

FIRE
BOWLING GREEN, KY
EST. 1898

COMMUNITY RISK ASSESSMENT STANDARDS OF COVER

2023

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INTRODUCTION



STANDARDS OF COVER

The Commission of Fire Accreditation International (CFAI) defines the Standards of Cover (SOC) as those written policies and procedures that establish the distribution and concentration of fixed and mobile resources of an organization. This manual is a vital component of the Bowling Green Fire Department's effort toward the provision of services to the City. The following contains specific methodology that helps define the Department's mission, describes the Bowling Green Fire Department's service level, defines the basic resources necessary to meet the stated objectives, and identifies the current effectiveness of these objectives.

The following elements were developed to ensure the citizens of Bowling Green receive an adequate emergency response from the Bowling Green Fire Department (BGFD). It also provides for emergency response determined by the nature and type of incident and assigns resources accordingly.

DUTIES

It is the duty of the BGFD senior staff members to monitor incident data to ensure the requirements for the standards are met. When any nonconforming trends are identified, BGFD senior staff members shall make recommendations to bring response times within compliance. It is the duty of each officer to adhere to the staffing requirements of this standard. It is the responsibility of all suppression personnel to respond quickly and safely to life-threatening emergencies. This Standard of Response Coverage ensures the Fire Department has the right number of personnel with the right equipment arriving within the right timeframe to effect positive change during calls for emergency response.

COMMUNITY RISK ASSESSMENT

Additionally, the CFAI defines Community Risk Assessment as the identification of the potential and likely risks within a particular community, and the process of prioritizing those risks. Probability is the likelihood of an event occurring and consequence is the outcome of an event.

In conducting a Community Risk Assessment, the BGFD has strived to evaluate a broad range of risks from varying perspectives. The consequences that result from both fire and non-fire hazards can be measured in different ways; the consequence may be injury, loss of life, economic loss, historical loss, or cultural loss. The consequence may be narrow, affecting only one life, or it may be broad, affecting many lives, possibly the entire city, and/or surrounding environment. The actual event may be a structure fire, a motor vehicle accident with entrapment, a heart attack, or a hazardous material spill. Once the probability and consequence of an event have been evaluated, the total risk of that event can be weighed.

BGFD's goal is to have resources in place to provide equal distribution within the city that provide rapid first-due arrival in all areas, with increased concentration of resources in areas of greater risk. This assessment started with a broad view of the city, considering the Department's overall response history of volume, population, and risks within. The assessment then focused on the 7 response districts and then expanded into closely evaluating the 24 planning zones. Finally, the assessment evaluated the risks associated with 5,571 individual inspected structures.



EXECUTIVE SUMMARY

The American fire service is an evolutionary professional trade that has witnessed countless changes over the centuries, dating back to the Roman Empire. A progressive fire department must be able to adapt to change as well as maintain modern innovative strategies and provide adequate intervention at emergency situations to effect positive change.

The Bowling Green Fire Department's vision is "Continuous improvement through intentional efforts for excellence," and the accreditation process allows the Department to pave a road to achieve just that. The following standard of cover and community risk assessment outlines the innovations, strategies, and analytics that complement the Department's values of honor, integrity, and professionalism.

The collection of information in this document provides not only a narrative of the Bowling Green Fire Department's performance in community safety and protection, it also provides analytics that allow for educated future growth strategies to be applied that maximize personnel and equipment resources to make Bowling Green a better place.

The following document contains comprehensive observations and categorizations of the risks in the City and the tools the Department has to mitigate emergency situations of all types and sizes. This also contains detailed recourse definitions that describe the critical tasks associated with incidents and the staffing demanded to carry out these tasks. Conclusions of performance can be found late in the document that provide a direction for future growth and a path for innovation and improvement.



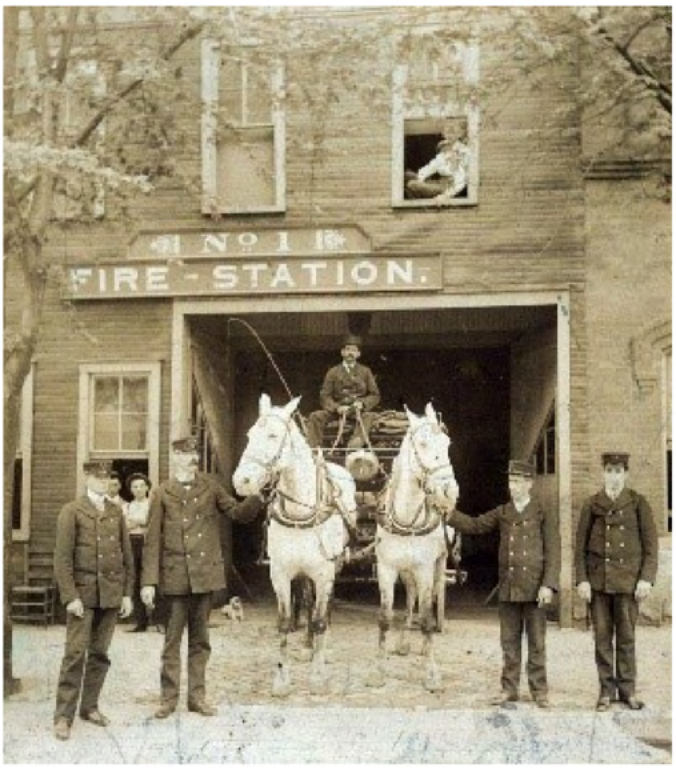
HISTORY OF THE FIRE DEPARTMENT

Official records indicate that the City of Bowling Green saw the need for fire protection around the year 1820. However, the first fire engine wasn't purchased until 1831 at a cost of $300 from the American Hydraulic Company. It was a hand-pulled, hand-operated rotary engine. By September of 1832, the first engine house had been constructed, and in 1838, Bowling Green was in the market for another fire engine, though records don't indicate if it was to replace or supplement the 1831 engine. The engine purchased in 1838 cost $700. Most records from this point until the 1860's are either missing or incomplete.



In February of 1866, another hand-pulled, hand-operated fire engine was purchased. During the 1870's, 80's and 90's, various purchases were made to add to and repair the fire apparatus for the volunteers. Records indicate that the volunteers were paid $2 for each fire they attended. In those days, they averaged about 60 fires per year.

On September 1, 1898, Bowling Green's first paid fire department came into existence. The chief of the Department was James A. Wilkerson, as he had been chief of the volunteer department. Chief Wilkerson was paid part-time because he also served as the city engineer at the same time. John Moltenberry and Dave W. Harrison were appointed



firemen, since both had seen action as volunteers.

As the Department became a paid one, it also moved its headquarters to a new location on State Street. In addition, the firefighters could ride on a hose and chemical wagon pulled by a team of horses rather than having to pull their equipment to a fire by hand. Hose and chemical wagons were purchased in 1898 and 1900, while a hook and ladder was purchased in 1901.

Until the early 1900's when the paid department was enlarged, volunteers aided the paid firefighters by running to the fire station and pulling their hose reels to the fire scene in order to assist. Around this same time, 17 fire alarm boxes were placed in the business section of Bowling Green. The alarm boxes were abandoned when telephones became available. One alarm box survived and is housed in the BGFD Administration Building.





In April of 1904, John Moltenberry was appointed to the position of Chief after having spent 2 years as a firefighter and 3 years as a captain. Moltenberry served as Chief until the end of 1938. His tenure as the City's first full-time paid fire chief saw many changes and improvements in the department. A new central fire station was completed in 1909 at a cost of about $10,000. In January of 1912, the chief's pay was $85 per month, captains received $65 per month, and firefighters with more than two years of experience received $60 per month. Lesser experienced firefighters received less pay. The Department at that time consisted of ten men who worked six days and six nights and had one day off.







In 1914, a "motor hose & chemical wagon" was purchased and by 1918, horse drawn fire engines had been totally eliminated. Chief Moltenberry apparently was in favor of replacing the horses because they "were always getting sick."

During the 1930's, firefighters began working a 24 hours on/24 hours off work schedule. In 1955, the number of fire stations increased from one to three; in 1970, a fourth station was opened to meet the needs of the growing city. In 1964, the firefighters also changed to a 24 hours on/48 hours off schedule, which they still work today.





In 1980, a new headquarters station was built on 7th Avenue and replaced the old building behind City Hall that still had a hay loft for the horses. In 1987, a new substation was opened on the north side of Bowling Green on Porter Pike. Two older substations were replaced and relocated with new buildings in 2001. In 2009, an additional fire substation was built, this one in the Greenwood area, and a new administrative building was built beside the headquarters station near downtown. Finally in May of 2021, a seventh station opened on Lovers Lane covering a district between Scottville Road and Cemetery Road.

In 2019, a significant portion of the fleet was upgraded with the replacement of four engines, one rescue, and one aerial from Pierce Manufacturing. An additional aerial was replaced in 2020, and a new engine was purchased for the addition of Station 7 in 2021. At the time of this report, the remaining two apparatus have been purchased to achieve a uniform fleet of frontline apparatus.







This brought BGFD to a current total of 7 stations and 1 administrative building. The Department currently has 10 frontline apparatus (6 engines, 1 rescue, 3 aerial ladders), with several support vehicles including an air crash fire rescue truck, a hazardous materials response unit, an equipment truck, brush truck, and special operations trailers to supplement the fleet.

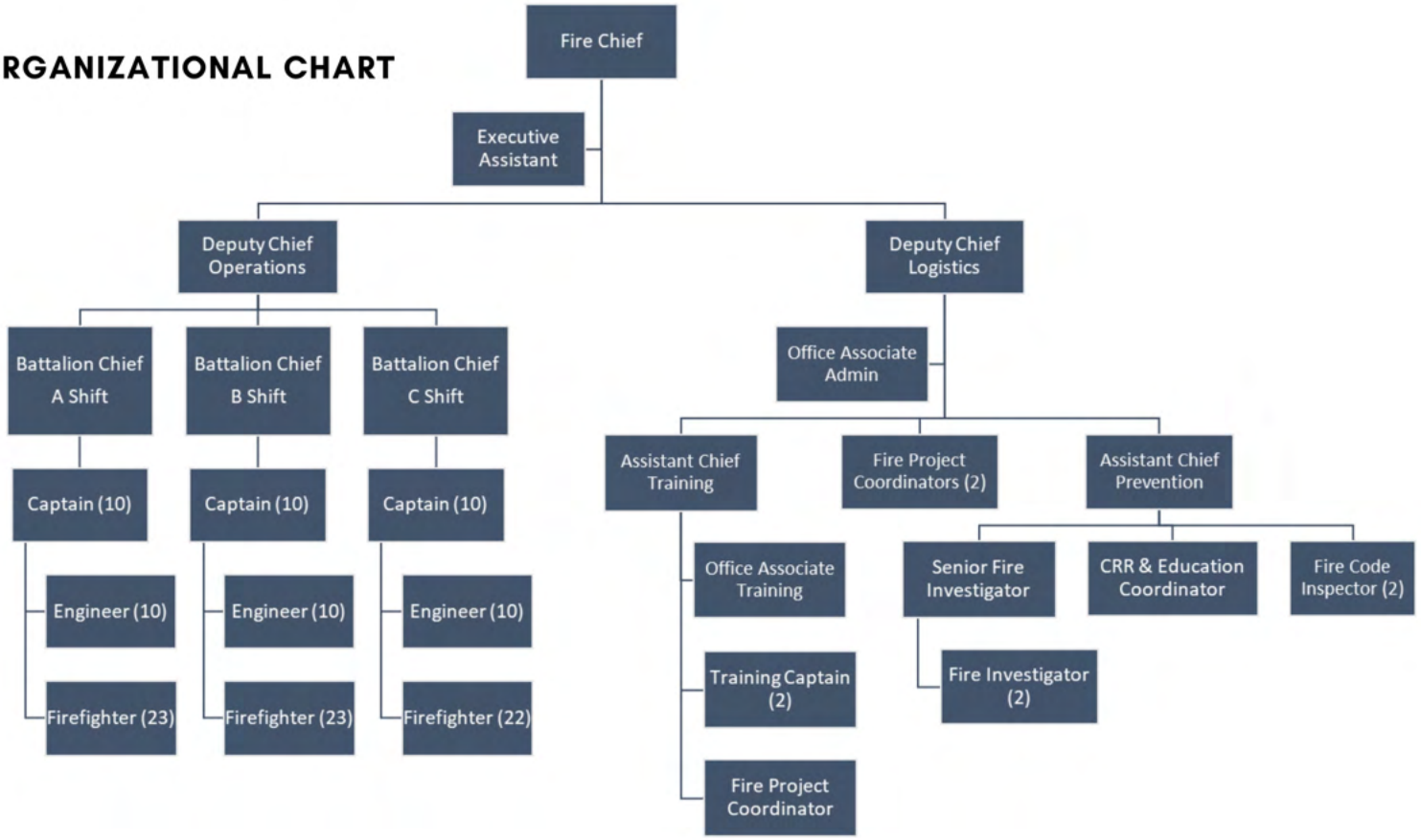
Plans are in place to build Station 8 in the northern Transpark area of Bowling Green to cover an identified gap in performance and protect a growing area of the City. An apparatus was ordered in July 2022 in anticipation of Station 8

DESCRIPTION OF SERVICES

The Bowling Green Fire Department is a career department with 150 employees. 131 are sworn personnel in the Suppression Division, 10 are sworn personnel in Administration, Training, and Prevention Divisions, and 9 are civilian. The Department's command staff includes the Fire Chief, two Deputy Chiefs, two Assistant Chiefs, and three Battalion Chiefs in the Suppression Division. The Administration Division includes the Fire Chief, two Deputy Chiefs, an Executive Assistant, and an Office Associate. The Training Division includes an Assistant Chief of Training, two Training Captains, an Office Associate, and a part-time Fire Project Coordinator. The Prevention Division includes an Assistant Chief of Prevention, one Senior Fire Investigator, two Fire Investigators, two Fire Code Inspectors, a Community Risk Reduction and Public Education Coordinator, and two part-time Fire Project Coordinators.

Approved for the upcoming fiscal year 2024 are three additional Battalion Chiefs in the Suppression Division, a sworn Training Instructor in Training Division, and additional civilian support staff for the Prevention Division. The Battalion Chief positions are contingent upon the opening of Station 8, the remaining positions are expected to be effective July 1, 2023.

ORGANIZATIONAL CHART



SUPPRESSION DIVISION

The Bowling Green Fire Department Suppression Division utilizes a three-shift (A, B, C) schedule, staffing one shift per 24-hour period. Each shift is fully staffed with 43 personnel.

Minimum staffing is established at 33. The Department consists of seven stations with a total of six engines, one rescue engine, one 107'aerial and two 100' aerial platform trucks.

Station One is staffed at minimum with a Battalion Chief in a Command Vehicle (Battalion 1), a three-person rescue engine (R1), and a three-person aerial platform (T1).

Station Two is staffed at minimum with a three-person engine (E2).

Station Four is staffed at minimum with a three-person engine (E4) and a three-person 107'aerial (T4).

Stations Three & Five are maintained with a minimum four-person engine crew at each station (E3, E5).

Station Six is staffed with a three-person engine (E6) and a three-person aerial platform (T6).

Station seven is staffed with a three-person minimum engine (E7).

In addition, the Department has a hazardous material truck, a decontamination trailer, an ARFF truck, a fire investigation equipment trailer, a loss control trailer, a brush truck, three zodiac rescue boats, two rescue rafts, and a trench/confined space rescue truck and trailer. The Department currently maintains five reserve apparatus for critical demand situations.

CURRENT STAFFING:

Station	Unit	Full Staffing	Minimum Staffing
1 - Headquarters	Battalion 1	1	1
1 - Headquarters	Truck 1	4	3
1 - Headquarters	Rescue 1	4	3
2 - Airport	Engine 2	4	3
3 - Southside	Engine 3	5	4
4 - Westside	Truck 4	3	3
4 - Westside	Engine 4	4	3
5 - Northside	Engine 5	5	4
6 - Greenwood	Truck 6	3	3
6 - Greenwood	Engine 6	4	3
7 - Lovers Ln	Engine 7	4	3



FIRE SUPPRESSION, INCIDENT STABILIZATION, & LOSS CONTROL

The Bowling Green Fire Department provides fire suppression and loss control services for all structures located within the City of Bowling Green. Seven fire stations are located strategically throughout the city and are able to deploy ten fire apparatus and a Battalion Chief quickly and efficiently in order to meet the response time standards as set forth by the Standard of Cover.

Members are trained, at minimum, to the IFSAC Firefighter 1 and IFSAC Firefighter 2 level in recruit training, receiving over 400 hours of training before being assigned to a fire apparatus. Annual training is conducted thereafter in order for members to continue to perform at a high level.

All fire apparatus equipment inventory meets the standard as set forth by ISO. All fires in the city are evaluated for loss control efforts. It is the mission of the Bowling Green Fire Department to serve, save and protect - this includes life and property. Loss control supplies and tools are housed at Station 4, and can be assigned to any fire as deemed necessary by the Incident Commander. Loss control efforts begin with the first arriving unit and continue throughout the incident. Once the fire has been extinguished and the investigation completed, the building can be made secure to prevent further water or weather damage, and to discourage trespassers from entering the property.

COMMUNITY RISK REDUCTION, FIRE PREVENTION, FIRE SAFETY EDUCATION, & CODE ENFORCEMENT

The Bowling Green Fire Department is intentional in efforts to be involved with public relations and outreach events within the community including; nursing home visits, media interviews, parades, and community block parties. The Department continues to provide up-to-date fire safety education through efforts in Community Risk Reduction (CRR) including; station tours, classroom education programs, and community smoke alarm/fire extinguisher drives. Annually, the Fire Department hosts a Firehouse Festival in October to commemorate National Fire Prevention Month. All community members are given an opportunity to see firefighting equipment, receive valuable fire safety information through handouts and demonstrations, and watch displays of the types of emergency responses the Department is involved in.

In an effort to reach and educate as many citizens as possible, the BGFD disseminates fire safety education continuously on social media platforms to include Facebook, Twitter, Instagram, and YouTube as well as periodic interviews broadcasted on both radio and TV outlets. The Department participates in many public education and community outreach events throughout the City of Bowling Green, local schools, and the campus of WKU. The Prevention Division is also very involved in recruitment efforts and attends several events throughout the year to disseminate qualification information and cultivate interest in fire service careers.

Community Risk Reduction is further outlined in detail in Volume 2 in BGFD's Policy and Procedures manual and Chapter 12 of the City of Bowling Green Code of Ordinances.



FIRE CAUSE INVESTIGATION AND ARSON PROSECUTION

The Bowling Green Fire Department strives to determine origin and cause of all fire incidents that fall under Kentucky Revised Statute 95.500. Three Fire Investigators, with the assistance of ATF Accelerant Detection Canine Millie, conduct all origin and cause investigations and they are an integral part in the public education outreach classes and recruiting events. In 2021, BGFD Investigations added an additional investigator and transitioned to a 24/48 hour shift schedule with additional on-call duties. This allows each shift to have a dedicated, assigned investigator. This transition was needed to keep up with the demands of the growing number of investigations without sacrificing the quality of the investigation. Investigation numbers have consistently increased within the reporting period. 116 Investigations were completed in 2021, which represents a 178% increase over the 5-year average. A new record was set with 123 investigations completed in 2022.

In 2021, the BGFD entered into a mutual aid agreement with The Warren County Sheriff's Office to assist with fire investigations throughout Warren County. BGFD also has an active memorandum of understanding with the Bowling Green Police Department for arson investigations within city limits. BGFD investigators work hand-in-hand with local law enforcement and the Court system to prosecute arson incidents.

178%

Increase in Investigations

in 2021 over the 5-year historical average

18.5

Scene Hours

In 2021, investigators spent 18.5 hours investigating arson incidents in Warren County, per a mutual aid agreement with WCSO



EMERGENCY MEDICAL SERVICE

The Bowling Green Fire Department provides emergency medical care as first responders at the EMT-Basic level to serve citizens and visitors. BGFD has an agreement with Med Center Health EMS to provide assistance on certain calls as dictated by agreed-upon standard operating guidelines and procedures. BGFD's Medical Director is Dr. Robert Wasson, who provides oversight to the Department's EMS program. 95% of members are certified to the EMT-Basic level, with several members being certified at the EMT-Paramedic level. Although BGFD does not provide ALS care, paramedics provide continuing education to basic providers. Transport is provided by Med Center Health EMS.



HAZARDOUS MATERIALS INCIDENT MITIGATION

Bowling Green Fire Department Hazardous Materials Program is designed to meet the standards set forth by NFPA 475, NFPA 472, and OSHA 1910.120. All members are trained to Awareness and Operations Level. Some members are trained to Technician Level with one obtaining Specialist. The stations that are expected to respond to a multiple-unit response participate in more training than the rest of the Department. These members' training hours exceed the required 6 hours per year by ISO. Members who are assigned to Station 3 have the most training hours in hazardous materials because the program is based at Station 3.

BGFD has one HazMat unit that is comprised of a 2004 GMC truck and a well-equipped 44' cargo trailer. The Department has a compliment of research software as well as hard copy books. Most mitigation equipment is housed in the response trailer. Training supplies are kept in a storage room.

The HazMat program has begun the planning phase for an additional HazMat unit. The growth of the Bowling Green community is going to require another unit to maintain an adequate response in industrial parks.

TECHNICAL RESCUE

The Bowling Green Fire Department provides six technical rescue specialties to the City of Bowling Green: Structural Collapse, Trench Rescue, Vehicle and Machinery Extrication, Swiftwater Rescue, Confined Space Rescue, and Rope Rescue.

STRUCTURAL COLLAPSE

The structural collapse program is in place so the BGFD can safely effect rescue in a collapsed building or structure. All members of the technical rescue program are trained to at least the operations level with a few trained to technician level. This gives members the knowledge to decide if a structure is safe to enter without supplemental shoring or if shoring needs to be in installed as they enter the structure

TRENCH RESCUE

The Department identified the need for a Trench Rescue Program in the late 1990's and the program has been developing ever since. The trench rescue program is intended for emergency response rescue of victims that are entrapped by a failed trench system at a construction site or other place where a trench collapse has occurred. The Bowling Green Fire Department technical rescue team has technician level and operations level trained personnel while all BGFD members are trained to the Trench Awareness level. The program has access to trench shoring equipment, shoring panels, rope rescue systems, and supporting equipment to carry out rescue operations.



VEHICLE AND MACHINERY EXTRICATION

The Bowling Green Fire Department responds to all vehicle accidents with injuries and entrapment inside the city limits. BGFD suppression apparatus are outfitted with a full complement of extrication tools that are made to be used to free occupants of vehicles or machinery they have been entrapped in or upon. Mutual aid responses are made to support county departments with incidents that involve vehicle entrapment. BGFD also responds for machinery extrication inside the city limits as well as Warren County.

SWIFTWATER RESCUE

The Bowling Green Fire Department Swiftwater Rescue Program exists to provide water rescue services on the many waterways in the area. The Barren River, Drakes Creek, and Jennings Creek run through the heart of the City of Bowling Green.

In addition, BGFD provides automatic aid rescue services for the Barren River, Green River, Gasper River, Drakes Creek, and Trammel Creek in Warren County. Limestone Lake in the city, Shanty Hollow Lake in the county, as well as many other lakes, ponds, and waterways provide ample need for professional rescue services. Neighboring counties are able to request a response from the BGFD as well.

Paddle sports have become very popular in the area and the Warren County Blue Ways Project has set up 32 kayak access points on the many waterways of the county. This has provided an exciting opportunity for outdoor sports enthusiasts but has also increased the number of water rescues as more inexperienced paddlers are on the water.

To meet the need for these rescue services, the Bowling Green Fire Department Swiftwater Rescue Program operates with 3 motorized inflatable boats, 3 inflatable rafts, and 2 quick response RIT Craft inflatables. Stations 1, 5, and 6 make up the program and each station is equipped with a motorized boat and a raft as well as all necessary PPE. The goal of the program is for all Station 5 and 6 members to be certified to the Operations Level with Station 1 personnel trained to the Technician Level. Swiftwater training is performed every 6 weeks and Operations and Technician classes are provided as needed to certify new personnel. The Swiftwater Program has conducted over 70 water rescues in the past 10 years.

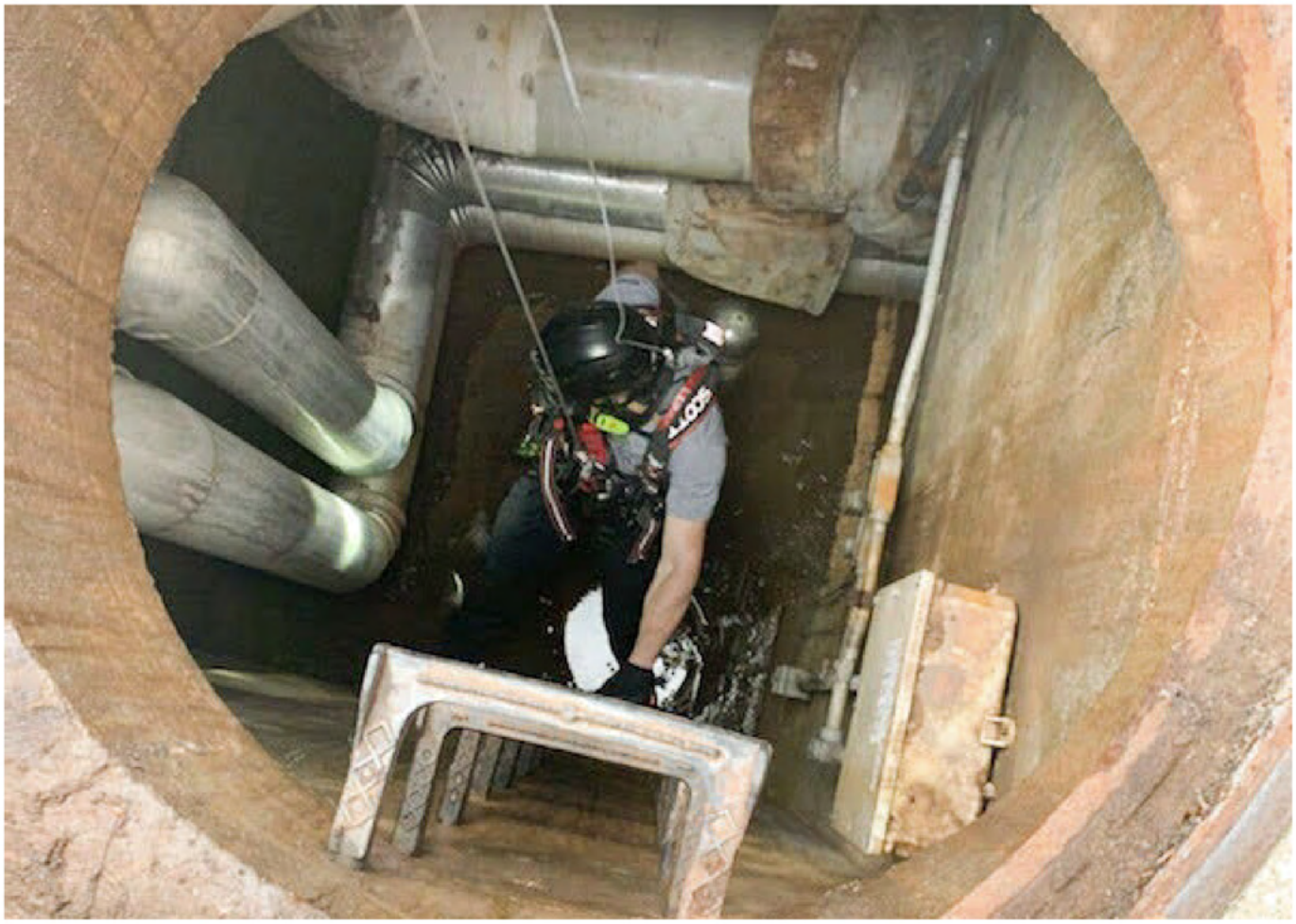


CONFINED SPACE RESCUE

BGFD Confined Space Rescue provides high-level emergency response to any confined space incidents in Bowling Green and Warren County. A confined space is a space that has limited openings for entry and/or exit and is not intended for continuous occupancy. If an emergency occurs in such a space, the confined space rescue team uses specialized equipment and training to mitigate the situation. The confined space rescue team will respond to the surrounding areas upon request.

ROPE RESCUE

The BGFD Technical Rope Rescue program is designed for response to both high- and low-angle rescue of stranded and/or injured persons. The members of the Rope Rescue Program are trained to either the operations or technician level as defined by NFPA 1670. BGFD maintains 3 full compliments of rope rescue equipment located at Station 1 and Station 5. The team from BGFD routinely responds to all of Bowling Green and also Warren County for rescue incidents and is also available to respond upon request to the surrounding areas of Western Kentucky.



AIRCRAFT RESCUE & FIREFIGHTING

The Bowling Green Fire Department Aircraft Rescue and Fire Fighting (ARFF) program is located at Fire Station 2 in to close proximity to the Bowling Green/Warren County Regional Airport (BGWCRA) to provide ARFF coverage in the event of an aircraft emergency at the airport. The BGWCRA is an FAA Part 139 Index A, Class 4 certified airport.

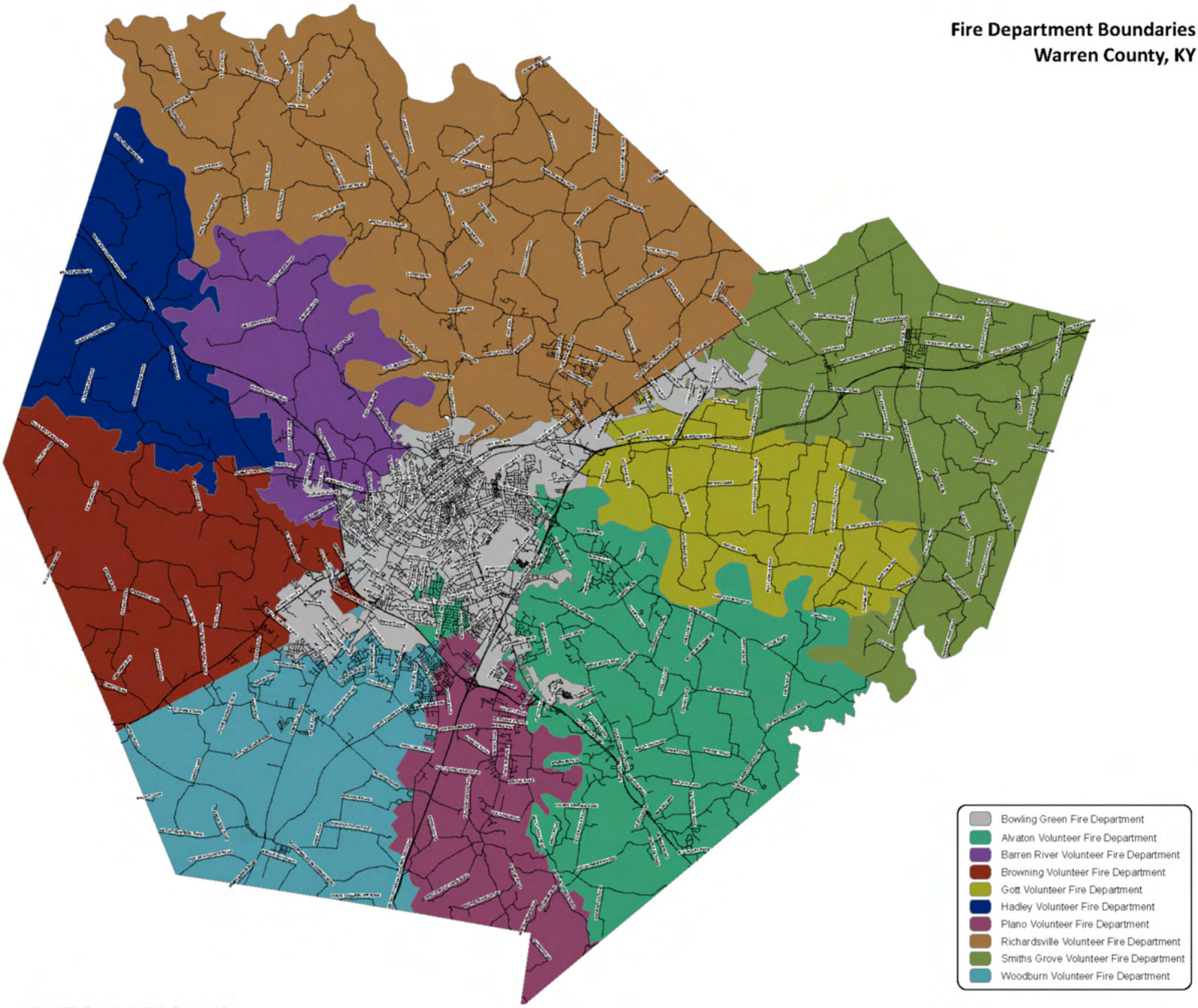
The primary aircraft operating from the airport are single-engine, fixed-winged aircraft that seat 2-4 persons (i.e., Cessna 172) based from the airport along with a few corporate and private turboprop aircraft (i.e., Pilatus), a business jet (Cessna Citation), and a few rotary aircraft. There are 15 hangers: 1 maintenance hanger, 6 hangers for the larger business and private aircraft, and 8 buildings of T-hangers.

Station 2 crews conduct multiple aircraft standbys throughout the year, primarily in the fall and winter due to the WKU football, basketball, and volleyball teams and their opponents utilizing charter aircraft to fly in and out of BGWCRA. These charter flights are on Index B and C aircraft and standbys are provided upon request. During these standbys, the crew is dedicated to providing ARFF coverage to that aircraft 15 minutes prior to and after a landing or departure.

Part of the program's annual evaluation is to ensure all 12 members (4 per shift) assigned to Station 2 cover all FAA Part 139 required subject areas of training throughout the year; this training is documented in Emergency Reporting and is provided to the FAA Inspector by the Assistant Chief of Training to ensure requirements are met and the airport can maintain its certification. In April and May, crews at Station 2 conduct annual airport refresher training for their respective shifts, help coordinate and participate in an annual, multi-agency airport night drill, and complete their annual ARFF certification burn. The BGWCRA donated a small, experimental private jet to the BGFD at the end of 2020 for training purposes. The jet is continually used for ARFF training by Station 2 crews to meet their FAA required skills. Six of the current Station 2 firefighters are ARFF IFSAC certified; the other 6 firefighters plan to go to the ARFF IFSAC training course later in 2023.

In May of 2021, Station 7 opened near the opposite side of the airport to service a growing area of the city where data indicated a new station was needed. Engine 7 will be the second arriving apparatus to the majority of on-airport emergencies and in some locations, the first. Because of this proximity, even though an ARFF vehicle is not stationed at Station 7, the Administration and firefighters felt it necessary for those stationed there to begin ARFF training. Station 7 personnel participate in weekly ARFF training facilitated by Station 2 captains and all members there also meet the Part 139 training requirements with the exception of being sent to a regional training center for an annual live burn.





AUTOMATIC AID

The Bowling Green Fire Department has an automatic aid agreement with the Warren County Technical Rescue Team to provide technical rescue support for events such as rope rescue and swift water rescue. This agreement establishes joint response for such events endangering life within Warren County Fire Department jurisdictions. Additionally, the BGFD, the Warren County Fire Departments, and the Warren County Sheriff's Department have an interlocal agreement for automatic aid for an active shooter/hostile event that takes place in Warren County. The BGFD has the proper personal ballistic protection of an active shooter response and members are trained in hemorrhage control and Rescue Task Force deployments. In the event of an active shooter response within Warren County, the BGFD will automatically respond to provide Rescue Task Force for entry into parts of the facility with law enforcement for hemorrhage control and rapid extrication of victims.

AREA CHARACTERISTICS

The City of Bowling Green is a rapidly-growing city located in south-central Kentucky. Situated on the Interstate 65 corridor, 66 miles north of Nashville and 114 miles south of Louisville, it is the regional economic, educational, and transportation hub for a ten-county development district. The city covers 42.55 square miles and has an estimated population of 73,529 according to current records at the Federal Census Bureau. Compared to the 2010 Census population of 58,067, there was a 24.5% population growth in the past 10 years. In addition, over the past 20 years since the 2000 Census, the population has increased 49.2%. The current population density is 1,728 per square mile. As the home of Western Kentucky University, the median age in Bowling Green, 27.6 years old, is significantly lower than the national average of 38.6 years old.

24.5%

Population Growth
from 2010 to 2020 Census

1,728

Population Density
People per square mile

27.6

Median Age
28% lower than National Average



The north and south corridors into the city host rapidly-growing industrial parks that are expanding the city limits. Kobe Aluminum, Henkel Corporation, and Bendix Commercial Vehicle Systems are just a few staples along the south corridor while Bowling Green Metal Forming, General Motors Assembly Plant, Ball Corporation, and Crown Cork and Seal call the north corridor home.

Mentionable future interests include Tyson Food's processing plant (400,000 square feet) that will be in full operation in 2023, as well as Envision AESC's battery cell factory, set to be fully operational in 2027, which will create 2,000 new jobs and have an estimated 68 acres under roof. Both of these future plans will reside in the north industrial park and will be driving additional commuter traffic to the area as well as an increased population to the City of Bowling Green.

The City of Bowling Green is known regionally and nationally for Western Kentucky University and as the home of the Chevrolet Corvette. Both these characteristics add flavor to the city and create additional dimensions to the district the Fire Department must protect.

The General Motors Corvette Assembly Plant and the National Corvette Museum are nationally recognized attractions that bring many tourists to town. In addition, Beech Bend Raceway hosts numerous car shows and racing events annually that bring a large influx of tourists to the area.

Western Kentucky University (WKU) is another major draw to the City of Bowling Green. With a total enrollment of 14,729 undergraduate students and 2,021 graduate students, WKU affects many aspects of the city in hosting sporting events and other extracurricular activities. Additionally, there are a total 18 residence halls on campus with 4,425 students living there for the fall 2022 semester. WKU's campus, as well as the center of the downtown district, covered by BGFD Station 1, have hilly topography, hence "Hilltoppers." This can create a challenging aerial platform set that requires both skill and creative thinking to overcome.

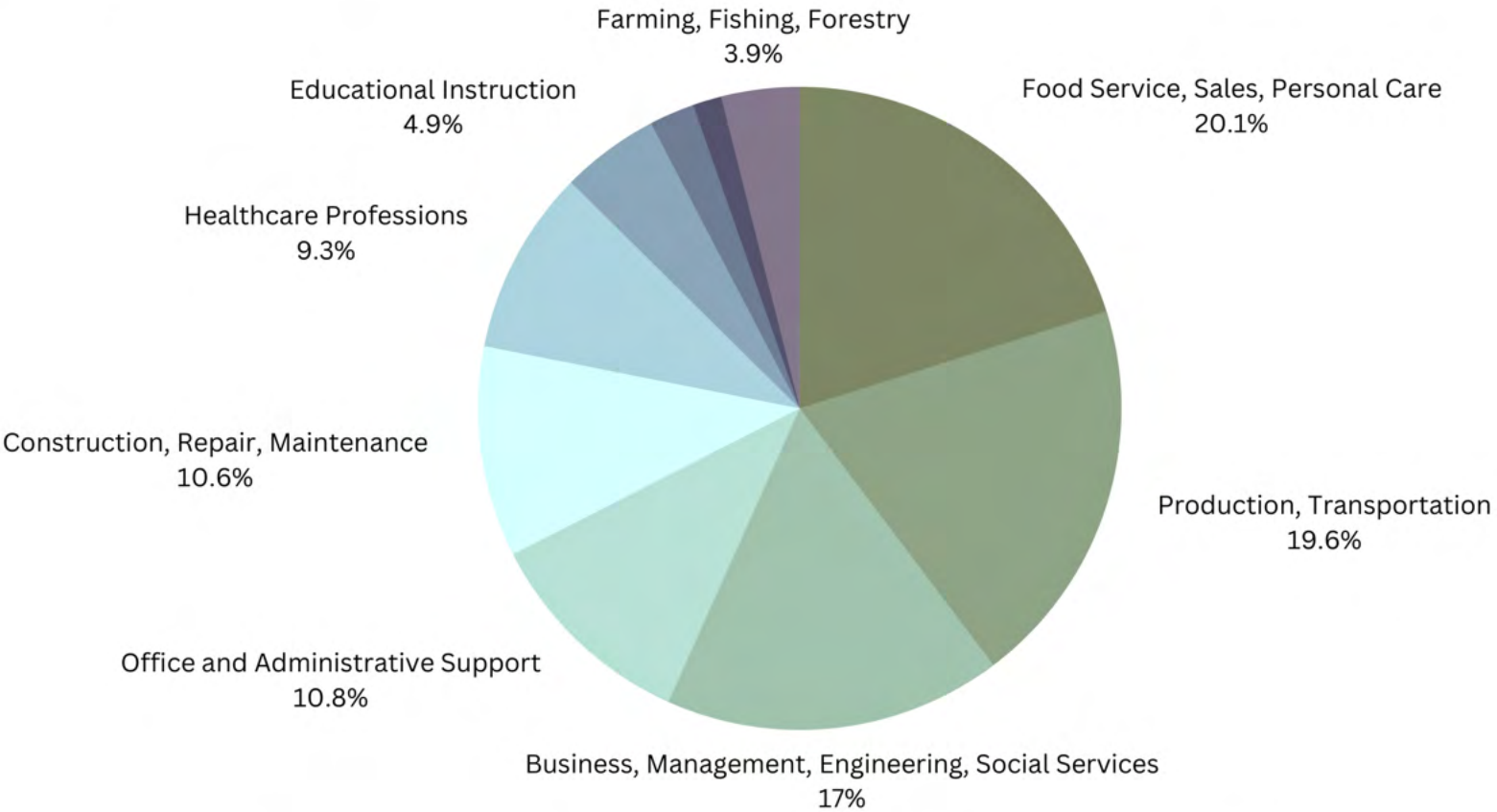


Data shows that the Census population numbers and square mileage totals do not tell the full story of the City of Bowling Green. According to a study by the Bowling Green Area Chamber of Commerce, the City's daytime population grows to a total of 94,476 people every day due to workers commuting from outside the City limits from Warren County and other surrounding counties. Considering this, as well as the added population of WKU's student population, the BGFD must be prepared to provide services for all population groups within the response area at any time of day.

ECONOMIC/OCCUPATIONAL BASE

The City of Bowling Green is at the center of a 10-county regional, economic, employment, transportation, healthcare, and education district. It has a varied economic profile. Manufacturing, education, healthcare, retail, and service industries have a significant employment role in the City of Bowling Green. As of March 2022, there were over 80,000 people employed in the City, while the resident population of the City is just over 73,000.

OCCUPATIONS IN BOWLING GREEN, 2022



The broad and varied occupational base provides the City of Bowling Green with a solid economic foundation and has been one stimulus driving City growth.

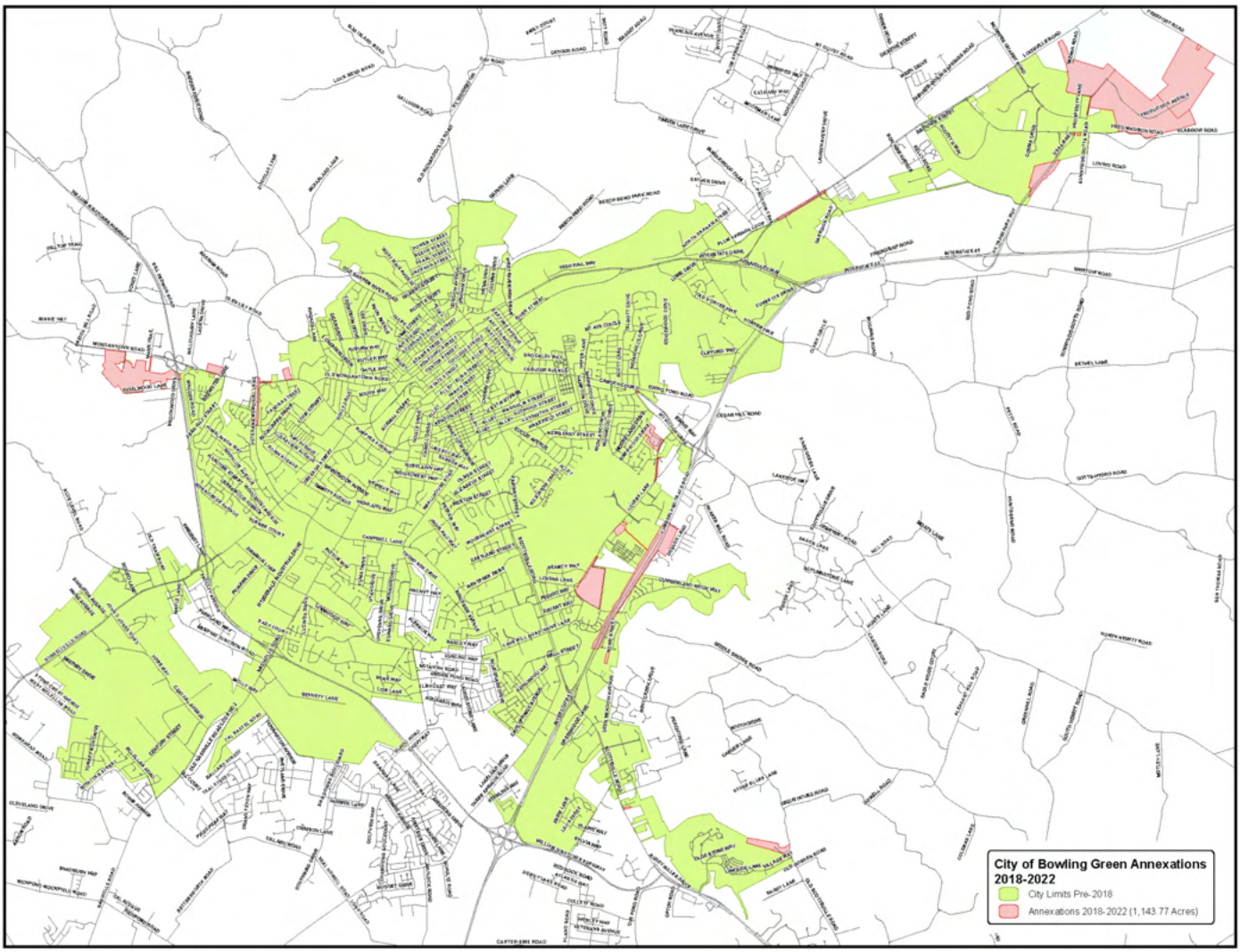
Daytime travel rates increase from normal levels during certain times of the year, such as the busy holiday shopping season or Corvette Homecoming weekend. Tourism has a significant impact on traffic at times. The Fire Department must consider all these activities in order to provide response during periods of heavy usage.

The Barren River flows east to west through Bowling Green's central district. The river complicates response strategies by introducing pinch points in logistics through two bridges in the city and one bridge on I-65. Barren River introduces swift water responses between Station 5 and Station 1 at the dam located at Bowling Green water treatment plant on 31-W Bypass. Drakes Creek also has the capacity for swift water events in the Greenwood District (Station 6) to the south of Bowling Green on Scottsville Road.

The I-65 and I-165 interstates cut Warren County into 4 quadrants. I-65 comes into Warren County from the south and slices through Bowling Green before it routes traffic northeast out of the county. I-165 begins in Bowling Green just off of Scottsville Road, flows around the city, and then towards the northwestern part of Warren County. Both interstates introduce similar logistical challenges as the Barren River by creating pinch points as well as the added risks of vehicle accidents and hazardous material cargo traveling through the city. Although the roadways of I-65 and I-165 are not included within the city limits, therefore not included in BGFD's response district, the risks associated by the roadways can have a mutual aid impact on the response elements of Warren County emergency agencies.



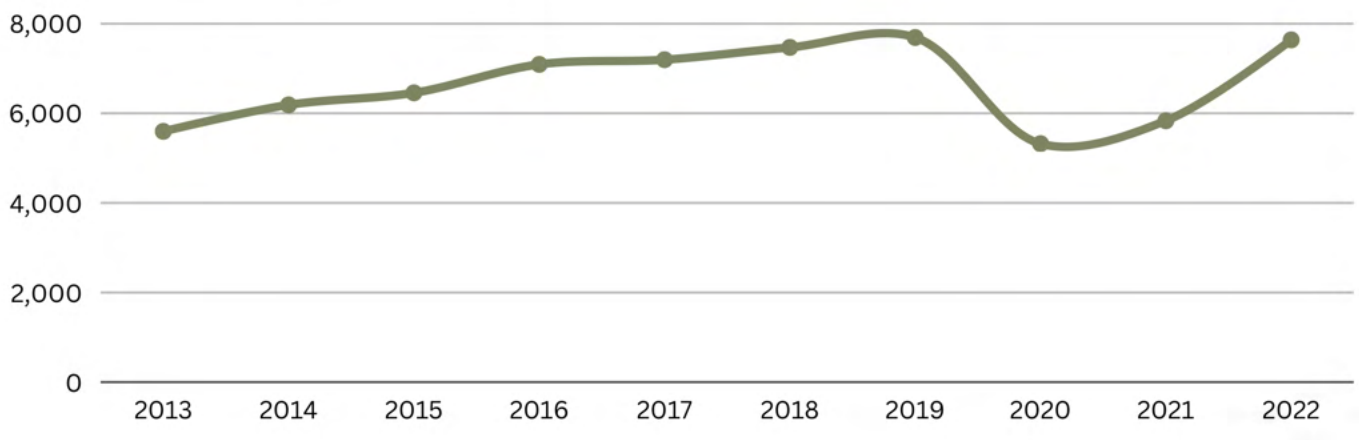
As of September of 2021, Automatic Resource Location (ARL) was added to BGFD's inventory of tools that allow the Department to capitalize on fast and efficient response times. ARL lets computer aided dispatching system (CAD) know where apparatus are located in the city via GPS transmitters and receivers on each unit. For example, if an apparatus is traveling through another district on its way to a training exercise and a call comes out, the traveling unit may be closer to the emergency scene than the unit that normally covers that district. If this is the case, the GPS coordinates of the traveling unit will reveal this to the CAD system and the closer unit will get dispatched to the scene. The BGFD still maintains the hard boundaries that separate fire districts within the city in the event that GPS malfunctions or otherwise is not available.



ANNEXATION AND GROWTH

Not only has the City of Bowling Green experienced a significant growth in population, there has also been significant area growth and increase in Fire Department call volumes. In 2018, the limits of the City of Bowling Green included 39.62 square miles. Through annexation, the City of Bowling Green in 2022 includes 42.55 square miles. This is an increase of 7.39% for the response district.

FIRE DEPARTMENT CALL VOLUME 2013 - 2022

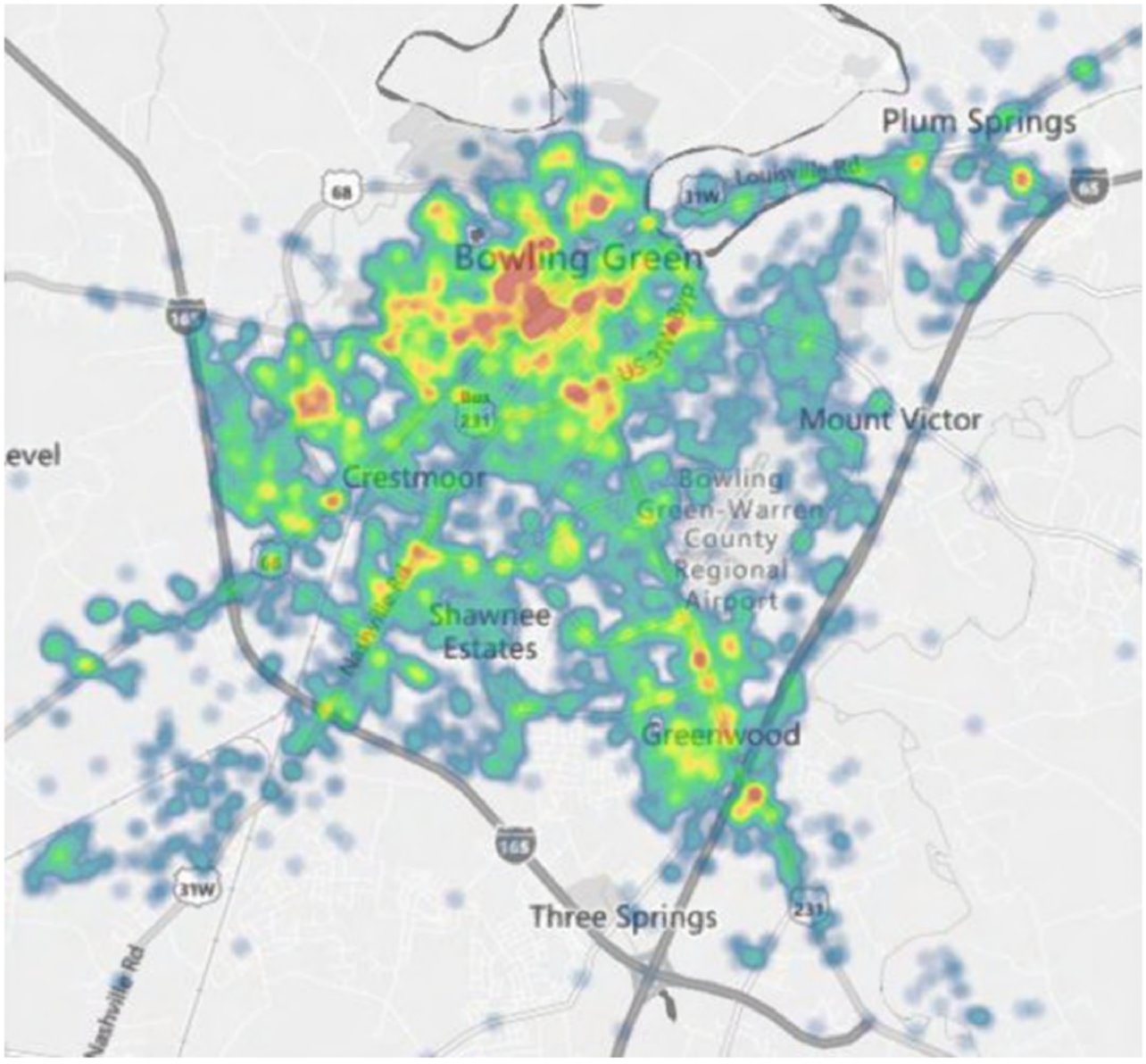


RISK ASSESSMENT

The Bowling Green Fire Department reduces risk in the community through emergency response, education, enforcement, and engineering. This section reviews, identifies, and categorizes the risks and hazards of the properties and area within the City of Bowling Green as they relate to the services provided by the Fire Department. By determining the fire and non-fire risks in the community, the risk assessment makes it possible to develop appropriate resource deployment strategies. The goal is to determine the probability of an event occurring, the consequence of that event, and place resources in position with the capabilities to effectively and efficiently mitigate that event.

The run volume concentration map below illustrates the high run volume in the districts covered by Stations 1 and 4, which justifies a higher concentration of resources in these areas.

RUN VOLUME CONCENTRATION



Risk assessment consists of two main elements: Probability and Consequence.

PROBABILITY

Probability is the likelihood that a particular event will occur within a given period of time. There is always a probability of an event occurring. The frequency of that probability ranges from low to high. Probability then is an estimate of how often an event will occur.

CONSEQUENCE

Consequence relates to life safety in regards to the amount of personnel and equipment required to rescue or protect the lives of occupants from life-threatening situations, including both fire and EMS, as well as economic impact (the losses of property, income, or irreplaceable assets). There is always a consequence from an event occurring. The consequences range from low to high.

Based on the Risk Assessment and the evaluation of probability and consequence, effective resource deployment or placement can be attained. Stated as simply as possible, this is how the Department determines where to put its stations, trucks, and personnel. Effective deployment, the placement of apparatus and personnel, consists of two main elements: Distribution and Concentration.

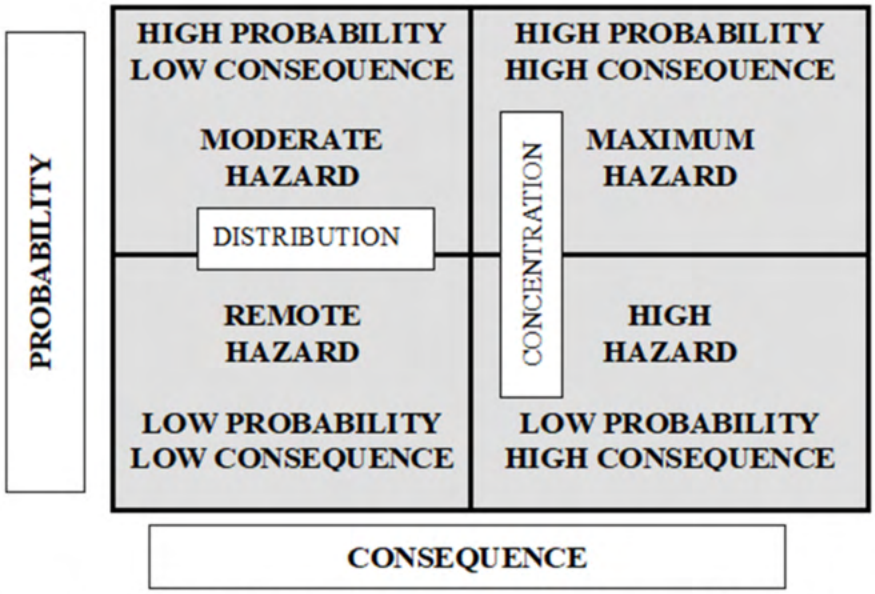
DISTRIBUTION

Distribution refers to the geographic location of all first-due resources for initial response. Distribution should be as uniform as possible throughout a response area. The Bowling Green Fire Department operates out of 7 fire stations distributed throughout the city to provide consistent response times. This distribution should allow first-arriving units to begin rapid early mitigation efforts, such as initial fire attack, search and rescue, initiating CPR, performing electro-cardio defibrillation, and calling for additional units.



CONCENTRATION

Concentration refers to the number of resources needed in a given area based on risk and history. While distribution is uniform to provide for faster initial response, concentration is increased in areas of higher risk, providing for arrival of the Effective Response Force. **Effective Response Force** is defined as the amount of resources that will most likely stop the escalation of an emergency of a specific risk type. In the City of Bowling Green, Fire Department personnel are more concentrated in the Headquarters (Station 1) and Westside (Station 4) districts. This is due to the Risk Assessment and the use of historical run data showing these districts to have an increased risk of fires and fire loss. This higher risk calls for increased concentration of Fire Department resources in this area.



This risk assessment has been developed as one of the fundamental documents for the Commission on Fire Accreditation International (CFAI) self-assessment process. It is a continuation of the initial assessment performed in 2007 and expanded in 2013, 2018, as well as this year. There have been significant changes in the BGFD response area. Both the population and size of the coverage area have increased. Station 7 came on-line in 2021 with a new engine, increasing the number of response districts from six to seven. Due to continuing growth and development, plans for the construction of an eighth fire station are being developed in the northern most industrial park to protect valuable economic assets to the City of Bowling Green. As the community has grown, the Department has also grown in order to meet the needs of the citizens of Bowling Green.

Additionally, the tools available for a risk assessment have grown more sophisticated. Data gathering and analysis are possible in ways never before available. GIS plotting of all incidents is commonplace. Response time analysis can be evaluated on a block-by-block basis. Detailed community information is readily accessible. The range and depth of accessible data provides great resources for assessment. A formal risk assessment will utilize some of these resources to gather data regarding the City of Bowling Green, its geography, population distribution and density, land use, socio-economic distribution, and Fire Department response history. This information will provide more clarity regarding the fire and non-fire risks existing in the City of Bowling Green. Much of this information is divided into 24 planning zones defined within the city for a more detailed analysis. All this is being conducted to provide solid data in order to make the best possible decisions for the deployment (both distribution and concentration) of Fire Department resources.

STRUCTURAL RISK EVALUATION

The evaluation of individual structures and occupancies in the Bowling Green area has the same bones as the risk assessment outlined previously, however its application differs in that it is focused on individual occupancies opposed to geographical areas. The BGFD uses a system called VISION to analyze and categorize risks in individual occupancies. VISION was created in 2005 by Emergency Reporting in contract by CFAI to create a web-based risk assessment resource. The VISION system can compare data to other departments nationwide, and generate the Occupancy Vulnerability Assessment Profile (OVAP) score for all inspected occupancies within the response area. The OVAP score reflects risk that is specific to each occupancy based on occupancy; area and volume; property value; and life safety profile. The higher the OVAP score, the higher the risk to the BGFD. VISION is used as a component of the Emergency Reporting System and is integrated into BGFD's database that contains all occupancy statistics and run reports. Like the Emergency Reporting system, VISION is 100% web-based. The OVAP score is evaluated in the "Hazards" tab within the occupancy settings in Emergency Reporting. Once in the Hazards tab, a user can enter information about the occupancy selected such as but not limited to number of employees, number of floors, square footage, occupant mobility, construction type, and fire load. The VISION system is a tool that is currently being refined by the BGFD. Not all occupancies have been fine-tuned to comply with this system but the BGFD has multiple full-time and part-time employees along with suppression employees honing the system.

Group	OVAP Score
Maximum	60+
Significant	40-59
Moderate	15-39
Low	14 or less

- **Maximum Risk:** Occupancies that are made up of combustible materials or share walls/attic space with or are closely exposed to other structures.
- **Significant Risk:** Occupancies that contain a substantial amount of wood-framed or heavy timber components
- **Moderate Risk:** Occupancies that comprise of an ordinary compliment of construction materials
- **Low Risk:** Occupancies that are made of mainly fire-resistive or noncombustible materials



DISASTER RISK

The City of Bowling Green is prone to disaster-related events that affect the Midwestern United States. The risk for tornadoes is 55% greater than the overall U.S. average. The risk of earthquake is below U.S. average and extremely rare. Disasters include the following:

SEVERE WEATHER

- Thunderstorms with large hail: annually
- Tornadoes: rare
- Flooding: rare
- Freezing temperatures with severe wind chill: annually
- Heavy snow with blizzard conditions: rare
- Prolonged hot temperatures with high heat conditions: annually
- Drought: rare

Severe Weather History

On Friday, December 10, 2021, the atmosphere deteriorated throughout the day, and at 0100 on Saturday morning the 11th, the first of three tornadoes crossed into Warren Co. at the Logan Co. line; this was an EF-3. The second tornado hit the Russellville Road area, proceeded south of Western Kentucky University's campus, parallel to Interstate 65; this was also an EF-3. The third tornado started at the Bowling Green - Warren County Regional airport, crossed Interstate 65 and caused damage to the Corvette track; this was an EF-2. Three significant tornados hit Warren County that morning, resulting in 17 casualties. The storm system that hit Kentucky caused over 70 casualties statewide.

BGFD activated Storm Mode in anticipation of severe weather to prioritize emergency resources. Deputy Chief Smith responded to the Dispatch Center to assist with prioritizing incident calls and effectively managing pending calls for service. Emergency Operations Center was established within one hour with additional phone lines to field calls away from the Dispatch Center. The Command Post was established at Jennings Creek Elementary School on Sunday, December 12th. The school's proximity to ground zero operations provided a large area for staging, accountability, and rehab.



400

Calls received to Dispatch

within the first hour after the storm

160

Search and Rescue Volunteers

assisted BGFD throughout the five-day search operation

244

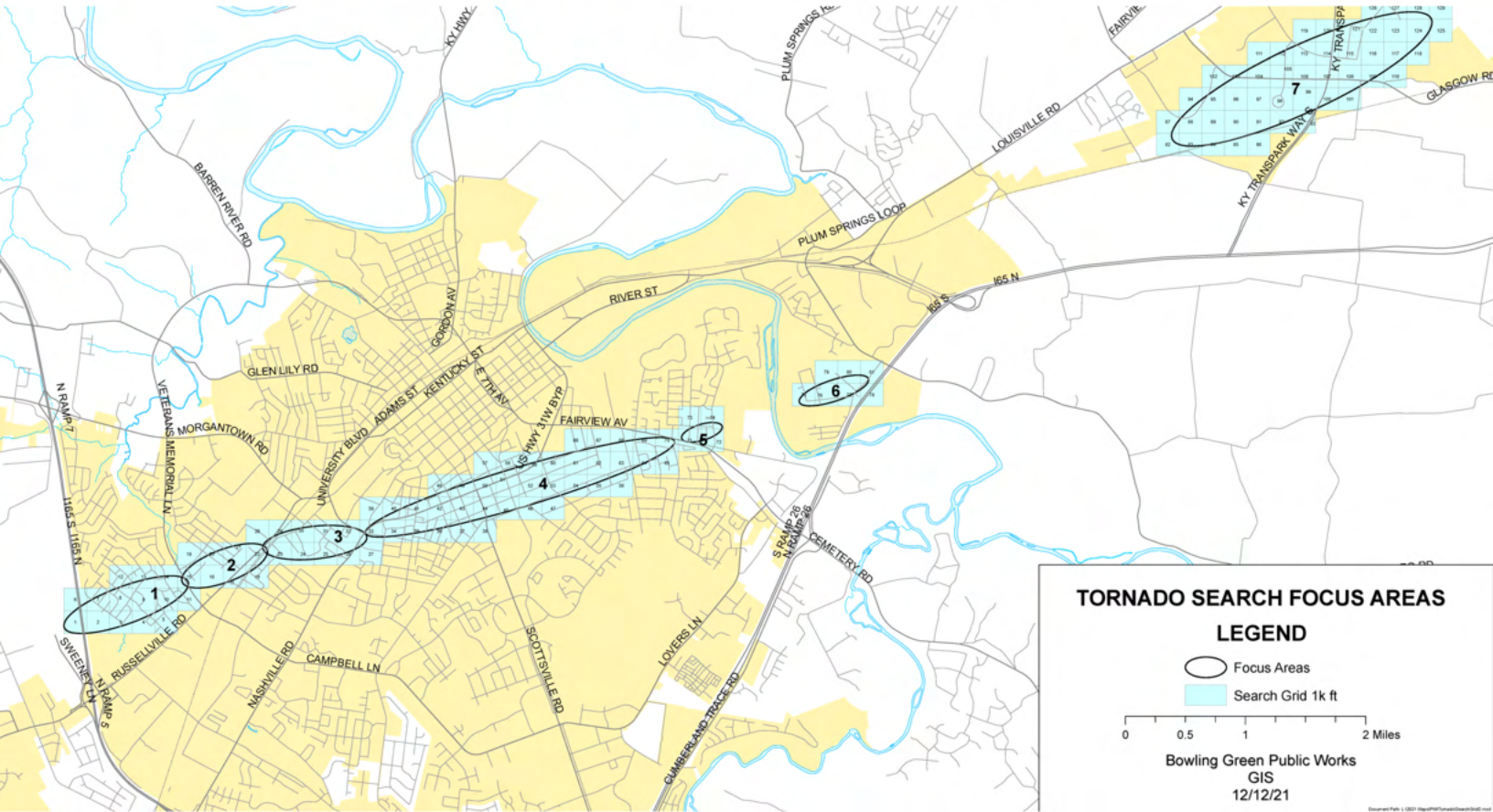
Missing persons cases

worked by BGPD, narrowed to zero after the final victim was located on Thursday, December 16th

The Strike Team was activated and an all-call was issued at 0139 on December 11th. 33 personnel were on shift that night, and between 0130 and 0700, 65 additional members of BGFD responded. BGFD units performed search and rescue in the Creekwood area through the night, rescuing multiple victims trapped in debris. Rescue efforts were only needed in the Creekwood neighborhood, although other areas of Bowling Green were severely affected, see map below. No injuries or fatalities were reported in other affected areas despite significant property damage.

Over the five days following the tornado events, BGFD was assisted by 160 additional search and rescue volunteers, including seven canines and the FEMA Urban Search and Rescue Task Force Type 3 Team of 45 personnel.

While the devastation was like no other, it allowed the Department to grow and develop additional outreach opportunities. The Prevention Division has created tornado shelter handouts and has held multiple tornado safety presentations throughout the community. Plans are in place to include this safety message in presentations, when appropriate, as part of Community Risk Reduction efforts.



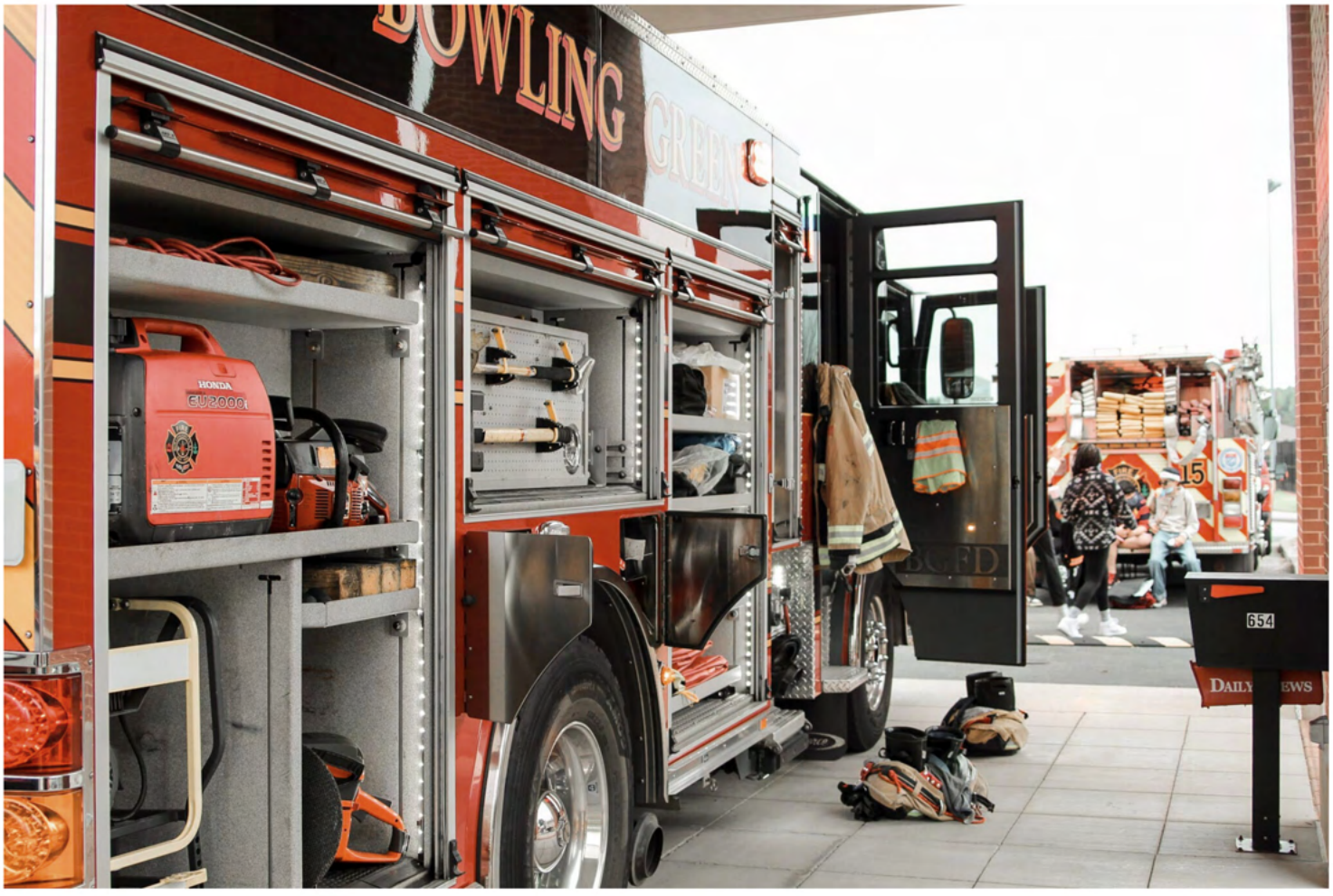
MAN-MADE RISKS

- Hazardous materials use and transport risk: daily - event: rare
- Commercial and small airport traffic risk: daily - event: rare
- Large structures with public gatherings: monthly
- Railroad traffic freight and passenger on shared line: rare
- Acts of aggression: rare

NATURAL RISKS

- Infectious disease: rare
- Earthquake: rate

The Fire Department is prepared to address each of these types of disasters within the scope of its mission. Conditions and outcomes under disaster situations may not achieve the established goals identified by the Department, as all agencies involved will most likely be overtaxed in their service delivery. The Department is capable of accessing additional resources through the Warren County Disaster Plan and the State of Kentucky Disaster Plan. Such plans call for operation and control beyond the scope of the city, but would be supported by the Department.



ADDITIONAL AND SPECIAL RISKS

The Bowling Green Fire Department recognizes special risks and hazards within its jurisdiction. These include railroads, major highways, special events, gatherings, and specific building occupancies that present unusual risks and hazards.

WILDLAND/URBAN FIRE INTERFACE

The Fire Department has assessed its risk of field fires located in non-developed areas of the city and determined it to be low. Open burning is regulated in the city through the issuance of open burning permits granted by the Fire Department. Each permit is issued following an inspection of the site by fire personnel. Times of extremely hot, dry weather require heightened awareness and preparation. The wildland fire risk in the City of Bowling Green is significantly mitigated by the general lack of large areas of woodland/grassland and the ubiquitous presence of a reliable water supply system.

RAILROADS

The CSX railroad runs daily within the City of Bowling Green. The railroad crosses the Barren River at Riverview Street. Also located in the city are several spurs and sidings for industrial use. According to CSX, approximately 10 to 15 trains pass through Bowling Green daily. The Fire Department has access to county and statewide resources to address hazardous material cargo problems that might occur during shipping. Evacuation/shelter in place is addressed by the city/county Emergency Operations Plan.



WEAPONS OF MASS DESTRUCTION RISKS

The City of Bowling Green is vulnerable to an act of aggression in the form of a weapon of mass destruction. The Department has identified notable structures, such as the U.S. Post Office, Warren County Courthouse, the Natcher Federal Courthouse, various WKU buildings, and other large office/warehouse properties as potential targets. The risk of domestic terrorism/WMD is low but Bowling Green is vulnerable to this risk, as is every other location within the United States.

Typical WMD that are deployed include any or all of the following:

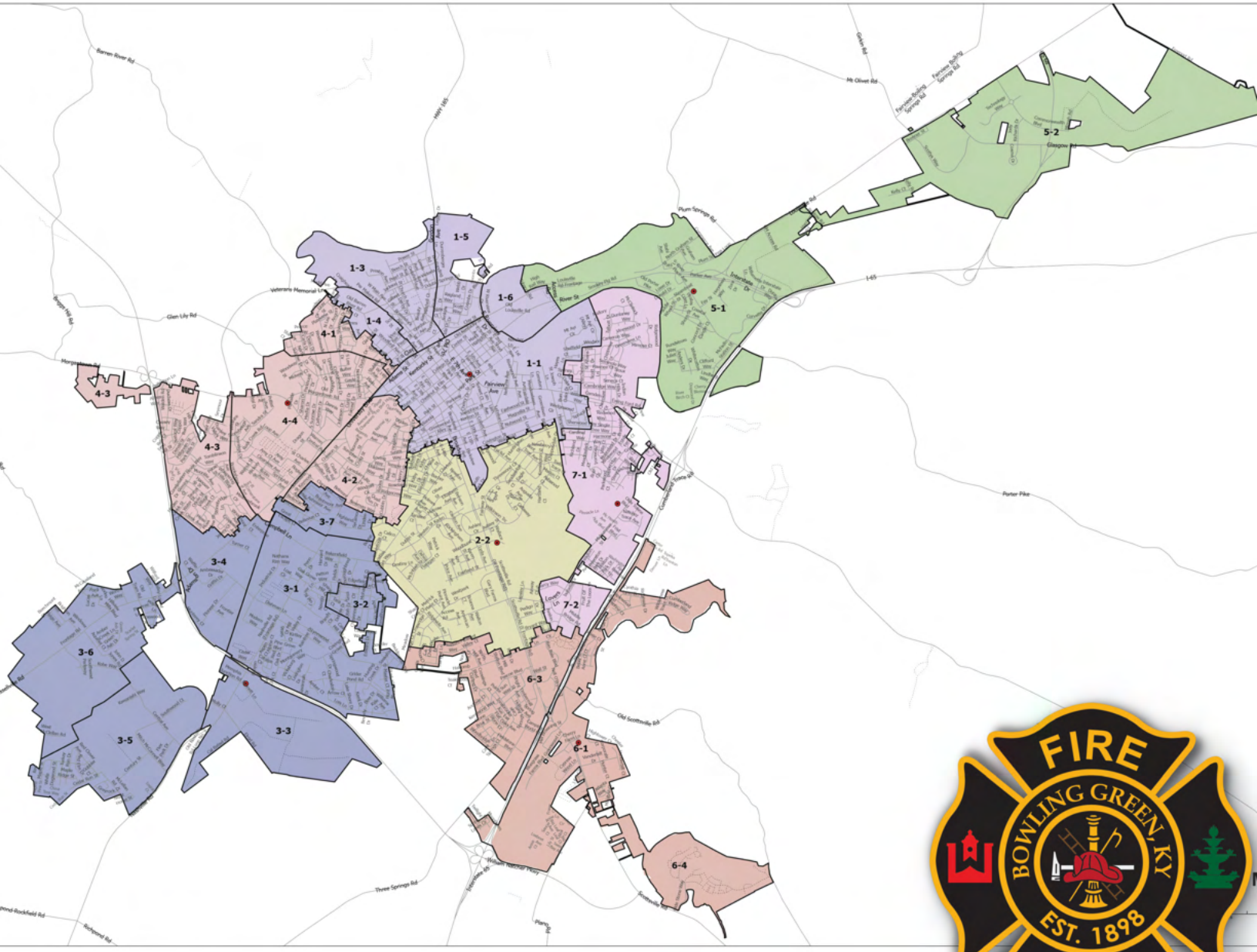
- Chemical
- Biological
- Radiological
- Nuclear
- Explosive

SPECIAL EVENTS

While there are several special events held in the city, the Fire Department does not necessarily provide special services during these events. The Department does provide extra EMTs on site during tailgating at Western Kentucky University football games and various other community events. The Department is typically involved during the planning stages of these events and does provide inspections of various structures and other inspections such as fireworks displays. These events typically do not impose on the fire protection of the city as they do not inhibit access to various sites.



GEOGRAPHICAL PLANNING ZONES



METHODOLOGY

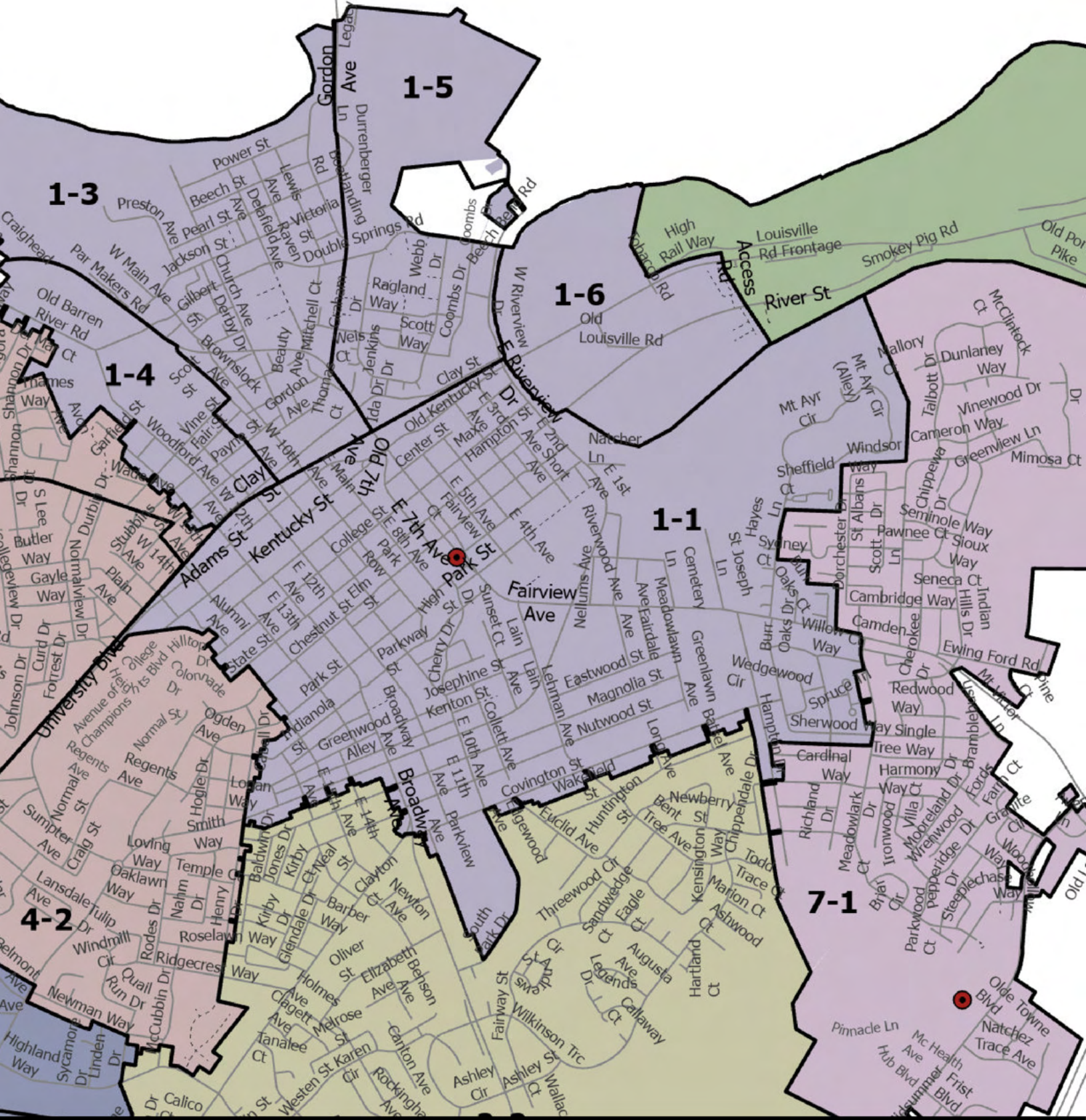
In order to better evaluate areas within the City of Bowling Green, the Fire Department has further divided its 7 Response Districts into 24 smaller, geographical planning zones for more detailed analysis. These zones have been organized and evaluated for size, population and population density, run volume, response time, and maximum risk structures. The planning zones are contained within the response districts, e.g., no planning zone crosses response district lines. For evaluation of areas crossing district lines, planning zones from neighboring districts are evaluated together.

The primary purpose for determining boundaries was for the evaluation of response times and run volume growth. When combined with other factors such as area, population, road miles, and future growth, this enhances the Department's ability to identify areas with service gaps.

For evaluation of response times, run-specific data was pulled from Emergency Reporting, the Department's RMS, and plotted on a GIS program map. The planning zone boundary lines were put down as a layer on the map, and run data was sorted into the zones. Responses that were cancelled-in-route, mutual aid given, and county extrication runs were eliminated to provide accurate response times. All other incident types were used for analyzing planning zones. This large data set allows for usable sample sizes when broken down into many smaller zones. For response time evaluation, only emergency responses were used. For call volume evaluation, both emergency and non-emergency responses were analyzed. This evaluation was begun in July 2014, when the Alpine RMS was implemented. In January 2019, the Department converted to the Emergency Reporting system, leading to incomplete data from 2018. Therefore, 2019 through 2021 are used for the current evaluation. After beginning with an initial data set of 18,781 total responses, 16,390 were evaluated in the 24 planning zones from 01/01/19 to 12/31/21. Both drive time and total response time are expressed in terms of performance at the 90% mark. The results from this evaluation reveal areas where performance gaps exist and are the impetus for a redistribution and expansion of resources.

In the 2018 Community Risk Assessment, zones 1-2, 2-1, and 6-2 were comprised of the area now covered by Station 7. These have been renamed to 7-1 and 7-2.





Planning Zone 1-1
Downtown

2.95

Square Miles

Fifth largest zone by area

2,940

Population Density

People per square mile

PLANNING ZONE 1-1
DOWNTOWN

Zone 1-1 is primarily commercial, residential, and public/public institutional. With 22 maximum risk structures, the most of any zone, it includes the BG Retirement Towers, the Medical Center, and the downtown district surrounding Fountain Square Park. The downtown area is composed of numerous buildings built in late 1800's to the middle 1900's, filled with mixed-use occupancies of residential and commercial development and sharing party walls. These structures are of considerable historic and cultural value. Other maximum risk structures include non-sprinkled fraternity and sorority houses, retirement apartments, and nursing homes. This zone had the highest call volume with 2,531 runs and the 3rd fastest total response time at 6:06.

This zone has a special non-fire risk: the technical rescue events which have occurred around the Barren River, at River Street. Over the past 5 years, 6 swift-water rescue events have occurred in this area. For this reason, the Fire Department's technical rescue team is located in this zone at Station 1.

$38.6K

Median Household Income

11% Lower than average for City of Bowling Green

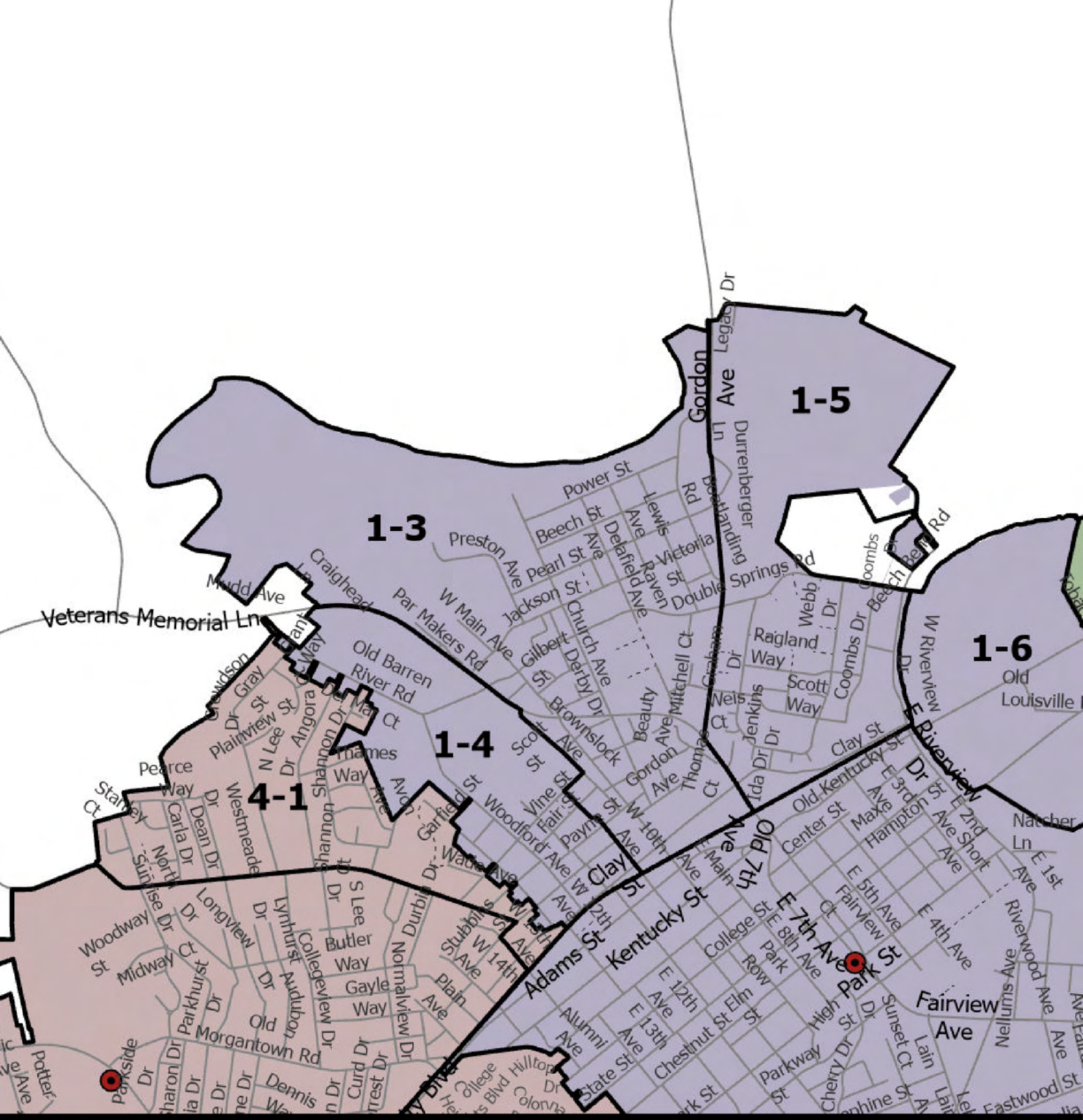
3:52

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Fountain Square



Planning Zone 1-3
Boatlanding

1.18

Square Miles

1,123

Population Density

People per square mile

PLANNING ZONE 1-3 BOATLANDING

Zone 1-3 is almost entirely residential, with some commercial and public/institutional land. It has 1 maximum risk structure: the Salvation Army residential house. This zone had the 11th highest call volume and the 8th best total response time.

This zone had three technical rescue runs, all swift-water responses at Boatlanding Road and is serviced by Rescue 1 and Truck 1, the Department's primary technical rescue units.

$29.1K

Median Household Income

33% Lower than average for City of Bowling Green

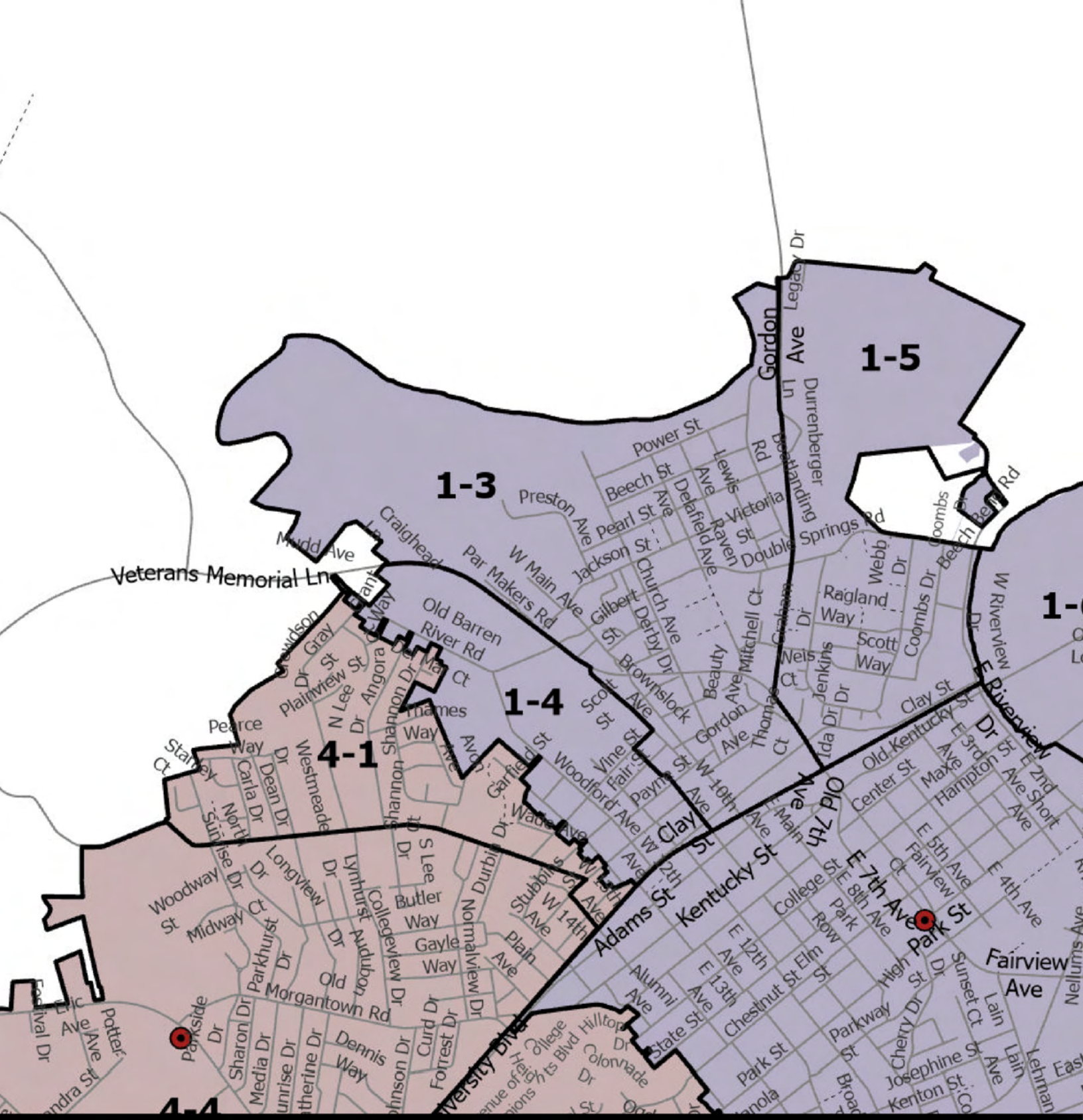
4:26

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Salvation Army



Planning Zone 1-4

.39

Square Miles

Second smallest zone by area

2,314

Population Density

People per square mile

PLANNING ZONE 1-4

Zone 1-4 has no maximum risk structures and consists almost entirely of residential area. It is a very small zone, at .39 square miles, that was separated out for evaluation due to being a border area between Stations 1 and 4. It has a total response time slightly above the average for all zones.

This zone was also separated out for analysis, along with zone 4-1, due to the increased risk of structure fires within its boundaries. The area had 9 structure fires among 364 total responses, one every 40 runs. This is 2.75 times higher than the citywide average of one structure fire every 110 runs.

$27.4K

Median Household Income

37% Lower than average for City of Bowling Green

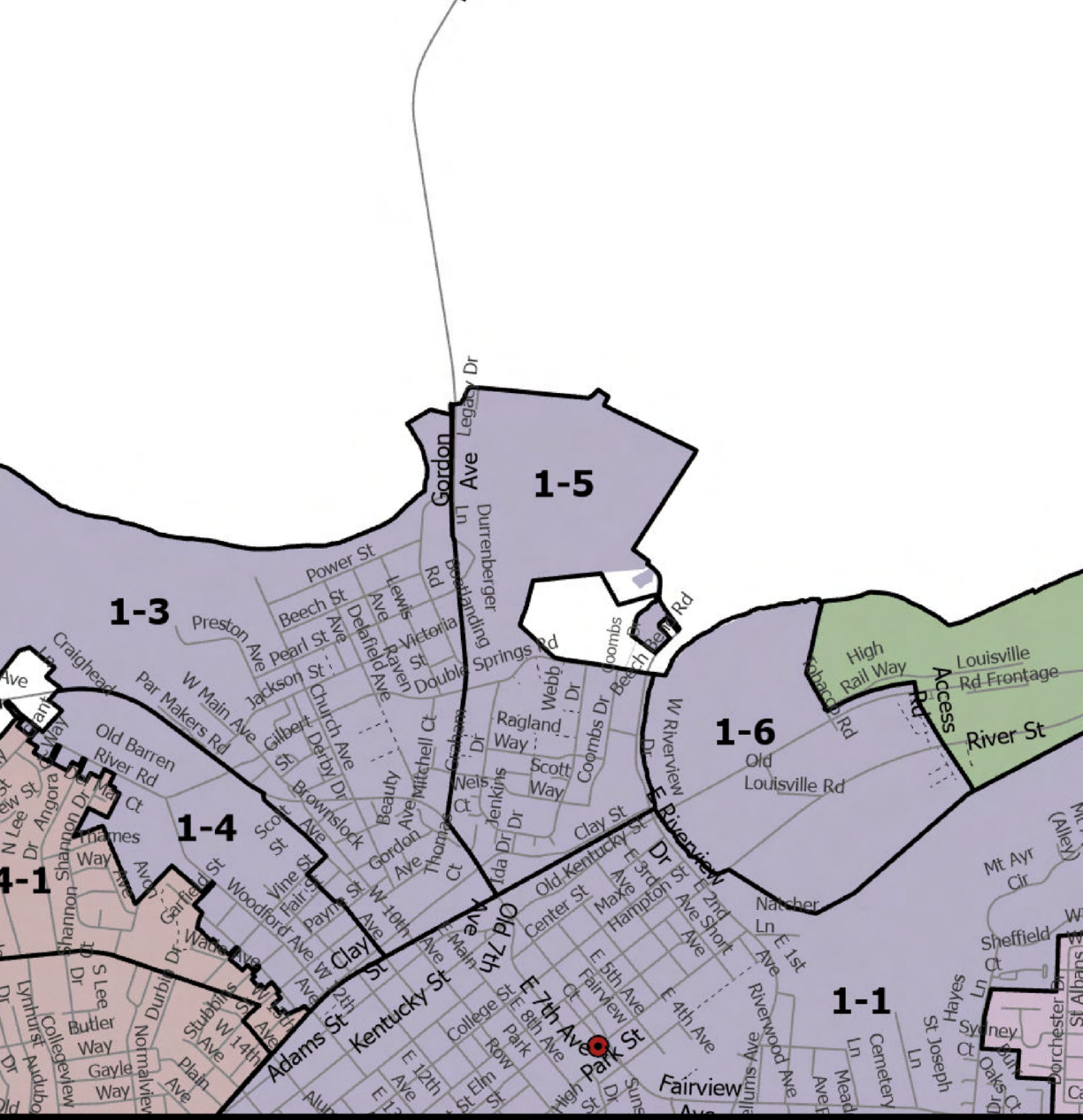
4:48

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



La Luz Del Mundo Church



Planning Zone 1-5
Housing Authority

.69

Square Miles

1,650

Population Density

People per square mile

PLANNING ZONE 1-5
HOUSING AUTHORITY

Zone 1-5 is mostly residential development with one large commercial development at Sugar Maple Square. Much of the residential housing is operated by the Bowling Green/Warren County Housing Authority. It has no maximum risk structures.

This zone saw a 19% reduction in call volume compared to the previous 3 year evaluation period. It also saw a reduction in structure fires, from 5 down to 2.

$25.2K

Median Household Income

42% Lower than average for City, lowest of all zones

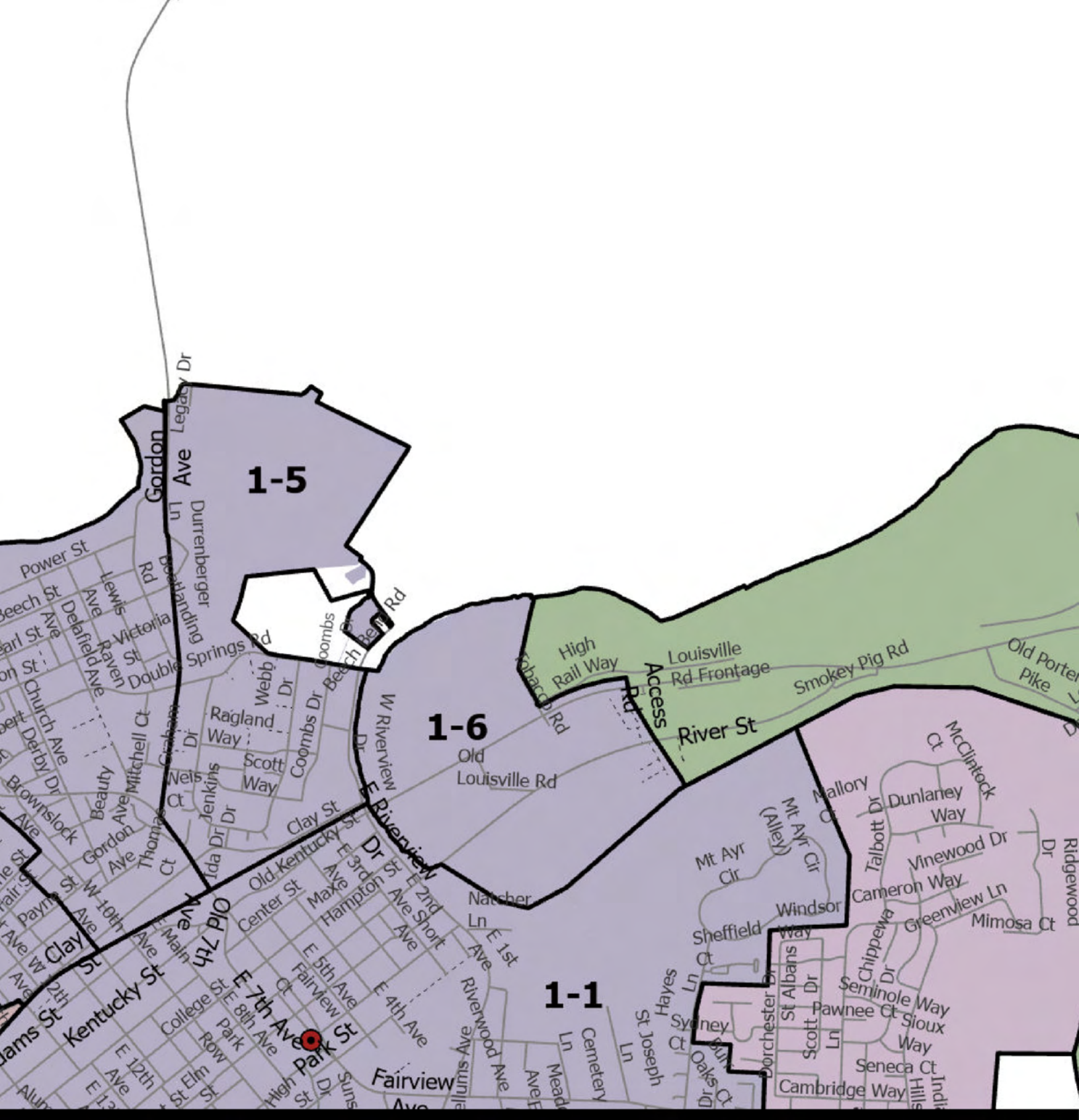
4:10

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Housing Authority of Bowling Green



Planning Zone 1-6
River Street

.53

Square Miles

248

Population Density

People per square mile

PLANNING ZONE 1-6
RIVER STREET

Zone 1-6 was newly-created in 2018. This zone was previously included in 5-1 in order to reduce call volume for Station 1, a very busy station, and add call volume for Station 5, the city's slowest station. New administration considered this a poor reason for allocating resources and moved this zone to Station 1's response district to provide better response times for citizens needing the Department's service. Zone 1-6 has a small area at .53 square miles and is a mix of older commercial and residential development on a busy roadway.

This zone had the highest risk for structure fires in the city, with 1 structure fire every 29 runs, compared to 1 every 110 runs citywide. Deeper evaluation of this zone showed further anomalies. Every other zone in the city showed a reduction in call volume from 2019 to 2020, with a slight rebound in 2021. Not so with 1-6. It had an increase in call volume in 2020, from 44 to 59. An evaluation of the types of incidents is indicative of the social upheaval the entire country witnessed in 2020. This area had structure fires, vehicle fires, rubbish fires, fire alarms, and medical calls that suggested a population struggling with social issues. The Department will monitor this area for further attention from all city services.

N/A

Income data unavailable

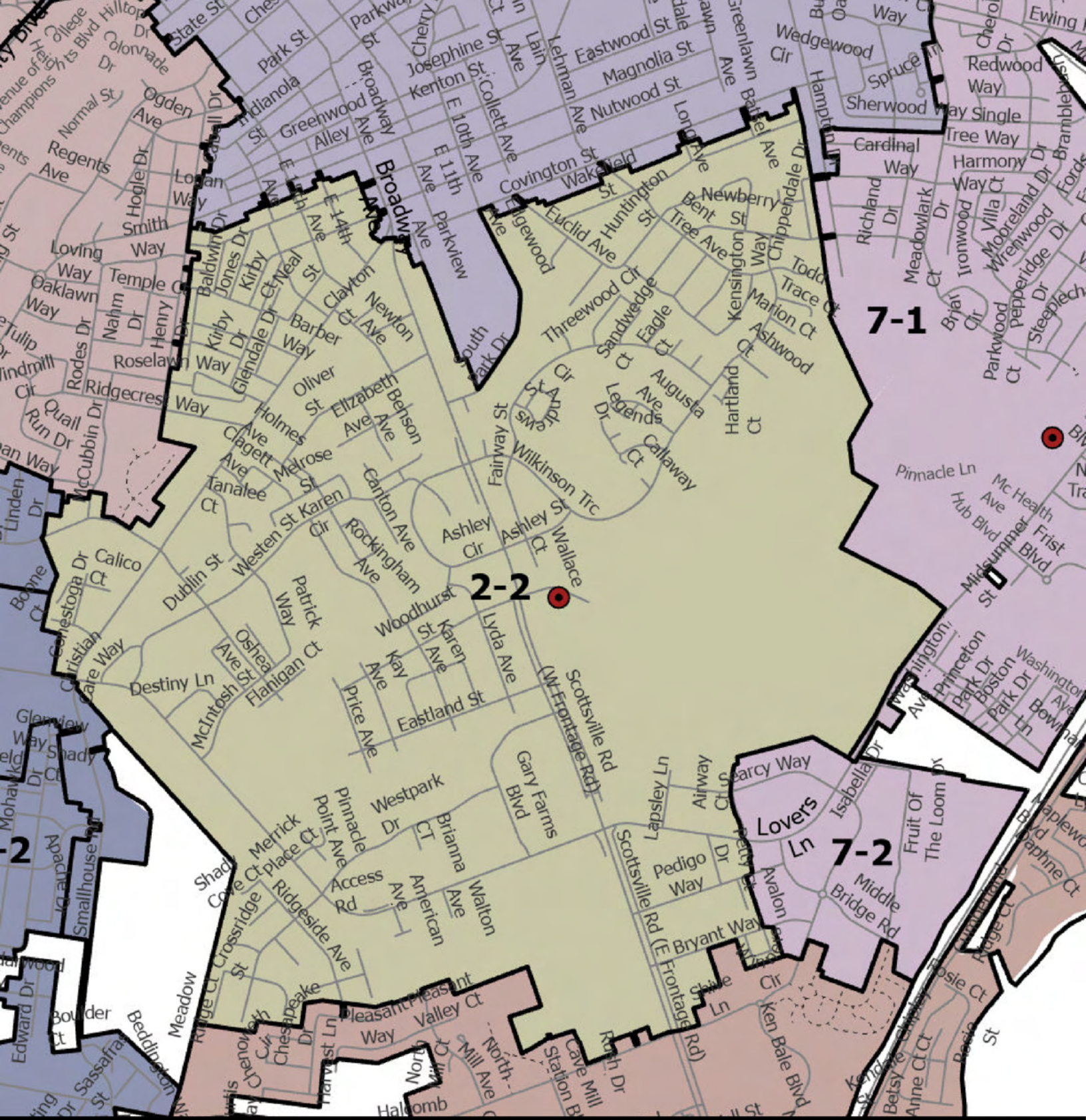
4:13

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Weldon Peete Park



Planning Zone 2-2
Airport

4.54

Square Miles

Largest zone by area

1,631

Population Density

People per square mile

PLANNING ZONE 2-2

AIRPORT

Zone 2-2 is the largest planning zone in the City of Bowling Green, has the third highest call volume, and has a response time 27 seconds faster than the citywide average. It is largely commercial land use, has significant areas of residential, and contains the Bowling Green/Warren County Regional Airport, which counts as over 30% of its land use for public/institutional land.

Zone 2-2 contains 7 maximum risk structures, including SKY Rehab Center, Village Manor Christian Health, and Greenview Regional Hospital. Other maximum risk structures include nursing homes and hotels. Scottsville Road, the busiest commercial road in the city, bisects this zone and over 30,000 vehicles per day travel it. Greenwood Mall, the city's largest retail development at over 550,000 square feet, is located in this zone, along with numerous other large shopping centers and "big-box" department stores. It is an area of high economic impact.

The non-fire risk for this zone is the regional airport. This regional public airport has over 70,000 total take-offs and landings every year, with most occurring directly over the city's busiest shopping district. The airport also has large fuel tanks onsite: 22,000 gallons of Jet A fuel and 14,000 gallons of Av. Gas. Station 2 specializes in aircraft rescue firefighting.

This zone is not divided into smaller planning zones due to its uniform geographical layout. Of all the response districts in the city, it has the most evenly distributed shape. All parts of zone 2-2 are within 2.5 driving miles of Station 2.

$54.9K

Median Household Income

26% Higher than average for City of Bowling Green

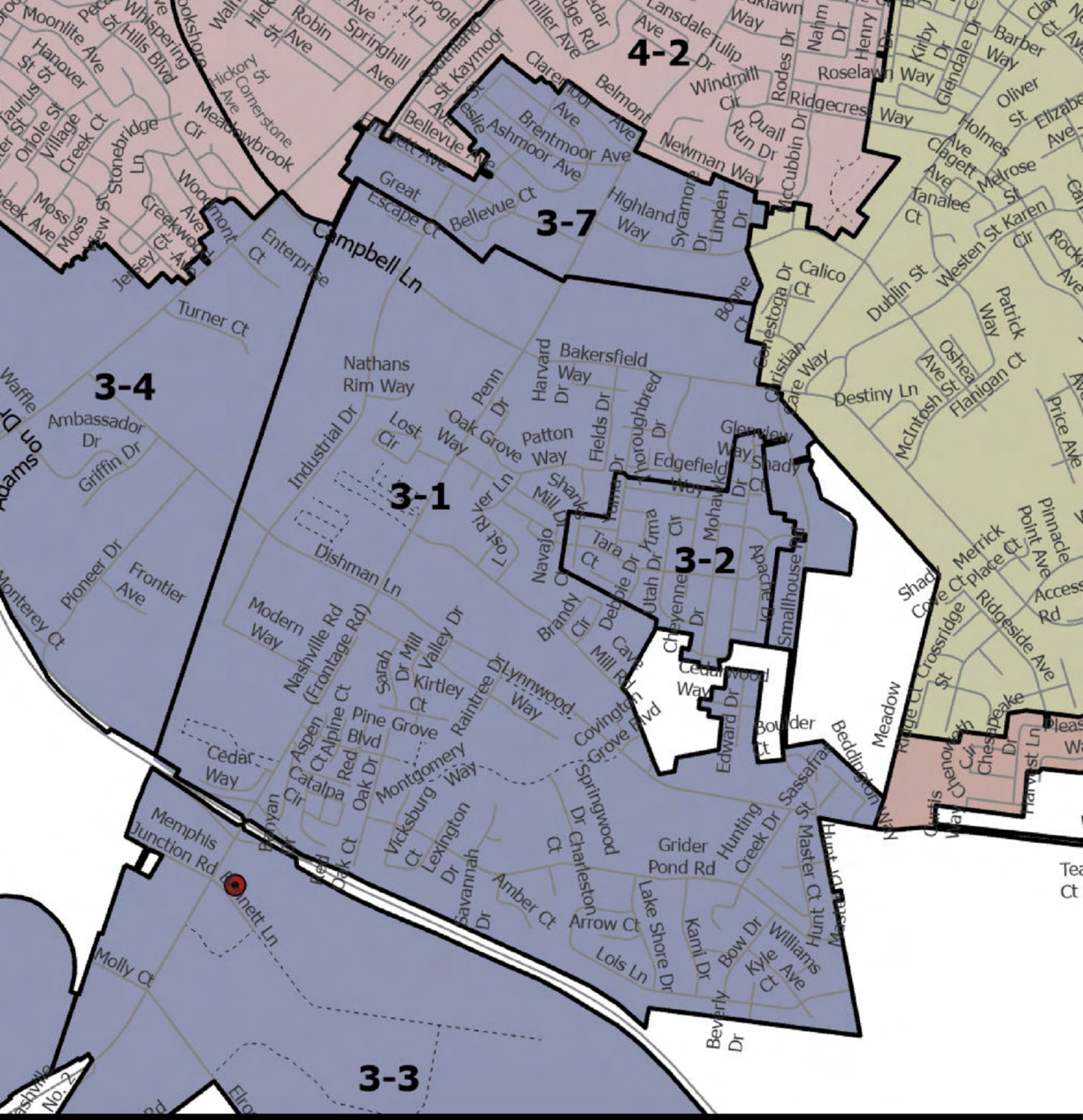
4:39

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Bowling Green/Warren County Regional Airport



Planning Zone 3-1
Nashville Road

2.99

Square Miles

Fourth largest zone by area

2,486

Population Density

People per square mile

PLANNING ZONE 3-1
NASHVILLE ROAD

Zone 3-1 is the 4th largest zone and has the 3rd highest population. This zone has a balanced mixture of residential and commercial with some significant industrial land use as well. It contains 5 maximum risk structures, including Staybridge Suites Hotel, Airgas Distributors, and 3 nursing homes.

This zone has the 5th highest call volume and had the 6th highest increase in call volume at 16%. This zone also has a risk for technical rescue incidents at Lost River Cave.

$41.3K

Median Household Income

5% Lower than average for City of Bowling Green

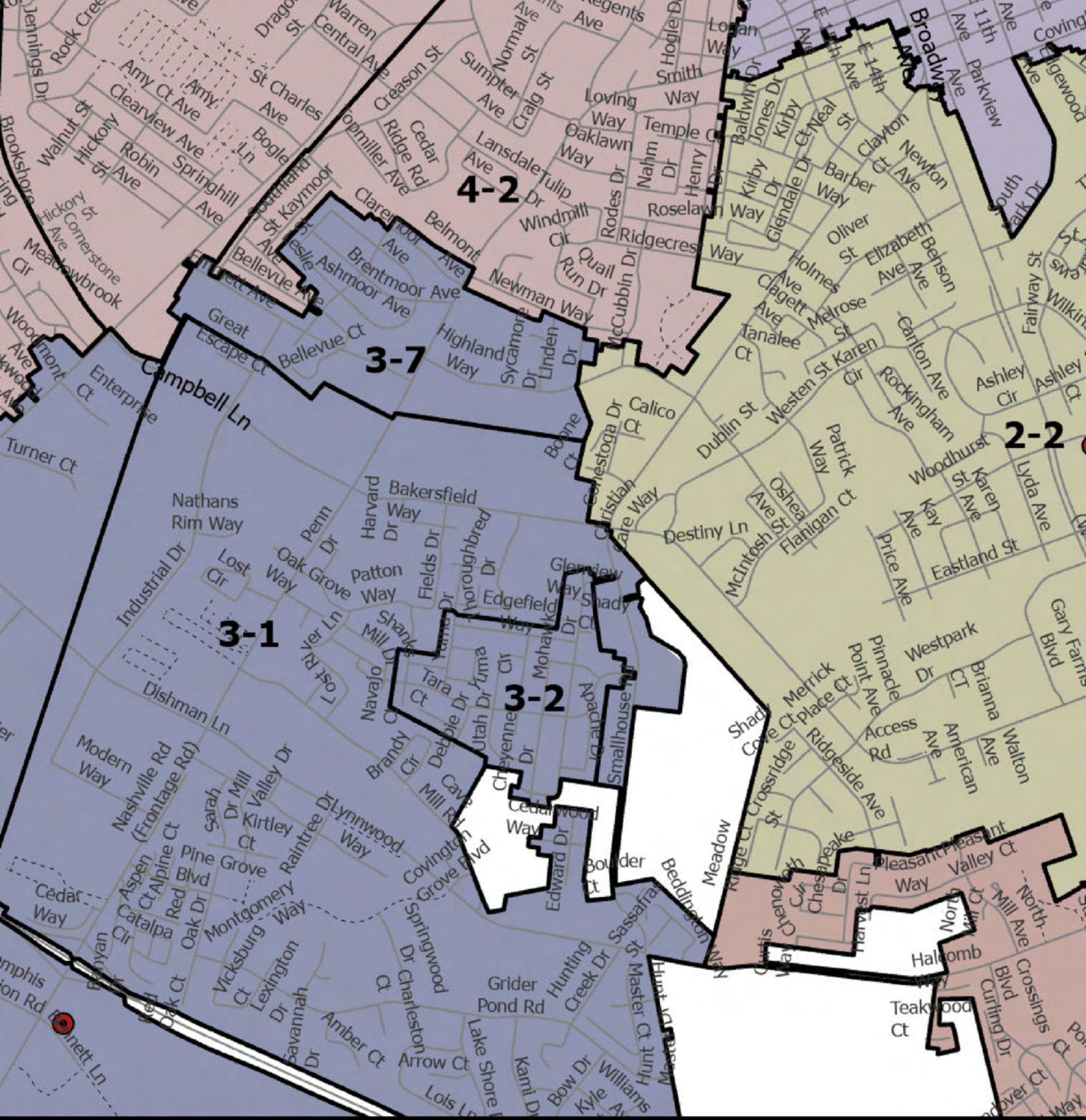
5:15

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Lost River Cave



Planning Zone 3-2
Shawnee Estates

.25

Square Miles
Smallest zone by area

3,018

Population Density
People per square mile

PLANNING ZONE 3-2
SHAWNEE ESTATES

Zone 3-2 is the smallest zone in the city at .25 square miles. It saw a 30% reduction in call volume versus the previous 3-year evaluation period. It is entirely residential and was separated out for analysis due to high run times within its boundaries. This zone, the Shawnee Estates neighborhood, has limited access due to the closing of a road into the back of the development. This has caused delayed response times to this zone. It has the 4th worst response time of all zones, at 8:57. The two zones surrounding it have response times of 7:33 and 6:51. Zone 3-2 could see improved response times if the area could be accessed off Patton Way. This opportunity has been explored without resolution. The Department will continue to monitor call volume and response time here.

$26.3K

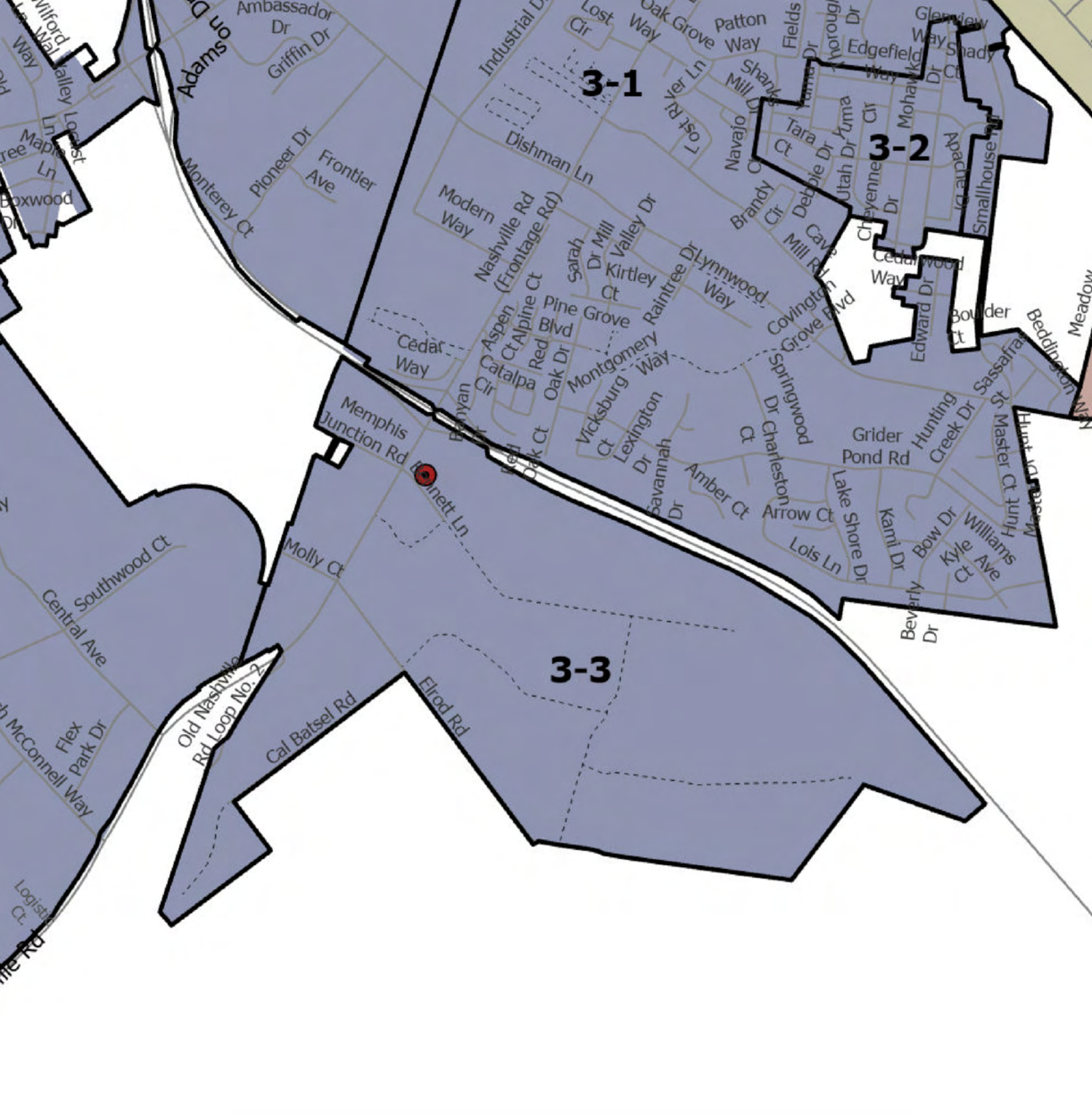
Median Household Income
40% Lower than average for City of Bowling Green

6:31

1st Unit Travel Time
90% travel time for all emergency runs 2018-2021



Shawnee Estates Neighborhood



Planning Zone 3-3
WKU Ag Farm

1.64

Square Miles

76.71

Population Density

People per square mile, second lowest of all zones

PLANNING ZONE 3-3
WKU AG FARM

Zone 3-3 has the 2nd lowest population of all zones and the fastest response times at 5:53. It is primarily agricultural with a small area of industrial development. It contains Fire Station #3 and has 1 maximum risk structure: International Paper. This zone also contains the WKU Agricultural Farm with an expo center and riding arena.

Zone 3-3 stands out as an anomaly. This is the zone where Station 3 is located and in the previous 3-year evaluation, it had the 5th worst response times. A closer look at the data at that time suggested the poor response times here were because of a fairly small sample size. This conclusion was borne out in the current evaluation. Zone 3-3 had a 19% reduction in call volume and improved from 5th worst in response time to 1st overall.

$72.4K

Median Household Income

66% Higher than average for City of Bowling Green

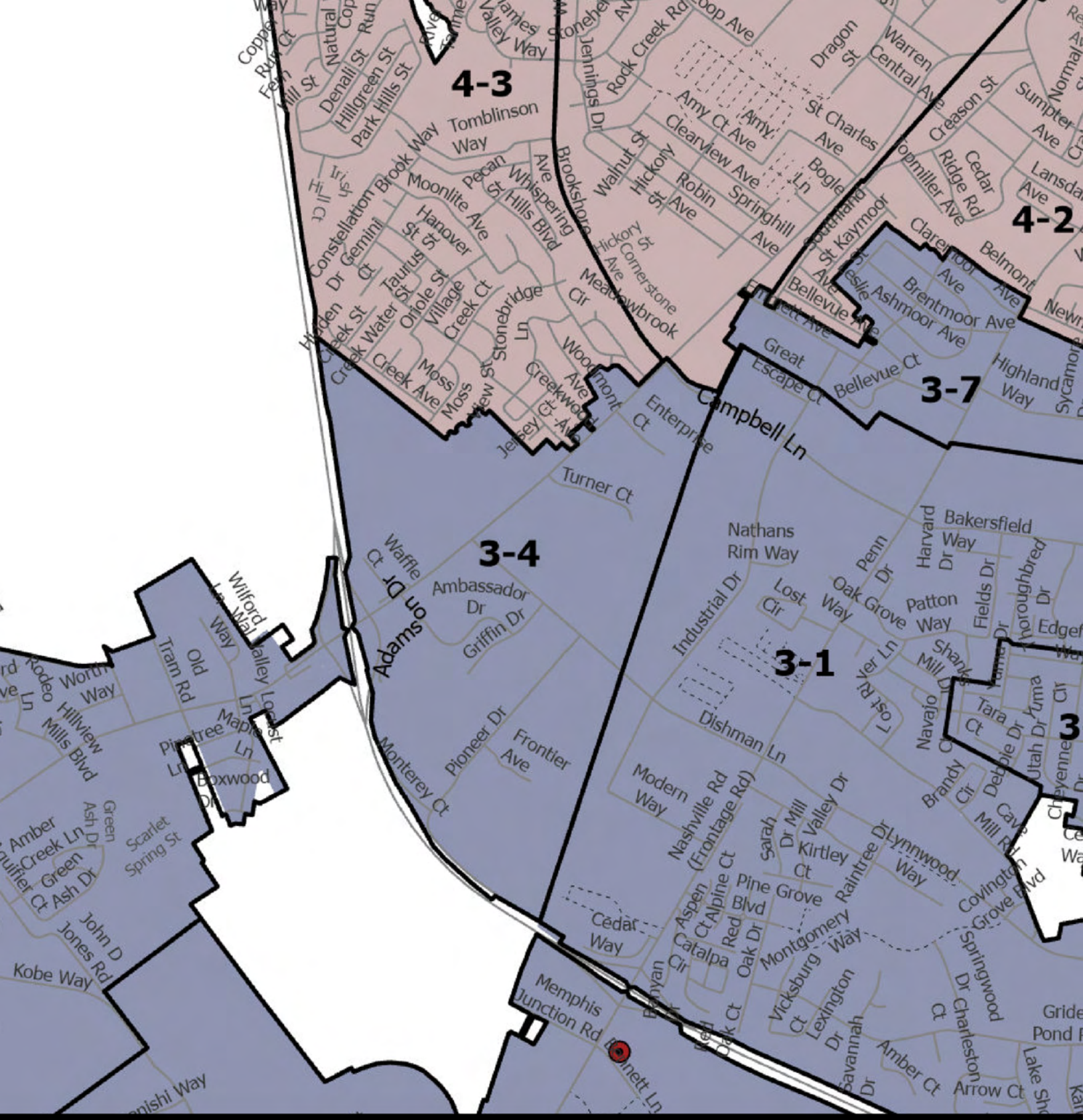
3:37

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Truck 4 - Pierce Velocity Ascendant 107'



Planning Zone 3-4
Russellville Road

1.08

Square Miles

1,180

Population Density

People per square mile

PLANNING ZONE 3-4
RUSSELLVILLE ROAD

Zone 3-4 had the largest percentage increase in population compared to the previous evaluation and saw a 9% increase in call volume. This zone is primarily industrial and commercial. It contains 2 maximum risk structures: Hills Pet Foods and Country Oven Bakery, an EHS site. It had a significant hazmat incident in 2022 with an ammonia leak. This zone ranks 17th in call volume and 17th in response time. The tornado in December 2021 entered the city at this zone before doing its worst damage in Zone 4-3. The railroad creates a barrier between this zone and Station 3.

$48.9K

Median Household Income

12% Higher than average for City of Bowling Green

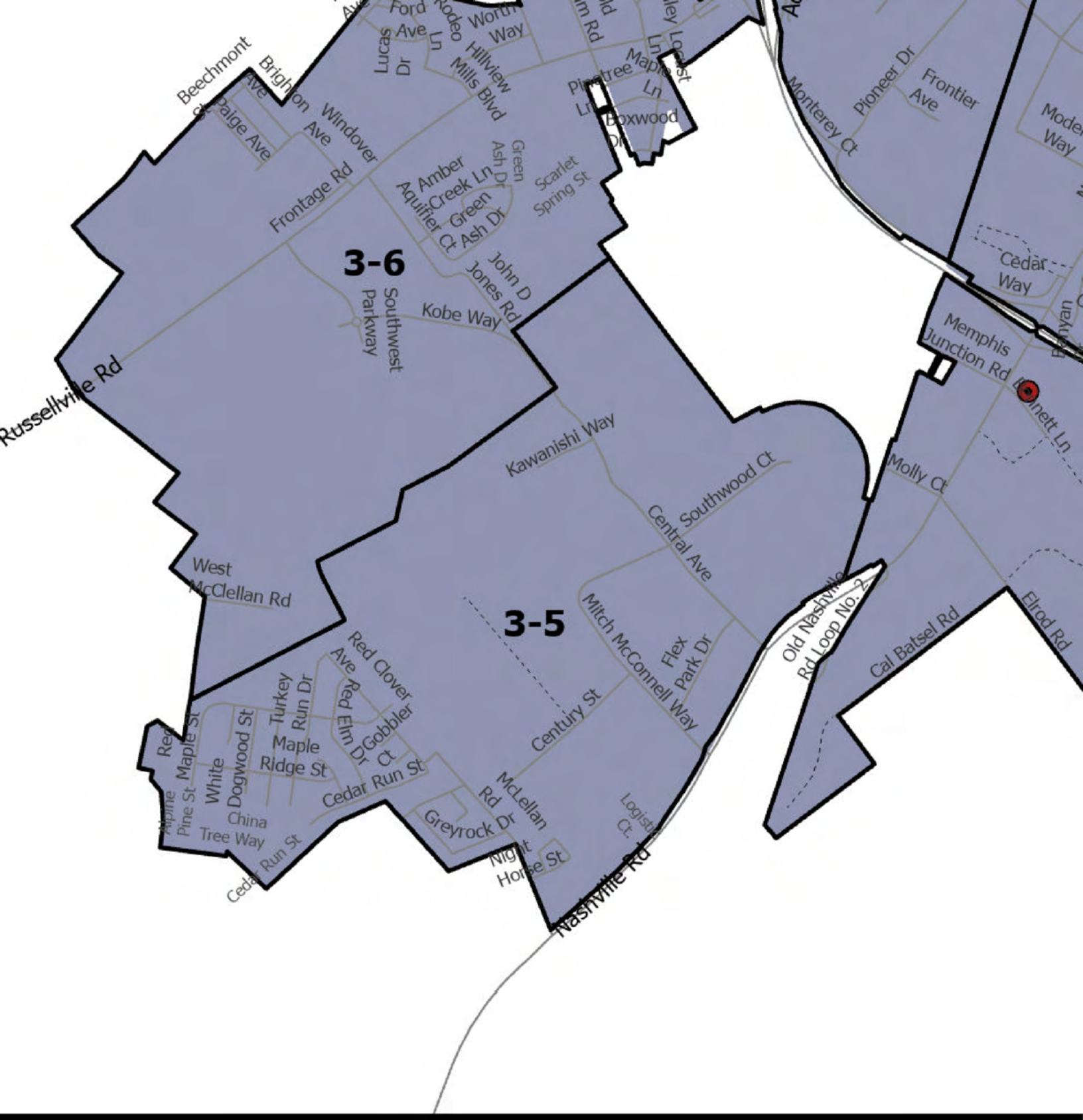
5:30

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Hill's Pet Foods



Planning Zone 3-5
Industrial Park

1.97

Square Miles

846

Population Density

People per square mile

PLANNING ZONE 3-5
INDUSTRIAL PARK

Zone 3-5 is primarily of heavy industrial development, with growing residential development on the outskirts. Its population grew by 106% and call volume increased by 32%. It contains 9 maximum risk structures, including Henkel Detergents and Kobe Aluminum. All the maximum risk structures here are large industrial factories. The Henkel Detergents warehouse is over 1.4 million square feet. This zone had a combination of the 5th highest call volume growth and 2nd worst response times, at 9:29. A deeper analysis of this zone reveals that 69% of the worst response times, over 8:30, are in the Greystone Neighborhood. Poor response times here are expected to increase as the neighborhood builds out in the back of the development, expanding City limits to the south.

The special risk and non-fire risk for zone 3-5 is the hazardous materials risk associated with the South Industrial Park. Eight extremely hazardous sites are located in this area. Valspar Corporation, a paint manufacturing facility, is the most significant example of the hazmat risks scattered throughout this zone. The Department's hazardous materials response unit is located at Station 3 to help cover this risk.

$71.2K

Median Household Income

63% Higher than average for City of Bowling Green

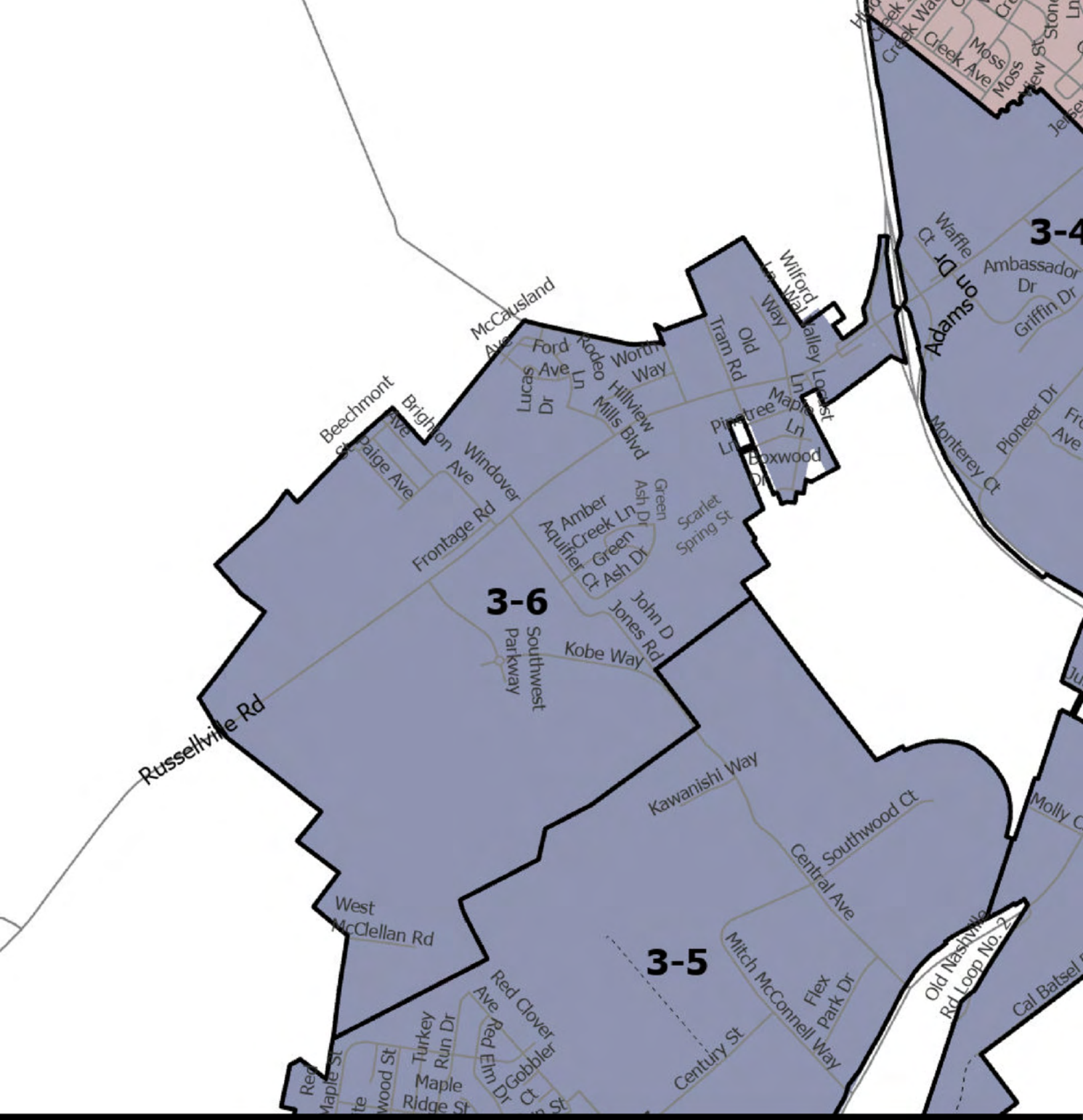
7:15

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Henkel Detergents



Planning Zone 3-6
Russellville Rd Expansion

2.13

Square Miles

665

Population Density

People per square mile

PLANNING ZONE 3-6
RUSSELLVILLE RD EXPANSION

Zone 3-6 is an area of growing residential development. Its population grew by 115%, the 4th highest of any zone. It also had the 2nd highest percentage increase in call volume, at 86%. In the previous evaluation it was almost entirely agricultural and vacant land but the pace of residential development has increased.

Zone 3-6 had the most notable combination of call volume growth and poor response time, at 8:55. The CSX railroad that bisects response district 3 creates a barrier between Station 3 and this zone with the only access over I-165. Almost all of this zone is outside a 2.5 mile driving distance. The Department is considering land acquisition near this zone to address these issues.

$70.4K

Median Household Income

61% Higher than average for City of Bowling Green

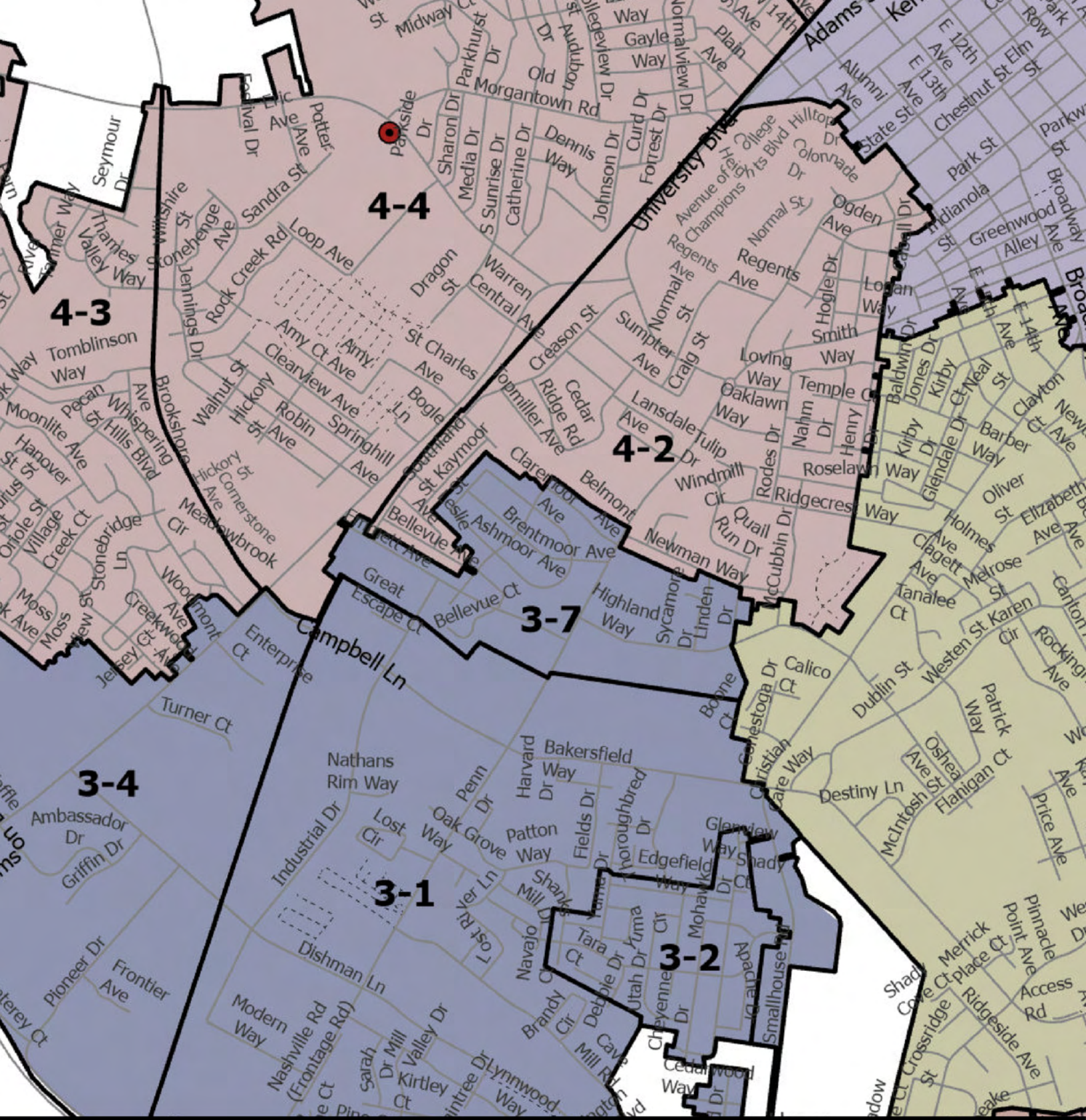
6:18

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Russellville Rd area Development



Planning Zone 3-7

.44

Square Miles

Fourth smallest zone by area

2,249

Population Density

People per square mile

PLANNING ZONE 3-7

Zone 3-7 is almost entirely residential with limited commercial and industrial land use. It is one of the smallest zones at .44 square miles and has seen continued reduction in call volume, at -36% compared to the previous 3-year evaluation period. It contains no maximum risk structures.

This zone was separated out for analysis due to its distant location from all surrounding fire stations. Further evaluation, including zones 3-4 and 3-6, may lead to a relocation of Department assets.

$75.4K

Median Household Income

73% Higher than average for City of Bowling Green

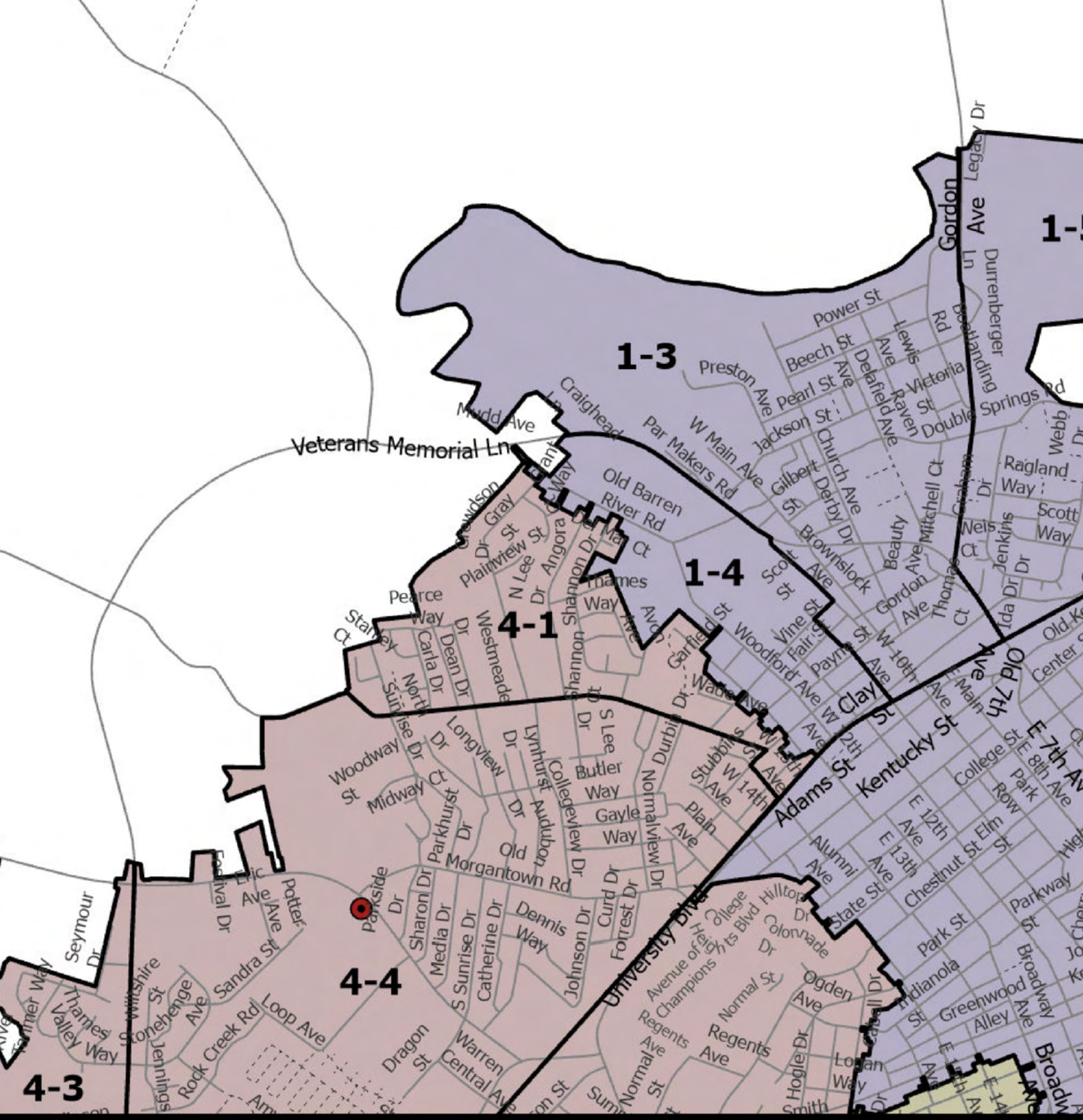
5:05

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Holy Trinity Lutheran School



Planning Zone 4-1
Glen Lily

.47

Square Miles

Fifth smallest zone by area

5,245

Population Density

People per square mile, second highest of all zones

PLANNING ZONE 4-1
GLEN LILY

Zone 4-1 is almost entirely residential zoning. Any other land use in this zone is vacant. It is densely populated, had a 38% increase in population, and a 16% increase in call volume. It has no maximum risk structures.

Zone 4-1 was separated out for analysis due to the high risk for structure fires within its boundaries. This area, adjacent to zone 1-4, has historically been an area with an increased occurrence of fires in residential occupancies. Zone 4-1 had one structure fire for every 78 runs, the 7th highest rate in the city.

$30.4K

Median Household Income

30% lower than average for City of Bowling Green

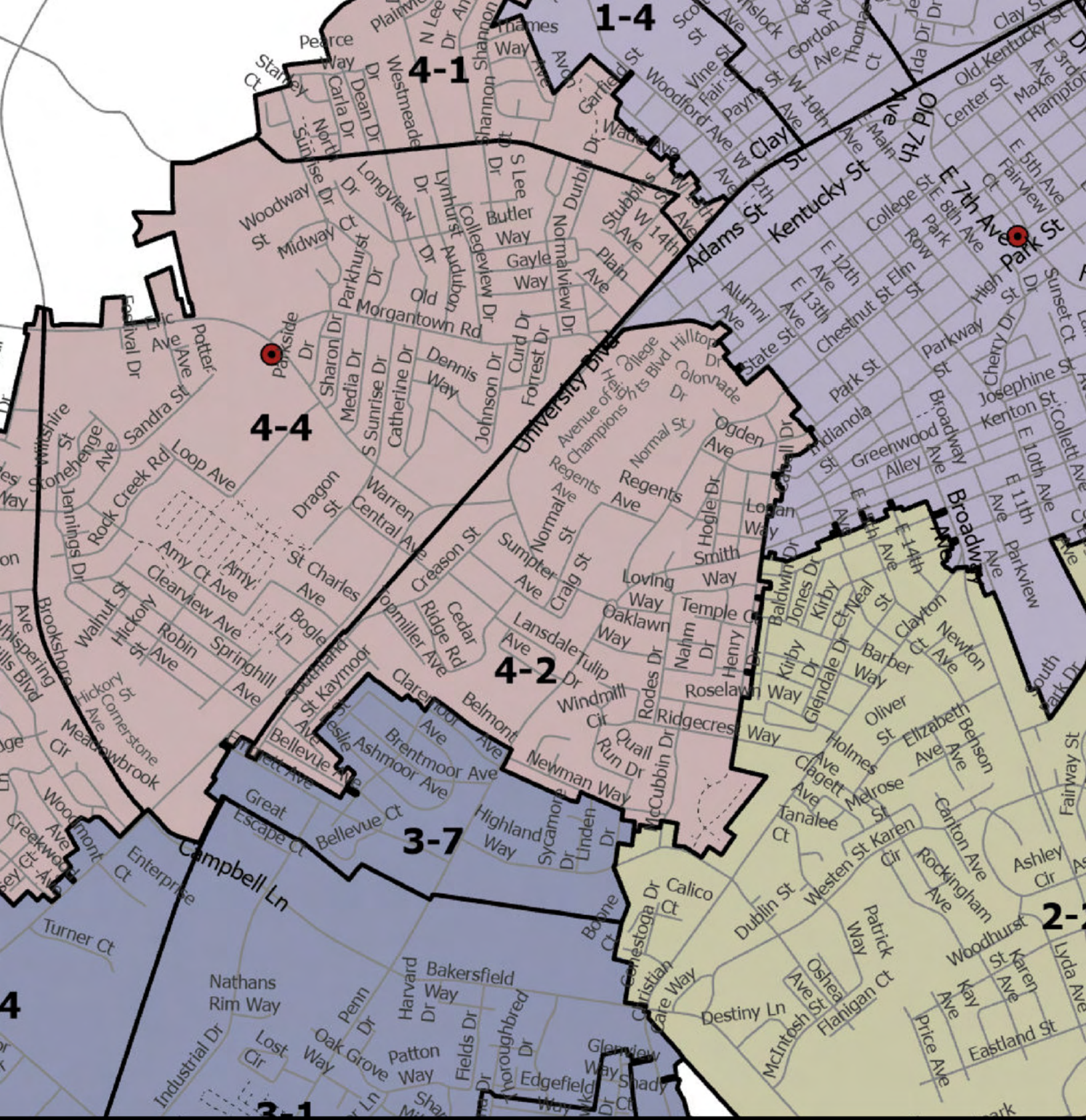
5:21

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Habitat for Humanity Development



Planning Zone 4-2
WKU

1.26

Square Miles

5,507

Population Density

People per square mile, highest of all zones

PLANNING ZONE 4-2
WKU

Zone 4-2 is the most densely populated zone in the city. It is primarily public/institutional and residential land use and contains Western Kentucky University. This zone has the 6th highest call volume and contains 19 maximum risk structures, including Pearce Ford Tower and numerous dormitories and fraternity and sorority houses.

The unique risk in zone 4-2 is WKU. It contains 12 of the city's 18 buildings that are 5 stories or taller. It contains Pearce Ford Tower (PFT), the highest rated risk structure in the city. At 27 stories, it is 12 stories taller than any other structure and as a dormitory ranks as a high risk occupancy type. PFT is built of Type 1 construction and has an automatic sprinkler and a standpipe system. Other concerns in this zone are the Helm Library and Kentucky Museum located on WKU campus. Both buildings present large non-sprinkled structures with a dense fire load. These buildings do have automatic fire alarm systems.

Zone 4-2 also has densely-populated residential areas with a large number of multi-family units and WKU has recently constructed 262 two-bedroom apartments off-campus. 4,425 students live on campus, including over 200 high school students living in Florence Schneider Hall while enrolled in the Gatton Academy at WKU. This zone is the location of large gatherings at Smith Stadium and Diddle Arena for NCAA FBS football games and Division 1 basketball games.

In addition to having the city's highest population density, Zone 4-2's total census number does not include students living on campus, a transient population group. When the university is in session, the population density for this zone may well be over 10,000 per square mile.

$52.4K

Median Household Income

20% higher than average for City of Bowling Green

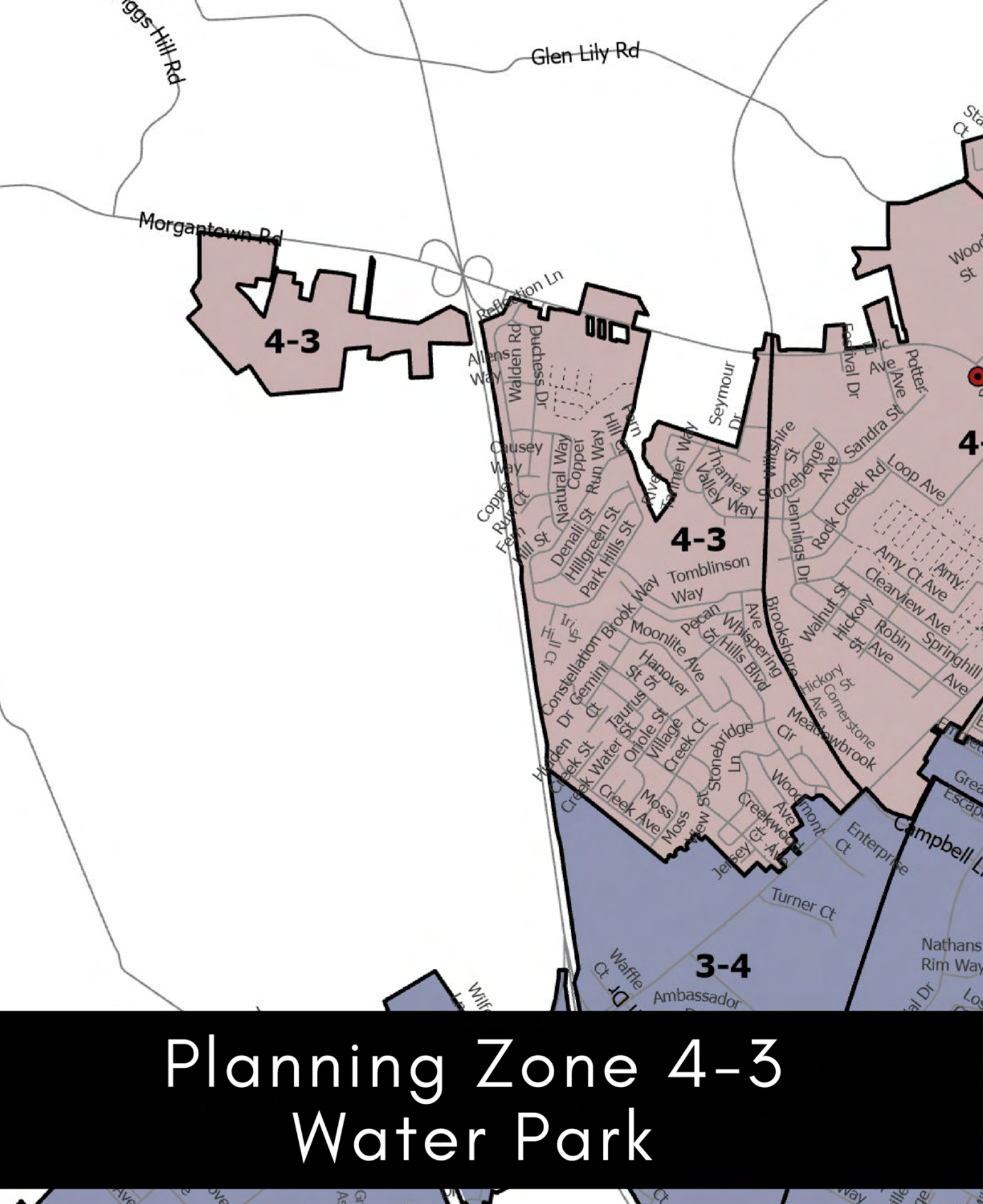
4:45

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Cherry Hall at WKU



Planning Zone 4-3
Water Park

2.09

Square Miles

3,392

Population Density

People per square mile

PLANNING ZONE 4-3
WATER PARK

Zone 4-3 is 2.09 square miles, up from 1.23 due to the annexation of the Baker Arboretum. It is predominately residential in nature with a large public park and aquatic center. It has the 7th highest population and 8th highest call volume. It had a 13% increase in call volume and a 32% increase in population. Zone 4-3 has the 4th highest risk for structure fires with 1 in every 59 runs. It contains no maximum risk structures.

This zone had the worst damage from the tornado in December 2021. As the tornado passed over its western edge and touched down in the Jennings Creek neighborhood, 15 people lost their lives that night. Extensive damage occurred indicative of a high EF3 tornado. Rebuilding from the extensive damage is currently ongoing.

$52.3K

Median Household Income

20% higher than average for City of Bowling Green

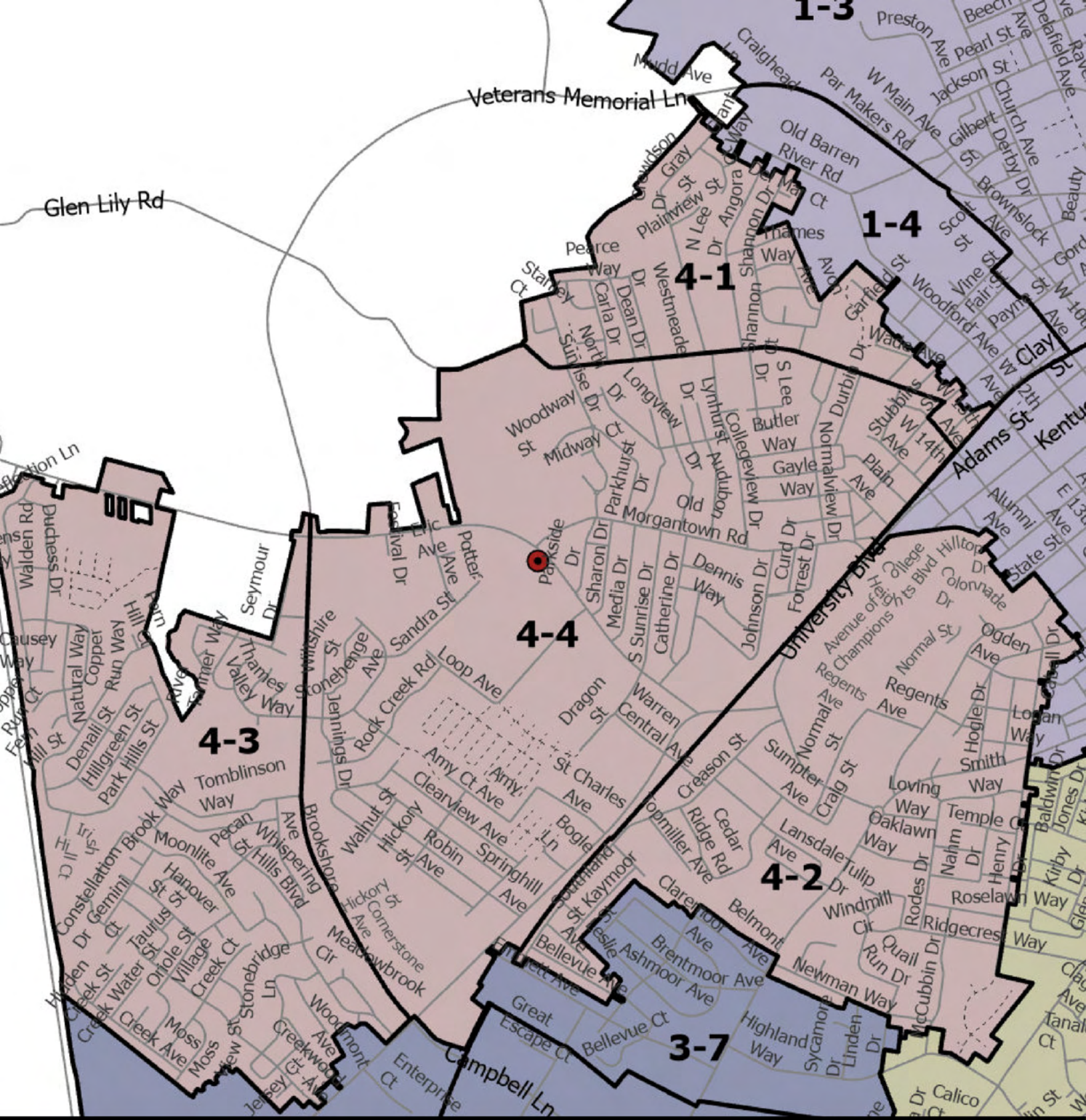
5:58

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Preston Miller Park



Planning Zone 4-4
Westside

2.12

Square Miles

4,670

Population Density

People per square mile, third highest of all zones

PLANNING ZONE 4-4 WESTSIDE

Zone 4-4 has a population of 9,905 with a 23% growth rate in the last 5 years. It has the highest population and second highest call volume of all zones. It is primarily residential with some commercial and some public-institutional land use. It contains 3 maximum risk structures, including Holley Performance Products. This zone also saw the highest total number of structure fires over the three year period, with 27.

Station 4 is located in zone 4-4 and this area had the 5th best total response time in the city, at 6:21 at the 90% mark.

$35.7K

Median Household Income

18% lower than average for City of Bowling Green

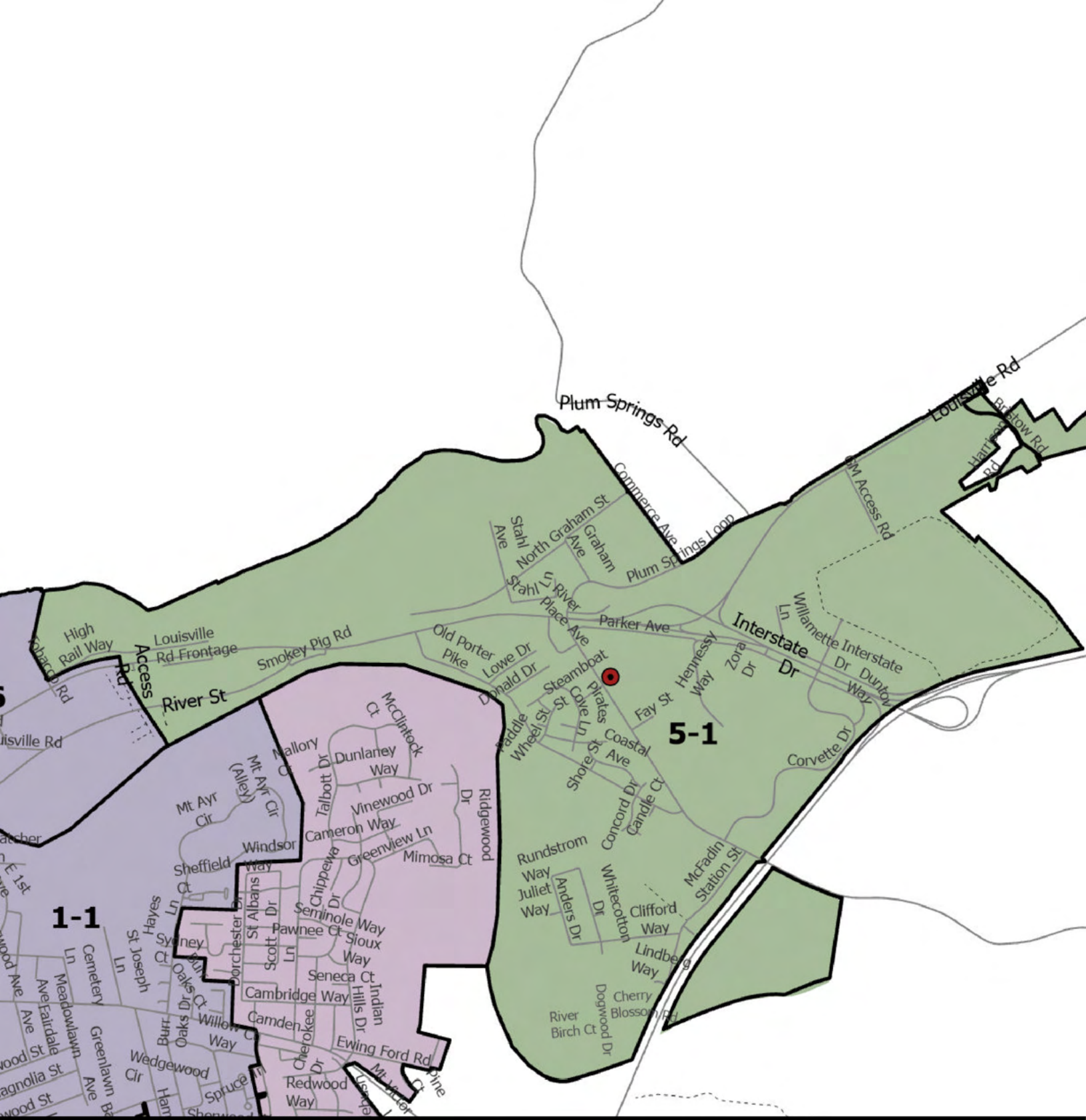
4:13

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Southern Kentucky Community Technical College



Planning Zone 5-1
Northside

3.61

Square Miles

Third largest zone by area

528

Population Density

People per square mile, third lowest of all zones

PLANNING ZONE 5-1 NORTHSIDE

Zone 5-1 is 3.61 square miles, down from 4.12 in 2018, due to separating out zone 1-6. It is the 3rd largest zone, had a 7% increase in call volume, and a 52% increase in population even after losing .5 square miles of area. Giving zone 1-6 to Station 1 improved response times in zone 5-1 from the 11th best to 2nd best compared to the previous evaluation. It is of mixed use, with significant areas of industrial, commercial, and residential development with some agricultural land use as well. It also contains the busiest roadway in the city, with the stretch of Louisville Rd (31-W) between Old Louisville Rd and Porter Pike carrying over 33,000 vehicles per day.

Zone 5-1 contains 5 maximum risk structures, including the General Motors Corvette Plant, the 2nd highest rated fire risk in the city. This manufacturing facility is over 2.2 million square feet and has recently had an expansion of over 1 million square feet. It is also an EHS site. This one structure represents the largest single economic impact on the City of Bowling Green due to its combination of employment, cultural importance, and the other industry in the area which supports it.

This zone shares a special non-fire risk with zone 1-1: the technical rescue events which have occurred around Barren River, at River St. Over the past 5 years, 6 swift-water rescue events have occurred in this shared area. For this reason, the Fire Department's swift-water rescue team is located in this zone at Station 5.

$42.9K

Median Household Income

Average for City of Bowling Green

3:53

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



National Corvette Museum



Planning Zone 5-2
Transpark

3.90

Square Miles

Second largest zone by area

17.9

Population Density

People per square mile, least of all zones

PLANNING ZONE 5-2
TRANSPARK

In 2018, Zone 5-2 was identified as an area in need for redistribution of resources. In 2023, this area has seen substantial economic growth and more is on the way. This zone is now 3.9 square miles, up from 2.33, due to annexation of land for industrial development. It is the 2nd largest zone in the city, had a 26% increase in call volume, had the 5th highest rate of structure fires, and had the worst response times in Bowling Green by a wide margin, at 10:44 for the first arriving unit. This zone is primarily industrial development with some agricultural/vacant land use. It has no residential development.

Zone 5-2 contains the Kentucky Transpark and has 3 maximum risk structures, including Bowling Green Metalforming. At over 1.1 million square feet, Bowling Green Metal Forming is the fourth highest rated risk in the city. The announcement of the construction of the $2 billion Envision AESC electric vehicle battery factory in 2022 has spurred the construction of Station 8 to provide coverage for this area, set to break ground in spring 2023.

$37.0K

Median Household Income

15% lower than average for City of Bowling Green

8:19

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Bilstein Cold Rolled Steel Factory



Planning Zone 6-1
Greenwood

2.38

Square Miles

1,118

Population Density

People per square mile

PLANNING ZONE 6-1
GREENWOOD

Zone 6-1 is an area of growing development. It is a mixture of commercial and residential development, with some industrial and some large tracts of agricultural/vacant land that are being rezoned. This zone already contains 10 maximum risk structures, including the Ramada Inn, Greenwood Nursing and Rehab, and 9 other hotels. Six of these structures are non-sprinkled hotels. It ranked 9th in call volume and 4th in total response time.

Zone 6-1 is bordered by I-65 and has some of the busiest roadways in the city with very high traffic counts. Continued development is expected in this area with large parcels of property annexed on Plano Road.

$94.6K

Median Household Income

117% Higher than average for City, highest of all zones

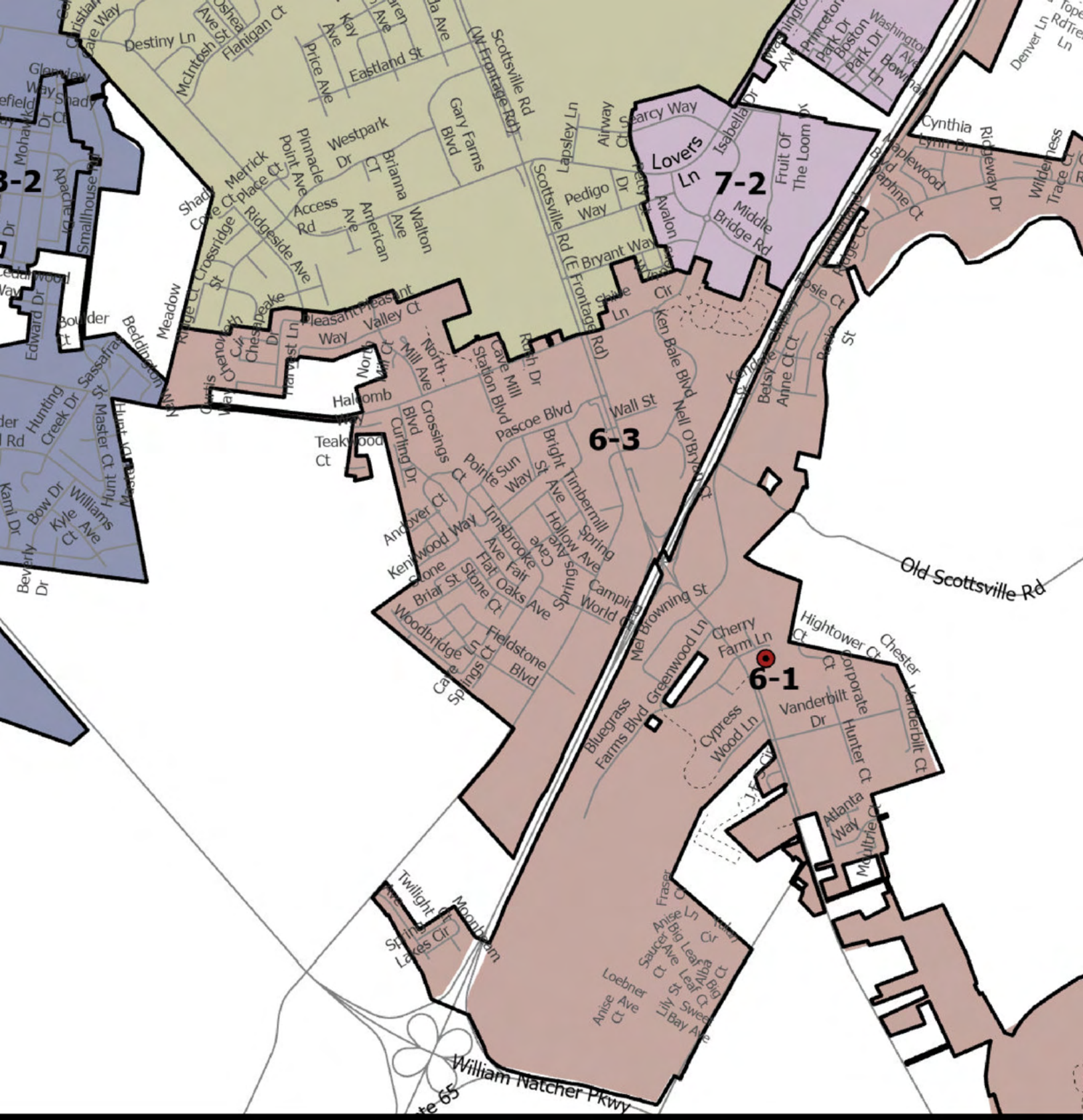
3:55

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Greenwood Nursing & Rehabilitation


6-3
7-2
6-1
Scottsville Rd (W Frontage Rd)
Scottsville Rd (E Frontage Rd)
Old Scottsville Rd
William Natcher Pkwy
Lovers Ln
Middle Bridge Rd
Pascoe Blvd
Wall St
Ken Bale Blvd
Nell O'Bryan Ct
Mel Browning St
Cherry Farm Ln
Greenwood Ln
Bluegrass Farms Blvd
Cypress Wood Ln
Vanderbilt Dr
Hightower Ct
Corporate Ct
Hunter Ct
Atlanta Way
Fieldstone Blvd
Woodbridge Ln
Stone Ct
Briar St
Flat Oaks Ave
Innsbrooke Ave
Andover Ct
Kenilwood Way
Pointe Sun Way
Curling Dr
Crossings Blvd
Station Blvd
Cave Mill Rd
Mill Ave
North Dr
Pleasant Valley Way
Pleasant Ln
Harvest Ln
Haddomb Ct
Teakwood Ct
Ridgeside Ave
Crossridge St
Access Rd
Merrick Place Ct
Pinnacle Point Ave
Westpark Dr
Brianna Ct
American Ave
Walton Ave
Gary Farms Blvd
Lapsley Ln
Airway Ct
Searcy Way
Isabella Dr
Fruit Of The Loom
Pedigo Way
Avalon Ln
Skille Ln
Cir
Betsy Anne Ct
Kendale Ct
Rosie Ct
Cynthia Lynn Dr
Ridgeway Dr
Wilderness Trace Ct
Daphne Ct
Maplewood Blvd
Destiny Ln
Flanigan Ct
McIntosh St
Oshea Ave
Price Ave
Kay Ave
Eastland St
Ken Ave
Glendow Way
Shady Dr Ct
Mohawk Dr
Smallhouse Rd
Edward Dr
Boulder Ct
Meadow Ridge Ct
Beddington Way
Sassafras St
Hunting Creek Dr
Master Ct
Hunt Club Pkwy
Williams Ct
Kyle Ave
Bow Dr
Kami Dr
Beverly Dr
Chesapeake Dr
Cherrywood Cir
Twilight Ct
Moonbeam
Spring Lakes Cir
Fraser Ln
Anise Ln
Big Leaf Ct
Alba Ct
Sweet Bay Ave
Loebner Anise Ave Ct
Saucer Ave
Lily Ct
Cir
Ridley
Mountain
Ave
Ct
Ln
Dr
Way
Rd
St
Pl
Blvd
Cir
Ct
Ave

1.62

Square Miles

4,308

Population Density

People per square mile

PLANNING ZONE 6-3
SCOTTSVILLE ROAD

Zone 6-3 is the 5th most populous zone in the city and has the 4th highest call volume. It is largely commercial business with residential areas included. It ranks 13th in total response time. This is an area of heavily trafficked highway business, including shopping, hotels, and restaurants.

Zone 6-3 contains 12 maximum risk structures, including the Drury Inn, Chandler Assisted Living, and Fern Terrace Nursing Home. Ten of the maximum risk structures in this zone are hotels, three of which are non-sprinkled. A high concentration of run volume is found in this zone, along with zone 7-2, at Fern Terrace Nursing Home, Countryside Village Mobile Home Park, and Charter Senior Living.

$48.5K

Median Household Income

11% Higher than average for City of Bowling Green

5:10

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Chandler Assisted Living



Planning Zone 6-4
Olde Stone

1.04

Square Miles

624

Population Density

People per square mile

PLANNING ZONE 6-4
OLDE STONE

Zone 6-4 is almost entirely residential, with some vacant land and a large golf course interspersed amongst the residential area. It has no maximum risk structures, however, many of the residential structures are single family homes with large square footage. This zone had the lowest call volume of any zone, with 41 total calls in three years, and had the 3rd worst total response time in the city, at 9:13.

This zone is outside a 2.5 mile driving distance from Station 6. Although it has the 3rd worst response times of all zones, the low call volume does not suggest it is a high risk zone.

Zone 6-4 has a special non-fire risk at Drakes Creek and Phil Moore Park. There have been three swift-water rescue incidents at this location in the previous three years. This area of Drakes Creek was annexed into the city with the Olde Stone development. The Department has responded to this risk by adding swift-water technicians and equipment at Station 6.

$93.5K

Median Household Income

114% Higher than average for City, second highest of all zones

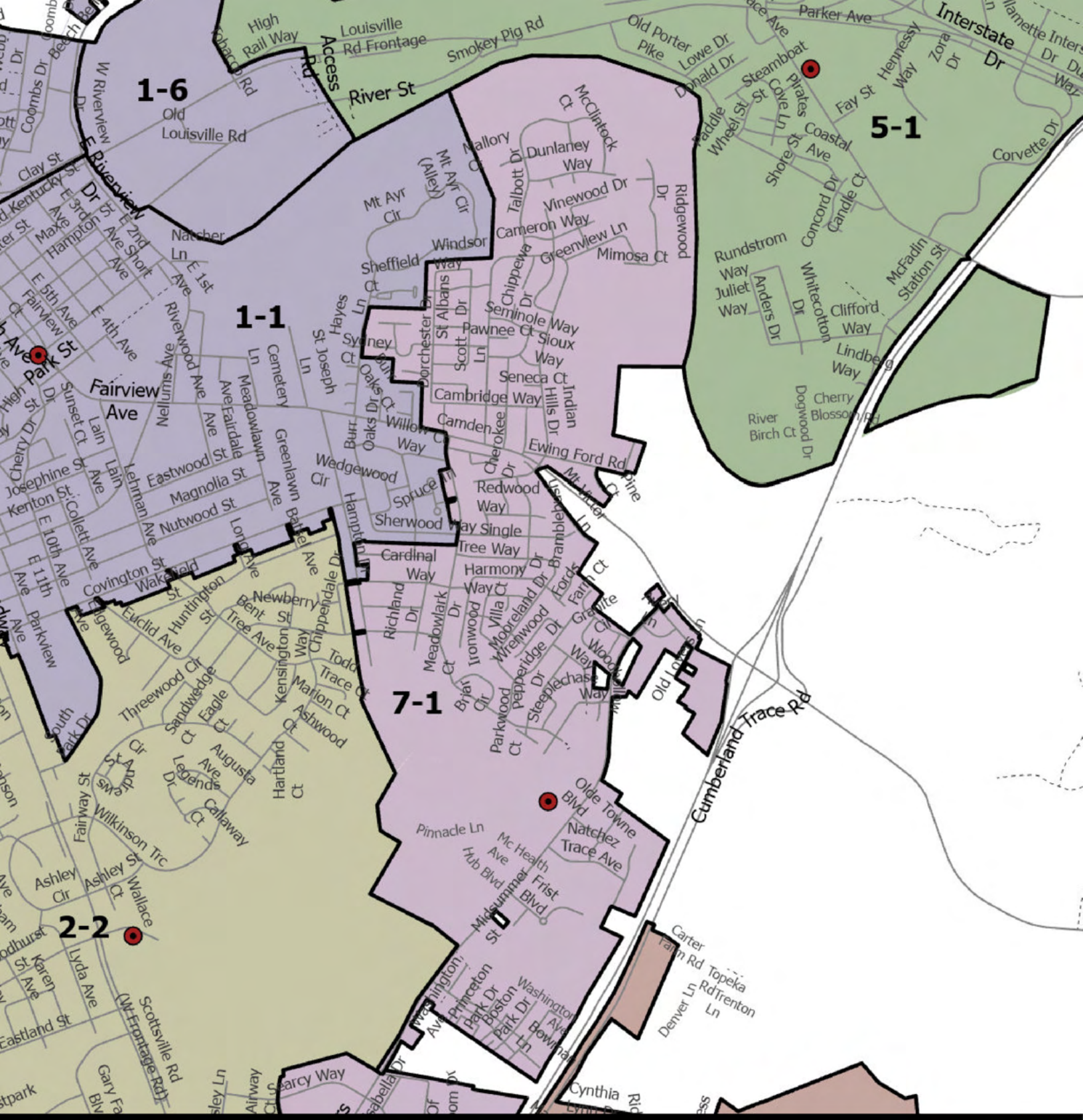
6:50

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Olde Stone



Planning Zone 7-1
Briarwood

2.65

Square Miles

1,771

Population Density

People per square mile

PLANNING ZONE 7-1
BRIARWOOD

Zone 7-1 was created in May 2021 when Station 7 opened by combining zones 1-2 and 2-1. It is an area of rapid growth and development: it had a 62% increase in population and an 82% increase in call volume, the 3rd highest. Prior to recent development on Lovers Lane this zone was mostly residential in the Indian Hills and Briarwood neighborhoods with agricultural land on Lovers Lane. Development around the Hub community has added a large hotel, multi-family residential area, commercial buildings, a retirement home, and medical treatment facilities. The Department built Station 7 to address this growth, turning a weak point for response times into a strength. From January 1, 2019 to May 22, 2021 this zone had 405 emergency runs with a total response time of 8:09. From May 23, 2021 to the end of that year it had 133 emergency runs at 6:41 total response time. This represents a great success for the Department's service to the citizens of Bowling Green. Growth and development in this zone will continue, reaping further benefits realized from addressing this performance gap.

$86.8K

Median Household Income

99% Higher than average for City of Bowling Green

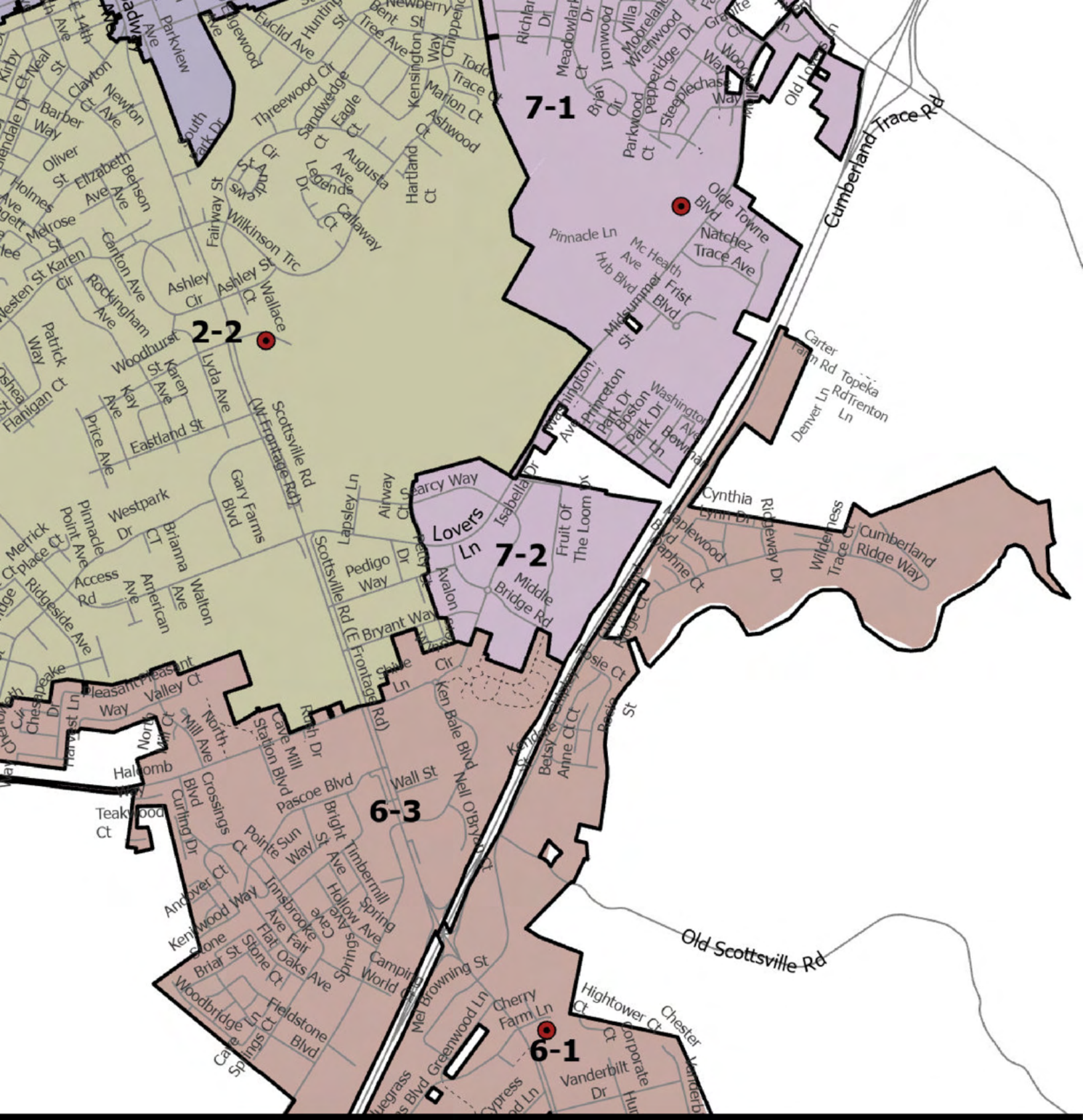
5:47

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Indian Hills Country Club



Planning Zone 7-2
Middle Bridge

.39

Square Miles

Second smallest zone by area

645

Population Density

People per square mile

PLANNING ZONE 7-2
MIDDLE BRIDGE

Zone 7-2 is a very small zone at .39 square miles, the second smallest, that nevertheless has a significant run volume, the 14th highest of all zones. It also had a 44% increase in call volume, the 4th highest. This zone has two maximum risk structures: Charter Senior Living and Fruit of the Loom Corporate Headquarters and Distribution Center. This zone was assigned to Station 6 prior to the construction of Station 7. Response times here have very slightly improved due to being covered by Station 7.

$39.1K

Median Household Income

10% Lower than average for City of Bowling Green

5:04

1st Unit Travel Time

90% travel time for all emergency runs 2018-2021



Fruit of the Loom Corporate Headquarters

Planning Zones 2019 – 2021

Planning Zone	Square Miles	Population (% Change, 2018 vs 2021)	# Runs 2019	# Runs 2020	# Runs 2021	# Runs Total 2019-2021	Growth 2014-2017 vs. 2019-2021	Structure Fires	Drive Time	Total Response Time @ 90%
1-1	3.0	8,681 (14%)	1,066	721	744	2,531	1%	24	**3:52**	**6:06**
1-3	1.2	1,329 (-9%)	279	127	139	545	-15%	**8**	4:26	6:37
1-4	.4	895 (-38%)	173	84	107	364	-13%	**9**	4:48	7:27
1-5	.7	1,138 (-1%)	124	81	65	270	-19%	2	4:10	6:29
1-6	.5	133	44	**59**	41	144	**New**	**5**	4:13	6:23
2-2	4.5	7,408 (-6%)	812	545	707	2,064	-3%	13	4:39	6:51
3-1	3.0	7,431 (22%)	561	432	385	1,378	16%	5	5:15	7:33
3-2	.3	767 (-8%)	45	30	22	97	-30%	0	**6:31**	**8:57**
3-3	1.6	126 (-2%)	41	35	46	122	-19%	0	**3:37**	**5:53**
3-4	1.1	1,272 (413%)	106	53	98	257	9%	2	5:30	7:54
3-5	2.0	1,670 (106%)	127	101	99	327	**32%**	4	**7:15**	**9:29**
3-6	2.1	1,416 (115%)	75	65	66	206	**86%**	0	**6:18**	**8:55**
3-7	.4	996 (1%)	50	22	31	103	-36%	2	5:05	7:13
4-1	.5	2,451 (38%)	146	114	132	392	16%	5	5:21	7:37
4-2	1.2	6,930 (1%)	375	229	270	874	9%	6	4:45	7:05
4-3	1.5	5,389 (32%)	288	158	203	649	13%	**11**	5:58	8:04
4-4	2.1	9,905 (23%)	970	616	657	2,243	-10%	27	4:13	6:21
5-1	3.6	1,905 (52%)	268	229	276	773	7%	5	**3:53**	**6:05**
5-2	3.9	70 (-36%)	91	79	66	236	26%	**4**	**8:19**	**10:44**
6-1	2.4	2,660 (95%)	247	167	202	616	-5%	7	3:55	6:11
6-3	1.6	6,993 (33%)	711	446	492	1,649	7%	8	5:10	7:19
6-4	1	648 (484%)	8	11	22	41	**105%**	0	**6:50**	**9:13**
7-1	2.6	4,691 (58%)	235	157	204	596	**82%**	5	5:47	7:56
7-2	.4	253 (212%)	132	92	106	330	**44%**	1	5:04	7:17
Total	41.6	75,157 (23%)	6,973	4,651	5,183	16,807	3%	**153 (+43%)**	**5:08**	**7:18**

OBSERVATIONS & CONCLUSIONS

ALARM HANDLING DISCREPENCY

Data in this chart shows that overall, the Department improved its total response time from 8:35 to 7:18, an improvement of 1 minute and 17 seconds. However, the drive time in all Planning Zones only improved from 5:35 to 5:08, a 27 second improvement. This discrepancy is due to a probable error in the RMS software recording of the Alarm Handling Time. City Dispatch put a new CAD system in service on January 12, 2021. At this time, the RMS system began recording the alarm handling time incorrectly. The Department is currently working on fixing this discrepancy.



RESPONSE TIME IMPROVEMENT

The Department's Total Response Time has improved significantly due to efforts on multiple fronts: building new stations and adding resources, installing new station alerting systems that improve call dispatching efficiency, covering districts when units are out of service, and dispatching the nearest available unit via ARL. Due to the error in call processing time, the exact improvement cannot be stated at this time. The improvement is most likely between 30 seconds and 1 minute.



CALL VOLUME GROWTH

Evaluating call volume growth was not a straightforward endeavor. The Department adjusted its response protocol in March of 2020 to account for the coronavirus pandemic. This led to a significant reduction in call volume in 2020 with a slight rebound in 2021. Comparing 3 years of data, 2015-2017 compared to 2019-2021, allowed the Department to take this into account and evaluate growth based on the relative increase compared to all other Planning Zones.



ZONE 6-4 OLDE STONE

Zone 6-4, the Olde Stone neighborhood, had the highest percentage increase in call volume, at 105%. It also had the third worst response time but with only 41 runs total from 2019 to 2021 it is a zone of lesser concern. Continued growth in this zone will be monitored.



ZONE 3-6

Zone 3-6, the Russellville Rd corridor west of I-165, had the 2nd highest percentage increase in call volume, at 86%. This zone had the most concerning combination of call volume growth and poor response time, at 8:55 total response time. This area will see continued development and population growth, including large multi-family residential complexes and commercial facilities. Increased responses will accompany this development. The Department is considering land acquisition near this zone and will monitor this area closely.



ZONE 7-1

Zone 7-1, the Lovers Ln area near The Hub development, had the 3rd largest percentage increase in call volume, at 82%. This area was identified in 2015 as an area that would see growth and development. The Department built Station 7 in 2021 to address this area and it has greatly improved response times, turning a weak point into a strength. Zone 7-1 had 405 emergency runs from January 1, 2019 to May 22, 2021 with a total response time of 8:09. After Station 7 opened on May 23, 2021 it had 133 emergency runs with a total response time of 6:41, an improvement of 1 minute and 28 seconds.

ZONE 3-5

Zone 3-5, including the South Industrial Park and Greystone neighborhood had a combination of the 5th highest call volume growth and 2nd worst response times. A deeper analysis of this zone reveals that 69% of the worst response times, over 8:30, are in the Greystone Neighborhood. As this neighborhood continues to build out in the back of the development these poor response times are expected to increase.



ZONE 5-2

Zone 5-2, the Transpark area, had the worst response times in the city by a wide margin. The total response time for the first arriving unit was 10:44, over a full minute slower than the 2nd worst zone and almost three-and-a-half minutes slower that the city as a whole. In response to call volume growth in this area, coupled with further development, including the $2 billion Envision AESC electric vehicle battery factory, the Department is in the process of designing and building Station 8. This new station will address an ongoing need to provide faster response and better service in an area of enormous economic growth. Target completion of Station 8 is spring of 2024.

STRUCTURE FIRES

The number of structure fires, incident types 111 and 121, has grown considerably. Total structure fires increased by 43%, from 107 fires in the previous 3-year reporting period to 153 from 2019 to 2021. Fires began increasing in 2020, a year of great social upheaval. Structure fires increased from 39 in 2019, to 55 in 2020, to 73 in 2021. From 2015 to 2017, three zones showed an increased risk for structure fires with more than 1 in every 100 incident responses being an Incident Type 111. From 2019 to 2021, ten zones reached this benchmark. Zone 1-6 had one structure fire per every 29 runs. Zone 1-4 had 1 per every 40 runs and Zone 4-3 had 1 per every 59 runs.



ZONE 3-3

Zone 3-3 is an area for consideration. In 2017, it had the 5th worst total response time even though Station 3 is located in this zone. At the time, it was believed to be an anomaly due to a small sample size. This has been shown to be the case as this zone now has the best total response time in the city at 5:53.



HIGHEST VOLUME, FASTEST RESPONSE

Zones 1-1 and 4-4 stand out as zones with very high call volume and very fast response times. These two zones have the 1st and 2nd greatest call volumes coupled with the 3rd and 5th fastest response times.

In addition, Zone 2-2 has the 3rd highest call volume and a response time of 6:51, 27 seconds faster than the city overall.

These positive results demonstrate that departmental resources are appropriately distributed.

CRITICAL TASKING & UNIT CAPABILITIES

Critical tasks are those tasks that must be conducted in a timely manner by firefighters at structure fires if firefighters are expected to control the fire prior to flashover. In creating a Standard of Cover, an assessment must be conducted to determine the capabilities of the arriving companies and individual firefighters to achieve those tasks.

The Bowling Green Fire Department has evaluated the critical tasks needed to fight a structure fire with life safety being emphasized. Whenever interior fire operations are being conducted, additional personnel must be staged to perform emergency operations in the event that the operation is not unfolding as planned. A command structure must also be in place.

The following list describes critical tasks that must be accomplished by the initial response force and effective response force in order for the Bowling Green Fire Department to meet its mission, goals, and objectives:

ATTACK LINE

A 1-3/4" hose that produces 150 GPM and is usually handled by a minimum of two firefighters, or a 2-1/2" hose that produces 250 GPM and is handled by a minimum of three firefighters. Each engine carries a set of attack lines that are either pre-connected to the pump, folded on the hose bed, or packaged for carrying into high-rise buildings. The selection of nozzle type, hose length, and hose size of which attack lines are used depends on the type of structure, the distance to the seat of the fire, fire load, and the stage in which the fire is burning at the time of hose line deployment. The 200-foot pre-connected lines are the fastest to use. However, when attack lines are needed beyond 200 feet, additional hose lengths can be added.



SEARCH AND RESCUE

A minimum of two firefighters are assigned to search for victims and remove them from danger. A four-person crew is preferred for most moderate risk structures to enable a quicker and more efficient search if victims are suspected to be present. Additional crews are required in multistory buildings or structures with people who are not capable of self preservation.

VENTILATION CREW

A minimum of two firefighters is required to open a horizontal or vertical ventilation flow path in coordination with the attack crew. Vertical ventilation or ventilation of a multistory building may require more firefighters. Ventilation removes superheated gases and obscuring smoke, preventing flashover and allowing attack crews to see and work closer to the seat of the fire.

BACK-UP LINE

A hose line that is equal to or greater in size and length than the initial attack line. This hose line is set up and established after the first fire attack line is in place. This hose line is put in place in case the fire load exceeds the capabilities of one line and to protect a means of egress for all firefighters operating in the hazard area. This operation needs a minimum of two firefighters.

HOSELINE SUPPORT

A minimum of one firefighter for each hose line operating in offense attack to assist with advancing the line forward and around obstacles.

RAPID INTERVENTION TEAM

A minimum of three firefighters equipped with self-contained breathing apparatus (SCBA), RIT equipment, and available near the entry point to enter the structure, to perform search and rescue for firefighters working within the IDLH atmosphere of a structure fire. The operation of a rapid intervention team at a structure fire is an OSHA requirement.



PUMP OPERATOR

One firefighter assigned to deliver water under the right pressure to all hose lines and master streams coming from the engine. This firefighter will also monitor the pressure changes caused by changing flows on each line and ensure that hose line crews receive an adequate fire flow. The pump operator can make the hydrant hookup alone if the engine is near a hydrant.

INCIDENT COMMAND

An officer assigned to remain outside of the structure to coordinate the attack; evaluate results and redirect the attack; arrange for additional resources; and monitor conditions that influence crew safety. Abide by the NIMS compliance.

AERIAL LADDER OPERATIONS

If an aerial device is used in operations, a minimum of one firefighter must be assigned to maintain primary control of the aerial device at all times.

ISO/ACCOUNTABILITY/REHAB

Incident Safety Officer provides the incident commander with information necessary to ensure safe operations and efficiently mitigate the emergency incident. The accountability officer keeps track of personnel on scene, and the rehab officer provides a logistical solution for rehabilitation efforts for personnel on scene.



STRUCTURE FIRE CRITICAL TASKING

Units or individuals that have completed their initial assignment may be reassigned or proceed to the next logical evolution of tactical considerations within their scope of service. This will maximize on scene resources to better mitigate the emergency.

Low Risk Structure Fire (Mobile Home) (ERF: 4 engines, 1 aerial, 1 command vehicle)	
Critical Task	**# Firefighters**
Attack Line	2
Search and Rescue	2
Ventilation Crew	2
Backup Line	2
Pump Operator/Water Supply	1
Rapid Intervention Crew	3
Command (BAT1) Aerial Ops ISO/Acct/Rehab	1 1 3
Total	**17**



Moderate/Significant Risk Structure Fire (ERF: 4 engines, 2 aerials, 1 command vehicle)	
Critical Task	**# Firefighters**
Attack Line	2
Search and Rescue	2
Ventilation Crew	2
Backup Line	2
Forcible Entry/Hoseline Support	2
Pump Operator/Water Supply	1
Rapid Intervention Crew	4
Command (BAT1) Aerial Ops ISO/Acct/Rehab	1 1 3
Total	**20**



Maximum Risk Structure Fire (ERF: 5 engines, 2 aerials, 1 command vehicle)	
Critical Task	**# Firefighters**
Attack Line	2
Search and Rescue	4
Ventilation Crew	2
Backup Line	2
Forcible Entry/Hoseline Support	2
Pump Operator/Water Supply	1
Rapid Intervention Crew	4
Command (BAT1) Aerial Ops ISO/Acct/Rehab	1 2 3
Total	**23**



STRUCTURE FIRE UNIT CAPABILITIES

The first arriving resources on scene of a structure fire of any risk shall be capable of providing 500 gallons of water and 1,500 gallons per minute (gpm) pumping capacity; establishing command; completing an initial size-up; requesting additional resources; initiating fire attack, including establishing and advancing an attack line flowing a minimum of 150 gpm; establishing an uninterrupted water supply; containing the fire; and rescuing at-risk victims. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

The Effective Response Force shall be capable of: establishing command; providing an uninterrupted water supply; advancing an attack line and a backup line for fire control; complying with the OSHA requirements of two in-two out; completing forcible entry; searching and rescuing at-risk victims; ventilating the structure; controlling utilities; establishing a 4-man RIT team; placing elevated master streams into service; and performing salvage and overhaul. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

In March of 2018, the Bowling Green Fire Department implemented a tiered response protocol calling for an additional unit to be automatically dispatched to a reported structure fires at any of the 103 maximum risk structures identified throughout the city (5 engines, 2 aerials, 1 command vehicle). The additional unit is utilized for an additional Search and Rescue team. These maximum risk structures are identified in the Bowling Green Fire Department Risk Assessment document and include:

- All Nursing Homes (Occupancy Types 311, 321) - 11 structures
- 29 Hotels, including all unsprinkled hotels and sprinkled hotels 4 stories tall
- All Residential Board and Care Occupancies (Occ. Type 459 [Senior Apartments]) - 5 structures
- All unsprinkled Fraternity/Sorority Houses and sprinkled frat houses over 10,000 sq. ft. (Occ. Type 462) - 15 structures
- All dormitories over 7 stories tall or non-Type I construction (Occ. Type 460) - 8 structures
- 4 large historic areas on Fountain Square
- All industrial manufacturing structures over 200,000 sq. ft. (Occ. Type 700) - 19 structures



In 2022, the BGFD adopted a new risk analysis system. The above listed structures have retained their maximum risk status within the Computer Aided Dispatching (CAD) system while BGFD's newly adopted risk assessment system is being refined. Once completed, the BGFD's risk assessment will be able to produce a list of all occupancies that can be sorted by risk category and Occupancy Vulnerability Assessment Profile (OVAP) score. The higher the OVAP score, the more risk is associated with the occupancy. When the majority of occupancies are evaluated and an accurate OVAP score is established, the response to all maximum risk occupancies can be updated at that time.

EMS CRITICAL TASKING

The Bowling Green Fire Department's EMS function provides for basic life support for potential life threatening emergencies. The Department responds in coordination with the Medical Center EMS. EMS functions can range from basic first aid to CPR and rapid defibrillation.

Moderate Risk EMS Critical Tasking		
Critical Task	**# Firefighters**	**Type of Treatment Administered**
Compressions	1	Compression of chest to circulate blood
Ventilate/Oxygenate	1	Ventilations, Bag-Valve-Mask, Apply O_2
Defibrillate	1	Electrical defibrillation
Total Required per patient	**3**	

The first-due unit shall be capable of: assessing scene safety and establishing command; sizing-up the situation; conducting initial patient assessment; initiating CPR; obtaining vitals and patient's medical history; initiating mitigation efforts within one minute of arrival; providing first responder medical aid including automatic external defibrillation; and assisting transport personnel with packaging the patient.

As the Bowling Green Fire Department provides EMS response only at the first responder level, in support of the local ambulance service, only one unit is sent to emergency medical calls. The remainder of the Effective Response Force, including Advanced Life Support, is supplied by the Medical Center of Bowling Green.

In 2022, the Fire Department arrived on scene before EMS 62% of the time and after EMS 21% of the time. The other 17% of EMS runs, the Fire Department and the Medical Center ambulance arrived simultaneously.



MASS CASUALTY/ACTIVE SHOOTER CRITICAL TASKING

High Risk: Active Shooter (ERF: 5 engines, 2 aerials, 1 command vehicle)	
Critical Task	**# Firefighters**
Command	1
Triage	3
Rescue Task Force/Patient Care/Hemorrhage Control/Extrication	19
Total	**23**

The first-due unit shall be capable of: establishing command, integrating into the ICS unified command operation, assembling rescue task force teams, determining the need for additional resources, setting up a staging area.

The ERF shall be capable of: assembling rescue task force teams, executing tactical searches of a hostile building in unison with a law enforcement element, perform hemorrhage control to victims, perform rapid extrication of victims, and perform patient care.



TECHNICAL RESCUE CRITICAL TASKING

Every technical rescue response varies in complexity and the demand for resources on scene can contrast in comparison from each other. High-angle or low-angle rope rescue, confined-space rescue, swift-water rescue, trench rescue, extrication, and structural collapse rescue all fall under Technical Rescue. Because the individual tasks in each specialty differ, there must be a specific set of tasks outlined for each discipline. The following tables can be function as a guide to a technical rescue response; however the scene complexity may warrant additions and/or modification in order to deploy diverse technical rescue strategies and tactics.

Low Risk Technical Rescue (entrapment) (ERF: 2 engines, 1 command vehicle)	
Critical Task	**# Firefighters**
Extrication	2
Vehicle stabilization/hose line	2
Patient Care	2
Command	1
Total	**7**



Moderate to High Risk Technical Rescue *all other technical rescue responses* (ERF: 4 engines, 2 aerials, 1 command vehicle)	
Critical Task	**# Firefighters**
Initial Recon/Logistics	3
Command	1
Operations Officer	1
Rescue/Entry Team	2
Support Rescue/Entry Team	2
Safety Officer	1
Staging/Rehab Resources	2
Support Personnel	8
Total	**20**

The first-due unit shall be capable of: establishing command; sizing up to determine if a technical rescue response is required; requesting additional resources; and providing basic life support to any victim without endangering response personnel.

The ERF shall be capable of: establishing patient contact; staging and apparatus set up; providing technical expertise, knowledge, skills and abilities during technical rescue incidents; performing trench, confined space, high angle, and swift water rescue; and providing first responder medical support.



HAZARDOUS MATERIALS CRITICAL TASKING

Hazardous materials responses are diverse in nature and require different influences in mitigation. The hazardous materials special operations unit, mobile command unit, and specialized equipment and personnel reside at BGFD's Station 3. The Fire Department currently trains all personnel to the Haz-Mat Operations level during initial training and all Stations 3 and 4 personnel are trained to the Haz-Mat Technician level. The following tables can function as a guide to a hazardous materials emergency response; however the scene complexity may warrant additions and/or modification in order to deploy diverse Haz-Mat strategies and tactics.

Low Risk Haz-Mat: Toxic Condition (ERF: 1 engine)	
Critical Task	**# Firefighters**
Command/Initial ERG Recon/Logistics	1
Decon/Patient care/Support	2
Total	**3**

Moderate Risk Haz-Mat: Gas Leak or Spill (ERF: 3 engines, 1 command vehicle)	
Critical Task	**# Firefighters**
Initial ERG Recon/Logistics	3
Command	1
Operations Officer	1
Decon Team	2
Support Decon Team	2
Safety Officer/Support	1
Staging/Rehab Resources	1
Total	**11**

High Risk Haz-Mat: Chemical Spill (ERF: 4 engines, 2 aerials, 1 command vehicle)	
Critical Task	**# Firefighters**
Command/Initial ERG Recon	1
Rapid Decon Team	2
Operations Officer	1
Entry Team	4
Support Entry Team	2
Decon Team	6
Patient Care	2
Safety Officer/Support	1
Staging/Rehab Resources	1
Total	**20**

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.

The ERF shall be capable of providing the equipment, technical expertise, knowledge, skills and abilities to mitigate a hazardous materials incident in accordance with Department standard operating guidelines.

ARFF Response (ERF: E2, ARFF22, E3, HazMat3, 4 additional units, 1 command vehicle)	
Critical Task	**# Firefighters**
Protect means of egress/fire extinguishment (ARFF22)	1
Hand-line deployment for fire attaack/foam blanket	2
Rescue Team	3
Water Supply, 2nd fire attack hand-line	3
Water Supply/Search	3
HazMat	4
Command	1
Safety Officer	1
Accountibility	1
Staging/Rehab	1
Total	**20**

The first-due unit shall be capable of: establishing command; sizing up to determine if a full-scale ARFF response is required; requesting additional resources; providing basic life support to any victim without endangering response personnel; applying a foam blanket for fire suppression; and protecting means of egress.

The ERF shall be capable of: establishing patient contact; staging and apparatus set up; rescuing victims; and providing technical expertise, knowledge, skills and abilities during ARFF incidents.

CRITICAL TASK EVALUATION

Critical Tasks must be identified and the capacity of all personnel to perform these tasks must then be evaluated. The Bowling Green Fire Department Training Division developed and conducted company-level task drills using a scenario-based performance objectives as well as reference to NFPA 1001 for specific tasking. The scenario and resulting evaluation was video recorded and timed to provide an accurate assessment of the Department's capabilities. All personnel perform a portion of these evaluations quarterly during Company Performance Drills (CPDs). Evaluated times are compared to average times and then used to evaluate performance of individuals. If an evaluated time doesn't reflect positively in comparison to the average time, this would indicate the need for additional training or familiarization with a specific critical task for that individual. Exceptional evaluation times are used by Training to push out new and improved techniques and tactics to the rest of the Department for optimal performance throughout.

COMPANY-LEVEL TASKS INCLUDED THE FOLLOWING EVOLUTIONS:

Force entry-Inward Swinging Halligan and Flathead	NFPA 1001 5.3.4
Force entry- Outward Swinging	NFPA 1001 5.3.4
Fire Attack 1 ¾" w/PDP	NFPA 1001 5.3.10 & 6.3.2
Fire Attack 2 ½" exterior advance w/PDP	NFPA 1001 5.3.10 & 6.3.2
Fire Attack 2 ½" interior advance w/ PDP	NFPA 1001 5.3.10 & 6.3.2
High Rise Deployment 2 ½" w/PDP	NFPA 1001 5.3.10 & 6.3.2
Turret Deployment- targets	NFPA 1001 5.3.10 & 6.3.2
Monitor set-up w/PDP	NFPA 1001 5.3.10 & 6.3.2
Ground Ladder set 2 man 24' set	NFPA 1001 5.3.6
Ground Ladder set 3 man 35' set	NFPA 1001 5.3.6
Ground Ladder set 1 man 24' set	NFPA 1001 5.3.6
Firefighter Rescue- Low heat	NFPA 1001 5.3.9
Firefighter Rescue- High heat	NFPA 1001 5.3.9
Victim Rescue- Low heat	NFPA 1001 5.3.9
Victim rescue- High heat	NFPA 1001 5.3.9
Primary Search- lead oriented	NFPA 1001 5.3.9
Primary Search- anchor oriented	NFPA 1001 5.3.9
Tool Haul	NFPA 1001 5.1.1.2
Taking Rear Ventilation and Search Techniques	NFPA 101 5.3.12 & 5.3.9
Water Supply	NFPA 1001 5.3.15
Vehicle Fire	NFPA 1001 5.3.7
Foam Application	NFPA 1001 6.3.1
Extinguisher usage	NFPA 1001 5.3.16

SAMPLE COMPANY PERFORMANCE DRILLS EVALUATION PROGRAM

CPD #	Description	Eval. Times	Eval Times (sec)	Average Time
1	Force entry-Inward Swinging Door	0:53, 1:05. 1:08, 1:02	53, 65, 68, 62	1:02
2	Force entry-Outward Swinging Door	0:44, 0:58, 0:56, 0:52	44, 58, 56, 52	0:52
3	Fire Attack 1 ¾" w/PDP	3:30, 3:30, 4:39	210, 210, 279	3:53
4	2 ½" exterior attack w/PDP	1:55, 2:10, 3:01	115, 130, 180	2:22
5	2 ½" interior attack w/ PDP	3:05, 3:02, 4:22	185, 182, 262	3:29
6	High Rise Deployment 1 ¾"	4:30, 5:07, 8:30	270, 307, 510	6:02
7	Turret Deployment w/ Targets	1:29, 1:26, 1:16	89, 86, 76	1:23
8	Monitor set-up w/ Targets	3:42, 3:19, 5:59	222, 199, 359	4:20
9	Ground Ladder - 24' extension (2-man)	1:25, 1:53, 1:18, 1:32	85, 113, 78, 92	1:25
10	Ground Ladder - 35' (3-man)	2:38, 4:07, 1:47	158, 247, 107	2:50
11	Ground Ladder - 24' (1-man)	1:25, 1:19, 1:18, 1:21	85, 79, 78, 81	1:17
12	Firefighter Rescue - Low heat	2:47, 3:08, 3:18, 3:04, 4:37	167, 188, 198, 184, 277	3:23
13	Firefighter Rescue - High heat	3:33, 3:33. 4:23, 3:49, 6:21	213, 213, 263, 229, 381	4:20
14	Victim Rescue - Low heat	4:06, 4:09, 4:18, 5:34	246, 249, 258, 334	4:32
15	Victim rescue - High heat	4:26, 4:56, 5:51, 12:24	266, 296, 351, 744	6:54
16	Primary Search - lead oriented	5:03, 4:25, 4:28, 6:32	303, 265, 268, 392	5:07
17	Tool Haul	5:18, 3:50, 3:10, 5:51	318, 230, 190, 351	4:32
18	Taking the Rear - Defensive Search	4:15, 5:17	255, 317	4:46
19	Water Supply - Forward Lay	3:07	187	3:07
20	Water Supply - Reverse Lay	4:21	261	4:21
21	Vehicle Fire w/ PDP	1:34, 2:08, 1:59	94, 128, 119	1:53
22	Foam Line Operations	1:52, 2:29, 3:11	112, 149, 191	2:31
23	1 ¾" and 2 ½" Deployment w/ Water Supply	NFPA 1410		
24	Reverse Lay w/ Portable Monitor	NFPA 1410		
25	Fire Attack w/ Turret Pipe and 5" Supply Line	NFPA 1410		
26	Sprinkler/Standpipe Hook-up w/ 5" Supply LIne	NFPA 1410		

CURRENT DEPLOYMENT AND PERFORMANCE

After performing a comprehensive Risk Assessment for Bowling Green and identifying the probability and consequence of all significant emergency events, the Fire Department made decisions about resource deployment, particularly regarding distribution and concentration of those resources. Response time goals were adopted from NFPA standards for the first arriving unit as well as the effective response force (ERF). Total response time goals were broken down into defined individual time elements (the Cascade of Events) for evaluation. Critical tasks were then identified and these tasks must be executed in order mitigation to be effective. Finally, the number of personnel necessary to complete the critical tasks was established.

The establishment of standards requires evaluation of performance for current effectiveness. This measurement of actual performance is accomplished using fractile measurement as opposed to run time averages, which can be misleading. When calculating averages, a few isolated abnormal responses can significantly skew the results and yield inaccurate evaluation. The fractile goals of the Fire Department call for evaluation to be measured at not less than 90% of performance. The citizens of Bowling Green can be told a fire truck will arrive at their house to a call for a structure fire within 6 minutes and 33 seconds from the time a dispatcher picks up the phone 90% of the time. This statement is a more accurate and efficient form of performance measure than an average run time.

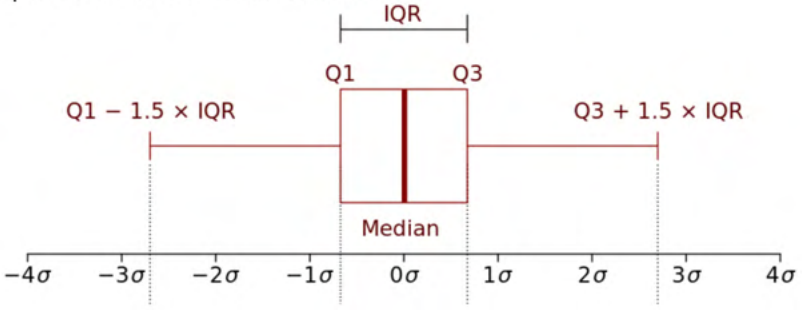
The following tables illustrate the BGFD's baseline performance objectives. Expressed in the tables as well is the Benchmark time adopted from NFPA standards. The baseline and benchmark times can easily be compared and contrasted in the tables to indicate performance gaps and trend that would lead to needed improvements or adjustments in practices.

The Department's baseline statements reflect actual performance during the evaluation period of 2018 to 2022. The Department does not rely on the use of automatic aid or mutual aid from neighboring fire departments to provide its effective response force complement of personnel. There were no aircraft fires within the reporting period so ARFF data is not reflected.

DATA & OUTLIER POLICY

Data was used only for those incident types within each risk category. Non-emergency, upgraded, or downgraded responses; cancelled enroute; and mutual aid given responses were removed from the reported dataset. ERF qualification changed from the 2018 Standard of Cover and the RMS data from that time is no longer available. First-arriving data from 2018 is accurate, however ERF information in unavailable due to a change in RMS. All times are expressed in decimal format.

An outlier is a value that lies an abnormal distance from other values in a dataset and standard deviation is a measure of the amount of variation in a dataset. For the purpose of this report, statistical outliers were removed both under the lower limit and above the upper limit using standard deviation and interquartile range.



LOW RISK STRUCTURE FIRE - BENCHMARK AND BASELINE

For 90 percent of all risk categories in structure fire responses, the total response time for the arrival of the first-due unit, staffed with 3 firefighters, shall be: 6 minutes and 20 seconds in all districts.

For 90 percent of all low risk structure fire responses, the total response time for the arrival of the effective response force (ERF), staffed with 17 firefighters and officers on 5 fire apparatus and 1 command vehicle, shall be: 10 minutes and 20 seconds in all districts.

The small dataset for low-risk structure fire incidents is not statistically significant. ERF does not include 2018 due to the unavailability of data from a previous RMS.

Low Risk Structure Fire (Incident Type 121) (ERF: 4 engines, 1 aerial, 1 command vehicle)								
	Benchmark	2018-2022	Gap	2022	2021	2020	2019	2018
Alarm Handling	1.00	0.63	-0.37	0.15	0.27	1.55	0.67	1.89
Turnout Time	1.33	2.40	1.07	2.55	2.21	1.78	1.68	1.95
Travel Time - First Arriving	4.00	4.27	0.27	2.73	3.53	4.17	2.87	4.45
n=		15		2	8	2	1	2
Travel Time - ERF	8.00	9.34	1.34	12.02	9.53	8.32	n/a	n/a
n=		9		1	6	2	0	unknown
Response Time - First Arriving	6.33	7.13	0.80	5.43	5.19	7.06	5.22	7.03
n=		15		2	8	2	1	2
Response Time - ERF	10.33	12.55	2.22	13.68	11.42	11.8	n/a	n/a
n=		9		1	6	2	0	unknown

For 90 percent of low risk structure fire responses, the total response time for the arrival of the first-due unit, staffed with 3 firefighters, was: 7 minutes and 08 seconds in all districts based on 15 incidents between January 1, 2018 and December 31, 2022.

For 90 percent of all low risk structure fire responses, the total response time for the arrival of the effective response force (ERF), staffed with 17 firefighters and officers on 5 fire apparatus and 1 command vehicle, was: 12 minutes and 33 seconds in all districts, based on 9 incidents between January 1, 2019 and December 31, 2022

MODERATE/SIGNIFICANT STRUCTURE FIRE - BENCHMARK AND BASELINE

For 90 percent of all risk categories in structure fire responses, the total response time for the arrival of the first-due unit, staffed with 3 firefighters, shall be: 6 minutes and 20 seconds in all districts.

For 90 percent of all moderate/significant risk structure fire responses, the total response time for the arrival of the effective response force (ERF), staffed with 20 firefighters and officers on 6 fire apparatus and 1 command vehicle, shall be: 10 minutes and 20 seconds in all districts.

ERF does not include 2018 due to the unavailability of data from a previous RMS.

Moderate/Significant Risk Structure Fire (Incident Type 111 in all structures that are not max-risk) (ERF: 4 engines, 2 aerial, 1 command vehicle)								
	Benchmark	2018-2022	Gap	2022	2021	2020	2019	2018
Alarm Handling	1.00	0.79	-0.21	0.34	0.45	0.88	1.03	0.80
Turnout Time	1.33	1.95	0.62	1.69	1.87	1.64	2.15	1.98
Travel Time - First Arriving	4.00	4.29	0.29	4.14	4.37	4.32	4.39	4.14
n=		209		56	56	35	28	34
Travel Time - ERF	8.00	11.37	3.37	12.05	10.98	10.65	11.85	n/a
n=		127		39	41	27	20	unknown
Response Time - First Arriving	6.33	6.55	0.22	5.67	6.41	6.94	6.81	6.56
n=		209		56	56	35	28	34
Response Time - ERF	10.33	14.33	4.00	14.21	14.07	12.72	14.79	n/a
n=		127		39	41	27	20	unknown

For 90 percent of moderate/significant risk structure fire responses, the total response time for the arrival of the first-due unit, staffed with 3 firefighters, was: 6 minutes and 33 seconds in all districts based on 209 incidents between January 1, 2018 and December 31, 2022.

For 90 percent of all moderate/significant risk structure fire responses, the total response time for the arrival of the effective response force (ERF), staffed with 20 firefighters and officers on 6 fire apparatus and 1 command vehicle, was: 14 minutes and 20 seconds in all districts, based on 127 incidents between January 1, 2019 and December 31, 2022

MAXIMUM RISK STRUCTURE FIRE - BENCHMARK AND BASELINE

For 90 percent of all risk categories in structure fire responses, the total response time for the arrival of the first-due unit, staffed with 3 firefighters, shall be: 6 minutes and 20 seconds in all districts.

For 90 percent of all max risk structure fire responses, the total response time for the arrival of the effective response force (ERF), staffed with 23 firefighters and officers on 7 fire apparatus and 1 command vehicle, shall be: 10 minutes and 20 seconds in all districts

The small dataset for maximum risk structure fire incidents is not statistically significant. ERF does not include 2018 due to the unavailability of data from a previous RMS.

Maximum Risk Structure Fire (Incident Type 111 in any structure identified as max-risk) (ERF: 5 engines, 2 aerial, 1 command vehicle)								
	Benchmark	2018-2022	Gap	2022	2021	2020	2019	2018
Alarm Handling	1.00	0.77	-0.23	n/a	0.18	0.67	0.82	0.43
Turnout Time	1.33	1.72	0.39	n/a	1.61	4.50	2.25	2.29
Travel Time - First Arriving	4.00	5.13	1.13	n/a	2.23	2.13	5.52	3.50
n=		13		0	3	4	4	2
Travel Time - ERF	8.00	13.56	5.56	n/a	13.08	7.23	13.53	n/a
n=		4		0	2	1	1	unknown
Response Time - First Arriving	6.33	6.31	-0.02	n/a	3.79	5.73	10.30	6.21
n=		13		0	3	4	4	2
Response Time - ERF	10.33	19.86	9.53	n/a	16.05	8.87	21.43	n/a
n=		4		0	2	1	1	unknown

For 90 percent of maximum risk structure fire responses, the total response time for the arrival of the first-due unit, staffed with 3 firefighters, was: 6 minutes and 19 seconds in all districts based on 13 incidents between January 1, 2018 and December 31, 2022.

For 90 percent of all maximum risk structure fire responses, the total response time for the arrival of the effective response force (ERF), staffed with 23 firefighters and officers on 7 fire apparatus and 1 command vehicle, was: 19 minutes and 52 seconds in all districts, based on 4 incidents between January 1, 2019 and December 31, 2022

EMERGENCY MEDICAL SERVICES - BENCHMARK AND BASELINE

For 90 percent of all emergency medical services (EMS) responses, the total response time for the arrival of the first-due unit, staffed with 3 firefighters on 1 fire apparatus, shall be: 6 minutes and 45 seconds in all districts.

Emergency Medical Services (Incident Types 311, 322, and 323)								
	Benchmark	2018-2022	Gap	2022	2021	2020	2019	2018
Alarm Handling	1.75	1.23	-.052	0.30	0.33	0.96	1.57	1.78
Turnout Time	1.00	1.70	0.70	1.55	1.54	1.67	1.77	1.77
Travel Time - First Arriving	4.00	4.93	0.93	4.77	4.79	5.00	4.93	5.10
n=		19,494		4,526	2,783	2,737	4,642	4,806
Response Time - First Arriving	6.75	7.13	0.38	6.22	6.35	7.02	7.28	7.92
n=		19,494		4,526	2,783	2,737	4,642	4,806

For 90 percent of all emergency medical services (EMS) responses, the total response time for the arrival of the first-due unit, staffed with a minimum of 3 firefighters on 1 fire apparatus, was: 7 minutes and 08 seconds in all districts.

An extra 45 seconds is added to the alarm handling benchmark in EMS incidents due to call transfer and answering time for PSAP to EMS Communications Center in accordance with guidelines provided by NFPA 1221.

The Fire Department relies upon the Bowling Green's Medical Center EMS, a third-party provider, to complete the ERF component of its EMS program. The initial arriving Fire Department company has the capabilities of providing first responder medical aid including automatic external defibrillation, until the third-party provider arrives on scene. If the third-party provider unit arrives on scene first, its personnel initiate care and the staff from the initial Fire Department company provide support as needed.

The Department had one mass casualty incident in the reporting period, an EF-3 tornado on December 11, 2021, resulting in 17 deaths within Warren County. Due to the damage; widespread response area; and logistical difficulties including blocked roadways, lack of access, loss of electricity and fiber, the Department is unable to measure response times to this particular incident.

LOW RISK TECHNICAL RESCUE - BENCHMARK AND BASELINE

For 90 percent of all low risk technical rescue incidents, the total response time for the arrival of the first-due unit, staffed with 3 firefighters, shall be: 6 minutes and 20 seconds in all districts.

For 90 percent of low risk technical rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with 7 firefighters and officers on 2 fire apparatus and 1 command vehicle, shall be: 10 minutes and 20 seconds in all districts.

ERF does not include 2018 due to the unavailability of data from a previous RMS.

Low Risk Technical Rescue (Incident Type 352) (ERF: 2 engines, 1 command vehicle)								
	Benchmark	2018-2022	Gap	2022	2021	2020	2019	2018
Alarm Handling	1.00	1.48	0.48	0.68	0.47	0.70	1.15	1.96
Turnout Time	1.33	1.93	0.60	1.49	2.04	1.79	1.72	2.03
Travel Time - First Arriving	4.00	4.96	0.96	5.22	3.98	4.10	4.62	8.29
n=		60		10	10	11	16	13
Travel Time - ERF	8.00	8.52	0.52	7.80	7.87	5.34	7.53	n/a
n=		18		4	4	2	7	unknown
Response Time - First Arriving	6.33	7.07	0.74	10.73	6.73	6.18	7.03	12.46
n=		60		10	10	11	16	13
Response Time - ERF	10.33	11.53	1.20	16.73	11.49	6.66	16.61	n/a
		18		4	4	2	7	unknown

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 3 firefighters, was: 7 minutes and 04 seconds in all districts, based on 60 incidents between January 1, 2018 and December 31, 2022.

For 90 percent of low risk technical rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with 7 firefighters and officers on 2 fire apparatus and 1 command vehicle, was: 11 minutes and 32 seconds in all districts based on 18 incidents between January 1, 2019 and December 31, 2022.

MODERATE TO HIGH RISK TECHNICAL RESCUE - BENCHMARK AND BASELINE

For 90 percent of all moderate to high risk technical rescue incidents, the total response time for the arrival of the first-due unit, staffed with 3 firefighters, shall be: 6 minutes and 20 seconds in all districts.

For 90 percent of moderate to moderate to high risk technical rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with 20 firefighters and officers on 6 fire apparatus and 1 command vehicle, shall be: 10 minutes and 20 seconds in all districts.

The small dataset for moderate to high risk technical rescue incidents is not statistically significant. ERF does not include 2018 due to the unavailability of data from a previous RMS.

Moderate to High Risk Technical Rescue (Incident Types 354, 355, 356, 357, 360, & 363) (ERF: 4 engines, 2 aerials, 1 command vehicle)								
	Benchmark	2018-2022	Gap	2022	2021	2020	2019	2018
Alarm Handling	1.00	1.31	0.31	0.90	1.39	1.52	1.02	0.75
Turnout Time	1.33	2.05	0.72	2.03	2.08	1.79	2.11	1.56
Travel Time - First Arriving	4.00	4.52	0.52	2.80	2.62	4.52	3.92	5.67
n=		24		4	5	5	4	6
Travel Time - ERF	8.00	12.38	4.38	n/a	9.83	13.33	5.90	n/a
n=		4		0	2	1	1	unknown
Response Time - First Arriving	6.33	6.92	0.59	6.63	5.91	6.93	5.84	7.28
n=		24		4	5	5	4	6
Response Time - ERF	10.33	18.37	8.04	n/a	13.70	20.27	8.15	n/a
		4		0	2	1	1	unknown

For 90 percent of all moderate to high risk technical rescue incidents, the total response time for the arrival of the first-due unit, staffed with a minimum of 3 firefighters, was: 6 minutes and 55 seconds in all districts, based on 24 incidents between January 1, 2018 and December 31, 2022.

For 90 percent of moderate to moderate to high risk technical rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with 20 firefighters and officers on 6 fire apparatus and 1 command vehicle, was: 18 minutes and 22 second in all districts based on 4 incidents between January 1, 2019 and December 31, 2022.

HAZARDOUS MATERIALS - BENCHMARK AND BASELINE

For 90 percent of all hazardous materials response incidents, the total response time for the arrival of the first-due unit, staffed with a minimum of 3 firefighters, shall be: 6 minutes and 20 seconds in all districts.

Due to a small dataset in low and maximum risk categories, all hazardous materials risk incidents are reported together in the table below. There were 2 low risk incidents and 9 maximum risk incidents within the reporting period. There were no hazardous materials incidents requiring an effective response force (ERF) during this time period.

All Risk Hazardous Materials (Incident Types 411, 412, 420, & 422)

	Benchmark	2018-2022	Gap	2022	2021	2020	2019	2018
Alarm Handling	1.00	1.39	0.39	0.43	0.49	1.26	1.69	2.15
Turnout Time	1.33	2.07	0.74	2.07	2.11	1.83	2.13	1.78
Travel Time - First Arriving	4.00	4.92	0.92	4.25	5.26	4.95	4.43	6.02
n=		229		61	57	20	48	43
Response Time - First Arriving	6.33	7.51	1.18	6.33	7.17	7.22	6.68	8.34
n=		229		61	57	20	48	43

For 90 percent of all hazardous material incidents, the total response time for the arrival of the first-due unit, staffed with 3 firefighters, was: 7 minutes and 31 seconds in all districts, based on 229 incidents between January 1, 2018 and December 31, 2022.



IMPROVING AND MAINTAINING RESPONSE CAPABILITIES

The Bowling Green Fire Department is an efficient, high quality organization that has many strengths. However, while implementing continuous improvement efforts, some shortcomings can be identified. The following are areas and ideas that the Department will be looking into in order to improve upon its successes and keep up with industry innovations.

IMPLEMENT OVAP SCORES INTO RISK ANALYSIS

Occupancy OVAP scores are currently under revision by the BGFD's Prevention and Administration Divisions. These OVAP scores can be very useful in refining tiered response efforts and identifying occupancies that will be challenging and pose higher risk in mitigating a structure fire or technical recue emergency event.

ESTABLISH OVAP SCORE THRESHOLD FOR TIERED RESPONSE PROTOCOLS

OVAP score >60 is max risk. This yields a very minimal number of occupancies within the response district, if any at all. Establishing a threshold OVAP score number will allow for useful tiered response strategy for higher risk occupancies.

IMPROVE THIRD PARTY CAD CONFORMITY

Call processing times have been identified as a possible deficiency that affects baseline performance. It is paramount that the call processing times that are provided to the BGFD from the dispatching agency are accurate and reflect the timeline which is being calculated.

IMPROVE COMMUNICATION BETWEEN DISPATCH CENTERS

A goal to improve communication between the PSAP and Medical Center EMS dispatch was established in 2017 to reduce call transfer times and improve EMS service to the City. This remains a priority for BGFD to allow real-time communication and CAD monitoring between dispatch centers.

Research and investigation of the above ideas can take the Bowling Green Fire Department to the next level of performance and will allow the Department to be in a position to serve its citizens better than it ever has before.



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