Fire Department Staffing and Deployment Study

for the Four Fire Districts in the

Town of Cumberland, Rhode Island

Report Submitted To: Cumberland Hill Fire District Board of Trustees

Report Prepared By: J. Curtis Varone
William T. Giannini
Anthony J. Veltri

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J. Curtis Varone
Attorney at Law
55 Azalea Avenue
Exeter, RI 02822
401 295-9111
401 527-9111

INTRODUCTION

The Cumberland Hill Fire District retained the services of J. Curtis Varone to evaluate the current level of fire protection provided by the Cumberland Hill Fire District and the town of Cumberland in general, and to evaluate how that level of protection would be improved or diminished in light of the proposals currently being considered by the town of Cumberland for consolidation of the four fire districts.

In conducting the research Chief Varone utilized the services of retired Chief William T. Giannini, and Anthony J. Veltri. The authors drew upon a combined eighty years of experience with various fire departments, as well as over forty years of extra-fire department activities that includes work with the National Fire Protection Association, Department of Homeland Security, National Fire Academy, and private consulting firms that evaluate fire departments, develop policies and procedures, and provide a host of related services.

ABOUT THE AUTHORS

J. Curtis Varone has over 40 years of experience in the fire service, retiring in 2008 as a Deputy Assistant Chief (shift-commander) with the Providence, Rhode Island, Fire Department, after twenty-nine years of service. He has also been a practicing attorney for over twenty-eight years, licensed in both Rhode Island and Maine. He previously served as the Director of the Public Fire Protection Division at the National Fire Protection Association.

Chief Varone joined the fire service in 1972 as a volunteer firefighter in North Providence. As the department transitioned from a volunteer to a combination department, he served as a call firefighter, being promoted to lieutenant in 1977. In 1979 he was hired as a full-time firefighter by the Providence Fire Department, where he rose steadily through the ranks.

He has served with both Massachusetts Urban Search and Rescue Task Force MATF01 and Rhode Island Urban Search and Rescue Task Force RITF01. Chief Varone was one of the principal organizers of RITF01, and served as task force leader. In 2005 he led the team on a deployment to Hancock County, Mississippi in the aftermath of Hurricane Katrina.

Chief Varone has two bachelors degrees from Providence College, the first in biology (1978), and the second in fire safety (1982) summa cum laude. He is a cum laude graduate of Suffolk University Law School, Class of 1985. Since graduating from law school, he has engaged in the general practice of law with a concentration in fire service issues.

In 1997, Chief Varone completed the Executive Fire Officer Program at the National Fire Academy, becoming the first person ever to receive four Outstanding Applied Research Awards. In 1998 he was awarded an Executive Fire Officer Fellowship to study Advanced Issues in State and Local Government at Harvard University's John F. Kennedy School of Government. He presently teaches in the Executive Fire Officer program at the National Fire Academy. He also teaches courses in Fire Tactics, Fire Protection, Fire Service Law, Collective Bargaining, and Firefighter Occupational Safety & Health in the fire science program at Providence College, is an instructor for the Rhode Island Fire Academy, and teaches NIMS ICS for Rhode Island Emergency Management Agency.

Chief Varone has written two books, *Legal Considerations for Fire and Emergency Services*, and *Fire Officer's Legal Handbook*. He writes the Fire Law column for Firehouse Magazine, is a deputy chief with the Exeter (RI) Fire Department, and serves as President of Exeter Volunteer Fire Department No. 1.

William T. Giannini retired in 2003 as the Assistant Chief of Operations for the Providence, Rhode Island Fire Department after almost 29 years of service. In that capacity he was responsible for the delivery of firefighting and emergency medical services, hazmat response, terrorism response, safety, and training for the 539 member department. He has eleven years of incident command experience, serving as Incident Commander for a variety of situations in an urban/metro setting. From September of 2001 to March 2003, he was detached from the fire department and was assigned by executive order to a terrorism task force within the Department of Public Safety to be a deputy coordinator of a team responsible for threat assessment, hazard analysis, risk assessment, public infrastructure protection, terrorism response, and continuity of government within and for the City of Providence. He possesses a Bachelor's Degree in Fire Safety from Providence College and a certificate in Environmental and Occupational Safety and Health from Roger Williams University, as well as having completed numerous nationally recognized courses in incident command, terrorism response, hazmat response, radiological/nuclear preparedness, response, and exercise evaluation, adult educational methodology, the instructional design process, and exercise design.

Chief Giannini is an instructor and course developer within the Hazardous Materials and Terrorism Departments at the National Fire Academy in Emmitsburg, Maryland. He is an instructor for the State of Rhode Island Fire Academy and is its terrorism curriculum coordinator. He is also a member of State Emergency Response Commission and is the chairman of its training committee. Additionally, he is a member of the instructional team for the Department of Defense's Weapons of Mass Destruction International Counterproliferation Project and in that capacity delivers chemical, biological, and radiological/nuclear counterterrorism instruction and conducts terrorism response exercises in Eastern Europe and central Asia. He was an exercise evaluator for the Department of Justice's former Domestic Preparedness Program, FEMA's Radiological Emergency Preparedness program, the Department of Homeland Security Exercise and Evaluation Program, and DHS's Regional Exercise Support Program; and in these programs has assisted in the facilitation and evaluation of many full-scale, functional, and tabletop exercises conducted throughout the United States, focusing on chemical, biological, and radiological/nuclear weapon response, the Incident Command System, NIMS, and EOC operations. He teaches for and has been a contributing subject matter expert to the Department of Homeland Security's Center for Domestic Preparedness in Anniston, Alabama, teaching Incident Command, Hazardous Materials Technician, Crime Scene Management, and Hazardous Evidence Collection courses. He has been a member of the Fire Science Advisory Council and the Emergency Management Advisory Council at the Community College of Rhode Island since 2000. He was a member of the team providing administrative and logistical support to FEMA's National Level Exercise – NLE 2010 – serving as the Lead Support Person for the Training Working Group.

Anthony J. Veltri holds an undergraduate degree in hydrogeology from the University of Rhode Island and two Master of Science degrees. His graduate research focused on predictive modeling of forest fire fuel loading using satellite remote sensing.

After working as a GIS Coordinator for the US Army Garrison in Hawaii, Anthony was recruited by the US Department of Homeland Security (DHS) to lead the Geospatial component of the DHS Office of Infrastructure Protection (IP). IP leads the coordinated national program to reduce risks to the nation's critical infrastructure posed by acts of terrorism, and to strengthen national preparedness, timely response, and rapid recovery in the event of an attack, natural disaster, or other emergency.

In his tenure at DHS, Anthony oversaw the creation and distribution of over 400 geospatial products, ranging from very simple to wildly complex, which provided situational awareness to the law enforcement and homeland security community for events such as:

- State of the Union Addresses
- G8 Summit
- Haiti Tsunami
- Superbowl and All-Star Games
- Joint Sessions of Congress
- Nuclear Security Summits
- BP Oil Spill Response
- Other major natural disasters

Most recently, Anthony led a distributed team of over 80 geospatial professionals managing GIS analysis and map production for a national resource agency in the states of Oregon and Washington for the US Forest Service.

METHODOLOGY

This study was conducted over approximately a seven week period between February 4, 2013 and March 21, 2013.

In conducting this study the authors interviewed personnel from each of the four fire districts; toured the four districts; identified target hazards; examined each of the fire stations along with the apparatus and equipment assigned to each station; reviewed the policies and procedures used by the departments; and conducted a comprehensive geographic information system (GIS) mapping study of the town of Cumberland.

The authors also reviewed the applicable National Fire Protection Association (NFPA) standards and Insurance Services Office (ISO) guidelines together with copies of two documents prepared by D.I. Jacobs Consulting, one dated May 9, 2012 titled Town of Cumberland, Rhode Island Fire Services Consolidation Findings and Recommendations Report, the other dated October 1, 2012 titled Cumberland Fire Consolidation Expert Report Dated October 1, 2012.

BACKGROUND INFORMATION

National Recommendations on Fire Apparatus Staffing and Deployment

There are two primary organizations that provide authoritative guidance on fire service staffing and deployment: the National Fire Protection Association and the Insurance Services Office.

The **National Fire Protection Association** (NFPA) is an international nonprofit whose mission is to reduce the worldwide burden of fire and other hazards on the quality of life.

Established in 1896, the NFPA is the world's leading advocate of fire prevention and universally recognized as an authoritative source on public safety. The NFPA develops, publishes, and disseminates more than 300 scientifically-based consensus codes and standards. Of these, over 100 directly impact the fire service, including standards on: minimum training requirements for firefighters (NFPA 1001), firefighter personal protective equipment (NFPA 1971), medical requirements for firefighters (NFPA 1582), fire apparatus (NFPA 1901), ground ladders (NFPA 1931), fire hose (NFPA 1961), nozzles (NFPA 1962), self-contained breathing apparatus (NFPA 1981), and a host of other matters.

NFPA standards are relied upon by fire chiefs and local officials to ensure that their firefighters and the public are properly protected. The NFPA standards-making process brings together experts in various disciplines to produce state of the art consensus standards in accordance with the requirements of American National Standards Institute (ANSI). The NFPA places an emphasis on due process, openness, and lack of dominance by interest groups in order to strike a balance between acceptable risk and the necessary commitment of resources.

Two of the most important standards that the NFPA has developed when it comes to evaluating fire department operations are NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, and 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*. A third standard, NFPA 1720, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments*, provides guidance for organizations that are not primarily career organizations.

NFPA 1500 specifies the minimum requirements for a fire department's occupational safety and health program, and specifies the procedures necessary to ensure the safety of members involved in rescue, fire suppression, and related activities.

The standard provides:

> *8.5.1 The fire department shall provide an adequate number of personnel to safely conduct emergency scene operations.*
>
> *8.5.1.1* Operations shall be limited to those that can be safely performed by the personnel available at the scene.*

In Appendix A.8.5.1.1 the standard states:

> *It is recommended that a minimum acceptable fire company staffing level should be four members responding on or arriving with each engine and each ladder company responding to any type of fire. The minimum acceptable staffing level for companies responding in high-risk areas should be five members responding or arriving with each engine company and six members responding or arriving with each ladder company. These recommendations are based on experience derived from actual fires and in-depth fire simulations and are the result of critical and objective evaluation of fire company effectiveness. These studies indicate significant reductions in performance and safety where crews have fewer members than the above recommendations. Overall, five member crews were found to provide a more coordinated approach for search and rescue and fire-suppression tasks.*

NFPA 1500 incorporates the safety requirements of the Occupational Safety and Health Administration (OSHA) in 29 CFR 1910.134, requiring that before a firefighter is allowed to enter a hazardous area at a structure fire, a crew of four members must be assembled on the scene.

> *8.8.2* In the initial stages of an incident where only one crew is operating in the hazardous area at a working structural fire, a minimum of four individuals shall be required, consisting of two members working as a crew in the hazardous area and two standby members present outside this hazardous area available for assistance or rescue at emergency operations where entry into the danger area is required.*

Under NFPA 1500, 8.8.2 and 29 CFR 1910.134, apparatus that is staffed with less than four personnel cannot initiate immediate entry into a working structure fire absent an imminent life threatening situation involving a savable human life. In other words, at a house or commercial building fire, a three person crew would not be permitted to enter immediately to attack the fire, absent a known trapped, savable person inside. Personnel would have to await the arrival of a second unit on scene.

NFPA 1500 requires that any entry with less than four firefighters on-scene based upon the "savable human life" exception be investigated with a written report issued to the fire chief.

Another important provision in NFPA 1500 is Chapter 4.1.2 that requires a fire department to identify the types of incidents that it expects its personnel to respond to; the functions and evolutions it expects its personnel to engage in; the minimum training required for members to perform each function; and the minimum number of personnel required for each function.

> *4.1.2* The fire department shall prepare and maintain written policies and standard operating procedures that document the organization structure, membership, roles and responsibilities, expected functions, and training requirements, including the following:*
> *(1) The types of standard evolutions that are expected to be performed and the evolutions that must be performed simultaneously or in sequence for different types of situations*
> *(2) The minimum number of members who are required to perform each function or evolution and the manner in which the function is to be performed*
> *(3) The number and types of apparatus and the number of personnel that will be dispatched to different types of incidents*
> *(4) The procedures that will be employed to initiate and manage operations at the scene of an emergency incident*

Chapter 4.1.2 is considered to be one of the most important provisions in NFPA 1500 because it requires a fire department's leadership to explain in writing how it's personnel will be deployed to combat fires given its current staffing configuration. Many understaffed fire departments avoid addressing this requirement because it would expose the reality that they do not have adequate resources to safely and promptly initiate an attack on the fire.

In addition to the safety concerns addressed in NFPA 1500, NFPA 1710 adds additional recommendations for staffing and deployment of a community's fire protection services. The requirements identified in NFPA 1710 are premised upon and supported by science, including:

- Studies on fire development and flashover;
- Studies on emergency medical service delivery and the impact of early intervention on patient survivability;
- Documented fire and emergency service deployment studies conducted by the National Institutes of Standards and Technologies (NIST), Worcester Polytechnic Institute, the International Association of Fire Chiefs, the International Association of Firefighters, Commission on Fire Accreditation International, and a number of major fire departments.

NFPA 1710 Ch. 5.2.3 requires that engine and ladder companies be staffed with a minimum of four on-duty personnel. The standard continues: "In jurisdictions with tactical hazards, high hazard occupancies, high incident frequencies, geographical restrictions, or other pertinent factors as identified by the authority having jurisdiction, these companies shall be staffed with a minimum of five or six on-duty members."

Among the other important requirements contained in NFPA 1710 that are pertinent to this study are:

- Alarm answering time of 15 seconds or less 95% of the time, and 40 seconds or less 99% of the time
- Alarm processing time of 60 seconds or less 90% of the time, and 90 seconds or less 99% of the time
- Turnout time of 60 seconds or less for medical and 80 seconds for fire and special operations incidents
- Delivery of the first engine company on scene within four minutes travel time 90% of the time
- Delivery of the balance of the first alarm on scene within eight minutes travel time 90% of the time

The standard also provides a methodology for determining the number of personnel who are needed on a first alarm, establishing a minimum of fifteen firefighters to combat a fire in what is commonly referred to as the minimum benchmark structure:

> *5.2.4.2.2* The initial full alarm assignment to a structure fire in a typical 2000 ft2 (186 m2), two-story single-family dwelling without basement and with no exposures shall provide for the following:*
> *(1) Establishment of incident command outside of the hazard area for the overall coordination and direction of the initial full alarm assignment with a minimum of one individual dedicated to this task*
> *(2) Establishment of an uninterrupted water supply of a minimum of 400 gpm (1520 L/min) for 30 minutes with supply line(s) maintained by an operator*
> *(3) Establishment of an effective water flow application rate of 300 gpm (1140 L/min) from two handlines, each of which has a minimum flow rate of 100 gpm (380 L/min) with each handline operated by a minimum of two individuals to effectively and safely maintain the line*
> *(4) Provision of one support person for each attack and backup line deployed to provide hydrant hookup and to assist in laying of hose lines, utility control, and forcible entry*
> *(5) Provision of at least one victim search and rescue team with each such team consisting of a minimum of two individuals*
> *(6) Provision of at least one team, consisting of a minimum of two individuals, to raise ground ladders and perform ventilation*
> *(7) If an aerial device is used in operations, one person to function as an aerial operator and maintain primary control of the aerial device at all times*
> *(8) Establishment of an Initial Rapid Intervention Crew (IRIC) consisting of a minimum of two properly equipped and trained individuals*

The standard calls for additional personnel to be dispatched on the initial alarm to occupancies that pose greater hazards than the minimum benchmark structure.

> *5.2.4.2.3* Fire departments that respond to fires in high-, medium-, or low-hazard occupancies that present hazards greater than those found in the low-hazard occupancy described in 5.2.4.2.2 shall deploy additional resources on the initial alarm.*

In addition to the NFPA staffing and deployment requirements, the other nationally recognized staffing and deployment model is established by the Insurance Services Office, or ISO. The ISO recommendations are part of a system used to grade fire protection services for purposes of insurance coverage and rate

determination.[1]

According to the ISO:

> *ISO collects information on municipal fire-protection efforts in communities throughout the United States. In each of those communities, ISO analyzes the relevant data using our Fire Suppression Rating Schedule (FSRS). We then assign a Public Protection Classification from 1 to 10. Class 1 represents exemplary public protection, and Class 10 indicates that the area's fire-suppression program doesn't meet ISO's minimum criteria.*
>
> *By classifying communities' ability to suppress fires, ISO helps the communities evaluate their public fire-protection services. The program provides an objective, countrywide standard that helps fire departments in planning and budgeting for facilities, equipment, and training. And by securing lower fire insurance premiums for communities with better public protection, the PPC program provides incentives and rewards for communities that choose to improve their firefighting services.*[2]

ISO's criteria recommends that a community ensure that a first-due engine company is located within 1.5 road miles of all protected properties and a ladder-service company located within 2.5 road miles.[3]

The ISO grading system gives maximum credit for engine and ladder companies staffed with six firefighters per apparatus.[4] Such staffing allows each unit to be self-sufficient and multi-versatile. A six person engine company would be capable of establishing its own water supply, stretching its own attack and at most single family residential fires providing either its own back up line, rapid intervention crew, or forcible entry team as circumstances may dictate. It also facilitates the routine deployment of larger caliber hoses (2 ½") at commercial structure fires and high rise buildings. A six-person ladder crew would be able to simultaneously provide ventilation, forcible entry, and search and rescue.

Crews that consist of three or four persons each cannot be expected accomplish all of the tasks that a six person crew could. Most three and four person engine companies rely upon a modified task force concept whereby a second arriving engine company provides a water supply to the first arriving engine company. This allows the first engine company to initiate an attack immediately without first securing a water supply. However, it delays deployment of a backup line and requires a second piece of apparatus to accomplish what a fully staffed single engine could.

The ISO benchmark criteria of 1.5 miles for engines and 2.5 miles for ladders, combined with a formula developed by the RAND Corporation that assumes an average responding speed of 35 mph, results in an expected response time of 3.2 minutes for an engine company and 4.9 minutes for a ladder-service

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[1] https://firechief.iso.com/FCWWeb/mitigation/ppc0001.jsp
[2] https://firechief.iso.com/FCWWeb/mitigation/ppc0001.jsp
[3] https://firechief.iso.com/FCWWeb/mitigation/ppc/3000/ppc3014.jsp
[4] The maximum number of points available for career fire departments is with staffing of six per unit. The ISO formula for **CREDIT FOR COMPANY PERSONNEL (CCP)** is as follows: CCP = ((OM + VM/3)/(EE + EL + 0.5(ES) – SC)) x 2 1/2
The maximum CCP can equal is 15; OM stands for On Duty Manpower (assigned); VM stands for Volunteer Manpower; EE stands for Existing Engines; EL stands for Existing Ladders; ES stands for Existing Service Companies; SC is Surplus Companies
If we assume a fire department has four engines and one ladder each with six members assigned, the formula would be: CCP = (30/5) x 2.5 = 15
That is the maximum score possible. Adding additional personnel will not increase the score, but lowering the staffing below 6 will decrease it.

company.[5]

Comparing the 3.2 minute ISO requirement for the first arriving engine to the NFPA 1710 recommended 4 minute travel time, the NFPA standard proves to be a bit more lenient for most communities. It is important to remember that the focus of the ISO recommendations is on property damage from an insurance perspective and not on life safety.

In addition, the ISO does not specifically require additional responding units to be spaced at designated distances, instead relying upon the assumption that if engines and ladders are spaced at intervals to reach the 1.5 and 2.5 miles first-in distances, there will be enough redundant coverage to ensure suitable backup.[6]

According to Robert W. Cobb, director of Community Hazard Mitigation for Risk Decision Services at ISO, maximum credit is given (and ISO recommends) the dispatch of at least 18 firefighters, two engine companies, and a ladder company, to reported structure fires.[7]

When considering the minimum resources to be dispatched, ISO considers the needed fire flow to a given occupancy and applies the following schedule to help determine how many engine companies are needed.

BASIC FIRE FLOW GPM	NUMBER OF NEEDED ENGINE COMPANIES
500 - 1,000	1
1,250 - 2,500	2
3,000 - 3,500	3

LIMITATIONS

This study was conducted for the purpose of evaluating the current level of fire protection provided by the Cumberland Hill Fire District and the town of Cumberland in general. The authors did not fully consider ancillary support matters such as dispatching, emergency medical services, technical rescue, hazardous materials, administration, training, apparatus, building condition, or budgetary matters beyond what was necessary to address the central question of level of fire protection service.

The authors were limited by a lack of consistent reliable data on the geographical area (square mileage) and populations of each of the four fire districts. The information available to the fire districts does not align with information provided by the US Census Bureau. The reason for this appears to be in part due to the fact that the US Census bureau publishes data about similarly named geographical areas, such as Valley Falls and Cumberland Hill. However, those areas are not contemporaneous with boundaries of the fire districts, nor does the Census Bureau track populations according to the fire districts boundaries. Thus the populations stated in this report are based upon good faith estimates provided by the fire districts.

In addition, the departments do not accurately track key information such as alarm answering time, alarm processing time, turnout time, response time (driving time) of the first arriving unit, nor response times of additional arriving units.

[5] https://firechief.iso.com/FCWWeb/mitigation/ppc/3000/ppc3015.jsp
[6] https://firechief.iso.com/FCWWeb/mitigation/securedocs/fsrs/ppc4005.jsp#510
[7] Personal communication, February 12, 2013.

CURRENT FIRE PROTECTION IN THE TOWN OF CUMBERLAND

CUMBERLAND FIRE DISTRICT

The Cumberland Fire District serves a population of approximately 6,500[8] covering an area of approximately 5 square miles. The community consists largely of older mill-type residences, single-family homes, and multi-storied tenements. Existing within the district are various commercial occupancies and locations that are significant in the eyes of the department because they present unique challenges. Among them are a National Grid LNG facility (high pressure transmission line), light industrial occupancies, and the Boys' Club.

Bisecting the district are the Blackstone River and Interstate Route 295, both of which limit the ability of apparatus and personnel to reach destinations on the opposite side.

The department consists of 13 career members: 1 chief, 1 captain, 3 lieutenants, and 8 firefighters. Acting Fire Chief Michael Feather is in overall command of the department. The department operates out of one station located at 1530 Mendon Road, Cumberland.

Despite the fact that the department physically has two engine companies and a brush truck, the normal shift staffing of three firefighters only allows one engine company to be in service at a time. The other apparatus are in reserve available to be deployed in the event of a significant incident by off-duty personnel who must be recalled back to duty at overtime compensation.

The career personnel work a four platoon schedule of twenty-four hours on-duty, twenty-four hours off-duty, twenty-four hours on-duty, and one-hundred and twenty hours off-duty.

Supplementing the career department is a small cadre (three to four) paid on-call firefighters. As explained below in the section of call personnel, the call firefighters are part-time paid employees who respond to augment full-time personnel for significant incidents. They are not dispatched to respond directly to each incident.

The Cumberland Fire District responds to approximately 1,050 calls per year, the majority of which are emergency medical assistance in nature. The department does not track turnout time or response time beyond the information maintained as part of the NFIRS reporting system.[9]

Approximately seventy-five percent of the district is served by fire hydrants. In areas of the district that lack hydrants, the department relies on tanker task forces provided through a mutual aid agreement. The department has not exercised tanker shuttle operations in recent memory.

The budget of the Cumberland Fire District is $1.65M per year with a three tier tax rate as follows: residential $2.28, Commercial $3.58, and Industrial $5.43.

CUMBERLAND HILL FIRE DISTRICT

The Cumberland Hill Fire District is approximately 8 square miles and serves a population of approximately 11,000[10]. The community consists of older mill-type residences, several residential

[8] Cumberland Fire District statistics provided by Acting Chief Michael Feather.
[9] For the past 18 months, all four fire districts have utilized a common NFIRS reporting system.
[10] Cumberland Hill Fire Department Statistics provided by Chief Kenneth Finlay.

developments from the 1940s, 50s, and 60s, a development from the 1990s of residences that incorporated truss construction, and more recently built single-family homes. There are also some multi-family residences in the district. Existing within the district are various occupancies and locations that are significant in the eyes of the department and that present unique challenges. Among them are a quarry that uses explosives and extreme heavy equipment, as well as an industrial park that manufactures, stores, and distributes pharmaceuticals, text books, and medical supplies. Additionally, within the district are four high-rise type housing buildings for the elderly, three of which are six stories. Also within the district is the House of Compassion which houses special needs tenants.

The department consists of 14 members: 1 chief, 1 deputy chief, 1 fire marshal, 1 captain, 2 lieutenants, and 8 firefighters. There is also one administrative civilian on staff. Former Woonsocket Fire Chief Kenneth Finlay is the chief. The department has two engine companies, an air supply unit, two brush trucks, and a boat. However, with only three firefighters on duty, only one engine company is staffed, while the remainder of the apparatus are in reserve.

Firefighters work a four platoon schedule of twenty-four hours on-duty, twenty-four hours off-duty, twenty-four hours on-duty, and one-hundred and twenty hours off-duty. Supplementing the paid department from time to time are two paid on-call firefighters who respond to supplement full-time personnel as explained below.

The Cumberland Hill Fire Department responds to approximately 1,600 calls per year, the majority of which are emergency medical in nature. The department does not track turnout time or response time beyond the information maintained as part of the NFIRS reporting system.

Approximately eighty percent of the district is served by fire hydrants. In areas of the district that are not served by hydrants, the department relies on tanker task forces provided through a mutual aid agreement. Overall, the water supply situation is reported to be good and the system in place is working well.

The budget of the Cumberland Hill Fire Department is $1.9M per year with a tax rate of $1.74.

NORTH CUMBERLAND FIRE DISTRICT

The North Cumberland Fire District serves an area of approximately 10 square miles and a population of approximately 8,100[11]. The community consists of a mix of older single-family residences, some multi-storied tenements, and newer single family homes. This district is probably the least industrialized of the fire districts in Cumberland, but nevertheless contains various occupancies and locations that are significant in the eyes of the department and that present unique challenges. Among them are an industrial park that includes a stone-cutting facility, as well as two nursing homes, including the 98 bed Mount St. Rita Health Center. The district also faces the most significant wildland-urban interface problem of the four districts.

The department consists of 13 members: 1 deputy chief, 1 captain, 3 lieutenants, and 8 firefighters. Presently, Fire Chief Brian Jackvony of the Valley Falls Fire Department is the acting fire chief for the NCFD. The department operates out of a single station with three members on duty at a given time. The on-duty members cross-staff an engine company and a ladder company (quint). Personnel respond with one or the other depending upon the location of the incident and which apparatus is dispatched.

[11] North Cumberland Fire Department Statistics provided by Chief Brian Jackvony.

Personnel work a four platoon schedule working two ten-hour day shifts, followed by two fourteen-hour night shifts, with ninety-six hours off-duty. Assisting the paid department from time to time is a cadre of eight paid on-call firefighters who respond to supplement full-time personnel.

The North Cumberland Fire Department responds to approximately 1,300 calls per year, the majority of which are emergency medical assistance in nature. The department does not track turnout time or response time beyond the information maintained as part of the NFIRS reporting system.

Approximately seventy-five percent of the district is served by fire hydrants. In areas of the district that are not served by hydrants, the department relies on tanker task forces provided through a mutual aid agreement. Chief Jackvony reports that the water supply situation is relatively good and the hydrant system is generally reliable.

The budget of the North Cumberland Fire Department is $1.8M per year with a tax rate of $1.68.

VALLEY FALLS FIRE DISTRICT

The Valley Falls Fire District serves an area that is roughly 3.5 square miles with a population of approximately 10,500[12]. The district consists of a mix of older single-family residences, some multi-storied tenements, and newer single family homes. It is the southernmost district in the town bordering on Central Falls and Pawtucket. Valley Falls is most densely populated of the fire districts in town and faces many of the same fire problems that larger cities face.

Valley Falls was once part of a thriving industrial area that included Central Falls, and Pawtucket. It contains various occupancies and locations that are significant in the eyes of the department and that present unique challenges. Among them are the City of Pawtucket water treatment facility; a railroad freight yard on whose rails are parked hazardous cargo including ethanol and other chemicals; several old mill complexes that have been subdivided into many small light industry facilities; a nursing home; and an eight-story building housing the elderly and disabled.

The department consists of 13 members; 1 chief, 1 captain, 3 lieutenants, and 8 firefighters. Brian Jackvony is the Fire Chief.

The district has three firefighters on duty who cross staff an engine company and a ladder company (quint). The personnel will take either the engine or the ladder depending upon which unit is dispatched. For fires in their own district, the crew will normally take the engine. For fires in another district, the firefighters will take the ladder unless specifically requested otherwise. The station also has a utility truck.

Personnel work two ten-hour day shifts, followed by two fourteen-hour night shifts, with ninety-six hours off-duty. Supplementing the career personnel are six or seven paid on-call firefighters.

The Valley Falls Fire District responds to approximately 1,450 calls per year, the majority of which are emergency medical assistance in nature. The department does not track turnout time or response time beyond the information maintained as part of the NFIRS reporting system.

The district is nearly fully served by fire hydrants. In areas of the district that are not served by hydrants, the department relies on tanker task forces provided through a mutual aid agreement. Overall, the water supply situation is reported to be good and the system in place is reliable.

[12] Valley Falls Fire Department Statistics provided by Chief Brian Jackvony.

The budget of the Valley Falls Fire Department is $1.7M per year with a tax rate of $2.05.

CALL-FIREFIGHTER USAGE

Each of the four fire districts in Cumberland maintains a roster of part-time paid on-call firefighters, also referred to as call firefighters or call-men. The call roster for the Cumberland Fire District has three call men; the Cumberland Hill Fire District has two; the North Cumberland Fire District has eight; and the Valley Falls Fire District has seven. As is common, the numbers of active call firefighters fluctuates from time to time and all chiefs report difficulty recruiting and maintaining personnel.

The call firefighters are trained to various levels. Some possess Firefighter I or Firefighter II certification from the Rhode Island Fire Academy, but not all have such training. Some call firefighters are emergency medical technicians, and some are new to the fire service, just beginning to acquire the necessary knowledge and skills. Not all are capable of entering a burning building to attack a fire, perform search and rescue under heavy fire conditions, nor be relied upon to rescue a downed firefighter. The departments utilize a color-coded ID tag accountability system to identify personnel according to capabilities.

Traditionally, a "call firefighter" is an individual that is summoned to respond to every alarm received by the fire department to which he belongs. In many respects a call firefighter is often thought of serving a role analogous to a volunteer firefighter, but one who is compensated for responding. If the call man is available to respond, he will and will be duly compensated; if he cannot respond, he will not and his lack of response will not be held against him. Fire departments utilizing such a manning system typically maintain large rosters of call men, relying on the hope that enough members will be available to respond to the call to satisfy the needs of the emergency.

Call firefighters in the town of Cumberland are not used in the traditional fashion. In the past, the fire districts used call firefighters to work assigned shifts to supplement career staffing. Over the past few years this practice has been eliminated due to budget constraints. The last district to use call firefighters in this way is Valley Falls. Years ago, Valley Falls paid call firefighters to work as a fourth firefighter seven nights a week. By this year, the budget only allowed the extra manpower three nights a week, Thursday, Friday and Saturday nights. According to Chief Jackvony, the practice will be eliminated this year due to budget constraints.

Besides the regularly scheduled shift assignments, call firefighters are summoned only when additional manpower is needed at an incident to which a first alarm of career firefighters has already responded. Call firefighters may also be requested to respond to the fire station to staff additional apparatus in the event that the career personnel are tied up at an emergency scene for an extended period of time, or to assist mutual aid companies that have been called in to staff Cumberland fire stations.

When additional manpower is needed, call firefighters are summoned via pagers simultaneously with a request for off-duty career firefighters to return to duty. In other words, the only time call firefighters are toned out is when career firefighters are being recalled. As such they serve as an additional supplement to the career department, a force-multiplier of sorts. They do not supplement the first alarm resources, but rather serve to provide for additional manpower for multiple alarm situations.

OVERALL OPERATIONS OF THE DEPARTMENTS

The four fire districts in Cumberland currently function in a loose confederation that operationally has all the hallmarks of being a single department. The districts all operate on a common radio channel with identical policies and procedures. They are dispatched by the town police dispatcher. They utilize comparable equipment, are cross-trained, and integrate seamlessly at emergency scenes.

The normal dispatch for a structure fire in town will vary somewhat depending upon the district. Fires in Valley Falls or North Cumberland will normally get three engines and one ladder dispatched with a total of twelve firefighters. Fires in Cumberland Hill or Cumberland will get two engines and two ladders. Regardless of the apparatus dispatched, the same twelve firefighters will respond. During the weekday the twelve responding firefighters may be supplemented by chiefs and deputies who are available.

The departments operate using a modified task force concept whereby the second arriving engine company provides a water supply to the first arriving engine company. Typically the first arriving ladder truck provides ventilation. Because both ladders are quints, they can also perform as an engine company if and when needed.

Each department trains with the other fire departments, a practice that is intended to ensure compatibility on the fireground. The departments share common standard operating procedures related to the most important fireground functions (e.g., Mayday, Rapid Intervention Team, Manpower Accountability, Structure Fire Operations, etc.).

The fire departments also work in close conjunction with a town Emergency Medical Services department, which staffs two rescues (ambulances) with two EMS personnel each. Because so much of the fire department's activity is EMS related, the rescues work closely with the four fire departments, one being housed at the Valley Falls Station and the other housed adjacent to the Cumberland Fire District Station on Mendon Road.

The majority of rescue personnel are paramedics, and the remainder are EMT-Cardiacs. Some but not all are also trained firefighters. Table 1 shows the equipment that the four fire districts operate.

Table 1

	Cumberland Hill	Valley Falls	Cumberland	North Cumberland
Engines	Engine 41 Engine 42	Engine 1	Engine 22 Engine 23	Engine 5
Aerial Ladders		Truck 1		Truck 5
Air Supply Units	Air Supply 4			
Brush Units	Brush 43 Brush 45		Brush 25	Brush 51
Utility Units		Utility 1		
Marine Units	Boat			
Staff Vehicles	Car 4 Car 44	Car 1	Car 2 Car 20	Car 5

EFFORTS TO CONSOLIDATE - HISTORY

The idea of consolidating the independent fire districts in Cumberland is not a new one. Efforts to do so reach back over forty years.

A Providence Journal/Evening Bulleting article dated April 29, 1991 stated that "Merging the (Cumberland) fire districts was an idea that had been talked about for more than two decades" and reports that a local retired fire chief "compared discussing a merger to kicking a dead horse". In the same article, another local fire official reportedly said "consolidation is an idea that has been around for over two decades. If it's such a great idea, how come it hasn't happened?" An August 7, 1998 article in the same publication reports the commissioning of a Massachusetts consulting group to "study the feasibility of merging the town's four fire districts", an action resulting from "a year-long study conducted by a mayoral-appointed commission".

More recently, the voters of Cumberland approved in 2010 a referenda question that authorized the town council to again explore the feasibility of, and produce a plan for, merging of the four existing fire districts by 2013. As a result of that authorization, the Cumberland Town Council hired the Donald I. Jacobs Consulting Services, of Holden, Massachusetts to conduct the study. A September 20, 2011 Providence Journal article reported that the company "won the contract with a bid of just over $8,700. Mayor Daniel J. McKee said Monday that some of the bids were in the $30,000-plus range and that one came in at about $180,000."

On October 1, 2012, Jacobs Consulting submitted to Mayor Daniel McKee its Fire Services Consolidation Study Final Report. In the letter of transmittal accompanying the report, Jacobs states that consolidation of fire services "will enable the Town to provide these vital services in a cost effective, safe, and efficient manner consistent with the mission and vision of public safety services and the fiscal constraints of the Town of Cumberland."[13] In the Executive Summary, Jacobs writes, "The formation of a unified department will result in lower costs to taxpayers, improved operational efficiencies, improved staff accountability and performance and improved quality of service."[14]

OVERVIEW OF THE JACOBS REPORT

Within the Jacobs report are three sections pertinent to fire department operations; Section 3, Fire Services Findings and Recommendations; Section 7, Fire Service Staffing and Organization Charts; and Section 9, Fire Station Location Analysis.

Jacobs Report Section 3 - Fire Services Findings and Recommendations

The Fire Services Findings and Recommendations section makes fourteen recommendations, each of which is ranked as either 1, Essential; 2, Important; or 3, Useful.

The recommendations listed as "Essential" are;

- Consolidate the four fire districts into one
- Develop SOPs and a Call Force Management Plan
- Require an annual financial audit

[13] D.I. Jacobs Consulting Company, Letter of Transmittal for Fire Services Consolidation Study Final Report, October 2012
[14] D.I. Jacobs, Fire Services Consolidation Study, Executive Summary, Page 2

- Revise the IMC software system

The recommendations listed as "Important" are;

- Establish a 5 Year Capital Management Plan
- Develop a replacement and maintenance schedule for apparatus
- Replace the 75' Tower (when scheduled) with a 105' Quint
- Explore the feasibility of establishing additional sources of water
- Establish a capital plan to expand water supply and location of hydrants
- Establish a single budget process
- Establish an Employee Training Committee
- Develop a Classification and Compensation Plan

The recommendations listed as "Useful" are;

- Establish a recruitment and retention policy
- Incorporate skill-based testing in the promotional process

Jacobs Report Section 7 - Fire Service Staffing and Organization Charts

The Fire Service Staffing and Organization Charts section present several proposals for the organization and staffing of the consolidated fire department. One proposal suggests staffing three stations with fifty-eight sworn personnel (the current staffing level); a second proposal suggests staffing three stations with forty-six personnel; and a third proposal suggests staffing four stations with fifty-eight personnel.

The Jacobs report claims there would be a $561,324 savings associated with the three station forty-six person model, together with a possible $1,267,985 savings for a two station model with thirty-two personnel. The report is silent about how these figures were arrived at, whether they would meet national standards, or the impact to the community in terms of safety if they were adopted.

At other points in the report, the Jacobs report refers to other proposals, namely: the "Current system configuration", an "Optimal 3-station system", an "Optimal-4 station system", and a "4 station system with a central public safety facility". It is unclear which organizational charts and cost savings align with which of the named proposals.

The report does not discuss apparatus staffing levels, but appears to leave staffing levels at three firefighters per shift per station. The proposed three-station model with fifty-eight firefighters calls for one station to be staffed with six firefighters (operating and engine and a ladder), which would leave twelve firefighters per shift on duty town wide. The other three station model calls for the elimination of three positions and the reduction of firefighting protection to three engines and nine firefighters town wide.

Jacobs Report Section 9 - Fire Station Location Analysis

The Fire Station Location Analysis section begins by stating: "THE FIRE DISTRICTS HAVE NOT ADOPTED SERVICE LEVEL STANDARDS FOR FIRE OR EMS SERVICE DELIVERY. THE PROJECT TEAM WILL USE A NATIONAL STANDARD AS A GUIDE TO MEASURE SERVICE

LEVELS."[15] The report explains the importance of selecting the "appropriate service level standards" for the community. Recognizing the unique characteristics of every community it continues: "A combination of standards to ensure the highest degree of emergency services is provided for the residents while being budget conscious to the taxpayer. This approach will allow a custom fit for the Town of Cumberland."[16]

The report notes that the time frames required for effective delivery of fire protection services aligns closely with the time frames required for the effective provision of emergency medical services. It discusses fire behavior, particularly "flashover", and the survivability of cardiac arrest in relation to the passage of time. It begins to establish a nexus between these occurrences and a community's development of response time and performance objectives for its fire/EMS services. Continuing, it states that communities sometimes develop response time and performance objectives using no single reference but adds, "However, there are now three major sources of information to which responders and local policy makers can refer when determining the most appropriate response objectives for their community."[17]

It explains that the Insurance Services Office (ISO)"provides basic information regarding distances between fire stations", but cautions that it does not take into consideration the unique characteristics of a community, such as its demographics, geography, and calls for service.

It refers to the National Fire Protection Association's (NFPA) Standard 1710, Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments. It states that NFPA 1710 was published in 2001 and "generated a great deal of dialogue and debate – which is still ongoing."[18]

It refers to the Center of Public Safety Excellence (CPSE) manual entitled "Objectives of Coverage", a document which "places the responsibility for identifying 'appropriate' response objectives on the locality".[19]

After discussing ISO, NFPA and CPSE, the Jacobs report cites the "uniqueness of the Town of Cumberland" (without identifying what those unique characteristics are) and recommends that the town adopt a level of service standard of:

- One minute (60 seconds) or less from call answer to dispatch of units 90% of the time.
- Two minutes (120 seconds) or less from dispatch notification to units going enroute 90% of the time.
- Eight minutes (480 seconds) or less from en-route time to arrival of the first unit on scene 80% of the time.

The report does not discuss where the "first unit on scene" in 8 minutes parameter is derived from, the reasoning for it, nor whether any other jurisdictions utilize it. More importantly the report omits any discussion of the potential consequences to firefighters or the community should the standard be adopted.

[15] D.I. Jacobs, Fire Services Consolidation Study, Station Location Analysis, Section 9, Page 1
[16] Ibid, Section 9, Page 2
[17] Ibid, Section 9, Page 6
[18] Ibid, Section 9, Page 6.
[19] Ibid, Section 9, Page 6

The remainder of this section discusses the analytical tools and methods used for assessing station locations, GIS modeling methodology, and the team's analyses of current and alternative fire station locations. Specifically, it analyzes coverage using the current 4-station configuration, and Optimal 3-station configuration, an Optimal 4-station configuration, and a 4-station configuration where a central public safety complex is located at approximately 2700 Diamond Hill Road. The data reported for each configuration is based on response times made within 8 minutes. Emphasis is made that the 8-minute travel time standard is "one of the key assumptions in the study".[20]

Throughout Section 9, the station that is designated for closure in the three station models is Station 2, the Cumberland Fire District station, located at 1530 Mendon Road. Section 9 concludes with a recommendation to adopt a three station model, although the recommendation does not specifically identify which station would be closed.

GIS ANALYSIS

As part of our evaluation of fire protection in the town of Cumberland, a comprehensive GIS study was performed by Anthony J. Veltri.[21] The authors posed four separate mapping queries to Mr. Veltri to better understand the current fire protection coverage and how that coverage will be improved or diminished by the Jacobs report recommendations. The queries were to develop maps showing the following:

1. Where in the Town of Cumberland can an engine company be delivered within four minutes travel time?
2. Where in the Town of Cumberland can enough manpower to initiate interior structural firefighting be delivered within four minutes travel time?
3. Where in the Town of Cumberland can enough manpower to initiate interior structural firefighting be delivered within eight minutes travel time?
4. Where in the Town of Cumberland can the first alarm arrive within eight minutes travel time?

Ordinarily a fifth query would be considered relevant: Where in the community can the minimum required fifteen firefighters be delivered within eight minutes travel time? However, because the four districts collectively lack the on-duty manpower to assemble the fifteen firefighters, that question is moot.

The results of the queries are essential to understanding where the level of protection stands today and where it will be if the Jacobs report recommendation to close Station 2 is implemented. The four minute parameter was used in Query 1 and Query 2 because that is the maximum travel time recommended in NFPA 1710 for the arrival of an initial engine company. It is admittedly more generous than the ISO parameter of 1.5 miles or 3.2 minutes, but under the circumstances the authors believe it is a sound, reasonable benchmark to apply.
The eight minute parameter was used in Queries 3 and 4 because according to NFPA 1710, the balance of the first alarm dispatched to any reported structure fire should be capable of arriving on scene in 8 minutes travel time.

[20] D.I. Jacobs, Fire Services Consolidation Study, Station Location Analysis, Section 9, Page 17
[21] The analysis was conducted using ArcView GIS software, a product of ESRI, Inc. along with ArcGIS's Network Analyst. The ArcGIS 10.1 software Network Analyst extension uses the TeleAtlas Dynamap®/Transportation v 10.3™ street database, which offers the most accurate and comprehensive U.S. street and address data available today. Additionally, areas with traffic calming measures were identified and given a time penalty to simulate the acceleration/deceleration necessary for a large vehicle to negotiate the road in the area of the noted obstacle. While the list of traffic calming devices was not comprehensive, it represents those that were visually evident in aerial photos and confirmed by public safety officials from the town noted slowdowns or delays.

The purpose of Query 2 is to allow us to determine where crews can initiate an offensive interior attack within four minutes given current staffing levels. Query 3 will assess the same question for eight minutes. Query 4 evaluates the ability of the departments to deliver a first alarm assignment in 8 minutes.

1. Where in the Town of Cumberland can an engine company be delivered within four minutes travel time?

The results of Query 1 are shown in the following maps, identified as Q1 Map 1 through Q1 Map 6. Q1 Map 1 shows in green highlight the areas of the community that can be reached by an engine company in four minutes with all four stations open. Q1 Map 2 shows the areas of the community that could be reached with an engine company in four minutes in the event that Station 2 is closed.

The current four engines can reach 74.52 percent of the addresses[22] in the town within four minutes. The closure of Station 2 would drop that to 64.74% of the addresses, a 13% reduction in coverage[23]. Additional Q1 maps (see Map appendix) show the four minute coverage areas of the individual stations.

In assessing this information, it is important to remember that the queries assume that all units are in service at their stations at the time of alarm. Response times can be expected to be greater when units are already deployed at an incident, out of service for maintenance, out of service for training, or otherwise unavailable necessitating units from a more distant station to respond.

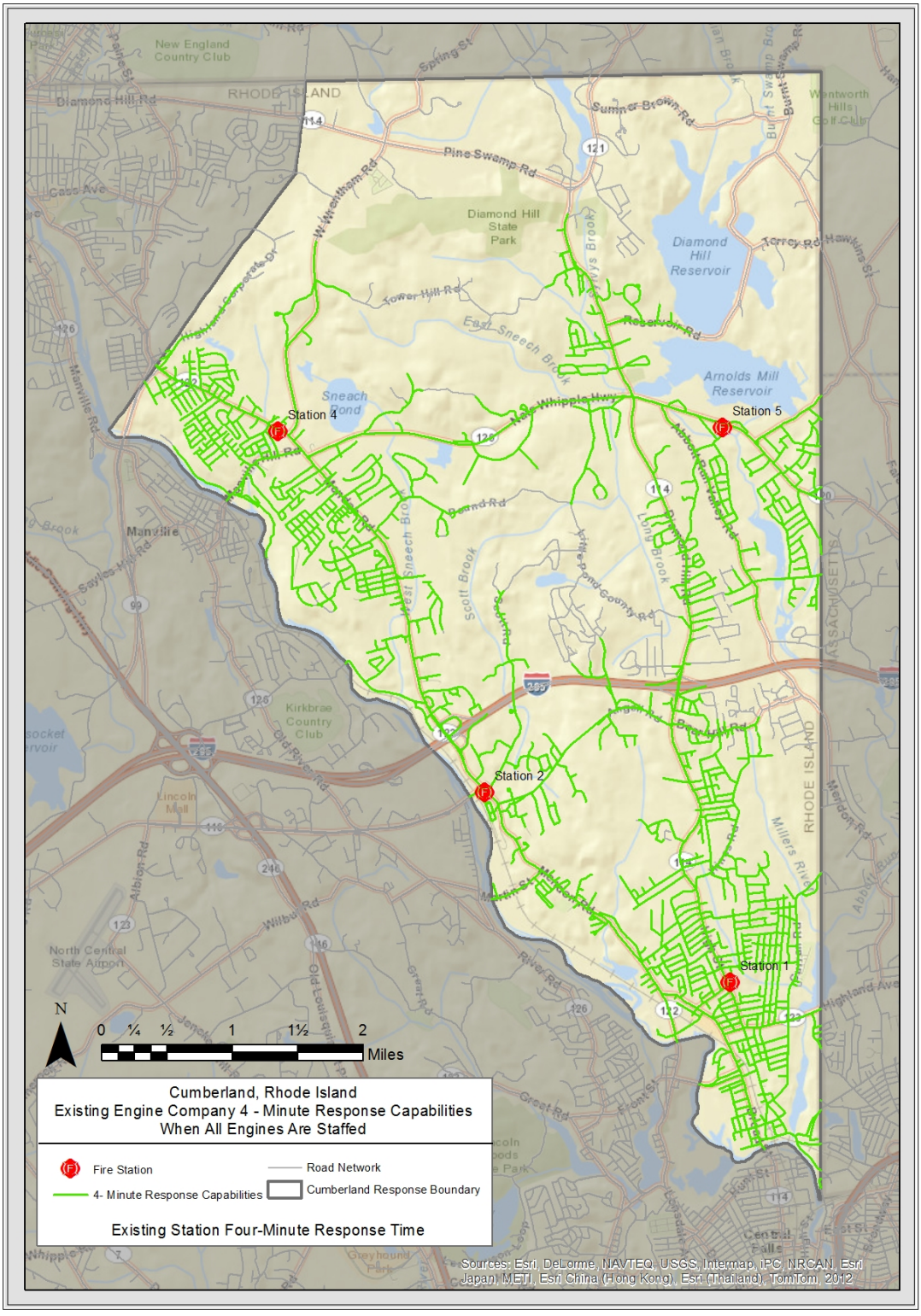
In addition, these are theoretical response times that cannot and do not account for traffic congestion, inclement weather (rain, ice and snow), and traffic hazards. Actual response times can be expected to be longer, meaning that the maps likely present an overly optimistic picture of response times.

Table 2 shows the actual road miles that each station can cover in 4 minutes. The total number of road miles is 212.25.

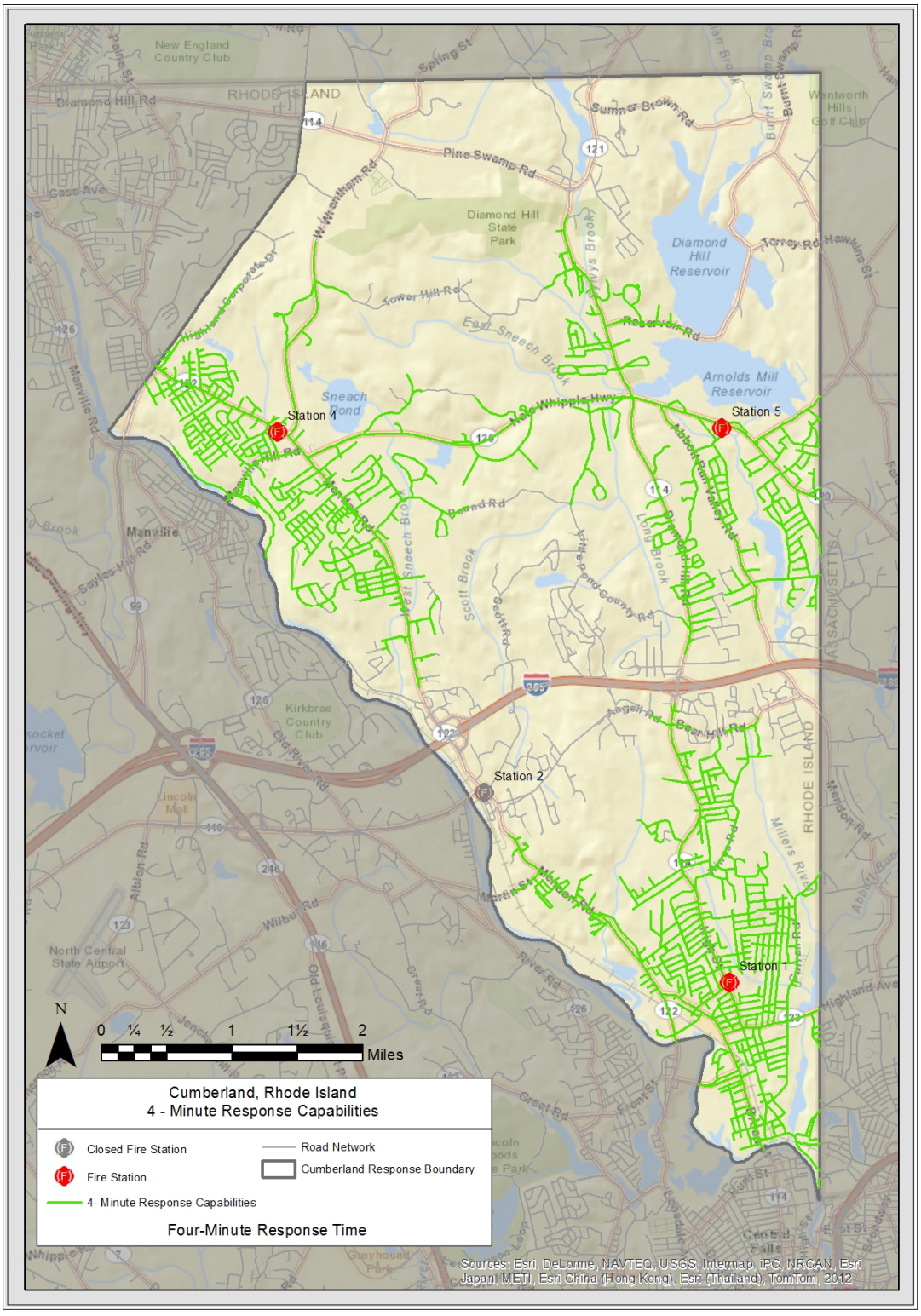
Table 2	
	Miles Reached in 4 Minutes
Station 1	55.08
Station 2	37.82
Station 4	47.11
Station 5	38.46

[22] The 74.52% figure is based on the number of road miles which can be reached in 4 minutes divided by the total number of road miles in the town. Since some areas of the town are more densely populated than others, the percentage of road miles covered may not directly correlate with the number of homes which can be reached.
[23] While this represents only 13% of road miles, the number of homes in the affected area is considerably higher than much of the rest of the town due to population density of this area. It is beyond the scope of this study to weight the roads as to the population density they serve, but anecdotally, a 13% loss of road miles covered in a densely populated area has more impact than the same loss of coverage in a low population density area.

Q 1 Map 1


Station 4
Station 5
Station 2
Station 1
N
0 ¼ ½ 1 1½ 2
Miles
Cumberland, Rhode Island
Existing Engine Company 4 - Minute Response Capabilities
When All Engines Are Staffed
Fire Station
Road Network
4- Minute Response Capabilities
Cumberland Response Boundary
Existing Station Four-Minute Response Time
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

Q 1 Map 2


Station 4
Station 5
Station 2
Station 1
Diamond Hill State Park
Diamond Hill Reservoir
Arnolds Mill Reservoir
Sneach Pond
Mendon Rd
Pine Swamp Rd
Reservoir Rd
Tower Hill Rd
Manville
Kirkbrae Country Club
North Central State Airport
Lincoln Mall
RHODE ISLAND
MASSACHUSETTS
N
0 ¼ ½ 1 1½ 2
Miles
Cumberland, Rhode Island
4 - Minute Response Capabilities
Closed Fire Station
Fire Station
4- Minute Response Capabilities
Road Network
Cumberland Response Boundary
Four-Minute Response Time
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

2. Where in the Town of Cumberland can enough manpower to initiate interior structural firefighting be delivered within four minutes travel time?

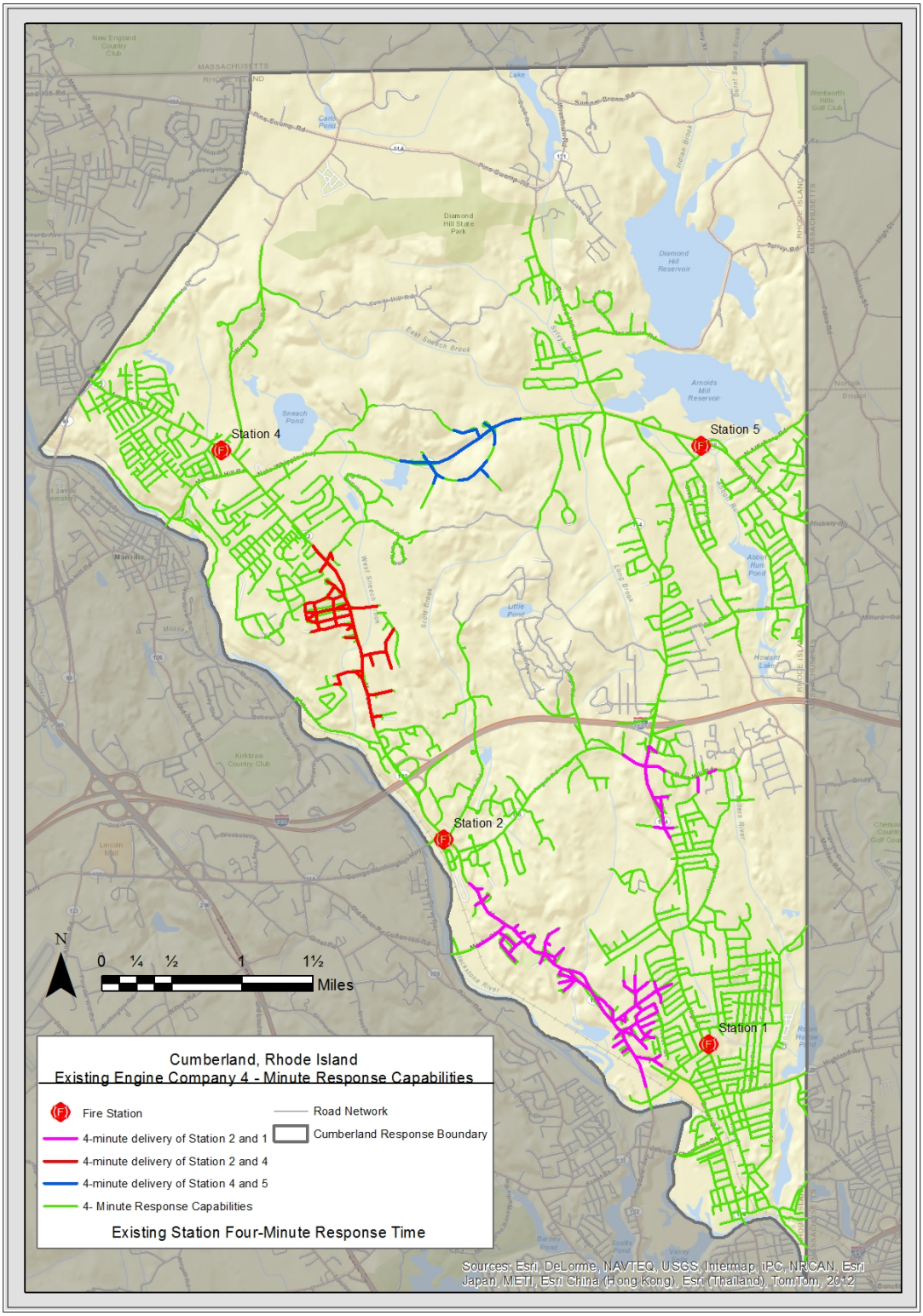
Under both NFPA and OSHA requirements, a minimum of four firefighters are required to be on scene before interior structural firefighting operations can be initiated. Because the four districts in Cumberland staff their apparatus with three firefighters, two pieces of apparatus must be on scene in order to assemble the requisite number of personnel to initiate an interior attack.

Q2 Map 1 depicts those areas of the town currently where the required number of personnel can arrive on scene within four minutes. The areas where an immediate interior attack can be initiated are highlighted in red, blue or purple. These areas correspond with 8.71% of the town's road network and are the only locations where crews can initiate immediate firefighting operations in four minutes.

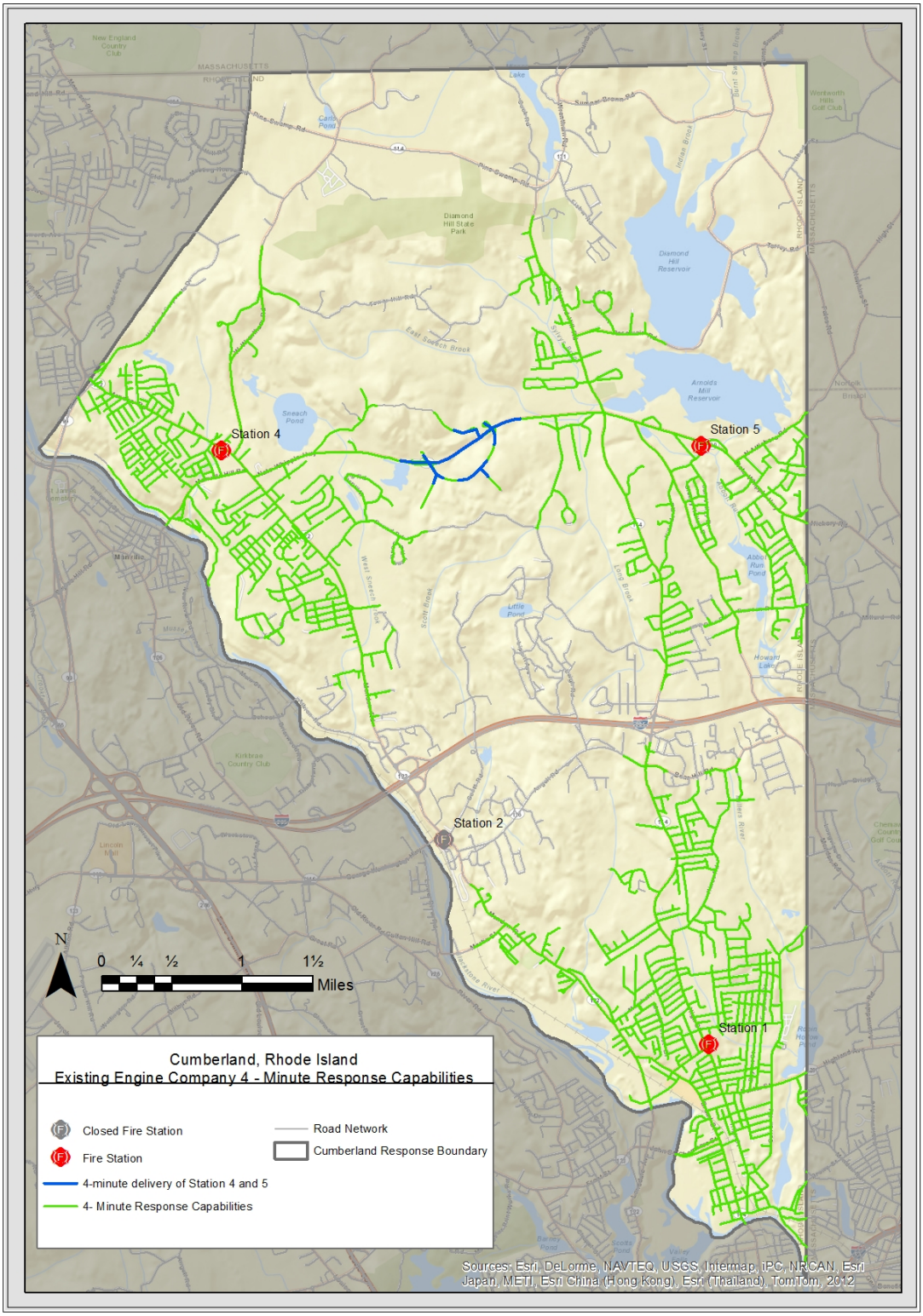
In areas of the town that are depicted in green or not highlighted at all, crews cannot initiate interior structural firefighting operations within four minutes.

Q2 Map 2 shows the impact that closing Station 2 will have upon on the ability to assemble the required number of personnel within four minutes. This represents just 1.07% of the road network in town, a decrease of 87.7%.

Q2 Map 1


Station 4
Station 5
Station 2
Station 1
N
0 ¼ ½ 1 1½
Miles
Cumberland, Rhode Island
Existing Engine Company 4 - Minute Response Capabilities
Fire Station
Road Network
4-minute delivery of Station 2 and 1
Cumberland Response Boundary
4-minute delivery of Station 2 and 4
4-minute delivery of Station 4 and 5
4- Minute Response Capabilities
Existing Station Four-Minute Response Time
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

Q2 Map 2


Station 4
Station 5
Station 2
Station 1
N
0 ¼ ½ 1 1½
Miles
Cumberland, Rhode Island
Existing Engine Company 4 - Minute Response Capabilities
Closed Fire Station
Fire Station
4-minute delivery of Station 4 and 5
4- Minute Response Capabilities
Road Network
Cumberland Response Boundary
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

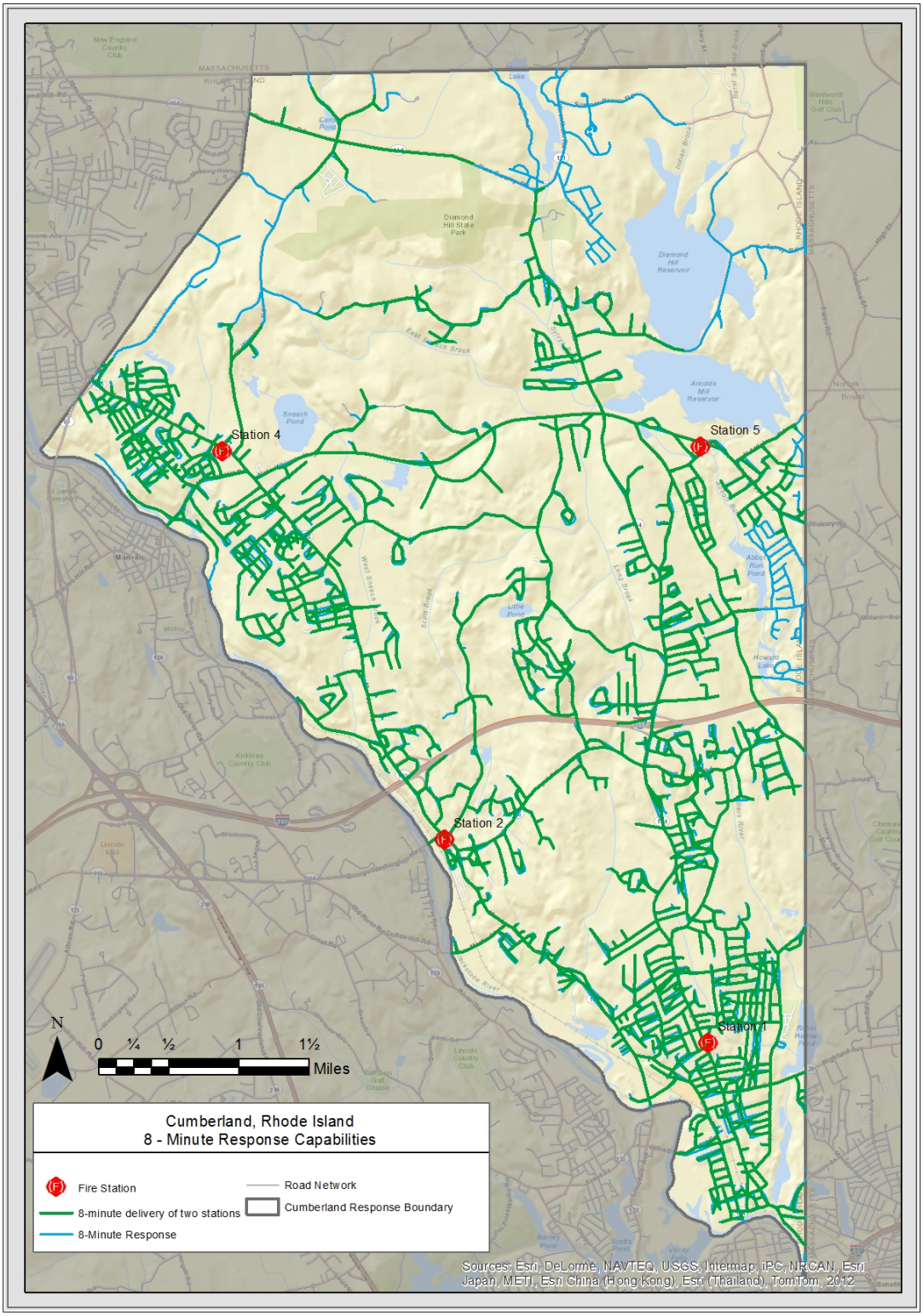
3. Where in the Town of Cumberland can enough manpower to initiate interior structural firefighting be delivered within eight minutes travel time?

Q3 Map 1 shows the areas in the town that can currently be reached by two companies in 8 minutes. This area represents 83.14% of the town and is highlighted in green showing where an interior attack can be initiated in 8 minutes.

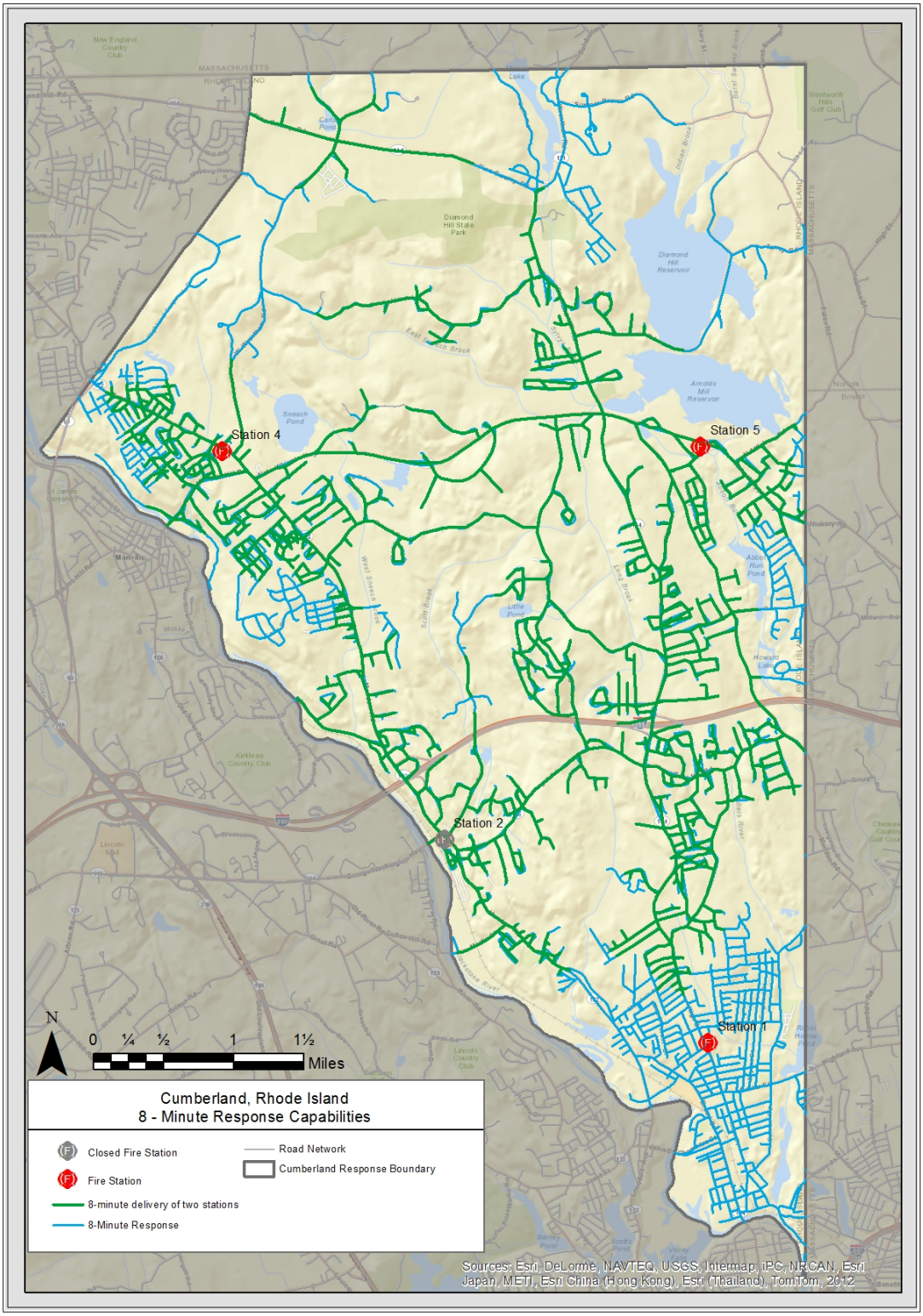
Q3 Map 2 shows the areas that could be reached within 8 minutes if Station 2 is closed. This area represents 58.02% of the town, a decrease of 30.2%.

In both maps, areas depicted in light blue represent areas where a single crew would be on scene within 8 minutes but would be unable to effect an entry due to the lack of manpower. The proportion of the town where a standby would have to occur increases from 16.86% to 41.98% with the closure of Station 2.

Q3 Map 1


Station 4
Station 5
Station 2
Station 1
N
0 ¼ ½ 1 1½
Miles
Cumberland, Rhode Island
8 - Minute Response Capabilities
Fire Station
8-minute delivery of two stations
8-Minute Response
Road Network
Cumberland Response Boundary
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

Q3 Map 2

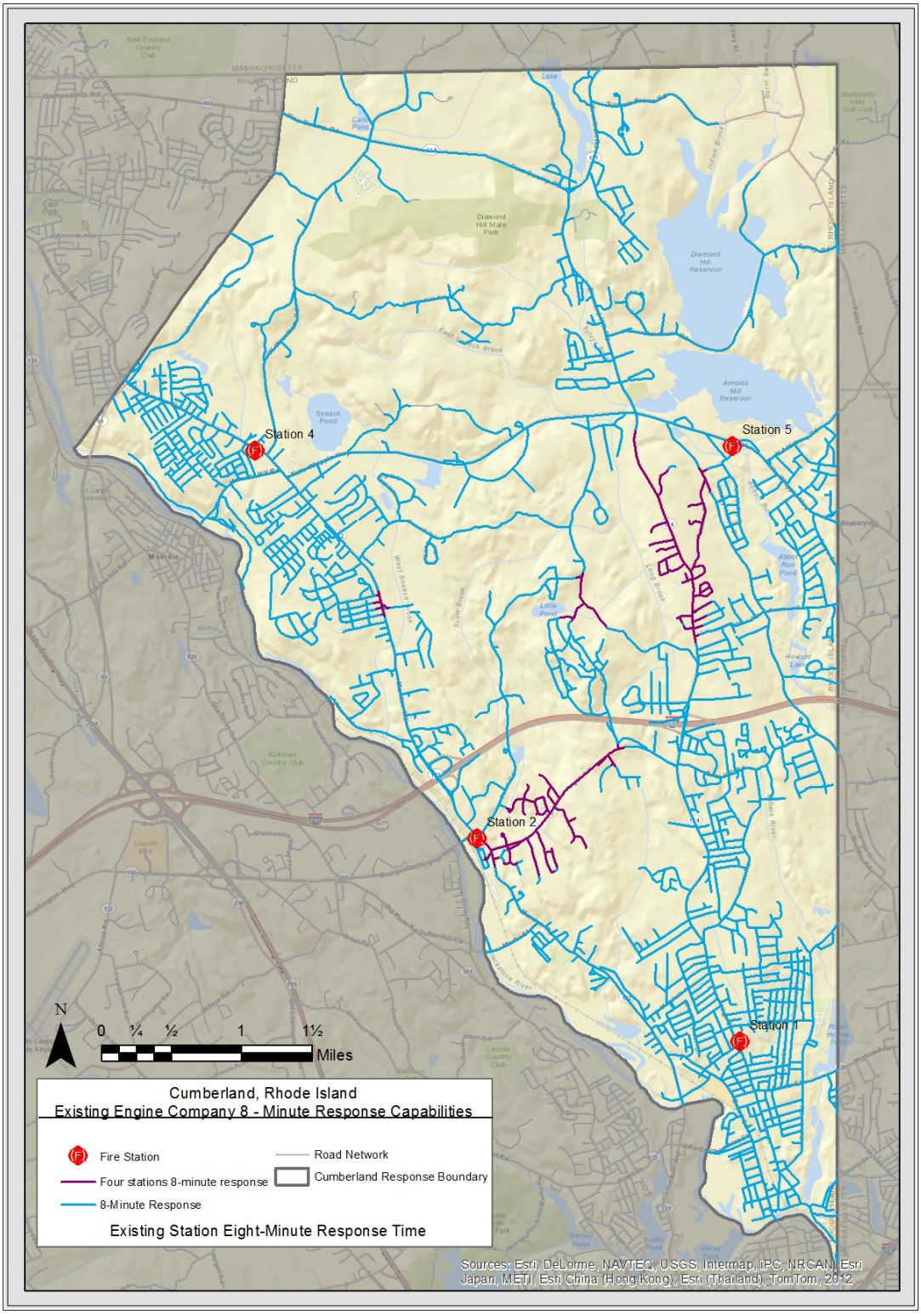

Station 4
Station 5
Station 2
Station 1
N
0 ¼ ½ 1 1½
Miles
Cumberland, Rhode Island
8 - Minute Response Capabilities
Closed Fire Station
Fire Station
8-minute delivery of two stations
8-Minute Response
Road Network
Cumberland Response Boundary
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

4. Where in the community can the entire first alarm arrive within eight minutes travel time?

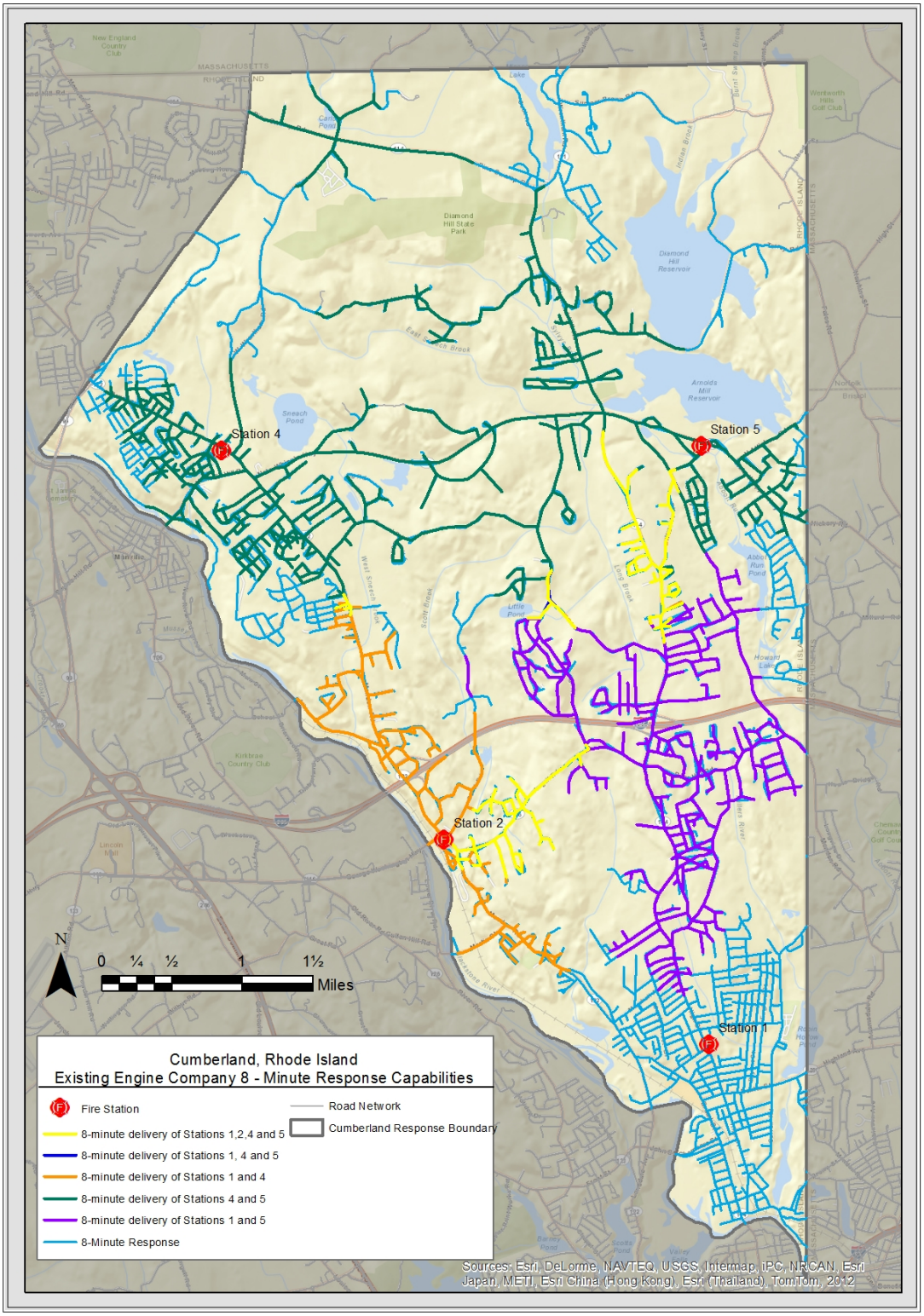
Q4 Map 1 depicts where the four fire districts can currently deliver their full first alarm assignment in 8 minutes. The data shows that at the present time the department can deliver a first alarm assignment to just 6.29% of the town in 8 minutes, as depicted in purple.

Q4 Map 2 shows the identical information but breaks down where certain stations can arrive within the 8 minute time frame.

Q4 Map 1


Station 4
Station 5
Station 2
Station 1
N
0 ¼ ½ 1 1½
Miles
Cumberland, Rhode Island
Existing Engine Company 8 - Minute Response Capabilities
Fire Station
Four stations 8-minute response
8-Minute Response
Road Network
Cumberland Response Boundary
Existing Station Eight-Minute Response Time
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

Q4 Map 2


Station 4
Station 5
Station 2
Station 1
N
0 ¼ ½ 1 1½
Miles
Cumberland, Rhode Island
Existing Engine Company 8 - Minute Response Capabilities
Fire Station
8-minute delivery of Stations 1,2,4 and 5
8-minute delivery of Stations 1, 4 and 5
8-minute delivery of Stations 1 and 4
8-minute delivery of Stations 4 and 5
8-minute delivery of Stations 1 and 5
8-Minute Response
Road Network
Cumberland Response Boundary
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

DISCUSSION

This report was commissioned for the purpose of evaluating the current level of fire protection provided by the Cumberland Hill Fire District and the Town of Cumberland in general, and to evaluate how that level of protection would be improved or diminished in light of the proposals currently being considered by the Town for consolidation of the four fire districts.

To do so, it is first necessary to characterize the level of service that presently exists in the town.

The authors' impression of each of the fire districts is that they are well led, well managed and highly motivated. The career personnel are knowledgeable and dedicated, albeit expressing an understandable level of concern for their futures.[24]

The stations and apparatus appear to be adequate, well maintained, and not suffering from apathy or neglect. The authors saw no signs of extravagant use of taxpayer funds in any aspect of the operations of the four districts, including station living quarters, apparatus, equipment, or training.

A review of the existing fire protection within the Town of Cumberland reveals that none of the four fire departments are in compliance with critical provisions of NFPA 1500, NFPA 1710, or ISO. Table 3 below outlines those issues.

Table 3

Standard	Requirement	Existing in Cumberland
1500	*…a minimum acceptable fire company staffing level should be four members responding on or arriving with each engine and each ladder company responding to any type of fire.*	Standard staffing is three members.
1500	*The minimum acceptable staffing level for companies responding in high-risk areas should be five members responding or arriving with each engine company and six members responding or arriving with each ladder company.*	Standard staffing is three members.

[24] The impact of the current state of events in Cumberland on the morale of its firefighters should not be underestimated. Each department has a number of highly skilled and talented employees who are recognized throughout the state for their expertise: firefighters, company officers, and chiefs whose knowledge and abilities could be lost to the town by way of a "brain drain" due to the stress and uncertainty they are facing. There is a cost associated with losing talented people that goes beyond the mere cost of having to hire and train their replacements. The frustration and stress was palpable to the authors and should not be overlooked by those hoping to improve the situation.

1500	*In the initial stages of an incident where only one crew is operating in the hazardous area at a working structural fire, a minimum of four individuals shall be required, consisting of two members working as a crew in the hazardous area and two standby members present outside this hazardous area available for assistance or rescue at emergency operations where entry into the danger area is required*	This standard cannot be met until the arrival of a second fire truck.
1710	Delivery of the first engine company on scene within four minutes travel time 90% of the time	74.52%
1710	Delivery of the balance of the first alarm on scene within eight minutes travel time 90% of the time	6.29%
1710	Deploying a minimum of fifteen firefighters in 8 minutes to combat what is commonly referred to as the minimum benchmark structure	Standard cannot be met due to staffing level of 12 members per shift.
ISO	6 Person Engines and 6 Person Ladders	3 person engines and 3 person ladders
ISO	Engine in 1.5 miles or 3.2 minutes Ladder in 2.5 miles or 4.9 minutes	4 minute arrival of first engine 74.52% of the time
ISO	Dispatch of at least 18 firefighters, two engine companies, and a ladder company to reported structure fires	Standard cannot be met due to staffing level of 12 members per shift.

It is the conclusion of the authors that the town currently has a bare minimum level of fire protection coverage. The current level of staffing of each apparatus with three firefighters is below national standards and recommendations, placing firefighters and members of the public at risk. With three person crews, firefighters cannot immediately enter a structure fire until the arrival of a second crew. This delay may predictably allow a containable fire to become larger which in turn poses an even greater threat to the safety of firefighters and adjoining properties. The likely result will also be higher fire losses for the property owner.

In addition if upon the arrival of a three person crew it is discovered that citizens are trapped, firefighters must take enormous risks to attempt a rescue while understaffed – something that would be illegal to do under OSHA regulations in the absence of a trapped victim. The grave risks associated with such understaffing is mitigated only by the fact that the town does not have a large number of working structure fires.[25]

The current arrangement of four fire stations, while far from optimal, provides a reasonable level of coverage for the majority of the community, with a few notable outliers being Mt. St. Rita's; properties on and north of Pine Swamp Road; locations on Industrial Drive including the Academy for Little Children and Old Dominion Freight Line; the area around Lippett Estates Conservation Area; and the Diamond Hill Reservoir area. According to the GIS study, the current four station model allows the apparatus to reach 74.52% of the community in 4 minutes.

The greatest area of concern that the authors have with the current level of fire protection is the minimum number of firefighters currently being dispatched to a reported structure fire. With only twelve members on duty, the departments cannot assemble the ISO recommended minimum of 18 firefighters, nor the NFPA 1710 recommended minimum of 15 firefighters.[26]

In addition, NFPA 1710 requires that the 15 firefighters be capable of arriving on scene within 8 minutes 90% of the time. According to the GIS study, the four districts can only meet the 8 minute requirement at 6.29% of the locations in town, and even then only 12 firefighters can be assembled. This inability to assemble a proper first alarm assignment poses a risk to firefighters and citizens alike.

As part of the authors' duties, we were asked to review the Jacobs report to determine if its conclusions and recommendations were advisable. It is not the authors' purpose to discredit or disparage the Jacobs report. In fact there are a number of points in the Jacobs report that the authors agree with. However, to the extent that the Jacobs report reaches conclusions that the authors believe place the public and firefighter safety at risk, it is important that the record be set straight.

The Jacobs Standard

The most troubling aspect of the Jacobs report is the recommendation that the Town of Cumberland adopt a standard of fire protection coverage that entails delivering a three person engine crew in 8 minutes travel time 80% of the time (hereinafter referred to as the ***Jacobs standard***).

In reaching its conclusion, the Jacobs report acknowledges NFPA 1710[27] and ISO as authoritative sources for helping a community determine fire protection coverage, but without explanation dismisses them in

[25] In the authors' opinion, a higher fire load would likely expose the risks that are currently being taken in Cumberland relatively quickly. The low incidence level is masking the risks associated with understaffing and long response times to an extent that the public and local elected officials are largely unaware. As will be discussed in the recommendations, the authors feel strongly that the new fire district and/or the town need to consider a strategic approach to address these deficiencies over the next five to ten years.

[26] NFPA 1710 requires a fire department to provide a minimum of 15 firefighters for a fire in a minimum benchmark structure. Chiefs Varone and Giannini toured the town of Cumberland and based on personal observation concluded that the overwhelming number of structures in the town present hazards greater than those found in the minimum benchmark structure.

[27] The Jacobs report states that NFPA 1710 was "published 2001 and generated a great deal of dialogue and debate – which is still on-going". The reference to 2001 is accurate, but it subtly implies that it is not current. NFPA 1710 has been updated twice, once in 2004 and most recently in 2009 with an effective date of June 15, 2009, twenty-six months before Jacobs Consulting was awarded the bid to conduct the study. As for "dialogue and debate" like many

favor of the Center for Public Safety Excellence (CPSE) concept of "Standards of Cover". The CPSE's manual, *Standards of Cover 5th Edition*, outlines a process that a community can follow to determine its own standard of cover.[28]

The Jacobs report fails to delineate the process or methodology used to reach its conclusion on the recommended standard of cover. In the absence of this information, the authors are dumbfounded by what appears to be an illogical proposition that ignores national standards, OSHA regulations, and uncontroverted scientific data about fire and EMS coverage.

Given that the key recommendations of the Jacobs report (closing Station 2, reducing staffing to nine firefighters per shift, and saving taxpayers an estimated $561,324) are directly premised upon that proposed standard of cover, the authors are compelled to analyze the Jacobs standard in detail.

First, there is no national standard or recommendation that provides for a standard of cover of eight minutes travel time for one engine 80% of the time. Such a standard goes against volumes of EMS science on the need for prompt CPR and early defibrillation for heart attack patients.[29] It also goes against the science of flashover and fire behavior.

It is important to remember that travel time is but one component of overall response time.[30] Travel time must be combined with the time it takes for: (1) a dispatcher to answer a call; (2) the dispatcher to identify and begin alerting the appropriate companies; and (3) the crews to get to the apparatus, don appropriate personal protective equipment, and begin responding (often referred to as turnout time). In addition, there is the time after the responders arrive at the street address to which they are dispatched until they reach the patient or the location of the fire or emergency, which NFPA 1710 refers to as *intervention time*.

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new NFPA standards, the first edition of NFPA 1710 was met with opposition from those whose interests were threatened by the changes. The second and third editions of the standard (2004 and 2009) have been adopted without the least bit controversy and what's more, the requirements in the standard have recently been vindicated by scientific research studies conducted by NIST. More to the point, the research and evidence in support of NFPA 1710 is uncontroverted and uncontradicted. There is no research to date which supports staffing apparatus with less than four firefighters as efficient, safe, or responsible. There is no research which supports response times beyond four minutes for the first arriving engine company and eight minutes for the balance of the first alarm.

[28] The authors are skeptical of the CPSE approach, likening it to allowing drivers to establish their own "speed limit" on roads rather than basing speed limits on the research of traffic engineers and highway safety experts using proven and peer reviewed scientific principles. Nevertheless, if a community diligently and honestly applies the criteria outlined in the *Standards of Cover 5th Edition,* a reasonable level of protection should result. It does not appear that such a methodology was applied in this case. Rather the Jacobs report reaches its conclusion to adopt a standard of cover of one 3 person engine in 8 minutes 80% of the time without explanation or justification, and without consideration of the need for additional standards of cover to address the time required to assemble a crew of at least four firefighters on scene, and the time it takes to assemble the full first alarm assignment on scene.

[29] Sado DM, Moon J, Woldman S., The importance of prompt CPR in cardiac arrest, *BMJ*. 2012 Jun 25; 344:e4204. doi:10.1136/bmj.e4204; Berdowski J, Berg RA, Tijssen JG, *et al*. Global incidences of out-of-hospital cardiac arrest and survival rates: systematic review of 67 prospective studies. *Resuscitation* 2010;81:1479–87; Lund-Kordahl I, Olasveengen TM, Lorem T, *et al*. Improving outcome after out-ofhospital cardiac arrest by strengthening weak links of the local chain of survival; quality of advanced life support and post-resuscitation care. *Resuscitation* 2010; 81:422–6; M.P. Larsen, M.S. Eisenberg, et al., Predicting survival from out-of-hospital cardiac arrest: a graphic model, *Annals of Emergency Medicine* 22, no. 11 (November 1993): 1652 – 8.

[30] The Jacobs report includes two additional standards of cover, one to address dispatching (60 seconds or less from call answer to dispatch of units 90% of the time) and the other to address turnout time (two minutes (120 seconds) or less from dispatch notification to units going enroute 90% of the time). Neither of these align perfectly with national standards but for the sake of this analysis have not been examined closely.

A standard of cover of eight minutes travel time for one engine company in all actuality means an overall response time of between 10 to 12 minutes to an emergency at a single family residence. For other types of occupancies such as apartment buildings, high rise buildings, large commercial occupancies and schools, the intervention time to access the location of the incident will likely extend overall response time well beyond 10 to 12 minutes.

At 10 to 12 minutes a person suffering a heart attack will statistically have little to no chance of being saved, and a relatively small room and contents fire will likely have reached flashover. That is why the NFPA recommends a maximum travel time of four minutes and the ISO recommends a maximum of 3.2 minutes (1.5 miles) for a first arriving engine.

Second, NFPA 1710 recommends a 90% fractal for use as a measure, not 80% as proposed in the Jacobs standard. Use of the 80% figure in the Jacobs standard is neither explained nor justified.

Third, even more concerning is the fact that the Jacobs standard calls for a three person crew to be delivered in Cumberland, as opposed to a four person crew under NFPA standards and a 6 person crew under ISO.

A three person crew is not allowed to enter a working structure fire except under extraordinary circumstances, namely: to rescue a savable person who is known to be trapped. In this regard, the Jacobs standard ignores a very important metric: when can an interior attack on a structure fire be made. The authors address this issue in Queries 2 and 3 and will discuss it more fully below.

Ignoring this metric paints an overly optimistic picture of fire protection coverage in Cumberland by associating the arrival of a fire truck on scene with the ability to immediately enter and extinguish a fire. Such an association is appropriate when apparatus is properly staffed, because four person crews can immediately make entry to initiate a fire attack.

That is not the case in Cumberland. In Cumberland, a three person engine crew must remain outside the structure until a second crew arrives. As such, a second metric is required: how long will it take for sufficient personnel to arrive on scene such that interior firefighting operations can be initiated. The Jacobs standard fails to consider this second metric.

Lastly, the Jacobs standard ignores one of the most important safety parameters in NFPA 1710: when will the balance of the first alarm arrive on scene such that a coordinated attack on the fire can be implemented. The arrival of first alarm companies – all first alarm companies - is an absolutely critical metric for firefighter safety, safety of the public, and efficient firefighting operations.

NFPA 1710 requires the balance of the first alarm to be on the scene in 8 minutes travel time. The ISO assumes that if engines and ladders are spaced at 1.5 and 2.5 mile intervals respectively, that the arrival of the 2 engines and one ladder dispatched on the first alarm will be within 6.4 minutes (3.2 minutes or less for first engine, 4.9 minutes or less for the first ladder, and 6.4 minutes or less for the second engine).

The Jacobs standard ignores totally any measure of the time it takes to deliver a first alarm assignment. On this point, the authors remain dumbfounded.

In summary, the authors believe the Jacobs standard is dangerously flawed and poses an unreasonable risk to the safety of firefighters and citizens alike. It should not be adopted by the Town of Cumberland, the four fire districts, or by any newly created fire district.

Jacobs Report's Recommendation to Close Station 2 and Reduce Manpower

As indicated above, the authors have grave concerns about the adoption of the Jacobs standard for the Town of Cumberland. In addition, the authors are similarly concerned with the recommendations that flow from the Jacobs standard, namely that Station 2 can be closed and that the town can safely be protected with a total of nine firefighters on duty.

Our GIS data shows that an interior attack can currently be initiated at only 8.27% of the street addresses in town in four minutes travel time, and 83.14% in 8 minutes. Both of these metrics place Cumberland well outside of national recommendations ***before*** any proposed changes.

If the Jacobs recommendation of closing of Station 2 and eliminating three positions is implemented, these percentages would drop to 1.07% for four minutes, and 58.02% for 8 minutes. These represent an 87.7% and 30.2% decrease respectively and would exacerbate an already marginal fire protection situation.

One of the most startling impacts of closing Station 2 will be on fire protection in Valley Falls, the most densely populated and urban area of the town. A simple comparison of Q3 Map 1 to Q3 Map 2 shows the problem graphically. With Station 2 open (Q3 Map 1), an interior fire attack can be initiated in less than 8 minutes in all of Valley Falls.

If Station 2 is closed, virtually all of Valley Falls is left without a second arriving crew for an extended period of time. On virtually every fire in Valley Falls, firefighters responding from Station 1 would be unable to initiate an interior fire attack until crews from Cumberland Hill or North Cumberland arrive on scene. If the Jacobs recommendation is adopted, a house fire in Valley Falls will literally burn for 8 to 10 minutes with three firefighters on the scene who are unable to enter to attack the fire.

No where in the Jacobs report is this fact discussed as even a possibility. It is the authors considered opinion that it is not just a possibility, nor even a probability, it is an inevitable result of closing Station 2. It will happen, it is just a question of when and how frequently.

Valley Falls in many ways resembles an urban area like Central Falls or Pawtucket. See Table 4. There are numerous two and three family homes, some closely packed into neighborhoods with little separation posing a risk of conflagration not seen in other areas of Cumberland, but common to many larger northeast cities. Mill buildings and commercial occupancies are interspersed with wood frame residential occupancies making the fire potential in Valley Falls great. It is an area where a delay in fire attack can least be tolerated.

Table 4

	Population	Square Miles	Density	NFPA Class
Cumberland Hill	11,000	8	1375/sq. mile	Urban
Cumberland	6,500	5	1300/sq. mile	Urban
North Cumberland	8,100	10	810/sq. mile	Suburban
Valley Falls	10,500	3.5	3,000/sq. mile	Urban
TOWNWIDE	**33,506**[31]	**28.3**	**1184/sq. mile**	**Urban**

[31] US Census Bureau, 2010. Estimates from other sources range from 34,000 to 36,000.

The closing of Station 2 will also place a greater burden on the other three stations creating what we refer to as a *negative synergistic effect*. By way of explanation, if Station 2 closes, all three stations will have to cover the runs that Station 2 currently handles. That means that each of the three remaining stations will be out of service (unavailable to respond) more often than is the case currently. This fact, coupled with longer response times due to the closed station creates the negative synergistic effect.

One consequence of the negative synergistic effect will be on Valley Falls, where Station 1 will undoubtedly be out of service more often than is the case currently because they will have to cover part of Station 2's district. This in turn will require apparatus from Cumberland Hill or North Cumberland to respond in first due to Valley Falls. The result is there will be considerably longer response times for the first in companies at a fire in Valley Falls than would have been the case if Station 2 were open. Fires will burn longer without intervention.

It also means that when Station 1 is first in at a structure fire in Valley Falls, it is more likely that either Cumberland Hill or North Cumberland, or both will be tied up on other runs, resulting in even longer delays than shown on the Q3 Map 2 as out-of-town mutual aid resources must be called in on the first alarm.

The authors' other major concern with the closing of Station 2 is the proposed elimination of three firefighters from an already understaffed community. With twelve firefighters currently, Cumberland meets neither ISO's recommended 18 firefighters or NFPA's recommended 15 firefighters. [32]

There are no safe operating procedures that would permit nine firefighters to safely combat a working structure fire, absent remaining outside. There are a number of activities that need to occur simultaneously at a structure fire: size-up, stretching of attack hoselines, securing a reliable water supply, forcible entry, ventilation, search and rescue, securing the utilities. These activities cannot be done sequentially, and to the extent understaffing requires them to be done sequentially, firefighter safety is at risk, the public is at risk, and peoples' homes and property will be unnecessarily damaged and destroyed.

It is the opinion of the authors that reducing the firefighting force down to nine firefighters would be irresponsible.

RECOMMENDATIONS

1. CONSOLIDATION: The authors concur with the conclusion and recommendation of the Jacobs report that consolidation of the four fire districts into one district will likely improve fire protection coverage to the town in the long term. The authors recognize that the current arrangement of the four fire districts is not optimal. Having said that, the authors believe leaving things the way they are currently (four fire districts with four fire stations staffed with three firefighters each) is far and away preferable to the three-

[32] Even applying NFPA 1720, the deployment standard applicable to volunteer fire departments, based on a town-wide population density of over 1,000 persons/sq. mile, Cumberland should be able to provide 15 firefighters on scene in 9 minutes – with the 9 minutes including turnout time. As stated above, NFPA 1710 (career) allows 60-80 seconds for turnout time and 8 minutes travel time for the arrival of first alarm personnel, equaling the 9 minutes allowed under NFPA 1720. The point here is the town cannot not meet the NFPA deployment standard for a volunteer fire department.

station nine-firefighters on-duty model proposed by the Jacobs report. The authors strongly advise against closing Station 2 and eliminating any firefighting positions.

2. FOUR STATIONS 12 FIREFIGHTERS MINIMUM: The authors recommend adoption of a consolidation model that would provide for one fire district operating out of the four existing stations with a minimum of 12 firefighters per shift. The organizational structure of the Four Station – Fifty Eight Sworn Personnel model proposed in the Jacobs report sounds plausible in terms of total manpower.

3. ON DUTY SHIFT COMMANDER: Once the four districts are merged into a single entity, each of the four shifts should have a chief officer appointed to serve as the shift commander. This will increase the total number of personnel on a shift to thirteen, but through economies of scale such an increase should be possible without increasing the total number of uniformed personnel beyond the Four Station - Fifty-Eight Sworn Personnel model proposed in the Jacobs report. The shift commander's position will provide needed administrative oversight to better manage each shift, and more importantly be an important step toward better and safer fire ground operations by providing a command level officer on-duty at all times.

4. CONSOLIDATE CUMBERLAND RESCUE INTO THE NEW FIRE DISTRICT: At the present time, the town of Cumberland employs four EMS personnel on each shift to staff two rescue squads. The rescues work in close conjunction with the four fire districts at emergency scenes, but their personnel are paramedics and/or EMT-Cardiacs, not firefighters. They do not engage in firefighting activities at emergency scenes.

Many fire departments across the country, and more particularly many fire departments within the state of Rhode Island, provide EMS transport as an integral part of the services they provide. Both the International Association of Fire Chiefs (IAFC) and the International Association of Firefighters (IAFF) support fire-based EMS. In fact, all four fire districts in Cumberland already provide EMS, they just do not provide EMS transport.

By merging Cumberland Rescue into the new fire district, and cross-training Cumberland Rescue personnel to function as firefighters, the new fire district would gain the services of four additional on-duty firefighters at no additional cost.[33] This would allow the consolidated department to better meet national staffing requirements by increasing shift staffing to 16 (17 if the shift commander position is included). Additional economies of scale would be recognized through incorporating the administrative overhead costs of Cumberland Rescue into the new fire district.

5. STAFFING AND DEPLOYMENT: The authors recommend that the new fire district engage in a strategic planning process with a goal of meeting the requirements of both ISO and NFPA 1710 over the next five to ten years. The results of such a goal will be improved safety for personnel, better delivery of emergency services for the public, and lower insurance premiums for property owners. In that vein, the leadership of the new district should utilize GIS data to identify the optimal locations for future fire stations. At present, only 74.52% of the community can be reached within the time frames recommended by national standards. The strategic use of GIS should help the community determine whether a fifth station is required or whether response time improvements can be achieved through better placement of the four stations.

6. REGIONALIZATION: The efforts to consolidate firefighting and EMS should not stop with the proposed merger of the four districts and Cumberland Rescue. Other jurisdictions bordering Cumberland

[33] There would be a cost in terms of providing the current Cumberland Rescue personnel with firefighter training, but once trained their salaries would become part of the overall budgetary costs of the fire district. The cost to the taxpayer each year would be no more, whether they were strictly EMS, or cross-trained firefighter-EMS personnel.

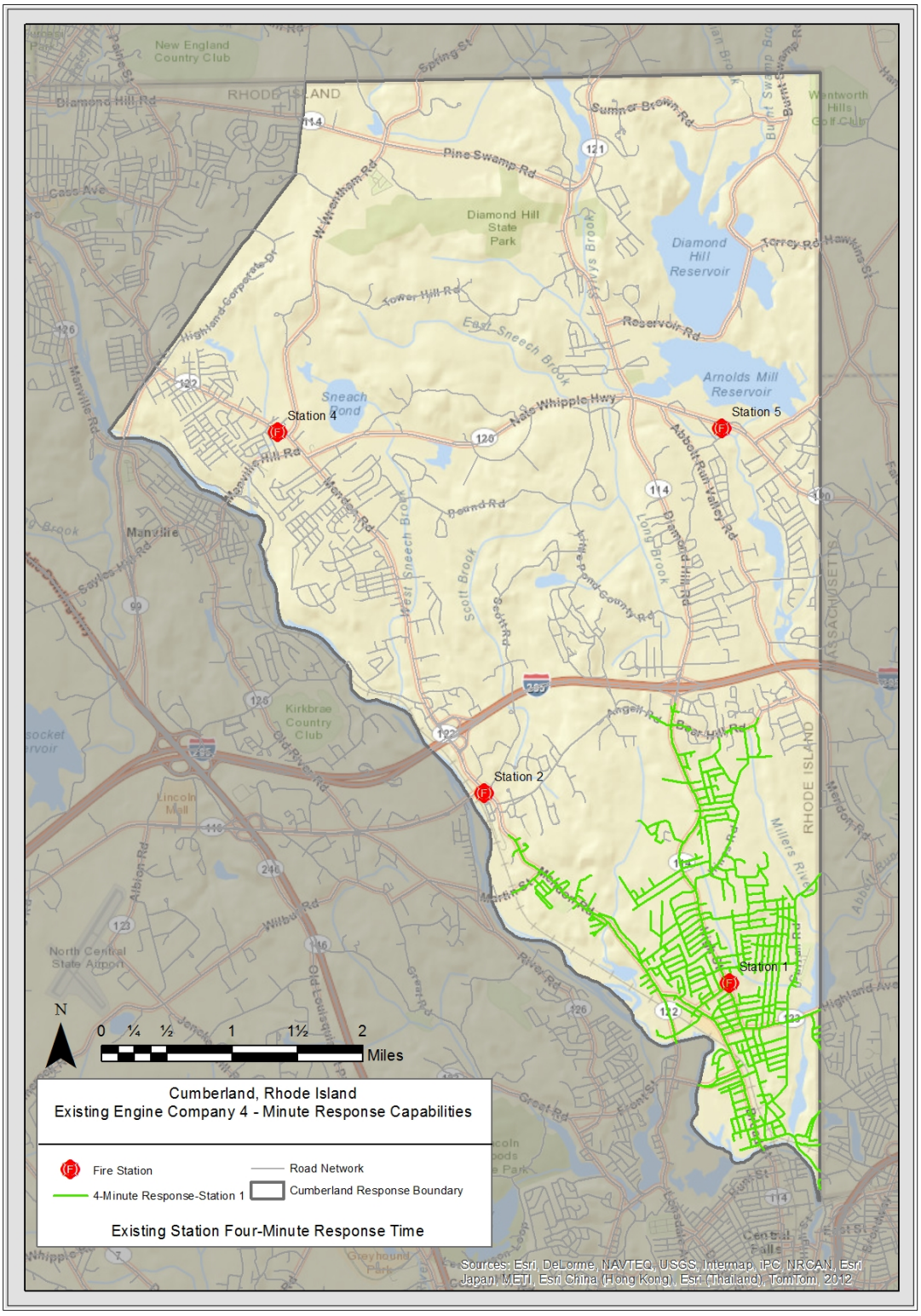
could also benefit through the regionalization of common services, including dispatching, training, purchasing, and fleet maintenance to name but a few. Consideration should also be given toward a broader regionalization of fire protection beyond the borders of the town once the immediate town-wide consolidation is complete. It is recommended that this regionalized fire department concept be explored before any decision is made regarding the building of new fire stations.

7. TANKER: The authors recommend that the new fire district acquire one water tanker-tender to provide coverage to areas of the town that lack hydrants. Approximately 20-25% of the town lacks hydrants. At a fire in an non-hydranted area, Cumberland is totally reliant upon other communities to provide tankers. This practice may have been economical and entirely understandable from the perspective that none of the four fire districts felt a responsibility to provide a tanker. However, going forward it would be unwise for the combined department to continue a total reliance on mutual aid tankers. First there is the issue of response times for mutual aid tankers to get to the scene of the fire. Second, in the event of a major incident or weather event where other communities' resources are committed to dealing with their own emergencies, the town would be without a way of delivering large quantities of water to the non-hydranted areas. A cross-staffed tanker would provide a reasonable measure of protection to the community.

Map Appendix

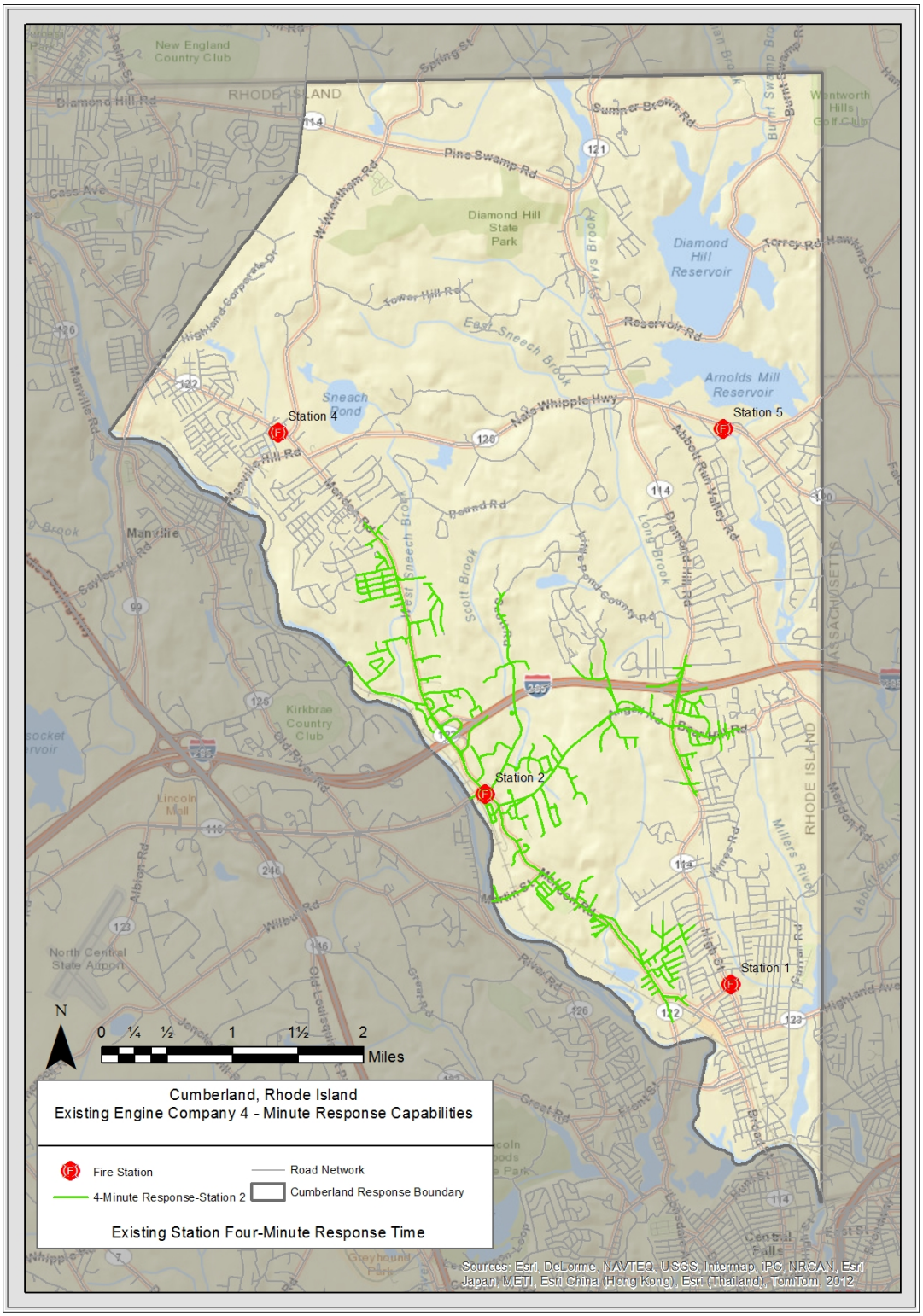
Station 1 – Valley Falls Fire District – 4 Minute Response Zone

Q 1 Map 3



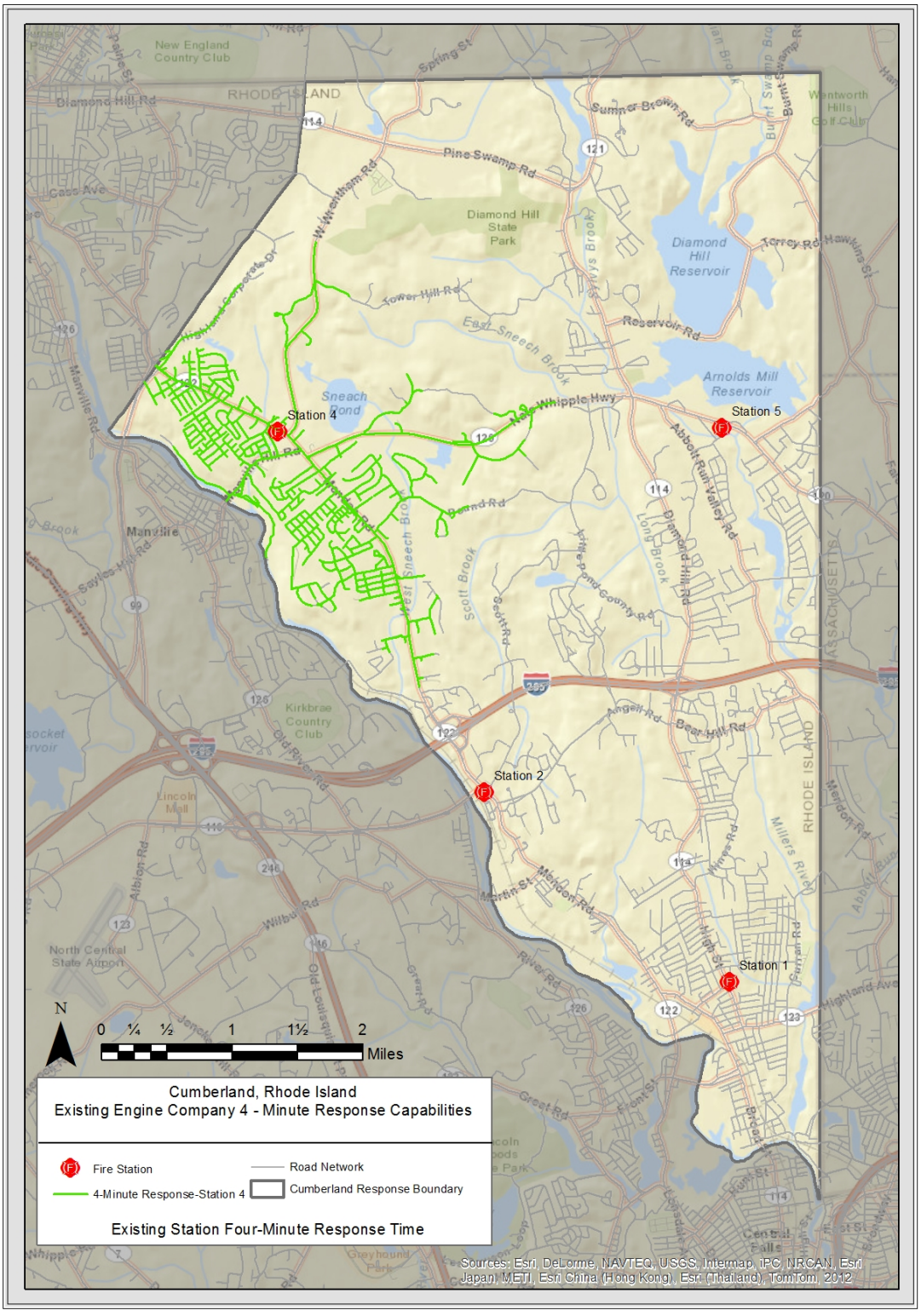
Station 2 – Cumberland Fire District – 4 Minute Response Zone

Q 1 Map 4



Station 4 – Cumberland Hill Fire District – 4 Minute Response Zone

Q 1 Map 5



Station 5 – North Cumberland Fire District – 4 Minute Response Zone

Q 1 Map 6