TOWN OF NORTH READING, MASSACHUSETTS
FIRE SERVICE
DEPLOYMENT ANALYSIS

March 2025

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Project Background, Scope & Methodology

Background

MRI (Municipal Resources, Inc.) was engaged by the Town of North Reading, Massachusetts, to conduct a service demand study of the North Reading Fire Department (NRFD). The study consisted of a thorough review of existing staffing, deployment, incident response times, projected growth, target hazard locations and service level demand to indicate whether the Department can provide a level of service that is in line with generally accepted standards and benchmarks for a community of like character. The Town will also utilize this information to assist in determining if there is an operational need for an additional fire station, and potential locations if that need is identified. The study also assessed the current adequacy of the existing NFRD station and the need for upgrades to better meet the needs of the department.

Scope & Methodology

The locations of fire stations in every community are typically based on a historical need at the time the station was built, as well as the town's infrastructure at that time. Today, communities are taking into consideration their master planning documents, regional economic growth patterns, and potential demographic changes when determining fire station locations. Changes in a community often require a station to be replaced and/or relocated, or additional stations constructed.

In order to provide an effective fire suppression service, a community must deploy its fire apparatus in such a manner that a sufficient number of apparatus, staffed with sufficient resources (firefighters), respond and arrive at reported fires and requests for emergency medical aid within an acceptable period of time. The MRI study team evaluated the current NFRD fire station and has analyzed the effectiveness of the current staffing patterns and apparatus placement. We reviewed fire department incident patterns, including the mapping of location of all incidents, actual fire incidents, and fire and EMS incident "hotspots" based upon statistical data obtained from the NFRD fire incident reporting system. Hotspots indicate frequent calls for service. The team also analyzed and mapped out response times using what are referred to as "heat" or "bleed" maps. Finally, we evaluated various scenarios that include the coverage provided by the existing fire station with deployment models that envisions the addition of a second fire station, at various locations throughout the Town that could potentially improve response times of the fire department apparatus and Firefighters/EMS to the scene of the call.

The scope of the study was developed with input provided by the Town of North Reading Fire Department, Department of Public Works, and the North Reading Fire Station Building Committee and focused on the following areas:

- Review and evaluate NRFD fire service data and operational information as provided by the Town.

- Review and evaluate fire and EMS GIS Maps that consider response data. The maps were developed by the Town and the MRI project team to maximize the value of these maps.

- Review and evaluate the current deployment pattern.

- Review and evaluate incident volume and trends.

- Review and evaluate response times.

- Review the average number of responders for each incident type.

- Assess and evaluate the Department's current staffing, organization and delivery of services, with the primary focus being on providing a rapid response to critical incidents.

- Toured the community and reviewed community demographics, target hazards and response patterns.

- Identify the response patterns generated by staffing a second station. Specifically identifying the number of incidents that would be positively impacted by a reduced response time if this facility were appropriately located and staffed on a 24/7 basis

- Develop a report that will address staffing, service demand trends, and comment on facility needs over the next decade.

CHAPTER II

Community Profile: Background and Local Information

The Town of North Reading

The Town of North Reading, located in Middlesex County, Massachusetts, was incorporated as the Town of North Reading in 1853. Located in the Ipswich River watershed area, North Reading has a total area of 13.51 square miles and is approximately fifteen miles north of the City of Boston. While there are no major highways that pass through its borders, state routes 28 and 62 traverse through the Town, with Route 28 serving as a north-south connector in the western section of Town, and route 62 serving as an east-west passage throughout the Town.

North Reading is bordered by six communities: Reading to the south, Wilmington to the west, Andover to the northwest, North Andover to the northeast, Middleton to the east, and Lynnfield to the southeast. Although the area immediately surrounding the Route 28 corridor is home to a mixed amount of commercial, retail and light industrial uses, North Reading remains today largely a residential community. The historic roots of the Town are still evident as demonstrated in the Town center where a colonial/federal character lives on. The historic commercial roots of the Town were primarily agricultural, although some small mills and footwear fabricators once called North Reading home in the 19th century.

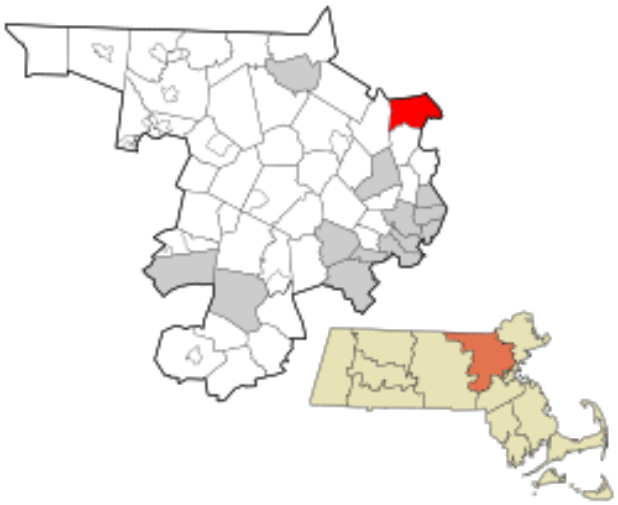


Figure II – 1 North Reading Mass -Middlesex County

The 2024 Census estimates the population to be 16,477 residents resulting in a 2.7% increase annually, and an increase of 5.91% since the 2020 census. The population density is estimated to be 1,220.5 people per square mile. It's important to note this increase in population and population density as a benchmark when considering the future needs of the NFRD. Population density is defined as a measurement of how many people live in each area, usually expressed as the number of people per square mile or square kilometer. It's calculated by dividing the number of people in an area by the area itself.

Current North Reading Fire Service Facility Overview

Figure II - 2 North Reading Mass Fire Station
152 Park Street

Fire stations are the basis of a rapid response and foundation for meeting the North Readings service level expectations.

MRI conducted a site visit with Fire Chief Don Stats on December 12, 2024. The NRFD Fire Station is located at 152 Park Street and is the only fire station covering the 13.5 sq miles of the community. The Fire Station is a two-story masonry building that was built in 1967. The building abuts and is connected to the Town's Police Station. Gross square footage of the building is approx. 14,305 square feet.

Typical staff consists of The Fire Chief, the Deputy Fire Chief, the Administrative Assistant and 5 firefighters per shift. MRI also reviewed and evaluated a Space Study Report conducted by KBA Architects dated January 16, 2016. The actual space study was conducted in 2015.

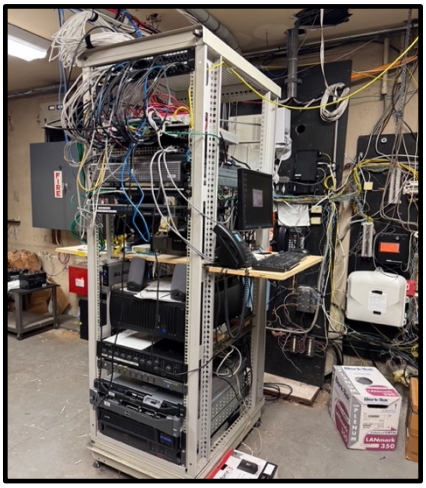


Figure II - 3 Critical IT, Radio, and Phone Equipment stored in basement

Based on our review and evaluation, MRI noted and concurs with previous studies on recommendations for the need of renovations to the NRFD station located at 152 Park Street.

Several observations relative to the building and fire apparatus space needs, aging conditions of the building, and lack of ADA and life safety systems, was observed and included the following:

- Inadequate restroom facilities and ADA accessibility.
- As currently configured, the Fire Station is not fire safe, health, or ADA compliant.
- The Fire Apparatus bays are not properly designed for modern fire apparatus. The bays height and length results in literally fire apparatus bumper to bumper and with little room to transverse between apparatus. Within the apparatus bays, there are only two storage closets resulting in multiple other tools and equipment stored on the bay floors.
- The basement area has a lack of organized storage areas and holds a significant number of auto parts, snow removal equipment, and tools and equipment from both the fire and police agencies.
- The current Dormitory on the second floor is approximately 860 square feet open area. There is a variety of beds in the dormitory with lockers located throughout configured to provide a small amount of privacy, with personal storage consisting of plastic storage bins that are kept on top of lockers.
- Building HVAC Systems are energy inefficient, aged, and in need of updating or replacement.

Figure II - 4 Inadequate storage areas

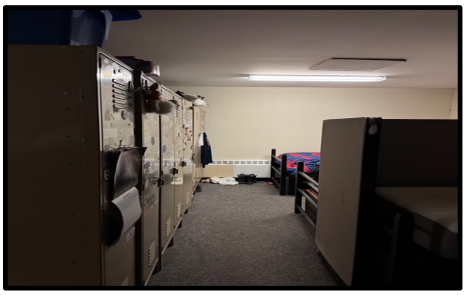
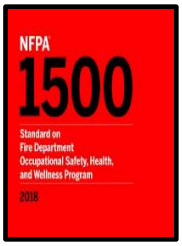


Figure II - 5 Inadequate Dormitory Space

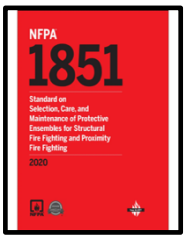
MRI also looked at the various best practices and standards that apply to the status of the fire station. The following standards that do not meet best practices and standards relative to the fire station include the following:

- The facility is not in full compliance with the requirements and recommendations of **NFPA 1500: *Standard on Fire Department Occupational Safety, Health, and Wellness Program*** (National Fire Protection Association; Quincy, MA; 2021 edition) which provides requirements for facility safety, maintenance, and inspections.



- The facility is not in compliance with the requirements and recommendations of **NFPA 1581: *Standard on Fire Department Infection Control*** *Program* (National Fire Protection Association; Quincy, MA; 2022 edition) which has requirements to provide minimum criteria for infection control in the fire station, in the fire apparatus, during procedures at an incident scene, and at any other location where fire department members are involved in routine or emergency operations.

- The facility is not in compliance with the requirements and recommendations of **NFPA 1851: *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*** **(**National Fire Protection Association; Quincy, MA; 2020 edition). This standard provides safety requirements for storage and cleaning of personal protective equipment.



Fire stations are a critical community asset. The fire station facilities of a modern fire department are designed to do much more than simply provide a garage for apparatus and a place for firefighters to wait for a call. Well-designed fire and EMS facilities enable staff to perform their duties effectively, efficiently, and safely. A fire station should, at a minimum, provide adequate, efficiently designed space for the following functions:

- Housing of fire apparatus, with adequate space for apparatus length and height (and the housing of all equipment, including staff, and service and support vehicles, including trailers);
- On-duty crew quarters, with adequate toilet/shower/locker room space for both sexes;
- Adequately sized sleeping facilities;
- Kitchen and eating area;
- Training and meeting space;
- Administrative offices;
- Vehicle maintenance (as necessary);
- Hose drying and storage (as necessary);
- Supply and equipment storage; and

- Public entrance/reception area

Figure II - 6 Hudson NH Fire Station 4 built 2018

Fire stations are unique facilities in that they must accommodate extremely diverse functions, including living quarters, recreation, administration, training, community education, equipment and vehicle storage, equipment and vehicle maintenance, and hazardous materials storage. While it is usually only occupied by fire department personnel, the facility may also need to accommodate the members of the public who visit for station tours, public education presentations, and to discuss building projects or apply for permits. Many communities find that a fire station is an ideal place to locate the community's emergency operations center (a large room, such as a training classroom, can be designed to serve as the EOC when needed). Meeting rooms are also frequently made available to community organizations, thus increasing their versatility. However, in today's environment, serious consideration must be given to station security and whether to allow members of the public who are not members of the department to utilize these facilities, particularly if there is open, or easy, access to the operational areas of the facility.

Figure II - 7 Hudson NH Fire Station 4

Fire department capital facilities are exposed to some of the most intense and demanding uses of any public local government facility. Many fire stations are occupied twenty-four hours a day, seven days a week, by on-duty personnel standing by to respond to emergency incidents. The very nature of the fire department's operations necessitates that all stations be functional, adequate to fulfill the department's core missions, and be well maintained.

The adequacy, quality, and appearance of fire station facilities have a significant impact on the performance of the department. Fire stations support the needs of the fire department and the community in which they are located. Fire stations that meet those needs now and in the future are built and maintained with quality products and systems. An attractive, well-maintained, functional, clean, and well-designed fire station can contribute to the morale, productivity, and operational effectiveness of the fire department. Most citizens have little contact with the fire service and often make judgments that are, at least partially, based upon their impression of fire station facilities.

It is important the existing fire stations are properly maintained, and any future stations are designed and constructed in such a manner that employees can perform their duties efficiently and effectively. Fire stations have an anticipated useful life of 50 to 75 years, depending upon the patterns of the community. As a facility ages, it may no longer meet the needs of an evolving department and/or community, thus negatively affecting morale, efficiency, safety, security, technology, and overall efforts to provide quality fire, rescue, and emergency medical services. It may also hamper the ability of the department to keep pace with increasing and/or expanded requests for, and/or levels of, service. Older and/or obsolete facilities are also expensive to maintain due to inefficient energy systems. When these conditions occur, typical remedies include expanding, renovating, and/or replacing the existing facilities.

There is no specific template for fire station design and construction. Each station must be designed to meet the unique needs of the community, or area of the community, it will serve. The same design and construction standards also apply to existing fire department facilities that are aging but can be renovated using national best practices in fire station design, such as guidance provided by the National Fire Protection Association (NFPA) and the Federal Emergency Management Agency (FEMA). These organizations recommend that the following features be included in fire station capabilities:

- Seismic-resistant construction (based on local risk assessment)
- Flood hazard protection (based on local risk assessment)
- Automatic fire sprinkler system and smoke detection system
- Carbon monoxide detectors
- Vehicle exhaust extraction system
- Capability to decontaminate, launder, and dry personal protective equipment and station uniforms
- Facility security
- Emergency power supply
- Exercise and training area(s)
- Compliance with the Americans with Disabilities Act (ADA)
- Compliance with current fire and building codes

- Adequate storage for supplies and equipment, including emergency medical and disaster supplies
- Adequate parking for on-duty personnel, administrative staff, and visitors
- Capability for future expansion

Fire station facilities should be an important component of a municipal capital improvement plan (CIP). A long-term plan should be in place that takes into consideration the expected life expectancy of a facility, space needs, technology needs, and location requirements, based on response times, travel distance, changes in community development patterns, and regional fire protection capabilities. The construction or renovation of fire stations is a costly proposition that should be planned well in advance to balance other community needs for capital projects.

CHAPTER III

Resource Deployment and Incident Response Overview

The mission performed by the fire department is one of the fundamental functions of government, which is to ensure the safety and protection of its residents and visitors. The expectations for the type, quality, and quantity of fire and emergency medical services must come from its residents and other taxpayers. There is no "right" amount of fire protection and EMS delivery. It is a dynamic and constantly changing level based on the expressed needs of the community and its requests for fire and EMS services. It is the responsibility of elected officials to translate community needs into reality through direction, oversight, and the budgetary process. It is their unenviable task to maximize fire, EMS, and other services within the reality of the community's ability and willingness to pay, particularly in today's economic environment.

From an operational perspective, the appropriate deployment of resources is critical to the ability of any fire department to effectively, efficiently, and safely fulfill its core public safety, emergency medical response, and fire protection missions. In determining an acceptable level of risk, elected officials in every community must ask questions about the fire and EMS resources, such as: 1) how much do we need; 2) how much we can afford; and 3) how should those resources be positioned and deployed to provide maximum benefit to the community? These are never easy decisions especially when one considers the fact that virtually any decisions on emergency service deployment that involve building, moving and/or relocating a resource (fire station, personnel, or fire apparatus), even for the considerable benefit of the community, may have a negative effect on at least a small percentage of the population. The location of new fire stations can have the same effect.

From the perspective of stations and apparatus, there are three main factors that are used to help determine the deployment of resources: response time, travel distance, and call volume. A traditional, and long used, method of determining the appropriate deployment of resources is the fire company travel distance model employed by the Insurance Services Office (ISO) to assist them with determining the Public Protection Classification (PPC) rating for communities (including) North Reading, The PPC is utilized for determining fire insurance rates by participating insurance companies for the specific community and surrounding areas.

CHAPTER IV

Insurance Services Office (ISO) and Relation to Deployment Models

The Insurance Services Office's (ISO) Public Protection Classification (PPC) program evaluates communities according to a uniform set of criteria defined in the Fire Suppression Rating Schedule (FSRS). This criterion incorporates nationally recognized standards developed by the National Fire Protection Association (NFPA) and the American Water Works Association (AWWA). Using the FSRS, ISO evaluates the fire suppression capabilities of a community and assigns a PPC classification; a number rating from 1 to 10. Class 1 represents exemplary fire protection (by ISO's standards), and Class 10 indicates that the area or community's fire suppression program does not meet minimum recognized criteria or standards. In most cases, this means there is no recognized fire department or formal fire protection. Any building more than five road miles from a fire station or outside the boundary of a fire protection area is rated 10. Generally, areas of a community that are more than 1,000 feet from a fire hydrant, but within five road miles of a fire station, are rated Class 9.

The FSRS allocates credit for fire protection by evaluating these four major categories (Figure IV-1):

1. **Fire Alarm and Communication System:** This aspect of the evaluation examines a community's facilities and support for handling and dispatching fire alarms. This includes telephone lines and systems, staffing, dispatching systems, and equipment. This component equates to 10% (10 points) of the evaluation.

2. **Fire Department:** This component of the evaluation, which accounts for 50% of the total classification (50 points), focuses on the fire department and its operations. Areas that are examined include the number of engine and ladder/service companies, distribution of fire stations and fire companies, equipment carried on the apparatus, pumping capacity, testing of hose, pumps and ladders, reserve apparatus, department and on-duty staffing, and training.

3. **Water Supply System:** The third component of the evaluation is an analysis of the community's water supply system for fire protection. Chief among the areas that are examined include fire hydrant size, type, flow, and installation. In addition, the condition and frequency of inspection of the hydrants is evaluated. Finally, the overall capabilities of the water supply system are assessed in comparison to the needed fire flow for target hazards in the community. Forty percent of the final rating (40 points) is based on the water supply system.

4. **Community Risk Reduction:** A relatively new addition to the FSRS, the Community Risk Reduction section offers a maximum of 5.5 points, resulting in 105.5 total points now available in the FSRS. The inclusion of this section for "extra points" allows recognition for those

communities that employ effective fire prevention practices, without unduly affecting those who have not yet adopted such measures.

The addition of the Community Risk Reduction section gives incentives to those communities who strive proactively to reduce fire severity through a structured program of fire prevention activities. The areas of community risk reduction evaluated in this section include:

- Fire prevention
- Fire safety education
- Fire Investigation

Figure IV - 1 FOUR KEY PARTS OF ISO PPC EVALUATION PROCESS
Source: ISO

Every City, or area that provides fire protection services is subject to being graded to establish a PPC. Individual buildings, both residential and commercial, are subject to the community's PPC rating. When calculating property insurance premiums, insurance companies use the PPC to apply various factors that reflect a particular community's PPC. Some individual facilities within a community may also be individually assessed and assigned a specific rating.

Although there may be validity to the argument that this rating is no longer utilized by all insurance companies that issue policies to industrial and commercial facilities within ISO, it is still recognized as a comparative benchmark of public fire protection. Moreover, within the past several years, ISO has significantly revised its FSRS, and as a result, the PPC to reflect new innovations and technology, and the evolving standards and industry best practices within the fire service. Among these changes are:

- Greater reference to nationally accepted consensus standards; NFPA and AWWA.
- Increased recognition of automatic fire sprinklers.
- Greater reliance on technology-based solutions (e.g., GIS, thermal imaging cameras).
- Increased emphasis on fire training activities.
- New reference to national standard safety requirements.
- New reference to accreditation; focus on master/strategic planning.

According to ISO, the PPC helps measure the effectiveness of fire protection and provides an important advisory evaluation to both insurers and communities. It is applied nationwide, and more than ever incorporates accepted national consensus standards. The PPC is used in marketing, underwriting, and pricing of both homeowners and commercial lines of fire/property insurance. Broadly speaking, the cost of insurance premiums is generally lower with better protection which translates into lower losses; the cost is higher in areas that have lower levels of protection which often translates into higher losses. Many insurers still rely on this information, at least partially, to set their fire insurance rates.

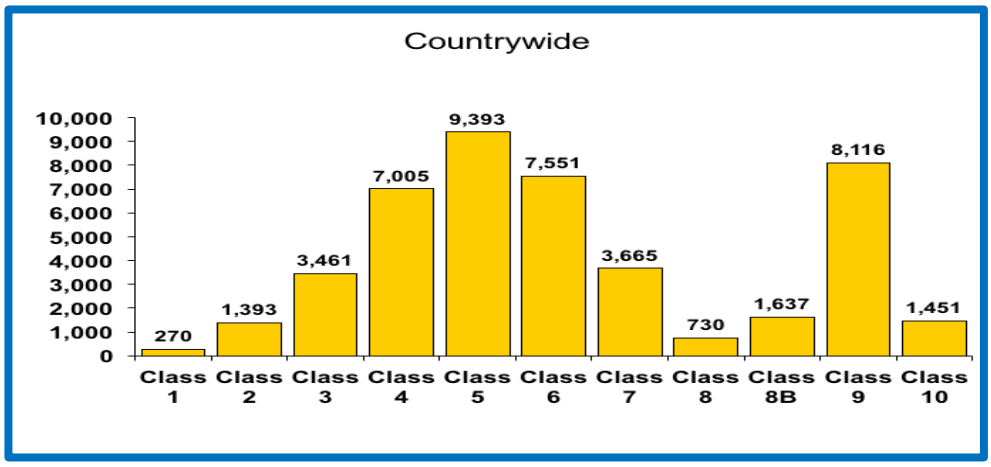


Figure IV - 2 INSURANCE SERVICE OFFICE RATING DISTRIBUTION CHART

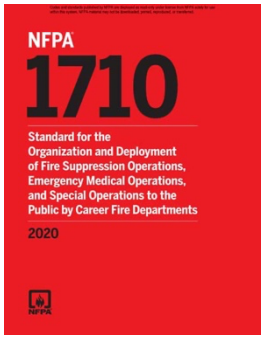
Based on the most recent ISO evaluation, the NRFD was awarded a rating of Class 4. It is important to note that the ISO grade is only for fires and has no rating or grade related to EMS response, capabilities, equipment etc.

SRS Feature	Credit Available
Emergency Communications	10
Fire Department	50.00
Water Supply	40.
Community Risk Reduction	5.50
Total (with a 4.24 deduction for Divergence)	105.5

Figure IV - 3 ISO Credit Points Table - Source ISO

The Community Risk Reduction section of the FSRS offers a maximum of 5.5 points, resulting in 105.5 total points available in the FSRS. Traditionally, under the ISO deployment and coverage model, to obtain maximum point value for this component of an evaluation, the first due engine company should be within 1.5 miles travel distance of every location within their first due response area. The first due ladder company should have a travel distance of no more than 2.5 miles. Travel distance is one of several factors that can have an impact on response time and is usually the most significant. ISO is also looking at response time.

Today, for most ISO evaluations, response time is the most critical factor for both fires and emergency medical incidents. It is not just a cliché that during critical life-threatening situations, minutes and even seconds truly do count. Even ISO, which traditionally used a travel distance model, relies more heavily on response time statistics rather than strictly a distance-based evaluation.



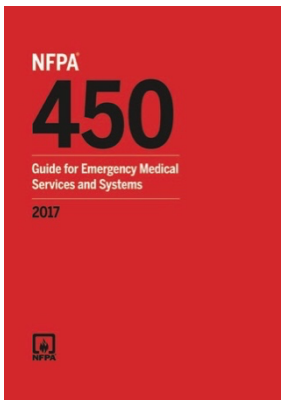
NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Career Fire Departments*[1], 2016 edition (National Fire Protection Association; Quincy, MA) addresses the organization and deployment of fire suppression operations, emergency medical operations, and special operations. It is the benchmark standard that the United States Department of Homeland Security utilizes when evaluating applications for staffing grants under the Staffing for Adequate Fire and Emergency Response (SAFER) grant program.

Paragraph 4.1.2.1 of NFPA 1710 (2020 Edition) states that the first arriving engine company shall arrive at the scene of a fire suppression incident within four minutes (240 seconds) or less, and/or the entire full first alarm response should arrive on scene within eight minutes (480 seconds). For EMS incidents, a unit with first responder or higher-level trained personnel should arrive within four minutes (240 seconds), and an Advanced Life Support (ALS) unit should arrive on scene within eight minutes (480 seconds). Paragraph 4.1.2.2 requires the establishment of a 90% performance objective for these response times.

The four-minute response time is from when the units are physically moving to the incident. One minute can be added for call processing and dispatch, and one minute can be added for turnout time, that is from when firefighters in the station are notified until they are responding, providing six total minutes (360 seconds) from the time the 9-1-1 call is answered, until the first unit arrives on location.

[1] NFPA 1710 is a nationally recognized standard, but it has not been adopted as a mandatory regulation by the federal government or the Commonwealth of Massachusetts. It is a valuable resource for establishing and measuring performance objectives in the NRFD but should not be the only determining factor when making local decisions about the town's fire and EMS operations.

The EMS component of the emergency services delivery system is more heavily regulated than the fire side. In addition to NFPA 1710, NFPA 450 *Guidelines for Emergency Medical Services (EMS) and Systems*, 2021 edition (National Fire Protection Association; Quincy, MA) provides a template for local stakeholders to evaluate an EMS system and to make improvements based on that evaluation. The Commission on Accreditation of Ambulance Services (CAAS)[2] also promulgates standards that are applicable to their accreditation process for ambulance services. CAAS recommends that an ambulance arrives on scene within eight minutes, fifty-nine seconds (8:59) of dispatch. The Commonwealth of Massachusetts regulates EMS agencies, and certain federal Medicare regulations are also applicable.



As a percentage of overall incidents responded to, it could be argued that EMS incidents constitute the greatest number of "true" emergencies, where intervention by trained personnel does truly make a difference, sometimes literally between life and death. Heart attack and stroke victims require rapid intervention and care, and transport to a medical facility. Nationally, the standard of care based on stroke and cardiac arrest protocols is to have an emergency response unit on scene at a medical emergency within six minutes. The longer the time duration without care, the less likely the patient is to fully recover. Numerous studies have shown that irreversible brain damage can occur if the brain is deprived of oxygen for more than four minutes. In addition, the potential for successful resuscitation during cardiac arrest decreases exponentially with each passing minute that cardio-pulmonary resuscitation (CPR) or cardiac defibrillation is delayed.

Structure fires are the type of incident that many of the regulations and standards pertaining to firefighters are primarily focused on. They are generally the most hazardous type of incidents for both firefighters and civilians. Structural firefighting has become far more challenging and dangerous in the last thirty years with the introduction of significant quantities of plastic and foam-based products into homes and businesses (e.g., furnishings, mattresses, bedding, plumbing and electrical components, home and business electronics, decorative materials, insulation, and structural components). These materials ignite and burn quickly and produce extreme heat and toxic smoke.

If firefighters cannot arrive in a timely manner and attack the fire quickly, a strong possibility exists that a dangerous flashover (simultaneous ignition of the combustible materials in a room) will occur. Flashover can occur within five to seven minutes of fire ignition and is one of the most dangerous events that a firefighter can face.

[2] The Commission on Accreditation of Ambulance Services (CAAS) is an independent commission that established a comprehensive series of standards for the ambulance service industry.

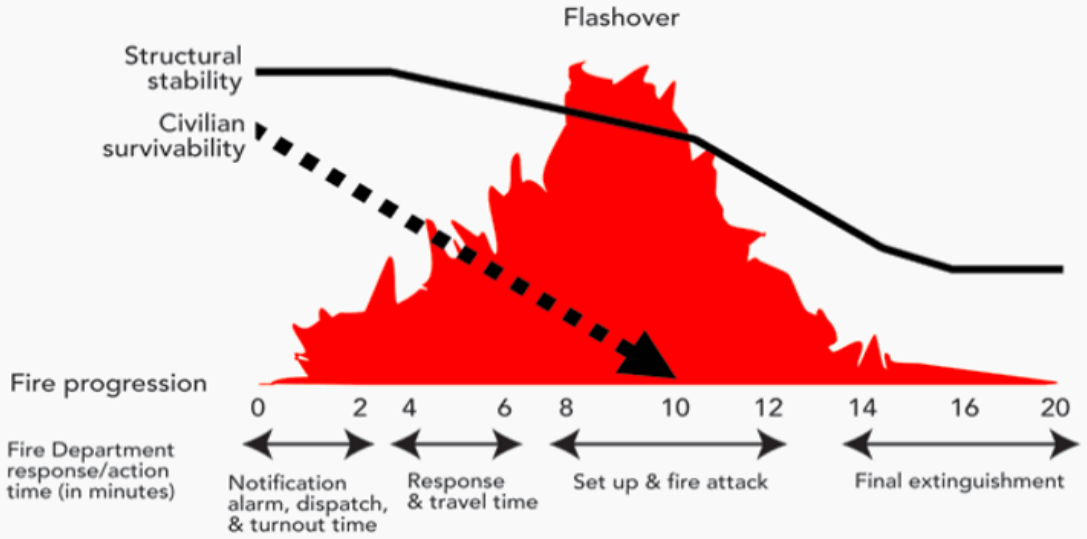


Figure IV - 4 Flashover Graph

During the five-year period from 2019 to 2023, the NRFD responded to a total of 13,056 requests for fire and EMS assistance, an average of 2,611 calls per year, or 7.1 calls per day. Of those calls, 227 were actual fire incidents, an average of 45 per year, or on average 1 fire per week that were ultimately classified as a fire in a structure for National Fire Incident Reporting System (NFIRS) purposes.

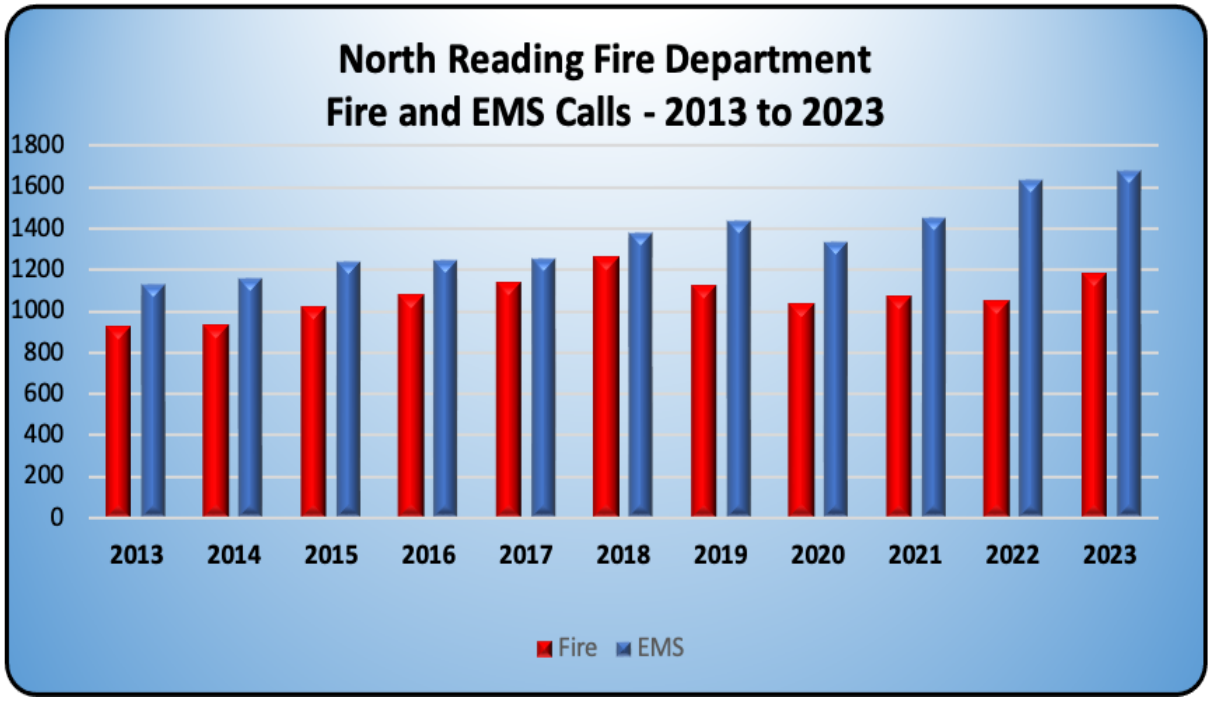


Figure IV - 5 North Reading Incident Response Data Summary 2013 - 2023

CHAPTER V

Current Resource Deployment and Incident Analysis

The North Reading Fire Department currently operates from a single fire station located at 152 Park Street. This single fire station provides fire and emergency medical services for an estimated population of 16,477 residents within a 13.5 square mile area.

When analyzing the locations of the current fire station, the location was most likely chosen to protect what was then the developed areas of the town. As the town has continued to develop and expand its residential and business areas, it has not made the adjustments necessary to keep up with that growth and expansion. The continued future projected growth in North Reading requires the need to expand the fire department infrastructure and emergency services delivery. Previous studies related to the fire department's organizational structure (MRI Fire Services Organizational Analysis – January 2006) recommended the need for infrastructure improvements due to growth of the community during that time. Those recommendations remain valid today and with this resource deployment, incident analysis space needs study, and annual increases in the number of calls for fire and emergency medical services, the need is further validated for an additional fire station, while also continuing to utilize the existing station as part of an overall community fire protection model. A one fire station model will not continue to provide adequate fire and EMS services to the community.

This NRFD Fire Department Deployment Model, at least from the perspective of the current single fire station location is basically unchanged since the early 1960s. While the staffing needs have increased, they currently have not kept pace with the best practices and recommendations of fire industry standards or OSHA requirements or the increasing requests for emergency fire and EMS services.

Utilizing current trends to help predict future ones, while not an exact science, can be helpful to communities and fire departments in predicting and planning for future operational needs. However, as with any other type of statistical analysis, the information that is analyzed is only as good and/or reliable as the data that was originally entered and has been provided for evaluation. The data that was analyzed for this report was provided to the MRI study team by the fire department and IT staff for the Town of North Reading. The fire and EMS statistical reports were automatically compiled through the department's reporting software for the years 2019 to 2023. Each emergency incident that the NRFD responds to results in the generation of an NFIRS incident report. The data received from that information is then overlayed on a Geographic Information System (GIS), which is a computer system that analyzes and displays geographically referenced information. It uses data that is attached to a unique location.

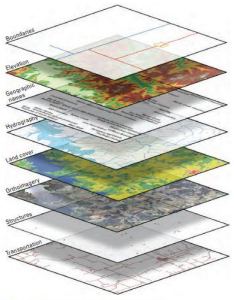


Figure 1. Eight base layers of *The National Map*.

Figure V - 1 GIS Layers Data

The NRFD is like most fire-based EMS departments that respond to more emergency medical incidents than actual fires, and other types of emergency incidents. The data we analyzed was validated and accurate as to the overall incident numbers, and general classification of the incident types. Data validation and accuracy is a critical part of fire service response analysis to develop an accurate picture of the community's emergency service needs. Data errors can skew response time statistical analysis.

One of the best ways to get a broad overview picture of an emergency services provider is to look at and analyze their emergency response/incident statistics such as the location of emergency calls and the amount of time it takes to respond and arrive on the scene.

Looking at statistical data that is compiled from fire and EMS incident reports that are generated for every emergency response and/or request for assistance will assist with determining the adequacy of current deployments and operations, as well as identify trends in responses (i.e., increasing versus decreasing, changing types of incident requests, increasing response times, and frequency of simultaneous incidents).

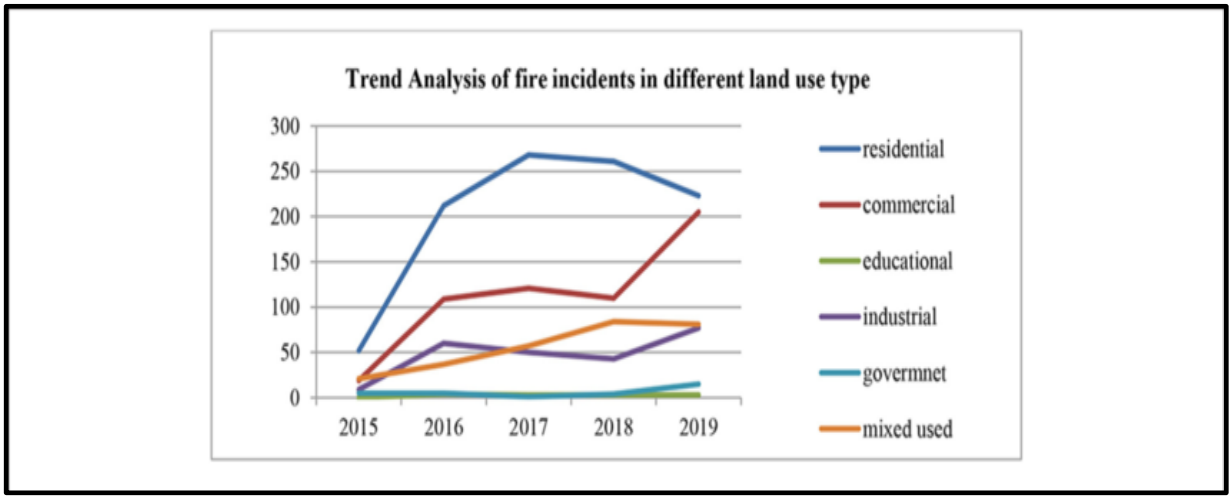


Figure V - 2 Example of Trend Analysis of Fire Incidents

MRI with the assistance of the North Reading GIS Team utilized fire and EMS response data from 2019 to 2023 to develop various response models based on location of fire and EMS calls, response time to fire and EMS calls, and by response distance from the current North Reading Fire Station and to other geographical locations within the Town of North Reading for potential future fire station locations.

The data that was compiled from North Reading Fire Department response and call data analysis was then overlayed on the North Reading GIS mapping system which provided several "heat" or "bleed" maps that displays the geographical and incident call density locations. When multiple

calls occur in the same geographical location or area, the locations show a larger data heat map (shown as a larger circle) in the various maps developed. The **orange circles** represent those areas of North Reading that have the highest density for requests of Fire and EMS calls for service.

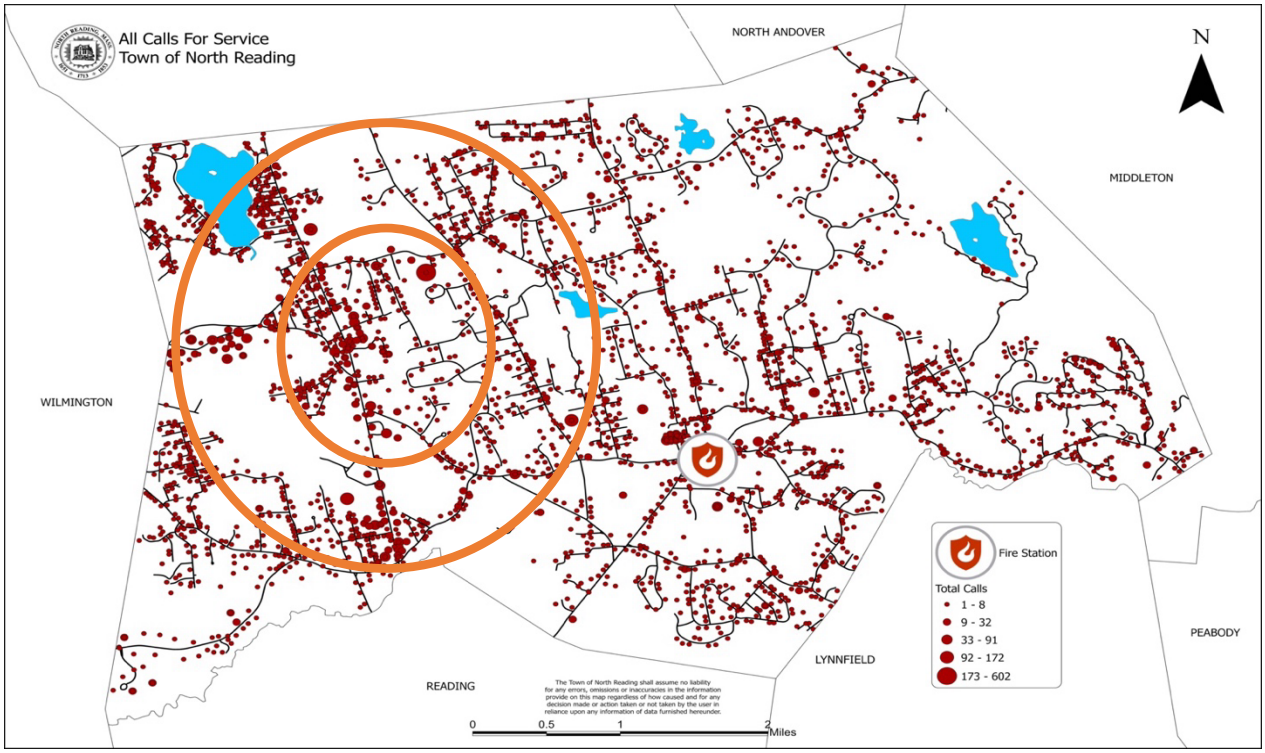


Figure V - 3 Town of North Reading GIS MAP
Showing the Location of all Calls for Service 2019 to 2023

- This GIS Map displays All Calls for Service from 2019 – 2023. The red dots represent the number and location of calls for service within the 5 – year period. The larger the circle the higher number of calls for service for that address.

- The **Orange** circle is used to focus on the area with the highest concentration of calls for service in the Town of North Reading. The northwest area within the **Orange** circle demonstrates the highest concentration of calls.

- This area consists of residential, retail business, and some technology – office type buildings.

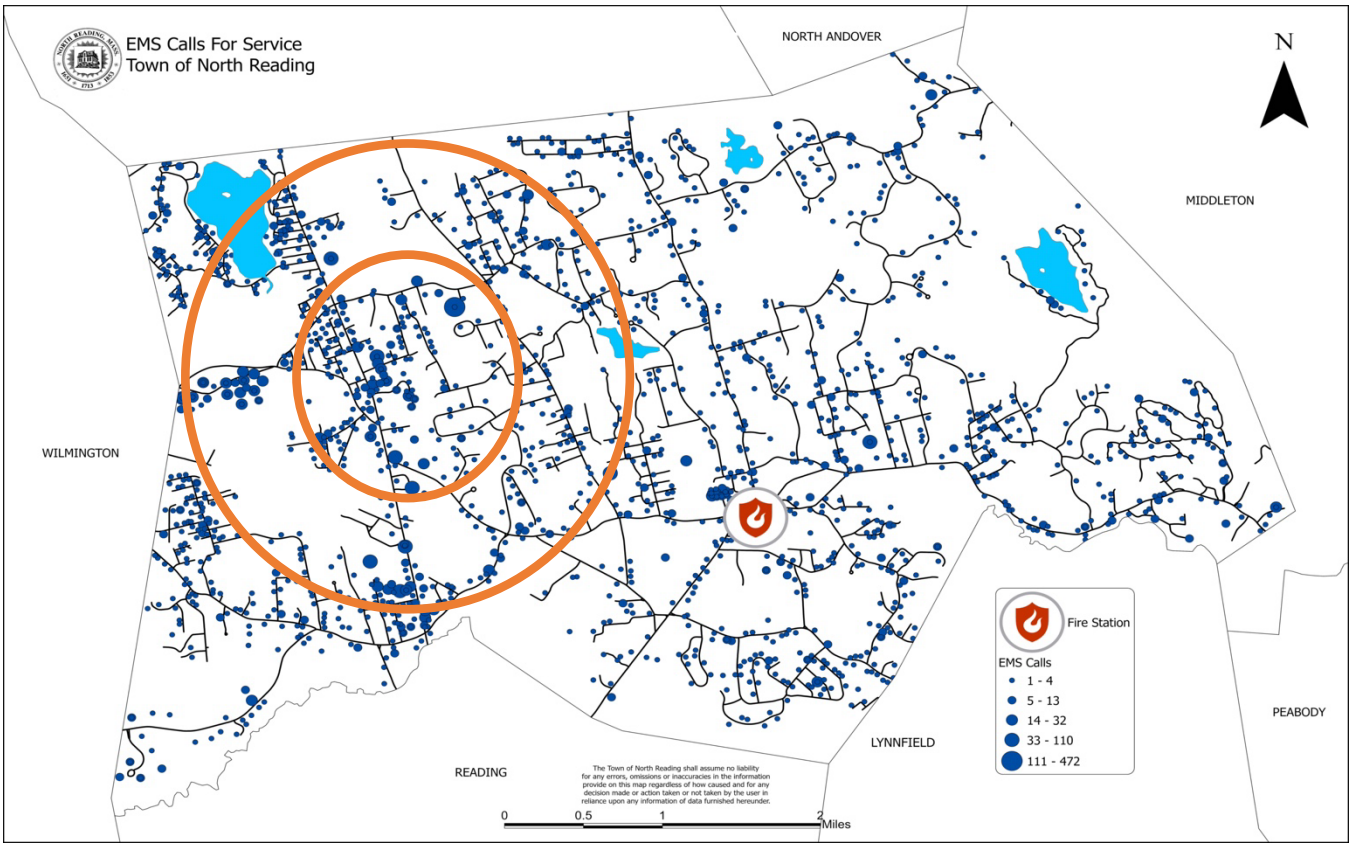


Figure V – 4 Town of North Reading GIS MAP
Showing Location of all EMS Calls for Service 2019 to 2023

- This GIS Map displays All EMS Calls for Service from 2019 – 2023. The blue dots represent the number and location of EMS calls within the 5 – year period. The larger the circle the higher number of EMS calls for service for that address.

- The **Orange** circle is used to focus on the area with the highest concentration of all EMS calls for service in the Town of North Reading. The northwest area within the **Orange** circle demonstrates the highest concentration of calls.

- This area consists of residential, retail business, and some technology – office type buildings.

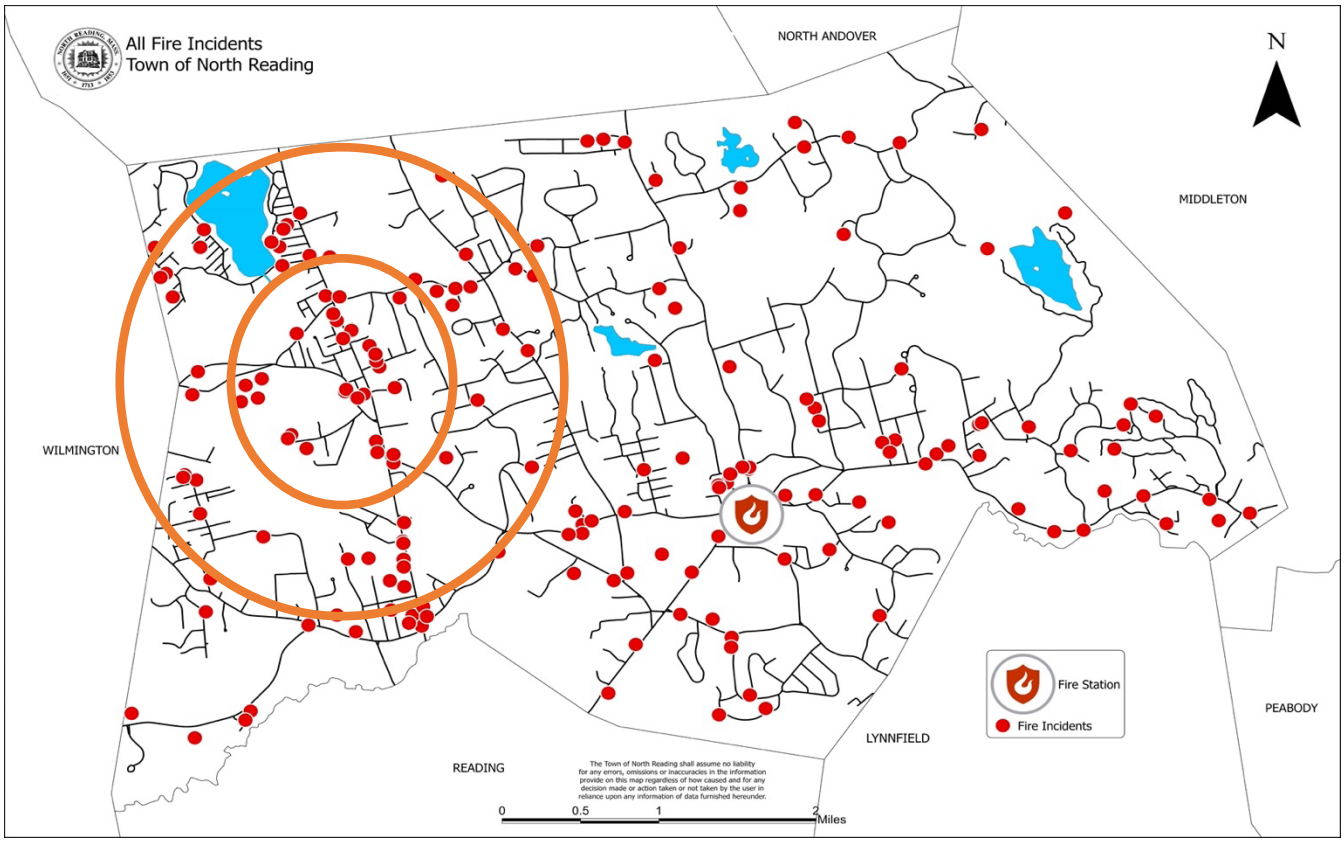


Figure V – 5 Town of North Reading GIS MAP
Showing the Location of all Fire Incidents Calls for Service 2019 to 2023

- This GIS Map displays the location of all fire incidents 2019 – 2023. The red dots represent the number and location of all fire incidents within the 5 – year period.

- The **Orange** circle is used to focus on the area with the highest concentration of fire incidents in the Town of North Reading. The northwest area within the **Orange** circle demonstrates the highest concentration of calls.

- This area consists of mixed uses of property, both commercial and residential, with the greatest density of population being in this area.

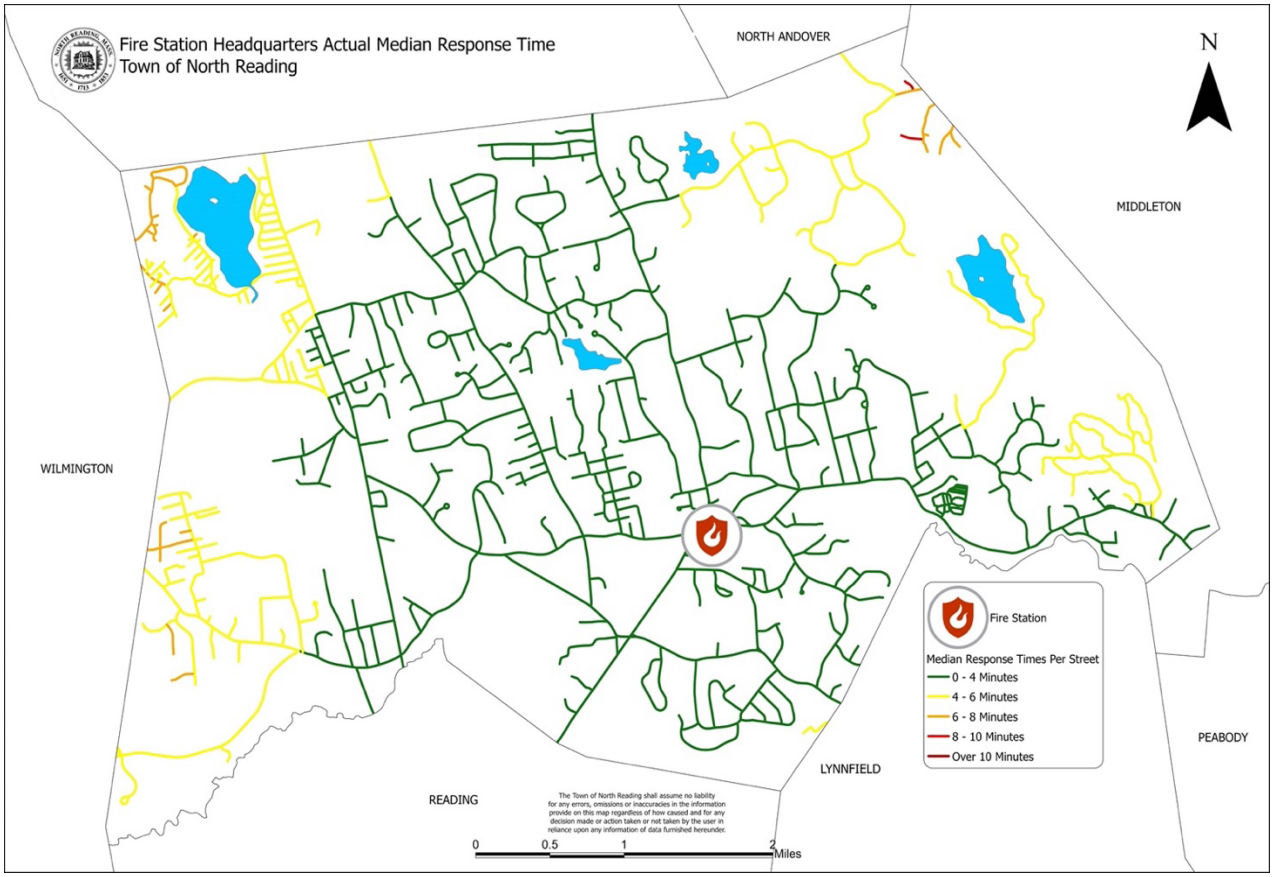


Figure V – 6 Town of North Reading GIS MAP
Showing Fire Station Headquarters Median Response Time by Street for All Calls for Service 2019-2023

The MRI team evaluated response times, travel/distance times, and locations in our study. To quantify the results, we also ran a median response times scenario with the assistance of the North Reading GIS team.

- This GIS Map displays the actual "Median Response Time" for all calls for service to each street that the calls originate from, responding from Fire Station Headquarters. The Median Response Time is the middle point in a set of response times, meaning when all response times are listed from shortest to longest, the median is the time that falls directly in the middle, representing the "typical" response time where half of the responses were faster and half were slower; it's a more accurate representation than the average (mean) when dealing with significantly varied response times.

- As shown in the Map Legend, a street displayed in Green represents a response time in a range from 0 - 4 Minutes, Yellow from 4 – 6 Minutes, with other response times displayed in colors as shown in Legend.

- As explained earlier in this report, Paragraph 4.1.2.1 of NFPA 1710 states that the first arriving

engine company shall arrive at the scene of a fire suppression incident within four minutes (240 seconds) or less, and/or the entire full first alarm response should arrive on scene within eight minutes (480 seconds).

- For EMS incidents, a unit with first responder or higher-level trained personnel should arrive within four minutes (240 seconds), and an Advanced Life Support (ALS) unit should arrive on scene within eight minutes (480 seconds). Paragraph 4.1.2.2 requires the establishment of a 90% performance objective for these response times.

- The four-minute response time is from when the units are physically moving to the incident. One minute can be added for call processing and dispatch, and one minute can be added for turnout time, that is from when firefighters in the station are notified until they are actually responding, providing six total minutes (360 seconds) from the time the 9-1-1 call is answered, until the first unit arrives on location.

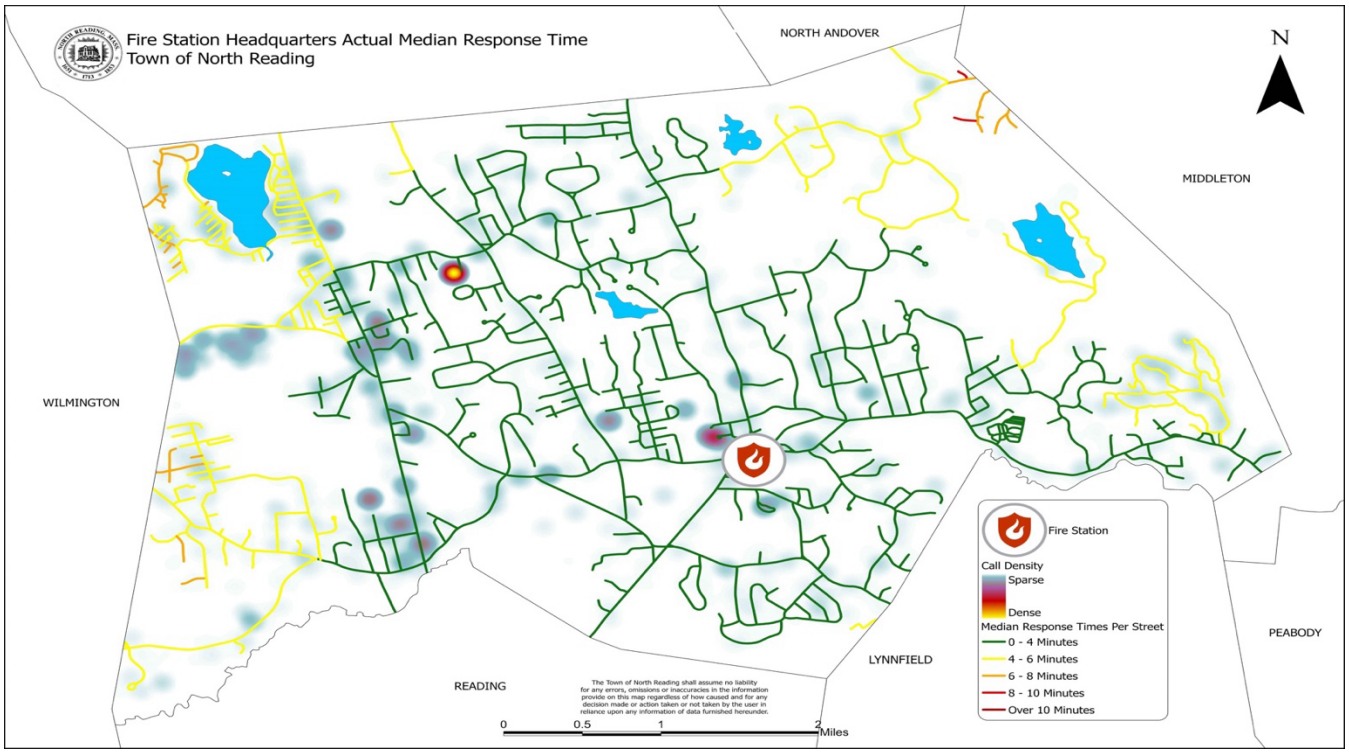


Figure V –7 Town of North Reading GIS MAP Showing Fire Station Headquarters Median Response Times by Street with Call Density for All Calls for Service 2019 to 2023

- This GIS Map again displays the actual "Median Response Time" for all calls for service to each street that the calls originate from, responding from Fire Station Headquarters but with "Call Density" data overlaid on the map.
- Call Density data allows for visual representation of the data where different colors are used to indicate the magnitude of calls in each area of Town, allowing for easy identification of call patterns and trends within the call data set.
- This map identifies call patterns and trends from the Call Density data that indicates a higher call volume coming from the northwest and southwest quadrants of the Town.
- The actual Median Response Time responding from Fire Station Headquarters displayed in the Green 0 - 4 minutes range indicates that the high call density areas along Main St from North St to Park St is adequately covered but the high call density areas to the northwest and southwest of this section of Main St falls below this range into the Yellow 4 - 6 minute range and some streets fall into the Orange 6-8 minute range.
- The 0 – 4-minute actual Median Response Time data from 2019 – 2023 indicates that **65 road miles can be traveled** within this range, responding to **4,705 EMS calls for service**, **162 Fire Incident calls** and **4,165 calls for other types of service** from the Fire Station Headquarters.

The Maps to follow will overlay "GIS Response Time Estimates" responding from a proposed second Fire Station location situated at selected locations throughout Town to see what the overall response time improvements might be in those areas not displayed in the Green 0 - 4 minutes range, especially in the high-density call areas. There are 6 potential locations, in addition to the existing Fire Station Headquarters, that were thought to provide improved response times to call locations requiring fire services outside of the 0 – 4-minute response time.

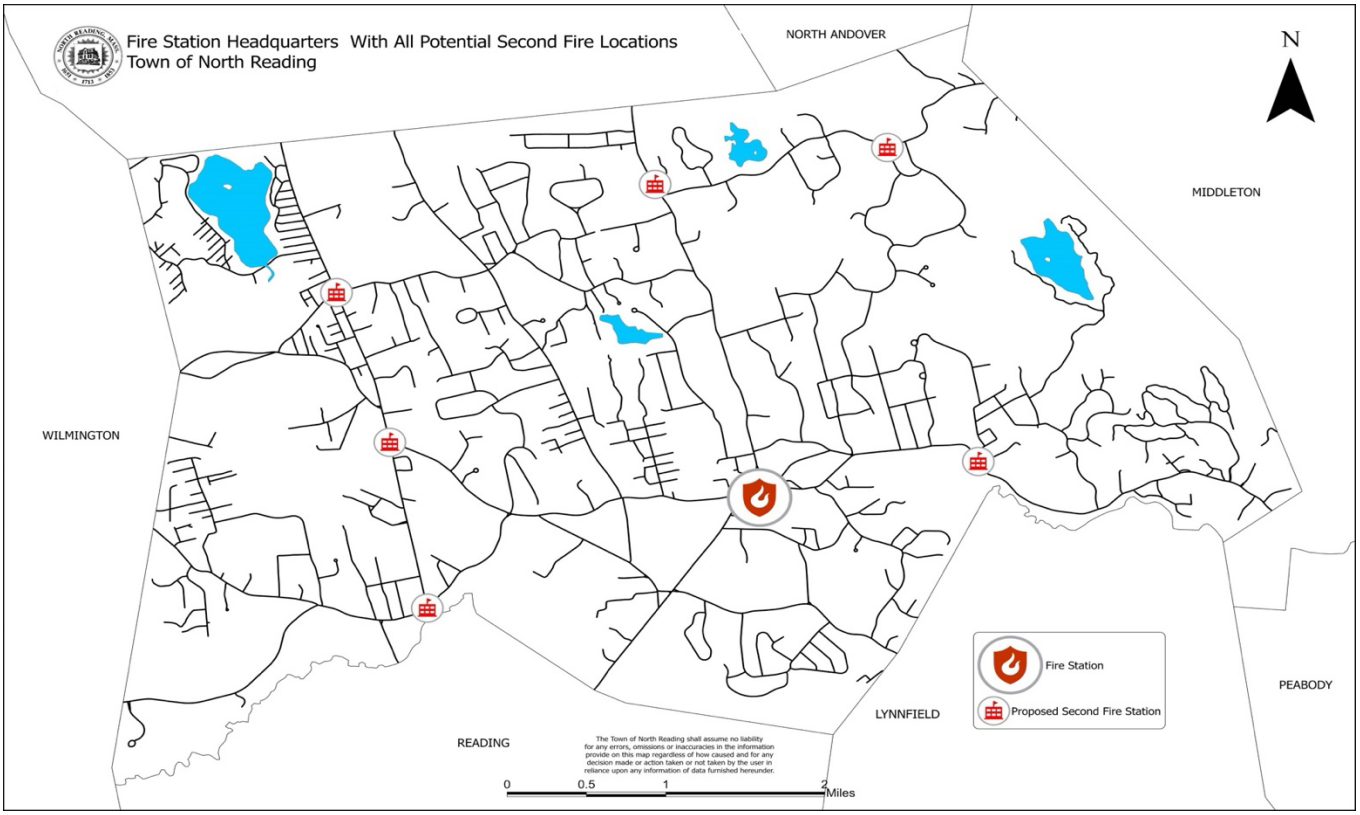


Figure V –8 Town of North Reading GIS MAP Showing the Fire Station Headquarters And Proposed Second Fire Station Locations Situated at Selected Locations Throughout Town.

- This GIS Map displays the current Park Street Fire Station Headquarters and the 6 potential locations for a second fire station.
- The selection of a potential second fire station location is based on three main factors used to help determine the effectiveness of Fire Department resources when responding to calls for service. They include:
    - Call Volume Density within the Selected Area
    - Response Time Effectiveness from the Selected Location
    - Travel Distance Covered within Response Time Ranges

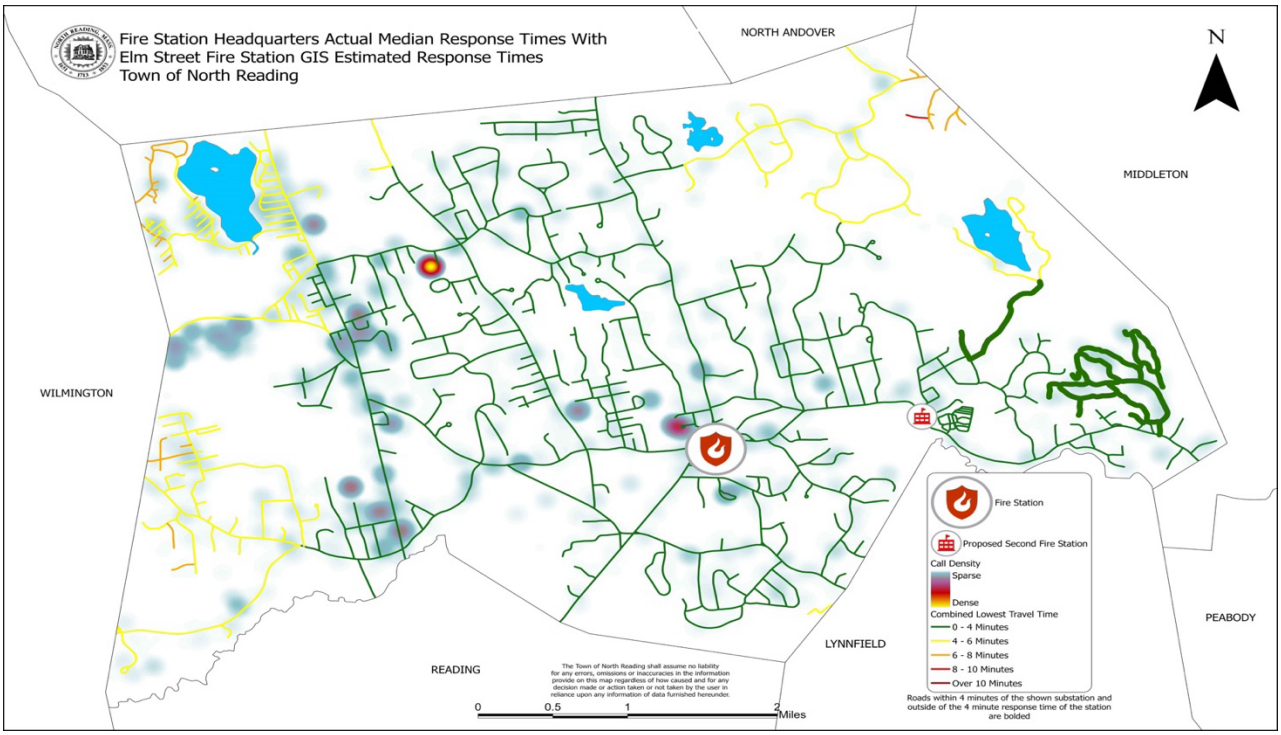


Figure V –9 Town of North Reading GIS MAP Showing Potential Station Response Time at Elm Street Overlaid with the Fire Station Headquarters Median Response Time by Street with Call Density for All Calls for Service 2019-2023

- This GIS Map displays the effectiveness of a potential fire station location at Elm Street in the south east quadrant of the Town. As shown in **Bold Green** for road travel within the 0 – 4 Minute Response Range, Response Time Analysis implies improvement in a concentrated section of this area of Town not already sufficiently covered by Fire Station Headquarters.

- This location results in **4 additional road miles of travel distance** but creates a significant **overlap of 25 road miles** with the Fire Station Headquarters response areas within the 0 – 4 Minute Response Range, which is duplicative and counterproductive to the goal of expanding and maximizing response coverage areas.

- This location does not improve response time to the northwest area of Town with the highest call density for fire incidents and EMS calls. If this fire station location was in service during the 5-year analysis period of calls for service, it would have added an additional **172 EMS calls**, **7 fire incident calls** and **128 calls of other types** in the southeast quadrant of the Town within the 0 – 4 Minute Response Time. This area is predominantly residential in use.

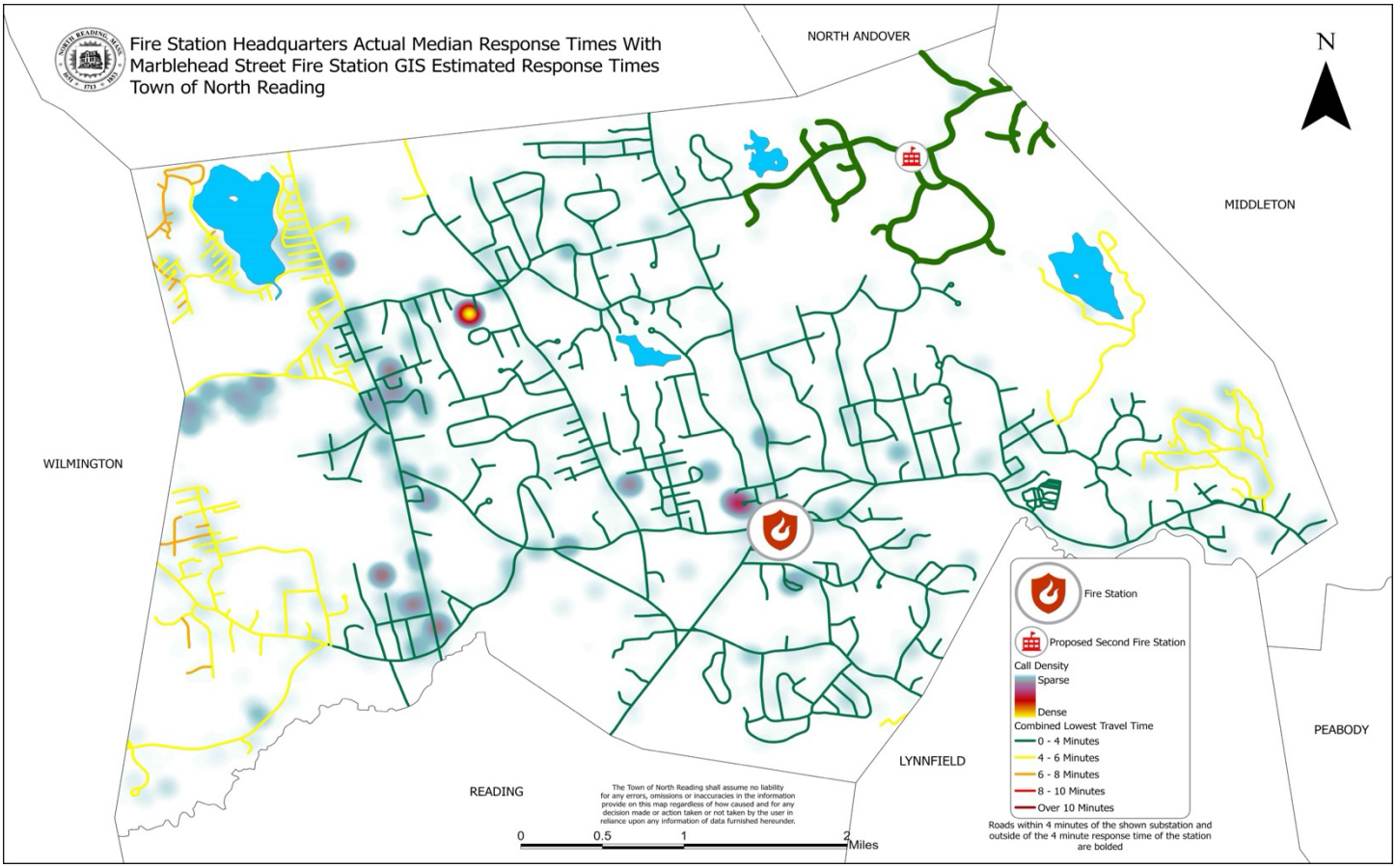


Figure V –10 Town of North Reading GIS MAP Showing Potential Second Fire Station Response time at Marblehead Street, Overlaid with the Fire Station Headquarters Median Response Time by Street with Call Density for All Calls for Service 2019-2023

- This GIS Map displays the effectiveness of a potential fire station location at Marblehead Street in the northeast quadrant of the Town. As shown in **Bold Green** for road travel within the 0 – 4 Minute Response Range, Response Time Analysis implies improvement in a concentrated section of this area of Town not already sufficiently covered by Fire Station Headquarters.
- This location results in **5 additional road miles of travel distance** but creates a significant **overlap of 11 road miles** with the Fire Station Headquarters response areas within the 0 – 4 Minute Response Range, which is duplicative and counterproductive to the goal of expanding and maximizing response coverage areas.
- This location does not improve response time to the northwest area of Town that has the highest call density for fire incidents and EMS calls. If this fire station location was in service during the 5-year analysis period of calls for service, it would have added an additional **189 EMS calls**, **8 fire incident calls** and **119 calls of other types** in the northeast quadrant of the Town within the 0 – 4 Minute Response Time. The area is predominantly residential in use.

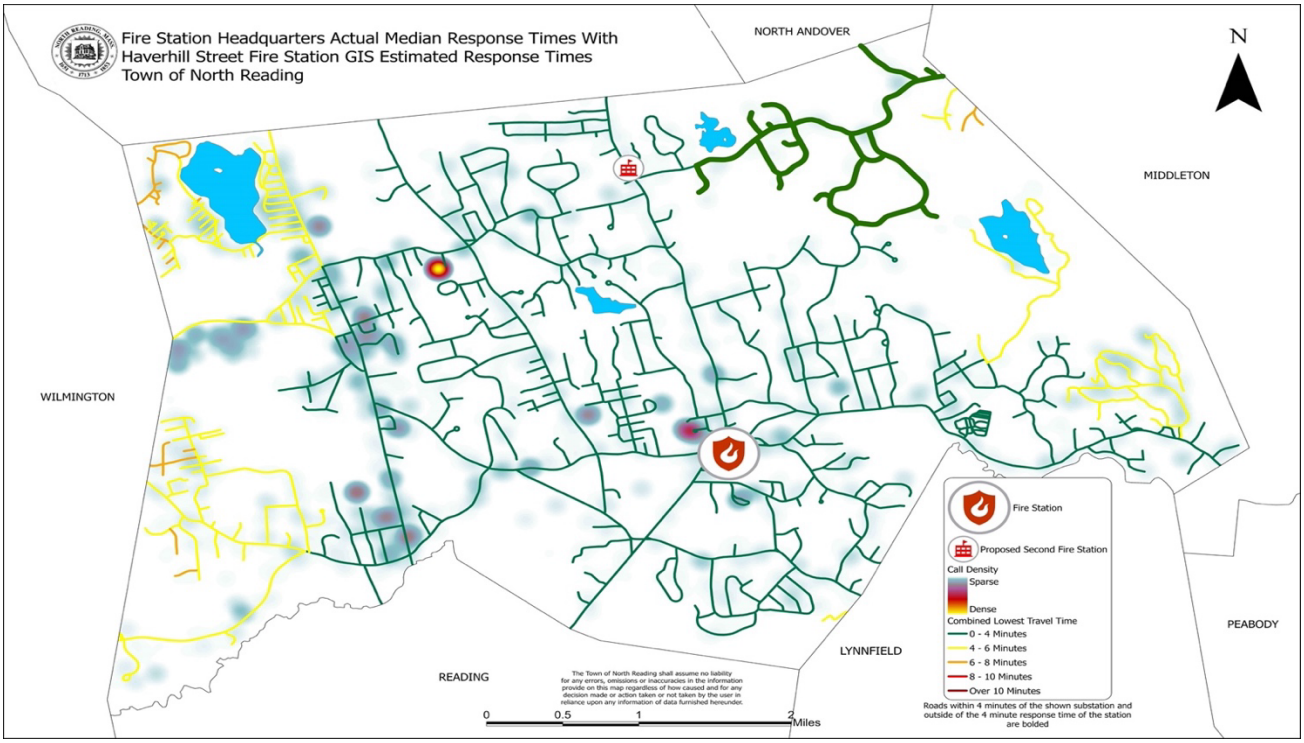


Figure V –11 Town of North Reading GIS MAP Showing Potential Second Fire Station Response Time at Haverhill Street Overlaid with the Fire Station Headquarters Median Response Time by Street with Call Density for All Calls for Service. 2019-2023

This GIS Map displays the effectiveness of a potential fire station location at Haverhill Street in the northern quadrant of the Town. As shown in **Bold Green** for road travel within the 0 – 4 Minute Response Range, Response Time Analysis implies improvement in a concentrated section to the east of the Station that is not already sufficiently covered by Fire Station Headquarters. The area is also predominately the same area improved by the Marblehead Street location.

- This location results in **5 additional road miles of travel distance** but creates a significant **overlap of 23 road miles** with the Fire Station Headquarters response areas within the 0 – 4 Minute Response Range, which is duplicative and counterproductive to the goal of expanding and maximizing response coverage areas.
- This location does not improve response time to the northwest area of Town that has the highest call density for fire incidents and EMS calls. If this fire station location was in service during the 5-year analysis period of calls for service, it would have added an additional **154 EMS calls**, **7 fire incident calls** and **270 calls of other types** in the northeast quadrant within the 0 – 4 Minute Response Time.
- This area is a mix use area of residential and business uses.

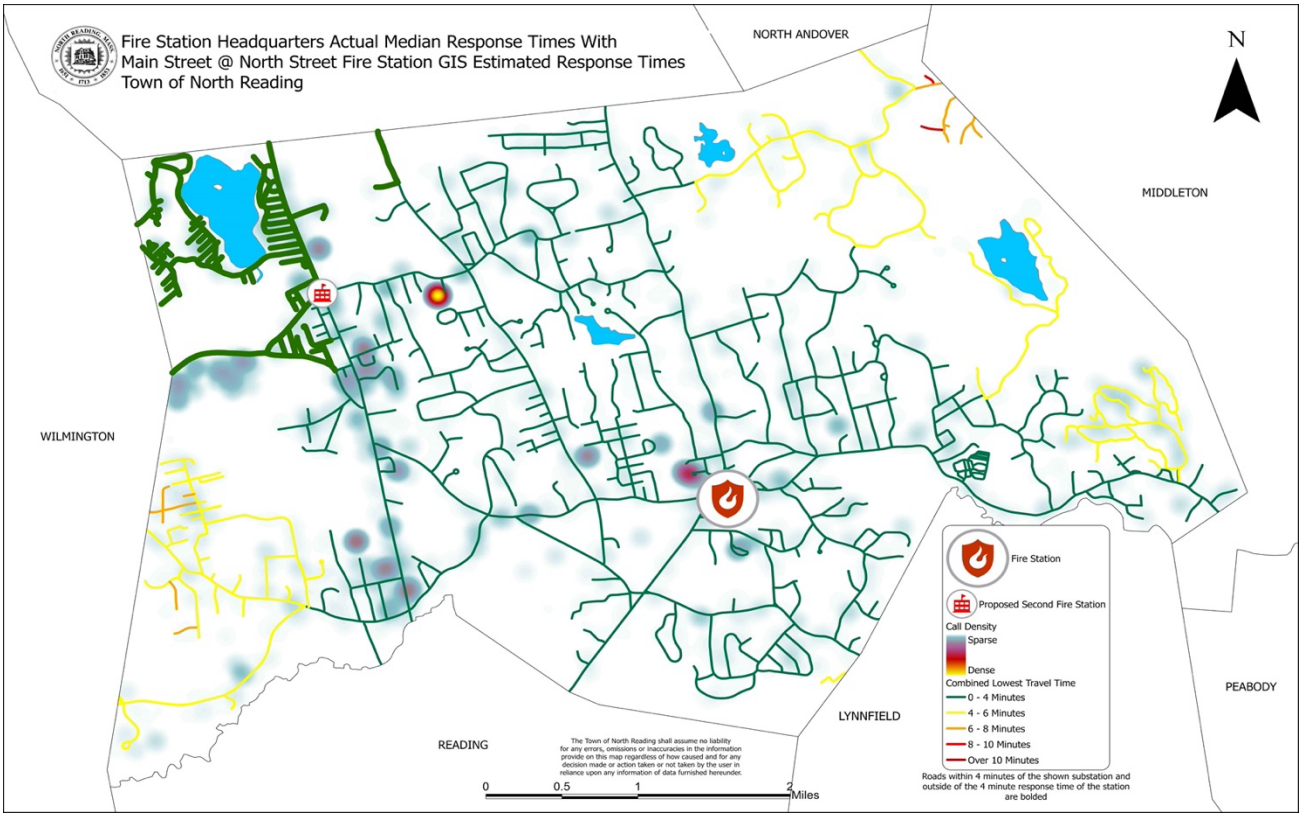


Figure V –12 Town of North Reading GIS MAP Showing Potential Second Fire Station Response Time from Main Street at North Street, Overlaid with the Fire Station Headquarters Median Response Time by Street with Call Density for All Calls for Service 2019-2023

This GIS Map displays the effectiveness of a potential fire station location at Main Street @ North Street in the northwest quadrant of the Town. As shown in Bold Green for road travel within the 0 – 4 Minute Response Range, Response Time Analysis implies improvement along Main Street to the north of this fire station location as well as all areas to the northwest and a concentrated section just southwest of this location that is not already covered by Fire Station Headquarters within the 0 – 4 Minute Response Range.

- This location creates **25 road miles of overlap** southeast and east of this fire station location with the Fire Station Headquarters response areas within the 0 – 4 Minute Response Range, but it results in one of the highest additional travel distance within the 0 – 4 Minute Response Time, **adding 10 road miles**.
- This location also improves the overall response time in the northwest area of Town that has the highest call density for fire incidents and EMS calls. If this fire station location was in service during the 5-year analysis period of calls for service, it would have added an additional **1,076 EMS calls**, **24 fire incident calls** and **824 calls of other types** in the northwest quadrant of the Town within the 0 – 4 Minute Response Time.
- The area is a mix use area of residential and business uses.

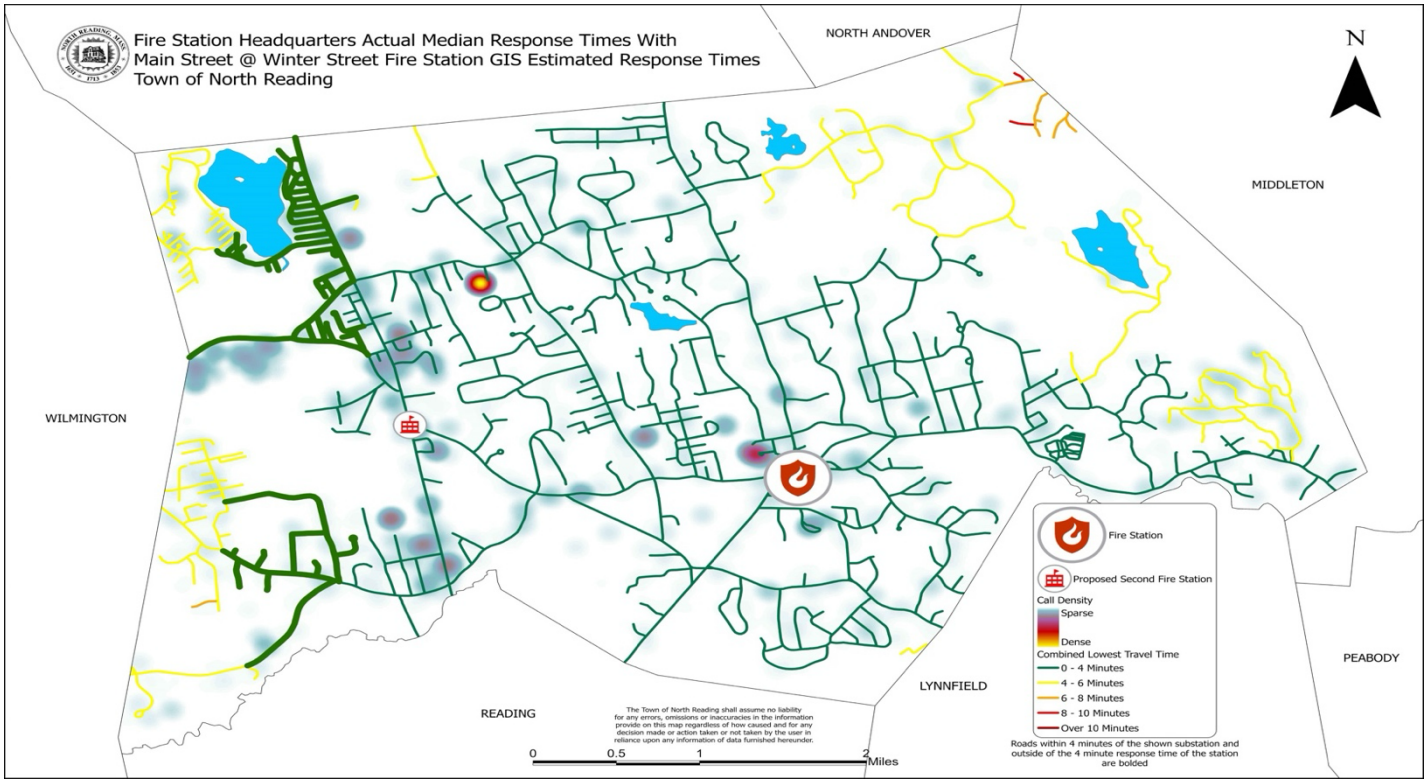


Figure V –13 Town of North Reading GIS MAP Showing Potential Second Fire Station Response Time from Main Street and Winter Street, Overlaid with the Fire Station Headquarters Median Response Time by Street with Call Density for All Calls for Service 2019-2023

- This GIS Map displays the effectiveness of a potential fire station location at Main Street @ Winter Street in the mid-west quadrant of the Town. As shown in **Bold Green** for road travel within the 0 – 4 Minute Response Range, Response Time Analysis implies improvement along Main Street north of North Street as well as a significant area to the northwest of this fire station location. It also improves an area in the southwest quadrant of Town not already covered by Fire Station Headquarters within the 0 – 4 Minute Response Range.
- This location creates **24 road miles of overlap** in the southeast, east and northeast of this fire station location with the Fire Station Headquarters response areas within the 0 – 4 Minute Response Range, but it results in the third highest additional travel distance within the 0 – 4 Minute Response Time, **adding 9 road miles**.
- This location also improves the overall response time in the northwest area of Town that has the highest call density for fire incidents and EMS calls. If this fire station location was in service during the 5-year analysis period of calls for service, it would have added an additional **996 EMS calls**, **20 fire incident calls** and **809 calls of other types** in the mid-west quadrant of the Town within the 0 – 4 Minute Response Time.
- The area is a mix use area of residential and business uses.

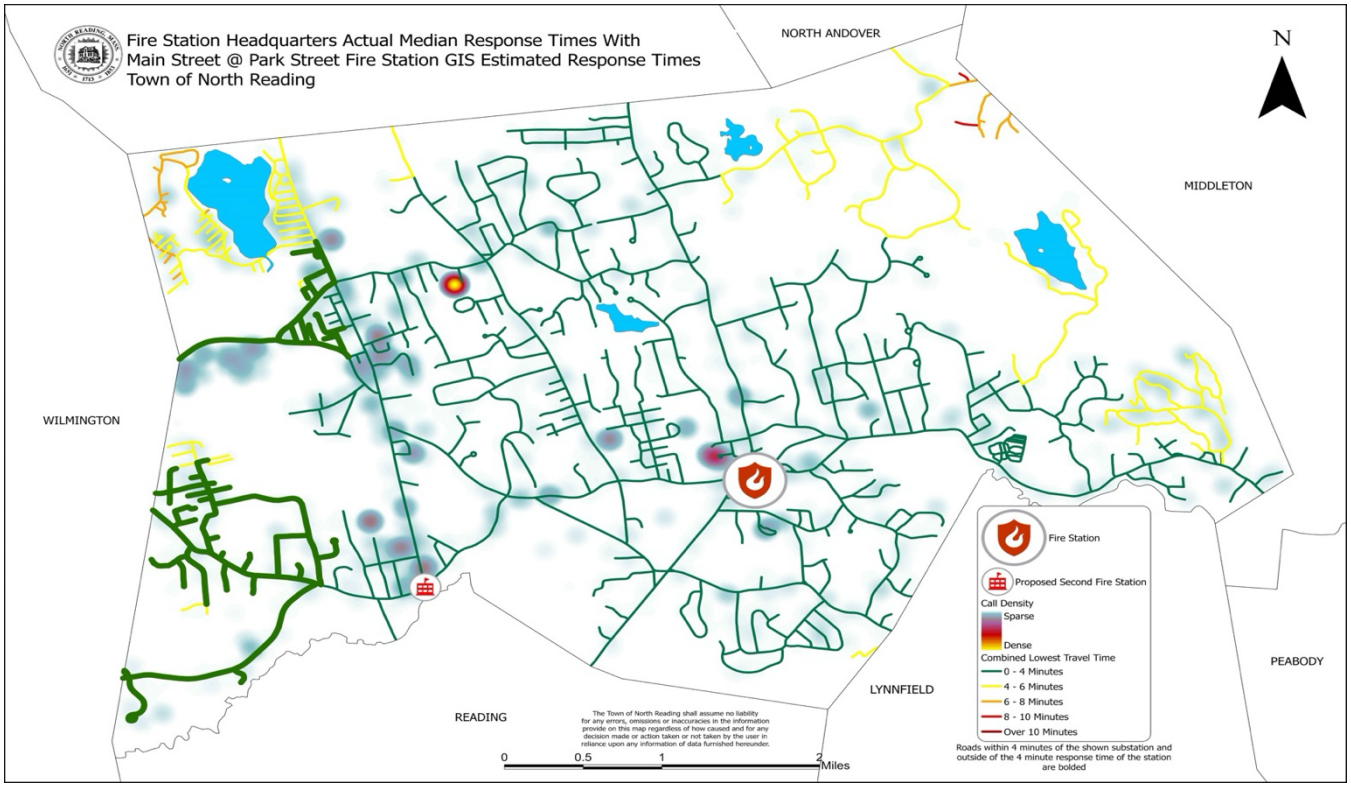


Figure V –14 Town of North Reading GIS MAP Showing Potential Second Fire Station on Main Street at Park Street, Overlaid with the Fire Station Headquarters Median Response Time by Street with Call Density for All Calls for Service 2019-2023

- This GIS Map displays the effectiveness of a potential fire station location at Main Street @ Park Street in the southwest quadrant of the Town. As shown in **Bold Green** for road travel within the 0 – 4 Minute Response Range, Response Time Analysis implies improvement in the far west quadrant of Town along Park Street heading west from its intersection with Concord Street, as well as most all side streets off of this section of Park Street, and Concord Street in its entirety. It also improves a small segment of Main Street starting at North Street for a short distance as well as improvements in a concentrated area west and southwest of this segment. These areas of improvement are not already covered by Fire Station Headquarters within the 0 – 4 Minute Response Range.
- This fire station location creates **18 road miles of overlap** to the north, northeast and just to the west of this location with the Fire Station Headquarters response areas within the 0 – 4 Minute Response Range, but it results in the second highest additional travel distance within the 0 – 4 Minute Response Time, **adding 10 road miles**.
- This location also improves the overall response time in the northwest area of Town that is part of the highest call density for fire incidents and EMS calls. If this fire station location was in service during the 5-year analysis period, it would have added an additional **973 EMS**, **20 fire incident calls** and **819 calls of other types** in this area of Town within the 0 – 4 Minute

Response Time.

- The area is a mix use area of residential and business uses.

Fire Stations & Response Time Totals		Non-Overlap Calls for Service Metrics Improvements within 4 Minute Response Time					Ranked Improvement Values High to Low
Fire Station Location Description	**All Calls for Service Responded to within 4 Minutes**	**Additional EMS Calls for Service Responded to within 4 Minutes**	**Additional Fire Incident Calls for Service Responded to within 4 Minutes**	**Additional Other Calls for Fire Services Responded to within 4 Minutes**	**Additional Travel Distance Road Miles Covered within 4 Minutes**	**Road Miles Overlapped with Fire Station HQ within 4 Minutes**	**Aggregate Values of 4 Minute Response Time Metrics**
Main St @ North St Fire Station (GIS Estimated Response Time)	1,924	1,076	24	824	10	-25	1,909
Main St @ Winter St Fire Station (GIS Estimated Response Time)	1,825	996	20	809	9	-24	1,810
Main St @ Park St Fire Station (GIS Estimated Response Time)	1,812	973	20	819	10	-18	1,804
Haverhill St Fire Station (GIS Estimated Response Time)	431	154	7	270	5	-23	413
Marblehead St Fire Station (GIS Estimated Response Time)	316	189	8	119	5	-11	311
Elm St Fire Station (GIS Estimated Response Time)	307	172	7	128	4	-25	286

Figure V –15 Statistical Ranking of Potential Second Fire Station Locations Using GIS Estimated 0-4 Minute Response Times for All Calls for Service 2019-2023

Chapter VI

Conclusion and Recommendations

MRI conducted this study for the Town of North Reading Massachusetts to review and make recommendations on existing staffing, deployment, incident response times, projected growth, target hazards, and service demand of the NRFD. A site visit was conducted to understand the fire department's current and future needs. MRI has conducted several organizational and operational studies of fire service organizations with similar size and structure of the NRFD. The common factor in these studies is that the New England Fire Service is experiencing increasing requests for fire and EMS services, growing populations, staffing shortages, difficulty in recruiting and retaining qualified Firefighter and EMTs. In addition to these challenges is obtaining capital funding for fire department infrastructure, staffing, apparatus and ambulances in competition with other municipal agencies attempting to accomplish the same goals. The importance of planning and preparing to be ready to implement these capital funding projects is paramount in having the organization ready to act when the opportunity presents itself.

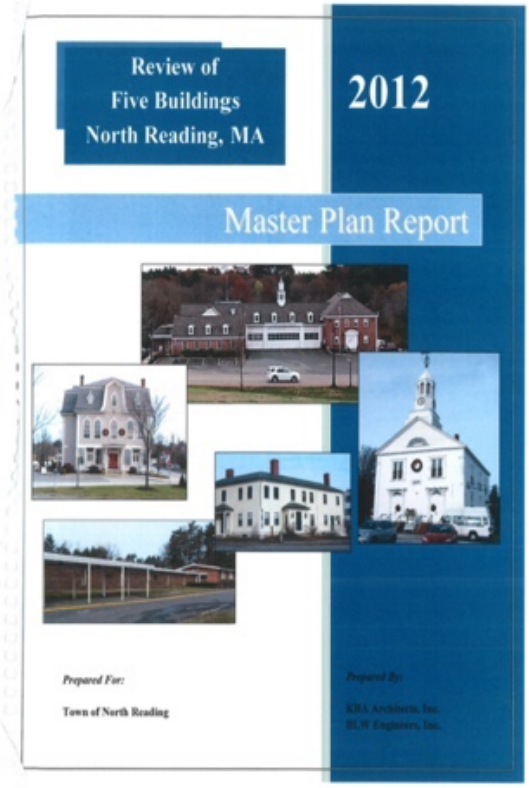


Figure VI - 1 Master Plan Report - 2012

The NRFD has established a number of benchmarks in preparation for bringing forth their needs in preparation of asking the Citizens of North Reading to support the critical upgrade of facilities to meet health, fire, and life safety standards, a need for an additional fire station location(s) due to the previous aforementioned current and future needs, and working towards meeting national standards on staffing, and emergency response is a priority.

A previous Master Plan report in 2012 was conducted by KBA Architects Inc. and BLW Engineers Inc, identified the critical need to upgrade and renovate the Park Street Fire Station due to its age, outdated HVAC Systems, space needs, and the general repair of the building due to its condition.

In 2015, KBA conducted a space study of fire headquarters and issued a spatial analysis report that identified the need to construct additional space and renovate the existing space. In this report, KBA provided update estimated costs for the recommended improvements.

There remains a clear need to address these longstanding issues to preserve and have this facility continue operating in the future. The 24-hour operation of the NRFD accelerates service, maintenance, and the overall need for facility improvements.

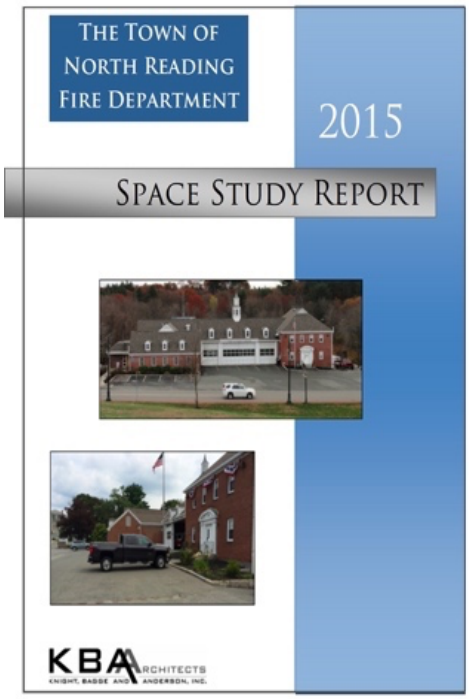


Figure VI-2 - Master Plan Update - 2015

Recommendations:

Based on a comprehensive analysis of the current data related to number of fire calls, geographic potential locations of fire stations, response analysis, study of GIS mapping of the Town of North Reading, input from the North Reading Building Committee, Chief Don Stats, Public Works Director Joe Parisi Jr., and GIS Program Manager, Danny Szottfried, MRI presents the following MRI recommendations:

I. ***Recommendation – A new fire station should be constructed in an area that would provide measurable improvements in response to fire and EMS emergencies as well as provide the NRFD with additional resources to provide emergency services to the multifamily community nearing completion in the northwest quadrant of the Town of North Reading as well as improve response times for the southwest, central and northeast quadrants of the Town.***

II. ***Recommendation –The northwest and southwest quadrant in the Town of North Reading through comprehensive analysis of fire response time, distance, and number of calls for fire and EMS services is clearly identified as a need to support the NRFD current and future growth. Locating a station in the area of North Street and Main Street or in the immediate adjacent area where land is available would have the greatest positive impact on response times, however placement at other locations along Main Street where land is available would also have a similar, but slightly lower impact on response times.***

III. ***Recommendation: The new station should be designed to accommodate the number of personnel that would staff the assigned fire apparatus at that fire station as well as consideration for staffing needs at that location in the future.***

IV. ***Recommendation: Consideration of the size of a new fire station should consider developing available space to address the lack of proper fire apparatus and apparatus bays, that may assist in cost savings of renovations proposed for the Park Street Station by transferring back up apparatus to the new station.***

V. ***Recommendation: That the proposed renovation of the Park Street Fire Station continue and be included as one large infrastructure capital improvement project with the construction of a new fire station. The scope and timing of this project may need to be adjusted depending on the size and extent of a second station to be constructed.***

Our project team would like to take this opportunity to express our thanks and appreciation to the Town of North Reading, Fire Chief Don Stats, Public Works Director Joe Parisi Jr., and GIS Program Manager, Danny Szottfried for their assistance in compiling a comprehensive list of data,

development of GIS Mapping, and other data which provided the information to bring forth our recommendations.

CHAPTER VII - THE PROJECT TEAM

The MRI project team consisted of the following personnel:

Team Leader:

Brian P. Duggan, Director Fire Services Group, retired from the Fire Department in Northampton, Massachusetts, where he instituted substantial changes to modernize and restructure the entire department including equipment, facilities, personnel, and training. In conjunction with his staff, Brian integrated Emergency Medical Services (EMS) into the organization and created a regional Advanced Life Support (ALS) Program that currently serves 18 communities within the Northampton Area. He formerly commanded the Northborough, Massachusetts, Fire Department, and has significant experience with the Massachusetts Department of Fire Services where over three decades, he held several key positions. Following his retirement, Brian has continued his active fire service involvement by serving as both a volunteer chief fire officer and through continuing to develop training and certification programs as a program Coordinator for the Massachusetts Department of Fire Services.

Mr. Duggan developed and directed the Graduate and Undergraduate Fire Science Programs at Anna Maria College in Paxton Massachusetts from 1995 - 2003. Mr. Duggan has a Business Management/Fire Science degree from Providence College and a Master's Degree of Business Administration (MBA) from Nichols College in Dudley, Massachusetts. He is also a graduate of the National Fire Academy Executive Fire Officer Program and the Senior Executive Program for State and Local Leaders at Harvard University. In December 2012, Mr. Duggan received a Master's Degree in Homeland Security through the Naval Post Graduate School based in Monterey, California, where his thesis entitled "*Enhancing Decision-making during the First Operational Period of Surge Events"* was selected as an outstanding thesis. He was one of the first fire service professionals to be designated as a Chief Fire Officer by the Commission on Fire Accreditation International.

Brian led the Massachusetts fire service through his affiliation as Chairman of the Fire Chief Association of Massachusetts Technology Committee and as a Regional Director on the Massachusetts State Fire Mobilization Committee. Mr. Duggan has authored several publications, inclusive of writing Section 7, Chapter 3, Fire Department Information Systems, in the Nineteenth and Twentieth Editions of the National Fire Protection Association's Fire Protection Handbook. Chief Duggan has been affiliated with MRI as a subject matter advisor since 2002 and he has served as Director of Fire Services since 2015. Currently, Mr. Duggan is regarded as an expert specific to fire service response to photovoltaic and battery energy storage

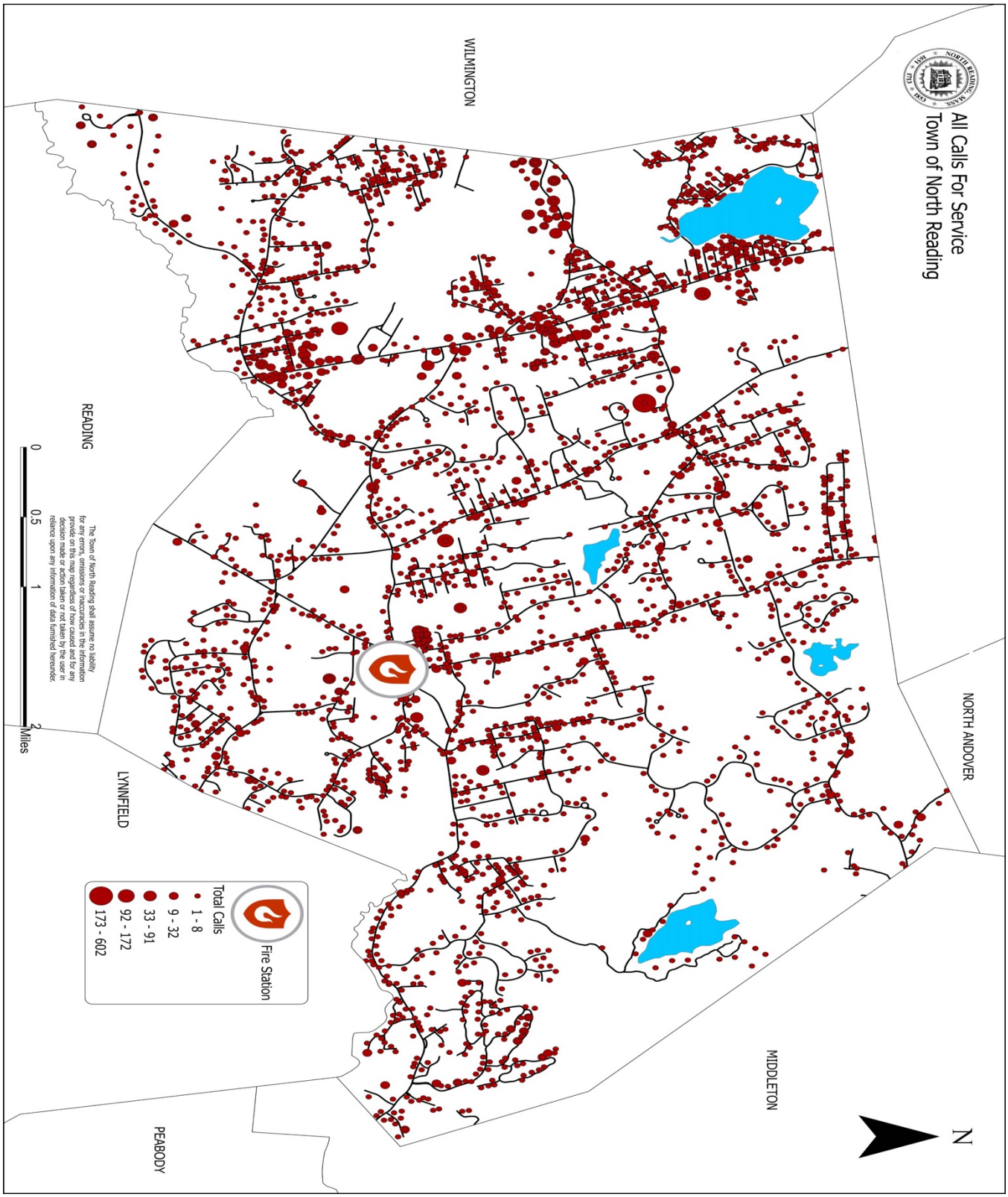
system (BESS) emergencies. He has developed several nationwide training programs providing first responders with new insight on these emerging challenges.

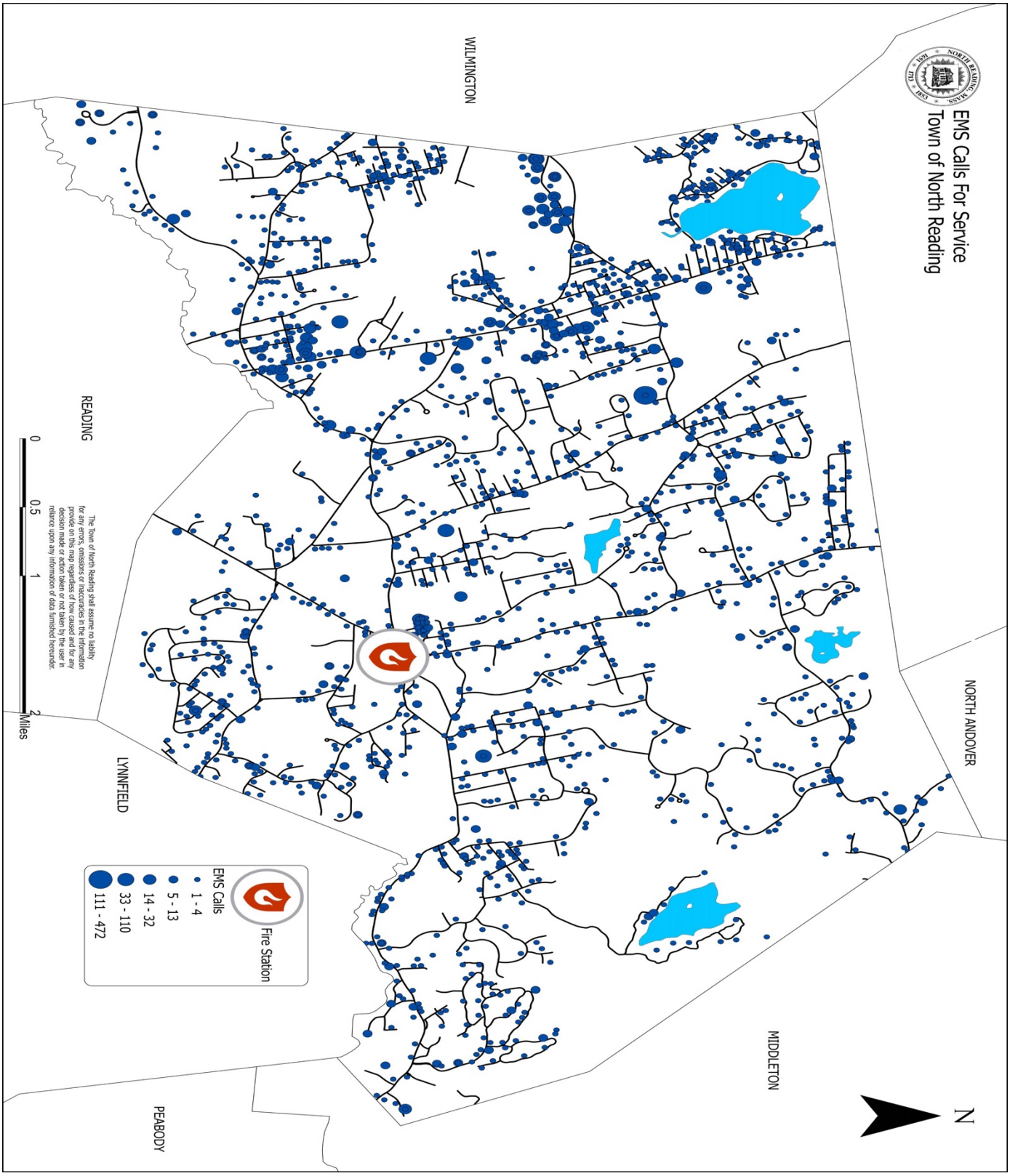
Senior Consultant:

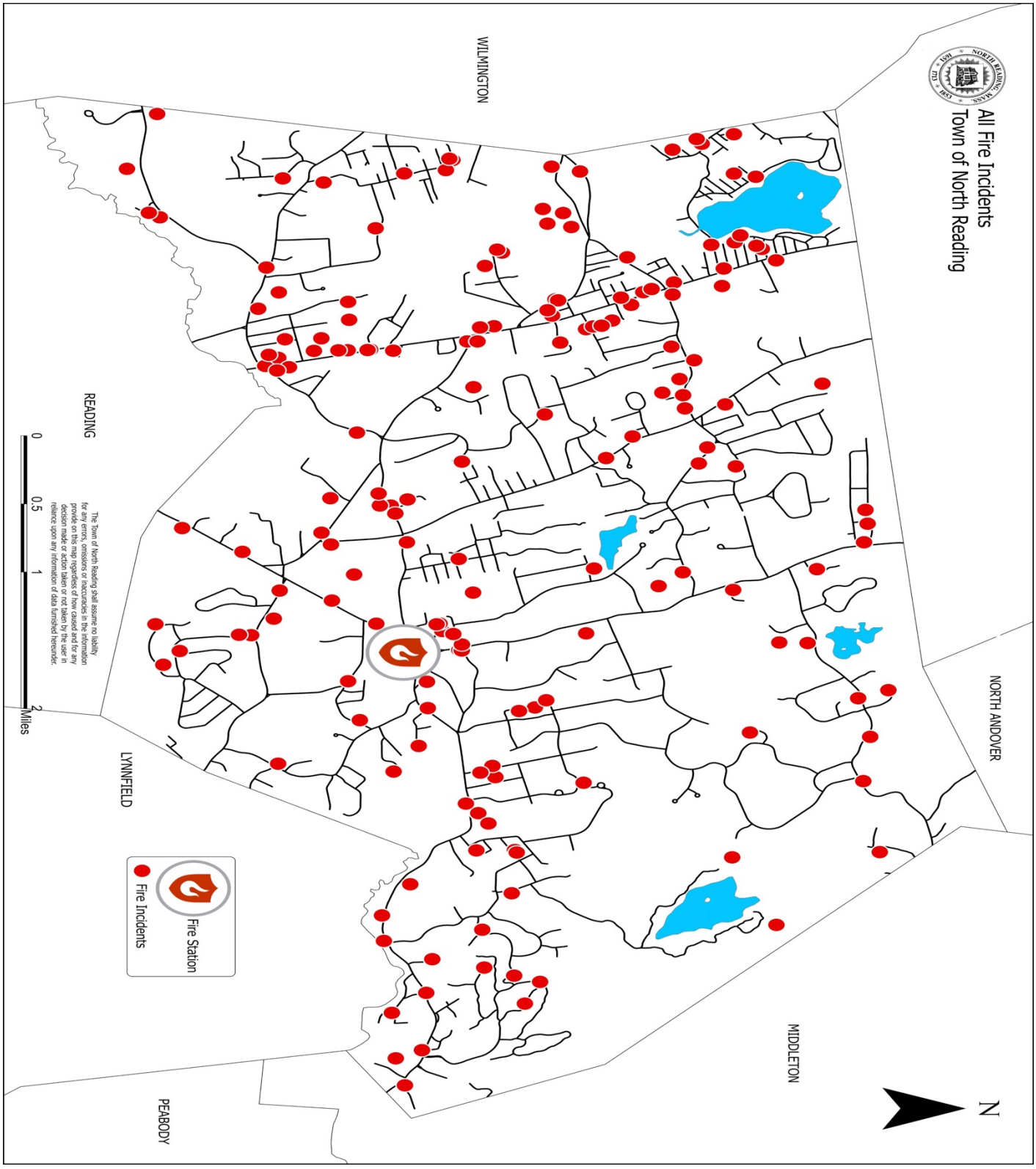
Shawn Murray, Senior Public Safety Consultant; he is a graduate of the State University of New York – Empire State College with a BS in Business, Management, and Economics with a concentration in Fire Administration. He is also a graduate of the National Fire Academy Executive Fire Officer Program and holds the Chief Fire Officer Designation from the Commission on Professional Credentialing. Chief Murray retired as the Fire Chief in Hudson, New Hampshire, where he served since 2001. His retirement spanned a career of almost 37 years collectively in the Fire Service serving in the USAF, Federal, State, and municipal organizations. Shawn began his career in the Goffstown, N.H. Fire Department, a combination department where he served as Training Officer with distinction. Shawn then served as Assistant Fire Chief of the Hudson N.H. Fire Department and within two years was appointed Chief of the Department. Chief Murray also served the Commonwealth as Director of the Mass Fire Academy.

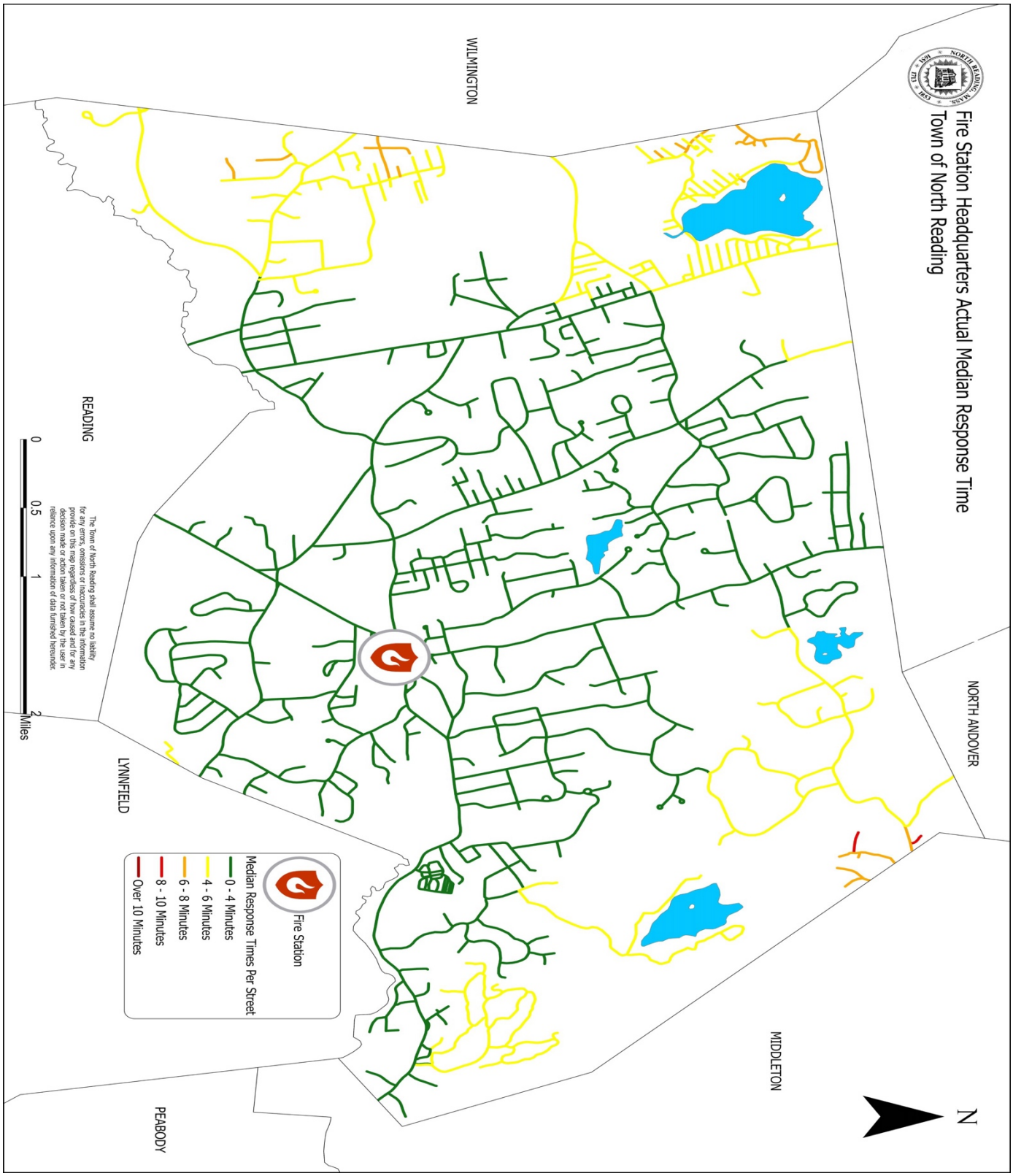
Chief Murray is a Certified Fire Officer in accordance with NFPA 1021; a Certified Fire Service Instructor in accordance with NFPA 1501; and a Certified Safety Officer in accordance with NFPA 1521. Chief Murray is a member of the International Association of Fire Chiefs; served as a Director with the New England Association of Fire Chiefs, and Past President of the New Hampshire Fire Chiefs Association. Chief Murray is a creative and innovative problem solver with the ability to develop collaborative solutions to complex organizational, business, and technical challenges including organizational change and transition. He has demonstrated skills sets in budgeting and financial forecasting; policy and program development; and organizational and personnel management within dynamic and challenging fire service working environments including fulltime, part-time, paid on call, and volunteer personnel models.

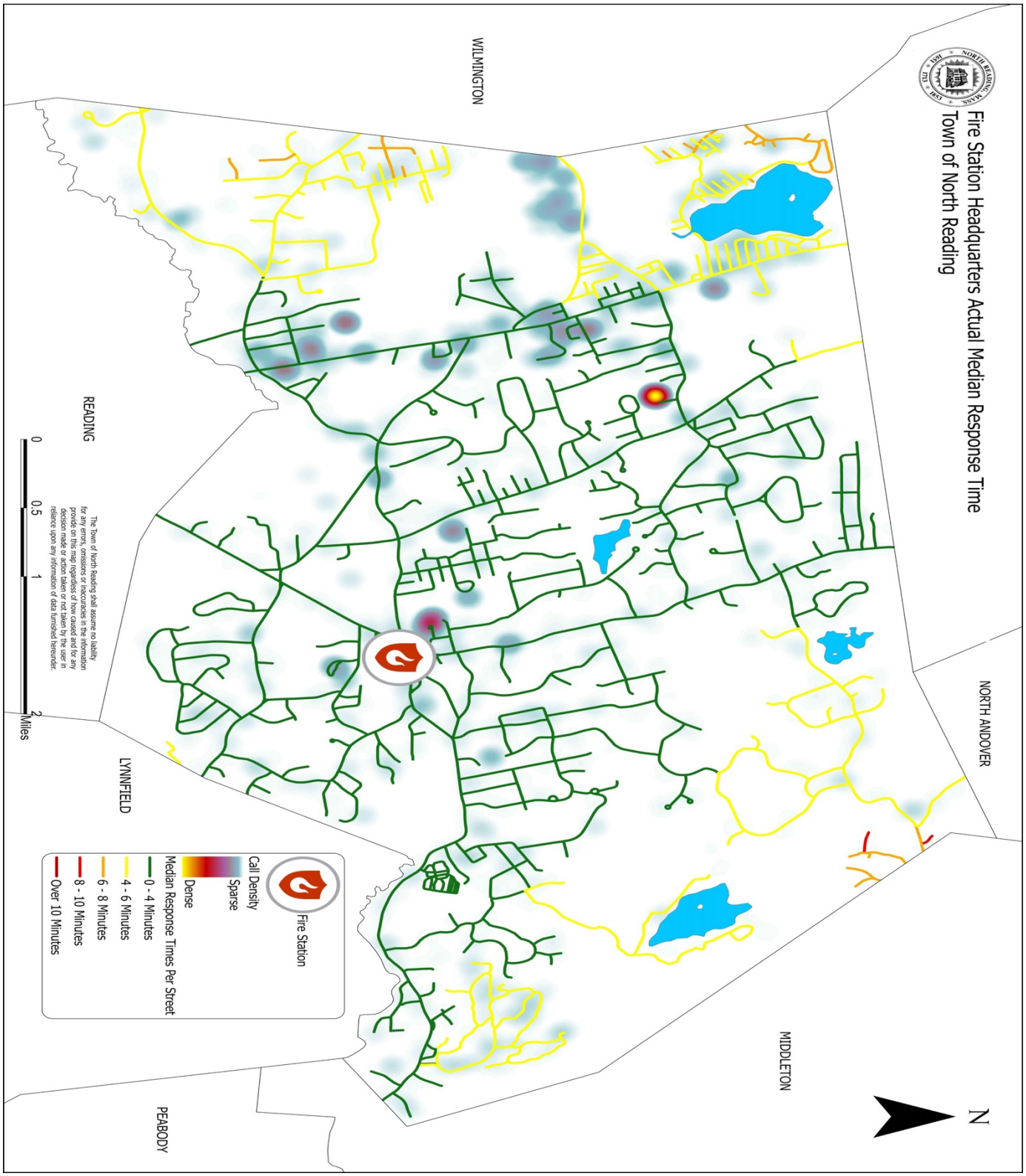
Appendix A – GIS Maps in Landscape Format

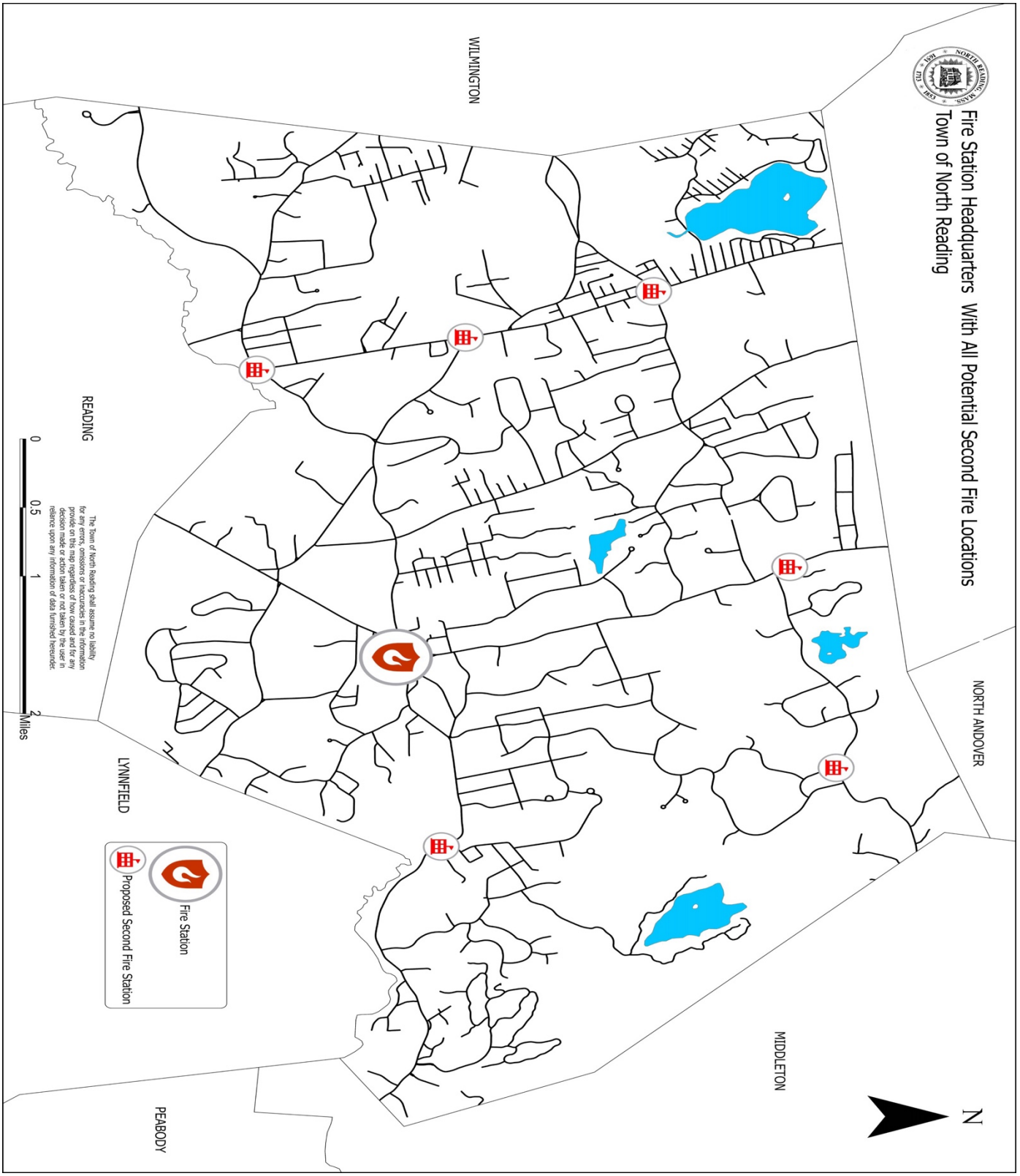

All Calls For Service
Town of North Reading
WILMINGTON
READING
LYNNFIELD
PEABODY
MIDDLETON
NORTH ANDOVER
N
0
0.5
1
2
Miles
The Town of North Reading shall assume no liability for any errors, omissions or inaccuracies in the information provide on this map regardless of how caused and for any decision made or action taken or not taken by the user in reliance upon any information of data furnished hereunder.
Fire Station
Total Calls
1 - 8
9 - 32
33 - 91
92 - 172
173 - 602

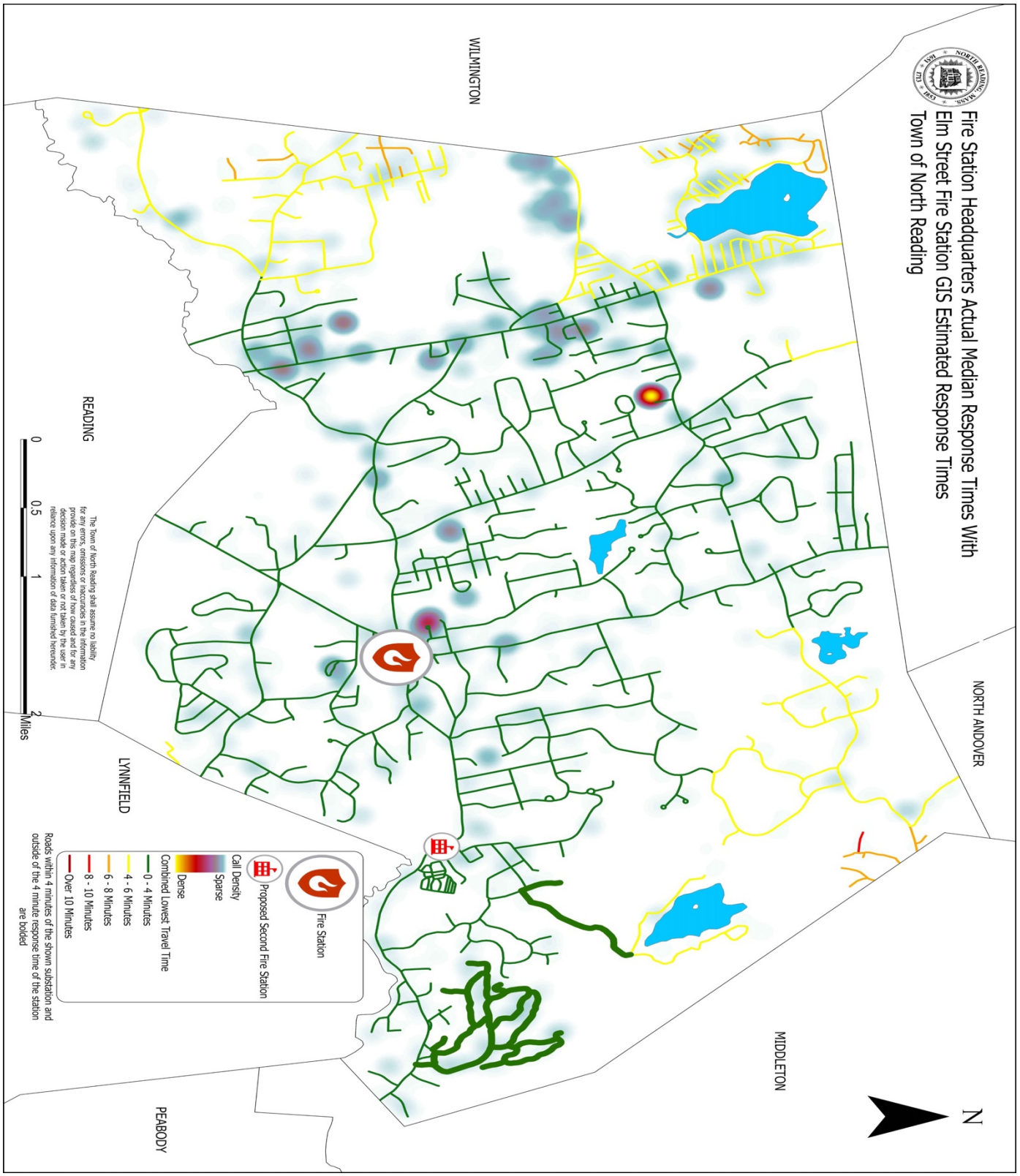

EMS Calls For Service
Town of North Reading
WILMINGTON
READING
LYNNFIELD
PEABODY
MIDDLETON
NORTH ANDOVER
N
Fire Station
EMS Calls
1 - 4
5 - 13
14 - 32
33 - 110
111 - 472
0
0.5
1
2
Miles
The Town of North Reading shall assume no liability for any errors, omissions or inaccuracies in the information provided on this map regardless of how caused and for any decision made or action taken or not taken by the user in reliance upon any information or data furnished hereunder.

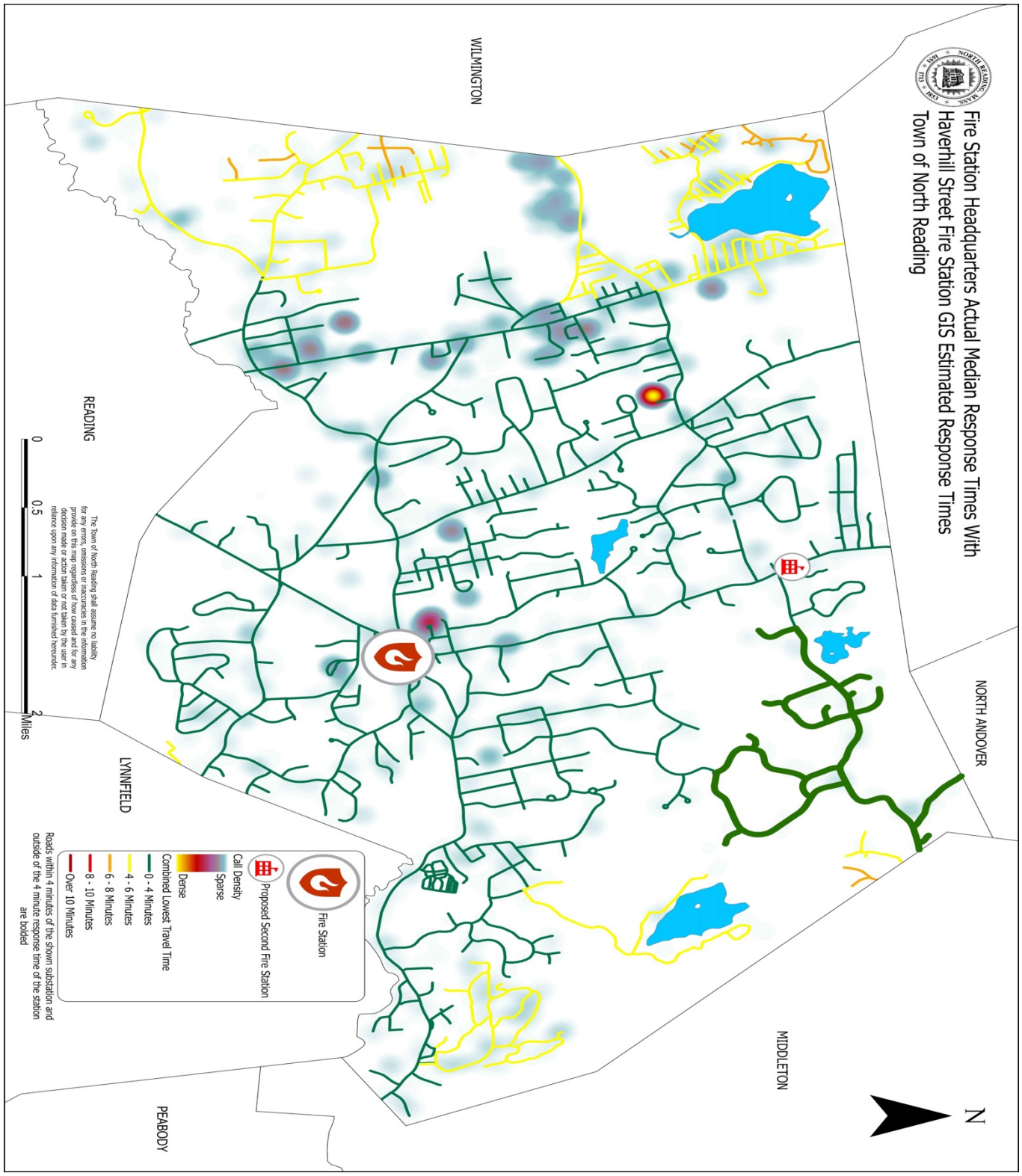

All Fire Incidents
Town of North Reading
WILMINGTON
READING
LYNNFIELD
PEABODY
MIDDLETON
NORTH ANDOVER
N
Fire Station
Fire Incidents
0
0.5
1
2
Miles
The Town of North Reading shall assume no liability for any errors, omissions or inaccuracies in the information provide on this map regardless of how caused and for any decision made or action taken or not taken by the user in reliance upon any information of data furnished hereunder.

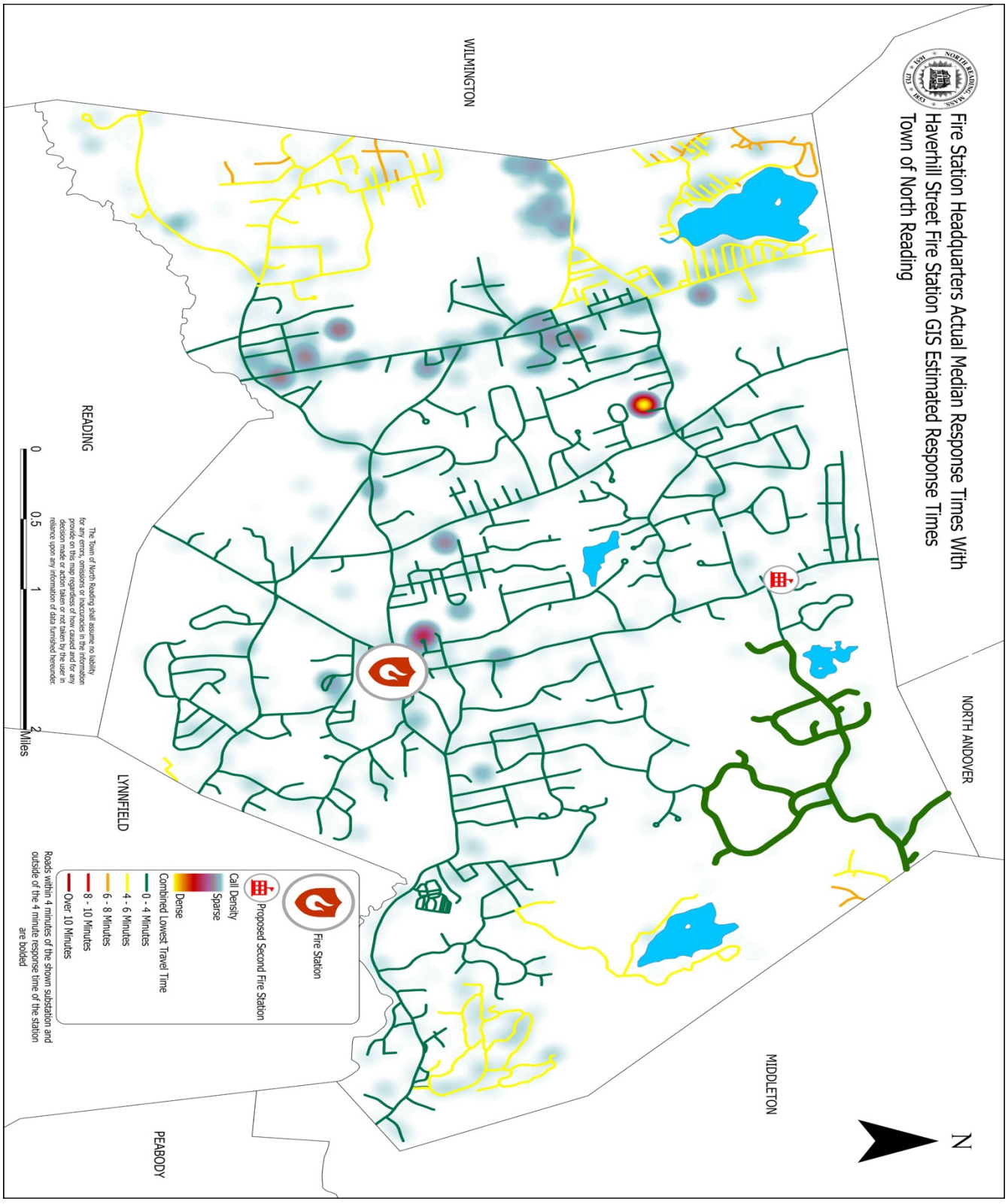

Fire Station Headquarters Actual Median Response Time
Town of North Reading
WILMINGTON
READING
LYNNFIELD
PEABODY
MIDDLETON
NORTH ANDOVER
N
Fire Station
Median Response Times Per Street
0 - 4 Minutes
4 - 6 Minutes
6 - 8 Minutes
8 - 10 Minutes
Over 10 Minutes
0
0.5
1
2
Miles
The Town of North Reading shall assume no liability for any errors, omissions or inaccuracies in the information provided on this map regardless of how caused and for any decision made or action taken or not taken by the user in reliance upon any information of data furnished hereunder.

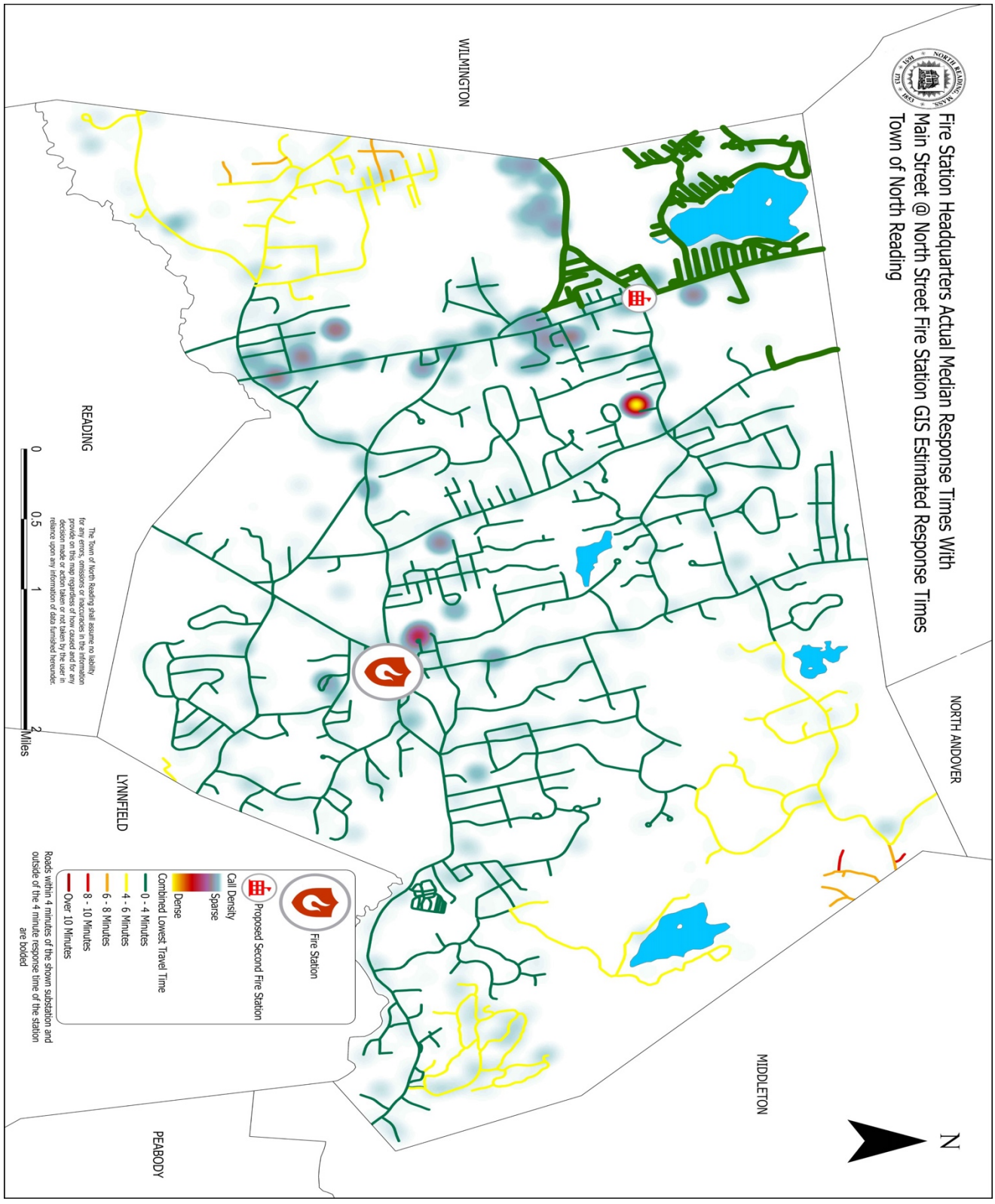

Fire Station Headquarters Actual Median Response Time
Town of North Reading
WILMINGTON
READING
LYNNFIELD
PEABODY
MIDDLETON
NORTH ANDOVER
N
0
0.5
1
2
Miles
The Town of North Reading shall assume no liability for any errors, omissions or inaccuracies in the information provide on this map regardless of how caused and for any decision made or action taken or not taken by the user in reliance upon any information of data furnished hereunder.
Fire Station
Call Density
Sparse
Dense
Median Response Times Per Street
0 - 4 Minutes
4 - 6 Minutes
6 - 8 Minutes
8 - 10 Minutes
Over 10 Minutes

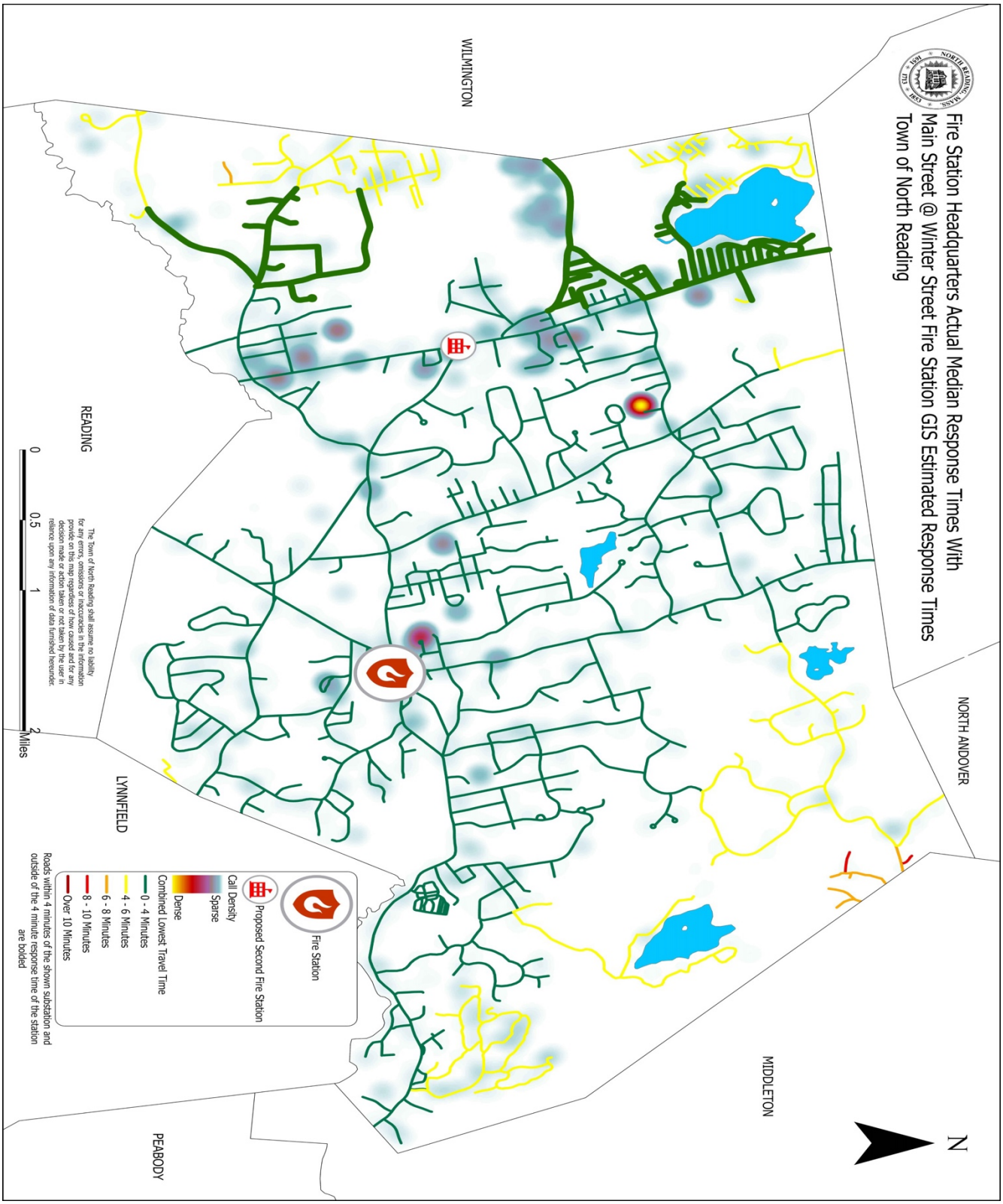

Fire Station Headquarters With All Potential Second Fire Locations
Town of North Reading
WILMINGTON
READING
LYNNFIELD
PEABODY
MIDDLETON
NORTH ANDOVER
N
0
0.5
1
2
Miles
Fire Station
Proposed Second Fire Station
The Town of North Reading shall assume no liability for any errors, omissions or inaccuracies in the information provide on this map regardless of how caused and for any decision made or action taken or not taken by the user in reliance upon any information of data furnished hereunder.

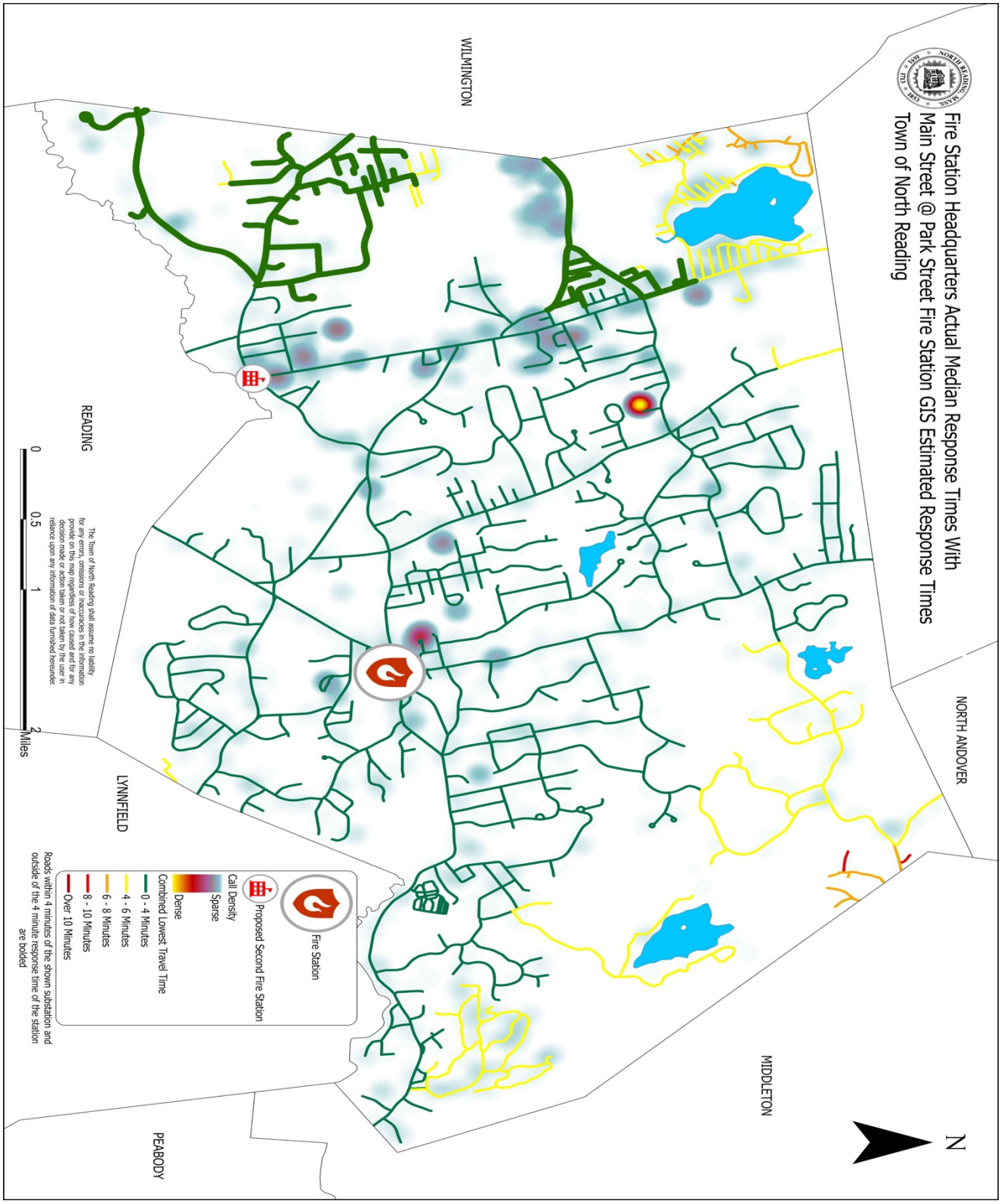

Fire Station Headquarters Actual Median Response Times With
Elm Street Fire Station GIS Estimated Response Times
Town of North Reading
WILMINGTON
READING
LYNNFIELD
PEABODY
MIDDLETON
NORTH ANDOVER
N
0
0.5
1
2
Miles
The Town of North Reading shall assume no liability for any errors, omissions or inaccuracies in the information provide on this map regardless of how caused and for any decision made or action taken or not taken by the user in reliance upon any information of data furnished hereunder.
Fire Station
Proposed Second Fire Station
Call Density
Sparse
Dense
Combined Lowest Travel Time
0 - 4 Minutes
4 - 6 Minutes
6 - 8 Minutes
8 - 10 Minutes
Over 10 Minutes
Roads within 4 minutes of the shown substation and outside of the 4 minute response time of the station are bolded


Fire Station Headquarters Actual Median Response Times With
Haverhill Street Fire Station GIS Estimated Response Times
Town of North Reading
WILMINGTON
READING
LYNNFIELD
PEABODY
MIDDLETON
NORTH ANDOVER
N
0
0.5
1
2
Miles
The Town of North Reading shall assume no liability for any errors, omissions or inaccuracies in the information provide on this map regardless of how caused and for any decision made or action taken or not taken by the user in reliance upon any information of data furnished hereunder.
Fire Station
Proposed Second Fire Station
Call Density
Sparse
Dense
Combined Lowest Travel Time
0 - 4 Minutes
4 - 6 Minutes
6 - 8 Minutes
8 - 10 Minutes
Over 10 Minutes
Roads within 4 minutes of the shown substation and outside of the 4 minute response time of the station are bolded


Fire Station Headquarters Actual Median Response Times With
Haverhill Street Fire Station GIS Estimated Response Times
Town of North Reading
WILMINGTON
READING
LYNNFIELD
PEABODY
NORTH ANDOVER
MIDDLETON
N
0
0.5
1
2
Miles
The Town of North Reading shall assume no liability for any errors, omissions or inaccuracies in the information provided regardless of how caused or any decision made or action taken or not taken by the user in reliance upon any information of data furnished hereunder.
Fire Station
Proposed Second Fire Station
Call Density
Dense
Sparse
Combined Lowest Travel Time
0 - 4 Minutes
4 - 6 Minutes
6 - 8 Minutes
8 - 10 Minutes
Over 10 Minutes
Roads within 4 minutes of the shown substation and outside of the 4 minute response time of the station are bolded


Fire Station Headquarters Actual Median Response Times With
Main Street @ North Street Fire Station GIS Estimated Response Times
Town of North Reading
WILMINGTON
READING
LYNNFIELD
PEABODY
MIDDLETON
NORTH ANDOVER
N
0
0.5
1
2
Miles
The Town of North Reading shall assume no liability for any errors, omissions or inaccuracies in the information provide on this map regardless of how caused and for any decision made or action taken or not taken by the user in reliance upon any information of data furnished hereunder.
Fire Station
Proposed Second Fire Station
Call Density
Sparse
Dense
Combined Lowest Travel Time
0 - 4 Minutes
4 - 6 Minutes
6 - 8 Minutes
8 - 10 Minutes
Over 10 Minutes
Roads within 4 minutes of the shown substation and outside of the 4 minute response time of the station are bolded


Fire Station Headquarters Actual Median Response Times With
Main Street @ Winter Street Fire Station GIS Estimated Response Times
Town of North Reading
WILMINGTON
READING
LYNNFIELD
PEABODY
MIDDLETON
NORTH ANDOVER
N
0
0.5
1
2
Miles
The Town of North Reading shall assume no liability for any errors, omissions or inaccuracies in the information provide on this map regardless of how caused and for any decision made or action taken or not taken by the user in reliance upon any information of data furnished hereunder.
Fire Station
Proposed Second Fire Station
Call Density
Sparse
Dense
Combined Lowest Travel Time
0 - 4 Minutes
4 - 6 Minutes
6 - 8 Minutes
8 - 10 Minutes
Over 10 Minutes
Roads within 4 minutes of the shown substation and outside of the 4 minute response time of the station are bolded


Fire Station Headquarters Actual Median Response Times With
Main Street @ Park Street Fire Station GIS Estimated Response Times
Town of North Reading
WILMINGTON
READING
LYNNFIELD
PEABODY
MIDDLETON
NORTH ANDOVER
N
0
0.5
1
2
Miles
The Town of North Reading shall assume no liability for any errors, omissions or inaccuracies in the information provided on this map and assumes no responsibility for any decision made or action taken or not taken by the user in reliance upon any information or data furnished hereunder.
Fire Station
Proposed Second Fire Station
Call Density
Sparse
Dense
Combined Lowest Travel Time
0 - 4 Minutes
4 - 6 Minutes
6 - 8 Minutes
8 - 10 Minutes
Over 10 Minutes
Roads within 4 minutes of the shown substation and outside of the 4 minute response time of the station are bolded