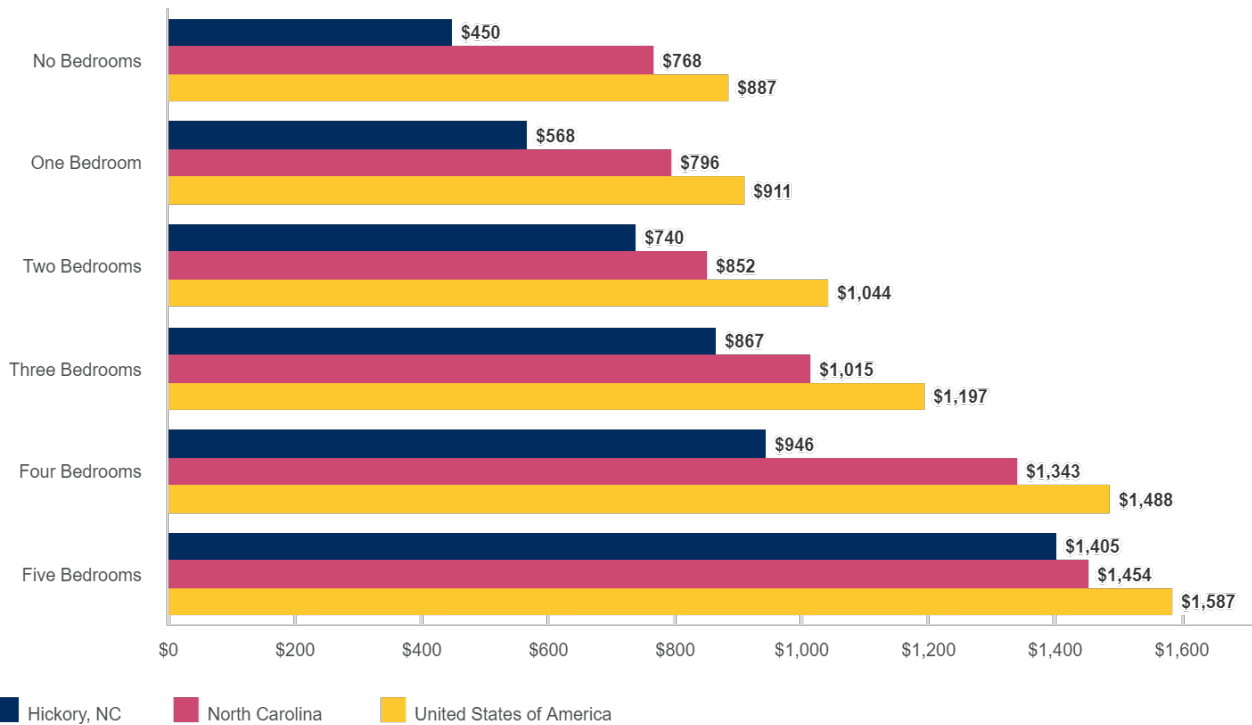
43.3%

North Carolina

46%

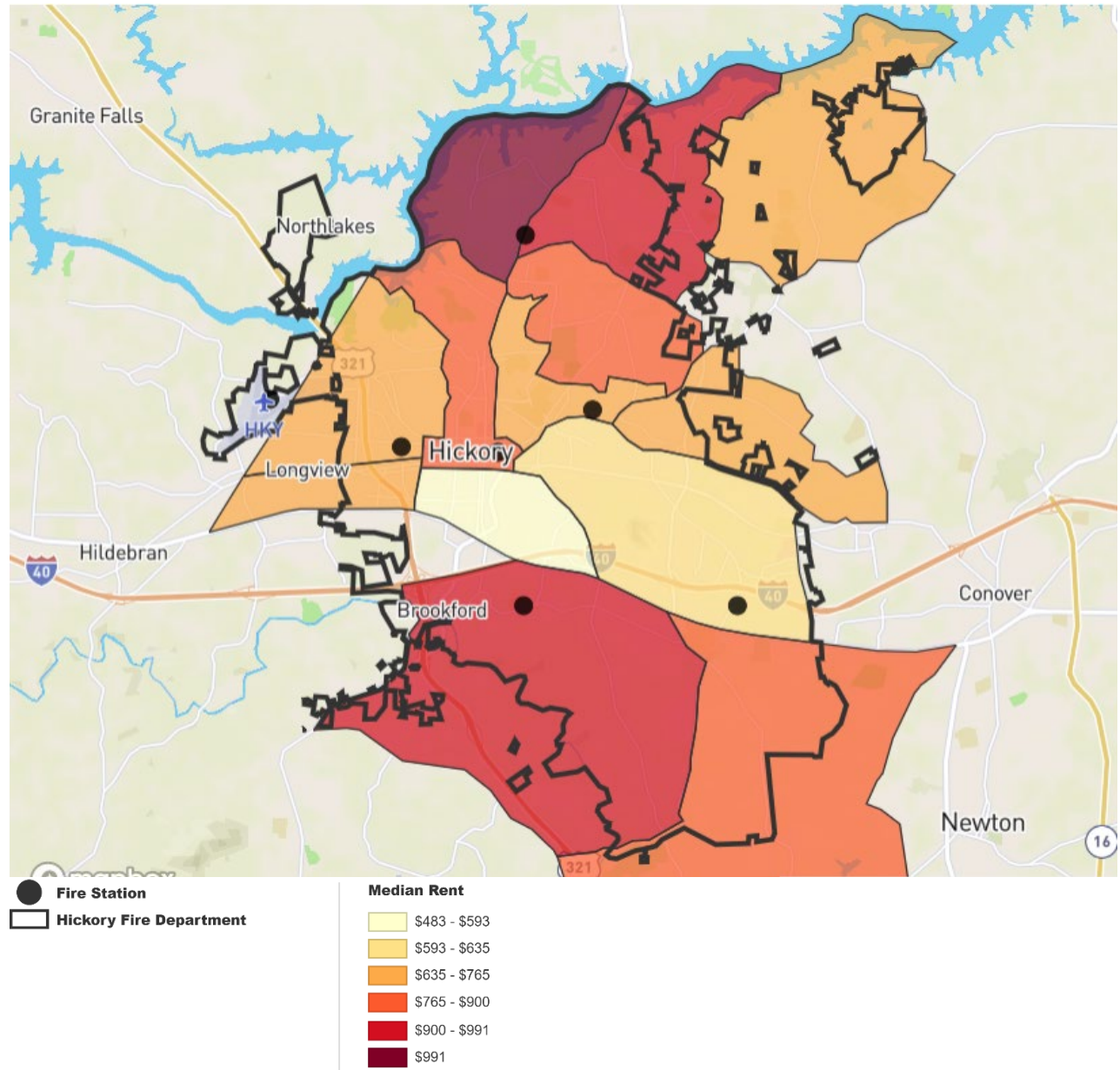
United States of America

Median Rent by Number of Bedrooms



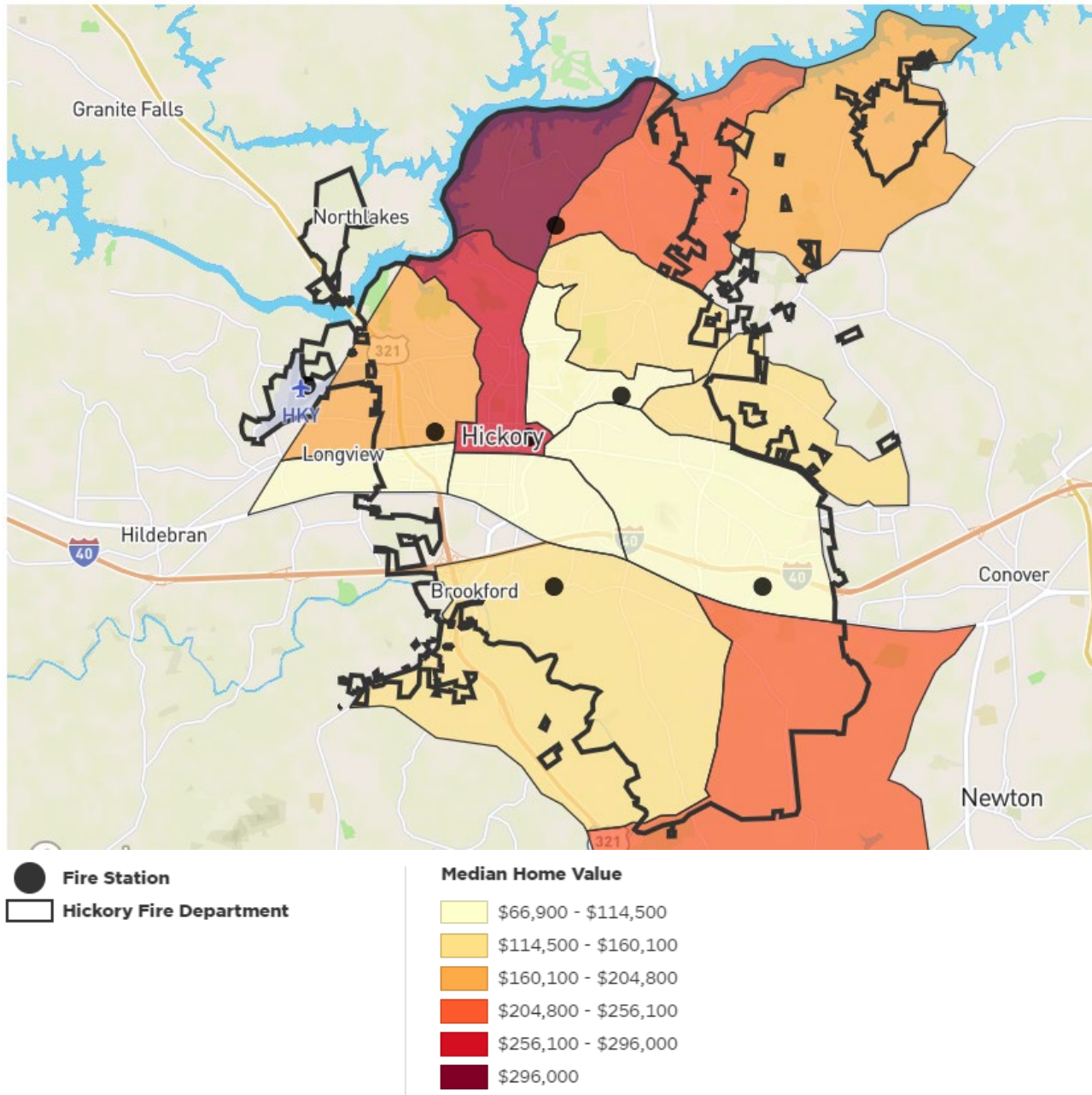
Sources: US Census ACS 5-year

Median Rent Price



Sources: US Census ACS 5-year

Median Home Value



Sources: US Census ACS 5-year

Sources: US Census ACS 5-year



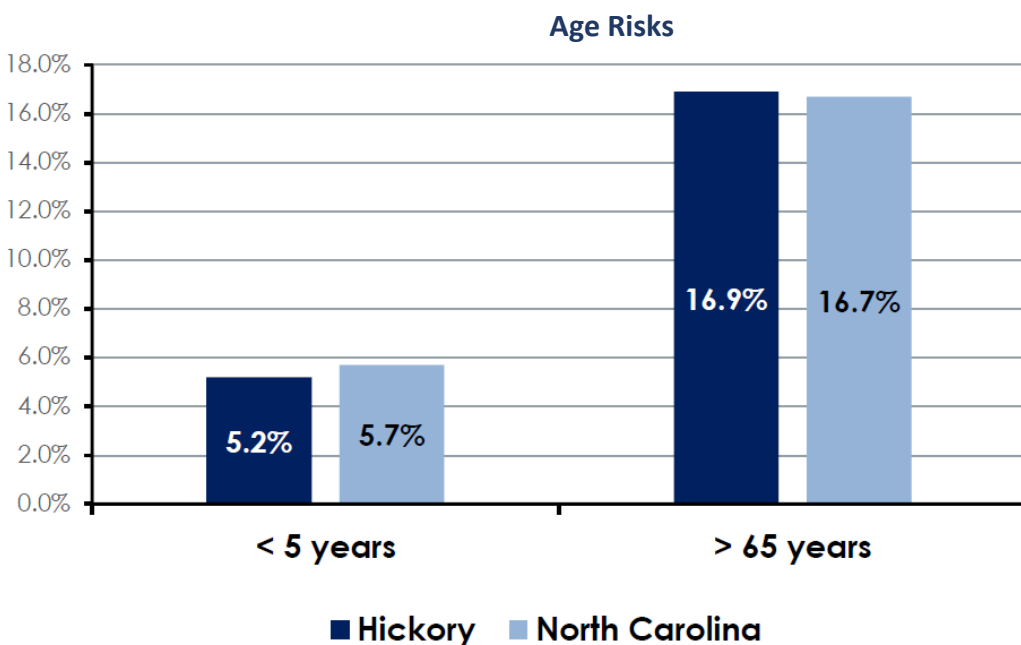
Dependent Population

Dependents, residents who are either children or the elderly, may be at greater risk for and during an emergency. Children under the age of five or adults over 65 are considered at a higher risk because of mobility issues and may need assistance

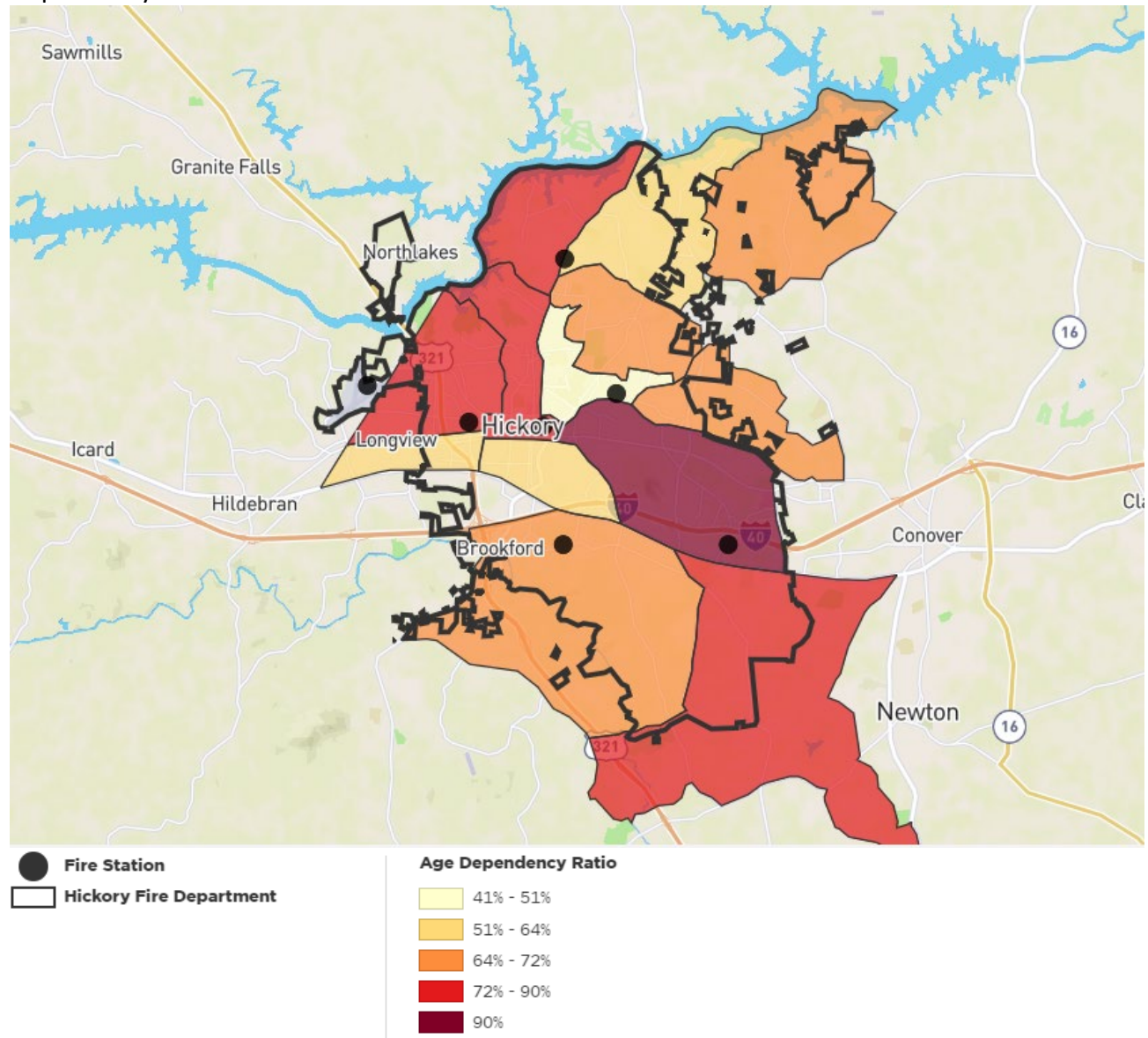
evacuating a building or home. In Hickory, the population under the age of five is 5.2% compared to 5.7% for the state. Adults greater than 65 years of age is 16.9% in Hickory, which is greater than the state at 16.7%. The median age in Hickory is 37.8, which is slightly lower than the state at 38.7. By understanding the vulnerability of our residents, we can both plan for services and engage partners already providing direct assistance programs.

What is the status of dependents in our community?

Age dependency ratios explain how many dependents there are for every 100 people of working age in an area. When adult workers leave, elderly may remain at home alone. Understanding this family dynamic is useful for uncovering where daytime emergencies affecting those more vulnerable populations.



Dependency Ratios

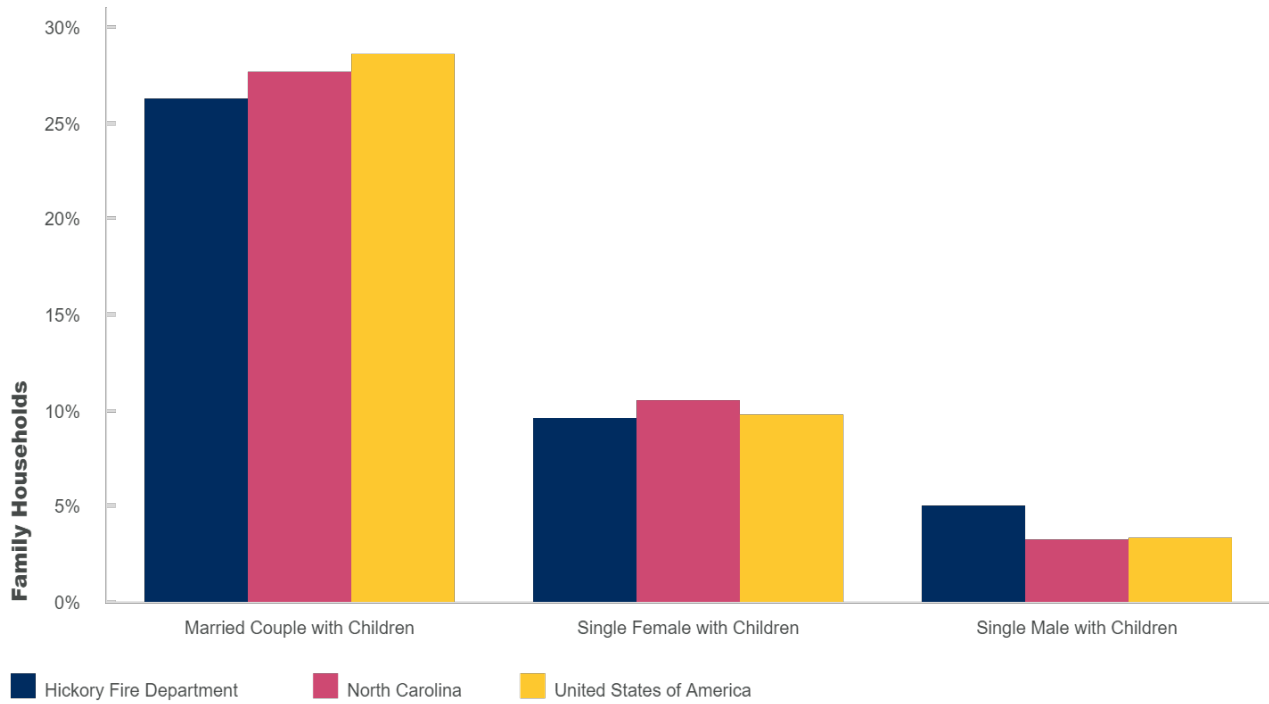


Sources: US Census ACS 5-year.

Exactly how vulnerable are our children?

In high poverty and low-income areas, paying a babysitter or daycare can be beyond a family's means. Some children in those families may be left without supervision. Without supervision, children may cause more fires or emergency situations.

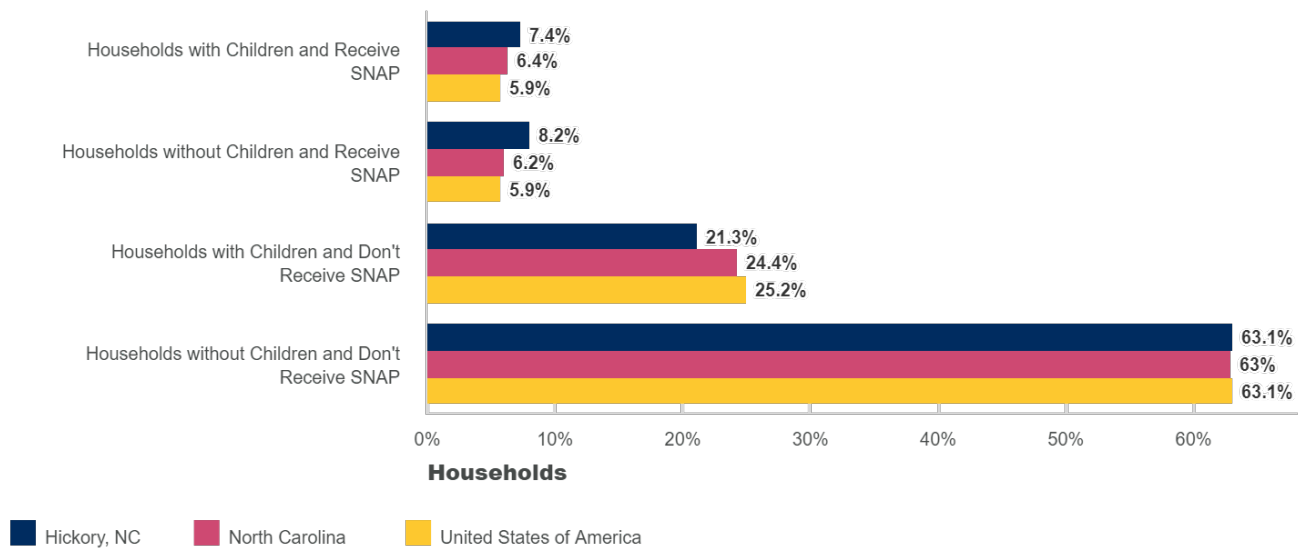
Family Type with Children



Sources: US Census ACS 5-year

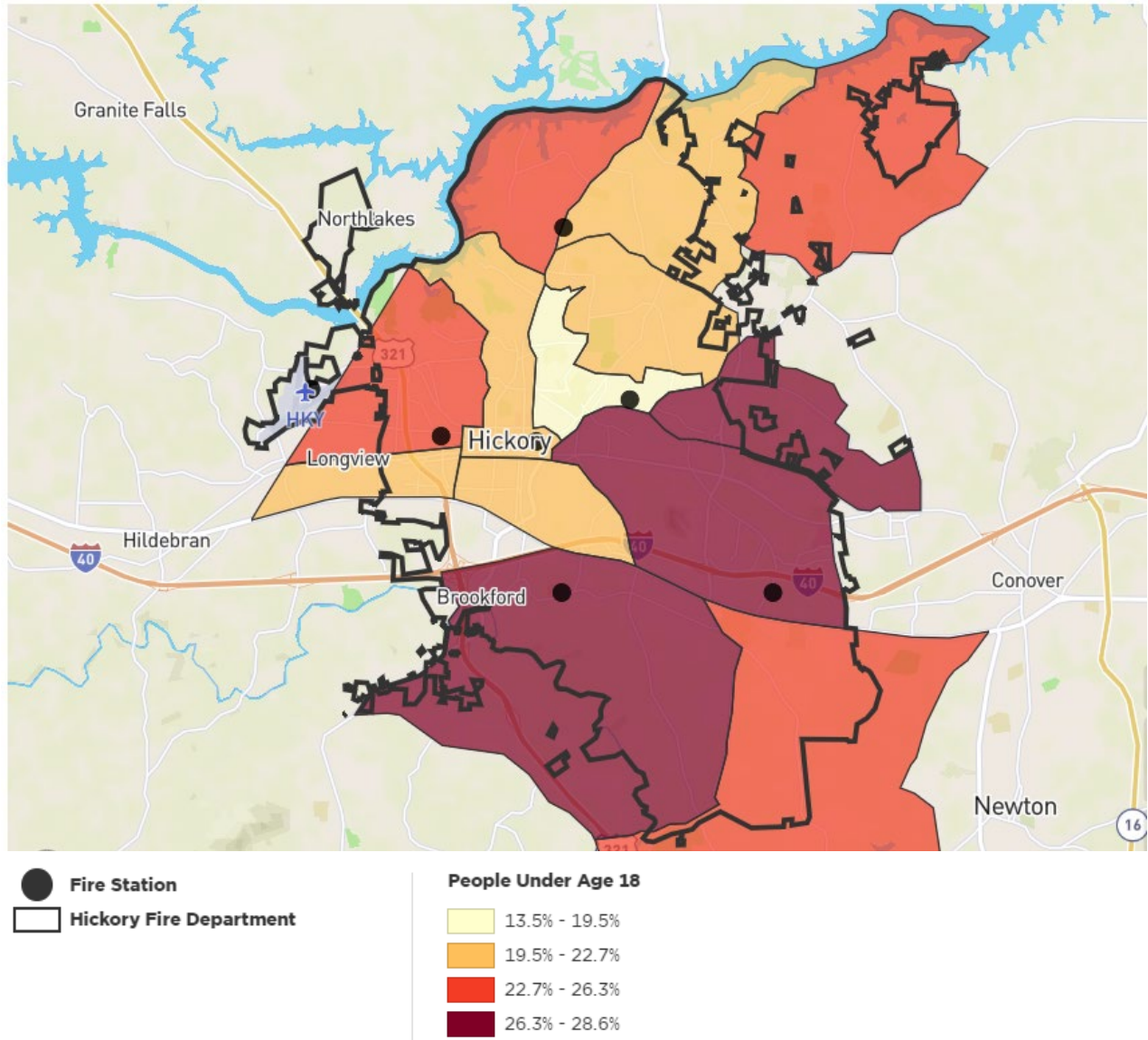
The Census Bureau defines a family household as one that "includes a householder and one or more people living in the same household who are related to the householder by birth, marriage, or adoption. All people in a household who are related to the householder are regarded as members of her or his family" (https://www.census.gov/glossary/#term_Familyhousehold).

Households Receipt of Food Stamps/SNAP and Presence of Children



Hickory Fire Department Community Risk Assessment-Standards of Cover

People Age Under 18

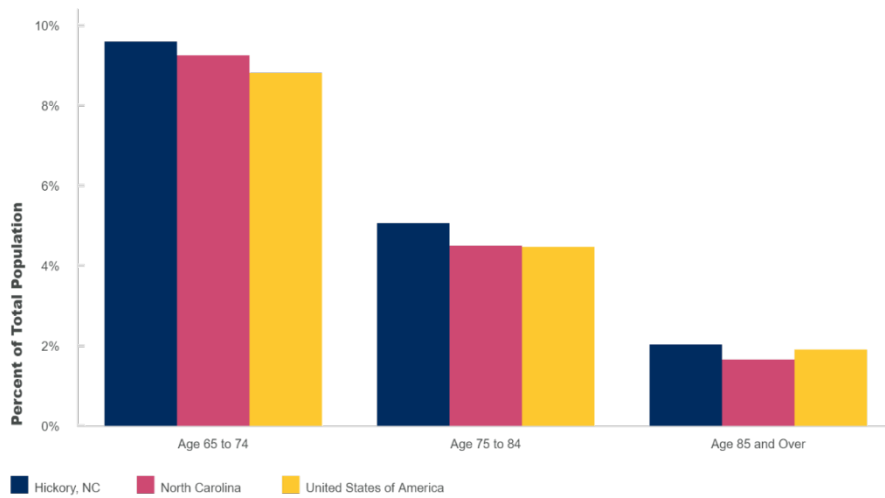


Sources: US Census ACS 5-year

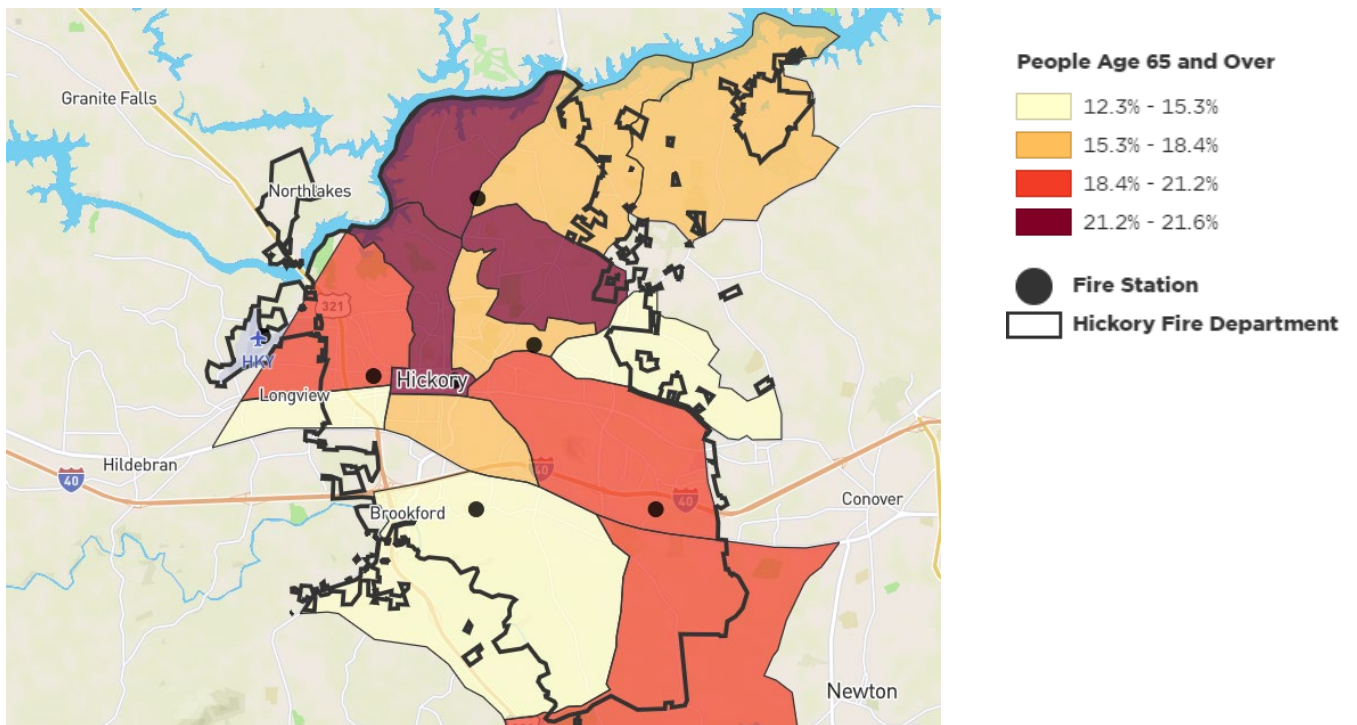
Exactly how vulnerable are the elderly?

With age often comes mobility challenges and reduced hearing and eyesight. These factors may increase the risk of our elderly residents being killed in a fire or hurt in their own homes. These residents could have a harder time notifying authorities about an emergency or leaving a dangerous situation. Prevention and response times can make all the difference in situations like these. Identifying where our elderly residents live is a first step to improving outcomes.

Age Breakdown for Those Age 65 and Over



People Age 65 and Over



Sources: US Census ACS 5-year

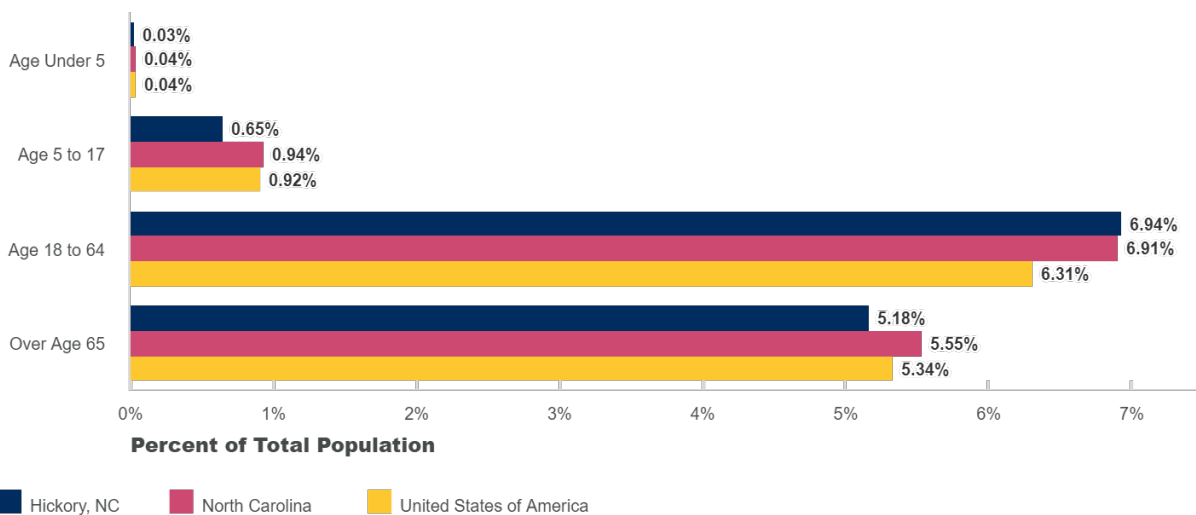
Disabilities

People with disabilities live in every community. In fact, more than 43 million Americans have a disability, and the population of the group of Americans with disabilities is constantly changing. At any moment, a community member could become part of this group, for a



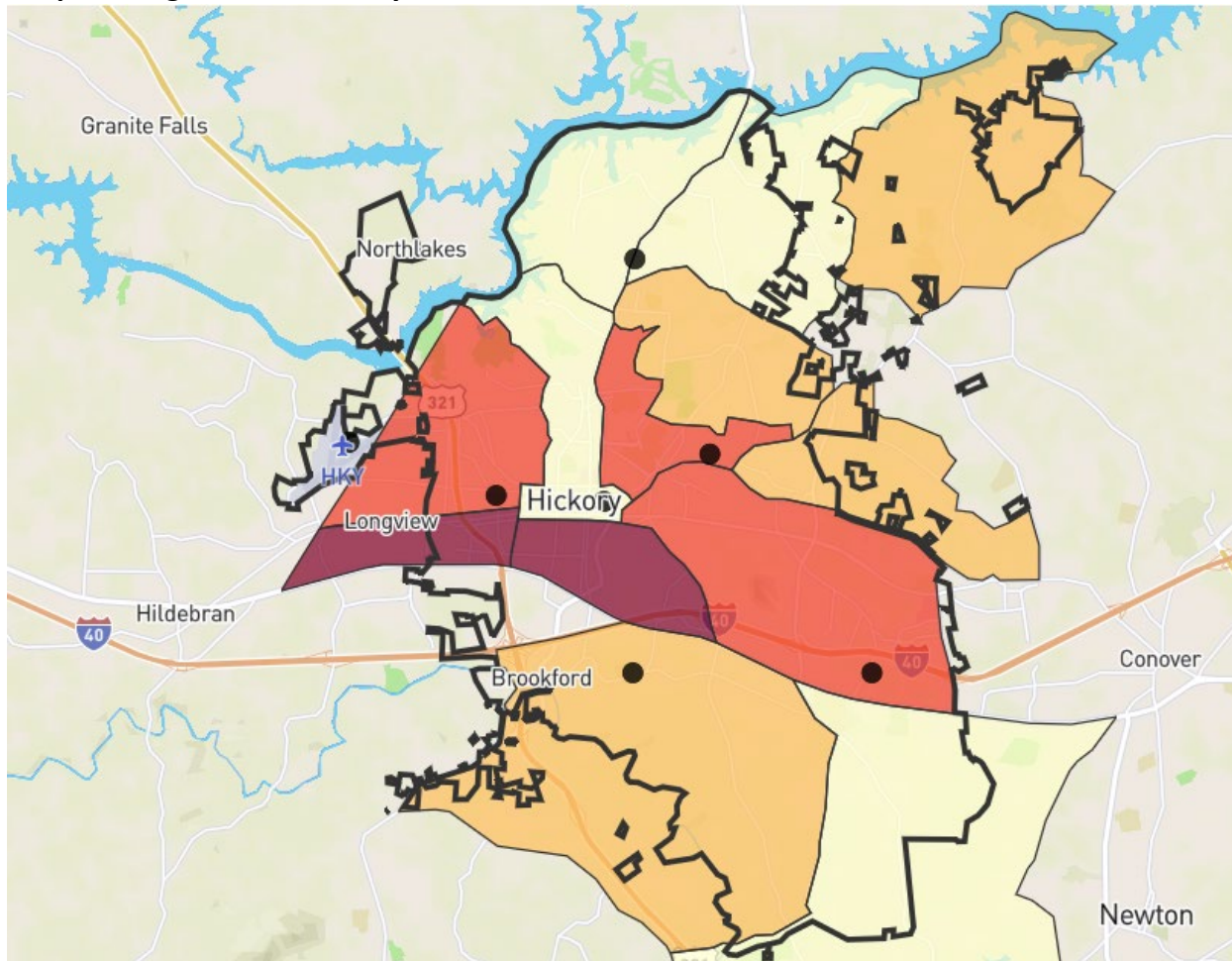
short or long time. Some categories of disabilities include mobility, visual, hearing, speech, and cognitive, and some people can have multiple disabilities at once. It is important to consider how risk differs for people with disabilities, and how these disabilities could impact an individual's ability to identify and respond in an emergency. Disabilities can be temporary or permanent, apparent or hidden, and therefore assumptions about whether people have disabilities should be avoided. Understanding this helps avoid assumptions by providing data about this population.

People Living With a Disability by Age Group



Populations with a disability increase risks in the community, and this group may not have the ability to escape during an emergency, increasing the chance of injuries or death from a fire. In Hickory, the percentage of people with a disability is 12.8%, which is slightly lower than the state at 13.4%.

People Living With a Disability



- Fire Station
- ▭ Hickory Fire Department

People Living With a Disability

- 8.6% - 12%
- 12% - 15.2%
- 15.2% - 19.4%
- 19.4% - 22%



People Living With a Disability

12.8%

Hickory, NC

13.4%

North Carolina

12.6%

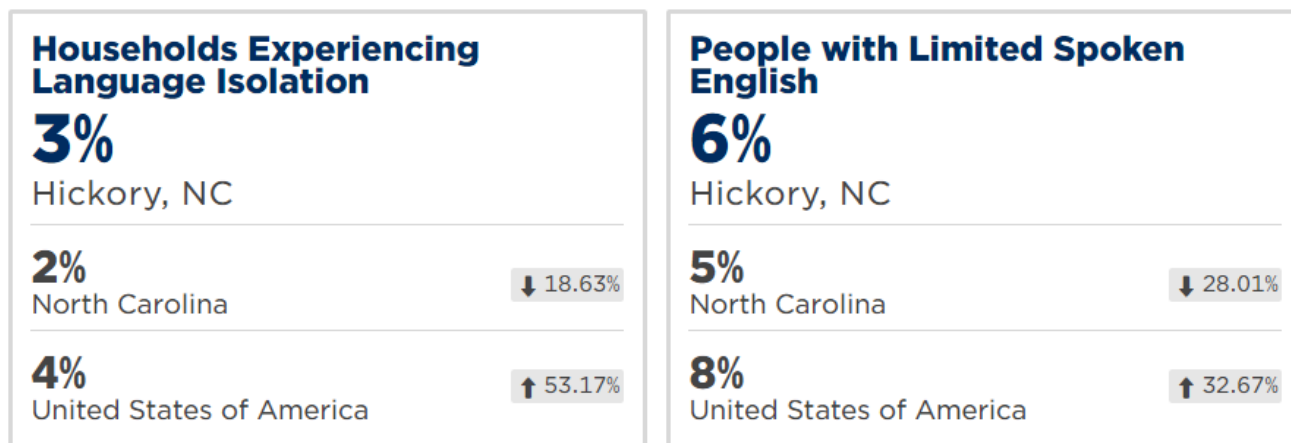
United States of America

Language Isolation

Providing emergency services and prevention education can become complicated when trying to serve non-English speaking residents. Use this section on high rates of language isolation to identify where non-English efforts are best concentrated and which languages



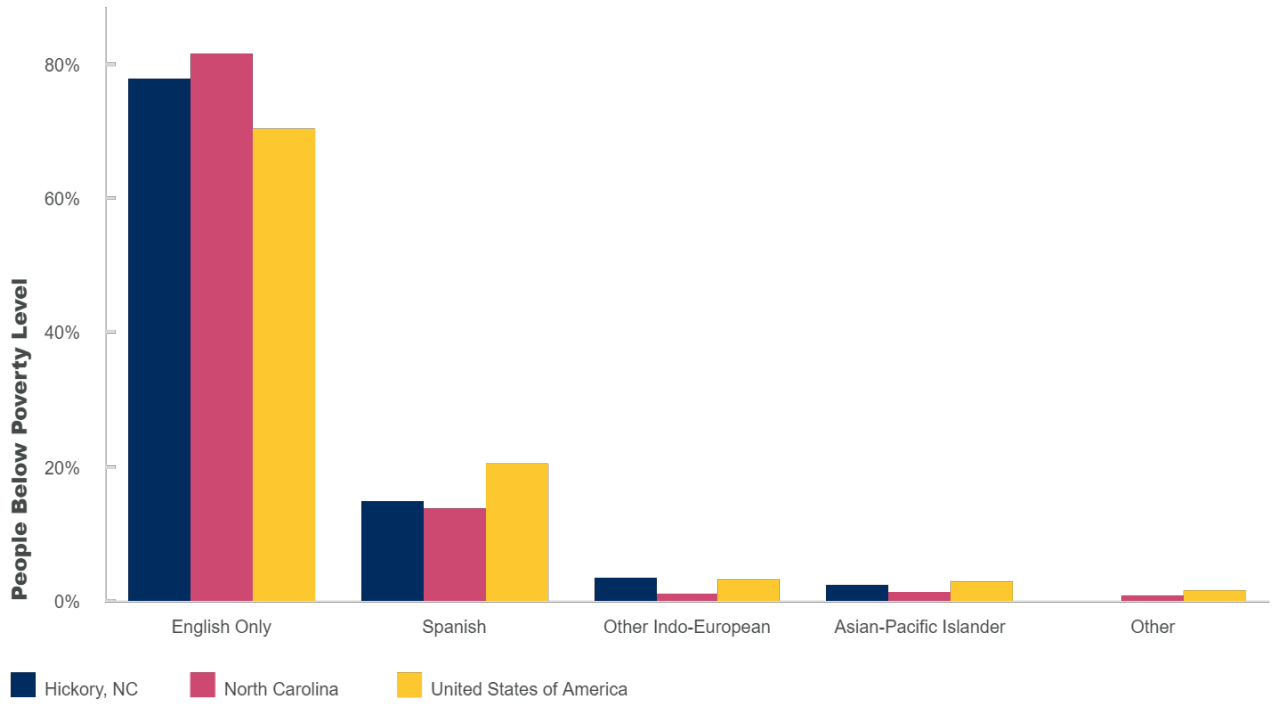
might be needed. Not only will this understanding increase successful prevention educational efforts, but it could result in better outcomes for residents during an emergency.



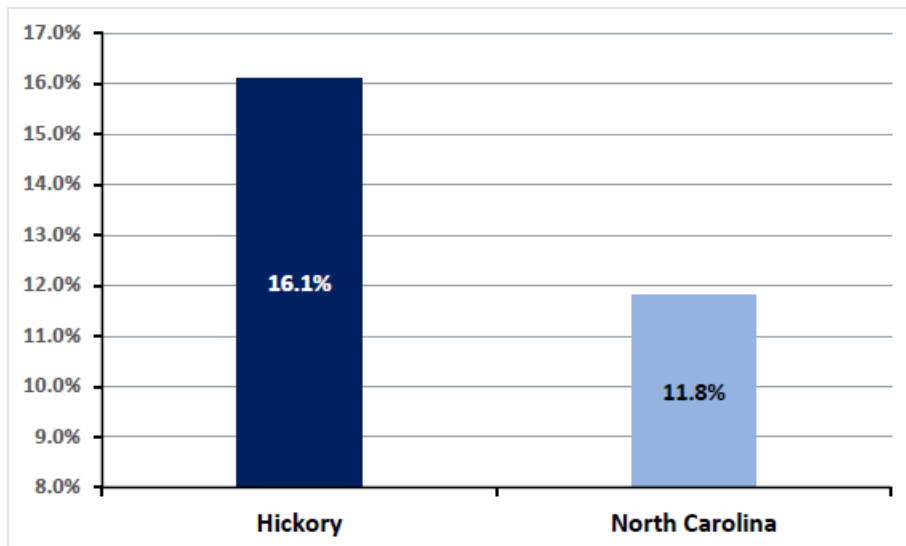
*% Diff. shows the *percentage increase or decrease* as compared to the original geography.

Sources: US Census ACS 5-year

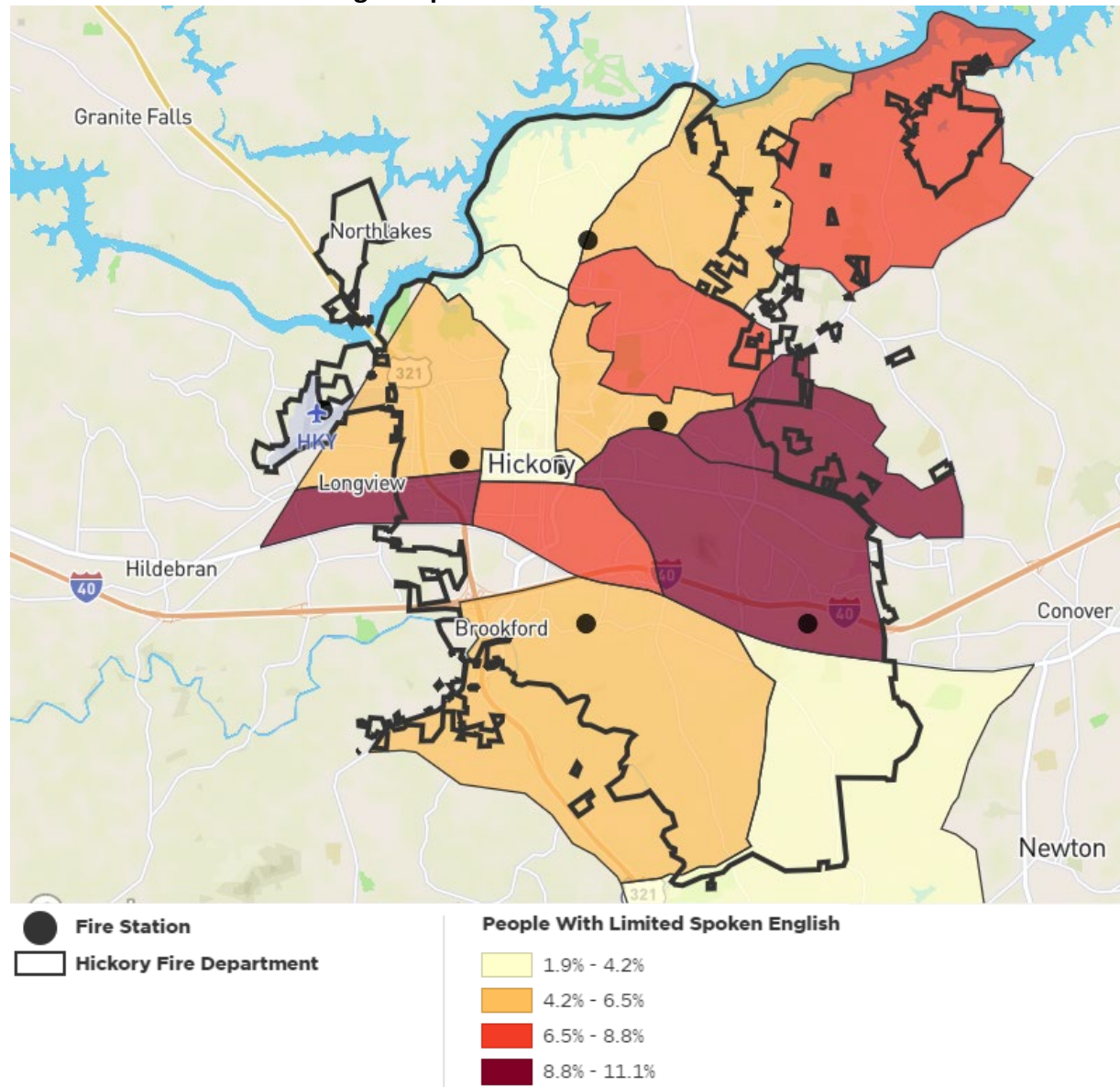
People Below Poverty Level by the Language They Speak at Home



mySidewalk.com - Sources: US Census ACS 5-year



Households With Limited English Spoken



Source: US Census ACS 5-year

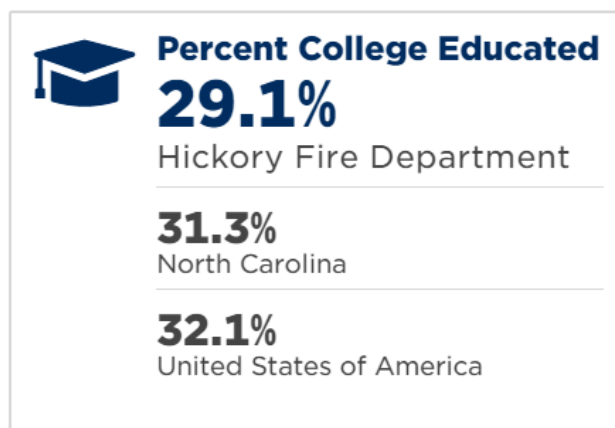
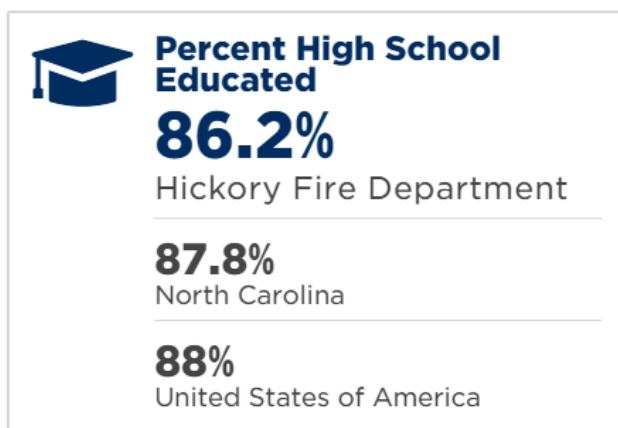
People without proficiency of the English language can increase risks. Emergency personnel that respond to an incident may encounter a patient unable to understand or answer questions because of their limited English-speaking skills. This population will have difficulty if mitigation or prevention materials are not printed in their native language. The number of people speaking a language other than English spoken at home is 16.1% in Hickory, which is higher than the state at 11.8%.

Education



This demographic provides additional information on people living in Hickory. Although these people do not fall into the NFPA high-risk populations, they can still impact the community's risks. Educational levels impact income levels, and a lower

income can lead to restricted access to resources, which can leave residents vulnerable. Lower educational levels also result in less exposure to a variety of perspectives and opportunities, which adds challenges to adverse situations. Additionally, educational levels influence a community's literacy rate. Knowledge of a community's literacy rate is critical for reaching all populations in that community and communicating safety messages to them.

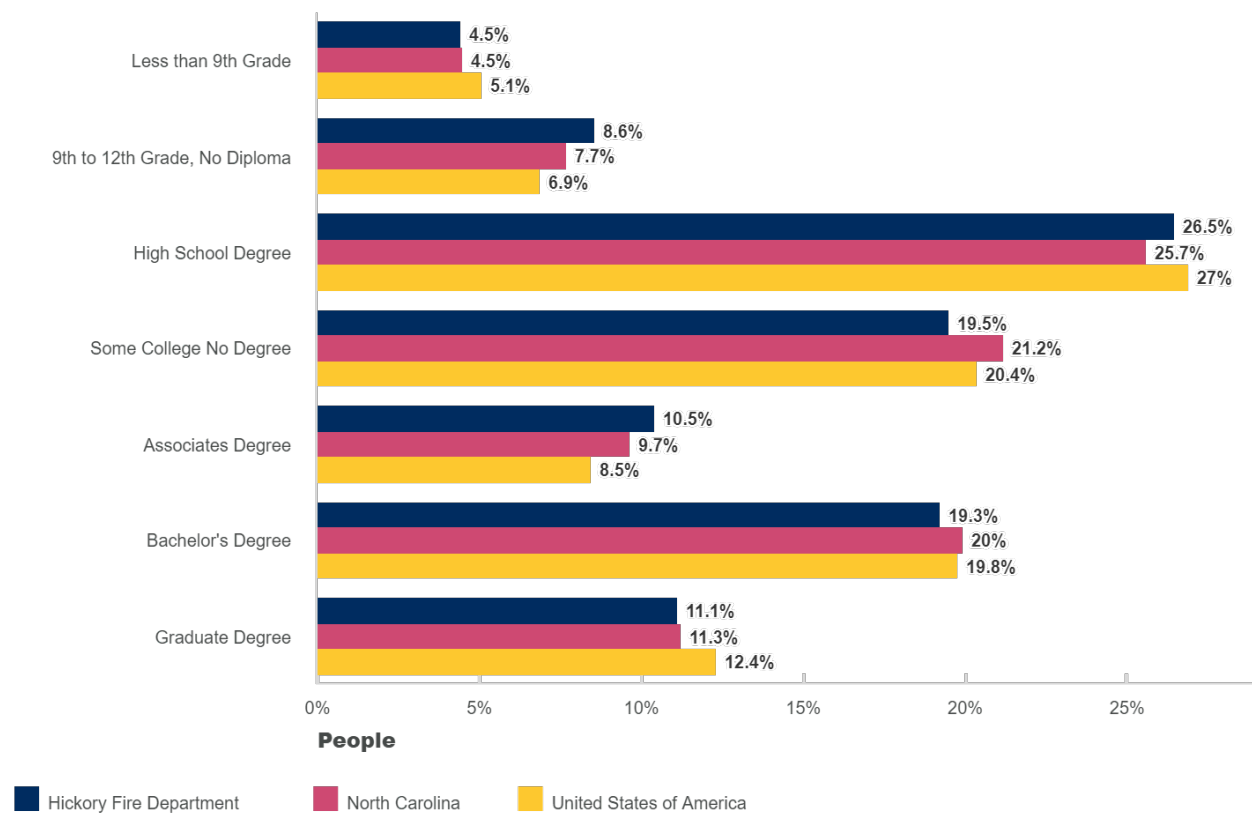


Sources: US Census ACS 5-year. Percent High School Educated includes anyone who earned a high school diploma, GED or equivalent credential, or higher level of educational attainment. Percent College Educated includes anyone who earned a bachelor's degree, master's degree, professional school degree, or doctorate.

Hickory Fire Department Community Risk Assessment-Standards of Cover

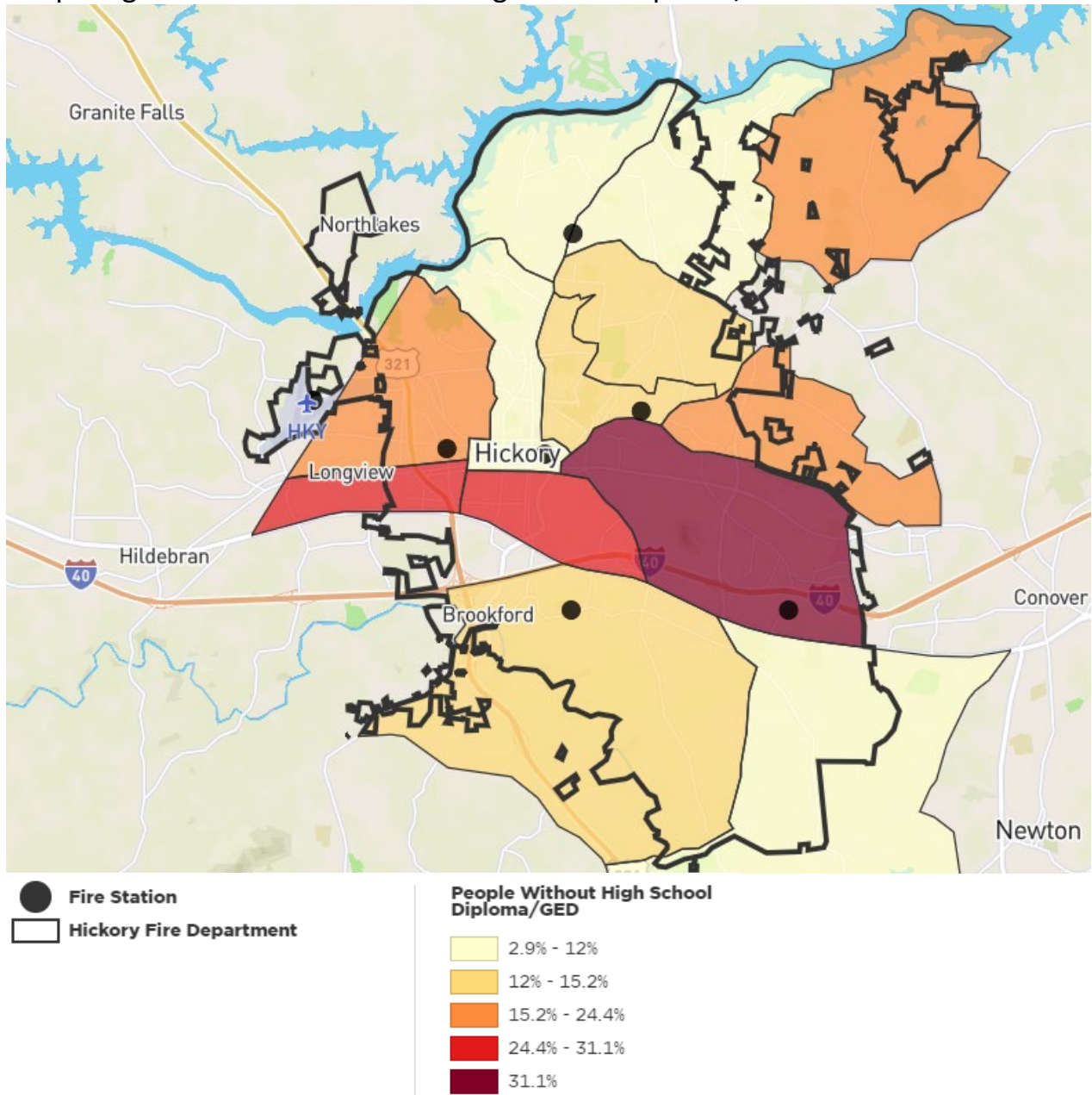
According to the U.S. Bureau of Labor Statistics, the higher the educational levels obtained directly relate to higher wages. In 2018, the median weekly earnings with a high school diploma and no college education were \$730, 62% less than someone with at least a bachelor's degree who earned \$1,198. In Hickory, 26.5% of the population only has a high school education, slightly higher than the state at 25.7%. Residents with a bachelor's degree are 30.4%, which is slightly less than the state at 31.3%. The following figure shows high school graduates only and people having a bachelor's degree over age 25.

Highest Level of Educational Attainment



Sources: US Census ACS 5-year

People Age 25 and Over Without a High School Diploma/GED



Sources: US Census ACS 5-year

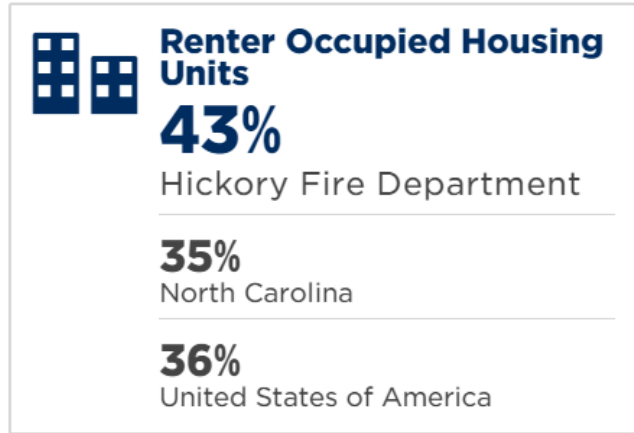
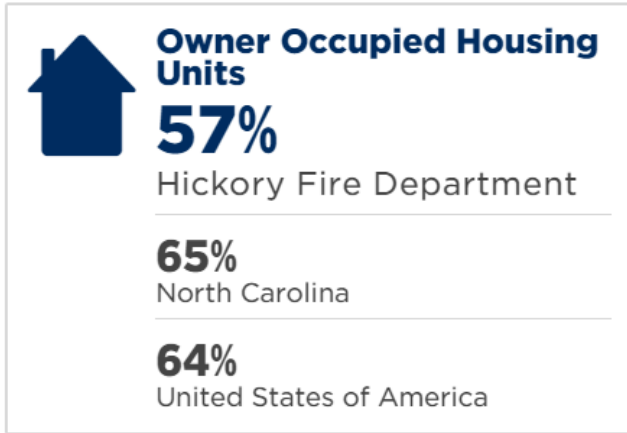
Built Environment

Members of a community often trust that the built environment around them is safe, stable, and reliable. Unfortunately, there are hazards inherent to or exacerbated by our built environment. First responders know this. They are trained to respond to hazardous materials incidents, they frequently conduct building inspections, and they are on the front lines when something goes awry with local infrastructure. Therefore, it's important to know where and when incidents in our built environment occur, who they impact, and to what degree. This section provides information on the community's infrastructure. Understanding the utilities that support or threaten the community, how people and goods move from place to place, and how and where hazardous materials are transported and stored are important factors of a CRA.

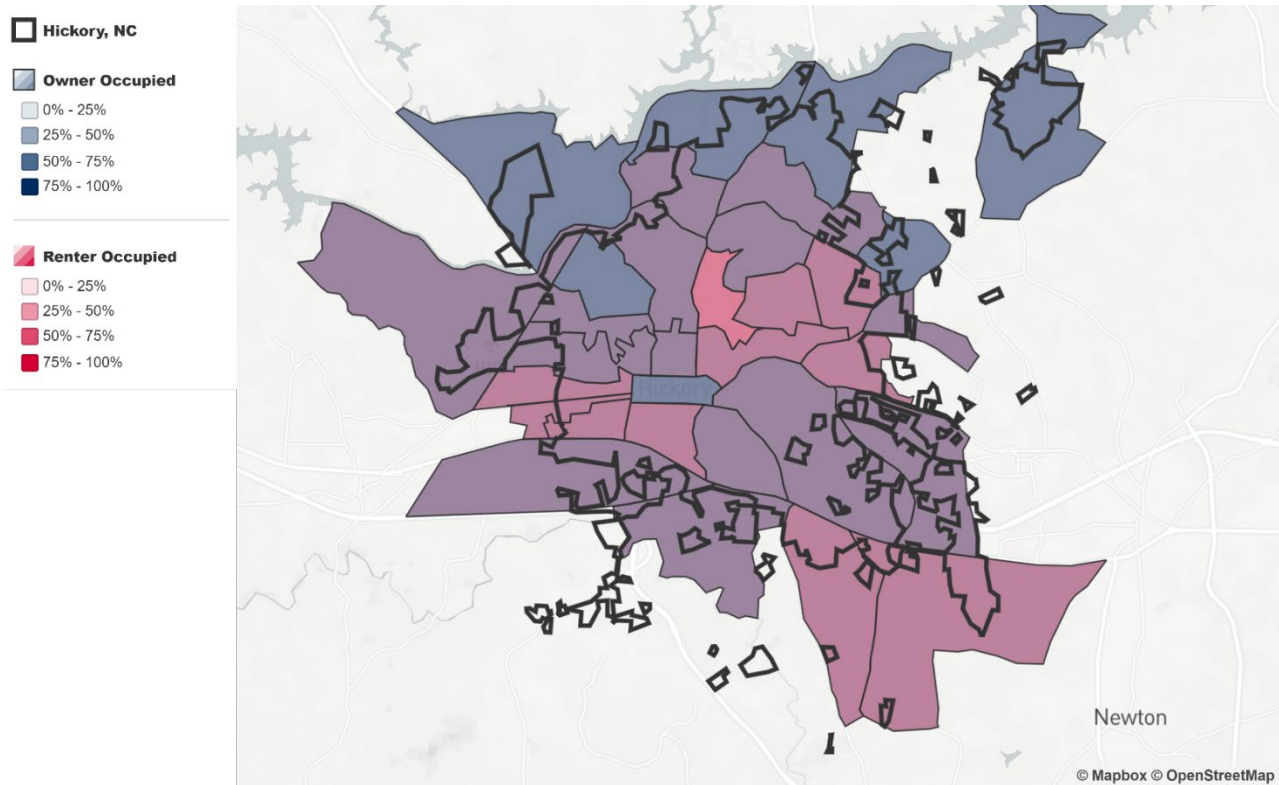
Housing Types

Our community is comprised of both rented and owned housing units. Each type presents different needs and risks for our residents. The median building age is 1978 and 57% of the homes are owned by the occupant and 43% are rented. Overcrowded housing units make up 3% of the housing market and 11% are vacant. Four-room houses make up 23.7% of the housing units. Lead paint is suspected in 56% of homes since they were built before 1979. Housing is primarily single-family dwellings although there are numerous apartment buildings already in existence and many more being currently built. Less than 1% of the homes have suppression systems. More and more people are moving into the city which has made the need for housing more urgent. Most residential construction is lightweight construction, while most commercial construction is fire-resistive or ordinary.

Hickory Fire Department
Community Risk Assessment-Standards of Cover

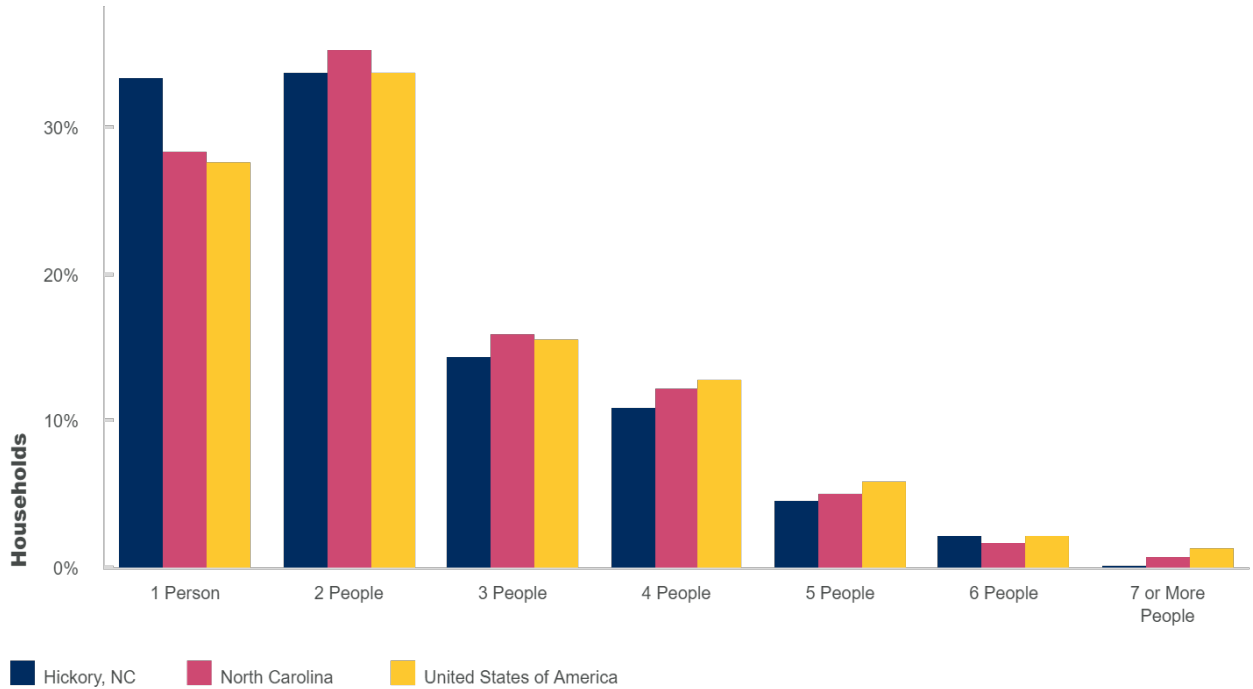


Sources: US Census ACS 5-year



Sources: US Census ACS 5-year Areas of dark blue have a greater percent of owners while areas of dark red have a greater percentage of renters. Purple areas are more even makeup of owners and renters.

Household Size




mySidewalk.com - Sources: US Census ACS 5-year

Sources: US Census ACS 5-year

Households

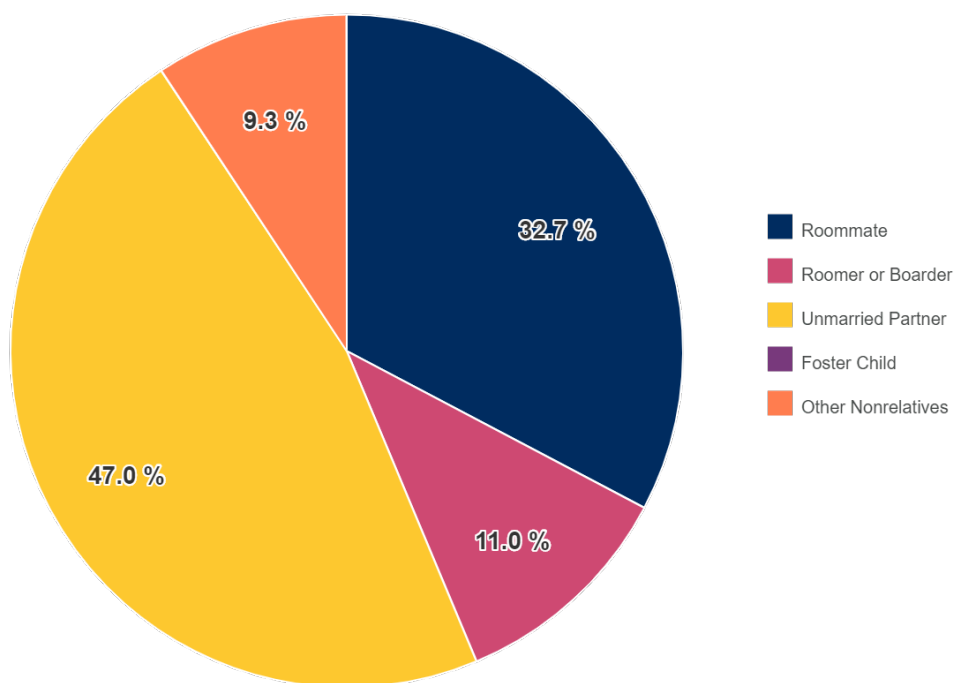
Every household is different; some are filled with children and their parents, others may have no children at all, or children and other relatives. Other residents may make their home with roommates or renters.

 <p>Family Households 60% Hickory Fire Department</p> <hr/> <p>65% North Carolina</p> <hr/> <p>66% United States of America</p>	<p>Nonfamily Households 40% Hickory Fire Department</p> <hr/> <p>35% North Carolina</p> <hr/> <p>34% United States of America</p>
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Sources: US Census ACS 5-year The Census Bureau defines a family household as one that “includes a householder and one or more people living in the same household who are related to

the householder by birth, marriage, or adoption. All people in a household who are related to the householder are regarded as members of her or his family" ([https://www.census.gov/glossary/#term Familyhousehold](https://www.census.gov/glossary/#term_Familyhousehold)). A nonfamily household is defined as consisting "of a householder living alone (a one-person household) or where the householder shares the home only with people to whom he/she is not related (e.g. a roommate)" ([https://www.census.gov/glossary/#term Nonfamilyhousehold](https://www.census.gov/glossary/#term_Nonfamilyhousehold)).

Types of Residents in Nonfamily Households



Sources: US Census ACS 5-year Roomer or Boarder is a person who lives in a room in the household of the householder. A cash or non-cash (i.e. chores) arrangement is usually made for their living accommodations. Roommate is a person age 15 or over, unrelated to the householder, and who shares the household in order to share expenses. Other nonrelative is anyone not related to the householder (by birth/marriage/adoption) and who is not described by other categories.

Housing Conditions

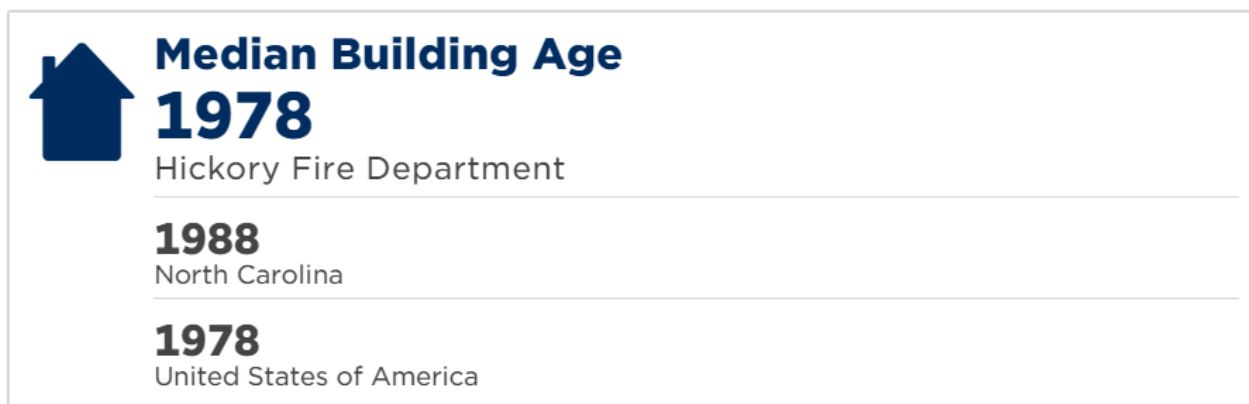
The type of housing in a community varies and provides insight into ownership, age of housing, and the number of units in a building. By understanding where and how our residents live, we can better plan for



emergencies and find programs to help our residents address their needs.

How old are our homes?

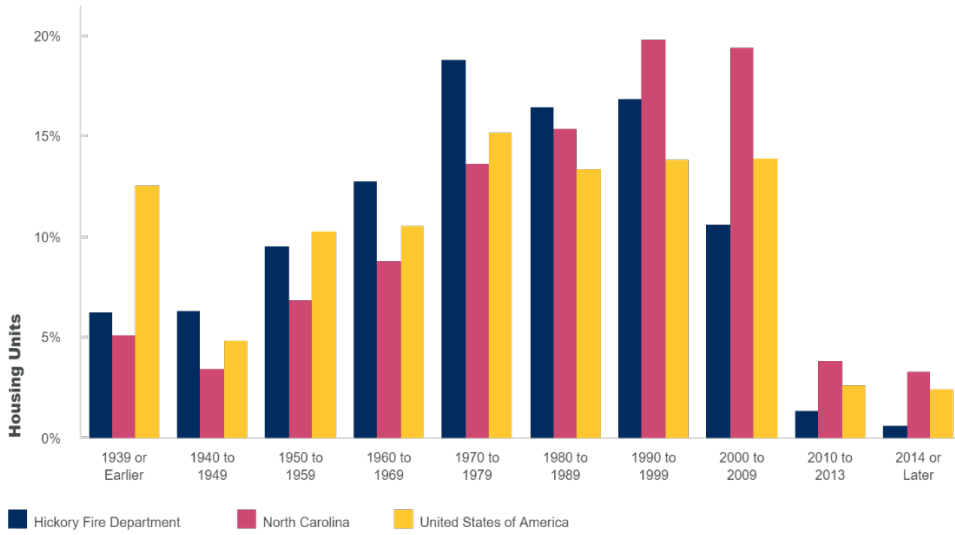
Older homes can pose several challenges. They can lack structural integrity, have unsafe wiring, and often don't comply with the most up-to-date building codes. Older homes can also pose hazards to the health of residents. Use this section to understand which areas in our community have older homes.



Sources: US Census ACS 5-year

Hickory Fire Department Community Risk Assessment-Standards of Cover

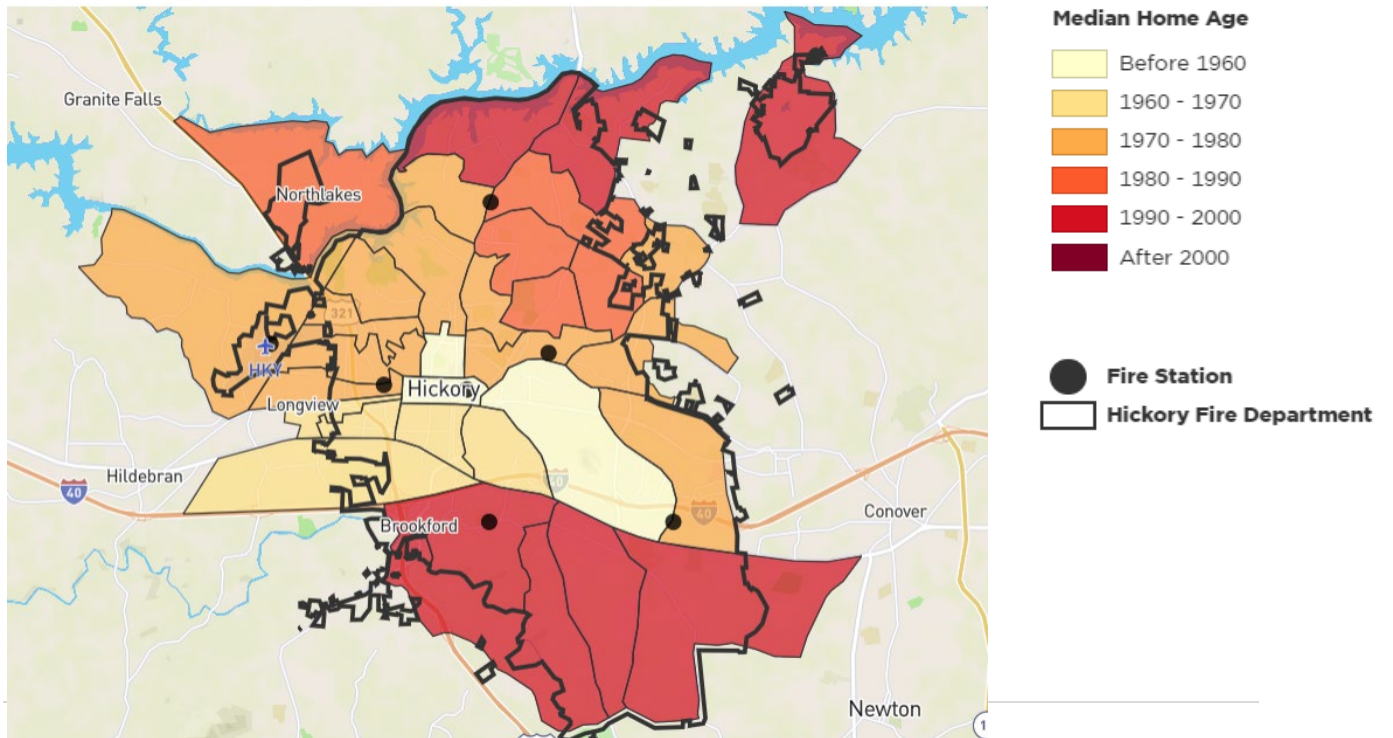
Housing Units by Year Built



Age of Housing

As a home ages, the maintenance needed to maintain the structure increases. If problems are not corrected, the home can become more hazardous to its inhabitants and emergency responders. Homes built before 1975 in North Carolina did not require smoke alarm installation during construction, thus potentially increasing the risk for the occupants. 50.8% of the housing was built before 1980, as shown in the following figure.

When does occupancy create hazards?



Overcrowding can happen when households facing poverty try to reduce the cost of housing by increasing the number of residents. A housing unit is categorized as overcrowded when more than one person per room lives



there. The number of residents living in a single housing unit can increase risk and complicate rescue efforts. The density of housing structures can also increase the danger of a fire affecting more than one structure.

On the other side of the spectrum, vacant homes don't have anyone to watch over them so a fire or other incident may go unnoticed until it's too late. Vacant homes may even be the target of arson. The 2020 U.S. Census estimated 12,435 housing units with 1,011 vacant. These vacant structures create additional problems for the community and the fire department. If these buildings are not maintained, the structural integrity will decrease and pose difficulties for responding personnel. If these buildings are not secured, the chance of vandalism may increase and create additional problems for the fire department and law enforcement. Knowing where each of these factors occur may help minimize loss of life and property.

Overcrowded Housing Units

3%

Hickory Fire Department

2%

North Carolina

3%

United States of America

Vacant Housing Units

11%

Hickory Fire Department

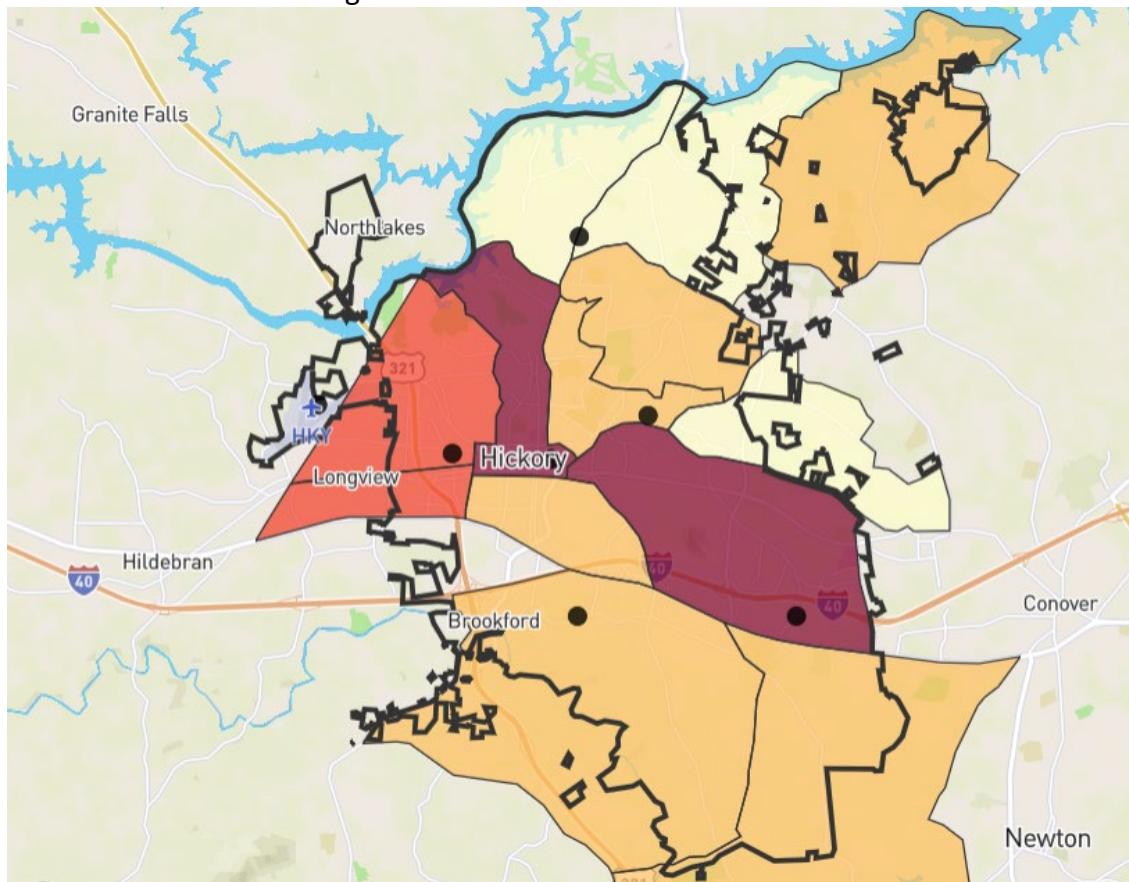
14%

North Carolina

12%

United States of America

Vacant Residential Housing Units



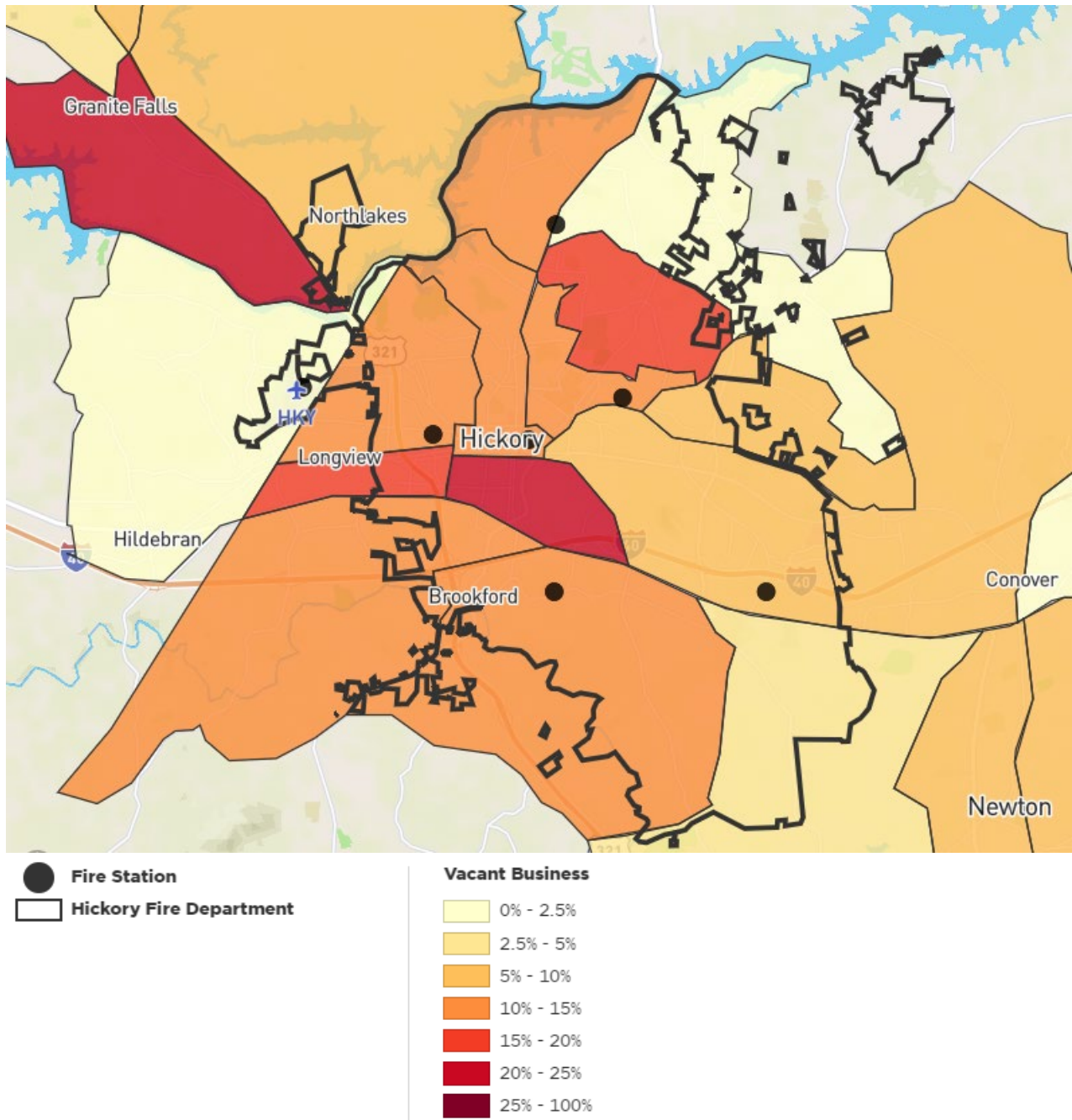
- Fire Station
- Hickory Fire Department

Vacant Housing Units

- 3% - 7%
- 7% - 13%
- 13% - 18%
- 18% - 20%

Source: United States Postal Service
Businesses Vacant Addresses

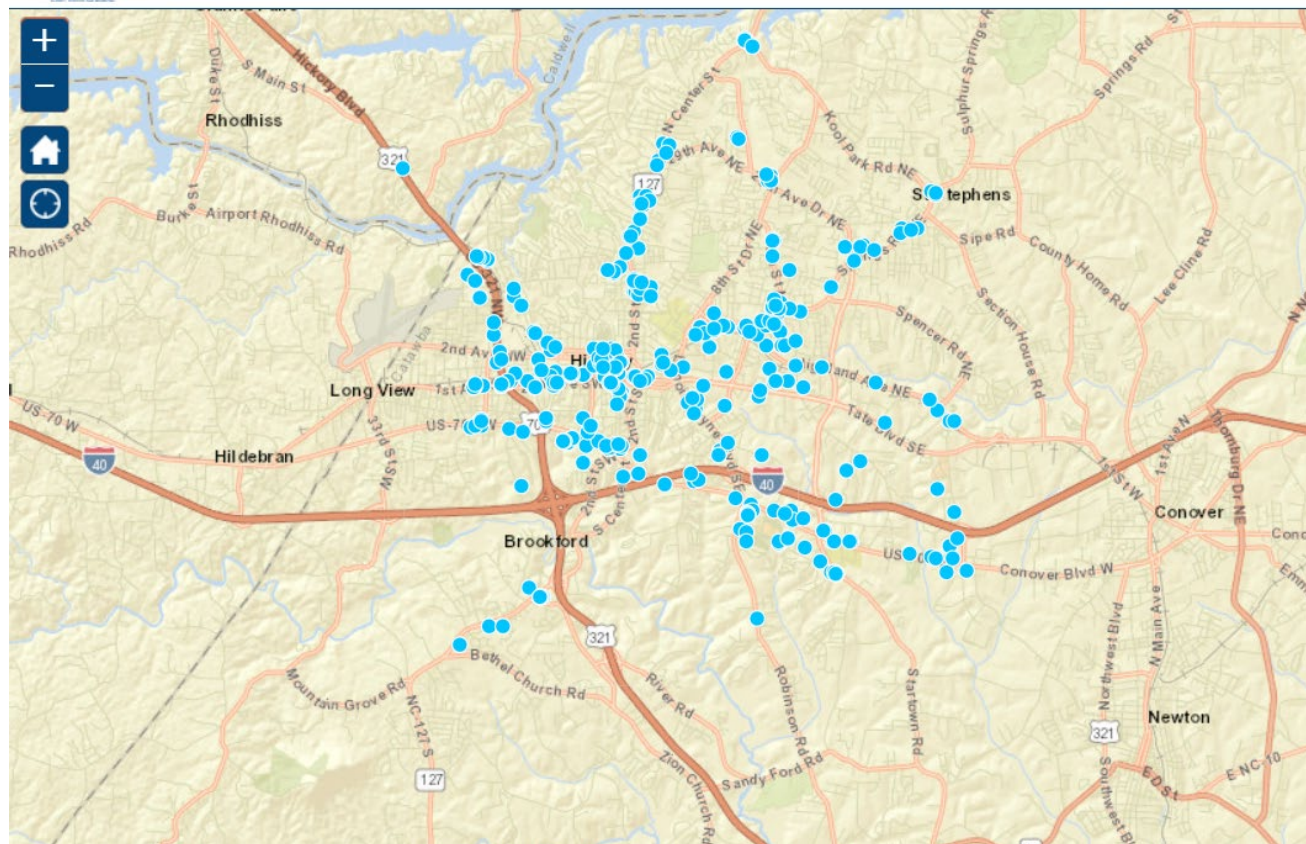
Hickory Fire Department
Community Risk Assessment-Standards of Cover



Source: United States Postal Service

City staff maintain an inventory of vacant and under-utilized buildings within the Hickory city limits and extra-territorial jurisdiction. This inventory provides essential information about vacant buildings to allow staff to help with marketing these properties for occupancy or redevelopment. The inventory contains detailed property information for each vacant building. Where available, a photo of the building and real estate contact information is also included.

 **Site Selector** ...locate available vacant buildings in the City of Hickory [Hickory Vacant Building Inventory website](#)



Land Use

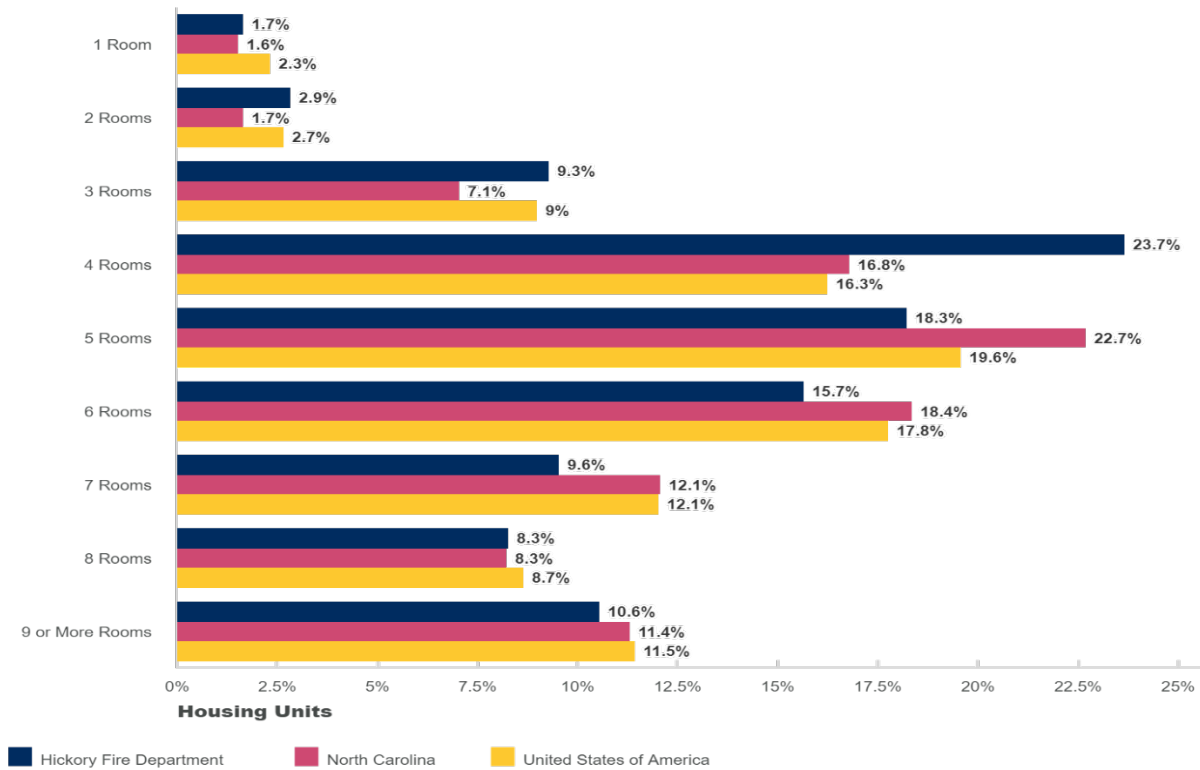
Land use regulation provides a jurisdiction a method to manage community growth and is defined by locally appointed or elected officials. Where land use regulations exist, it offers a way to determine if a development is suitable for that area. Regulations may require minimum street widths, landscaping, and proper turning radius, potentially impacting fire service responses.

Future growth in Hickory is expected to occur in the southeast and northeast portions of the district. Growth outside of the current corporate limits is using the city's water and sewer services is being annexed. Numerous multifamily apartment complexes have been completed

Hickory Fire Department Community Risk Assessment-Standards of Cover

or are proposed for the service area. The current occupancy rate for multifamily housing is 3%; thus, the continued growth of this housing type is expected to continue. Future growth towards the airport may increase after the extension of a sewer line that will expand the system's current capacity.

Housing Units by Number of Rooms



mySidewalk.com - Sources: US Census ACS 5-year

Land Use Risk

The use of land related to the structures and stockpiles vary in size and type. Some uses of land pose more risk to a community than others, such as a single-family home versus a chemical storage facility. Because of the myriad of uses, a macro analysis of risk based upon future land use is employed in the methodology. The study team was supplied with a zoning code attribute for each area within the fire city limits as well as extending outward into the current unincorporated county area.

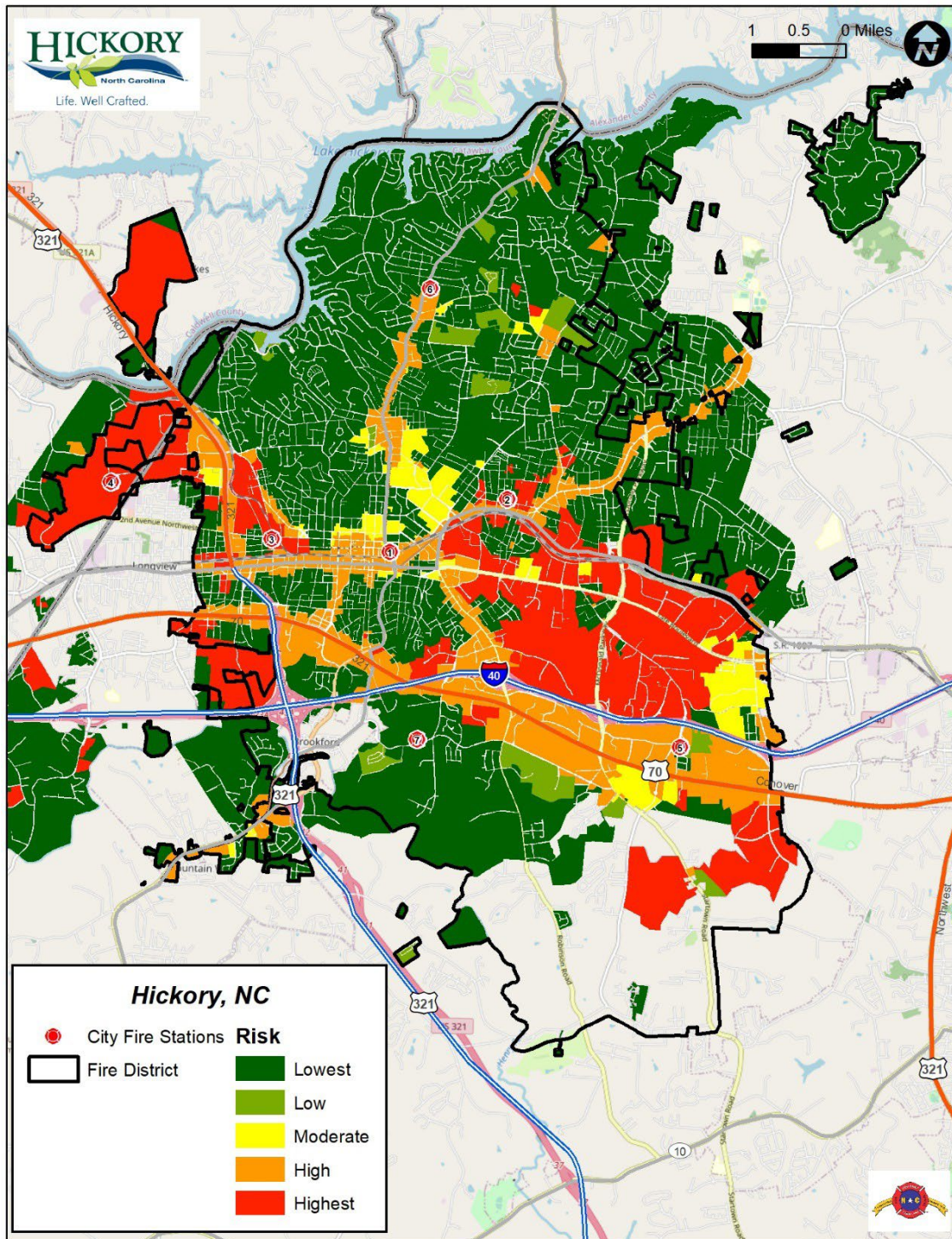
The types of uses pose different risks to a community. Some may be a point of public assembly; others may be a facility that contains hazardous materials for their processes. Others are homes, that if lost to a fire is tragic to the owner and family. A loss of a structure that employs 300 residents is a greater overall impact loss to the community. The study team defines risk level as follows with some examples noted:

Risk Category Criteria:

1. Lowest - Wide separation of single-family dwellings and farmland.
2. Low - Single-family dwellings with a separation of at least 100 feet between buildings.
3. Moderate - Commercial and light industrial facilities, small shopping centers, and high-density, low-rise residential buildings.
4. High - High-rise hotels and residential buildings, large shopping centers, and industrial complexes.
5. Highest - Refineries, large industry, lumber yards, and propane storage facilities.

These risk levels were applied to the zoning data provided in the resulting map.

Land Use Risk Map



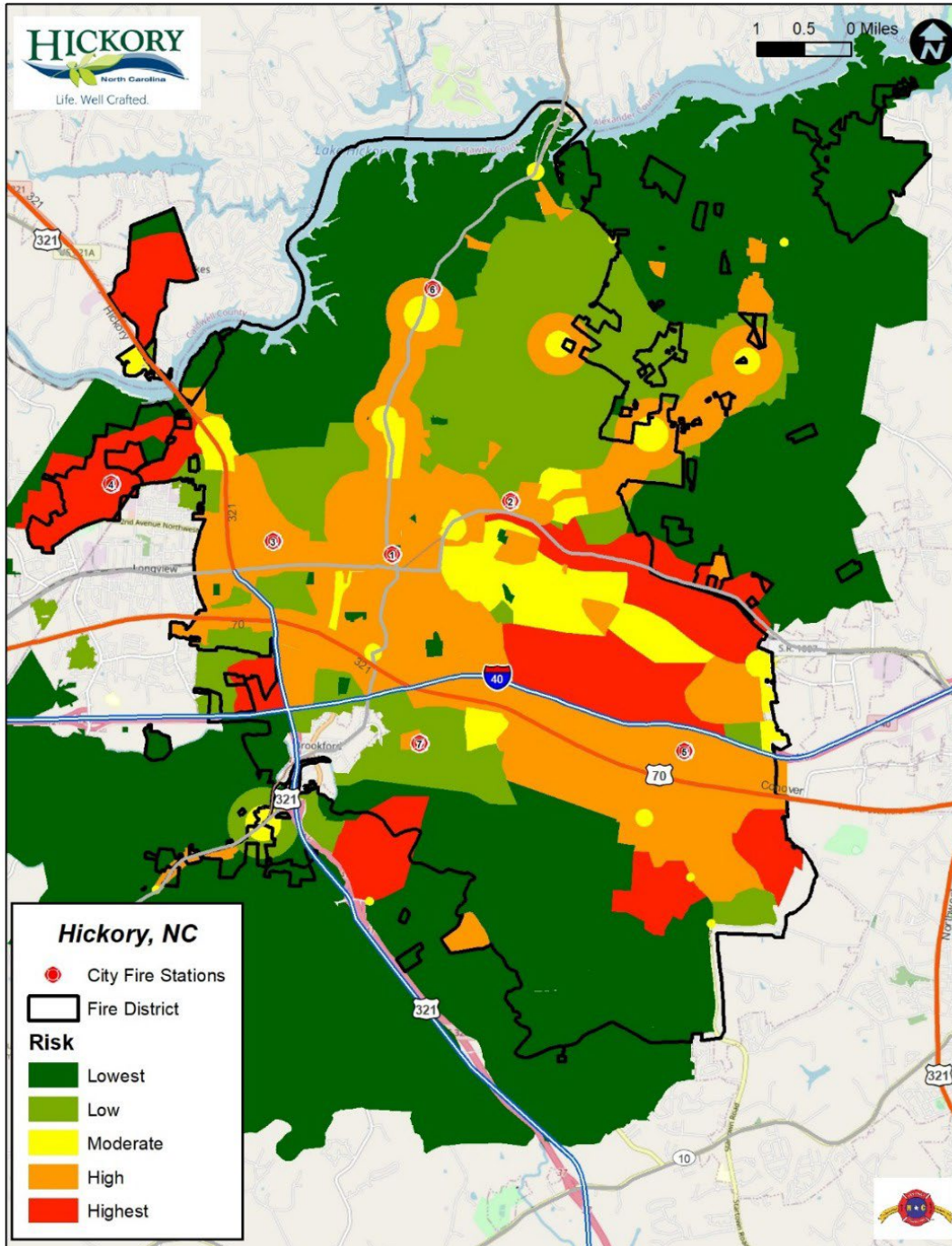
Most of the district has low or moderate risk levels. Higher risk can be seen along the arterial roadways and along the rail lines.

Structural Risk Changes

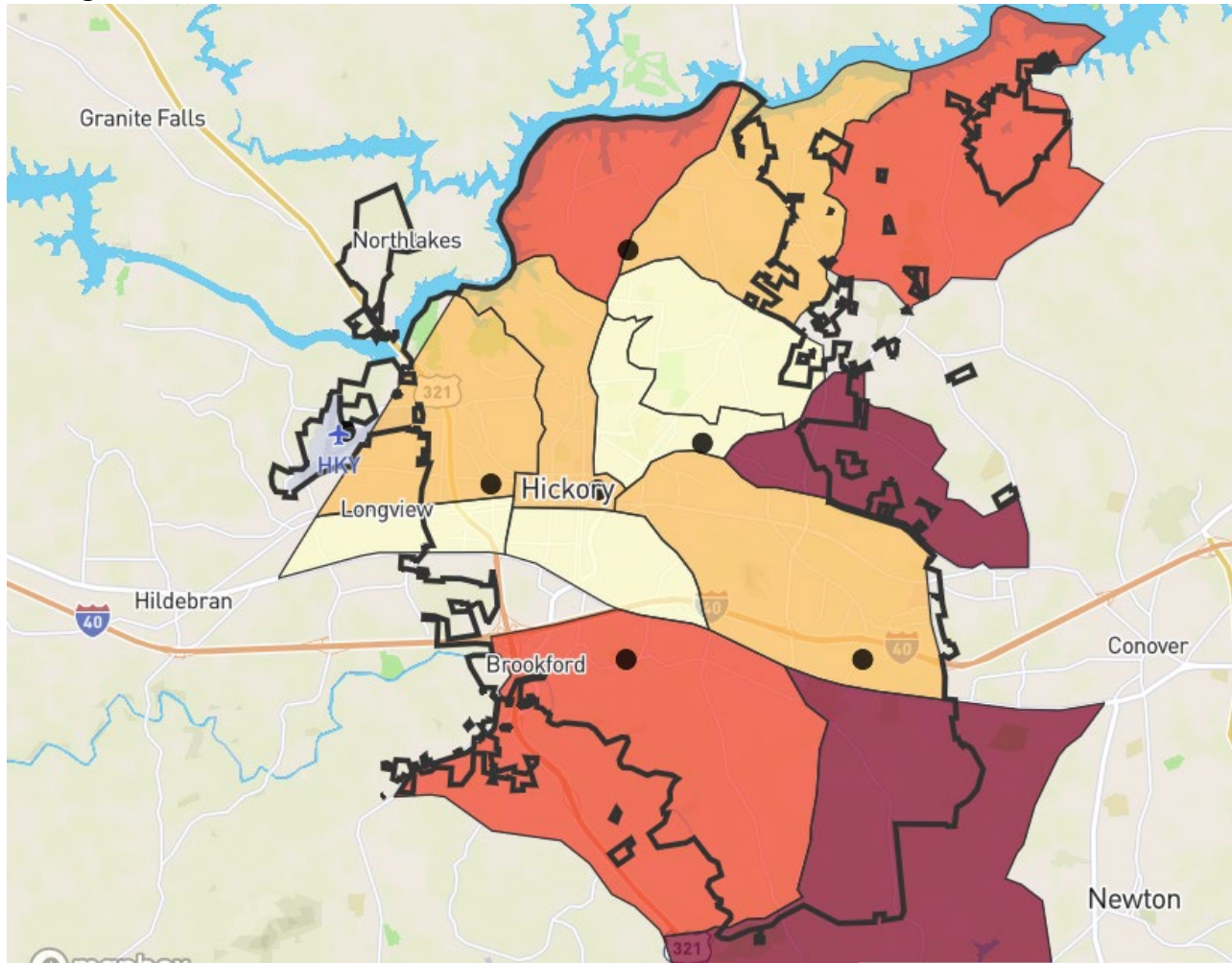
The City of Hickory has developed a future land use layer that projects the various use types in differing areas of the city, including the fire district area. These were translated into the same categories used for the city zoning data earlier.

Future Land Use Risk

Compared to the current zoning, structural risk increases in the central area and south of US 70.



Average Household Size



● Fire Station
□ Hickory Fire Department

Average Household Size

- 2.1 - 2.3
- 2.3 - 2.6
- 2.6 - 2.7
- 2.7

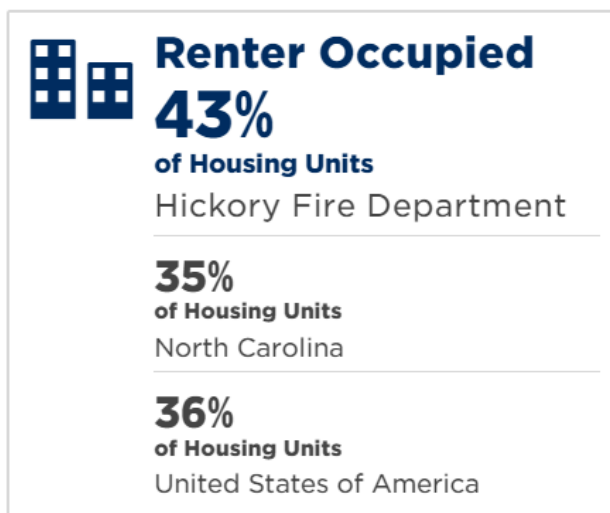
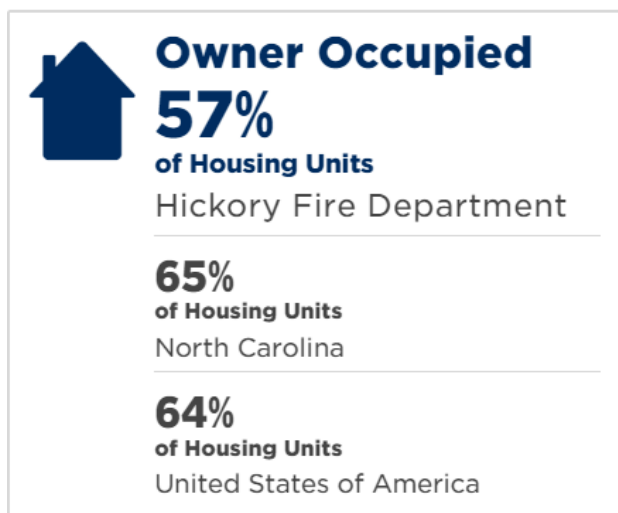
Source: US Census ACS 5-year.

What kinds of homes are present in our community?



People who live in rented housing units are often prevented from making significant updates to wiring or implementing other major safety precautions. Renters have to rely on the property owner to ensure proper safety measures are taken. At the same time, property owners have little control over their tenants' potential risky behaviors.

In addition, there may be more than one housing unit in a single building, whether rented or owned, adding even more uncontrollable factors to a home and any necessary emergency response. This section details the distribution of rented and owned homes in our community.

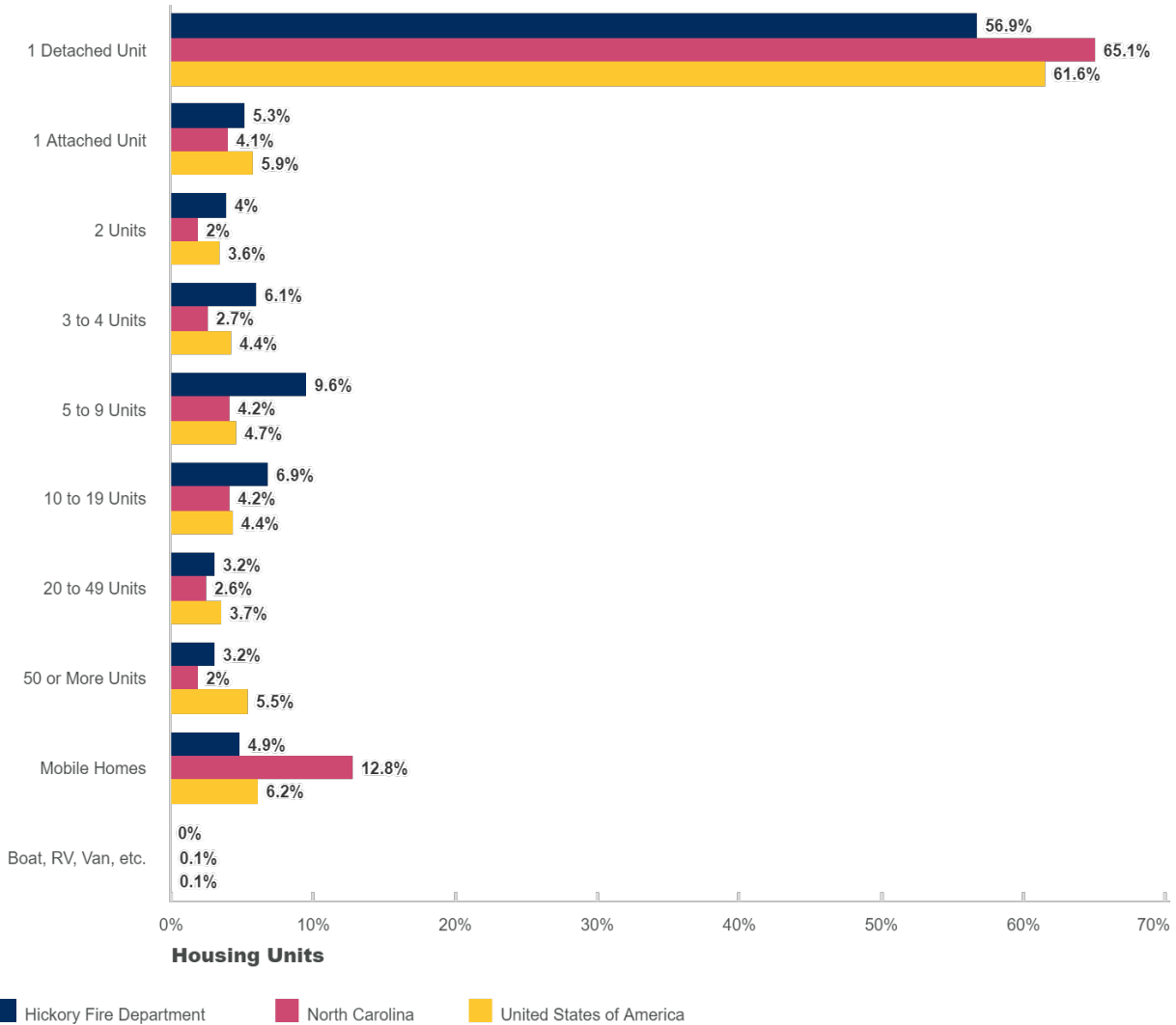


Sources: US Census ACS 5-year

Housing Units

62.1% of the housing units in Hickory are one- or two-family dwellings, which is slightly less than the state at 71.2%. Mobile homes are 4.4% which is less than the state at 12.6%. The following figure shows the number of units per building.

Housing Units by the Number of Units in the Structure

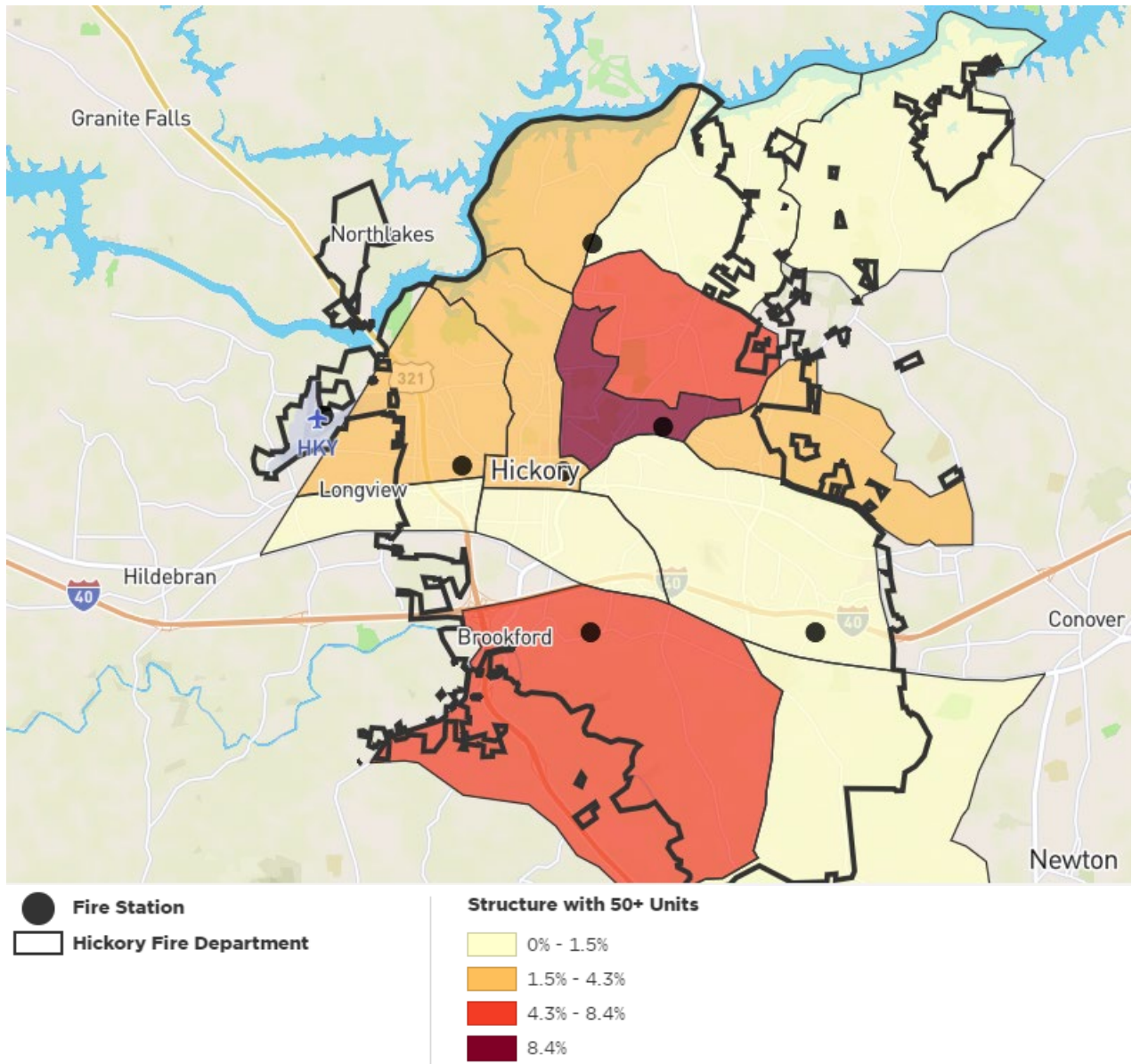


n space on all sides, or the house is joined only to a shed or garage. Attached means that the house is joined to another house or building by at least 1 wall that goes from ground to roof. Examples include row houses and townhouses.

Sources: US Census ACS 5-year
 Detached means there is open space on all sides, or the house is joined only to a shed or garage.
 Attached means that the house is joined to another house or building by at least 1 wall that goes from ground to roof. Examples include row houses and townhouses.

Hickory Fire Department Community Risk Assessment-Standards of Cover

Structures with 50 or More Units



Hazardous Materials

Hazardous materials have the potential to cause harm to people, animals, or the environment. They can be the result of large industrial processes, or as small as old paint cans stored in a resident's garage. It is important for both residents and responders to be aware of these hazards, including what they are, where they are located, and how they impact the community. This knowledge may help uncover root causes of issues and aid in response pre-planning.



Emergency and Hazardous Chemical Inventory Forms

Organizations and businesses with hazardous chemicals above set thresholds are required by the EPA under Section 312 of the Emergency Planning and Community-Right-to-Know Act of 1986 (EPCRA) to fill out Emergency and Hazardous Chemical Inventory Forms, as known as Tier II reports. These reports are submitted annually to fire departments, local governments, state officials, tribal agencies, and other organizations to allow those organizations to plan and respond to a chemical emergency. Use the resources below to access the Tier II reports.

- The State of North Carolina only accepts Tier II information submitted through E-Plan.
- EPA [Tier2 Submit™](#) is downloadable software to submit a Tier II form
- NOAA's Computer-Aided Management of Emergency Operations ([CAMEO](#)) provides guidance on the use of Tier II data

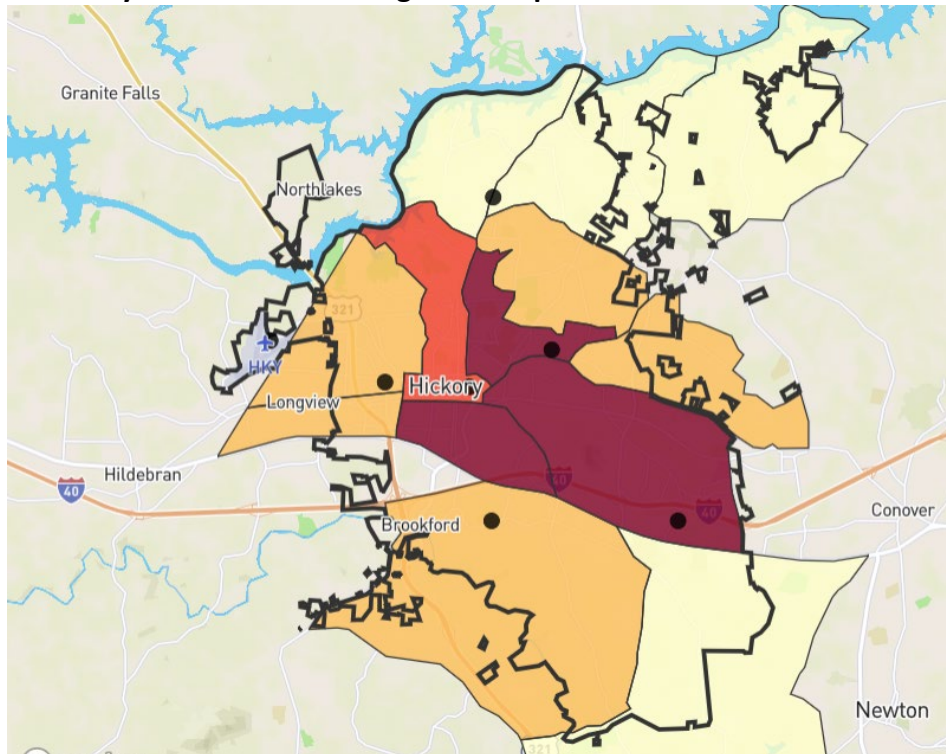
Environmental Justice

The EPA Environmental Justice indexes reflect different environmental hazards for people's health. The visualizations below highlight some of the environmental hazards, with the indexes weighted by populations who are particularly vulnerable. These pose not only an everyday threat to health, but the impact can be compounded during an emergency incident.

<p>Lead Paint Environmental Justice Index</p> <p>21</p> <p>Hickory, NC</p> <hr/> <p>12</p> <p>North Carolina</p>	<p>Buildings Built prior to 1979, Potential for Lead Paint</p> <p>56%</p> <p>Hickory, NC</p> <hr/> <p>45%</p> <p>North Carolina</p>
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Sources: EPA; US Census ACS 5-year The Lead Paint Environmental Justice Index is the percent of housing units built pre-1960 weighted by the proportion of the population identified as low-income or belonging to an ethnic/racial minority group. Lower percentage indicate fewer older housing units and lower potential exposure lead paint, while higher percentage indicate more older housing and a higher potential exposure to lead paint, based on building age.

Proximity to Treatment Storage and Disposal Facilities

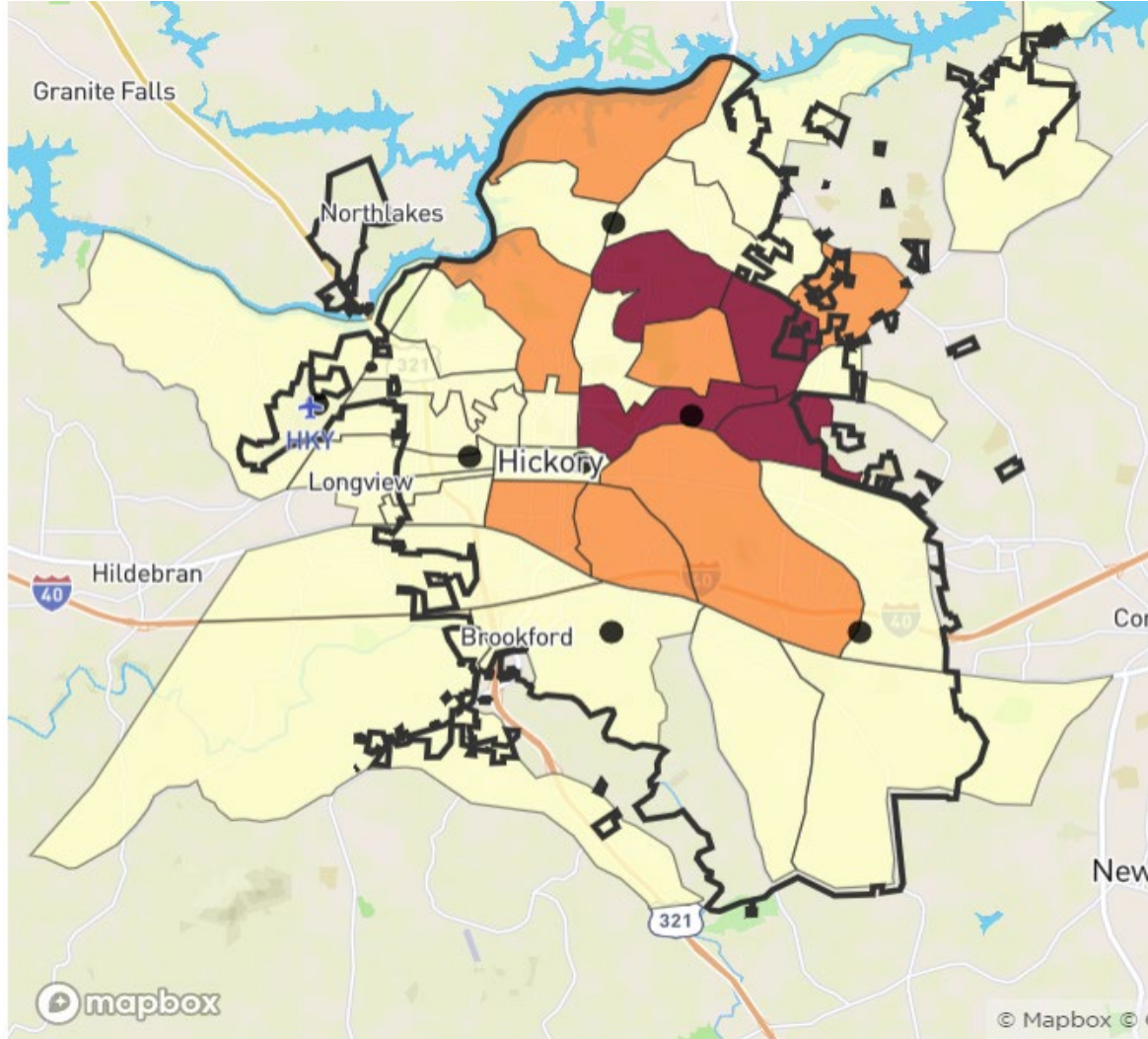


Sources: EPA Lower values indicate closer and higher values indicate farther from treatment storage and disposal facilities. This Environmental Justice Index is used by the EPA to identify geographic areas that are possibly impacted by environmental hazards, with emphasis on areas with populations which may experience disproportionate effects.

Analysis of Incident Data

The following map details the HazMat release related incidents from the most recent full year's worth of incident data.

HazMat Release Related Incidents



NFIRS incident types 411, 413, 420, 421, 422, 423, 424, 431, and 451

Utilities

Communities depend strongly on the systems that support them, from plumbing and electricity to, more recently, the Internet. When a disaster occurs and these systems fail, it is important to know which parts of the community are impacted the most. In some cases, utilities can also be a hazard, such as downed power lines and pipeline leaks. This section provides an overview of which utilities the community relies on and where they are located.

US Energy

The US Energy Information Administration (EIA) collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment.



Pipelines

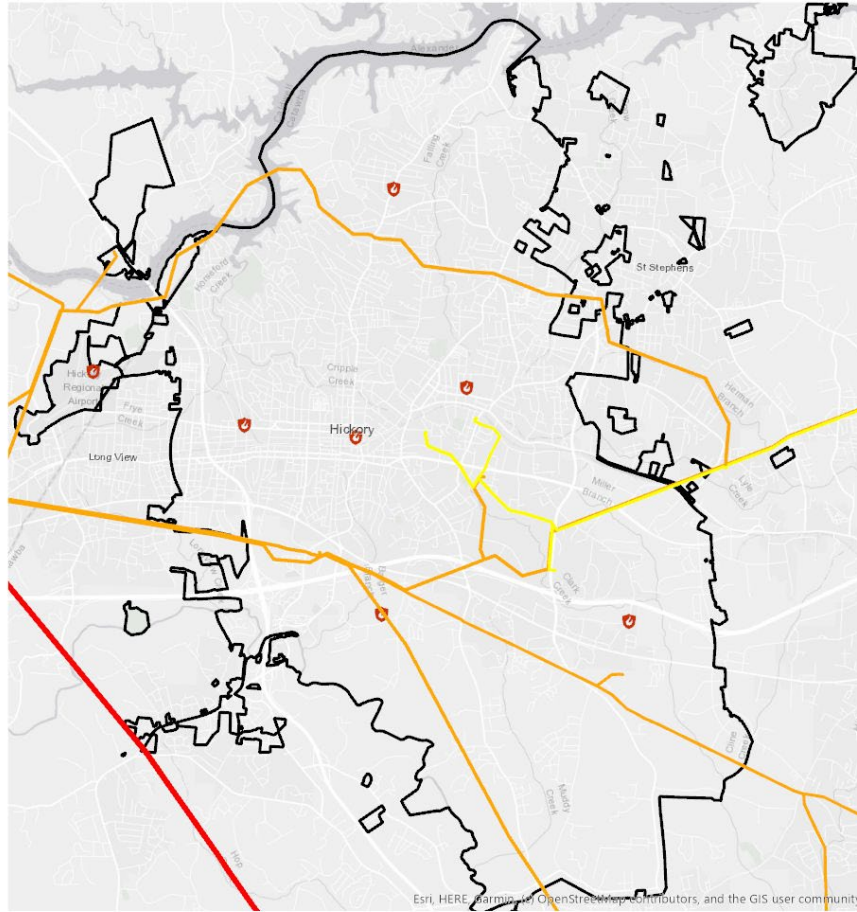
The [National Pipeline Mapping System \(NPMS\)](#) by the US DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) provides information and locations of hazardous liquid and gas pipelines. The detailed mapping interface is restricted to government officials and pipeline operators, though there is a [public viewer](#) available with a set map scale.

Pipelines carry a variety of substances, though the two most common are liquid petroleum and natural gas. The map below shows the natural gas compressor stations, delivery locations and some pipelines. The locations in the map below are approximate.

Electric Transmission Lines

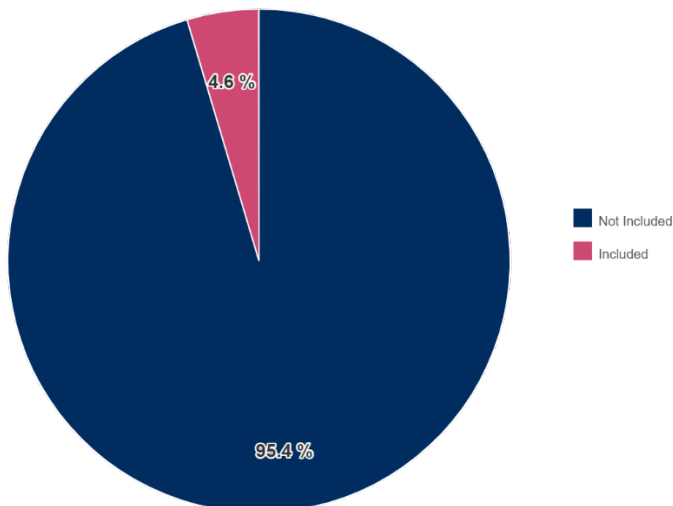
High voltage transmission lines pose a unique danger during an emergency. The map below displays different high voltage transmission lines

- Fire Stations
- Hickory Fire District
- Voltage Class
 - UNDER 100
 - 100-161
 - 220-287
 - 345+
 - NOT AVAILABLE



Source: Homeland Infrastructure Foundation-Level Data (HIFLD)

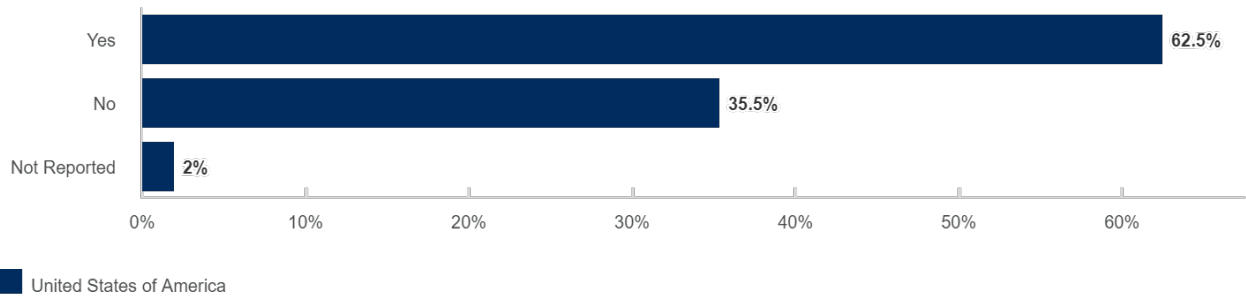
Inclusion of Utilities in Rent



What are our utilities?

From essential home aspects such as having kitchen facilities and plumbing to how a home is heated, the utilities or lack thereof can tell us a lot about the homes in our community.

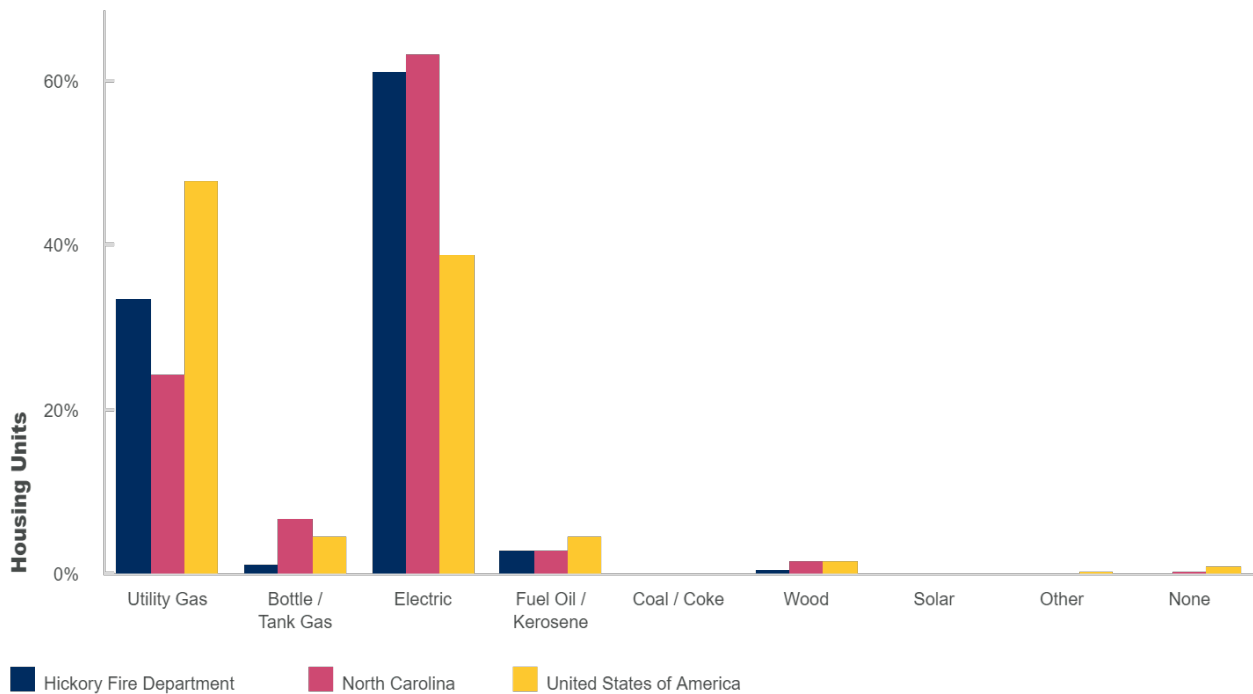
Carbon Monoxide Detector Prevalence in Homes in the United States



myStidewalk.com - Source: American Housing Survey (AHS) 2017

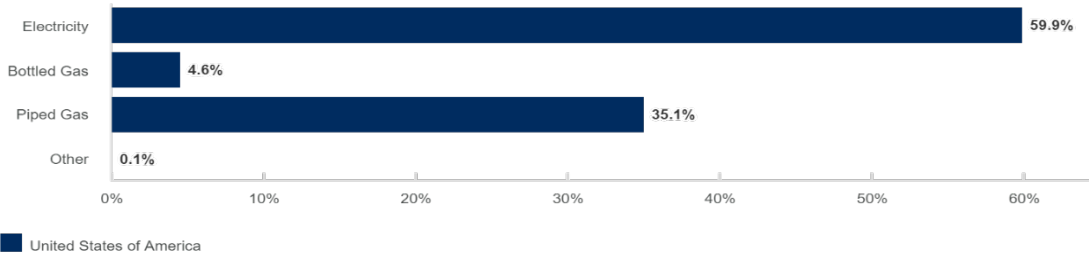
Sources: US Census ACS 5-year

Heating Fuel for Housing Units



Hickory Fire Department Community Risk Assessment-Standards of Cover

Typical Cooking Fuel Types in the United States



Housing Units Without Complete Kitchen Facilities

2.9%

Hickory Fire Department

2.6%

North Carolina

2.8%

United States of America

Housing Units Without Complete Plumbing

2%

Hickory Fire Department

2.2%

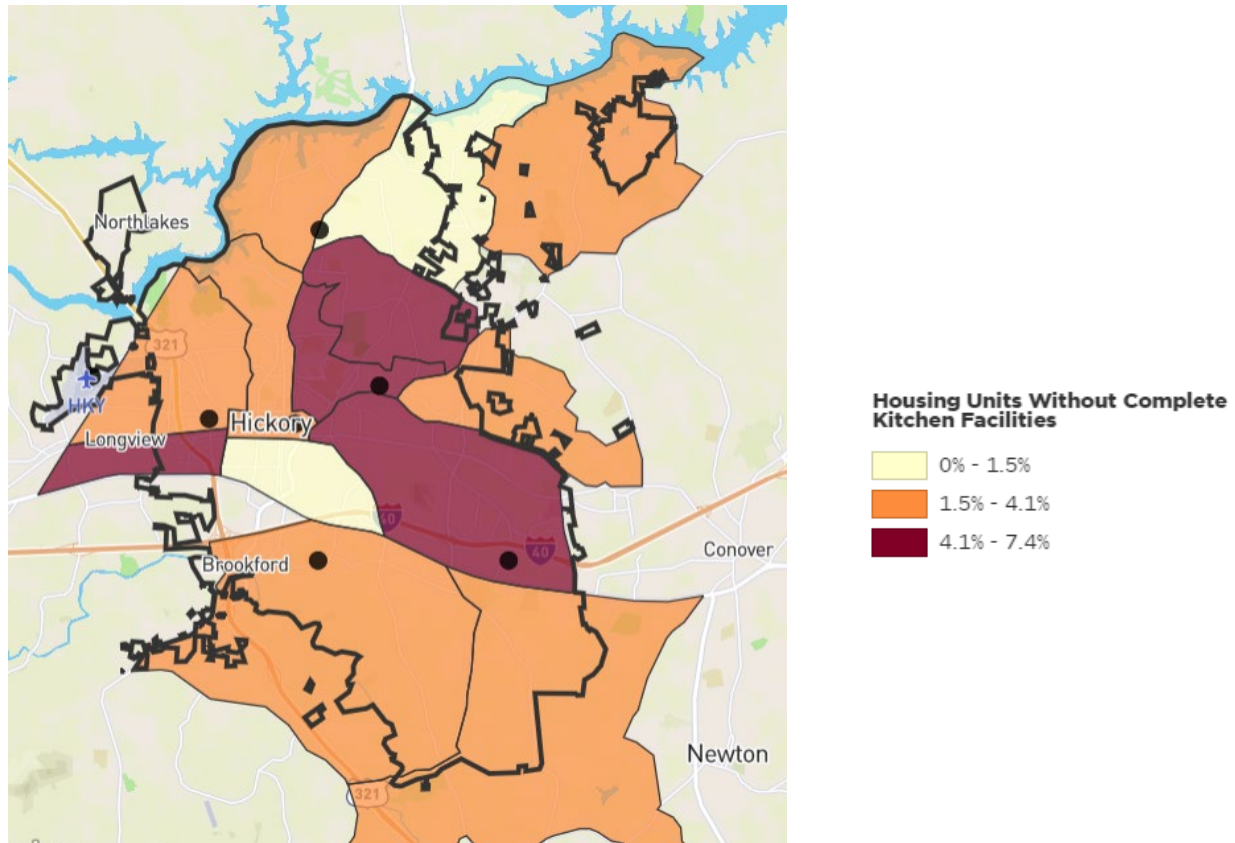
North Carolina

2.1%

United States of America

Complete Kitchen Facilities is defined by the US Census Bureau as having each of the following:

- A sink with a faucet
- A stove or range
- A refrigerator



Critical Infrastructure

The Cybersecurity & Infrastructure Security Agency defines critical infrastructure as sectors whose assets, systems, and networks, whether physical or virtual, are considered so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof. The 16 sectors are in the following categories:

- Chemical
- Communications
- Dams
- Emergency Services
- Financial
- Government
- Information Technology
- Transportation
- Commercial Facilities
- Critical Manufacturing
- Defense Industrial Base
- Energy
- Food and Agriculture
- Healthcare and Public Health
- Nuclear reactor, Materials & Waste
- Water and Wastewater systems

It is important to review the sectors that may affect emergency response.

Transportation

Transportation is more than the cars that get residents from home to work and back again. It encompasses how materials move through a community and the intersections of people, goods, and machines. Risk exists at these intersections. In addition, damaged bridges and derailed trains pose a risk to human safety and the stability of the economy. This section not only shows how residents move but also shows where critical transportation infrastructure exists.



Roads and Highways

A network of streets and roads allows emergency responders to navigate the district quickly and efficiently for service delivery. Without a well-designed and developed highway system, it becomes difficult to respond promptly and safely.

Much of Hickory is based on a grid system of streets, while the town's suburban areas consist of subdivisions with interconnected streets and cul-de-sacs. Subdivisions with one access can create problems for emergency responders if the street is blocked such as

Hickory has several major highways and roads throughout the county, including I-40 and other collector streets, to disperse traffic in the community. The following figure shows the traffic counts at selected intersections in Hickory.

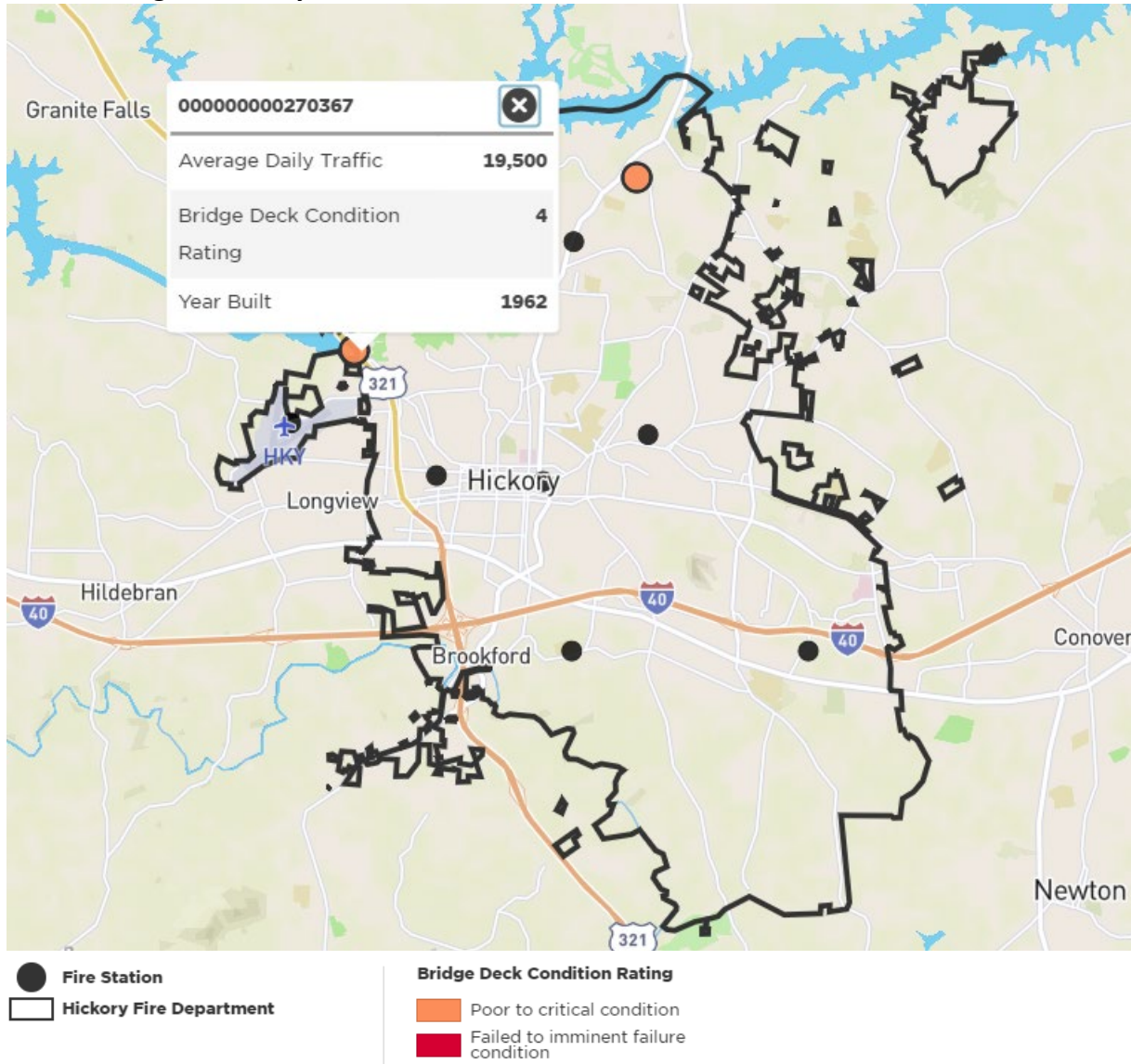
Annual Average Daily Traffic Count

Location	Ave Annual Daily Traffic - Vehicles	Ave Annual Daily Traffic - Trucks
I-40 between Exit 123 and Exit 125	60,500	10,690
321 Segment south of Grace Chapel Rd	40,500	2,970
N Center St north of 17 th Ave NE	33,500	1,490
Springs Rd NE west of 25 th St Dr NE	23,500	N/A
US 70 east of S Center St	16,500	770

Bridges

The location, size, and condition of bridges are recorded in the National Bridge Inventory, which is compiled by the Federal Highway Administration. Bridges are part of the critical infrastructure system of every community. The map below to learn the year each bridge was built along with the average daily traffic volume.

NCDOT Bridge Inventory



Sources: US DOT BTS National Bridge Inventory. Full condition ratings: 9 Excellent condition, 8 Very good condition, 7 good condition, 6 satisfactory condition, 5 fair condition, 4 poor condition, 3 serious condition, 2 critical condition, 1 "imminent" failure condition, 0 failed condition, N not applicable, 99 Unknown

Railroads

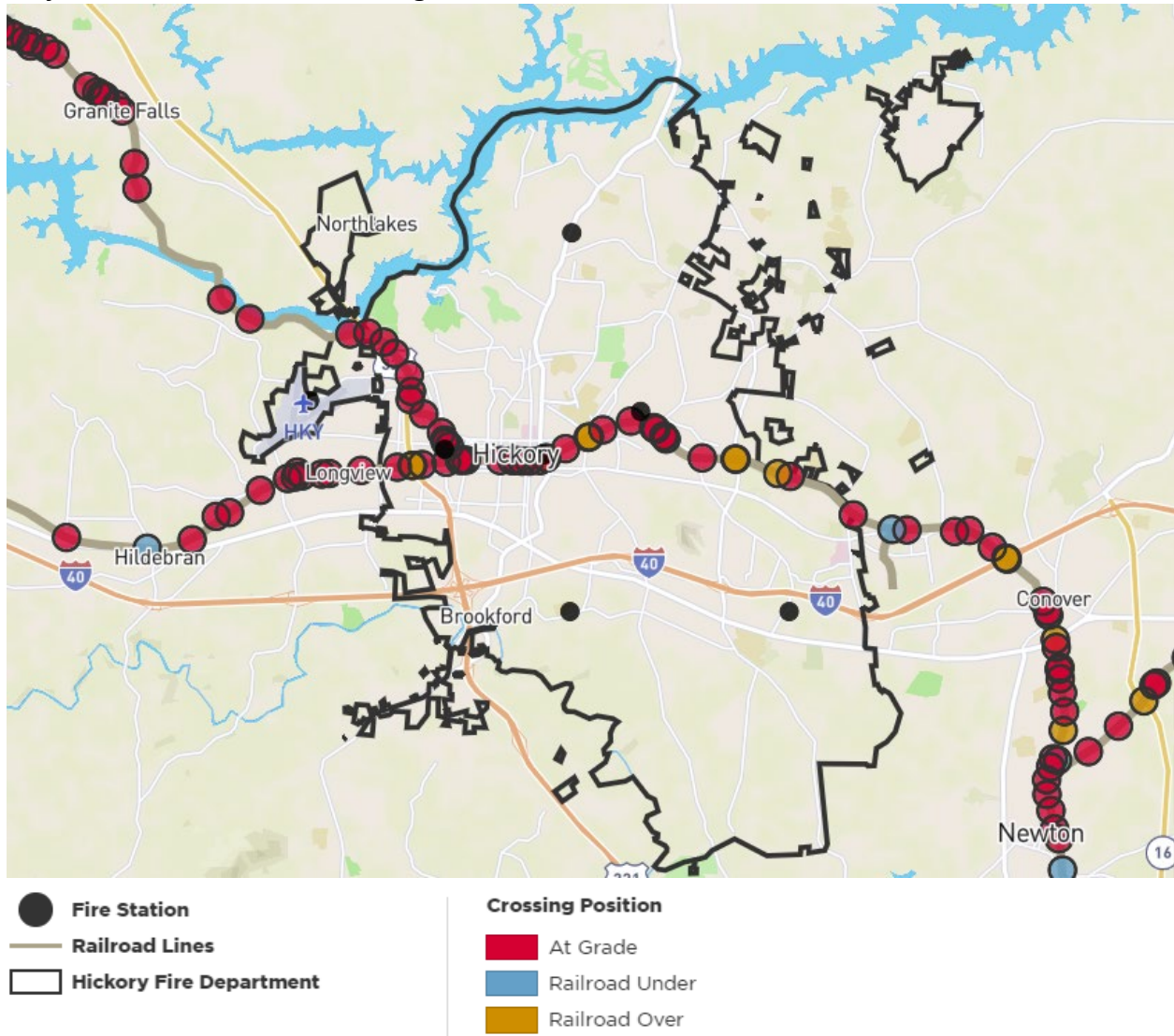
Railroads are part of what make up the critical transportation infrastructure in the United States. Freight train cars can carry hazardous materials through your community.

In addition, railroad crossings at grade, where the motor vehicles, cyclists, and pedestrians cross the path of a railroad, are a potential hazard. The map below highlights major railroad crossings.

In the event of an emergency, passenger trains require a different response than freight trains. Amtrak is the major provider of long-distance passenger trains in the United States. The City of Hickory does not have any Amtrak routes within the response area. The risk is confined to the hazards associated with trains hauling various freights.

A Blue Ridge rail line passes through Hickory, and many are controlled crossings to prevent accidents. Other rail lines with minimal traffic have only signs to notify motor vehicles of an approaching train. Trains traveling through the city can delay response from emergency services if the crossing is blocked during an incident. Locations not controlled present an increased risk if drivers are not aware of an approaching train. A derailment may occur in remote areas of the city and create problems accessing the location during an incident or availability of water during a fire. The creation of contingency plans for these types of emergencies will assist in the development of strategies and tactics for the incident.

Major Railroad Lines and Crossings



Source: US DOT BTS National Highway-Rail Crossings Inventory Program; US Census Crossing position 1 is At Grade, 2 is Railroad Under, and 3 is Railroad Over

Means of Transportation

Part of the physical infrastructure picture is residents' access to different transportation options. Lack of any vehicle has implications for emergency evacuations. Commute means of transportation speaks to the modes of transit residents utilize on their daily commute.



Housing Units With No Vehicles

6.9%

Hickory Fire Department

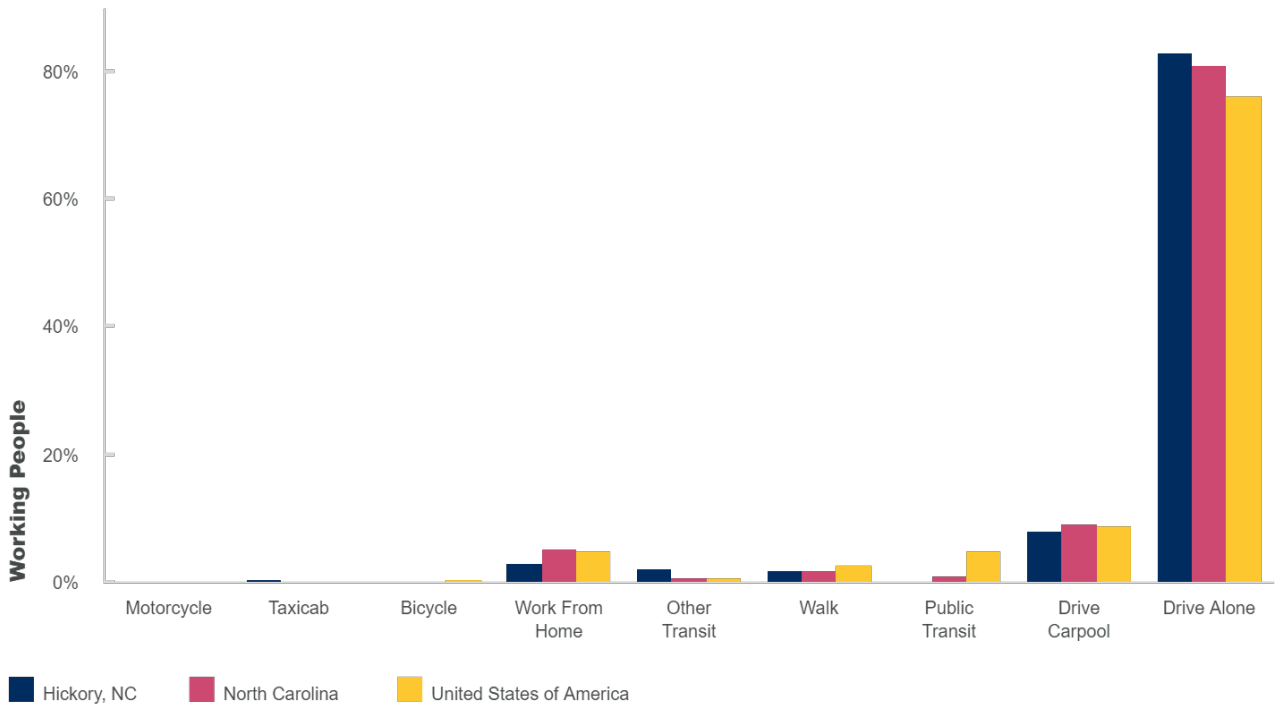
5.8%

North Carolina

8.6%

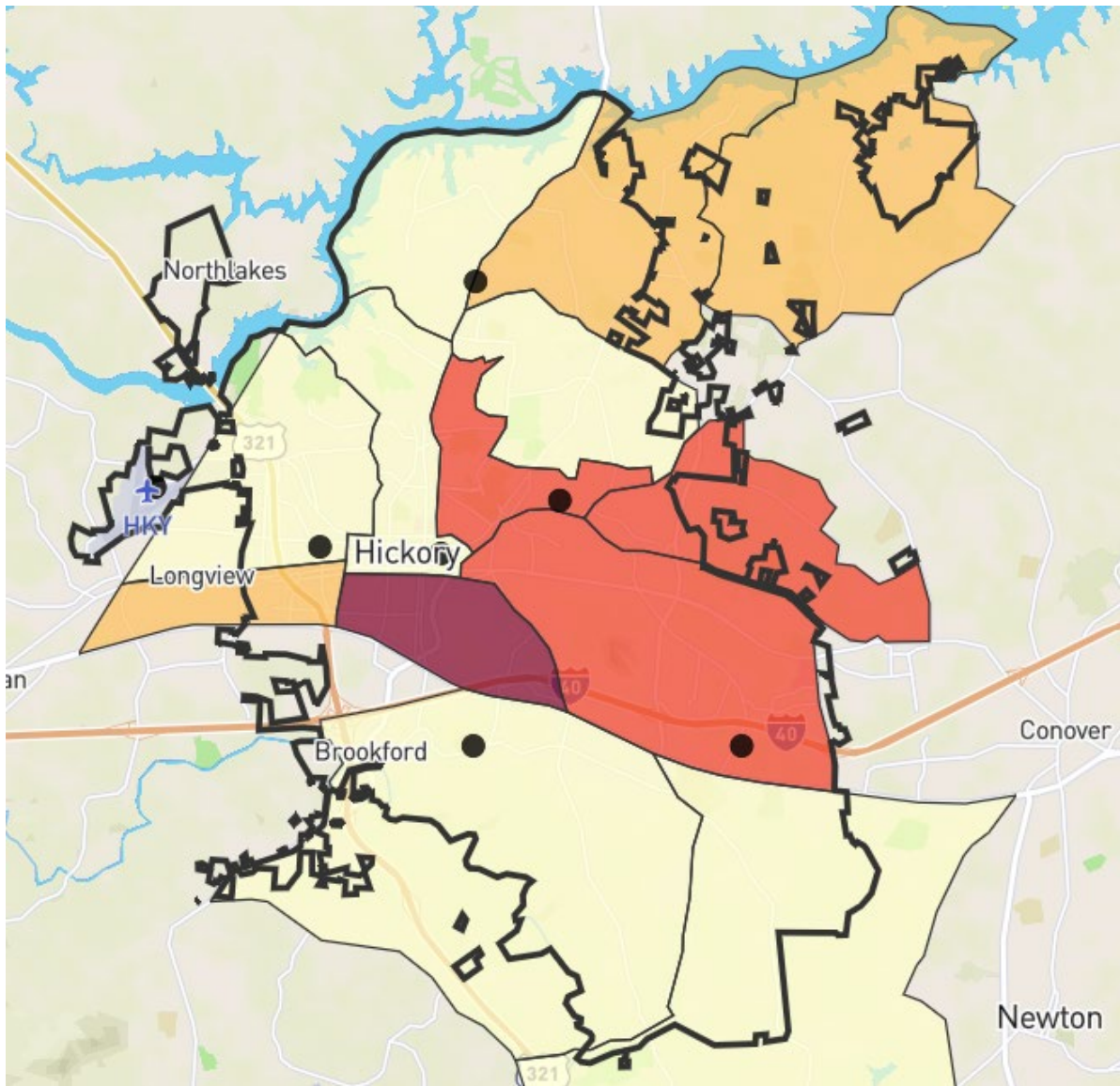
United States of America

Commute Means of Transportation



mySidewalk.com - Sources: US Census ACS 5-year

Vehicles Available for Occupied Housing Units



● Fire Station
▭ Hickory Fire Department

Housing Units Without Vehicles

- 1.5% - 6.4%
- 6.4% - 9.5%
- 9.5% - 27.2%
- 27.2%

Communications

Internet services are essential for the public, commercial establishments, and emergency services to conduct business daily. Other communications are vital to the community, such as cellular phones, Voice over Internet Protocol (VoIP) telephone systems, or transmission lines from the local telephone company. These systems allow the public to notify emergency services of an incident. When these essential communication systems fail, the community is impacted when an emergency occurs.

Water Resources

Controlling a fire becomes challenging without an adequate water supply and distribution system consisting of water storage, mains, and a fire hydrant system. A system of well-distributed hydrants and appropriately sized water mains are necessary to provide the required water for fireground use.

The City of Hickory provides water services to more than 27,000 customers through 950 miles of water lines. The water plant is a regional treatment facility and uses water from the Catawba River. The facility can produce 30 million gallons per day.

Natural and Weather Hazards

The climate and geography that a community resides in dictates the weather events and natural disasters that will impact its residents. While these events cannot be prevented, it is possible to prepare for their impact by understanding where vulnerable people and infrastructure are located. Analyzing past weather trends may also help determine the frequency of events. Identifying those risks can lead to better preparation for our residents, businesses, and responders for inevitable emergencies. These sections provide data on those common climate hazards and weather disasters.

Wildfire

Every year, wildfires burn across the country, and more and more people are living where wildfires are a real risk. Now nearly 45 million homes abut or intermingle with wildlands and more than 72,000 US communities are now at risk. But by working together responders and residents can make their neighborhood much safer from wildfire.



Wildland-Urban Interface (WUI)

Wildland Urban Interface (WUI) maps highlight areas of varying housing/development density alongside vegetation. These interface areas are at risk of wildfire. Wildfire poses a threat to people, homes, and businesses. It can also destroy native vegetation/forest, result in soil erosion, kill animals, result in spread of invasive plants, negatively impact air quality, and adversely impact watershed health.

Ecoregions

Ecoregions are areas where ecosystems (and the type, quality, and quantity of environmental resources) are generally similar. These ecoregions are intended for use in research, assessment, management, and monitoring of ecosystems.

Ecoregions were built for large geographic extents - things like entire states, multiple counties, or watersheds. They are not built for small areas like an individual town, county, or city.



There are four levels of Ecoregions for North America, with Level III and Level IV built in greater detail for the continental US.

Description

The South is one of the fastest growing regions in the nation, with an estimated population growth of 1.5 million people per year. The South also consistently has the highest number of wildfires per year. Population growth is pushing housing developments further into natural and forested areas where most of these wildfires occur. This situation puts many lives and communities at risk each year.



The WUI is described as the area where structures and other human improvements meet and intermingle with undeveloped wildland or vegetative fuels. Population growth within the WUI substantially increases the risk from wildfire.

For the Hickory Fire Department response area, it is estimated that 36,486 people or 82.3 % percent of the total project area population (44,321) live within the WUI.

In particular, the expansion of residential development from urban centers out into rural landscapes, increases the potential for wildland fire threat to public safety and the potential for damage to forest resources and dependent industries. This increase in population across the region will impact counties and communities that are located within the Wildland Urban Interface (WUI).

WUI Risk Index

Class	Acres	Percent
-9 Major Impacts	0	0.0 %
-8	115	0.6 %
-7	502	2.4 %
-6	222	1.1 %
-5 Moderate	15,112	72.8 %
-4	1,801	8.7 %
-3	1,051	5.1 %
-2	1,197	5.8 %
-1 Minor Impacts	771	3.7 %
Total	20,771	100.0 %

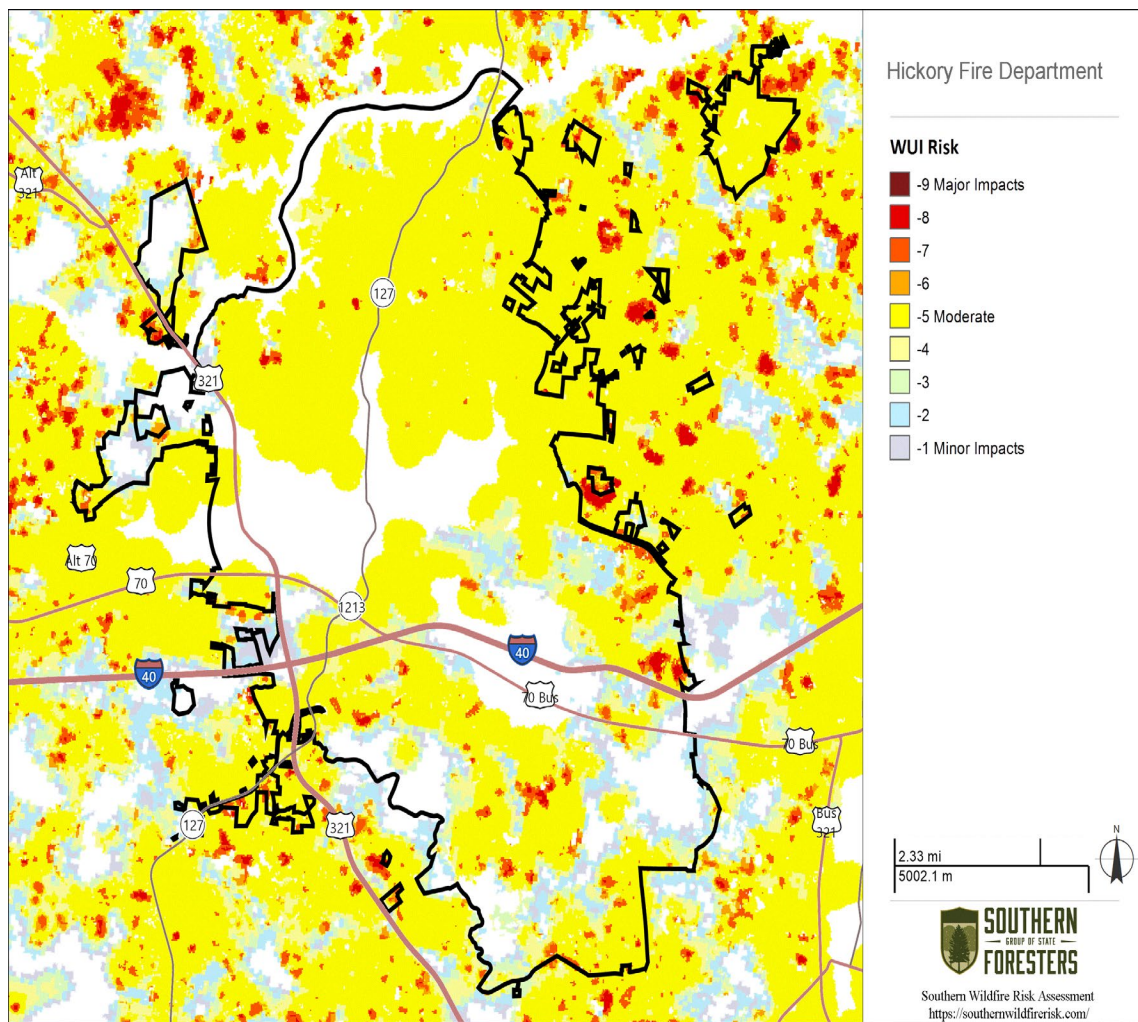
The Wildland Urban Interface (WUI) Risk Index layer is a rating of the potential impact of a wildfire on people and their homes. The key input, WUI, reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the Wildland Urban Interface and rural areas is key information for defining potential wildfire impacts to people and homes.

The WUI Risk Rating is derived using a Response Function modeling approach. Response functions are a method of assigning a net change in the value to a resource or asset based on susceptibility to fire at different intensity levels, such as flame length. The range of values is from -1 to -9, with -1 representing the least negative impact and -9 representing the most negative impact. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1.

To calculate the WUI Risk Rating, the WUI housing density data was combined with Flame Length data and response functions were defined to represent potential impacts. The response functions were defined by a team of experts based on values defined by the SWRA Update Project technical team. By combining flame length with the WUI housing density data, you can determine where the greatest potential impact to homes and people is likely to occur.

Hickory Fire Department Community Risk Assessment-Standards of Cover

Fire intensity data is modeled to incorporate penetration into urban fringe areas so that outputs better reflect real world conditions for fire spread and impact in fringe urban interface areas. With this enhancement, houses in urban areas adjacent to wildland fuels are incorporated into the WUI risk modeling. All areas in the South have the WUI Risk Index calculated consistently, which allows for comparison and ordination of areas across the entire region. Data is modeled at a 30-meter cell resolution, which is consistent with other SWRA layers.





Class	Acres	Percent
Non-Burnable	14,286	51.1 %
1 Lowest Intensity	2,681	9.6 %
1.5	5,134	18.4 %
2 Low	2,535	9.1 %
2.5	1,196	4.3 %
3 Moderate	1,133	4.1 %
3.5	794	2.8 %
4 High	192	0.7 %
4.5	0	0.0 %
5 Highest Intensity	0	0.0 %
Total	27,951	100.0 %

Wildland Fire Intensity Scale

Characteristic Fire Intensity Scale (FIS) specifically identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist based on a weighted average of four percentile weather categories. Similar to the Richter scale for earthquakes, FIS provides a standard scale to measure potential wildfire intensity. FIS consist of 5 classes where the order of magnitude between classes is ten-fold. The minimum class, Class 1, represents very low wildfire intensities and the maximum class, Class 5, represents very high wildfire intensities. Refer to descriptions below.

Class 1, Very Low:

Very small, discontinuous flames, usually less than 1 foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and non-specialized equipment.

Class 2, Low:

Small flames, usually less than two feet long; small amount of very short range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.

Class 3, Moderate:

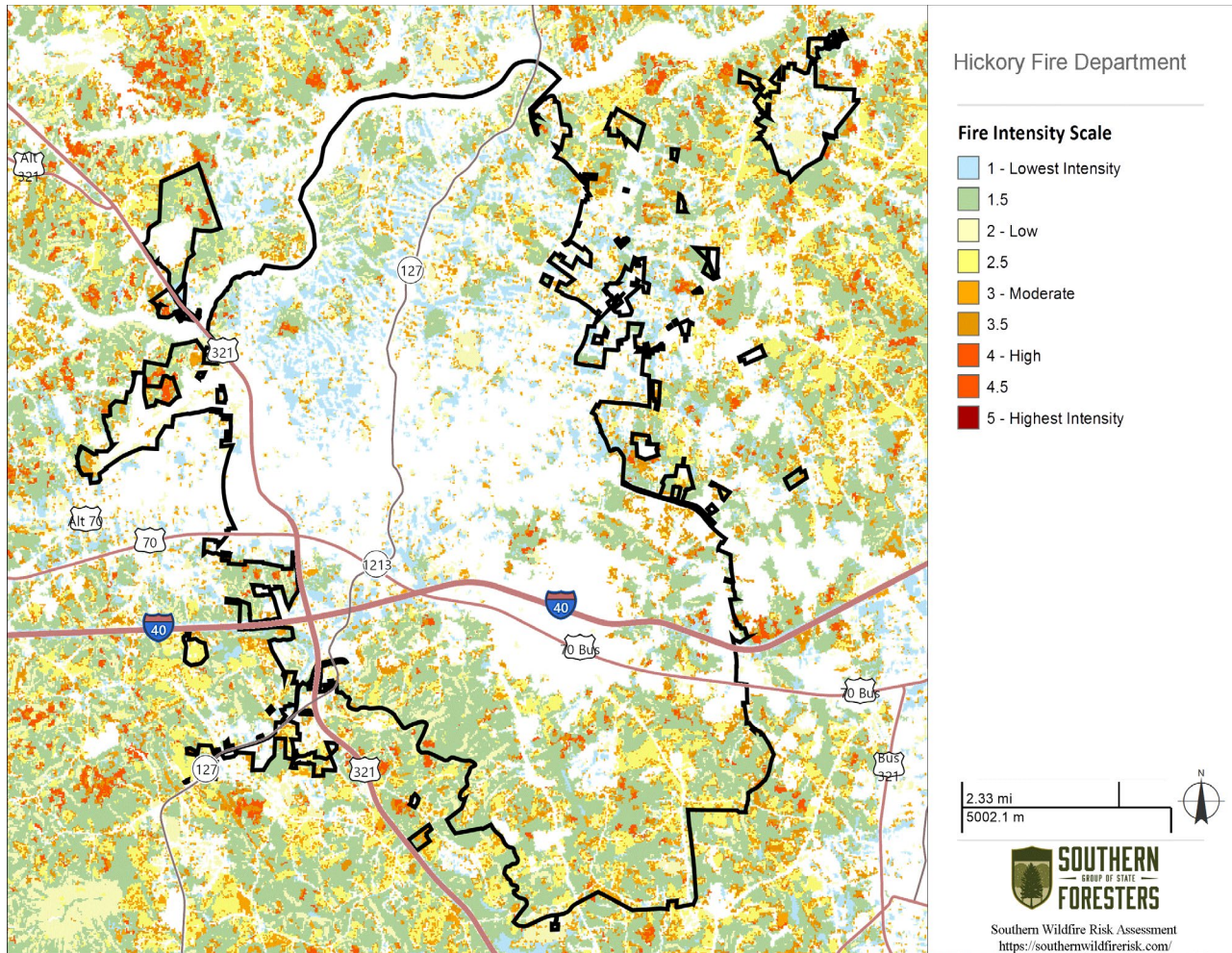
Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential for harm or damage to life and property.

Class 4, High:

Large Flames, up to 30 feet in length; short-range spotting common; medium range spotting possible. Direct attack by trained firefighters, engines, and dozers is generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property.

- **Class 5, Very High:**

Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.



Flooding

Flooding is the most common and widespread of all natural disasters. It can happen anywhere and at anytime, with devastating results to life and property. Tropical storms and cyclones can produce heavy rains that flood coastal communities. Inland, floods can occur in valleys, near rivers and streams, and even in small creeks and dry stream beds. Flooding along rivers can occur seasonally as rains that come in winter or spring combine with melting snow can quickly fill river basins beyond capacity. In urban areas, land loses its



ability to absorb rainfall as fields are converted to roads, causing streets and roadways to become swift-moving rivers. This section provides information on the wide variety of factors that can contribute to flood conditions.

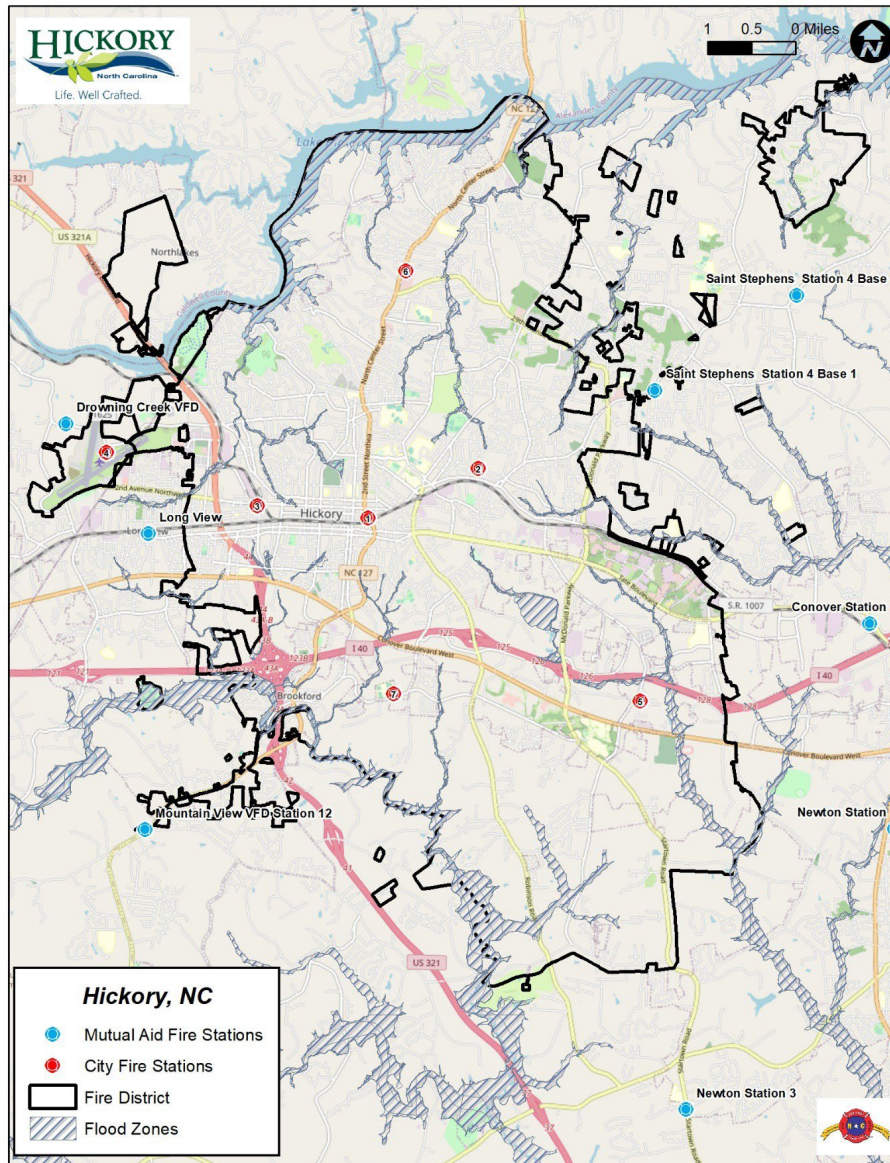
Hurricanes are huge tropical storms that move in a spiral. They form in the eastern Pacific Ocean, the Caribbean Sea, the Gulf of Mexico, and the southern Atlantic Ocean. The hurricane's calm center, called an eye, is about 20 to 30 miles wide. The storm around the eye can extend outward 400 miles with winds in excess of 74 mph. Over the past few decades massive hurricanes have made international news for devastating communities around the country,



causing fatalities, injuries, displacement, and irreparable damage to local infrastructure and economies. It is important to understand how a hurricane may impact a community and to put preparation and response measures in place before it is too late.

When flooding occurs, it can impede response by emergency responders and delay their arrival. There are areas in Hickory where a higher risk of flooding can happen. These areas, including Zone A (1% annual floodplain chance) and Zone AE (1% annual floodplain chance with elevations), are primarily along Snow Creek, Falling Creek, Horseford Creek, Barger Branch, Lyle Creek, Herman Branch, and their tributaries. The overall risk of significant flooding in Hickory is low. There have been five historical flooding events between 1993-and 2013 that caused more than \$6.3 million in losses, according to the Unifour Regional Hazard Mitigation Plan.

Flooding Zones



Hurricanes and Tropical Storms

Although the direct impact of a tropical storm or a hurricane in Hickory is low, the secondary effects such as heavy rainfall, tornados, and high winds can create numerous problems in the community. Risks increase for personnel during the storm when exposed to falling trees or limbs, and extreme caution is necessary during a response. Response by emergency services may be delayed by down trees or power lines when they cannot reach the incident location.

The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 Category rating that is based on a hurricane's sustained wind speed. The scale also estimates potential property damage. Hurricanes that are

Category 3 and above are considered major hurricanes due to their potential for significant loss of life and damage inflicted. Wind speed is measured using a 1 minute average.

Saffir-Simpson Hurricane Wind Scale

Category	Wind Speed (mph)	Description
1	74 to 95	Very dangerous winds; Some damage
2	96 to 110	Extremely dangerous winds; Extensive damage
3	111 to 129	Devastating damage
4	130 to 156	Catastrophic damage
5	157 or higher	Catastrophic damage

Source: NOAA National Hurricane Center and Central Pacific Hurricane Center

Water Damage

Water is a driving agent of hurricane related damage. The damages caused by water come from both the storm precipitation and storm surge. Storm surge is purely the water level rise caused by the hurricane winds and low pressure. When the storm surge is combined with the already-present tides, the storm surge can become a storm tide. Thus a storm surge during a high tide can cause even more damage. While the Hickory Fire Response District is far enough inland to avoid hazards related to storm surge, wind and water damage caused by flooding remain threats depending on the track of a hurricane.

Winter Storms

When winter storms occur, a response by emergency personnel can be delayed because of road conditions. Severe winter weather is listed as a top hazard in the North Carolina Hazard Mitigation Plan for the Piedmont 4 Region, including Hickory. The HMP assigns a priority risk score of 3.0 for severe winter weather events. These storms may occur each winter, but most are not significant enough to receive a federal disaster declaration. Since 1996, two declarations have included Hickory.

Type	Date
Blizzard of 96	January 1996
Severe Ice Storm	December 2002

Tornados

For those who live outside of Tornado Alley, tornadoes may not be top of mind when it comes to community safety. However, tornadoes have been reported in all 50 states and on average cause 70 fatalities and 1,500 injuries nationwide each year. Aside from harming people, tornadoes have the potential to destroy homes, businesses, and critical infrastructure.

Enhanced Fujita (EF) Scale

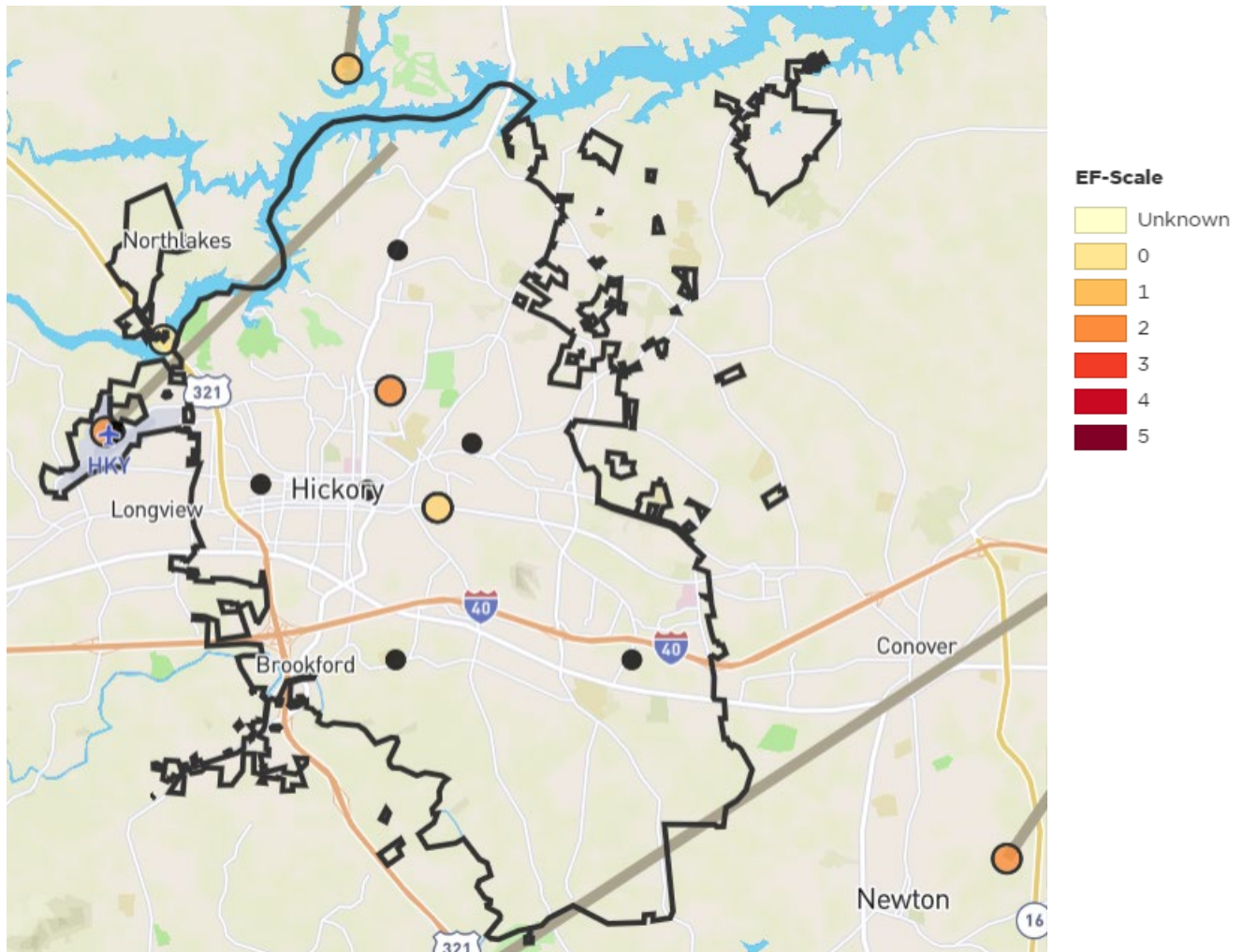
The EF Scale is used to assign a rating to a tornado based upon estimated wind speeds and related damage. Damage from a tornado is measured using a list of Damage Indicators and Degrees of Damage tables, which help to estimate the wind speeds produced by the tornado. Wind speeds are estimated for 3-second gusts, not measurements, based upon damage and then the tornado is assigned an EF rating by the National Weather Service (NWS).

EF Rating	3 Second Wind Gust (mph)
0	60 to 85
1	86 to 110
2	111 to 135
3	136 to 165
4	166 to 200
5	Over 200

Source: NOAA National Weather Service (NWS) The Enhanced Fujita Scale

Previous Tornadoes

A challenge of tornado data is that the tornado or its damage must be observed. It is not a weather phenomena that can be recorded by a fixed instrument (like rainfall or temperature), nor can it be tracked easily by satellite given its short-life and unpredictable occurrence. NOAA's Doppler weather radars, more post-tornado damage assessments, and increasing population in previously unpopulated areas have greatly improved the recording of tornadoes.



Tornadoes reported to NOAA

- Fire Station
- ▭ Hickory Fire Department
- Tornado Paths

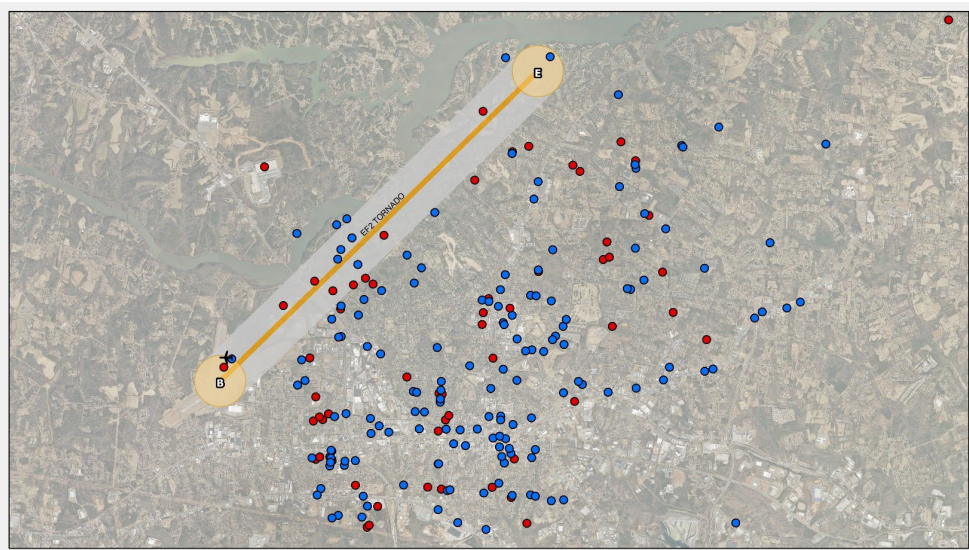
Historical Perspective

On Monday October 23rd 2017 a band of rain showers along and ahead of a strong cold front quickly intensified during the afternoon across Upstate South Carolina, then moved quickly northeast into the North Carolina foothills and far western Piedmont. Multiple severe and/or tornadic thunderstorms developed within the line, with multiple tornadoes, some of which were quite strong, reported across the area. This was the second tornado outbreak to impact this area in just over two weeks, and for the most part, the same counties that were impacted on October 8th were once again affected on the 23rd. Meanwhile, moderate to heavy rain

falling throughout the morning hours, followed by a brief period of intense rainfall associated with the band of rain showers resulted in areas of flooding and flash flooding near the eastern escarpment of the Blue Ridge.

NWS storm survey found the path of a tornado that began at the Hickory Regional Airport in Burke County moved into Catawba County near Highway 321, moving northeast along the Caldwell County line/Catawba River. Although the tornado was in a weakening state as it moved into Catawba County, it also widened to more than a half mile. Widespread tree damage occurred, with many trees falling on homes, vehicles, and smaller structures. The tornado either dissipated near Lake Hickory, or abruptly changed direction to more of a northerly direction as it crossed into extreme southeast Caldwell County.

Tornado Path with Fire and EMS/Rescue incidents (10/23/17)



Thunderstorms

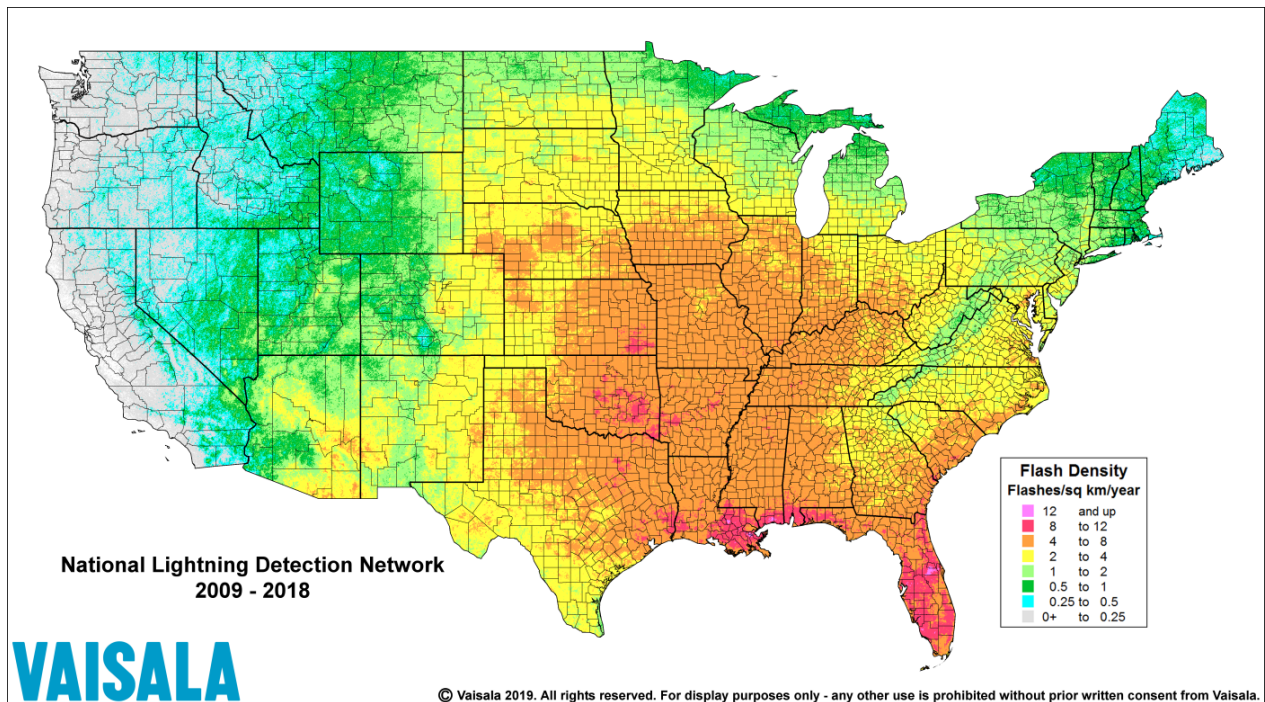
Thunderstorms can occur any time of day, any day of the year. They always include lightning and can also include strong winds, hail, tornadoes, or flooding. These storms can come on suddenly and pose a serious threat to human safety, buildings, and infrastructure.

The chance of a thunderstorm occurring in Hickory increases during the spring of each year and into the summer, much like the other areas in the southeastern United States. The HMP notes that these storms can include hail and tornadoes, increase property damage, or people, and

receive the highest priority risk index score of 3.1 for the region. These storms can strain local emergency services during these events, specifically during an electrical storm.

Lightning

Thunder and lightning are a familiar part of storms for most people. Shelter should be taken inside a building or vehicle, there is no place outside that is safe during a thunderstorm. Wait at least 30 minutes after hearing the last clap of thunder before leaving your shelter. The composite map from Vaisala below shows lightning strikes from 2009-2018.

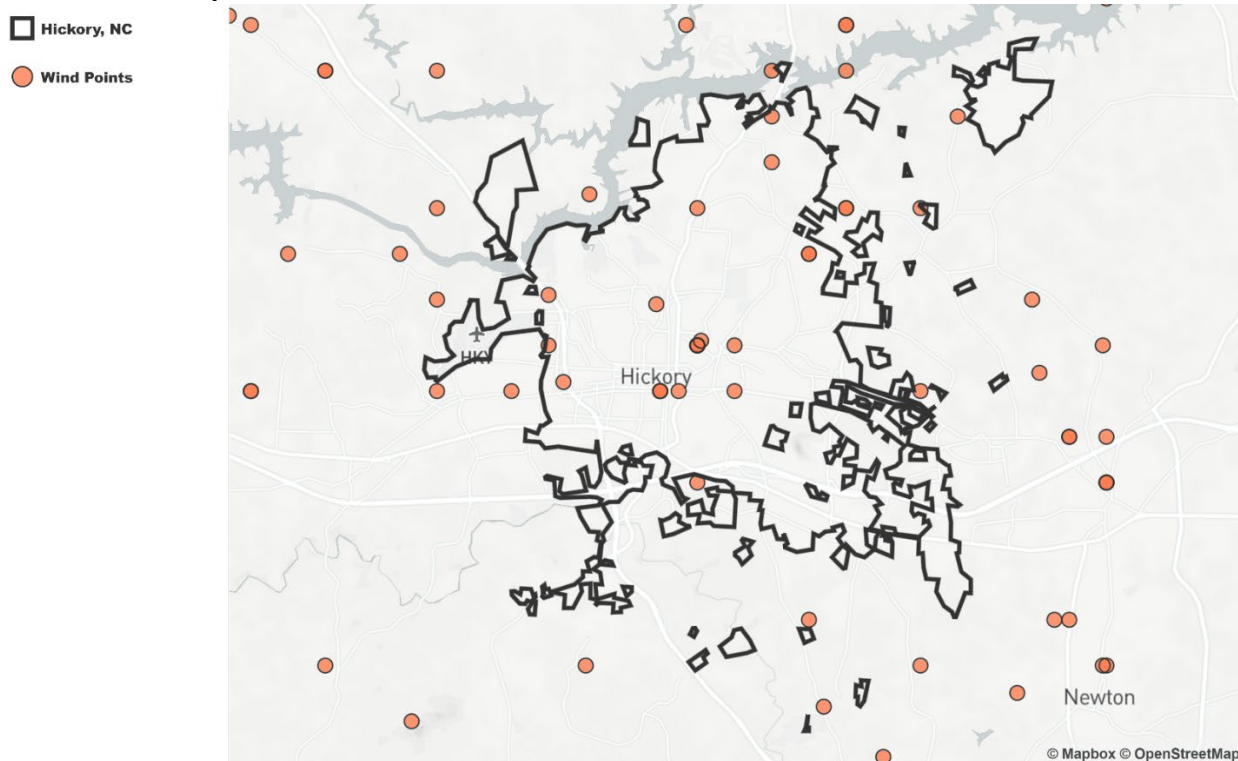


Source: Vaisala <https://www.vaisala.com/>

Wind

A severe thunderstorm is one in which the winds meet or exceed 58 mph. High wind can pick up debris, which can result in additional damage to structures and hazards to people. The map below shows high wind incidents as reported to NOAA.

Severe Wind Reported to NOAA



Source: NOAA National Weather Service (NWS) Storm Prediction Center (SPC) SVRGIS

Hail

Hail can damage automobiles, roofs, crops, livestock, vegetation, and anything else in its path to the ground. Below is a reference chart to use when characterizing hail size and a map below detailing historical severe hail events.

Hail Size

NOAA encourages the *measurement*, not estimation, of hail size. The table below provides the measured hail size with an equivalent sized common object.

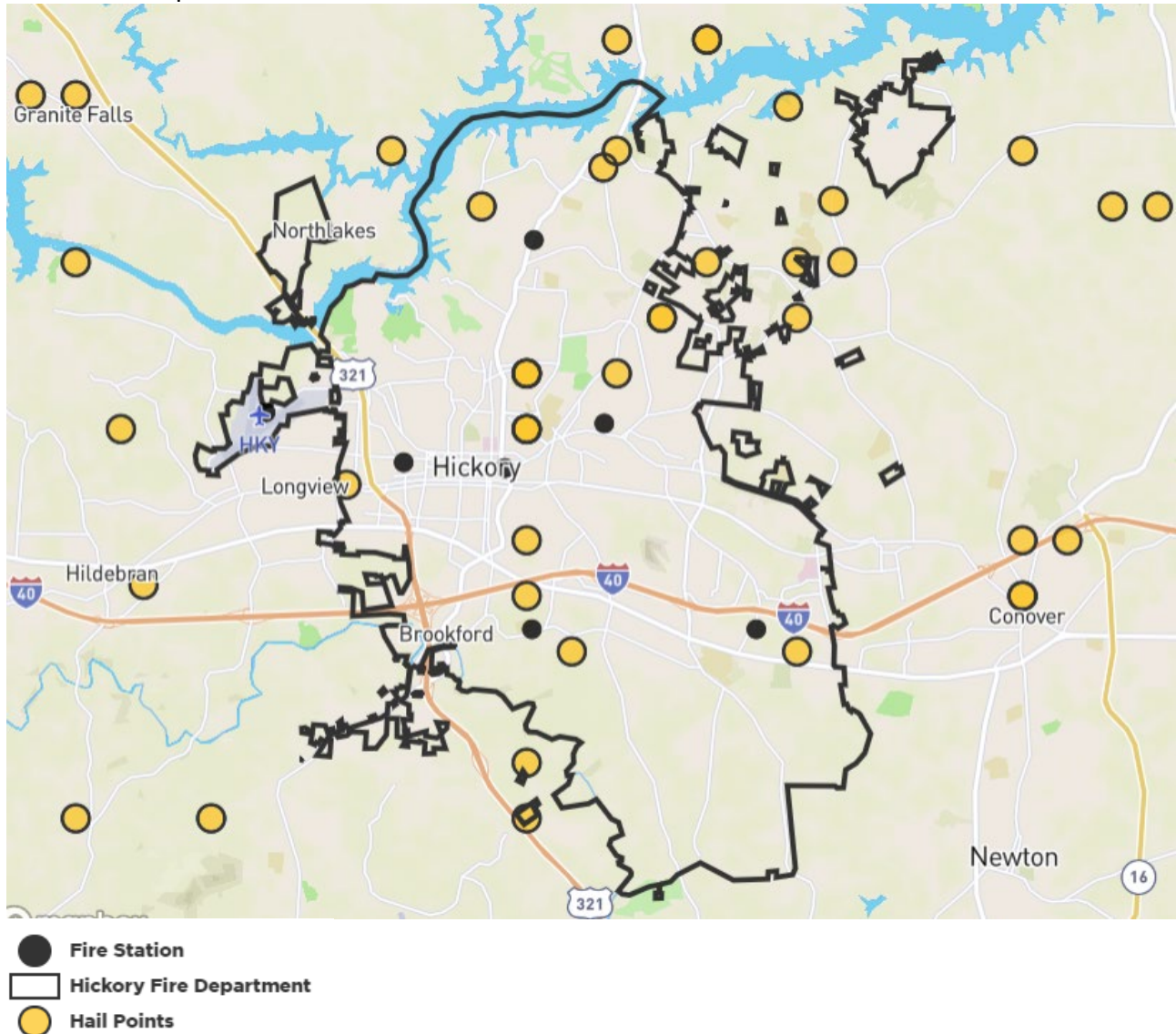
Measurement	Comparable Object
½ inch	Marble
¾ inch	Penny
⅞ inch	Nickel
1 inch	Quarter
1¼ inch	Half Dollar
1½ inch	Walnut
1¾ inch	Golf Ball
2 inch	Egg
2½ inch	Tennis Ball

Hickory Fire Department Community Risk Assessment-Standards of Cover

2¾ inch	Baseball
3 inch	Tea Cup
4 inch	Softball
4½ inch	Grapefruit

Source: NOAA National Weather Service Storm Prediction Center (SPC)

Severe Hail Reported to NOAA



Source: NOAA National Weather Service (NWS) Storm Prediction Center (SPC) SVRGIS

Earthquake / Seismic Activity

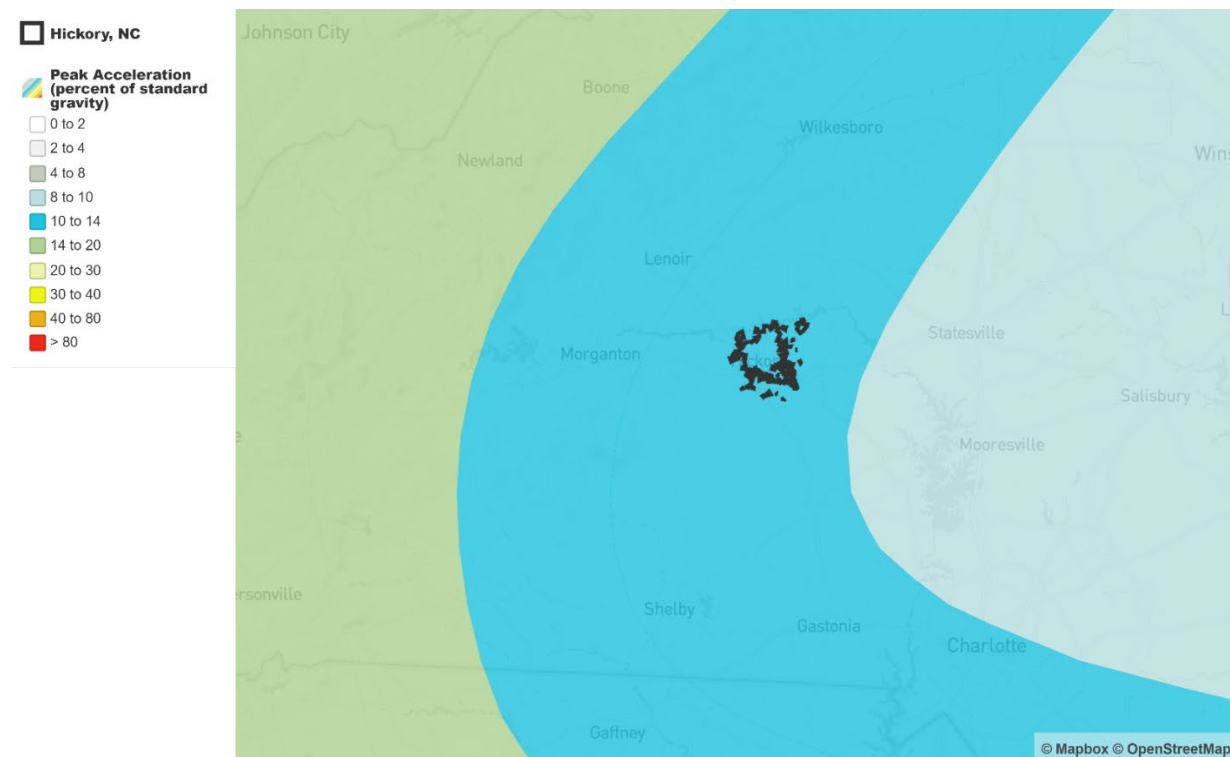
Each year 12,000-14,000 earthquakes are reported; an average of 35 earthquakes a day. Forty-five states and US territories are at moderate to high risk for earthquakes. When earthquakes strike a populated region, they can cause extensive property damage. Buildings and bridges can

collapse and utility service - gas, water, electric, phone, and internet - can be disrupted. Earthquakes can also cause serious injuries and fatalities. Scientists cannot predict precisely when or where one will occur, so it is important for communities to be prepared at all times.

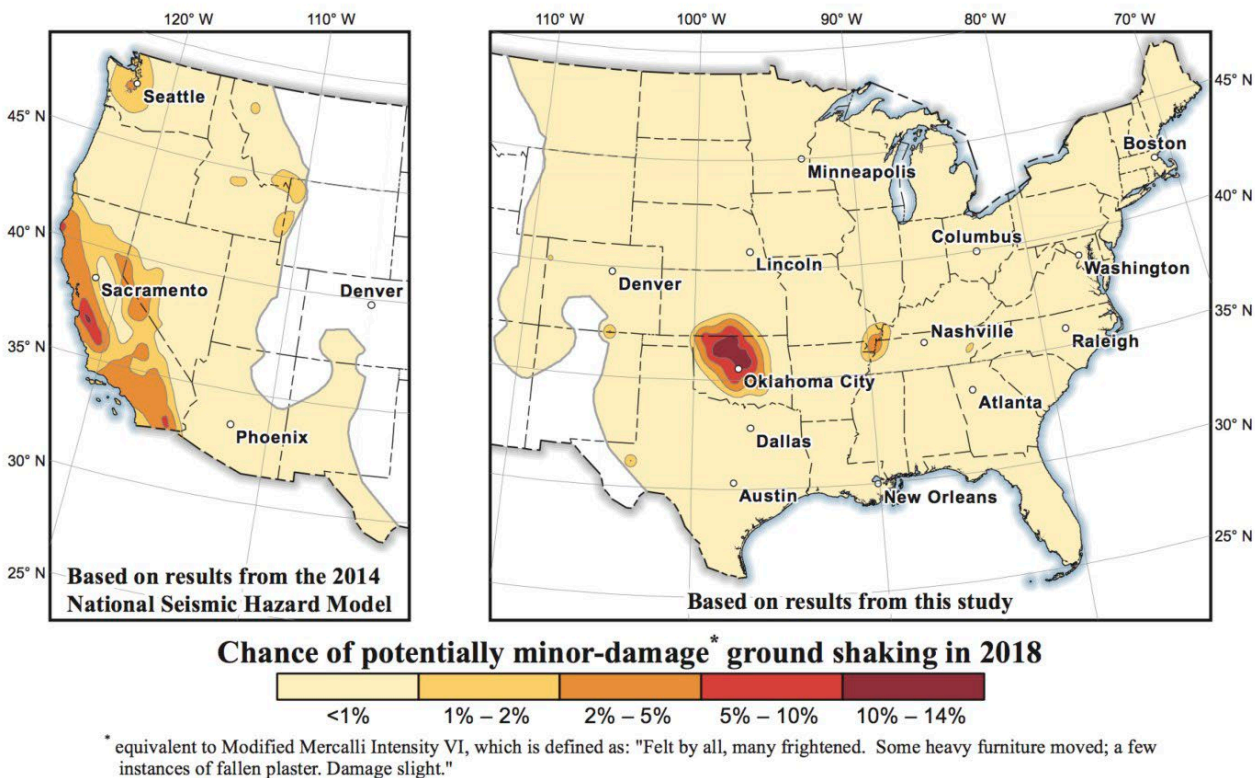
Earthquake Hazards

The ground shaking due to an earthquake varies from place to place. The USGS National Hazard Map below is an estimate of ground shaking or ground motion over 50 years. The hazard includes the variables of magnitude, location, frequency, properties of rock, and soil properties.

National Seismic Hazard



Source: USGS Seismic Hazard 2014 for lower 48, 1998 for Hawaii, 2007 for Alaska 2% change of peak ground acceleration in 50 years. Values are in percent of standard gravity. Lowest values are lowest hazard; highest values are highest hazard.



Sources: UGSG Short-Term Induced Seismicity Model 2018

Pandemics

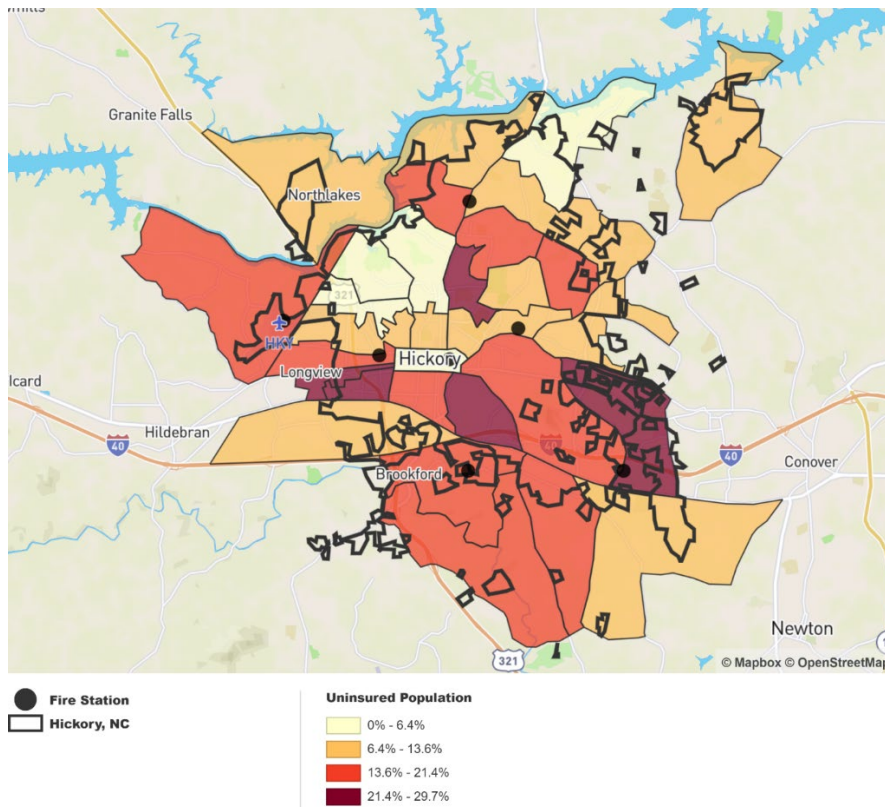
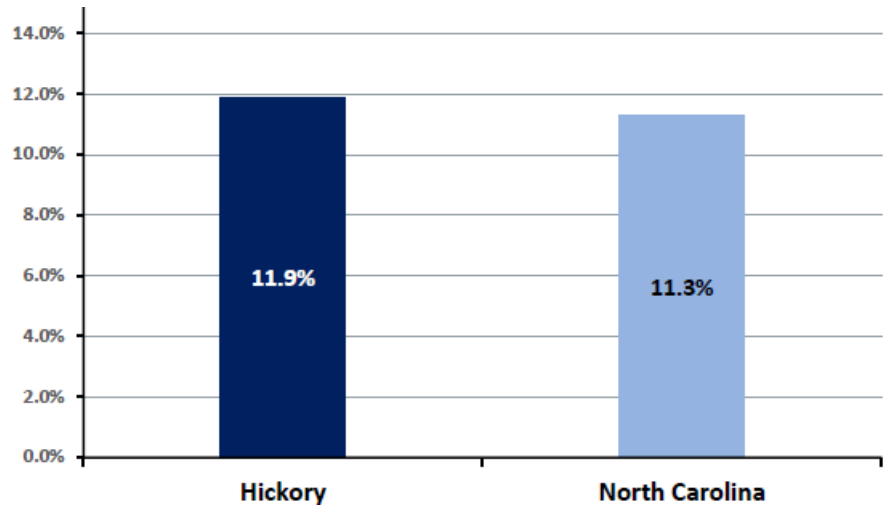
COVID-19 has brought to life the impact a pandemic can have on a community. While a pandemic may have once been considered a low probability / high impact threat, COVID-19 has proven the importance of an all-hazards risk assessment to prepare for, respond to, and recover from a pandemic.

Factors Adding to the Challenges of a Pandemic

The COVID-19 pandemic hit some of our neighbors harder than others. The crisis has laid bare existing health and socioeconomic disparities across the community. This section provides insights about factors related to increased vulnerability to the impacts of a pandemic.

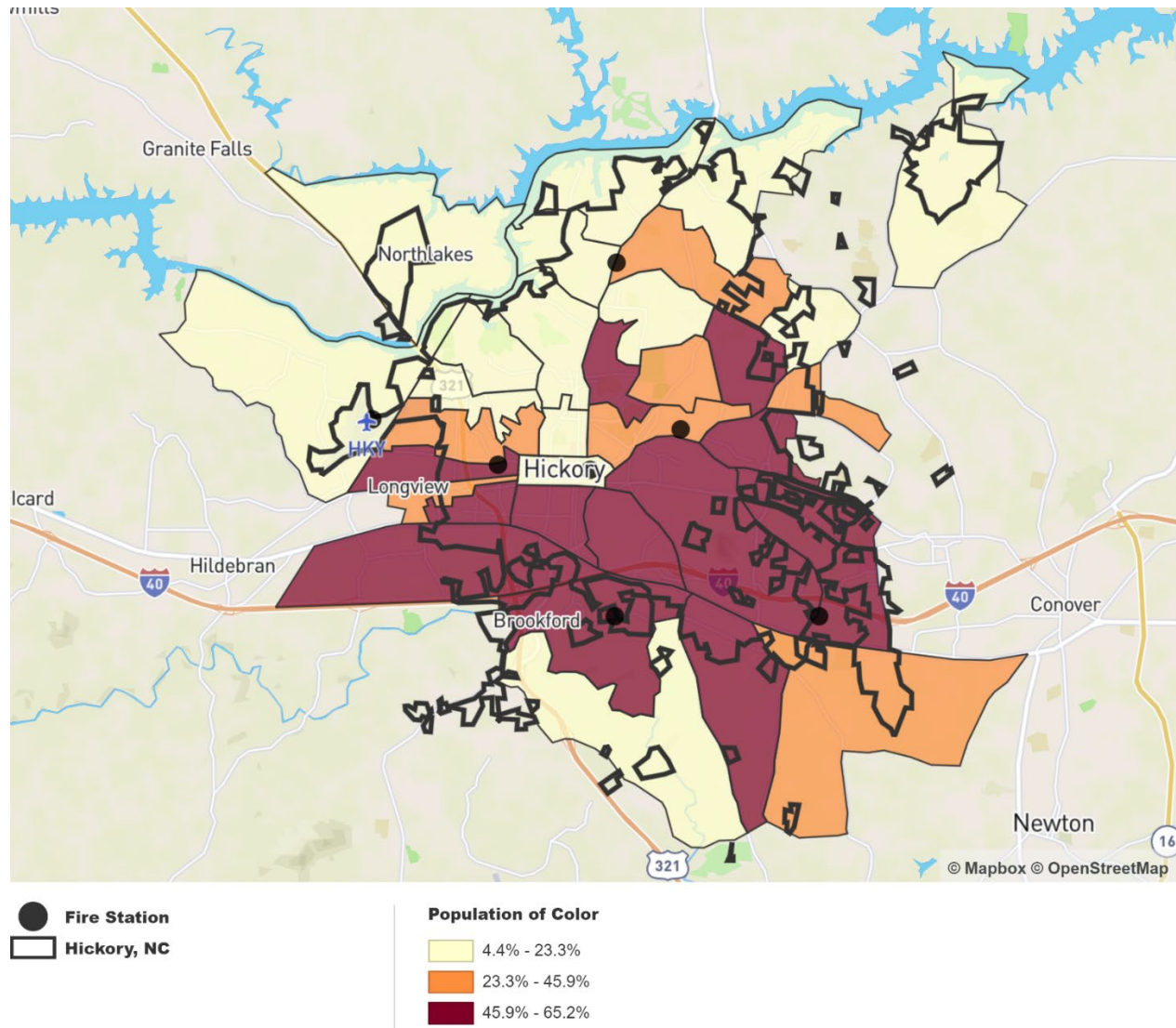
Health Care

Those without health insurance are less likely to participate in preventive care and control health conditions that lead to increased risk of complications associated with a pandemic. Unfortunately, some members of our community lack health insurance. Without adequate insurance, lower-income populations cannot pay for health care visits; thus, it may delay medical appointments allowing their conditions to become worse. When health insurance is not available, an additional burden is placed on emergency services and increases the number of medical responses. This figure shows that the population without health insurance in Hickory is 11.9%, compared to the state at 11.3%.



Black, Indigenous, People of Color (BIPOC)

Long-standing systemic health and social inequities have put some members of BIPOC groups at increased risk of getting COVID-19 or experiencing severe illness, regardless of age. Sources: [CDC](#)



Sources: US Census ACS 5-year. This map shows the percent of people who self-identified as any race other than white alone.

Occupations with High Exposure to Respiratory Viruses

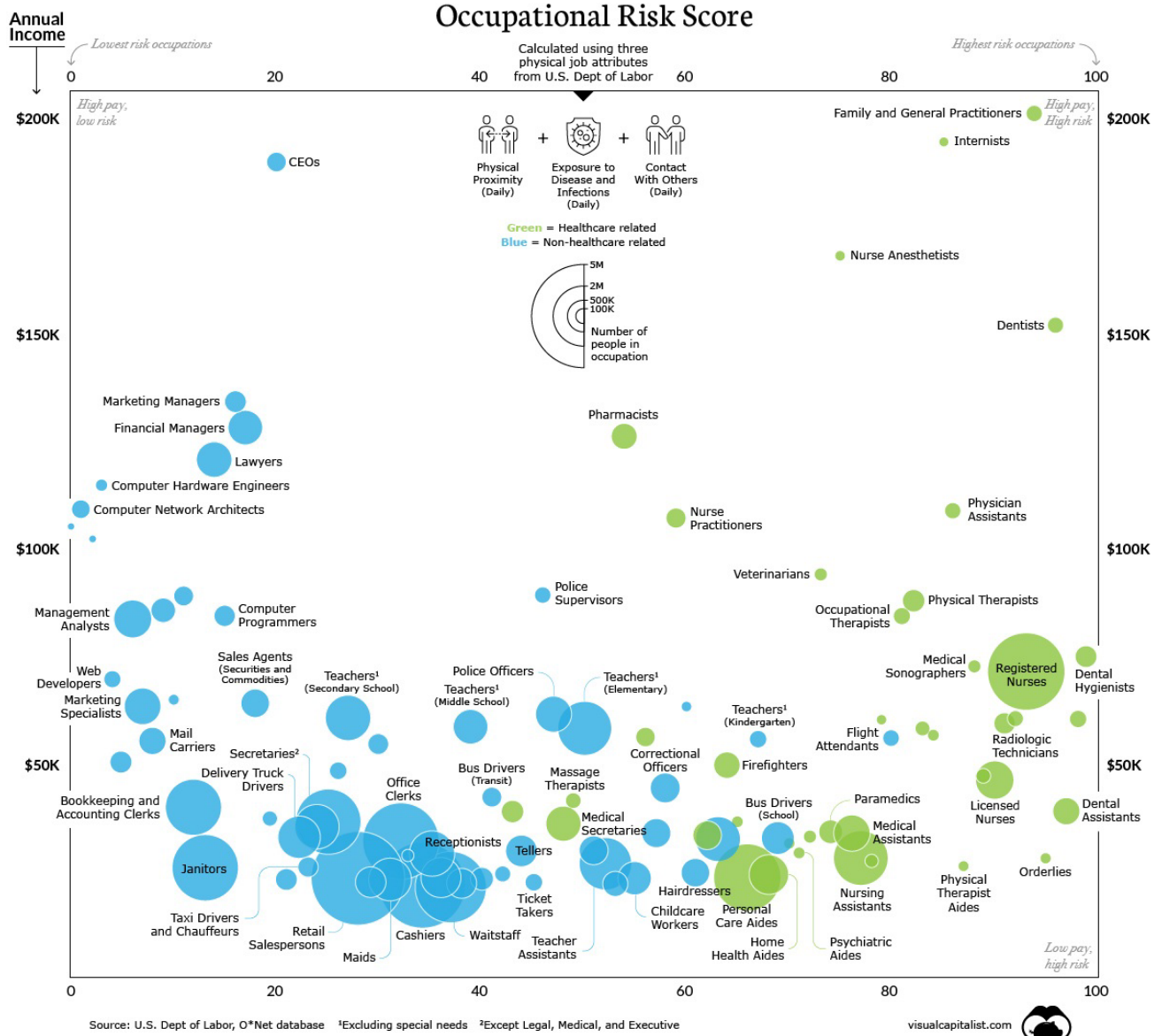
The impact of respiratory virus can vary drastically by occupations. The COVID-19 pandemic brought much of this exposure risk to light. While some were hit hard by layoffs or furloughs, others were able to transition to working from home, and some occupations continued to show up to work in conditions that put them at higher risk to exposure to the virus. These conditions will continue to exist for future pandemics as well as the fall flu season.

An occupational risk score, as defined by [Visual Capitalist](#), is a weighing of three job factors:

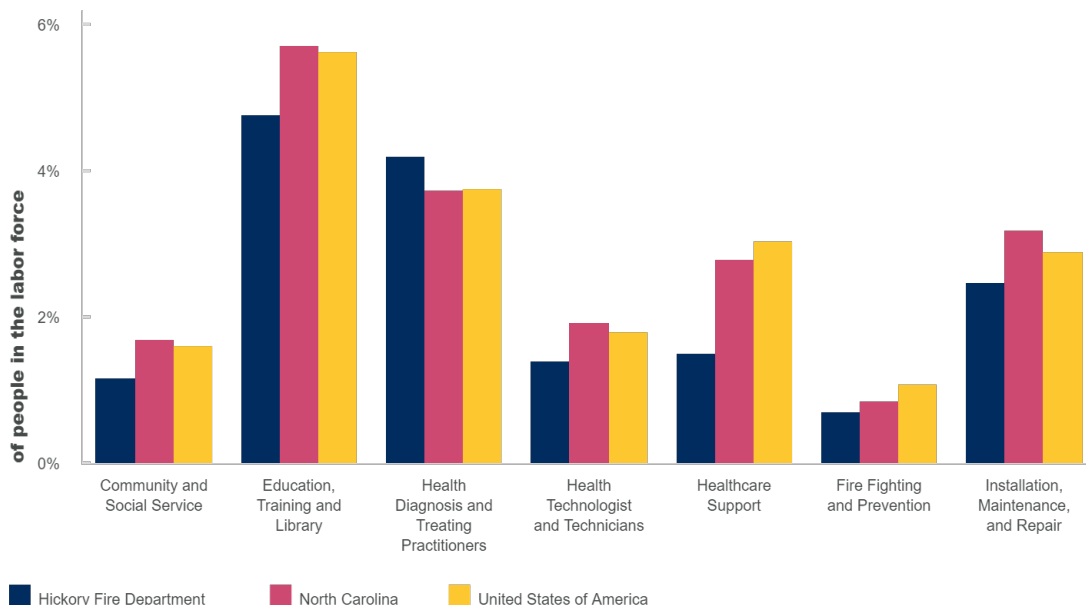
1. Contact with others
2. Physical proximity to others while performing the job
3. Exposure to disease and infection

These three factors can also be plotted against income to show how occupations of all salaries are at high risk to exposure to future pandemics. As one might expect medical professionals are at high risk of exposure to viral pathogens, but occupations like flight attendants, teachers, firefighters, bus drivers, hair dressers, correctional officers, home aids, veterinarians, child care workers, postal workers, and police all are at higher risk.

Hickory Fire Department Community Risk Assessment-Standards of Cover



Occupations with Potential High Exposure to COVID-19



based on the Visual Capitalist COVID-19 Occupational Risk Score. For more details on the risk score by occupation, please go to <https://www.visualcapitalist.com/the-front-line-visualizing-the-occupations-with-the-highest-covid-19-risk/>

Crowded Living Conditions

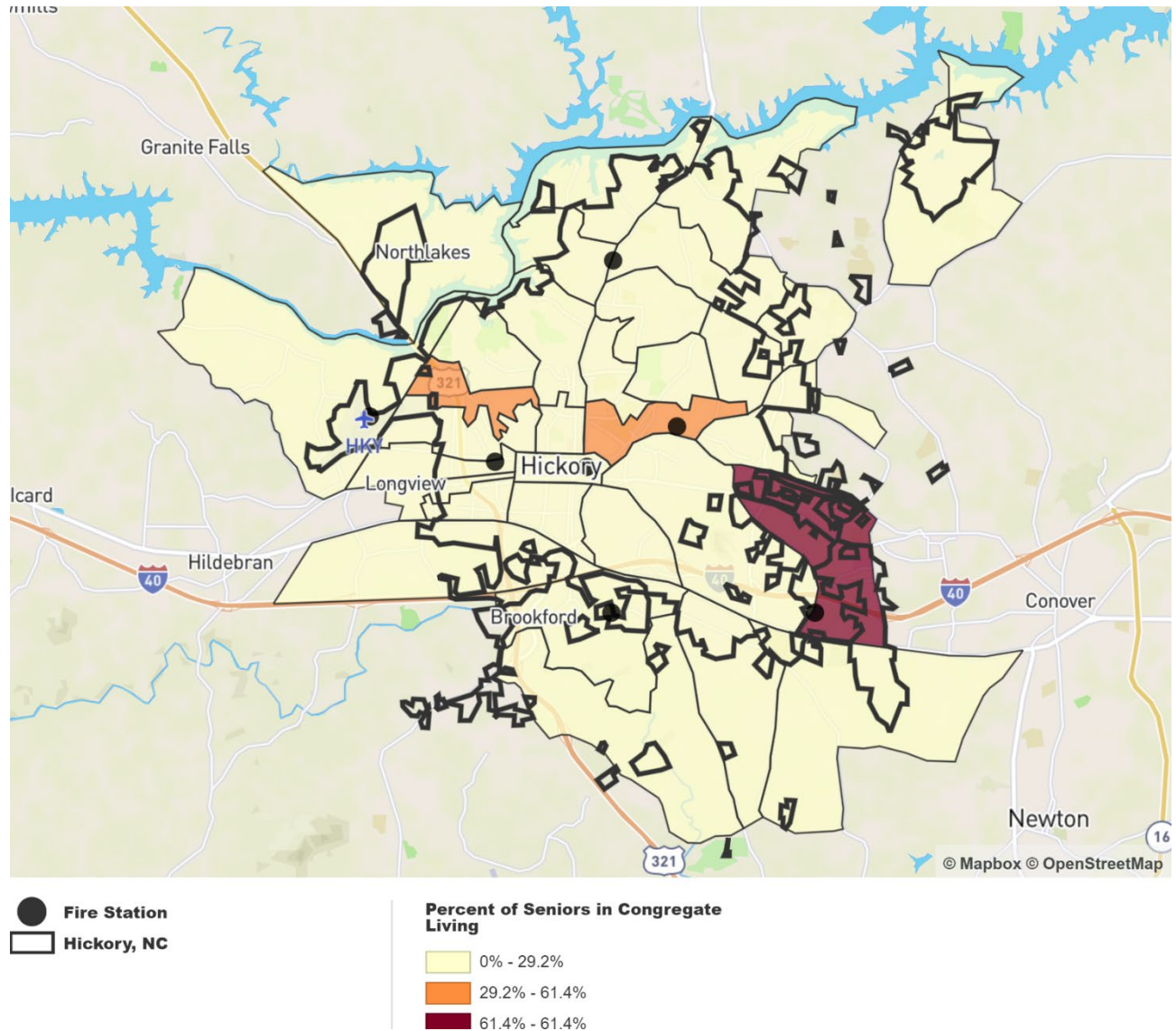
Hot spots of respiratory virus transmission can be traced to congregate living settings such as nursing homes and assisted living facilities. Additionally, older adults have a more difficult time fighting viruses and close quarters provide more opportunity for the virus to spread.

Residential occupancies with many people living together also pose this greater risk of transmission.

<p>Seniors (Age 65 and Over)</p> <p>17.1% of total population</p> <p>Hickory Fire Department</p>	<p>Seniors in Congregate Living</p> <p>6% of all seniors (age 65 and Over)</p> <p>Hickory Fire Department</p>
<p>15.5% of total population</p> <p>North Carolina</p>	<p>2.8% of all seniors (age 65 and Over)</p> <p>North Carolina</p>
<p>15.2% of total population</p> <p>United States of America</p>	<p>3.1% of all seniors (age 65 and Over)</p> <p>United States of America</p>

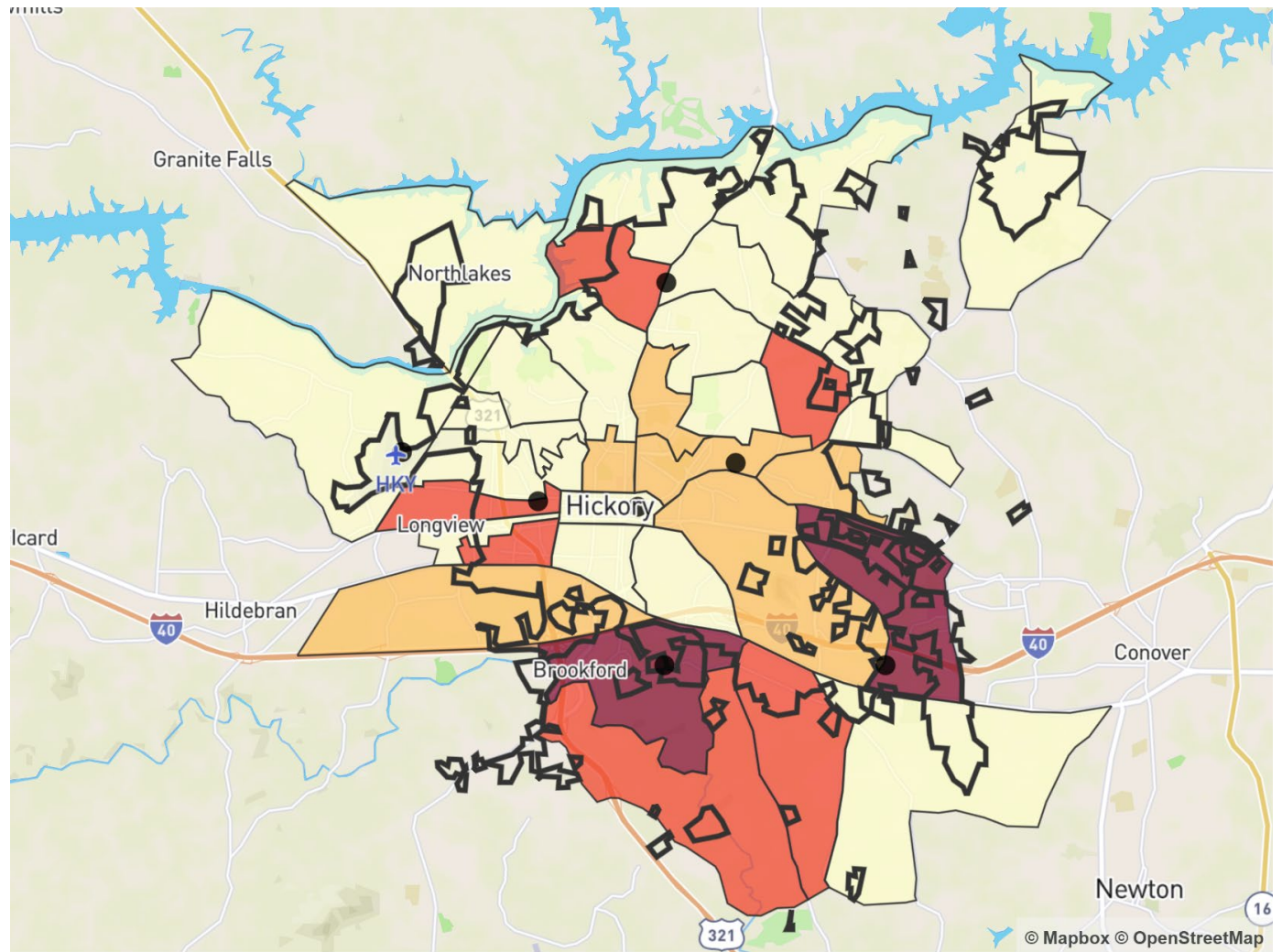
Sources: US Census ACS 5-year

Percent of Seniors in Congregate Living



Sources: US Census ACS 5-year. Congregate living, called group quarters by the Census, is a non-household living situation. A group quarters is owned or managed by an organization that provides housing services for residents and the individuals who live there are not usually related to each other. Group quarters include places such as residential treatment centers, nursing homes/facilities, group homes, prisons, and worker dormitories.

Overcrowded Housing Units



● Fire Station
□ Hickory, NC

Overcrowded Housing Units

- 0% - 3.7%
- 3.7% - 7.7%
- 7.7% - 14.9%
- 14.9% - 16.5%

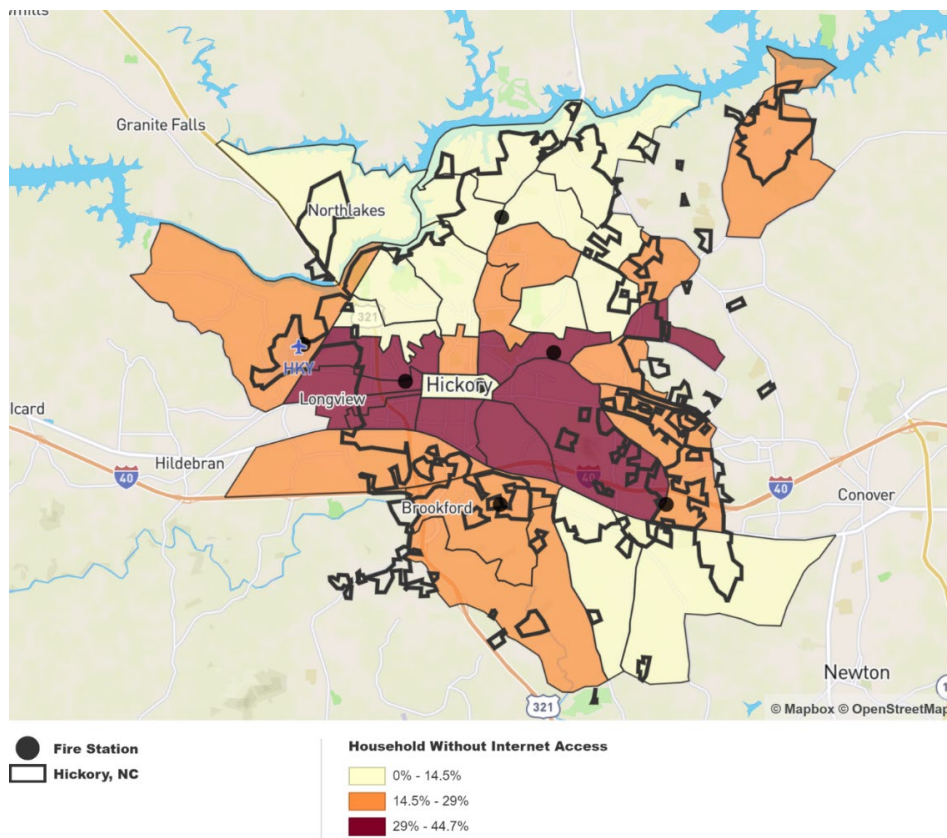
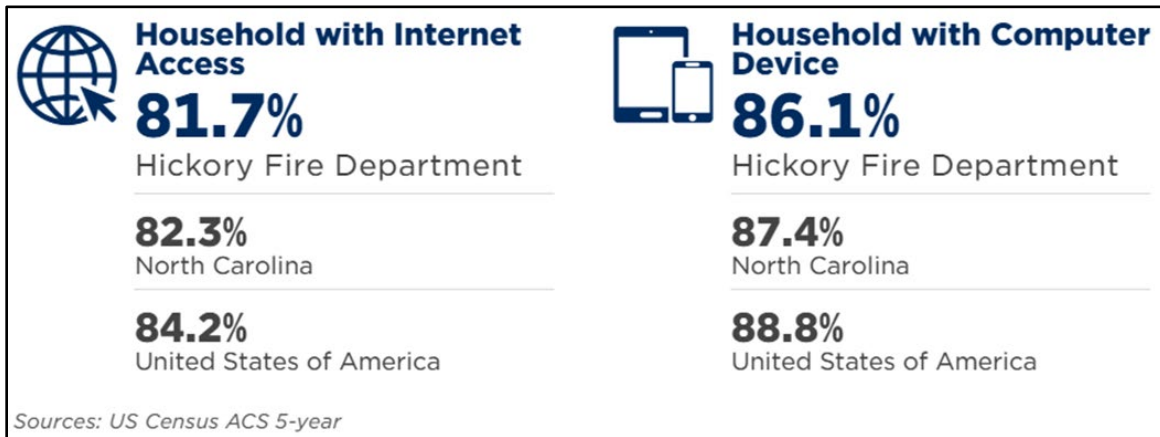
Sources: US Census ACS 5-year. Overcrowded housing units are occupied housing units that contain more than one person per room.

Infrastructure

With social distancing serving as a primary tool in the COVID-19 response strategy, high speed internet access has proven to be a critical component of local infrastructure. With workplaces,

Hickory Fire Department
Community Risk Assessment-Standards of Cover

schools, and libraries closed, people rely on home internet service to learn, work, shop, and obtain medical advice and spiritual care without leaving their homes.



Sources: US Census ACS 5-year

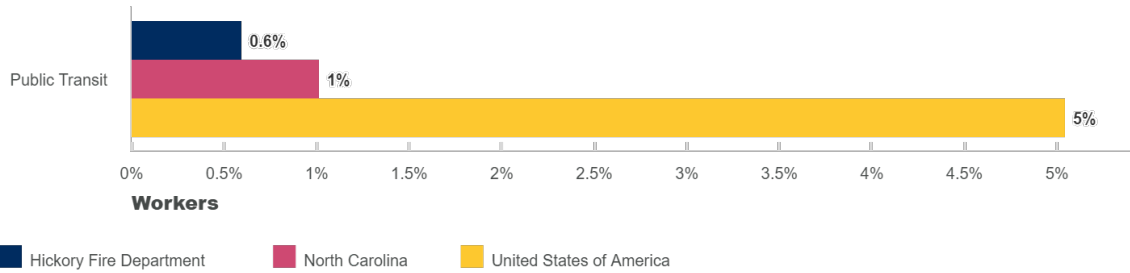
Commute

When the need for social distancing increases, the demand for public transportation decreases and schedules are modified accordingly. However, many people in essential services and those

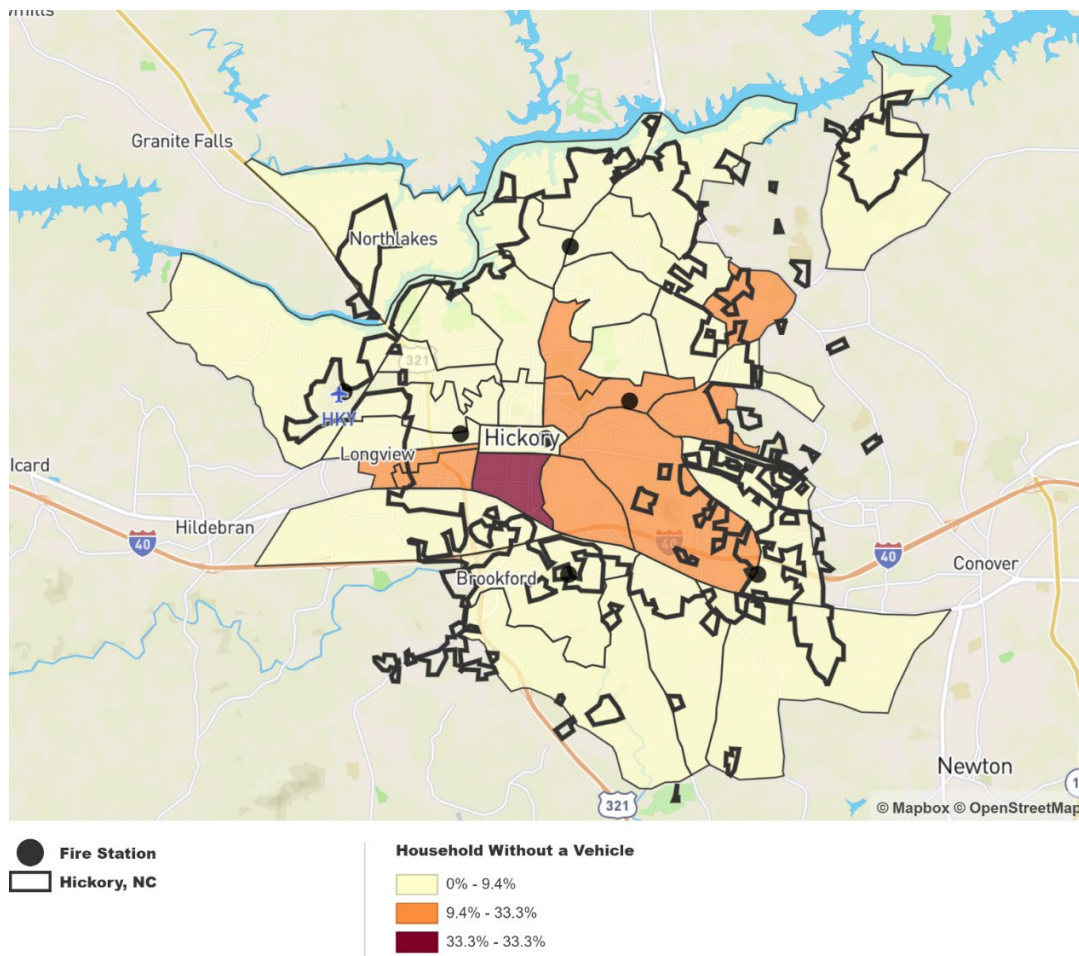
Hickory Fire Department Community Risk Assessment-Standards of Cover

in dense urban environments rely on public transportation. Lacking access to a personal vehicle as a means of transportation will become a critical issue during a pandemic.

Workers Who Commuted Via Public Transit Before COVID-19



mySidewalk.com - Sources: US Census ACS 5-year



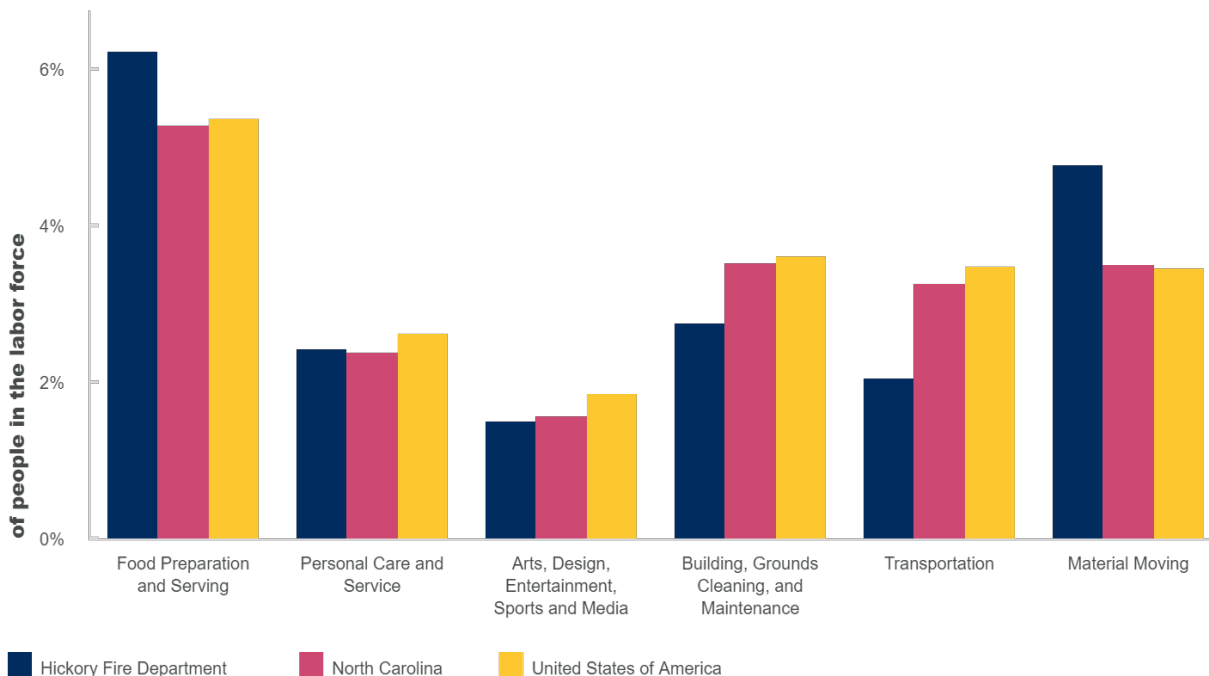
Sources: US Census ACS 5-year

Economics

The economic impact of the COVID-19 pandemic was unprecedented. Never before has the pause button been hit across the country and people encouraged or required to stay at home

for weeks. The unemployment rate hit peaks not seen in almost a century and it is unknown how long it will take to return to pre-pandemic levels. In addition, the impact on occupations was unique. Retail and restaurant workers were furloughed or laid off, as were many people in traditionally white-collar jobs. These economic demographics should drive the service delivery of the Hickory Fire Department daily as well as aid in preparing for the next pandemic.

Local Labor Force in Most Impacted Occupations



: US Census ACS 5-year. The pre covid-19 most impacted jobs are from the Bureau of Labor Statistics (BLS) Current Population Survey, Table A30. The most impacted jobs based upon the national unemployment rates for May 2020.

Median Household Income

\$50,970.20

Hickory Fire Department

\$52,413

North Carolina

\$60,293

United States of America

Sources: US Census ACS 5-year

Median Home Rent
\$744.93

Hickory Fire Department

\$877
North Carolina

\$1,023
United States of America

Sources: US Census ACS 5-year

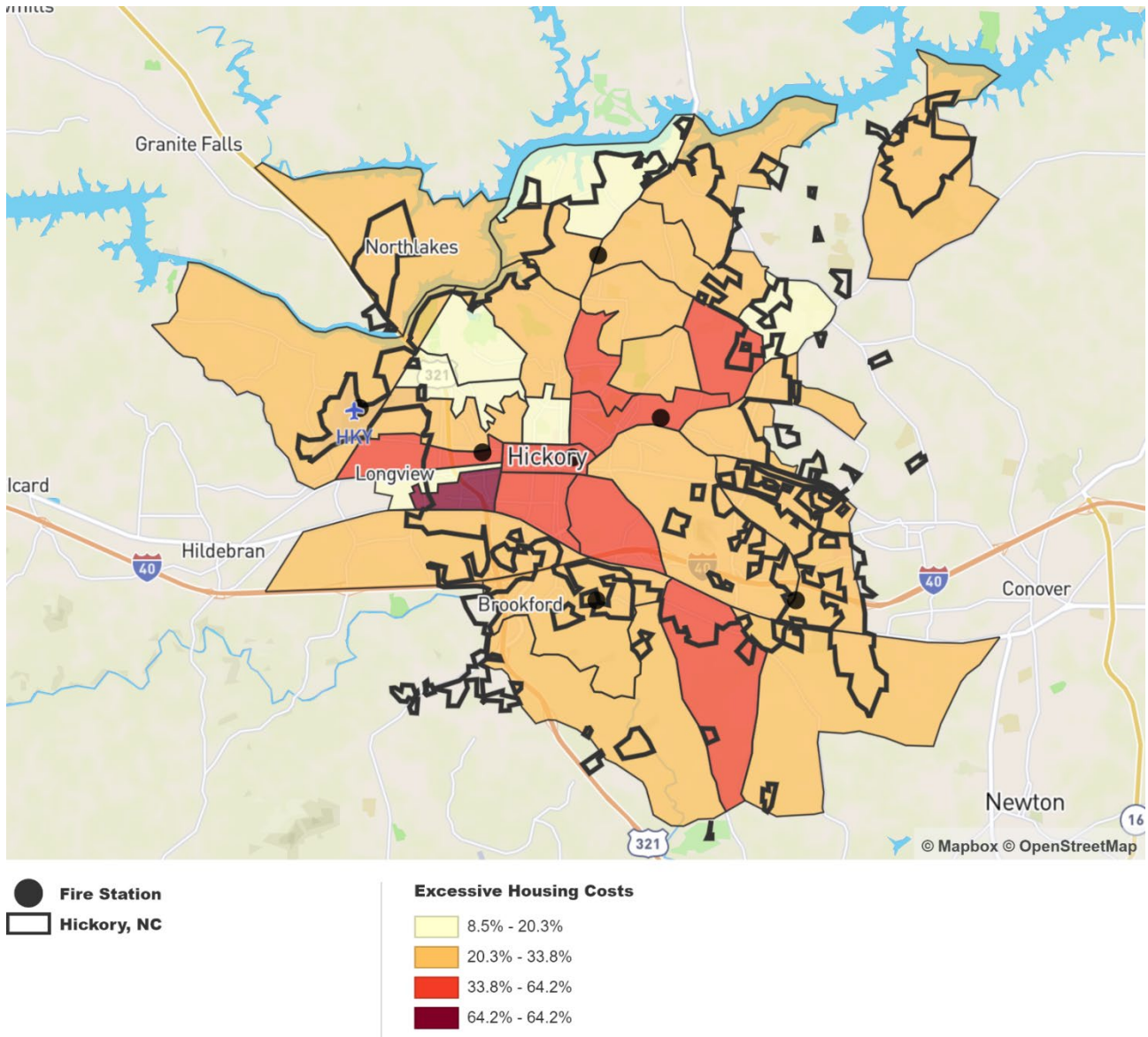
Median Home Value
\$157,652.29

Hickory Fire Department

\$165,900
North Carolina

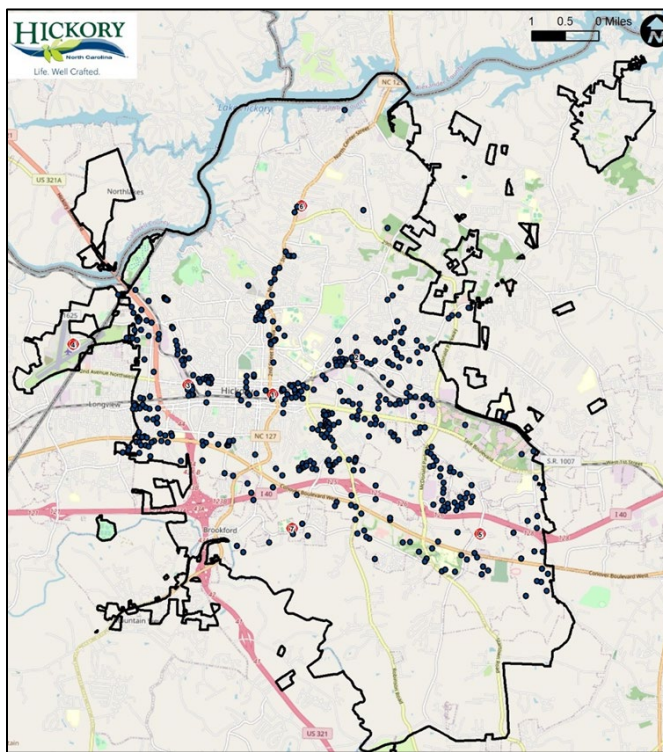
\$204,900
United States of America

Excessive Housing Costs



Target Hazards

Within the response area are buildings considered target hazards. These buildings or facilities typically present higher fire risks to people, property, or the environment. These may include buildings with a high occupancy rating, facilities where the occupants may need assistance during an evacuation, or locations where hazardous materials are present. These occupancies create special hazards for the occupants and emergency responders. Target hazards can also be considered significant or historic properties that are important community assets.



Buildings greater than 25,000 square feet and requires higher fire flow requirements. Public and private schools also present an increased risk for the community and require additional assistance during an incident. Mass casualty events can easily become overwhelming and outside assistance becomes necessary. These occupancies require up-to- date pre-incident action plans, so emergency responders become familiar with the building and surrounding area for site-specific hazards.

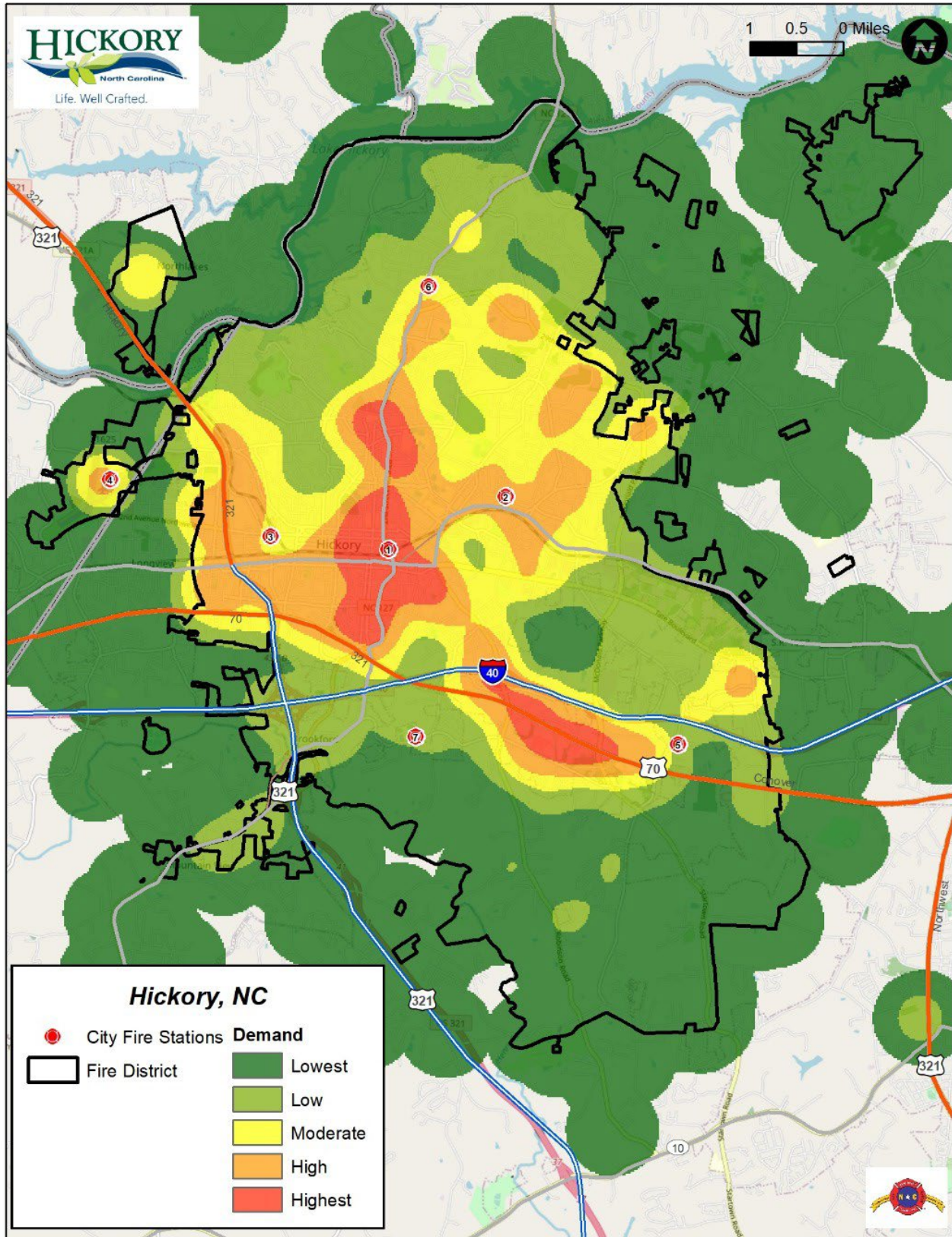
ALL-HAZARD RISK ASSESSMENT

Demand for Service

The demand for services although correlates with higher population, can also be driven by non-residential commercial facilities like nursing homes, higher educational, and public facilities such as airports, and transportation terminals. Highly congested and unimproved intersections can also drive service demand for the fire service. Because of these factors, the demand for services is also a major element in coverage analysis. The following map demonstrates where the demand for services is the most intense based upon the geographic coordinates (X, Y) given in the fire department's raw incident data.

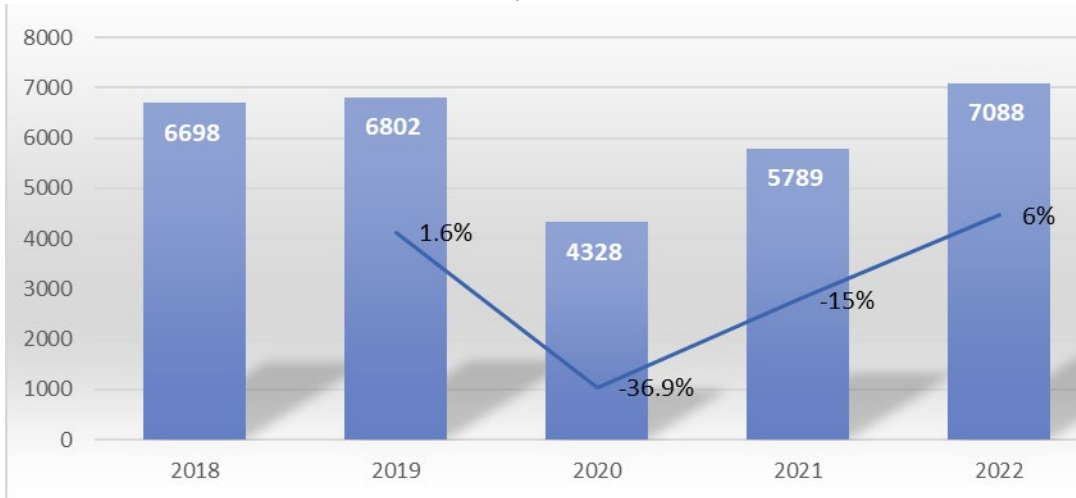
This section provides a broad look at the department's total incidents. It summarizes everything the fire department receives a call for, including fire, EMS, hazardous conditions, false alarms, public service, and more. This overview can reveal larger trends in response and lead to discussions about resource utilization, both of which can help in developing a standard of response coverage (SOC). Data analysis is vitally important to determining the fire department's performance. Identifying current performance can predict how future trends will impact the overall fire protection service delivery system. Response data analysis is necessary to produce credible trends and recommendations based on risk.

Service Demand Density



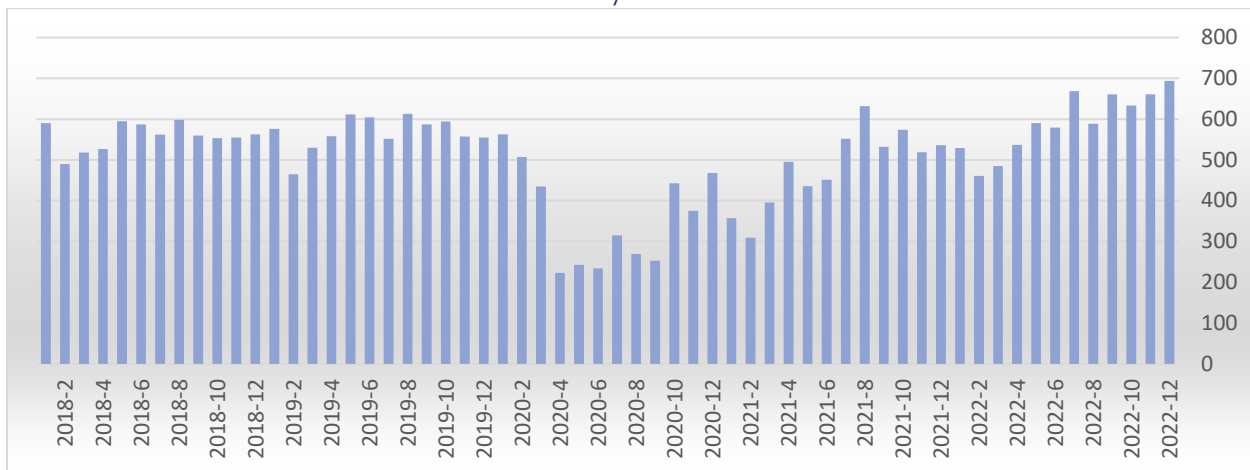
Hickory Fire Department
Community Risk Assessment-Standards of Cover

Demand by Calendar Year



Prior to the effects of the COVID pandemic in 2020, the department had small annual increases in the overall demand for service (0.15 to 1.54%). The department averaged 6,730 events annually or approximately 18.5 events per day. Starting in March of 2020, the demand, like other departments throughout the country, dropped significantly for many reasons. In the months following March 2020, monthly demand reached almost 60% reduction compared to the same month in 2019. In 2021, the total demand started climbing again but finished 15% less than 2019.

Demand by Year-Month



When evaluating the 5-year period, the demand trend appears to be decreasing because of COVID, but when evaluating the month demand since March of 2020 there is an increase in the trend.

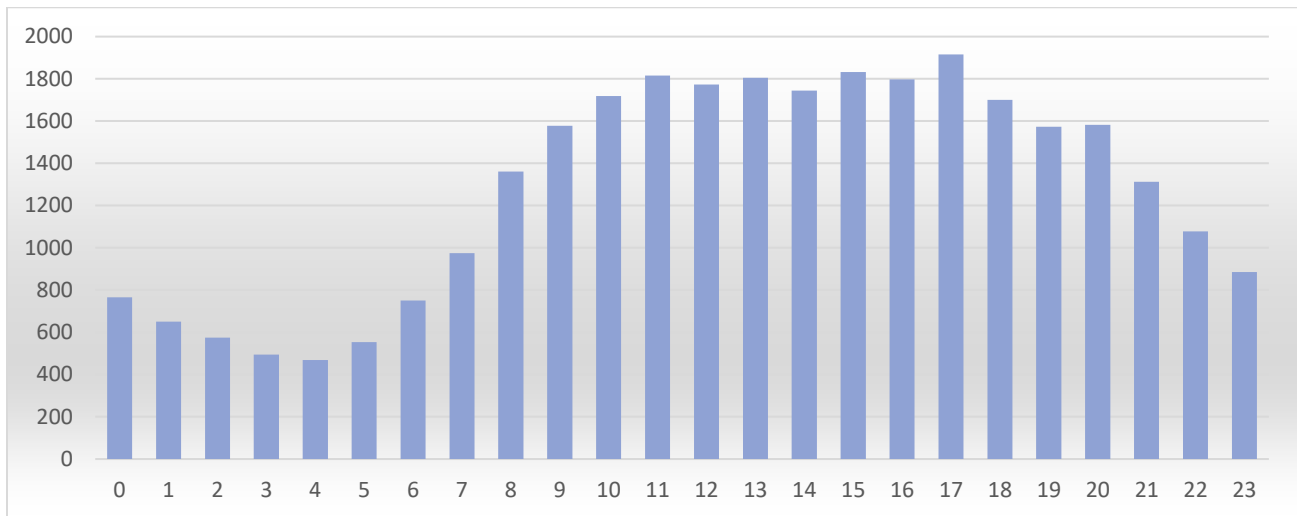
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Heat Graph - Demand by Month, by Year

Demand	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	590	490	518	527	595	587	562	598	560	553	555	563
2019	576	465	530	558	611	604	552	613	587	594	557	555
2020	563	507	435	223	243	234	315	269	253	443	375	468
2021	357	309	396	495	436	451	552	632	532	574	519	536
2022	529	461	485	537	590	579	669	589	661	633	661	694

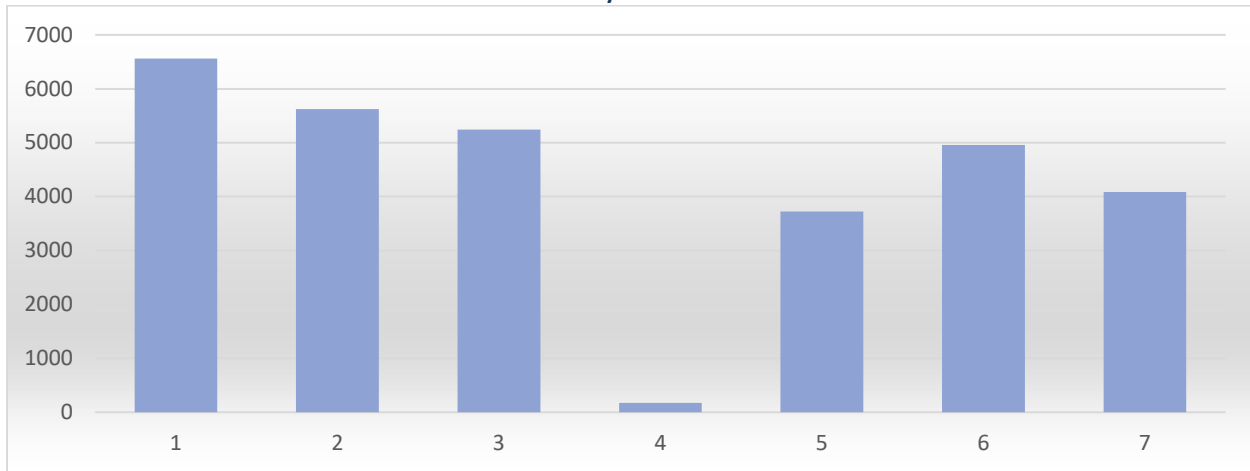
The heat map above shows the effects of COVID but also shows significant increases in other months. Extreme cold temperatures in December 2022 caused significant freezing of pipes throughout the response district. Once thawed, the broken pipes resulted in an influx of fire alarms due to water flow and service calls for flooding. The event may have been the reason for the increase seen above.

Demand by Alarm Hour



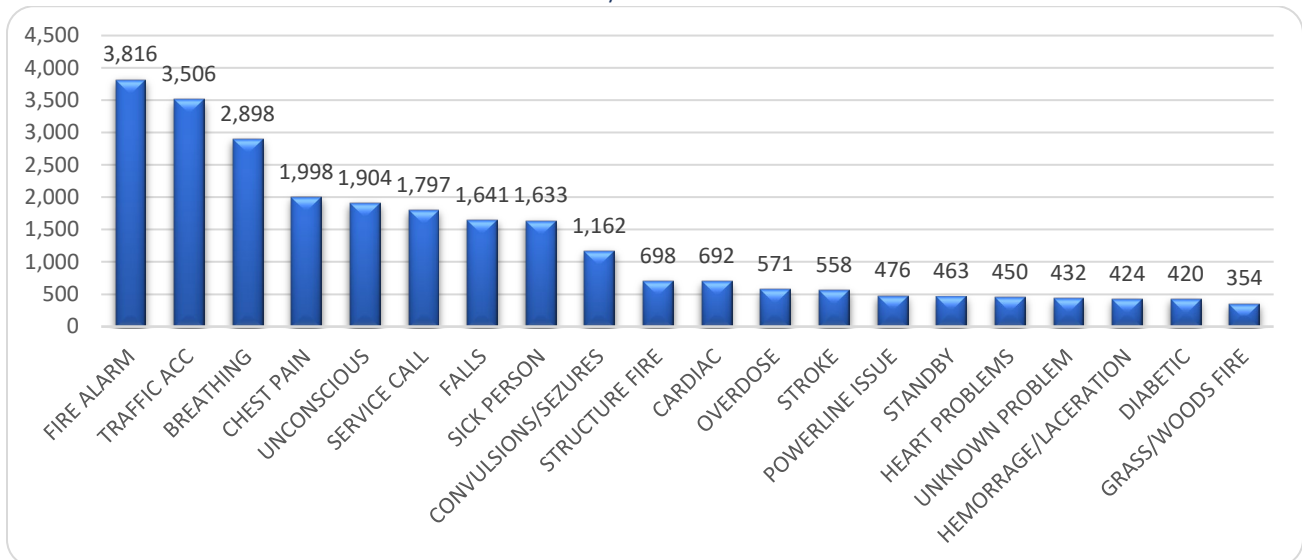
Demand by alarm hour follows the normal industry trend. The 5pm hour records the highest demand hour and 4am records the lowest.

Demand by Station Area



Each incident is analyzed in ESRI ArcGIS to determine the station’s first-due territory it falls in. With the switch to dispatch by AVL, the closest available apparatus are alerted to respond. However, the “first-due districts” represent the station closest to the incident.

Demand by Nature Code



The Hickory Fire Department responds to over 220 unique incident types know as “nature codes.” These nature codes describe the event dispatched by the 911 center. The top 20 nature codes (by count over the 5-year period) is shown above.

Calls by Type

The table and charts below show the number of responses by call type, average responses per day, and the percentage of response that fall into each call type category for the past 5-years.

Call Type	Number of Calls	Calls per Day	Call Percentage
EMS	18,049	9.9	36.84%
FIRES	5,736	3.1	11.71%
HAZMAT	1,347	0.7	2.75%
MVC	5,532	3.0	11.29%
RESCUE	705	0.3	1.44%
SERVICE	17,629	9.7	35.98%
Total	48,998	26.8	100.0%

WORKLOAD: RUNS AND TOTAL TIME SPENT

Hickory Fire Department
Community Risk Assessment-Standards of Cover

The workload of each unit is measured in two ways: number of dispatches and deployed time. The commit time of a run is measured from the time a unit is dispatched through the time the unit is cleared. Because multiple units respond to some calls, there are more unit responses than calls and the commit time per unit varies from the total duration of incidents.

Annual Responses and Commit time by Incident Type

Call Type	Total Annual Minutes	Average Deployed Min. per Day	Total Annual Runs	Percent of Total Runs
EMS	85,050	233.0	4,243	39.9%
FIRES	62,444	171.1	1,258	11.8%
HAZMAT	9,467	25.9	250	2.4%
MVC	30,535	83.7	1,122	10.6%
RESCUE	3,476	9.5	107	1.0%
SERVICE	83,266	228.1	3,654	34.4%
Total	274,238	751.3	10,634	100.0%

Demonstrated Response Performance

Total Response Time

Total Response Time is the duration of time measured from the event receipt at the Public Safety Answering Point (PSAP) until the first fire department unit arrives on the scene of the emergency incident. Total response time should be measured for the first-arriving unit and the arrival of the full alarm, if possible. This time can be broken into many different segments but throughout this document we will measure the following:

- *Call processing time* – the elapsed time from event receipt at the PSAP to the dispatching of the first unit.
- *Response Time* - the elapsed time from when a unit is dispatched until the first unit arrives. This is inclusive of Turnout time and Travel Time
- *Total Response Time* – the time elapsed from receipt at the PSAP until arrival of the unit on scene.

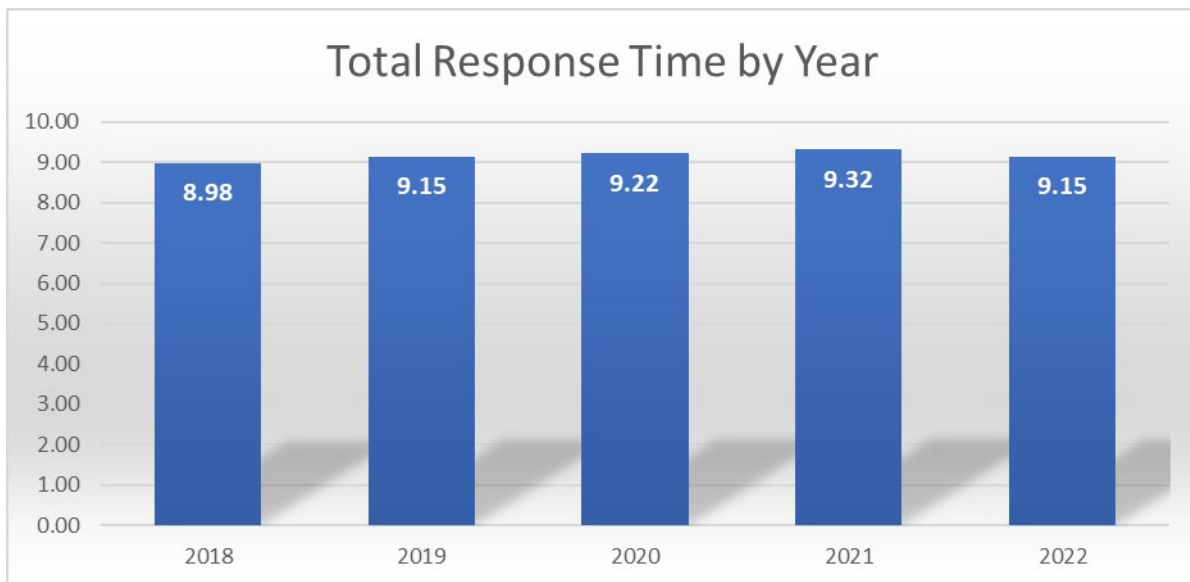
The fire department will typically evaluate and focus on response time while call processing time is normally the responsibility of the 911 center, but call processing plays an important role in the overall response time and the outcome of those we serve and protect. Because of this, the fire department analyzes this information quarterly and maintains a close working relationship with the 911 center director and his staff to implement a continuous improvement plan, using NFPA standards as a benchmark.

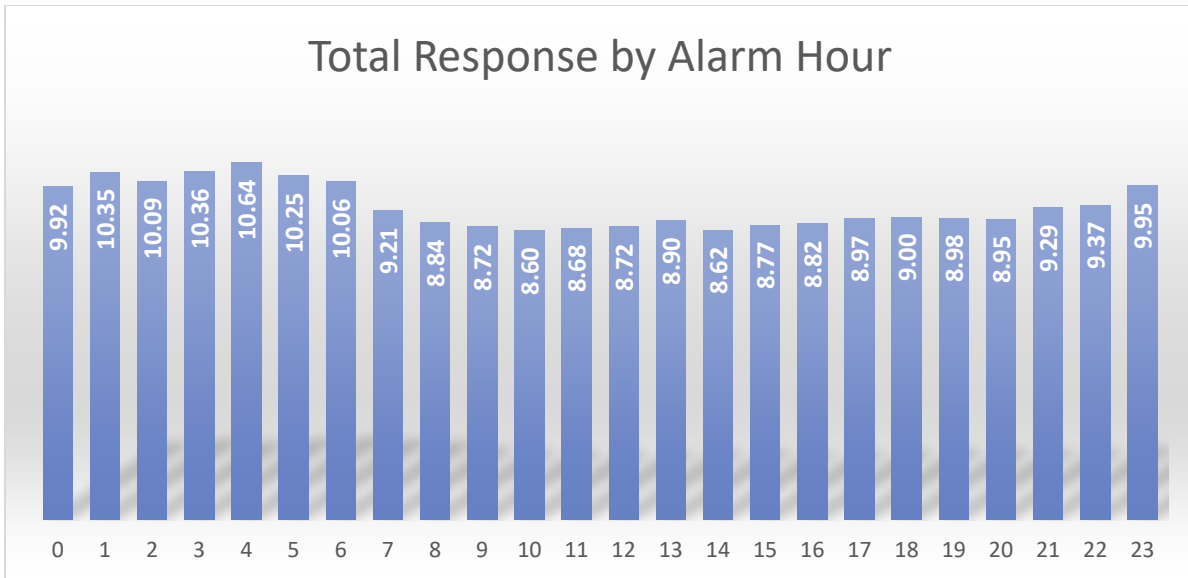
This section provides a broad look at the department's total incidents. It summarizes everything the fire department receives a call for, including fire, EMS, hazardous conditions, false alarms, public service, and more. This overview can reveal larger trends in response and lead to discussions about resource utilization, both of which can help in developing a standard of response coverage (SOC). Data analysis is vitally important to determining the fire department's performance. Identifying current performance can predict how future trends will impact the overall fire protection service delivery system. Response data analysis is necessary to produce credible trends and recommendations based on risk.

Total response time is defined as the time elapsed from receipt of a 9-1-1 call at the public safety answering point (PSAP) until arrival of the first unit on the scene of the emergency. In addition, measurements are presented at the 90th percentile. Use of the 90th percentile is the national standard. Every fire department will experience situations where multiple calls are occurring simultaneously, where storms hit the area, where there are mechanical failures, where traffic situations harshly affect response time and others. Because of this, most fire departments report all performance at the 90th percentile. Reporting in this way enables city leaders and elected officials to accurately state to their constituents that the response time of their fire department is “x” 90 percent of the time.

Response times are only evaluated for events in the department’s primary jurisdiction, excluding those events where mutual/auto aid was given to other departments, non-emergency responses, and outliers with justification.

Total Events: 22,527 **Total Response Time:** 9 minutes, 9 seconds (9.15)



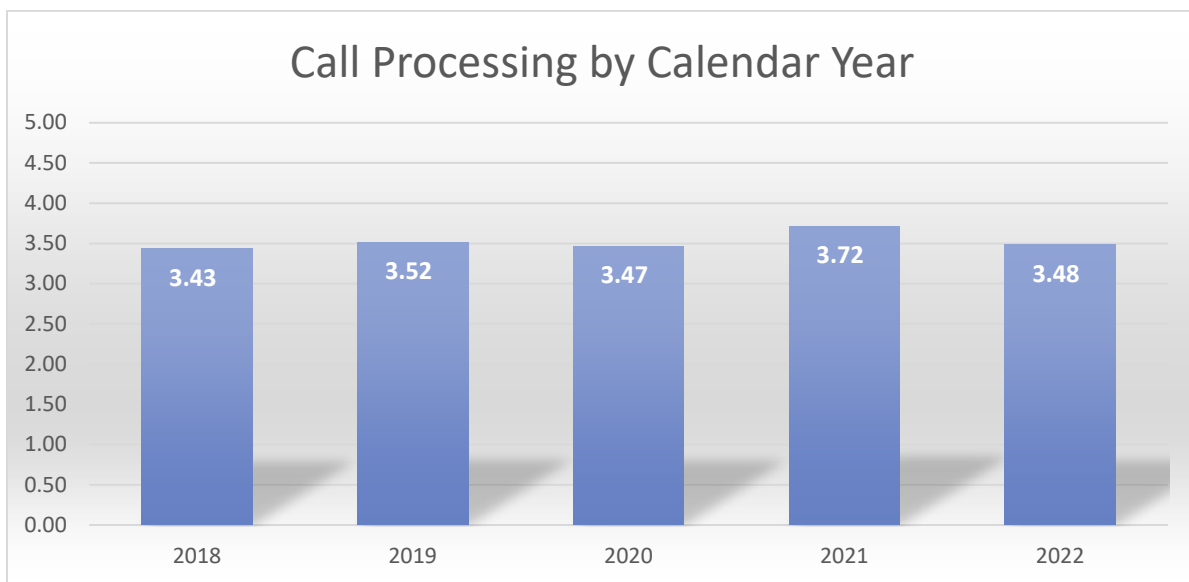


Total Response Time – Breaking it apart

Call Processing Time

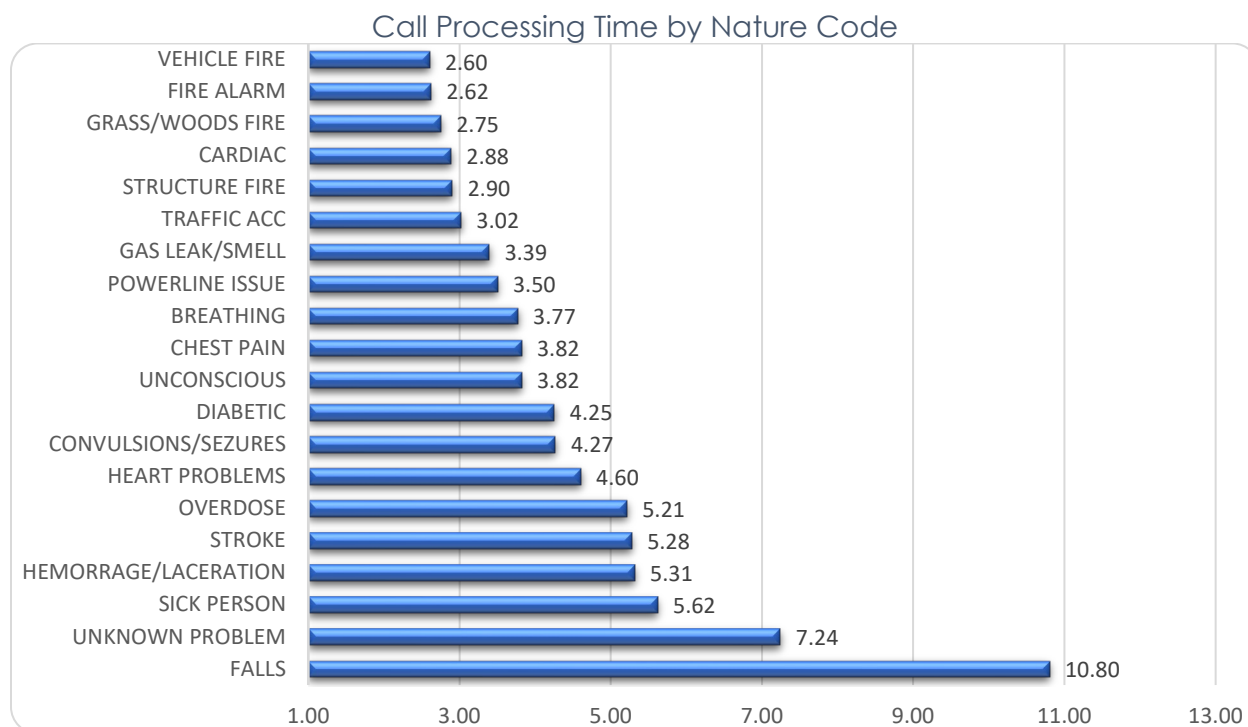
For the evaluation of Call Processing Time, the graphs below do not include the non-emergent nature codes and only evaluates records where at least one unit arrived.

Overall, the department has a **Call Processing Time of 3 minutes, 31 seconds (3.52)**



Hickory Fire Department Community Risk Assessment-Standards of Cover

The 911 center call processing times are more than double the NFPA standard and show an incremental increase time taken to process an event. Nighttime hours, when call volume has shown to be lowest, post some of the highest times. Recruitment and retention issues continue to plague 911 centers across the county. The pandemic only exacerbated this issue. While the aggregate totals at the 90th percentile might cause alarm, Hickory Fire Department staff work closely with Catawba County 911 administrators to track performance and fast-track high priority incidents such as structure fires and cardiac arrests.



The graph above shows the top 20 nature codes (by count over the 5-year period) and their respective call processing time at the 90th percentile.

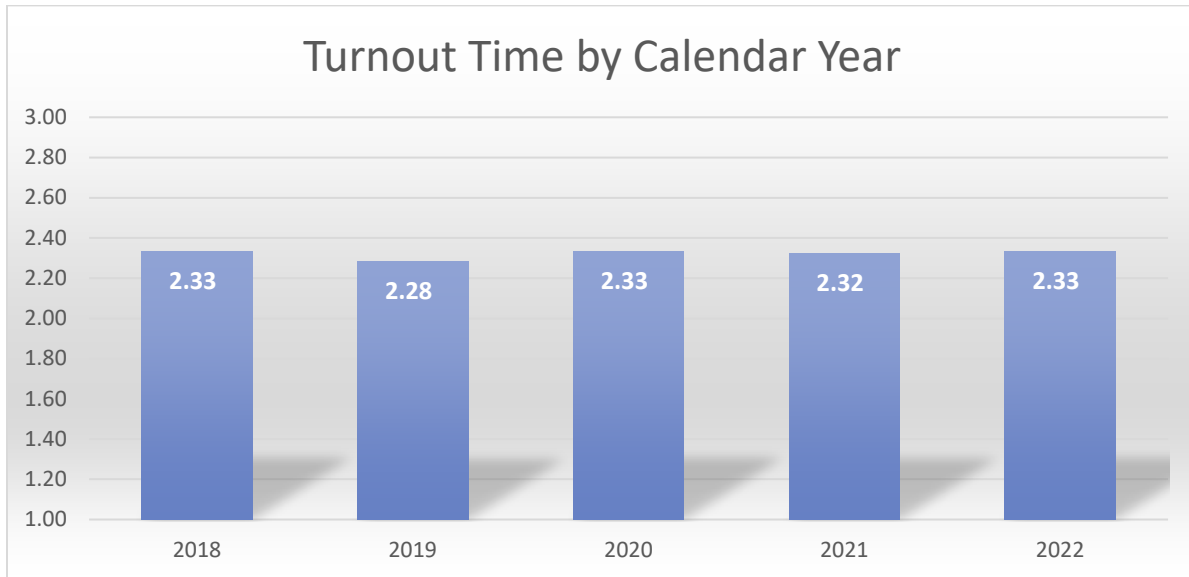
Call Processing – Heat Map by Month

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	3:19	3:24	3:08	3:26	3:27	3:11	3:26	3:41	3:38	3:18	3:24	3:38
2019	3:28	3:28	3:39	3:41	3:30	3:22	3:36	3:20	3:36	3:33	3:20	3:29
2020	3:20	3:26	3:48	3:24	3:02	2:36	3:02	3:19	3:07	3:49	3:51	3:44
2021	3:50	3:35	3:21	3:27	3:42	3:28	3:53	3:44	3:48	3:50	3:50	3:42
2022	3:43	3:46	3:50	3:52	3:38	3:34	2:58	3:17	3:26	2:59	3:14	2:59

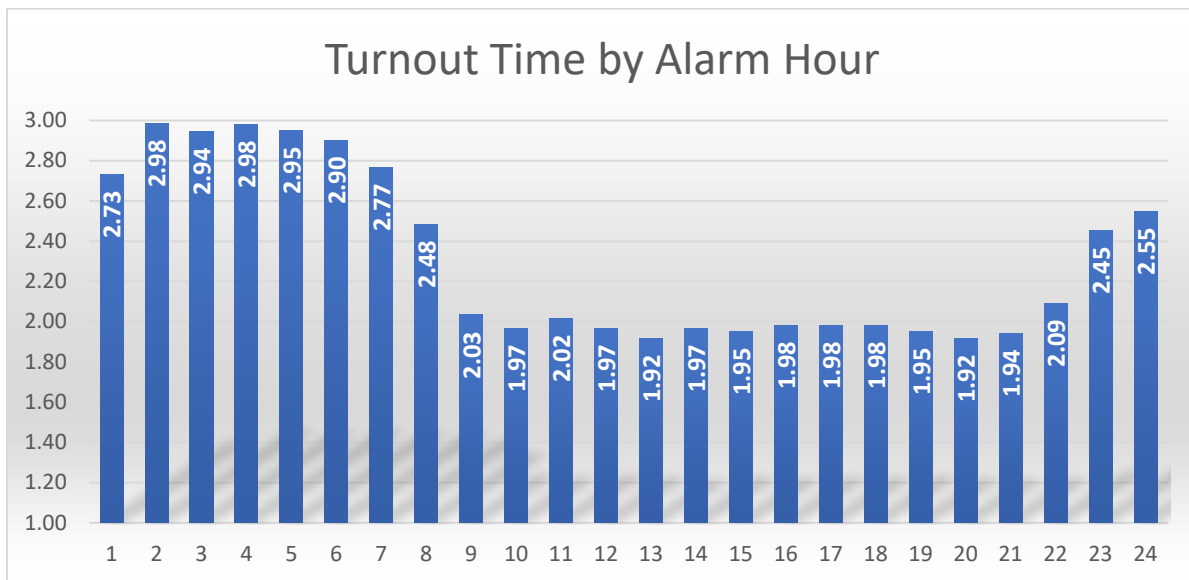
Turnout Time

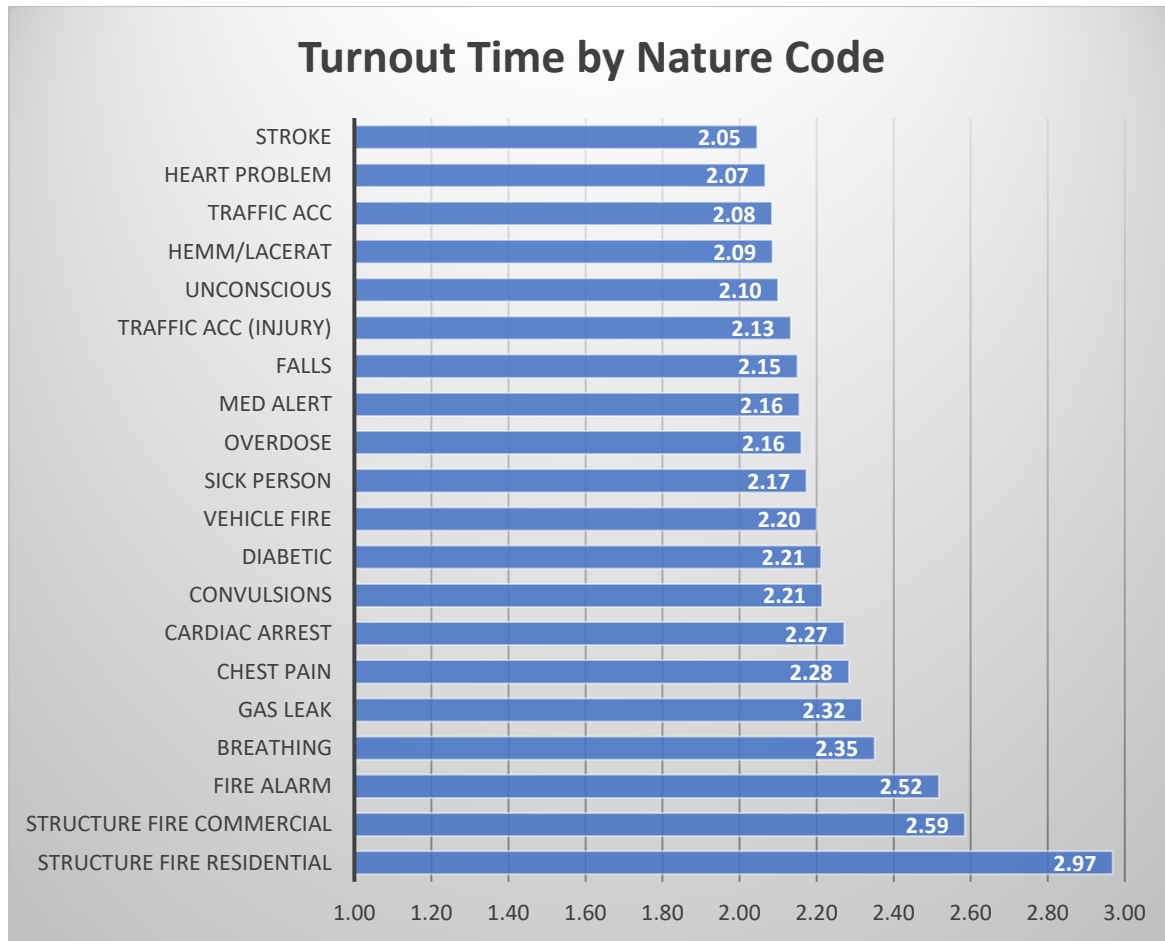
Turnout was evaluated for only the first arriving unit and does not include non-emergent responses.

Overall, the department has a **Turnout Time of 2 minutes, 19 seconds (2.32)**



Turnout time by the alarm hour follows the industry trend to increase during the nighttime hours when staff are asleep.

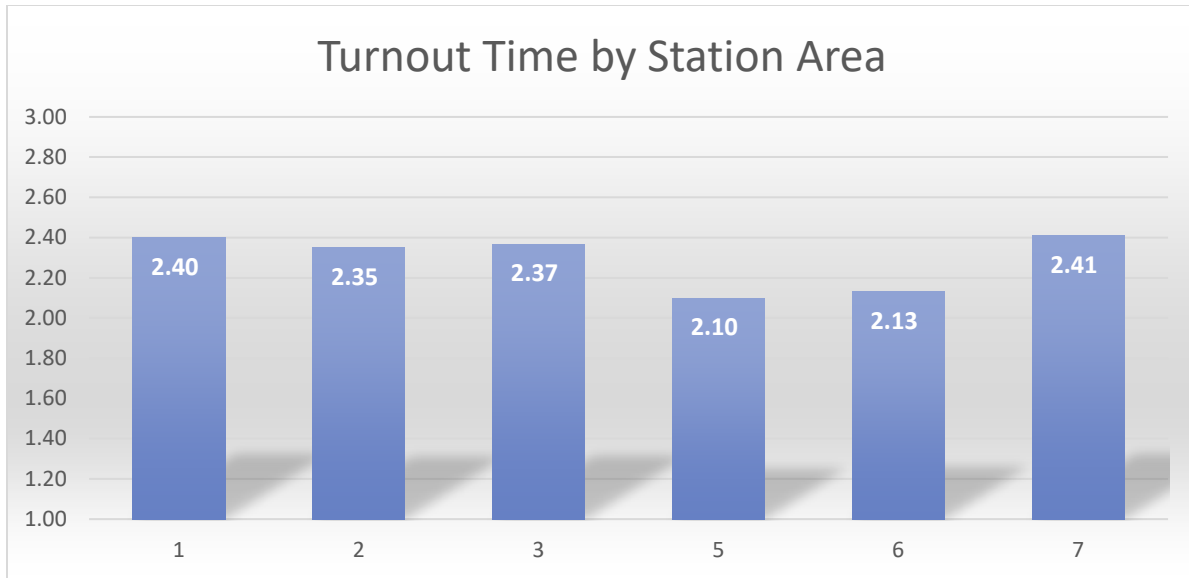




Turnout Heat Map by Month

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	2:25	2:23	2:19	2:16	2:13	2:15	2:16	2:21	2:27	2:22	2:16	2:19
2019	2:11	2:15	2:12	2:21	2:23	2:23	2:12	2:11	2:06	2:12	2:20	2:16
2020	2:15	2:09	2:06	2:25	2:12	2:22	2:23	2:18	2:40	2:42	2:25	2:19
2021	2:25	2:07	2:13	2:23	2:18	2:27	2:19	2:15	2:21	2:20	2:22	2:20
2022	2:19	2:20	2:11	2:13	2:16	2:17	2:13	2:15	2:17	2:30	2:28	2:27

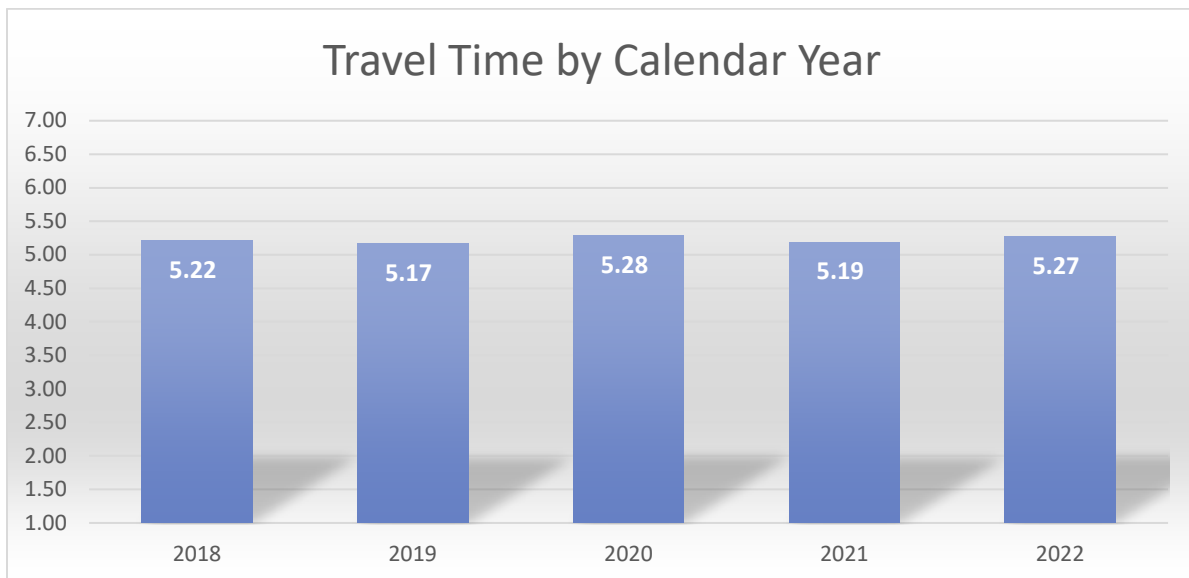
Station construction and layout can impact turnout times. Stations with quick access to the bay floor may prove to be advantageous. Since the data contained information about the station area and evaluation can done with some broad assumptions. There is no guarantee the first unit enroute was in the fire station or even related to the station marked as the first due area.

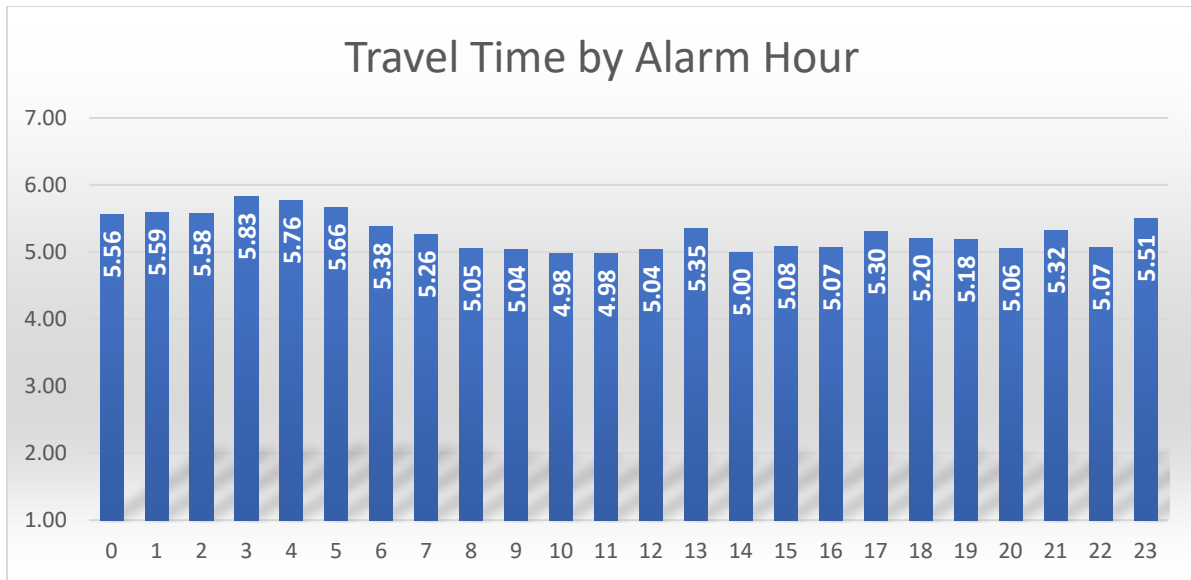


Travel Time

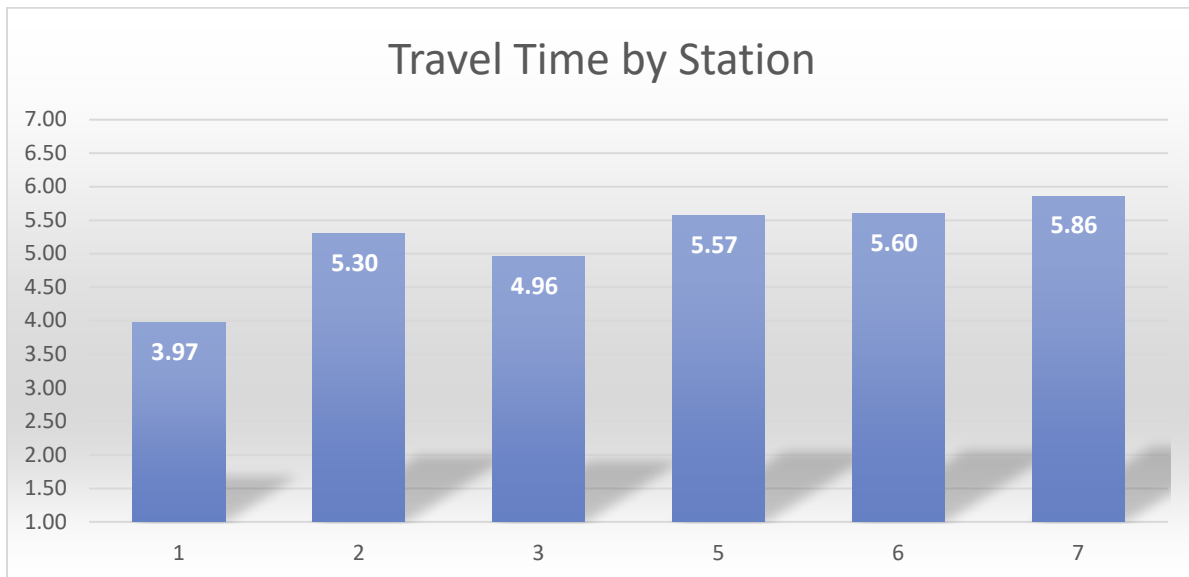
If an enroute time and arrival time exist, a travel time can be calculated. This evaluation does not include non-emergent responses and measures only the first arriving unit. Throughout the 5-year period, the Hickory Fire Department remained constant with a slight increase in time during the COVID pandemic years. Time of day had little effect on travel.

Overall, the department has a **Travel Time of 5 minutes, 14 seconds (5.23)**



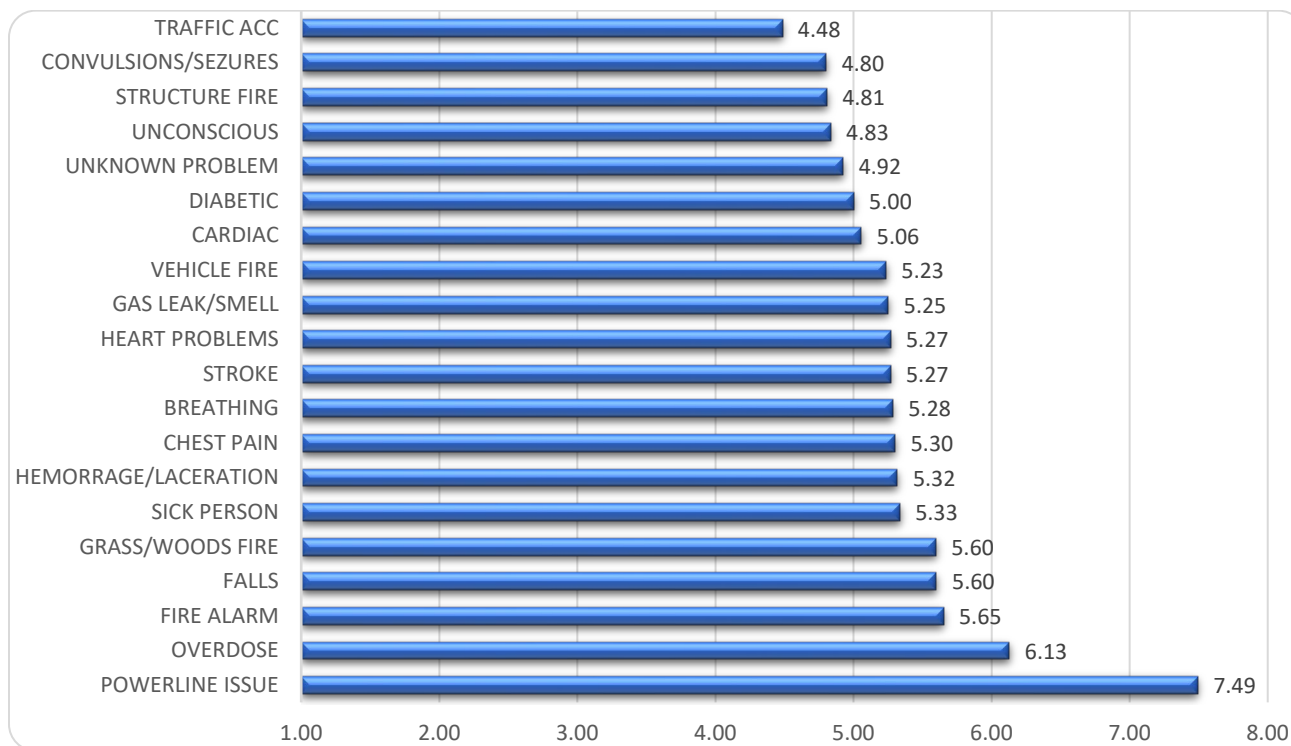


Travel time by station suggest Station 1 with a closer proximity to many events than other stations, while Station 5, 6 and 7 have the longest travel times.



Hickory Fire Department Community Risk Assessment-Standards of Cover

Travel Time by Nature Code

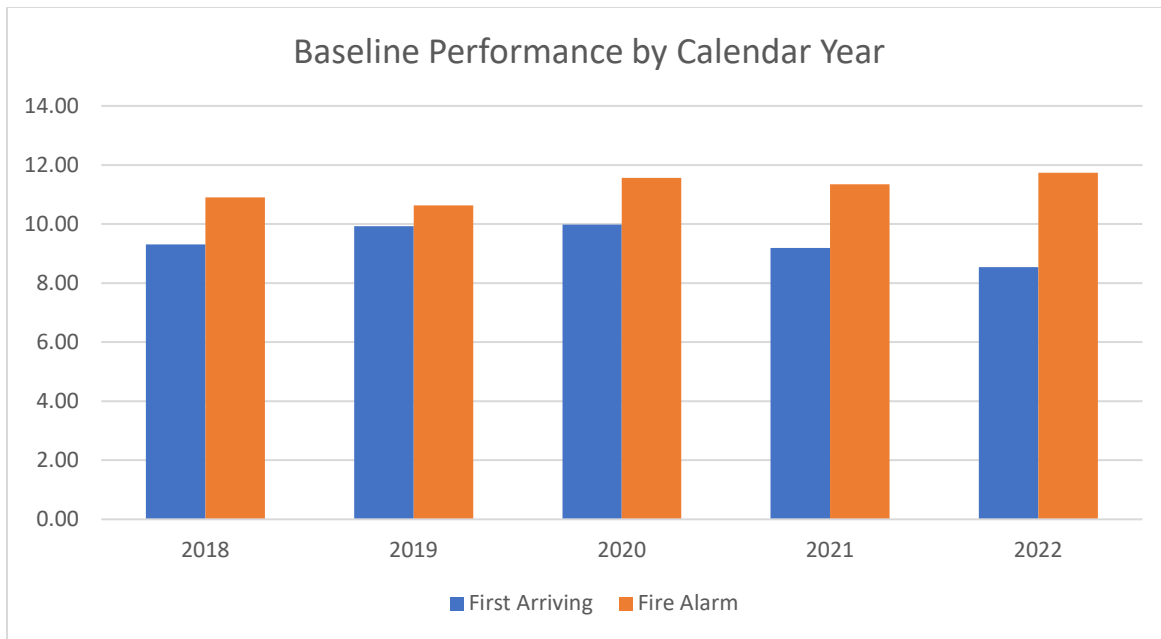


Travel Time Heat Map by Month

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	5:22	5:02	5:12	5:05	5:14	5:00	5:04	5:13	4:55	5:22	5:03	5:46
2019	5:10	5:15	5:11	5:07	4:57	5:15	5:20	5:29	4:55	5:13	5:15	5:07
2020	5:20	4:55	5:07	5:26	5:23	5:34	5:40	4:48	5:32	5:18	5:27	4:53
2021	5:11	5:41	5:03	4:59	5:22	5:26	4:59	5:12	5:12	4:59	5:08	5:18
2022	5:25	4:59	4:47	5:24	5:14	5:08	5:21	4:54	5:08	5:10	5:23	5:26

Structure Fire Analysis

Over the past 5-years, there were **647 events** dispatched **STRUCTURE FIRE** and an assigned a station value of 1 through 7. These were all in the City of Hickory jurisdiction and not Aid Given to another department.



Between 2017 and 2022, the department has a baseline demonstrated performance of:

First Arriving Unit – **9 minutes, 37 seconds (9.62)**

First Alarm Arrival - **11 minutes, 19 seconds (11.31)**

Methodology

Background

Completing a community-wide risk assessment on every property in a fire district can be a daunting task. Conflicting personal biases when assessing risk factors can lead to a lack of standardization when assessing properties.

Firefighters completed this process for every inspectable property in the response area. The difference between inspectable properties and commercial is an important distinction. While both terms include factories, places of assembly, institutions, warehouses, and general mercantile occupancies, the narrow term “Commercial” leaves out many “residential” occupancies that could be priorities for community risk reduction programs.

The International Building Code (IBC) has several categories of residential construction types. Most notably hotels, motels, dormitories, and congregate care facilities are typically classified

as residential. The Hickory Fire Department's Fire and Life Safety Division also inspect in-home daycares, foster homes, apartment complexes, and custodial care facilities. Custodial care facilities include assisted living facilities, social rehabilitation facilities, halfway houses, as well as alcohol and drug centers. Each of these "residential" construction types have unique hazards. We found it pertinent to identify these hazards, specifically the socio-economic factors that exist, and quantify the risk at each individual inspectable residential property in the district.

Property Risk Calculator

The Hickory Fire Department utilized the National Fire Protection Administration's Property Inspection Prioritization (PIP) Tool for calculating the risk at each inspectable property in the district. The decision support platform was originally designed to assist Authorities Having Jurisdiction (AHJs) with the prioritization of property inspections. The tool works by combining assessments of several risk factors with an underlying data science model to classify a property as being "at risk."

To go into a bit more detail, PIP ranks the inspection priority of a property based on its occupancy type, importance to the community, and other risk factors. The PIP risk factors were formulated with the guidance of the NFPA PIP Development Task Group (which consists of 13 enforcement officials from across the U.S. and Canada). This group identified, in addition to the occupancy type, six high level factors which would have significant impacts on the inspection priority:

Question 1. Occupant Characteristics:

How vulnerable are the property's typical occupants?

People with limited or no mobility tend to be most at risk, followed by senior citizens and young children. Transient and low-income populations probably also face some elevated risks, so are socially disadvantaged populations, people in middle-age, and single parents.

Risk Factors

1. There are no occupant related risk factors for this building.

2. Elevated challenges based on demographics, high unemployment, single parent, age > 50, single parent
3. Low income, transient population
4. Age less than six or over 65, people with disabilities, low mobility, disabled
5. Impaired, no mobility

Question 2. Regulatory Oversight/Compliance:

What is the combined history of inspections and violations at the property?

The longer a property has gone without inspection, the higher the fire risk is for that property. Inspection lags of more than five years face the highest risk, while those inspected within the past year have the lowest risks. Likewise, the more serious the history of violations at a property, the higher the fire risk is for that property.

Risk Factors

1. A recent inspection has been performed with no violations
2. No inspection in last 1-2 years, minimal violation risk history
3. No inspection in last 2-3 years, moderate risk violation history
4. No inspection in last 3-5 years, serious risk violation history
5. There had been no inspection in this building for the last 5 years

This risk factor is particularly important for an accurate snapshot of the risk at a particular property. It also quantifies the role of fire code enforcement activities as they relate to mitigating risk in a community. Unfortunately, it also identifies the blighted properties that fire code officials do not have the jurisdiction to enter and inspect on a regular basis. Inspectors do visit every vacant building in the district twice annually to ensure basic code compliance. For the purpose of this risk factor, vacant building site visits are not considered inspection as fire code officials cannot require all fire protection and notification systems be operational.

Question 3. Response Experience:

What is the history of emergency response incidents at the property?

Properties with higher rates of previous incidents (including Fire, EMS and Police actions) generally have increased risks for future incidents.

Risk Factors

1. No emergency responses in the building in the last year
2. 1 emergency response in this building in the last year
3. 2-5 emergency responses to this building in the last year
4. 5-9 emergency responses in this building in the last year
5. More than 9 emergency responses in the last year

Question 4. Building Stock:

How does the construction of and fire protection systems in a property contribute to its fire risk?

The most at-risk properties most often are those that lack any fire protection systems followed by taller, older buildings constructed largely by easily combustible materials with minimal modern fire protection systems. Newer, smaller buildings with non-combustible construction materials and effective fire protection systems (such as fire sprinkles) face the least risks.

Risk Factors

1. No building stock risk factors for this building
2. Small height and area, less than 25 years old
3. Moderate height and area, over 25-50 years old
4. Large height and area, combustible construction, over 50 years old
5. No fire protection systems such as fire alarms and sprinklers

Question 5. Property's Socio-Economic Importance:

What is the social and economic importance of this property?

Properties that are socially and economically important to a community are generally considered to warrant increased attention from inspectors. Properties of high importance may include institutions such as schools, hospitals, and shopping malls.

Risk Factors

1. Very Low Importance (Personal/family loss)

2. Low Importance (Single Business loss)
3. Moderate Importance (Moderate economic impact to community)
4. High Importance (Severe economic impact to community, tax base or job loss)
5. Very High Importance (Irreplaceable major loss to community, infrastructure, cultural, historical)

Question 6. Emergency Response Capability:

What limitations are there to an effective emergency response at this property?

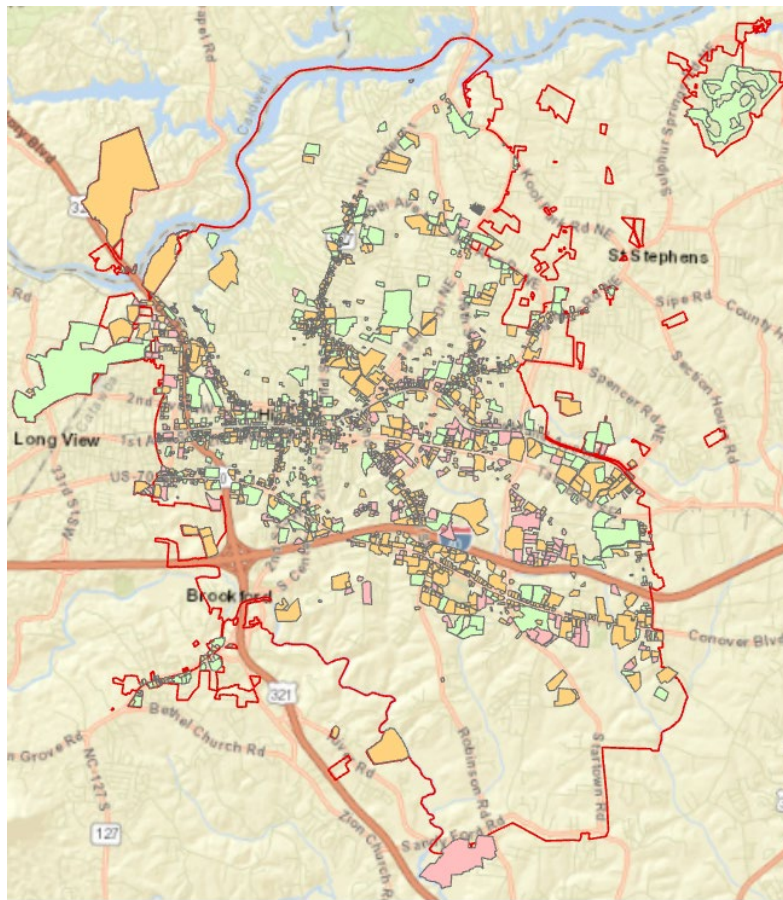
Limited lower levels of water supply, and increased response times all are associated with increased risk from fires.

Risk Factors

1. Emergency Response has no risk factors for this building
2. First alarm response (ERF) time 8-10 minutes
3. First alarm response (ERF) time over 10 minutes
4. Moderate water supply OR response time 4-5 minutes
5. Deficient water supply OR 1st Engine response time over 5 minutes

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A higher priority level means that the model predicted that an AHJ would be more likely to say a property is “at risk.” It is important to note that PIP is not actually predicting whether a property will have a fire, violate a code, or face some situation. Rather, PIP tries to predict whether an AHJ would judge a property of being “at risk” of some negative event. This allows the Hickory Fire Department to complete an all-hazards risk assessment and focus on many of the risk mitigation programs under the CRR model.

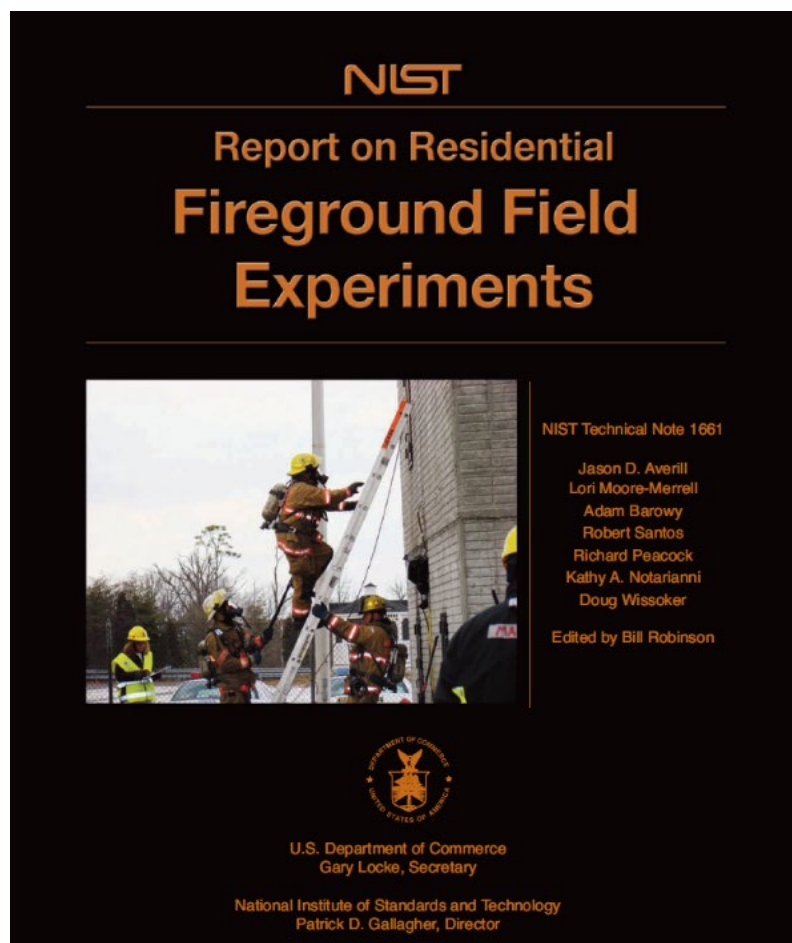


Based on the above criteria, each property is scored on a scale from 0 to 1, where values near 1 indicate high priority and values near zero indicate low priority. Properties were grouped into three categories and assigned either a lower, moderate, or high classification. This priority is used to define, develop, execute, and measure Community Risk Reduction (CRR) programs at the Hickory Fire Department.

Critical Task Analysis

Residential Fireground Field Experiments

In April 2010, the National Institute of Standards and Technology (NIST) published the Report on Residential Fireground Field Experiments. NIST in conjunction with several other entities, conducted a series of fireground experiments to quantify the improvement larger crew sizes had in performance. The experiments were conducted simulating a one and two family residential structure fire.



As a part of the Community Risk Assessment process, the fire department must ensure the appropriate equipment, personnel, and apparatus are deployed to every incident. Utilizing the NIST report as a guide, the Hickory Fire Department conducted its own series of experiments to

drive the critical task analysis for one and two family residential structure fires. Experiments were conducted on three separate days at the Western Piedmont Community College (WPCC) emergency services training center. Crews were presented with the following scenario:



The engine company arrives to a single story residence with smoke visible. The company officer directs their crew to enter the building in division B. The company must force entry into the building. An aggressive interior attack is made with a 1.75" preconnected hose line. Once the fire is located and extinguished the victim is located and removed to the division B door the scenario will be complete.



Crews were asked to perform each of the following critical tasks:

- Conduct Size-up, transmit report, establish command
- Establishment of initial attack line
- Establishment of water supply
- Force Entry
- Advance Attack Line
- Conduct Primary Search
- Position Backup Line
- Mechanical Ventilation



Each scenario was repeated a total of six times per day across all three training sessions to achieve statistically significant data. It was important for the integrity of the process that each critical task is performed in a linear flow meaning the subsequent task cannot be initiated until the previous task is complete. Each task was performed by a two-person team, followed by a three-person team, and finally a four-person team.

Conduct Size-up, transmit report, establish command	4 Firefighters	3 Firefighters	2 Firefighters
Evolution 1	01:08	00:52	00:57
Evolution 2	01:12	00:57	01:03
Evolution 3	01:16	01:00	01:05
Evolution 4	01:07	00:55	00:52
Evolution 5	00:55	01:29	00:57
Evolution 6	01:12	00:57	01:06

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Establish Initial Attack Line	4 Firefighters	3 Firefighters	2 Firefighters
Evolution 1	00:49	00:54	01:08
Evolution 2	01:31	01:01	01:16
Evolution 3	01:34	01:08	01:26
Evolution 4	01:09	01:04	01:27
Evolution 5	01:07	00:54	01:24
Evolution 6	01:19	00:46	01:10

Establishment of water supply	4 Firefighters	3 Firefighters	2 Firefighters
Evolution 1	02:25	01:49	02:15
Evolution 2	01:45	01:32	01:55
Evolution 3	02:19	02:08	02:00
Evolution 4	02:38	02:14	03:06
Evolution 5	02:14	01:54	02:34
Evolution 6	01:36	02:04	02:09

Advance Attack Line	4 Firefighters	3 Firefighters	2 Firefighters
Evolution 1	00:42	01:52	02:33
Evolution 2	01:31	02:18	01:37
Evolution 3	01:05	01:35	01:19
Evolution 4	01:21	02:07	03:45
Evolution 5	01:08	02:00	02:55
Evolution 6	01:19	01:55	00:58

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Conduct Primary Search	4 Firefighters	3 Firefighters	2 Firefighters
Evolution 1	06:33	06:26	06:42
Evolution 2	05:55	03:11	06:19
Evolution 3	08:56	05:19	06:09
Evolution 4	04:37	04:07	06:30
Evolution 5	04:16	08:13	05:45
Evolution 6	04:23	04:14	04:37

Position Backup Line	4 Firefighters	3 Firefighters	2 Firefighters
Evolution 1	01:08	01:06	01:26
Evolution 2	01:11	01:03	01:23
Evolution 3	01:01	01:11	01:13
Evolution 4	01:21	00:57	01:13
Evolution 5	00:44	00:59	01:14
Evolution 6	01:10	01:33	00:50

Mechanical Ventilation	4 Firefighters	3 Firefighters	2 Firefighters
Evolution 1	01:43	01:45	01:38
Evolution 2	02:35	01:08	01:27
Evolution 3	01:14	01:36	01:47
Evolution 4	00:53	01:15	01:52
Evolution 5	01:06	02:33	01:40
Evolution 6	01:12	00:50	01:04

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Water on Fire (Calculated)	4 Firefighters	3 Firefighters	2 Firefighters
Evolution 1	04:19	04:55	06:21
Evolution 2	05:26	05:09	05:20
Evolution 3	05:16	05:11	05:08
Evolution 4	05:28	05:54	08:48
Evolution 5	05:09	04:58	07:17
Evolution 6	04:48	04:58	04:30

From this data, each of the six shift Battalion Chief’s drafted recommendations the minimum firefighters required to safely complete each task at a residential structure fire. These drafts were compiled to what became the Effective Response Force (ERF) to be built into the first-alarm assignment for structure fires. The department’s staffing model was changed to achieve the ERF regardless of the location of an incident.

One and two Family Occupancies	
HFD Current MINIMUM First Alarm Deployment	
Task Identification	Firefighters
Command Officer	1
Pump Operator	1
Attack Line	2
Forcible Entry	
Hydrant Hook-up	1
Back-up Line	
Search and Rescue Team	2
Ground Ladders	2
Ventilation	
Utility Control	1
Aerial Operator	1
Rapid Intervention	4
Total Personnel	15

NFPA 1710: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments further outlines the need for additional manpower for fires in the following occupancy types:

- Open-air strip shopping center ranging from 13,000 ft² to 196,000 ft²
- Three-story or more, garden-style apartment buildings
- High Rise Buildings

Fires in Apartments and Strip Malls	
HFD Critical Task Analysis	
Task Identification	Firefighters
Command Officer	1
Safety Officer	1
Pump Operator	1
Fire Attack	2
Back-up Line	2
Rapid Intervention Team (RIT)	4
Ladders & Utilities Control	2
Search	4
Ventilation	2
Water Supply	1
Aerial Operator	1
Total Personnel	21

Fires in High Rise Buildings	
HFD Critical Task Analysis	
Task Identification	Firefighters
Command Officer	1
Safety Officer	1
PIO/Command Aid	1
Pump Operator	1
Fire Attack	4
Search and Forcible Entry	4
Rapid Intervention Team (RIT)	4
Ladders	2
Ventilation	2
Aerial Operator	1
Backup Team	4
Water Supply and Utilities Control	1
Total Personnel	26

It should be noted that while many of these type occupancies exist in the response area, most contain fire protection and notification systems. These systems ensure most fires are actually out on arrival of the first-due company and others are quickly confined prior to the arrival of the effective response force. In fact, over the past two years, 70 commercial structure fires were dispatched, six met the criteria of a 111-building fire with a median combined property and contents loss of \$3,000. The “upgrade” feature in the Computer Aided Dispatch (CAD) system serves as a working fire notification. Shift commanders are given wide discretion and regularly upgrade a response based on information provided by the telecommunicator. In addition to the three high-hazard property types identified in NFPA 1710, the Hickory Fire Department through an ongoing risk assessment has identified the following occupancy types that present hazards requiring additional resources over and above the initial alarm assignment. These occupancy types include:

- Offices
- General Mercantile
- Schools
- Hospitals
- Skilled Nursing Facilities
- Industrial and manufacturing facilities
- Mid-rise structures

3-AXIS RISK SCORE CATEGORIZATION

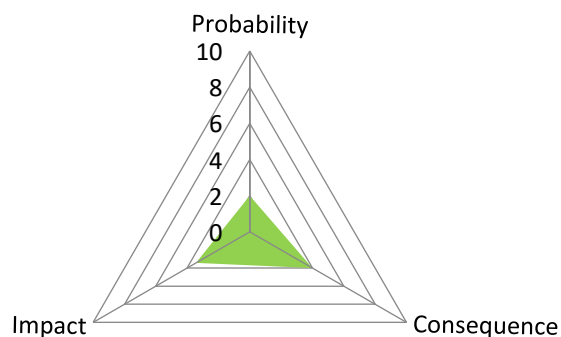
Fire

Low Fire Risk

This risk category includes fire responses that are typically handled with a single resource such as an engine or ladder. While non-emergent fire incidents are also included in this category, they are not included in performance benchmark measures. Incidents in this category include passenger vehicle fires, dumpster fires, rubbish fires, mulch fires, contained grass fires, and lightning strikes (no fire). The critical tasks outlined are for routine incidents. The category also includes chimney fires as they are routinely handled by the primary unit. More complex incidents will be elevated to a higher risk category due to their scope and the need to call for additional resources.

Low Risk Fire	
Probability of occurrence	8
Consequence to community	4
Impact on Fire Department	0.9375
SCORE	12.56514

RISK SCORE



Example:

Hazard – Contained dumpster fire

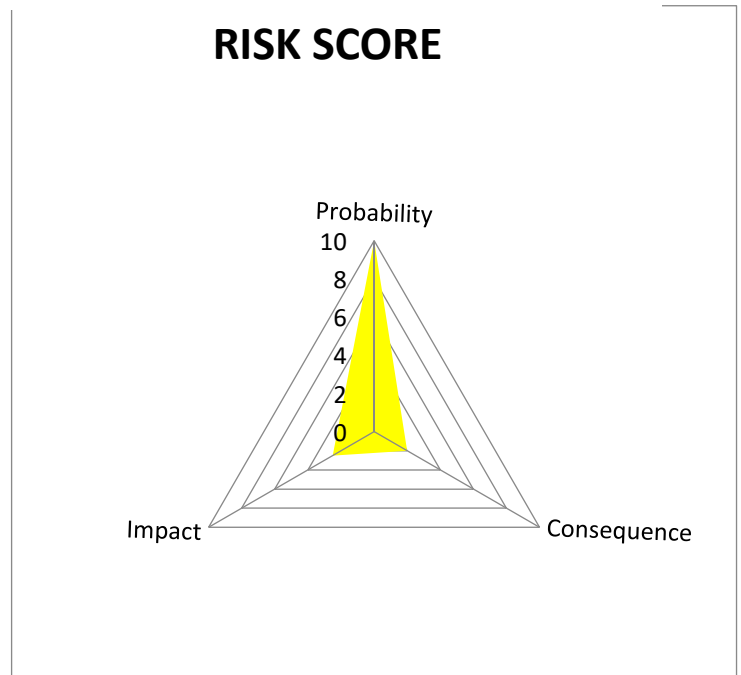
Impact – Single engine response.

Consequence to the community – very low.

Moderate Fire Risk

Incidents in this category includes residential and commercial fire alarms. Dispatched fire alarms are further subdivided into properties >1000' from the closest pressurized fire hydrant. More complex incidents will be elevated to a higher risk category due to their scope and the need to call for additional resources.

Moderate Fire Risk	
Probability of occurrence	10
Consequence to community	2
Impact on Fire Department	2.5
SCORE	22.91288



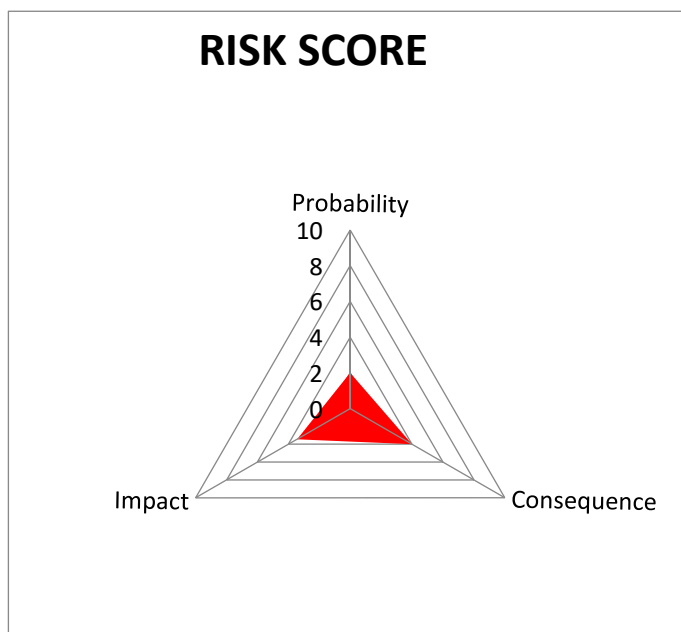
Critical Task Analysis	
Incident Type: Fire Alarm	
Task Identification	Firefighters
Incident Command/Safety	1
Investigation Team	2
Pump Operator	1
RIC Team	4
Total Personnel	8

Example:
Hazard – Commercial Fire Alarm
Impact – Multi-Company Response
Consequence to the community – very low.

High Fire Risk

This risk category includes working structure fire incidents and commercial vehicle fires. Structure fires are further subdivided into properties >1000' from the closest pressurized fire hydrant. Explosions are also added to this risk category due to their complex nature and consequence to the community. In accordance with NFPA 1710, the department has the capability to deploy additional alarm assignments that can provide for additional command staff, firefighters, and support services. Catawba County EMS responds on the initial alarm due to the high-risk nature of these event.

High Fire Risk	
Probability of occurrence	6
Consequence to community	6
Impact on Fire Department	4.6875
SCORE	37.29486



Example:
Hazard – Structure Fire
Impact – Multi-Company Response
Consequence to the community – moderate

Critical Task Analysis	
Incident Type: Structure Fire	
Task Identification	Firefighters
Command Officer	1
Pump Operator	1
Attack Line	2
Forcible Entry	
Hydrant Hook-up	1
Back-up Line	
Search and Rescue Team	2
Ground Ladders	2
Ventilation	
Utility Control	1
Aerial Operator	1
Rapid Intervention	4
Total Personnel	15

Special Fire Risk

Aircraft fires occurring on the airport property or otherwise are classified as special. The firefighter stationed at the airport fire station is notified of the potential for an aircraft emergency. That firefighter relays the information available to the 911 center and appropriate resources are dispatched. While 17 firefighters are dispatched on the initial alarm, the shift supervisor conducts an initial and ongoing rapid risk assessment and scales the response to address the risk presented. Considerations during the rapid risk assessment include soles on board, type of mechanical failure, and the type of aircraft among other things.

ARFF Deployment - Special Fire Risk	
Incident Type: Airport Alert II & III	
Critical Task Identification	Firefighters
Incident Command	2
Operations Chief	1
Safety Officer	1
Extinguishment	4
Rescue	4
Triage	1
Medical Care	4
Total Personnel	17

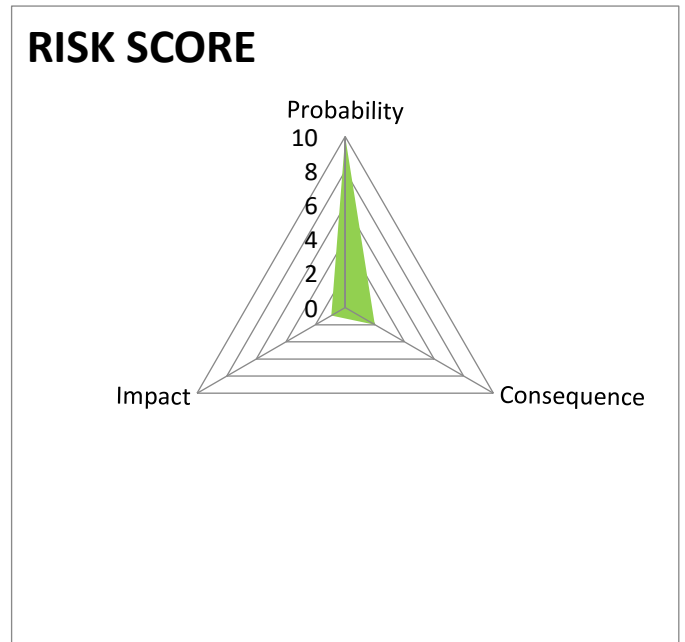


EMS

Low Risk EMS

This risk category includes Emergency Medical Dispatch (EMD) determinants that are not initially designated as high priority in the system. This includes nature codes such as abdominal pain, back pain, and sick persons. The Hickory Fire Department provides the basic life support functions outlined in department policy, the county medical director, and protocols from the North Carolina College of Emergency Physicians (NCCEP). More complex incidents will be elevated to a higher risk category due to their scope and the need to call for specialized local, regional, and/or state resources.

EMS Deployment	
Low Risk	
Critical Task Identification	Rescuers
IC/Safety/Documentation	1
Patient Care	1
Total Personnel	2

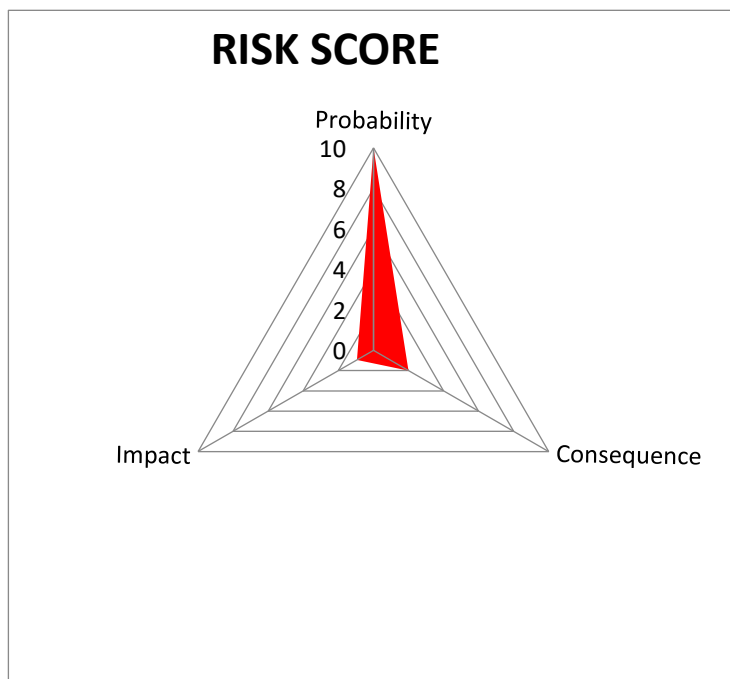


Low-Risk EMS	
Probability of occurrence	10
Consequence to community	2
Impact on Fire Department	0.6250
SCORE	14.8429276

High Risk EMS

This risk category includes Emergency Medical Dispatch (EMD) determinants that considered high priority in the system. This includes nature codes such as Chest Pain, Stroke, and Unconscious. The Hickory Fire Department provides the basic life support functions outlined in department policy, the county medical director, and protocols from the North Carolina College of Emergency Physicians (NCCEP). More complex incidents will be elevated to a higher risk category due to their scope and the need to call for specialized local, regional, and/or state resources.

EMS Deployment	
High Risk	
Critical Task Identification	Rescuers
IC/Safety/Documentation	1
Patient Care	2
Total Personnel	3



High Risk EMS	
Probability of occurrence	10
Consequence to community	2
Impact on Fire Department	0.9375
SCORE	15.6749203

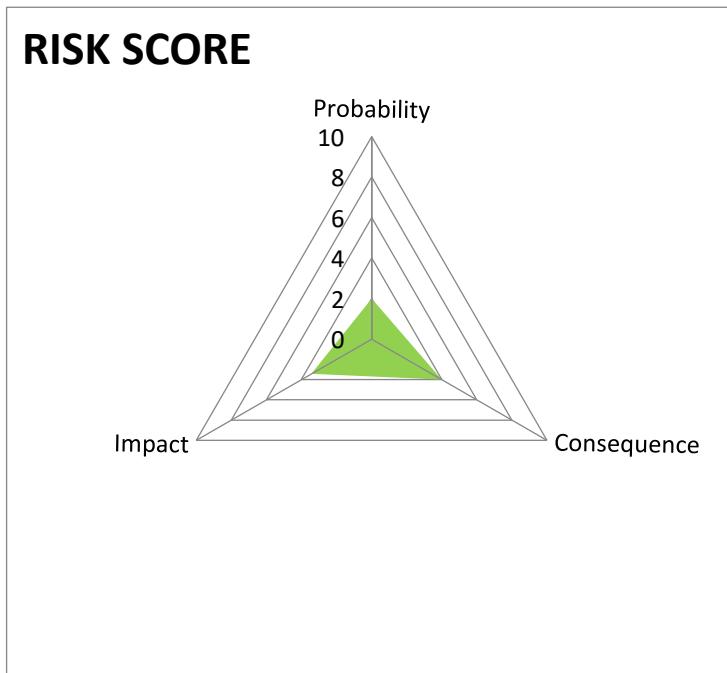
Technical Rescue

Low Risk Technical Rescue

This risk category includes Helicopter rescues, Animal rescues, and elevator rescues. The Hickory Fire Department provides the basic functions of operations level Helicopter Search and Rescue outlined in Chapter 15 of NFPA 1670. Similarly, the Knowledge, Skill, and Abilities (KSA's) highlighted in the awareness section of Chapter 9 of NFPA 1670 apply. The critical tasks outlined for both Helicopter and Animal rescues are for routine incidents. More complex incidents will be elevated to a higher risk category due to their scope and the need to call for a specialized regional team or state resource.

Low Risk Technical Rescue	
Probability of occurrence	2
Consequence to community	2
Impact on Fire Department	1.56
SCORE	4.214929

Rescue Deployment - Technical Rescue	
Low Risk	
Critical Task Identification	Rescuers
Incident Commander	1
Technical Rescuers	2
Total Personnel	3

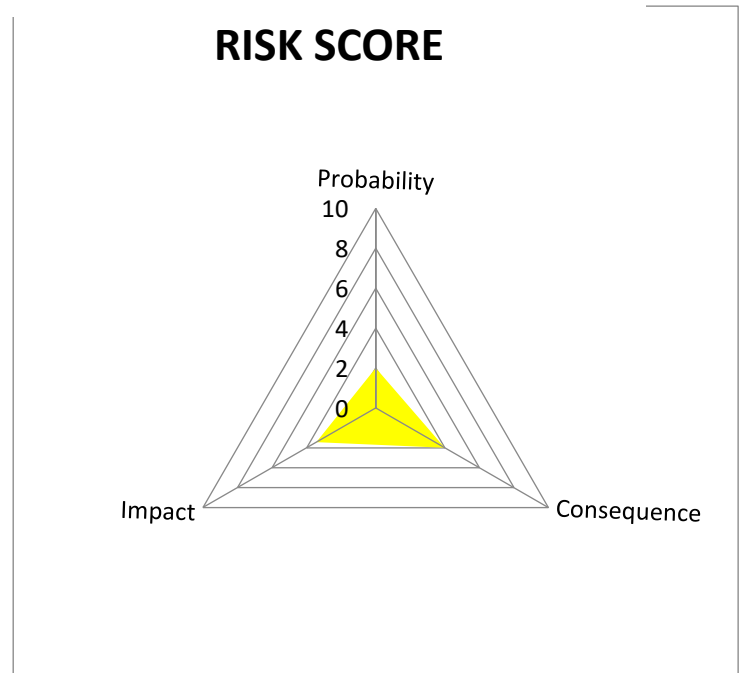


Example:
Hazard – Animal rescue
Impact – Single company Response
Consequence to the community – very low

Moderate Risk Technical Rescue

This risk category includes a variety of technical rescue specialties including Water, Rope, Confined Space, Machinery, Wilderness, and Water rescues. As with other risk categories, the critical tasks outlined are for routine incidents that can be mitigated with properly trained on-duty resources. More complex incidents will be elevated to a higher risk category due to their scope and the need to call for a specialized regional team or state resource.

Moderate Risk Technical Rescue	
Probability of occurrence	4
Consequence to community	2
Impact on Fire Department	2.50
SCORE	9.721111



Example:
 Hazard – Watercraft rescue
 Impact – Multi-company Response
 Consequence to the community – low

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Rescue Deployment - Moderate Risk Tech Rescue		
Incident Type: Surface Water Rescue		
Critical Task Identification	Rescuers	Notes
Incident Commander	1	
Reach/throw rescuers	2	
Boat Crew	3	1 - Operator 2 - Rescuers
Total Personnel	6	

Rescue Deployment - Moderate Risk Technical Rescue		
Incident Type: Rope Rescue		
Critical Task Identification	Rescuers	Notes
Incident Commander	1	
Rigging Team	4	
Victim Contact	2	Triage, Treatment, & Packaging
Total Personnel	7	

Rescue Deployment - Moderate Risk Technical Rescue		
Incident Type: Confined Space		
Critical Task Identification	Rescuers	Notes
Incident Commander	1	
Operations	1	
Rigging Team/Air Supply	2	Rope Raises or Lowers
Entry Team	2	
Rapid Intervention Team (RIT)	2	IDLH - 2 In 2Out
Total Personnel	8	

Rescue Deployment - Moderate Risk Technical Rescue		
Incident Type: Machinery Rescue		
Critical Task Identification	Rescuers	Notes
Incident Commander	1	
Safety Officer	1	
Stabilization	2	
Disentanglement	2	
Lock out - Tag out	1	
Apparatus Operator	1	Equipment Gopher
Total Personnel	8	

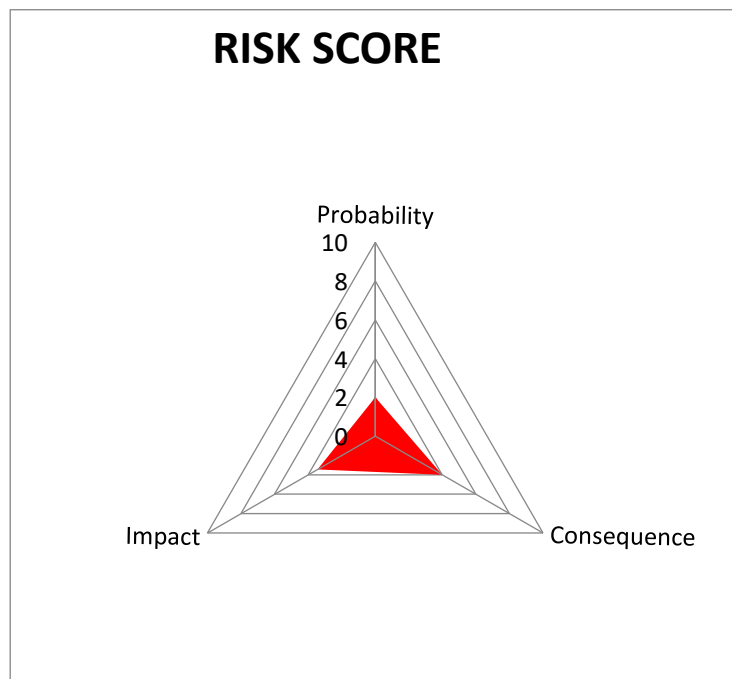
Rescue Deployment - Moderate Risk Technical Rescue		
Incident Type: Swiftwater Rescue		
Critical Task Identification	Rescuers	Notes
Incident Commander	1	
Safety Officer	1	
Rigging Crew 1	2	Side 1 of water body
Rigging Crew 2	2	Side 2 of water body
Boat Operator	1	
Rescue Swimmer	1	
Total Personnel	8	

High-Risk Technical Rescue

This risk category includes the technical rescue specialties of Structural Collapse and Trench Rescue. It also includes motor vehicle accidents with pin-in/entrapment/overtaken. As with other risk categories, the critical tasks outlined are for “routine” incidents that can be mitigated with properly trained on-duty resources. More complex incidents will be elevated to a maximum risk category due to their scope and the need to call for a specialized regional team or state resource.

High-Risk Technical Rescue	
Probability of occurrence	6
Consequence to community	2
Impact on Fire Department	2.5
SCORE	14.035669

Example:
Hazard – Traffic Accident (entrapment)
Impact – Multi-company Response
Consequence to the community – low



Rescue Deployment – High-Risk Technical Rescue	
Incident Type: Vehicle Rescue	
Critical Task Identification	Rescuers
Incident Commander	1
Stabilization/Patient Care	2
Extrication	2
Fire Suppression	2

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Apparatus Pump Operator	1
Total Personnel	8

Rescue Deployment – High-Risk Technical Rescue		
Incident Type: Structural Collapse Rescue		
Critical Task Identification	Rescuers	Notes
Incident Commander	1	
Safety Officer	1	
Strut Team 1	2	Technical Rescuers
Strut Team 2	2	Technical Rescuers
Equipment Gopher	1	FAO
Fire Suppression	2	
Apparatus Pump Operator	1	
Total Personnel	10	

Rescue Deployment - High Risk Technical Rescue		
Incident Type: Trench Rescue		
Critical Task Identification	Rescuers	Notes
Incident Commander	1	
Operations/Safety	1	
Panel Assembly	4	Ground Pads
Strut Team	4	2 in - 2 out rotation
Rigging, Air Supply, & Ventilation	3	Rope work, air cart, fans
Total Personnel	13	

Hazmat

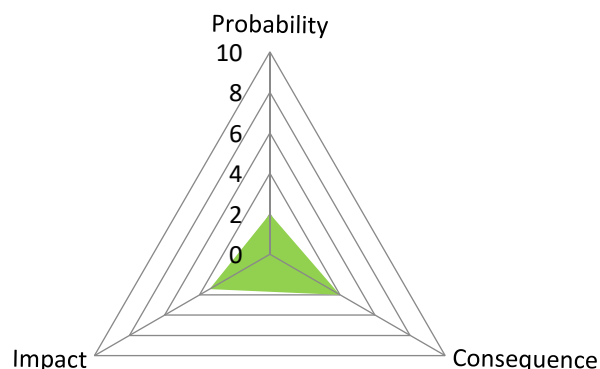
Low Risk Hazmat

This risk category includes emergency responses to “routine” Carbon Monoxide alarms, Gas alarms, and Gas Smells. The Hickory Fire Department provides the basic functions of operations level Hazardous Materials outlined in Chapter 5 of NFPA 472. Similarly, the Knowledge, Skill, and Abilities (KSA’s) highlighted in the awareness section of Chapter 5 of NFPA 1072. The critical tasks outlined are for “routine” incidents. More complex incidents will be elevated to a higher risk category due to their scope and the need to call for a specialized regional team or state resource.

Low Risk Hazmat	
Probability of occurrence	2
Consequence to community	2
Impact on Fire Department	1.56
SCORE	4.2112231

Low Risk Hazmat Deployment	
Critical Task Identification	Rescuers
Incident Commander	1
Ensure scene safety	1
Investigate/Mitigate	1
Total Personnel	3

RISK SCORE

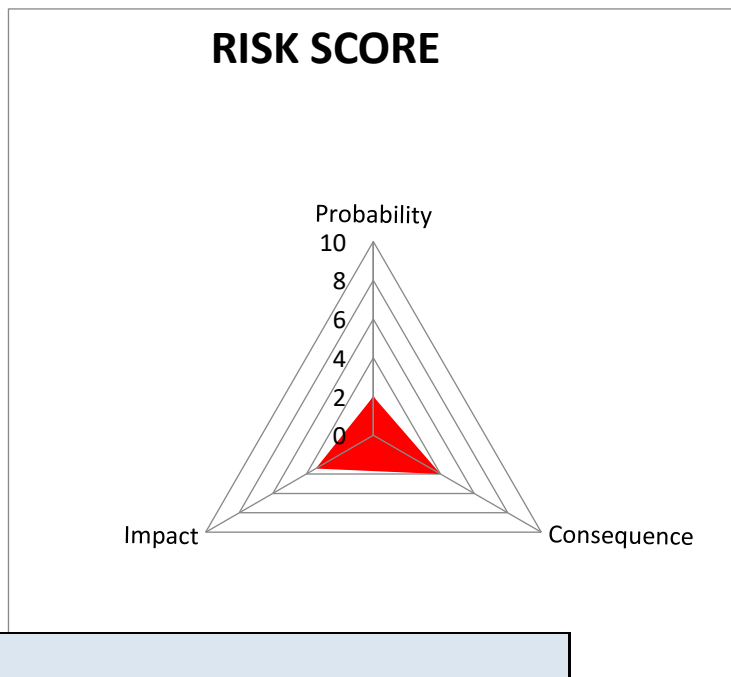


Example:
 Hazard – Fuel Spill (<50 gallons)
 Impact – Single Company Response
 Consequence to the community – very low

High Risk Hazmat

This risk category includes emergency responses to Gas leaks from cut gas lines, significant fluid leaks from a commercial vehicle, carbon monoxide leaks with symptoms, and other hazmat spills. The Hickory Fire Department provides the basic functions of operations level Hazardous Materials outlined in Chapter 5 of NFPA 472. Similarly, the Knowledge, Skill, and Abilities (KSA's) highlighted in the awareness section of Chapter 5 of NFPA 1072. The critical tasks outlined are for "routine" incidents. More complex incidents will be elevated to a higher risk category due to their scope and the need to call for a specialized regional team or state resource.

High Risk Hazmat	
Probability of occurrence	2
Consequence to community	4
Impact on Fire Department	3.4375
SCORE	12.2541447



High Risk Hazardous Materials Deployment		
Critical Task Identification	Rescuers	Notes
Incident Commander	1	
Safety Officer	1	
Operations Team	3	
Backup Team	3	
Patient Care	3	
Total Personnel	11	

DEPLOYMENT ANALYSIS

Benchmark Objectives

Although the National Fire Protection Association (NFPA) 1710 document provides response time benchmarks, fire departments often measure baseline performance, in terms of total response time to reflect their demonstrated performance. The difference between the benchmark and baseline is referred to as the gap and a gap analysis should be performed periodically to determine needs for improvements and highlight performance improvements that have been made.

Benchmark statements describe the ultimate level (future) of performance for an agency and are also referred to as goals. It is not expected that an agency attains these goals, rather they describe the level at which the agency is striving to perform, in the context of continuous improvement.

Benchmark Statements - Fire Suppression

For 90 percent of all **LOW**-Risk fires, the total response time for the arrival of the first-due unit, staffed with 2 firefighters and 1 officer, shall be: 9 minutes 40 seconds in urban areas and 12 minutes 50 seconds in rural areas. The first-due unit shall be capable of: providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity; initiating command; investigating the situation; requesting additional resources; establishing an attack line, flowing a minimum of 150 gpm; establishing a water supply; and containing the fire. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the public.

For 90 percent of all **Moderate**-Risk fires, the total response time for the arrival of the effective response force (ERF), staffed with 8 firefighters and officers, shall be: 13 minutes 5 seconds in urban areas and 15 minutes 30 seconds in rural areas. The erf shall be capable of: providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity; initiating command; requesting additional resources; investigating the reason for the alarm activation, establishing a back-up line and advancing an attack line if needed, each flowing a minimum of 150 gpm; establishing an uninterrupted water supply; containing the fire; rescuing at-risk victims; and performing salvage operations. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the public.

For 90 percent of all **High**-Risk fires, the total response time for the arrival of the effective response force (ERF), staffed with 15 firefighters and officers, shall be: 13 minutes 5 seconds in urban areas and 15 minutes 30 seconds in rural areas. The erf shall be capable of: providing

500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity; initiating command; requesting additional resources; establishing a back-up line and advancing an attack line, each flowing a minimum of 150 gpm; establishing an uninterrupted water supply; containing the fire; rescuing at-risk victims; and performing salvage operations. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the public.

For 90 percent of all **Special-Risk** Fires, the total response time for the arrival of the effective response force (ERF), staffed with 17 firefighters and officers, shall be: 11 minutes 54. The ERF shall consist of a primary responding ARFF vehicle equipped with a 350 GPM Darley pump powered by a Kubota engine, 500-gallon water tank, 60 gallons of AFFF foam concentrate, and 500 pounds of Purple K dry chemical. This vehicle shall also be equipped with a bumper turret with an integrated FLIR camera. The bumper turret shall deliver water, foam, or purple K at the rate of 100 GPM.

Benchmark Statements – EMS

For 90 percent of all **Low-Risk** EMS responses, the total response time for the arrival of the first-due unit, staffed with 2 firefighters, shall be: 10 minutes 10 seconds in all urban areas and 13 minutes 20 seconds in all rural areas. The first-due unit shall be capable of: assessing scene safety and establishing command; sizing-up the situation; conducting an initial patient assessment; obtaining vitals and patient's medical history; initiating mitigation efforts within one minute of arrival; providing medical aid at the basic life support level, packaging the patient if transporting to a medical facility is warranted.

For 90 percent of all **High-Risk** EMS responses, the total response time for the arrival of the first-due unit, staffed with 2 firefighters and 1 officer, shall be: 10 minutes 10 seconds in all urban areas and 13 minutes 20 seconds in all rural areas. The first-due unit shall be capable of: assessing scene safety and establishing command; sizing-up the situation; conducting an initial patient assessment; obtaining vitals and patient's medical history; initiating mitigation efforts within one minute of arrival; providing basic life support automatic external defibrillation (AED), mechanical CPR (Lucas device), administering indicated medications at the direction of medical control; and assisting transport personnel with packaging the patient.

Benchmark Statements – Hazardous Materials

For 90 percent of all **Low-Risk** hazardous materials response incidents, the total response time for the arrival of the first-due unit, staffed with 2 firefighters and 1 officer, shall be: 9 minutes 40 seconds in all urban areas and 12 minutes 50 seconds in all rural areas. The first-due unit shall be capable of: establishing command; sizing up and assessing the situation to determine the presence of a potential hazardous material or explosive device; determining the need for

additional resources; estimating the potential harm without intervention; and begin establishing a hot, warm, and cold zone.

For 90 percent of all **High-Risk** hazardous materials response incidents, the total response time for the arrival of the effective response force (ERF), staffed with 8 firefighters and officers, shall be: 13 minutes 5 seconds in all urban areas and 15 minutes 30 seconds in all rural areas. The ERF shall be capable of: appointing a site safety officer; and providing the equipment, technical expertise, knowledge, skills, and abilities to mitigate a hazardous materials incident in accordance with department standard operating guidelines.

Benchmark Statements – Technical Rescue

Technical Rescue – Low

For 90 percent of all low-risk technical rescue incidents, the total response time for the arrival of the first-due unit, staffed with a minimum of 2 firefighters and 1 officer, shall be: 7 minutes and 55 seconds for urban areas; and 9 minutes and 56 seconds in rural areas. For helicopter rescues the first-due unit is capable of: establishing a landing zone and ensuring the safe landing and/or take-off of the aircraft. For animal rescues the first-due unit is capable of: establishing command; evaluating the need for additional resources; and completing the rescue of the animal.

Technical Rescue – Moderate

For 90 percent of all moderate-risk technical rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with 8 firefighters and officers including the technical rescue team, shall be: 10 minutes and 13 seconds for urban areas; and 16 minutes and 38 seconds in rural areas. The ERF is capable of: establishing incident command, appointing a site safety officer; hazard control; and incident stabilization.

Technical Rescue – High

For 90 percent of all high-risk technical rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with 8 firefighters and officers including the technical rescue team, shall be: 10 minutes and 13 seconds for urban areas; and 16 minutes and 38 seconds in rural areas. The ERF is capable of: establishing incident command, appointing a site safety officer; hazard control; and incident stabilization.

Baseline Performance

Baseline statements describe the agency’s actual (current) performance and are provided for the same services as the benchmark statements.

The department’s baseline statements reflect actual performance during 2018 to 2022. The department does not rely on the use of automatic aid from neighboring fire departments to provide its effective response force complement of personnel. These resources are immediately available as part of a seamless response system. The department’s actual baseline service level performance is as follows:

Fire Suppression

For 90 percent of all **LOW-Risk** fires during this time period, the total response time for the arrival of the first-due unit is: 8 minutes 1 seconds in urban areas and 10 minutes 28 seconds in rural areas. The first-due suppression unit (engine or ladder) is capable of: providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity; initiating command; investigating the situation; requesting additional resources; establishing an attack line, flowing a minimum of 150 gpm; establishing a water supply; and containing the fire. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the public.

Low Risk Fire 90th Percentile Times Baseline Performance			Goal	2018-2022	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	0:02:55	0:02:35	0:02:03	0:02:16	0:02:49	0:02:55	0:02:45
		Rural	0:02:55	0:02:45	0:02:53	0:02:53	0:02:50	0:02:43	0:02:05
Turnout Time	Turnout Time 1st Unit	Urban	0:02:15	0:02:25	0:02:17	0:02:09	0:01:55	0:02:12	0:02:23
		Rural	0:02:15	0:02:23	0:01:37	0:02:01	0:01:49	0:02:11	0:01:49
Travel Time	Travel Time 1st Unit	Urban	0:04:30	0:04:35	0:04:55	0:05:59	0:05:28	0:05:39	0:05:10
		Rural	0:07:40	0:06:57	0:07:12	0:06:20	0:05:54	0:06:00	0:06:48
Total Response Time	Total Response Time 1st Unit on Scene	Urban	0:09:40	0:08:01	0:08:18	0:08:37	0:09:03	0:09:07	0:08:30
			n=	714	142	134	143	144	151
		Rural	0:12:50	0:10:28	0:10:28	0:10:05	0:09:50	0:10:48	0:09:19
			n=	66	12	14	14	14	12

Hickory Fire Department
Community Risk Assessment-Standards of Cover

For 90 percent of all **Moderate-Risk** fires, the total response time for the arrival of the effective response force (ERF), staffed with 8 firefighters and officers, is: 11 minutes 52 seconds in urban areas and 13 minutes 15 seconds in rural areas. The erf shall be capable of: providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity; initiating command; requesting additional resources; investigating the reason for the alarm activation, establishing a back-up line and advancing an attack line if needed, each flowing a minimum of 150 gpm; establishing an uninterrupted water supply; containing the fire; rescuing at-risk victims; and performing salvage operations. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the public.

Moderate Risk Fire 90th Percentile Times Baseline Performance			Goal	2018-2022	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	0:02:55	0:02:32	0:02:00	0:02:11	0:02:51	0:02:44	0:02:33
		Rural	0:02:55	0:02:32	0:01:37	0:02:02	0:02:33	0:02:50	0:03:01
Turnout Time	Turnout Time 1st Unit	Urban	0:02:15	0:02:32	0:02:28	0:02:34	0:02:33	0:02:26	0:02:41
		Rural	0:02:15	0:02:28	0:02:21	0:02:20	0:02:26	0:02:38	0:02:27
Travel Time	Travel Time 1st Unit Distribution	Urban	0:04:30	0:05:04	0:04:35	0:04:58	0:05:21	0:05:26	0:05:06
		Rural	0:07:40	0:07:10	0:07:10	0:07:32	0:06:52	0:07:16	0:07:21
	Travel Time ERF Concentration	Urban	0:07:55	0:06:13	0:07:18	0:06:42	0:06:09	0:05:50	0:05:17
		Rural	0:10:20	0:09:07	0:12:28	0:10:07	0:08:18	0:08:11	0:09:05
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	0:08:38	0:07:42	0:08:19	0:09:09	0:08:59	0:08:48	0:08:14
			<i>n=</i>	3935	816	702	734	825	858
		Rural	0:11:06	0:11:12	0:09:52	0:09:41	0:10:54	0:11:16	0:11:18
			<i>n=</i>	283	41	44	64	62	72
	Total Response Time ERF Unit on Scene Concentration	Urban	0:09:54	0:11:52	0:10:39	0:09:50	0:09:53	0:09:41	0:09:19
			<i>n=</i>	1643	299	268	317	376	383
		Rural	0:13:42	0:13:15	0:22:14	0:13:26	0:12:18	0:12:18	0:12:36
			<i>n=</i>	114	16	12	27	21	38

Hickory Fire Department
Community Risk Assessment-Standards of Cover

For 90 percent of all **High-Risk** fires, the total response time for the arrival of the effective response force (ERF), staffed with 15 firefighters and officers, is: 11 minutes 53 seconds in urban areas and 12 minutes 51 seconds in rural areas. The erf shall be capable of: providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity; initiating command; requesting additional resources; establishing a back-up line and advancing an attack line, each flowing a minimum of 150 gpm; establishing an uninterrupted water supply; containing the fire; rescuing at-risk victims; and performing salvage operations. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the public.

High Risk Fire 90th Percentile Times Baseline Performance			Goal	2018-2022	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	0:02:55	0:02:22	1:57	1:52	2:49	2:19	2:26
		Rural	0:02:55	0:02:03	1:36	1:45	1:49	2:53	1:30
Turnout Time	Turnout Time 1st Unit	Urban	0:02:15	0:02:43	2:28	2:54	3:04	2:23	2:37
		Rural	0:02:15	0:02:35	2:12	2:54	2:13	1:59	2:52
Travel Time	Travel Time 1st Unit Distribution	Urban	0:04:30	0:05:33	4:50	5:49	5:17	5:10	5:40
		Rural	0:07:40	0:08:26	5:07	8:08	8:15	8:30	8:20
	Travel Time ERF Concentration	Urban	0:07:55	0:06:54	6:27	7:25	6:46	6:45	6:50
		Rural	0:10:20	0:09:21	8:29	9:14	9:16	8:30	9:34
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	0:08:49	0:08:41	7:55	8:57	9:01	8:40	8:34
			<i>n=</i>	427	57	113	93	77	87
		Rural	0:11:28	0:11:08	8:11	10:55	11:19	11:12	12:22
			<i>n=</i>	57	7	17	18	8	7
	Total Response Time ERF Unit on Scene Concentration	Urban	0:11:54	0:11:53	12:26	11:27	11:13	11:19	12:41
			<i>n=</i>	210	51	52	41	35	31
		Rural	0:12:52	0:12:51	12:17	11:49	12:52	11:41	14:07
			<i>n=</i>	25	8	5	5	4	3

For 90 percent of all **Special-Risk** Fires, the total response time for the arrival of the effective response force (ERF), staffed with 17 firefighters and officers is: 5 minutes 31. The ERF shall be consist of a primary responding ARFF vehicle equipped with a 350 GPM Darley pump powered by a Kubota engine, 500-gallon water tank, 60 gallons of AFFF foam concentrate, and 500 pounds of Purple K dry chemical. This vehicle shall also be equipped with a bumper turret with an integrated FLIR camera. The bumper turret shall deliver water, foam, or purple K at the rate of 100 GPM.

Special Risk Fire 90th Percentile Times Baseline Performance			Goal	2018-2022	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	ARFF	0:02:55	0:02:17		0:00:30	0:01:49	0:00:45	0:04:22
Turnout Time	Turnout Time 1st Unit	ARFF	0:02:15	0:01:22		0:01:38	0:00:16	0:00:14	0:00:42
Travel Time	Travel Time 1st Unit Distribution	ARFF	0:04:30	0:03:25		0:02:58	0:00:04	0:00:33	0:03:28
	Travel Time ERF Concentration	ARFF	0:07:55	0:03:36		0:03:36	*	*	*
Total Response Time	Total Response Time 1st Unit on Scene Distribution	ARFF	0:08:49	0:05:32		0:04:48	0:02:05	0:01:16	0:08:32
			<i>n=</i>	10	0	3	3	2	2
	Total Response Time ERF Unit on Scene Concentration	ARFF	0:11:54	0:05:31	*	0:05:31	*	*	*
			<i>n=</i>	1	0	1	0	0	0

* n value too low for a statistical analysis of the 90th Percentile

Emergency Medical Services

For 90 percent of all **Low-Risk** EMS responses, the total response time for the arrival of the first-due unit, staffed with 2 firefighters: is 9 minutes and 26 seconds in all urban areas and 11 minutes and 33 seconds in all rural areas. The first-due unit shall be capable of: assessing scene safety and establishing command; sizing-up the situation; conducting an initial patient assessment; obtaining vitals and patient's medical history; initiating mitigation efforts within one minute of arrival; providing medical aid at the basic life support level, packaging the patient, and transporting the patient to the appropriate receiving facility.

Hickory Fire Department
Community Risk Assessment-Standards of Cover

Low Risk EMS 90th Percentile Times Baseline Performance			Goal	2018-2022	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	3:30	4:06	4:05	4:13	4:14	4:08	4:01
		Rural	3:30	4:14	4:10	4:29	4:08	4:15	4:11
Turnout Time	Turnout Time 1st Unit	Urban	2:10	2:14	2:18	2:19	2:15	2:15	2:07
		Rural	2:10	2:08	2:16	2:04	2:05	2:00	2:07
Travel Time	Travel Time 1st Unit	Urban	4:30	4:51	5:02	4:57	4:44	4:48	4:41
		Rural	7:40	6:59	6:38	6:08	6:28	6:57	7:20
Total Response Time	Total Response Time 1st Unit on Scene	Urban	10:10	9:26	9:41	9:45	9:27	9:25	9:00
			<i>n</i> =	5263	1053	692	448	1561	1509
		Rural	13:20	11:33	11:53	10:45	10:56	11:36	11:10
			<i>n</i> =	415	100	55	33	120	107

For 90 percent of all **High-Risk** EMS responses, the total response time for the arrival of the first-due unit, staffed with 2 firefighters and 1 officer: is 8 minutes and 44 seconds in all urban areas and 11 minutes and 3 seconds in all rural areas. The first-due unit shall be capable of: assessing scene safety and establishing command; sizing-up the situation; conducting an initial patient assessment; obtaining vitals and patient’s medical history; initiating mitigation efforts within one minute of arrival; providing basic life support automatic external defibrillation (AED), mechanical CPR (Lucas device), administering indicated medications at the direction of medical control; and assisting transport personnel with packaging the patient.

Hickory Fire Department
Community Risk Assessment-Standards of Cover

High Risk EMS 90th Percentile Times Baseline Performance			Goal	2018-2022	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	3:30	3:30	3:27	3:54	3:37	3:07	3:01
		Rural	3:30	3:25	3:20	3:45	3:19	3:04	2:50
Turnout Time	Turnout Time 1st Unit	Urban	2:10	2:17	2:20	2:16	2:17	2:16	2:14
		Rural	2:10	2:10	2:17	2:12	2:03	1:59	2:13
Travel Time	Travel Time 1st Unit Distribution	Urban	4:30	4:49	4:59	4:50	4:42	4:44	4:44
		Rural	7:40	7:14	7:27	6:45	7:08	7:15	7:29
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	10:10	8:44	8:45	9:18	8:55	8:28	8:13
			n=	7293	1887	1462	725	1652	1567
		Rural	13:20	11:03	11:35	11:14	10:55	10:38	10:50
			n=	674	185	149	66	139	135

Hazardous Materials

For 90 percent of all **Low-Risk** hazardous materials response incidents, the total response time for the arrival of the first-due unit, staffed with 2 firefighters and 1 officer, is: 9 minutes and 40 seconds in all urban areas and 11 minutes and 47 seconds in all rural areas. The first-due unit is capable of: establishing command; sizing up and assessing the situation to determine the presence of a potential hazardous material or explosive device; determining the need for additional resources; estimating the potential harm without intervention; and begin establishing a hot, warm, and cold zone.

Low Risk HazMat 90th Percentile Times Baseline Performance			Goal	2018-2022	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	2:55	3:16	2:15	3:44	3:33	2:48	3:33
		Rural	2:55	3:21	*	*	*	*	*
Turnout Time	Turnout Time 1st Unit	Urban	2:15	2:20	2:17	1:47	2:33	1:53	2:43
		Rural	2:15	2:09	*	*	*	*	*
Travel Time	Travel Time 1st Unit Distribution	Urban	4:30	5:00	4:56	4:04	4:38	3:57	4:59
		Rural	7:40	8:02	*	*	*	*	*
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	9:40	8:35	8:20	7:08	8:11	7:45	8:31
			n=	203	57	21	40	39	46
		Rural	11:47	14:49	*	*	*	*	*
			n=	26	*	*	*	*	*

Hickory Fire Department
Community Risk Assessment-Standards of Cover

For 90 percent of all **High-Risk** hazardous materials response incidents, the total response time for the arrival of the effective response force (ERF), staffed with 8 firefighters and officers, shall be: 13 minutes and 5 seconds in all urban areas and 15 minutes and 30 seconds in all rural areas. The ERF shall be capable of: appointing a site safety officer; and providing the equipment, technical expertise, knowledge, skills, and abilities to mitigate a hazardous materials incident in accordance with department standard operating guidelines.

High Risk HazMat 90th Percentile Times Baseline Performance			Goal	2018-2022	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	2:55	3:19	2:05	4:31	3:29	3:29	2:26
		Rural	2:55	3:07	1:25	*	4:24	2:53	2:36
Turnout Time	Turnout Time 1st Unit	Urban	2:15	2:20	3:11	1:52	2:15	2:15	2:27
		Rural	2:15	1:52	1:40	*	1:51	1:24	1:50
Travel Time	Travel Time 1st Unit Distribution	Urban	4:30	4:12	6:15	3:44	4:13	4:02	4:19
		Rural	7:40	8:10	8:18	9:32	8:53	5:47	5:36
	Travel Time ERF Concentration	Urban	7:55	6:45	8:32	6:59	6:37	6:08	7:01
		Rural	10:20	11:18	*	*	11:18	11:32	08:18
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	9:40	8:16	9:15	8:55	7:40	8:24	7:44
			n=	217	20	38	34	58	35
		Rural	12:50	11:37	*	*	13:04	0:12:16	0:09:02
			n=	20	*	*	5	6	5
	Total Response Time ERF Unit on Scene Concentration	Urban	13:05	10:38	13:01	17:11	10:43	09:35	10:33
			n=	139	15	12	24	39	27
		Rural	15:30	15:33	*	*	15:43	15:43	12:29
			n=	14	*	*	3	3	6

* n value too low for a statistical analysis of the 90th Percentile

Technical Rescue

For 90 percent of all **low-risk** technical rescue incidents, the total response time for the arrival of the first-due unit, staffed with a minimum of 2 firefighters and 1 officer, is: 7 minutes and 52 seconds for urban areas; and 9 minutes and 33 seconds in rural areas. For helicopter rescues the first-due unit is capable of: establishing a landing zone and ensuring the safe landing and/or take-off of the aircraft. For animal rescues the first-due unit is capable of: establishing command; evaluating the need for additional resources; and completing the rescue of the animal.

Low Risk Technical Rescue 90th Percentile Times Baseline Performance			Goal	2018-2022	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	2:55	2:42	2:09	2:13	3:09	2:57	2:49
		Rural	2:55	3:05	2:28	2:49	3:05	3:13	3:15
Turnout Time	Turnout Time 1st Unit	Urban	2:15	2:07	2:09	2:07	2:02	2:04	2:11
		Rural	2:15	2:05	1:59	2:16	2:12	2:02	1:50
Travel Time	Travel Time 1st Unit Distribution	Urban	4:30	4:25	4:37	4:31	4:18	4:16	4:27
		Rural	7:40	6:17	6:06	5:34	6:11	7:37	6:38
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	9:40	7:52	7:37	7:28	8:00	7:47	8:00
			n=	2965	584	568	523	659	631
		Rural	12:50	9:33	8:53	9:42	9:27	11:18	10:00
			n=	210	58	56	31	30	35

For 90 percent of all **moderate-risk** technical rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with 8 firefighters and officers including the technical rescue team is: 8 minutes and 43 seconds for urban areas. Responses to rural areas were statistically insignificant during this time period. The ERF is capable of: establishing incident command, appointing a site safety officer; hazard control; and incident stabilization.

Hickory Fire Department
Community Risk Assessment-Standards of Cover

Moderate Risk Technical Rescue 90th Percentile Times Baseline Performance			Goal	2018-2022	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	0:02:55	0:02:46	0:01:32	0:03:13	0:03:28	0:02:45	0:02:03
		Rural	0:02:55	*	*	*	*	*	*
Turnout Time	Turnout Time 1st Unit	Urban	0:02:15	0:02:06	0:02:08	0:01:21	0:02:15	0:01:34	0:02:05
		Rural	0:02:15	*	*	*	*	*	*
Travel Time	Travel Time 1st Unit Distribution	Urban	0:04:30	0:05:19	0:05:04	0:03:04	0:05:16	0:05:00	0:05:19
		Rural	0:07:40	*	*	*	*	*	*
	Travel Time ERF Concentration	Urban	0:07:55	0:05:34	0:03:30	0:05:47	0:05:04		0:04:38
		Rural	0:10:20	*	*	*	*	*	*
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	0:09:40	0:08:42	0:08:44	0:07:36	0:08:49	0:08:22	0:08:17
			<i>n</i> =	150	101	30	11	7	1
		Rural	0:12:50	*	*	*	*	*	*
			<i>n</i> =	5	0	1	3	0	1
	Total Response Time ERF Unit on Scene Concentration	Urban	0:13:05	0:08:43	*	*	*	*	*
			<i>n</i> =	4	1	1	1		1
Rural	0:15:30	*	*	*	*	*	*		
<i>n</i> =	1	0	0	0	0	0	1		

* n value too low for a statistical analysis of the 90th Percentile

For 90 percent of all **high-risk** technical rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with 8 firefighters and officers including the technical rescue team is: 9 minutes and 55 seconds for urban areas. Responses to rural areas were statistically insignificant during this time period. The ERF is capable of: establishing incident command, appointing a site safety officer; hazard control; and incident stabilization.

Hickory Fire Department
Community Risk Assessment-Standards of Cover

High Risk Technical Rescue 90th Percentile Times Baseline Performance			Goal	2018-2022	2022	2021	2020	2019	2018
Alarm Handling	Pick-up to Dispatch	Urban	0:02:55	0:02:31	2:47	2:12	2:32	*	*
		Rural	0:02:55	*	*	*	*	*	*
Turnout Time	Turnout Time 1st Unit	Urban	0:02:15	0:02:25	2:25	2:06	2:41	*	*
		Rural	0:02:15	*	*	*	*	*	*
Travel Time	Travel Time 1st Unit Distribution	Urban	0:04:30	0:04:37	5:00	5:01	3:56	*	*
		Rural	0:07:40	*	*	*	*	*	*
	Travel Time ERF Concentration	Urban	0:07:55	0:05:45	5:45	6:32	4:57	*	*
		Rural	0:10:20	*	*	*	*	*	*
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	0:09:40	0:08:10	9:21	7:55	7:57	*	*
			<i>n=</i>	124	32	63	29	*	*
		Rural	0:12:50	*	*	*	*	*	*
			<i>n=</i>	*	*	*	*	*	*
	Total Response Time ERF Unit on Scene Concentration	Urban	0:13:05	0:09:55	9:44	10:53	8:56	*	*
			<i>n=</i>	69	25	29	15	*	*
		Rural	0:15:30	*	*	*	*	*	*
			<i>n=</i>	*	*	*	*	*	*

SERVICE DISTRICT ANALYSIS

A critical factor in developing a Standard of Cover is to look at the overall system to see if an agency is meeting the established service level objects. A common method of accomplishing this is to break down each response district. This approach allows the fire department to analyze the workload and measure the performance of those stations based upon the identified service level objectives. In 2020 the department has transitioned to an AVL dispatch system that sends the closest available apparatus. This change eliminated “First-due” station districts for response purposes. These districts remain as planning zones for Community Risk Reduction programs. Doing so will assist the department to identify any areas of weakness, where

additional stations may be warranted, or additional companies should be placed in service based upon the workload.

The following pages provide a breakdown of each city station and provide an analysis for the companies' first-in response area. Performance measures are based upon the service level objectives and other workload indicators such as the total number of calls each apparatus responded to and occupancies inspected.

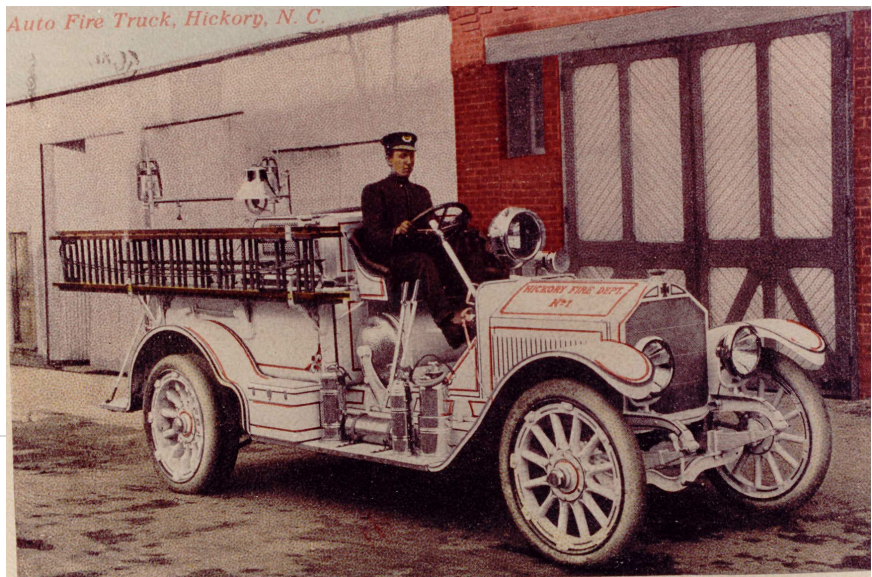
Station 1 (Earl G. Moser Main Station)

Station 1 is located at 19 2nd Street Drive NE. The phone number is (828) 323-7420.

Station 1 was re-built from an old two-story wooden building, which housed Hickory's firefighters in the horse-drawn days, into a two-story red brick and blue sided building on March 1, 1961. The building was renovated once more and was dedicated as the Earl G. Moser Fire Station on August 3, 2002. Station 1 houses one Engine Company (Engine 1), a Rescue Vehicle (Rescue 1), and one command vehicle. The Administration division is also located at this station.



The large brass bell outside Station 1 was placed there in 1962. This bell has a certain amount of history behind it. Purchased in 1912, this bell was originally located on top the old city hall. When brought to the fire department, the bell was used



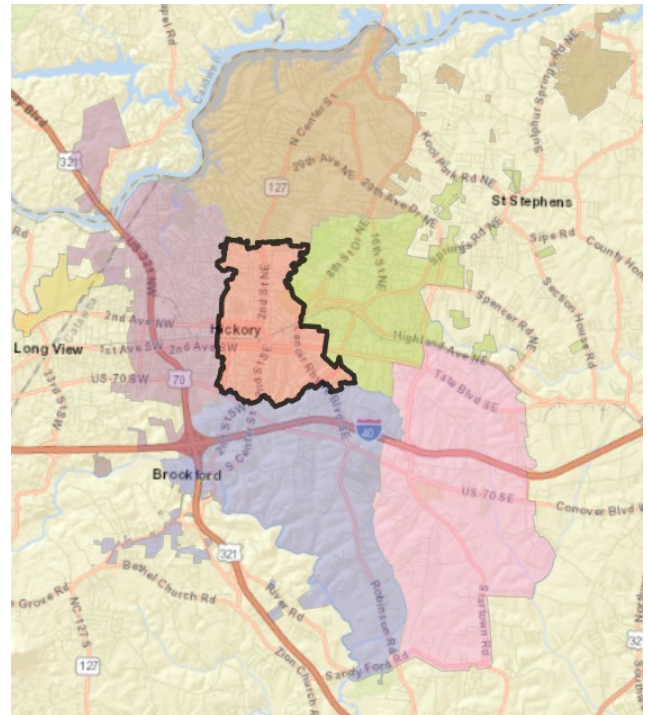
to alert volunteer firefighters of alarms.

Originally, the Hickory Fire Department was dispatched by a series of pull boxes located throughout the city. Today dispatch responsibilities are coordinated through the Catawba County Communications Center.

Station No. 1 – (Earl G. Moser Main Station)

Apparatus

- Staffed Units
 - Engine 1
 - Rescue 1
 - Battalion 1
- Additional Equipment/Services
 - Squad 1, Breathing Air Station, Swiftwater Boats w/motors



Workload Indicators

Average Annual Incident Responses

- Engine 1 – 1,336
- Rescue 1 – 1,368
- Battalion 1 – 646

Total Address Points Served – 4,974

Risk Assessment Occupancy Counts

Occupancy Types	Counts
Assembly	68
Business	534
Business Storage	43
Educational	12
General Industrial	28
Health Care	4

Hickory Fire Department
Community Risk Assessment-Standards of Cover

Health Care Ambulatory	2
High Hazard Industrial	5
Mercantile	86
Residential (includes Hotel)	1740
Special Purpose Industrial	1

Service Demand by Year					
Risk Level	2018	2019	2020	2021	2022
EMS - Low	521	489	178	349	536
EMS - High	405	460	208	378	532
Fire - Low	82	95	105	67	69
Fire - Moderate	218	192	172	175	203
Fire - High	13	15	20	17	10
Hazmat - Low	16	28	22	33	24
Hazmat - High	1	1	1		1
Rescue - Low	167	171	173	134	155
Rescue - Moderate	12	12	6	7	1
Rescue - High	1		8	5	7
Total	1436	1463	893	1165	1538

Estimated 2023 Service Demands	
Risk Level	
EMS - Low	590
EMS - High	585
Fire - Low	76
Fire - Moderate	223
Fire - High	11
Hazmat - Low	26
Hazmat - High	1
Rescue - Low	171
Rescue - Moderate	1
Rescue - High	8
Total	1692

Station 2

(Highland Station)

Station 2 is located at 1305 9th Avenue NE. It was constructed on June 7, 1983.

Apparatus

- o Staffed Units
 - o Engine 2
 - o Ladder 2

Workload Indicators

Average Annual Incident Responses

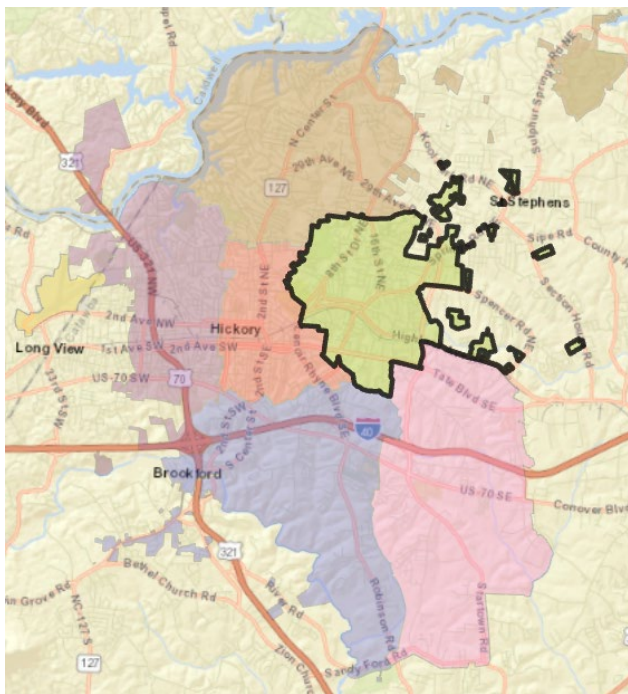
- o Engine 2 – 976
- o Ladder 2 – 855

Total Address Points Served – 6,260



Station No. 2 - Highland Station

Risk Assessment Occupancy Counts



Occupancy Types	Counts
Assembly	38
Business	192
Business Storage	72
Educational	8
General Industrial	169
Health Care	1
High Hazard Industrial	13
Mercantile	64
Residential (includes Hotel)	2285
Other Low Priority Property	3

Station No. 2 – Highland Station

Service Demand by Year					
Risk Level	2018	2019	2020	2021	2022
EMS - Low	380	463	184	243	412
EMS - High	388	406	207	451	436
Fire - Low	91	91	94	85	119
Fire - Moderate	119	137	117	119	183
Fire - High	15	11	18	18	10
Hazmat - Low	23	18	31	17	23
Hazmat - High	2	1		2	3
Rescue - Low	125	125	124	103	140
Rescue - Moderate	13	6	10	1	1
Rescue - High		1	6	14	4
Total	1155	1259	791	1053	1331

Estimated 2023 Service Demands	
Risk Level	
EMS - Low	453
EMS - High	480
Fire - Low	131
Fire - Moderate	201
Fire - High	11
Hazmat - Low	25
Hazmat - High	3
Rescue - Low	154
Rescue - Moderate	1
Rescue - High	4
Total	1464

Station 3

(West Hickory Station)

Station 3 is located at 135 11th Street NW. Station 3 was completed on June 26, 1984.

Apparatus

- o Staffed Units
 - o Engine 3
 - o Ladder 3
 - o UTV 1

Workload Indicators

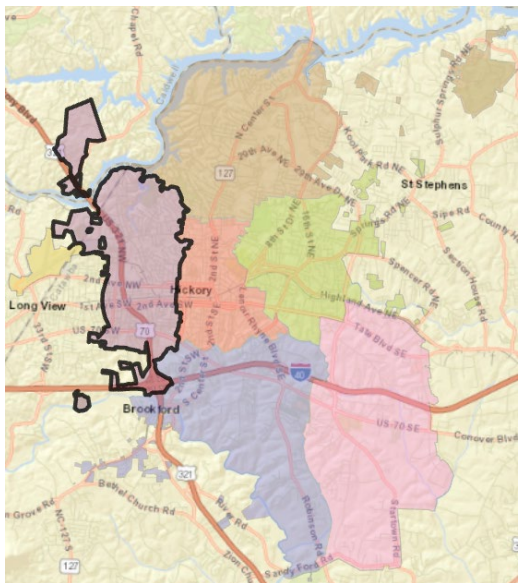
Average Annual Incident Responses

- o Engine 3 – 851
- o Ladder 3 – 802
- o UTV 3

Total Address Points Served – 4,643



Risk Assessment Occupancy Counts



Occupancy Types	Counts
Assembly	38
Business	275
Business Storage	88
Educational	2
General Industrial	67
High Hazard Industrial	18
Mercantile	60
Residential (includes Hotel)	2259
Other Low Priority Property	1
Special Purpose Industrial	1

Station No. 3 – West Hickory Station

Service Demand by Year					
Risk Level	2018	2019	2020	2021	2022
EMS - Low	362	386	139	176	288
EMS - High	373	359	172	320	295
Fire - Low	95	118	97	97	97
Fire - Moderate	134	122	158	166	194
Fire - High	18	10	13	24	11
Hazmat - Low	20	23	19	18	20
Hazmat - High	2	3	2		6
Rescue - Low	173	151	142	174	170
Rescue - Moderate	12	21	9	1	3
Rescue - High			4	17	8
Total	1189	1193	755	993	1092

Estimated 2023 Service Demands	
Risk Level	
EMS - Low	317
EMS - High	325
Fire - Low	107
Fire - Moderate	213
Fire - High	12
Hazmat - Low	22
Hazmat - High	7
Rescue - Low	187
Rescue - Moderate	3
Rescue - High	9
Total	1201

Station 4

(Airport Station)

The Airport Station is located at 3101 9th Avenue Drive NW. The new Station 4 was completed in December 1998. It replaced an old two-bay aluminum building.

Apparatus

- o Staffed Units
 - o Engine 4

Workload Indicators

Average Annual Incident Responses

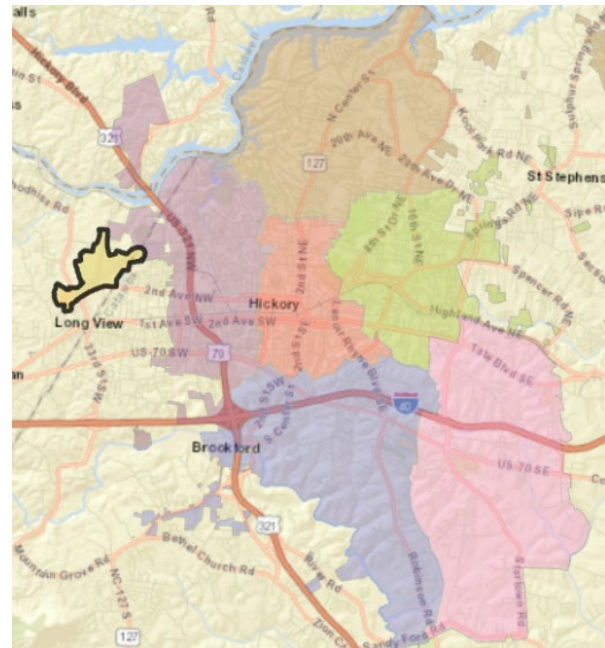
- o Engine 4 – 179

Total Address Points Served - 13



Risk Assessment Occupancy Counts

Occupancy Types	Counts
Assembly	3
Business	3
Storage	13



Station 4 - (Airport Station)

Service Demand by Year					
Risk Level	2018	2019	2020	2021	2022
EMS - Low	6	2		1	4
EMS - High	1			4	
Fire - Low	136	3			
Fire - Moderate		1			1
Fire - Special	1	2	3	2	
Rescue - Low	1	1	2		
Total	145	9	5	7	5

*In May 2018 HFD firefighters transitioned nightly inspections to airport maintenance staff as directed by FAA officials

Estimated 2023 Service Demands	
Risk Level	
EMS - Low	4
EMS - High	1
Fire - Low	1
Fire - Moderate	1
Fire - Special	3
Rescue - Low	1
Total	11



Station 5

(Fairbrook Station)

The Fairbrook Station is located at 1425 21st Street Drive SE. Station 5 was constructed August 28, 1990. Station 5's service area includes the Hwy 70 SE/Interstate 40/Fairgrove Church Road/Catawba Valley Blvd/Startown road corridor both in and out of the city limits. The Training Division is also located at Station 5.

Apparatus

- o Staffed Units
 - o Engine 5
 - o Tanker 5
 - o Battalion 2
 - o Additional Equipment/Services



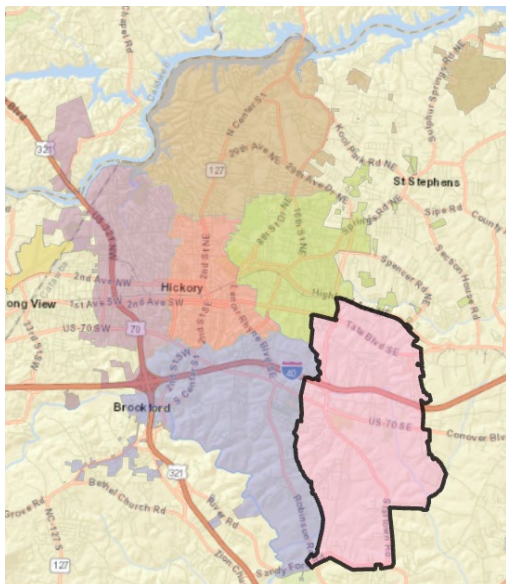
Workload Indicators

Average Annual Incident Responses

- o Engine 5 – 783
- o Tanker 5 – 4
- o Battalion 2 – 557

Total Address Points Served – 2,483

Risk Assessment Occupancy Counts



Occupancy Types	Counts
Assembly	40
Business	192
Business Storage	46
Educational	8
General Industrial	131
Health Care	1
Health Care Ambulatory	1
High Hazard Industrial	19
Mercantile	45
Residential (includes Hotel)	771
Special Purpose Industrial	1

Station No. 5 – Fairbrook Station

Service Demand by Year					
Risk Level	2018	2019	2020	2021	2022
EMS - Low	362	386	139	176	288
EMS - High	373	359	172	320	295
Fire - Low	95	118	97	97	97
Fire - Moderate	134	122	158	166	194
Fire - High	18	10	13	24	11
Hazmat - Low	20	23	19	18	20
Hazmat - High	2	3	2		6
Rescue - Low	173	151	142	174	170
Rescue - Moderate	12	21	9	1	3
Rescue - High			4	17	8
Total	1189	1193	755	993	1092

Estimated 2023 Service Demands	
Risk Level	
EMS - Low	317
EMS - High	325
Fire - Low	107
Fire - Moderate	213
Fire - High	12
Hazmat - Low	22
Hazmat - High	7
Rescue - Low	187
Rescue - Moderate	3
Rescue - High	9
Total	1201

Station 6

(Viewmont Station)

The Viewmont Station is located at 3036 North Center Street. Construction of Station 6 was finished May 31, 1989.

Apparatus

- o Staffed Units
 - o Engine 6
 - o Tanker 6

Workload Indicators

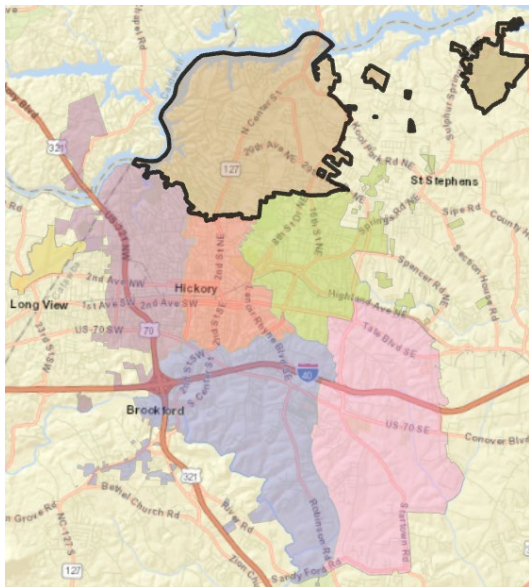
Average Annual Incident Responses

- o Engine 6 – 976
- o Tanker 6 – 5



Total Address Points Served – 6,918

Risk Assessment Occupancy Counts



Occupancy Types	Counts
Assembly	30
Business	85
Business Storage	13
Educational	10
General Industrial	5
Health Care	3
High Hazard Industrial	1
Mercantile	38
Residential (includes Hotel)	4488

Station 6 - (Viewmont Station)

Service Demand by Year					
Risk Level	2018	2019	2020	2021	2022
EMS - Low	382	417	158	221	354
EMS - High	304	342	156	302	419
Fire - Low	78	101	107	58	56
Fire - Moderate	169	154	164	137	222
Fire - High	4	11	8	8	5
Fire - Special	1				
Hazmat - Low	23	23	20	21	32
Hazmat - High					3
Rescue - Low	75	76	86	88	116
Rescue - Moderate	8	8	6	1	2
Rescue - High			1	12	5
Total	1044	1132	706	848	1214

Estimated 2023 Service Demands	
Risk Level	
EMS - Low	389
EMS - High	461
Fire - Low	62
Fire - Moderate	244
Fire - High	6
Fire - Special	0
Hazmat - Low	35
Hazmat - High	3
Rescue - Low	128
Rescue - Moderate	2
Rescue - High	6
Total	1330

Station 7

(Larson Moore Station)

The Larson H. Moore Fire Station is located at 465 Catawba Valley Blvd. SE. The Station 7 project began in April 2002 and was completed on July 30, 2003. Station 7's service district includes Hwy 70 and 321/Catawba Valley Blvd/Interstate 40 corridors within the city limits and extended coverage within the Fairbrook Rural District of Robinson Road/Startown and Sandy Ford Road.

Apparatus

- o Staffed Units
 - o Engine 7
 - o Tanker 7
 - o Ladder 16 (Reserve)
 - o Additional Equipment/Services



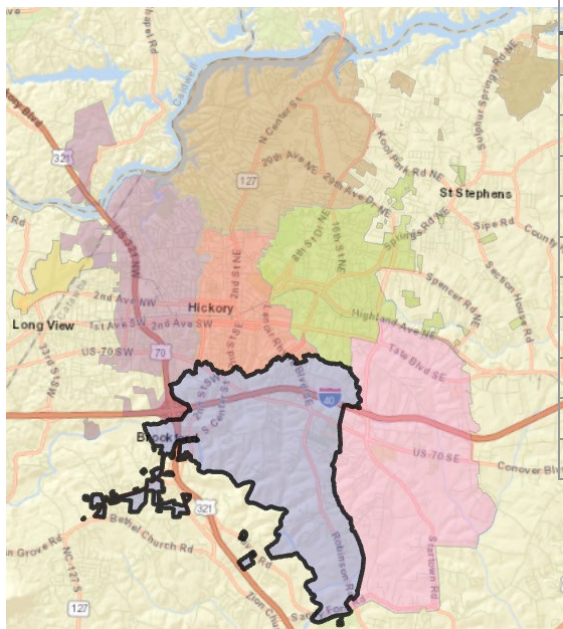
Workload Indicators

Average Annual Incident Responses

- o Engine 7 – 892
- o Tanker 7 – 8

Total Address Points Served – 2,782

Risk Assessment Occupancy Counts



Occupancy Types	Counts
Assembly	46
Business	149
Business Storage	36
Educational	3
General Industrial	24
Health Care	1
Health Care Ambulatory	2
High Hazard Industrial	15
Mercantile	45
Residential (includes Hotel)	1309
Other Low Priority Property	1

Station No. 7 – Larson Moore Station

Service Demand by Year					
Risk Level	2018	2019	2020	2021	2022
EMS - Low	256	267	96	144	242
EMS - High	247	252	151	295	257
Fire - Low	65	83	71	74	77
Fire - Moderate	114	115	100	94	148
Fire - High	7	6	5	11	4
Hazmat - Low	13	9	16	8	10
Hazmat - High	1		1		3
Rescue - Low	147	171	116	170	164
Rescue - Moderate	10	6	5	1	
Rescue - High			8	12	6
Total	860	909	569	809	911

Estimated 2023 Service Demands	
Risk Level	
EMS - Low	266
EMS - High	283
Fire - Low	85
Fire - Moderate	163
Fire - High	4
Hazmat - Low	12
Hazmat - High	4
Rescue - Low	180
Rescue - Moderate	2
Rescue - High	7
Total	1006