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# Fire Protection of Historic Streetscapes

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# Fire Protection of Historic Streetscapes

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## Project Report

Sponsoring Agency: National Association of State Fire Marshals

Submitted to:

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Date: December 17, 2009

## **Abstract**

This project was sponsored by the National Association of State Fire Marshals to address the issue of fire protection of historic streetscapes. We performed case studies of historic districts with histories of streetscape fires and their response. We also examined towns with successful fire protection programs to determine the most effective methods in protecting historic streetscapes from fire. We recommended educating building owners of risks and protection possibilities, and also stressed the importance of fire inspections and property maintenance.

## Authorship Page

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Chapter II: Background.....	Jared, Evan, Ben
Chapter III: Methodology.....	Jared
Chapter V: Results & Discussion.....	Jared, Evan, Ben
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## Executive Summary

Across the United States, historic streetscapes are a crucial part of many towns' economies. According to a 2003 research study by the Travel Industry Association and *Smithsonian Magazine* (Patkose, 2003), 81% of all adult tourists, amounting to 118 million people, were cultural heritage travelers. Tourists are attracted to historic "main streets" because of the economic diversity and culture of the historic neighborhood. However, because of the age of most of these buildings, many structures in historic downtown areas do not meet current fire or building code standards. These buildings are especially vulnerable to fires, creating risks for occupants, visitors, and firefighters putting out fires when they occur. Aside from the risk of life loss, the destruction of buildings in a downtown block will leave a scar on the main street as a whole, which could in turn hurt future tourism.

The purpose of this report is to provide our sponsor, the National Association of State Fire Marshals (NASFM), with recommendations on how to address the fire risks in historic buildings located in main street areas. Protecting these structures is very important to NASFM because it is in line with their primary mission of protecting life, property, and the environment from fire. Annapolis, MD, had extensive fires in 1997 and 2005. Bellefonte, PA, had multiple fires in 2004 and 2006, resulting in the loss of four buildings. Because of the regular occurrence of fires in these locations, it is evident that action to prevent future fires is a necessity.

In order to develop recommendations, we identified communities with experience in historic district fires and fire safety, as well as examined their responses and prospective

actions to avoid fires. Prior to this report, little information had been compiled regarding the vulnerability of historic districts. In order to collect data, we used interviews with fire chiefs, engineers, town officials, architects, historic preservationists, and Main Street revitalization experts, as well as archival research of newspaper articles about the fires. Based on the data, we determined that there were a few major points our report needed to address: building inspections, education and awareness of the threat of fire, funding and implementation of fire protection systems, and communication among owners, town council, historical preservationists, and fire officials.

One very simple way to reduce the chance of fire is to have regular fire inspections. This method is indispensable in preserving the historic aspects of a building. We found that in several cases outdated wiring spliced with modern wiring was the cause of the fire. During an inspection, the inspector would see flaws in the building, like faulty wiring, and make sure the building owner complied. The problem with inspections is that in some cases they do not occur regularly at all, either because low staff requires officials to have other priorities, or because of a lack of funding to pay for enough inspectors. We found that some towns only have inspections every decade, which is nowhere close to the necessary amount because a multitude of fire safety issues can arise in that time. With the addition of more inspectors, or at least more regular inspections, better fire safety can be attained.

Another key issue is education of owners. If owners can see the true risks that exist in historic streetscapes, they may be more willing to add fire protection systems to their buildings. In an educational meeting for owners, towns should show images of the buildings before the fire, images of the structures while the buildings are ablaze, and images of the potential vacant lot years after the fire. Such a graphic presentation will help

to convey to owners that their buildings are also at risk of destruction. Owners should also be informed about different fire protection systems that are available and creative ways of meeting building and fire codes so that they know that a variety of choices are available.

Some owners support fire protection systems, but do not have the money to implement them in their buildings. However, in Anoka, MN, the town acquired funding through building refurbishing grants. Using this money, they managed to install sprinkler systems in three blocks of the downtown area. In some towns tax credits are also available for building owners that install sprinklers into their buildings.

Communication and an alliance among the building owners, town council, historical preservationists, and fire officials is a necessity in preserving downtown buildings and preventing fires in the future. If an official manages to unite the town council, historic preservationists, and building owners by conveying the importance of fire protection and the potential of complete destruction of the downtown area to fire, much can be done to prevent further destruction. With all parties unified, it becomes much easier to protect historic streetscapes.

## 1. Introduction

Fires in historic streetscapes represent a great threat to residents, patrons, emergency personnel, the integrity of the neighborhood, the history tied to the streetscape, and economy of the town or city. Historic streetscapes, due to their construction and the fact that they are not usually required to comply with modern building and fire codes, are very vulnerable to fire. Historic streetscapes provide an important basis of small town economies, with cultural heritage tourism attracting over 100 million visitors a year in more than 200 million person trips (TIA, 2003). Furthermore, historic streetscapes implicitly represent an important part of United States history. The loss of a historic streetscape means a loss of a part of our cultural identity. Researching these issues is of value to The National Association of State Fire Marshals (NASFM) because it will form the basis of a project to provide pertinent information regarding methods of fire protection and prevention, both technical and social, to towns in need.

The historic streetscapes we examined are those made up of historic buildings either located very closely with neighboring buildings, or linked together by common walls, attics, or basements. In some cases a historic streetscape was built as one structure by one owner then later sectioned off and sold to multiple parties. Typically the first floor of these streetscapes is commercial or mercantile, with the upper floors, assuming they are utilized, generally being allocated to office spaces or residential housing.

One of the main contributions this report hopes to make is in examining the interaction among building owners, fire officials, historic preservationists, and town officials on fire protection and prevention issues. These groups all have an interest in the

preservation of historic streetscapes from fire damage, though their points of view may be different. Understanding the interaction of these groups is essential to this project because they are directly responsible for the outcome, good or bad, of a fire protection program. These groups are the primary decision makers in a town with a historic streetscape, so understanding methods of bringing them to agreement concerning a fire protection program is important.

The other issue this report addresses is how towns with historic districts achieved successful fire protection programs. We researched successful programs because knowledge of these programs is not well known across the country. Ideas these towns came up with could possibly be used in other locations. We conducted research into methods town officials used to convince building owners to take the steps necessary to protect their buildings from fire. We looked into methods of education, areas where grant money and tax credits were obtained, and technical or architectural methods of fire protection that have special applications to historic buildings and streetscapes.

Our goal was to compile information concerning the fire protection of historic streetscapes, to be used by NASFM in the development of a program that will serve as a resource for State Fire Marshals and local communities concerned with this issue. To address this issue we researched towns that have had fires in their downtown historic streetscapes and we have used them as case studies. We also looked at towns that were particularly creative and successful in achieving fire protection of their historic districts. In each town we researched the cause of the fires, various methods of fire prevention used in the community, activity in the aftermath of fires in the historic areas, and sources that had



knowledge of the incident within the community. We have developed detailed summaries of these incidents in order to lay the groundwork for NASFM's continuation of this project.

## **2. Background**

Due to the nature of historic streetscapes, there are certain challenges that exist in protecting and preserving them, most notably bringing owners of individual buildings in the streetscape together to form a coherent fire protection plan. This chapter aims to address and identify what historic streetscapes are, what type of role heritage tourism plays in some of these cities' and towns' income, information on fire protection options, what fire codes exist regarding historic streetscapes and the fire protection concerns that exist in historic streetscapes.

### **2.1. Historic Streetscapes**

A historic district identifies a small geographic area of common historical interest. Historic districts are recognized at several levels – municipal, state, and federal. A streetscape is most often a street with interconnected buildings, housing small businesses and residential areas on the upper floors. Historic buildings make up historic streetscapes and districts. However, not all buildings in an historic district are necessarily historic buildings; in some examples, a historic district may consist of a group of buildings that are considered historic together, not individually.

#### **2.1.1. Main Street Program**

In an effort to help maintain historic districts, the National Trust for Historic Preservation Main Street Program (NTHP, 2009) works to restore and revitalize struggling downtown areas. The Main Street Program works to bring together people to work towards the goal of revitalizing a main street. The program promotes the Main Street

district to encourage businesses and people to move into the downtown. Typically, businesses are located on the first floor and the Main Street program works to encourage people to live on the upper floors of these buildings. The Main Street program focuses on designing downtown districts to make them more appealing and longer lasting, and on rehabilitating buildings to get them into use. Finally, the Main Street program works to restructure the economy of downtowns, which includes recruiting new businesses and new economic uses of commercial areas. In order to convince people to move back into the apartments above businesses, the Main Street Program cleans up historic downtown areas, adding a welcoming atmosphere to potential residents. The NTHP uses organization, promotion, design, and economic restructuring when turning historic streetscapes into thriving business areas. When revitalizing historic downtown areas, the Main Street program supplies designers and architects, but it does not provide fire protection engineers. The NTHP has a priority on historic preservation, not fire prevention and protection, within its Main Street program.

### **2.1.2. Tourism in Historic Districts/Streetscapes**

Several historic districts, including the one in Annapolis, Maryland, use tourism as a means of income. Travelers to Annapolis generate \$65.9 million in tax revenue, and spend around \$1.5 billion in Anne Arundel County alone (Annapolis, 2009). If a fire occurs and destroys part of an historic streetscape, the entire feel of the streetscape is lost. With such a visible hole caused by the fire, the streetscape is much less appealing to the eye, and tourism suffers. According to a building owner who lost two 1800s-era buildings in a large streetscape fire in Annapolis (R. Rivera, 2005a), the damage could be “several million dollars” for his buildings alone. The loss of revenue from reduced tourism, as well as the

costs to repair or rebuild the destroyed building, could be catastrophic not only to the individuals who own the building, but also to the town's economy.

### **2.1.3. Ownership of Buildings in a Streetscape**

There are two different types of privately owned building types in historic streetscapes- business and residential. Marilyn Kaplan of Preservation Architecture (personal communication, September 21 2009) noted that there are often government incentives, such as grants, available for business owners to set up some form of fire protection. There are few incentives for private residential buildings. Regardless, business owners often balk at installing protection systems, due to the perceived cost of installation and the loss of business that would result from having to close down the business while renovations occurred. Annapolis, MD attempted to address this issue after a fire in 1997 that destroyed two historic buildings. The town began offering low-interest loans for sprinkler installation, but few owners took advantage of this opportunity (McCaffrey, 2007, p. AA03).

## **2.2. Fire**

The National Fire Protection Association (NFPA) Fire Protection Handbook says a fire requires three basic ingredients to start: an "oxidizing agent", such as oxygen in the air, a combustible material, and a source of ignition (2008, 2-19, 2-20). These three ingredients are commonly known as the fire triangle. The combustible material must have a temperature high enough to be ignited before a fire will start and/or spread. To extinguish the fire one aspect of the fire triangle must be eliminated. Typically this is accomplished by either removing the fuel or allowing the fire to burn all of the fuel up, limiting the amount

of oxygen available (sometimes achieved through chemical means), or cooling the fire to the point where the fuel is not combustible (sometimes accomplished by spraying water onto the fuel and surrounding fuel to prevent further ignition and spread).

### **2.3. Fire Protection of a Building**

The material in this section, except as noted, is primarily summarized from the publication by Watts & Kaplan.

Fire protection of a building, from a technical point of view, consists of two main principles: fire prevention and fire suppression (NFPA, 2008). Artim and Dr. Watts summarize that fire prevention is the concept of minimizing the chances a fire will start, whereas fire suppression is the concept of putting a fire out as quickly as possible to minimizing damage and loss of life (Artim and Watts, p.3).

#### **2.3.1. Fire Prevention**

Fire prevention is a proactive solution to fire protection because it focuses on keeping the fire from occurring in the first place. Methods of accomplishing fire prevention include education and fire code enforcement. A major source of fire education materials is the National Fire Protection Association (NFPA). The NFPA offers programs such as Fire Prevention Week, which is a program geared towards schools and informational sheets freely available for consumers about topics including candles, electrical safety and seasonal safety. Additionally, the NFPA provides materials for public educators including community tool kits and newsletters. All of these materials and programs can be utilized to educate people about fire risk. The goal behind educating people of fire risk is that, in theory, they will be more careful and more aware. However, despite educational initiatives, situations

that are a fire risk still occur. The enforcement of local fire codes is one of the more effective ways of dealing with these situations before they can result in fire. The National Fire Protection Association has developed more than “300 codes and standards intended to minimize the possibility and effects of fire and other risks.” (Codes and Standards, NFPA). If municipalities, specifically fire departments, enforce the local fire codes, hazardous situations can potentially be eliminated before they become a significant fire risk.

### **2.3.2. Fire Detection**

People, when present in a building, serve as effective fire detectors (Artim and Watts, 2009, p. 4). Smoke and fire have distinct characteristics that are typically easy for a person to detect. Unfortunately, humans are not always as effective as smoke detectors because they have to be present in the building when a fire starts and they have to react in the correct manner. Smoke detectors are useful because they can detect fire when the building is unoccupied or its owners are sleeping. Detectors do not have the added risk of human error, as they are made to sound an alert under very specific conditions.

There are different types of smoke alarms but they all operate on the same principle: they function by detecting smoke or smoldering, which may indicate fire. Dr. Watts and Kaplan highlight that smoke detectors are effective at detecting smoke shortly after the start of a fire. This is important because it enables a faster response by emergency personnel and can give the occupants a few extra moments to safely escape the building. The disadvantage of smoke alarms is they can be prone to false alarms and, from a building protection perspective, do nothing to suppress a fire.

## **Fire Alarms**

There are two types of alarm systems, local alarms and central station alarms. There are also two ways these alarms are triggered. The first method is manual activation; a person must go to an alarm box, typically located along exit paths, and activate the alarm. The second method uses automatic alarms; these are typically wired into a system and triggered by a fire detection system. A local alarm system alerts the people inside of a building that it may be burning; it is up to people to then call the necessary authorities. This alarm is typically found in situations where the only valuable contents of a building are the people in it. Dr. Watts and Kaplan describe central station alarms as being connected to some form of an outside service. The alarms have a system using either a telephone or radio that automatically contacts an outside organization or agency to notify them of the fire. In some cases, the outside party is a monitoring center and when an alarm sounds, the staff at the monitoring center responds accordingly and contacts the fire department and other necessary authorities. In other cases, the automated call will go straight to a 911-dispatch center or the local fire department.

### **2.3.3. Control System**

There two general types of fire detection and alarm control systems. The conventional system is a hard-wired system and operates as a circuit. The second system, described by Dr. Watts and Kaplan (2003, pp. 292-294) is called an “Addressable Control System” and is controlled by a computer chip to offer intelligent monitoring.

The conventional alarm system is a hard-wired circuit throughout a building into which detectors and alarms are hard-wired. When a detector perceives smoke, the circuit will close, sending a current through the system to the control unit, which will recognize

the signal and sound the installed alarms. The conventional control system has a simple and inexpensive installation for small to medium sized buildings, but the costs can get expensive for larger buildings due to the sheer amount of wire that needs to run throughout the building. The negative side to the conventional system is its maintenance and lack of location awareness. The system continually runs a very low current through the wires and therefore can detect when there is a break in the line. However, the system can only inform the maintainers that there is a break in the line, not where the break is. This issue extends to when the system detects a fire, it can only sound the alarm, and there is no computer chip to determine what detector is going off. The maintenance cost is high because the system requires operational tests, and periodically each detector needs to be serviced individually.

Dr. Watts and Kaplan consider the Addressable Control System to be “intelligent” and “state-of-the-art” (2003, pp. 293-294). The system is built around a small computer that monitors each alarm and detector. A computer can monitor the location of the detector, the response details, and the point in which the alarm should be switched on due to a specific ID or address assigned to the detector. The computer will poll the detectors every 5 to 10 seconds to check their status, “normal” or “emergency”. If a detector reports “emergency” mode, the system will restart the detector, and if it continues to report “emergency”, then the computer will sound the alarm. The maintenance for the addressable control system is easier than that of a conventional system because the system can monitor each detector and modify its sensitivity settings to increase the amount of time between required maintenance. Once the system can no longer adjust the detector’s settings, it will send an alert that the detector requires maintenance.



#### 2.3.4. Fire Suppression

Sprinklers consist of three components: the sprinkler itself, the piping and the water supply. Each sprinkler acts independently of the other sprinklers in the fire suppression system because each sprinkler has a temperature sensor that will break open at a certain temperature and open the flow of water.

A wet pipe sprinkler system is the typically used sprinkler system. Dr. Watts and Kaplan (2003, pp. 310-311), explain that such systems have several advantages including reliability, low installation and maintenance cost, ease of modification and little down time after a fire. Builders and engineers often choose these systems because they consist of few parts, which in turn reduce the number of failure points. Wet pipe sprinklers also have no response time, as opposed to dry pipe solutions, once their temperature sensor has broken open.

Dry pipe sprinkler systems work in essentially the same manner as a wet pipe solution, but the pipes are filled with pressurized air that will come out once the sprinkler is opened. After the pressurized air escapes, then water will spray out. Dr. Watts and Kaplan explain that there are several disadvantages to dry pipes compared to wet pipes including that they are less reliable, have a higher cost, offer less design flexibility, can be up to a minute slower than wet sprinklers and the pipes of a dry system can corrode if they are not drained properly. For these reasons Dr. Watts and Kaplan stress that dry pipe sprinkler systems should be limited to conditions where wet pipes would likely freeze.

An alternative to traditional water sprinklers, a newer technology in automatic fire suppression, is a mist sprinkler system. This system sprays water at a higher pressure than traditional sprinkler systems, and, according to Dr. Watts and Kaplan (2003, pp. 313-314),

produces higher efficiency cooling and fire control while using up to 25 percent less water. Currently the major drawback to mist systems is the higher installation cost.

### **2.3.5. Smoke Management**

The Fire Protection Handbook explains the term “smoke management” as methods that “can be used alone or in combination to modify smoke movement for the benefit of occupants or fire fighters or to reduce property damage” (NFPA, 2008, 18-50). Dr. Watts and Kaplan (2003, pp. 319-328) explain the two methods of smoke management in a historic building as passive or active systems. Passive smoke management relies on the actual building design and construction to control the spread, containment or release of smoke. Typically passive smoke management construction consists of some form of barriers, vents, shafts and towers. Active smoke management uses the “building’s structural barriers (walls, floors, doors, etc.) in conjunction with airflows and pressure differences produced by mechanical fans” to control where smoke goes in a building during a fire (2003, p. 322). Two factors to consider when designing active smoke control systems, is whether to have dedicated smoke control, for example fans that are installed and used only during a fire, or non-dedicated smoke control system, such as a system linked into existing fans.

### **2.3.6. Passive Fire Protection**

Passive fire protection is building materials and designs that resist and slow the expansion of fire in a building. Passive fire protection includes firewalls, fire separation walls, fire barriers, fire doors and fire-rated enclosures. The major concept behind passive fire protection is to use the design of the building to limit the spread of fire until active fire

protection can extinguish it (sprinkler systems or fire fighters). One aspect of passive fire protection is building structure. Newer methods are also in development.

### **Building Structure**

“Compartmentation,” as explained by Dr. Watts and Kaplan (2003, p. 332), is the practice of separating a building into zones with the goal of limiting a fire to as few zones as possible. Compartmentation can be created through the use of “fire-resistive barriers at walls, partitions, and floors” (p. 332). Compartmentation can be an effective means of fire control, but it also can make moving around a building during normal use more difficult because of increased number of doors and barriers. Additionally, the new construction must be carefully planned to avoid damaging the historic value of a building.

Compartmentation can be effective at reducing fire spread; however, compartmentation should not be confused with places that can trap fires such as hidden spaces and false ceilings. We discovered in our research that the existence of these hidden spaces and false ceilings could allow fire to spread undetected throughout a building for hours or more.

### **Fire Resistance**

Fire resistance is “the period of time, expressed in hours, a material or construction assembly will provide a barrier to fire spread and perform structurally after exposure to a standard intensity fire.” Dr. Watts and Kaplan state fire resistance consists of components that include interior construction, structure, exterior wall, and “fire stopping”. Interior walls, floors and ceilings can be constructed using highly rated fire protection materials to increase their resistance to fire. However, in some cases it is not possible to renovate buildings with materials such as fire-rated drywall, so other solutions can be pursued to

increase the fire resistivity. Structural fire protection involves increasing the fire endurance of the structural design of a building to help prevent collapse of a building during a fire. Exterior wall protection is achieved by adding fire detectors on the exterior of the building or the installation of exterior sprinklers. Fire stopping involves “fire-resistant barriers or materials that can prevent the spread of fire between rafters and joists and through walls and ceilings, horizontal and vertical barriers” (p. 341).

Firewalls or fire stopping is “concealed fire-resistant barriers or materials that can prevent the spread of fire.” Particularly between buildings that share common walls, fire stopping is important because it slows the spread of fire from one building to the next. Fire stopping can be achieved with the use of building materials during construction and renovations and it can be achieved in concealed and smaller spaces with fire-resistant materials such as mineral wool insulation. Different construction and different sized voids require different materials and sealants, thus it is important that before construction, a trained expert review the proposed construction and materials. As we discovered in our research, firewalls and fire stops are most effective when they are intact and uncompromised. Damages to firewalls and stops often occur when future renovations are done to a building; it is important that the walls be repaired and reinforced back to their original design.

Newer methods are being developed for passive fire protection. Intumescent paint can be applied to surfaces to help isolate the fire and slow its progress towards other rooms, floors, or buildings (Bowes, personal communication, 2009). The paint foams and bubbles when heat is applied, adding a layer of insulation between the walls or ceiling and

the fire. When applied to a surface, the paint can help isolate the fire for up to an hour so that fire crews have enough time to respond.

## **2.4. NFPA Fire Codes Applicable to Historic Streetscapes**

NFPA 914, the Code for Fire Protection of Historic Structures, became an official model code in 2001 after much revision (National Fire Protection Association Code 914, 2010). Before 2001, it existed as just a recommended practice. With the addition of the correct legal language and significant retooling of its stated processes for fire protection, it became designated as a code and state and local governments can adopt the code as law.

NFPA 914 deals with “the principles and practices of fire safety for historic structures and for those who operate, use, or visit them” (NFPA Code 914, 2007, section 1.1). NFPA 914 concerns itself with the preservation of historically significant buildings and addresses forms of construction, protection, and occupancy that are necessary to reduce the risk of fire. There is not a fire code similar to 914 for non-historic buildings.

Fire protection methods for historic buildings differ from those for regular buildings in several ways. The most obvious difference between the two is the need for codes that deal specifically with the preservation of the historic architecture and contents of a historic building. An example of this is in section 4.2:

“The goals of this code shall be to provide for fire protection to all historic structures and their occupants while protecting those elements, spaces, and features that make the structures historically or architecturally significant. The two goals shall be accomplished by operational approaches, system approaches, or the consideration of other factors, and shall be as follows: provide protection and life safety from the effects of fire and maintain the historic fabric and integrity of the building” (NFPA Code 914, 2007, section 4.2).

NFPA 914 also deals with the security of historic buildings, because arson, theft, vandalism and burglary are very real threats to the buildings and the historic items inside (NFPA Code 914, 2007, section 1.3). To do this, the code outlines security procedure that involve setting up fire prevention devices, security locks, and a screening of all personnel before they are allowed to operate in the buildings. The code also stipulates that these measures should neither impede an emergency evacuation nor damage the historic fabric of the site itself.

The owner or appointed governing body of the historic building is required to create a process team to apply code 914 to the building in question (NFPA Code 914, 2007, section 7.2) (see figure 1). This team should be knowledgeable about both historic preservation and fire protection. This team's job is to create an assessment of the building in terms of fire safety. This assessment will include structures on and adjacent to the historic building to identify potential paths of fire spread.

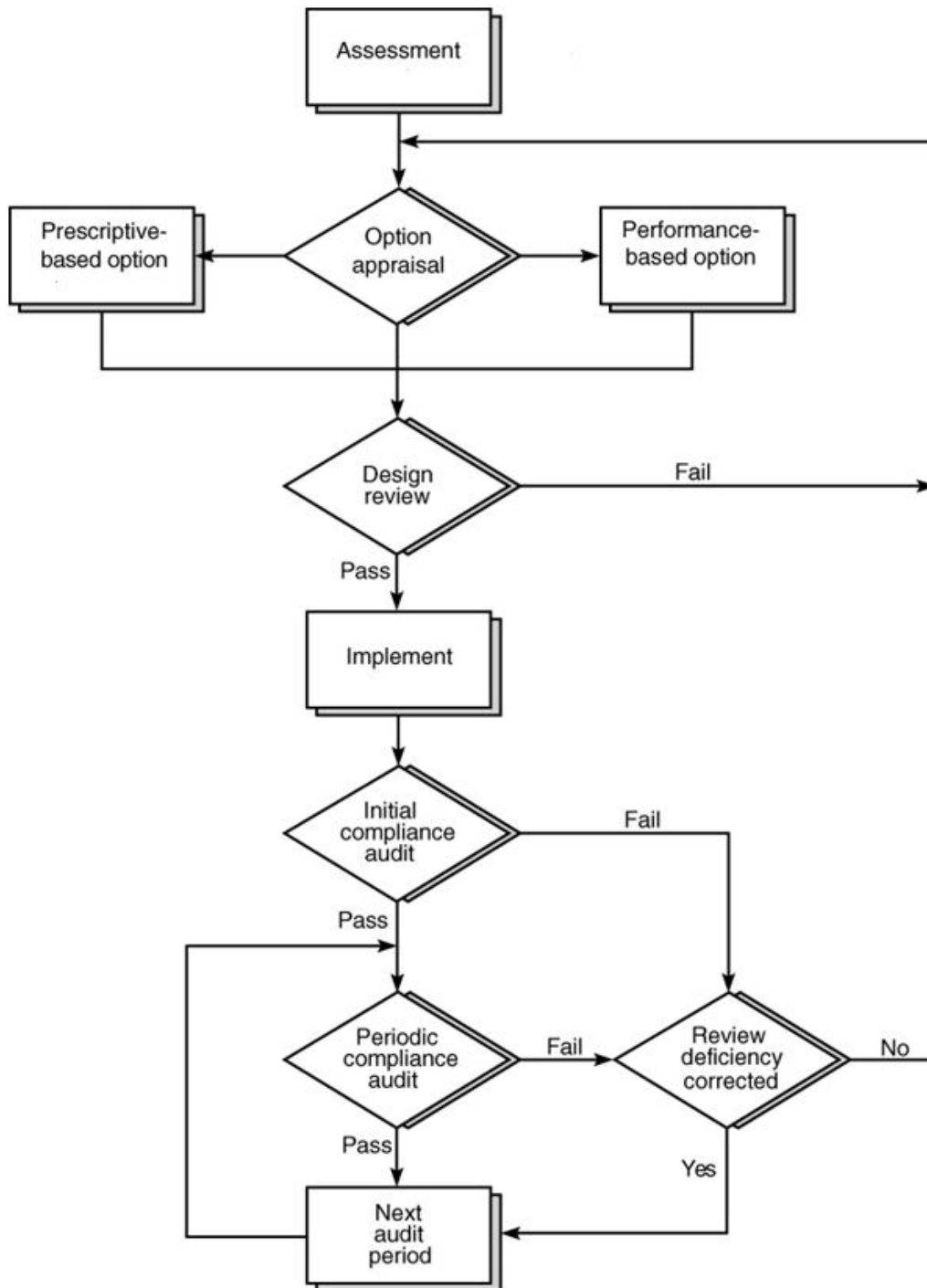


Figure 1 NFPA Fire Code 914 Application Process (Source: NFPA Code 914, 2007, 7.1)

In order to combat potential fires and to preserve the appearance of the historic building, a survey is done to determine areas to place fire protection equipment. The ideal placement of this equipment is a location that not visible to the casual observer and that will not damage historic items in the building when used. This survey is also required to evaluate all potential exits on their capacity and usefulness should a firebreak out (NFPA Code 914, 2007, 7.3).

Several different fire scenarios need to be conducted and analyzed before a historic building can be considered up to code. These scenarios are based on many different types of fire that originate in several different areas in the building. These fires account for the number of occupants, their respective locations, the activities they are performing, the sizes, furnishings, and contents of the rooms in the building, ventilation, fuel, and places of potential ignition. Data are taken from each of the eight different fire simulations and analyzed (NFPA Code 914, 2007, 9.5).

The process team then creates a proposal to bring the building up to compliance. After the owner makes the changes, the team conducts an audit on the building and its premises to ensure that the proposal was correctly followed. These audits occur both annually and after changes to NFPA code 914 in order to assess the safety of the building (NFPA Code 914, 2007, 7.9).

Another notable difference between the codes that apply to historic buildings and those that apply to regular ones is that the preservation of the appearance of the historic building weighs heavily on the fire suppressant technology used and its placement throughout the building. "Fire safety and fire protection features shall be designed, approved, implemented, and maintained to preserve the original qualities or character of a



building, structure, site, or environment” (NFPA Code 914, 2007, section 4.3.2.1). Fire suppressant technology is set up in historic buildings to be hidden and out of the way while not losing too much of its ability to combat the fire.

## **2.5. Vulnerability of Historic Streetscapes to Fire**

The differences between fire protection methods for historic buildings and modern buildings can be observed by looking at the fire protection priorities of each building type. The fire protection methods for regular buildings focus on containing the fire to the smallest area possible and preserving as many lives as possible (Deputy Fire Chief Brian Faria, personal communication, October 9, 2009). The methods for fire protection for historic buildings, while still considering protecting the lives of those involved in the incident to be the highest priority, make decisions based on their impact to the preservation of the building itself and the materials inside.

Historic buildings are more susceptible to fire and fire damage than newly constructed buildings because knowledge of fire protection and safety has progressed significantly over the years. Older construction techniques were not as concerned with fire safety and protection as they are now and were limited by the resources the builder had available. The materials commonly used in historic buildings had their flaws as well. Concrete with steel support rods inside for reinforcement can become vulnerable to collapse if the supports are inadequately protected from fire. These buildings are inherently more susceptible to fire and destruction due to their age and the toll time takes on everything.

The earliest form of building construction is the basic wooden frame. Generally early colonists in America created buildings with “stone foundations surmounted by post

and beam wooden frames.” Simple and cheap to construct, wood was the preeminent construction material up until the 1880’s when the risks of using it became so widely known that only small scale residences used it. Buildings constructed from wood often had chamfered, or beveled to a 45-degree angle, corners on their wooden beams, so as to remove the right angles from them and thus reduce the risk of the wooden beams catching fire.

Cast iron is another example of a problematic building material, as support rods created from it were generally structurally flawed due to the inconsistent casting process of the day. These internal flaws caused supports created from cast iron to fail and cause building collapse when faced with fire. Cast iron became a popular material in construction around the 1840’s. For the next thirty years it was regarded as a superb material to use for bracing and beams due to its strength and its perceived ability to create a fireproof structure. This method was abandoned in the 1880’s due to the realization of the limitations of cast iron and the improved methods of making steel. Inconsistent casting processes would leave cast iron supports less than structurally sound. Cast iron also has a tendency to expand under high heat and then shatter when rapidly cooled, which turned out to be a very large issue when a fire broke out in a building and the local firefighters used cold water to put it out, sometimes snapping beams and causing building collapse.

Cast iron led to more issues in the mid- to late nineteenth century, when it became common practice to design buildings with cast iron frames and extremely flammable lacquered wooden floors. These buildings often had many open vertical and horizontal areas due to stairs, elevators, plumbing, and ventilation. These open areas acted as flues

and helped provide the fire with more oxygen, which quickly caught the varnished floorboards on fire.

The proximity of several historic buildings to each other is a large factor in their susceptibility to fire. In cities and areas of development, buildings were often built too close together or with hazards such as overlapping rooftops and narrow alleys. This streetscape construction is very conducive to rapidly spreading fire and marks another method of construction that makes historic buildings more susceptible to fire than modern ones (Watts and Kaplan, personal communication, September 21, 2009). Historic buildings are more susceptible to fire and fire damage due to being constructed at a time when materials and construction practices were not what they are today. Because of the lack of knowledge of how to construct a “fire proof” building and the lack of fireproof materials to do it with, most historic structures still standing today will be, in some form or another, at a higher risk of burning down.

Along with the physical reasons historic streetscapes are susceptible to fire, there are also social aspects. Because streetscapes are made up of multiple buildings, each building could have a different owner. If the buildings are adjoined, then basements, attics, or walls could be shared. In order to install fire protection in a space shared by buildings, the two owners must agree on the installation. If two building owners would like to share a fire escape as a way of egress, but there is a building in between them, then the building owner in the middle must also agree, otherwise the fire escape cannot be built. If the state that contains the historic streetscape does not have an adopted fire code, then the fire officials can do nothing more than encourage owners to protect their buildings.

### **3. Methodology**

This chapter outlines the methods used in researching ways to address fire protection of historic streetscapes. We used archival research of news articles and periodicals, interviews with fire marshals, fire officials, and historic preservationists, as well as tours of historic districts in the Washington, DC, area. The following sections explain in detail how we obtained our information that ultimately led to our recommendations for NASFM so they can help to prevent future fires.

#### **3.1. Case Studies of Annapolis, MD and Bellefonte, PA**

We identified two historic districts that have had several instances of streetscape fires. We conducted in-depth case studies of these locations using news articles as well as interviews from experts in both locations. Since both locations have had several fires in their main street areas, we believed that they would be good examples to show what towns do in response to fires, as well as how towns deal with preventing future fires.

##### **3.1.1. Annapolis, MD**

To begin research for Annapolis, we researched articles in the *Washington Post* and *Washington Times* for articles about the streetscape fires of 1997 and 2005. Articles from around the date of the fire gave us background knowledge about the fire, what fire protection systems were in place, and the immediate reactions of the business owners and town officials. Months later, the same news sources published follow-up articles about what had been done in the rebuilding process, as well as what was known about the town council's efforts in preventing future fires.

Along with the archival research, we met with Lieutenant John Bowes of the Annapolis Fire Department to both discuss the details of the fires in Annapolis, as well as to find out how well buildings in Annapolis are protected after historic streetscape fires in 1997 and 2005. We also wanted to find out about the rate of inspections in Annapolis and what ordinances were in place before and after the fires. After meeting with Lt. Bowes, we met with Patricia Blick, a historic preservationist on the Annapolis Planning and Zoning Board. The purpose of the meeting with her was to determine how fire safety affects the preservation of historic structures in Annapolis, as well as to learn about the process of installing sprinklers in a building. After these interviews, we had a phone interview with Mary Giannini, the head of the Annapolis Main Street program. We wished to speak with her to learn about the incorporation of fire protection in historical restoration, as well as how politics in Annapolis affect fire protection.

Because the town is located close to Washington, DC, we were also able to tour downtown Annapolis. We were able to see first-hand what work had been done since the fires and document with pictures the progress that had been made in reconstruction.

### **3.1.2. Bellefonte, PA**

We also performed a case study on Bellefonte, PA. We specifically researched the Bellefonte Academy Fire and the Bush House fire because one of our sponsors, Dr. John M. Watts Jr., had written a publication as a result of these fires. News articles were also used to research the fires, particularly using several different *Associated Press* articles located online. As in the case of the Annapolis fires, this information was used to obtain background knowledge about the fire, fire protection systems in place, and the immediate

reactions of the business owners and town officials. We also followed sources months later to see what progress had been made in reconstruction and protection. It should be noted that the fires in Bellefonte occurred in historic buildings that were not part of historic districts; however, they were of interest because of the town's response to those fires, which we will discuss.

We had several interviews regarding the fires in Bellefonte. Our first interview was with Fire Protection Engineer Dennis Gentzel, who works with the Maryland Fire Marshal. He worked with the committee the borough of Bellefonte set up to help determine what could be done to prevent future fires. We interviewed him to learn of the specific issues that existed in Bellefonte, as well as his findings while on the committee. We also wanted to know if there was any opposition to the installation of fire protection systems in Bellefonte.

Our second interview was with Erin Hammerstedt, who works in the Bellefonte Historic Preservation Office. We wanted to learn what the preservation office has done in regards to fire safety in Bellefonte, investigate the inspection rate and process, as well as receive pictures of the locations before, during, and after the fires to portray the devastation.

### **3.2. Willmar, MN and Stillwater, MN**

We investigated the towns of Willmar and Stillwater because these two towns have many similarities, but have had very different levels of success when dealing with the problem of fire protection. With a thorough investigation of each location, we wanted to determine what factors affect the likelihood owners will install protection systems. We interviewed Fire Chief Marvin Calvin from Willmar and Fire Chief Tom Ballis from

Stillwater. We asked each about the fire codes utilized by their respective towns, and fire protection methods in place, as well as the percentage of buildings in the downtown area that had taken fire protection measures. Using this information, we could then analyze why one town had more owners participating in protection systems than the other.

### 3.3. Other Historic Districts with Fire Protection Experience

Along with the towns listed above, we also investigated several other towns across the country to add more evidence to aid our analysis and recommendations in the next two sections. Listed in the following table are the towns we investigated, as well as the contacts in each town we interviewed. We asked each contact about fires they may have experienced, what their towns have done in response to the fires, what ordinances were passed, what fire codes the towns followed, and how many of the people in the towns use fire protection systems.

**Table 1 Officials interviewed for Methodology Section 3.3**

Town	Official Interviewed	Position
Anoka, MN	Charlie Thompson	Fire Chief
	Jennifer Bergman	Executive Director, Housing and Redevelopment Authority
Rome, GA	George Lanier	GA State Fire Marshal's Office
Hopkins, MN	Dale Specken	Fire Chief
Miles City, MT	Derrick Rodgers	Fire Chief

### **3.4. National Trust for Historic Preservation Main Street Program**

In order to learn about how the National Trust’s Main Street Program uses fire protection when revitalizing historic districts, we met with Lauren Adkins, Assistant Director of Field Services. We wished to learn about her experiences with the conditions of buildings before they are restored, such as the fire risks that exist before revitalization occurs. We inquired about what funding was available for towns looking to restore their downtown areas, and we received the Main Street handbook entitled *Revitalizing Main Street*. The publication details what is necessary to revitalize a main street, as well as how to fund projects, which could include fire protection.

### **3.5. Summary**

Our methodology describes the steps we used to learn what towns have done in response to fires, as well as what steps towns have taken that have worked or have not worked. We also learned about the different funding that is available to towns that need aid in revitalizing their downtown areas, thus also making buildings more fire safe.



## **4. Results and Analysis**

### **Case Studies**

The information in these case studies contains multiple viewpoints and interviews. The studies of these towns are more in-depth than the other towns mentioned in this report because we have identified them as places that have had multiple fires in their historic areas; because they have had success improving fire safety and protection; or because they have had both fires and success improving fire safety.

#### **4.1 Annapolis, MD**

Annapolis, the capital of Maryland, is a small city located on the Chesapeake Bay. Because of its extensive history and heritage, the city's downtown area is a nationally recognized historic district by the National Register of Historic Places (National Park Service, 2009). However, several fires have occurred in the district, most recently one in 1997 and another in 2005. We researched these two fires and have analyzed what fire professionals and others can do to protect these streetscapes in the future.

##### **1997 Fire**

On December 9, 1997, fire swept through downtown Annapolis. By the end of the blaze, the fire had destroyed two buildings, both more than one hundred years old (Argetsinger & Moor, 1997). The buildings housed five businesses, all lost in the blaze. Firefighters believe the fire originated in The India Palace, which was in the first story of one of the buildings destroyed. However, because the damage was so great, the fire left no evidence to prove a cause. Firefighters were not even allowed to enter the building the next day for an

investigation because the remnants of the buildings were so unsafe (Argetsinger, 1997). Firefighters speculated the cause to be an electrical malfunction. In the end, fire officials estimated the damage to cost to be as high as \$3 million.

According to Captain Leonard Clark of the Annapolis Fire Department (Argetsinger & Mooar, 1997), neither building had any sprinklers installed. Along with the lack of any fire protection or prevention systems, the buildings contained extensive renovations. When renovations occur, open spaces are often left behind walls and ceilings. In the case of this fire, the false ceilings helped to sustain the fire. Another problem with fires in enclosed spaces is that the fire can grow largely unnoticed, leading firefighters to believe that the fire is much smaller until it is too late.

Unfortunately, the town discussed little legislation change after the 1997 fire. In 1995, the town renovated the downtown area and installed new water lines. During this process, the mayor and city council tried to convince owners to hook buildings up to the water supply and install sprinkler systems at low cost, but according to city administrator John Prehn (Argetsinger, 1997), “most of them didn’t do it.” In 2004 (Rivera, 2005a), the town passed legislation resulting in low-interest loans for owners that install sprinkler systems in their buildings. The government set aside a sum of money to dispense to owners looking for the loan. As owners pay the money back, the town redistributes the money to other owners. However, the legislation was not immediate and would take years to complete.

The location of the fire had remained an empty lot up through 2005. Finally, construction began on the buildings, seen in figure 5.



**Figure 2 Site of 1997 Annapolis Fire**

Unlike the original century-old buildings that once stood in its place, the newer buildings are far from historic-looking. In the building on the left, the brick is an entirely different color from the surrounding buildings. The top floor is completely composed of windows, which further detracts from the historic look of the streetscape. The first floor is also open to view because of large windows. The inside is also contemporary style, and is very visible to passersby. It does not appear that the designer even attempted to make the building fit the style of the rest of the historic streetscape. Annapolis is a nationally recognized historic district, but this building does not fit the “historic” mold that most historic districts follow.

## 2005 Fire

The destruction of Historic Annapolis did not cease after the 1997 fire. On November 25, 2005, another fire broke out at 118-122 Main Street, which is located in a very densely packed area of downtown Annapolis. Fire destroyed three buildings, and according to Annapolis architectural historian Orlando Ridout, “at least two of the three are significant historically” (Rivera & de Vise, 2005). The three buildings were constructed mostly of wood, with the façades of two of the buildings constructed of brick. Though the fire did not reach them, the surrounding buildings suffered smoke damage. Outdated electrical wiring was determined to have caused the fire. In the antiquated wiring scheme known as “knob and tube wiring” (Rivera, 2005b), copper wiring is fed through porcelain knobs inside wall spaces or along the ceiling or floor. The method, though outdated, is considered safe to use (Knob and Tube Wiring, 2008). However, when modern electrical wiring and knob and tube wiring are spliced together, the situation can become dangerous. There are several reasons as to why this splicing occurs. According to Annapolis electrical inspector Clinton Pratt, many insulation installers and carpenters have no idea about the regulations regarding copper wiring. Because the wiring is difficult to replace in historic buildings, owners and builders need to take precautions when the wire is present.

Like the 1997 fire, none of the buildings had sprinklers installed at the time of the blaze. Since there were no sprinklers, no one lived in the upper floors; instead, the space was used for storage. Since the ordinance for low-interest loans for sprinkler installation was only passed in the previous year, nothing had taken effect because of the long paperwork process. According to Annapolis’ most recent survey in 2003 (Rivera, 2005b), only 13 of 79 buildings in the historic downtown area were equipped with sprinkler

systems. Sprinklers are required for all new buildings, but the law does not apply to buildings already constructed.

Following this fire, the town of Annapolis finally considered the ordinances regarding protecting these streetscape buildings. Before the fire, only three owners submitted applications for the loan-based aid for sprinklers that passed in 2004. By the end of 2006, the town had approved five applications. Also, the town passed an ordinance about modifying a building (McCaffrey, 2005): If an owner or contractor does work on the building that is equal to or greater than ten percent of the building's value, then the owner must install sprinklers. According to Patricia Blick, the Chief Historic Preservation officer on the zoning board (personal communication, 2009), the government also offers "incentives" for owners to rebuild their property rather than move elsewhere. She gave the anecdotal example of a bar that burned down. If the owner refused to rebuild, then Annapolis could revoke the barkeeper's liquor license until he rebuilt the building at the same location. That way, the owner could not just leave the lot and find another property to open a bar.



**Figure 3 Site of 2005 Annapolis Fire**

Since 2005, the lot where the buildings once stood remains vacant. The frame of the building on the right remains charred from the fire. The lot is in a very dense section of Main Street, so the hole that the fire left is even more prominent.

#### **4.2 Analysis of the Annapolis Case Study**

When comparing the Annapolis fires of 1997 and 2005, there are several similarities including wiring issues and the resulting empty lots. Both fires apparently originated from electrical or wiring problems. Also, the sites of the fires were left open as empty lots for years. Only in recent years did the town restore the site of the 1997 blaze; the 2005 fire site still remains undeveloped. The problem that stands out the most, however, is the lack of fire precaution systems in the buildings when the fires occurred.

It seems as though the building owners in Annapolis are not as concerned as they should be about protecting their buildings. Before the fires even occurred, the government was offering incentives to help owners protect their property. They have been offered low-interest loans to help pay for the costs. When the town reinstalled waterlines in 1995, the town offered to connect the water to buildings at a “low price,” but owners resisted because the price was still too high.

According to Lt. John Bowes of the Annapolis Fire Department (personal communication, 2009), historic buildings do not normally meet building codes because of the variance between the codes of a century ago and the codes of today; historic buildings are thus grandfathered into the codes and usually are not required to meet current code unless they undergo major renovations. Thus, other steps must be taken, such as voluntarily installing fire protection methods or more stringent inspections, to ensure that buildings are protected. Common walls, basements, and attics are prevalent in the historic district of Annapolis, and all three characteristics of buildings help to spread fires. If owners were to take at least some steps in protecting buildings from fire, then the methods would help prevent the blaze from spreading. One of the misconceptions about sprinklers is the lengthy installation time. Lt. Bowes made it clear that sprinklers can be installed while the businesses are closed so that business is not lost, and within weeks the buildings can be protected.

After the 2005 fire, the fire department began inspecting historic buildings on a yearly basis; previously, inspections took place only once every three years. To do this, they hired another fire inspector. This has helped cut down on maintenance issues, such as faulty wiring, in buildings in the downtown.

### 4.3 Bellefonte, PA

Bellefonte, PA, is an ideal town for study because the entirety of the streetscapes in the downtown area is listed on the National Register of Historic Streetscapes. Bellefonte has also experienced two major fires in historic buildings within the last six years. The first occurred in 2004 in the Bellefonte Academy apartment complex. The second occurred at the Bush House, a historic hotel that was home to seven businesses, in 2006.

The Bellefonte Academy Fire occurred on July 14, 2004. It destroyed 33 apartments and left 40 people homeless, leaving what was once the Bellefonte Academy a smoldering ruin (Bellefonte Fire Department). This complex was 198 years old and was an important historical aspect of Bellefonte (Bellefonte Fire Department). The fire created “fire storm” conditions, ignited two neighboring rooftops, sent burning material a distance of 10 blocks away, and required the 20 fire companies called to help fight the fire (Pennsylvania). These companies were soon forced to relocate to a defensive position due to rapidly deteriorating conditions inside the complex (Bellefonte Fire Department).





**Figure 4 The Bellefonte Academy, Bellefonte PA Source: E. Hammerstedt.**



**Figure 5 The Bellefonte Academy Lot, Bellefonte PA (July 14, 2004). Source: E. Hammerstedt.**



**Figure 6 The Bellefonte Academy Lot, Bellefonte, PA. Source: E. Hammerstedt.**

The fire department had been concerned that the complex would burn down, due to its high state of disrepair and lack of a fire suppressant system, but renovation could not be enforced until early 2003. October 3, 2003, was established as the deadline to renovate the complex and correct the issues found, though this deadline was extended to July 30, 2004 (Joseph and Nissley, 2004).

The state required several measures be taken in order for the apartment complex to be considered compliant with code. This included the removal of several hazards such as paint and locks from doors. The state also required the separation of apartments with heat-resistant materials and the separation of a stair tower, which connected the second and fourth floor. Secondary forms of escape from the third floor, the fourth floor, and out of each of two basements were required, as was the installation of exit signs, automatic and

manual fire alarms, emergency light fixtures, crash bars on every exit, and sprinkler systems in each apartment (Joseph and Nissley, 2004).

Roughly 11 out of the 33 apartments in the Bellefonte Academy apartment complex had been renovated at the time of the fire. An operating fire alarm system was in place, though no sprinklers had been set up in any of the apartments (Bellefonte Fire Department). Construction of interior fire escapes in the main building had also begun (Joseph and Nissley, 2004). The deadline for renovation had not passed, however, so whether this fire could have been prevented if the systems had been put in place can only be speculated.

The Bush House was the sight of the second major fire in a historic building in Bellefonte. The Bush House originally was a 138-year-old hotel with a 4-story wood frame and brick walls. The building covered an entire city block but had no fire suppression system, such as sprinklers, in place (D. Gentzel, personal communication, November 11, 2009). When it burned down on February 8, 2006, it was home to seven different businesses, all of which were lost in the flame. To this day it has not rebuilt, leaving a piece of charred ground in Bellefonte's waterfront district (E. Hammerstedt, personal communication, December 2, 2009).



**Figure 7 The Bush House, Bellefonte, PA. Source: E. Hammerstedt.**



**Figure 8 The Bush House Fire, Bellefonte, PA (February 8, 2006). Source: E. Hammerstedt.**



**Figure 9 The Bush House Fire, Bellefonte, PA (February 8, 2006). Source: E. Hammerstedt.**



**Figure 10 The Bush House Lot, Bellefonte, PA. Source: E Hammerstedt**

The Bush House was a vital piece of Bellefonte's economy because it was both a major landmark and a home to seven businesses. The Bush House had only a limited sprinkler system installed (E. Hammerstedt, personal communication, December 02, 2009).

These fires are of interest to this project because they generated the creation of the Bellefonte Fire Department Preservation and Fire Prevention Task Force by the Bellefonte town council. Chief Tim Knisely, the fire chief at that time, organized this task force (D. Gentzel, personal communication, November 11, 2009). This task force included Chief Knisely, a fire protection engineer, a structural engineer, a fire alarm contractor, a sprinkler system contractor, a building code specialist, and a historic preservation specialist (T. Knisely, personal communication, December 11, 2009).

The goals of this task force were both "providing the highest degree of life safety possible" (Artim and Watts, 2009, p. 2) and preserving historic buildings in Bellefonte. The Fire Prevention task force worked with Dr. John M. Watts Jr. and Nick Artim, both experts in this field, in order to form a guide that would inform owners of historic buildings in Bellefonte of the steps they could take to protect their historic buildings (Artim and Watts, p. 2).

The Fire Prevention Task Force brought in Artim and Dr. Watts to present an educational program to both the county and the community. This was aired on a local government television channel, and was rebroadcast several times (T. Knisely, personal communication, December 11, 2009). Bellefonte received a second grant through the Pennsylvania Museum and Historic Commission. To try to educate the residents of Bellefonte regarding the process of fire protection and prevention, Bellefonte again enlisted the help of Dr. Watts and Nick Artim to create "Fire Detection & Suppression for Buildings

in Historic Districts” that was both informative and educational. This was done with the hope that the distribution of the report distributed would help convince owners that steps need to be taken to protect their buildings. Unfortunately the vast majority of buildings in Bellefonte’s historic downtown remain without means of fire prevention and protection (E. Hammerstedt, personal communication, December 02, 2009).

In 2007 the Fire Prevention Task Force presented recommendations that they thought would reduce the fire issue in Bellefonte to the town council. These recommendations included the inspection of all residential buildings both within the first year and periodically after that, depended on the perceived risk of fire for each building. They also recommended the installation of wireless smoke alarms in the upper floors of Bellefonte’s streetscapes so that a detection system could be put in place without rewiring historic buildings. The task force recommended a time frame of three to five years to install fire detection systems and seven to ten years for the installation of sprinkler systems. These recommendations were not put into effect (T. Knisely, personal communication, December 11, 2009).

The economic impact of the loss of the Bush house isn’t only due to the fire that destroyed it, but also due to the issues involving its reconstruction. The borough is still interested in constructing a new building in the now-empty lot where the Bush House once stood, but is encountering many issues. For example, a flood impact study needs to be undertaken before the site can be developed. The economic and historic benefits of once again having a complete historic streetscape, as opposed to one with such a blemish as a vacant lot, cannot be underestimated, but the steps to solving this can be difficult (E. Hammerstedt, personal communication, December 02, 2009).

The Bush House fire occurred slightly over a year and a half after the Bellefonte Academy fire, but building owners had done little to improve the protection of historic buildings in that time frame. Residents of Bellefonte believe that sprinkler and suppression systems are too expensive and are afraid that the installation of these systems would damage their buildings. This has made them balk at taking this route of fire protection (E. Hammerstedt, personal communication, December 02, 2009).

Bellefonte has also established prevention methods through the use of building codes, fire codes, and inspections. Bellefonte now requires a second means of egress, sprinkler installation, or both, depending on the situation, for buildings with two residential units or in buildings over two stories. Building inspections occur only if there is a change of use of the building. Private homes are not inspected at all, and currently there is a bi-annual commercial inspection plan on the table.

Two issues with using codes and inspections in Bellefonte need to be addressed. The first issue is that only apartments in buildings can be inspected. This means that the basements in apartment complexes cannot, by code, be looked at by an inspector. This also means that no commercial or other residential property in Bellefonte is inspected (T. Knisely, personal communication, December 11, 2009). This is an obvious concern because of the ease with which risk factors for fire accumulate in buildings that are not inspected.

The other issue is that it can be hard to judge what the residents will accept. Bellefonte was recently forced to take back requirements for the installation of sprinkler systems in Bed and Breakfast occupancies because of public complaint (E. Hammerstedt, personal communication, December 02, 2009). Pennsylvania will require the installation of sprinkler systems in all new connected buildings constructed after January 1, 2010, as



well as in all new single family buildings built after January 1, 2011 (Artim and Watts, 2009, p. 15). This is a noticeable change at the state level that should, with time, carry over to towns such as Bellefonte.

The combination of the fires in the Bellefonte Academy and in the Bush House convinced Bellefonte that it was necessary to pursue a grant to help protect other historic buildings in the borough from fire damage. Bellefonte received a Preservation Project Grant from the Pennsylvania Historical and Museum Commission for approximately \$15,000. Bellefonte was also able to secure funds from the Pennsylvania Downtown Center, and from the borough itself.

Bellefonte is an example of what happens when the residents, council, and city officials are not united in a fire prevention and protection plan. The Fire Chief noticed fire-related issues in historic buildings in Bellefonte, but was only able to address them when two of Bellefonte's historic buildings burned down. Even then, the town council and owners did not follow up on proposals suggested by the task force. While this task force did provide education in the form of a television broadcast and an educational publication, nothing else has been done to address the issue.

#### **4.4 Analysis of the Bellefonte Case Study**

The loss of the Bellefonte Academy occurred due to improper maintenance, a severe lack of building inspections, and the lack of a fire detection and suppression system. The Bush House similarly lacked an adequate suppression system. Neither of these buildings has been rebuilt.

Bellefonte responded to these fires by creating a task force to analyze the fire situation and make recommendations. The borough attempted to educate the residents of

Bellefonte by holding a workshop, which was broadcast multiple times over a local news channel, and creating a publication dealing with fire detection and suppression. Bellefonte also secured some funding from a Preservation Project Grant and the Pennsylvania Downtown Center.

Bellefonte's response to fire, despite being led by a proactive fire chief who was supported by a team of experts, was not fully successful. Bellefonte has done little to address the issue of fire protection since the task force made its recommendations. These recommendations were not put into place due to financial concerns and the lack of support of the residents for this program. Thus the fire protection plan of Bellefonte never made it past the stage of making recommendations.

#### **4.5 Analysis of the Annapolis and Bellefonte Case Studies**

The case studies of Annapolis and Bellefonte have many similarities, because both towns experienced fires in historic buildings. These fires caused the towns to turn their attention to the issue of fire prevention and protection. Finally, in both cases this interest waned and ended without resulting in a functioning fire protection plan. These towns are still at risk for additional fires in their historic buildings because of this.

Annapolis and Bellefonte's attempts at addressing the issue of fire protection were remarkably similar. Both towns noticed the need for increased inspection of the downtown historic streetscapes, though only Annapolis reacted to this and hired an additional inspector. Both towns were unaware of or did not pursue alternative solutions to fire protection and prevention, and focused on offering incentives for the installation of sprinkler systems. These incentives did not interest the residents, who still feared the cost of installation. With the exception of Bellefonte's attempt to educate their residents

regarding the fire protection of their historic downtown, neither town pursued fire safety options further.

Both Annapolis and Bellefonte are still at risk of additional major fires in their historic downtowns. Little has been done to address their fire risk issue, which makes it likely that additional historic structures will be destroyed by fire in the future. This represents not only a financial loss for these towns, but also a great cultural loss for many people.

#### **4.6 Willmar, MN**

Willmar, Minnesota, is located in the Kandiyohi County, to the west of Minneapolis. The population of Willmar was 18,351 at the time of the 2000 U.S. Census. The city has a historically designated downtown approximately fifty buildings. The downtown buildings are arranged in a standard streetscape design, businesses are generally set up on the first floor with residences on the upper floors. These streetscapes are at most three stories tall and have shared walls, attics, and narrow alleys (M. Calvin, personal communication, November 18, 2009).

Willmar's infrastructure was rebuilt in the last 20 years. This project installed water stubs into the basements of every building in the downtown, which would make it possible for a sprinkler system to be installed and hooked up to the town's water supply. A proactive fire marshal was able to get these stubs installed. Funding for this project came from the taxpayers and town's budget. The town council supported the fire chief, which helped to facilitate this project. Various groups such as engineers, building officials, and the fire department were also involved in this process. With the municipal water already running into these buildings, the largest part of sprinkler system installation was already

taken care of. Despite this, only 10-20% of the buildings in the downtown have installed sprinklers (M. Calvin, personal communication, November 18, 2009).

Currently a sprinkler system will only be installed if either a downtown building is determined to be unsafe or the owners elect to install the sprinkler system on their own. Building owners have identified cost as a concern for not installing sprinkler systems in their buildings (M. Calvin, personal communication, November 18, 2009).

The Building Official and Fire Chief in Willmar, MN, can and have utilized the 2007 Minnesota building code to require owners bring their buildings up to code (M. Calvin, personal communication, November 18, 2009). This building code gives a building official the right to declare a building unsafe and therefore require the residents to vacate it “if continued use is dangerous to life, health or the safety of the occupants.” (p. 142, section 1300.0180).

Buildings in the downtown have to be brought up to both building and fire codes in order to be used. However, some leniency has been granted. Building owners can adhere to either the current fire code or the historic preservation fire code. Minnesota’s fire code is based on the International Building Code and allows for a phased-in program to defray cost of a sprinkler system by installing the system in sections. Code officials would prefer sprinkler systems to be installed in buildings over time rather than not at all (M. Calvin, personal communication, November 18, 2009).

Willmar is reluctant to adopt Minnesota Building Code 1306, because of the instances in which this code requires the installation of sprinkler systems. Officials in Willmar feel that this would create a financial problem for building owners (M. Calvin, personal communication, November 18, 2009).

#### **4.7 Analysis of the Willmar Case Study**

The Willmar case study demonstrates that towns need to provide additional incentives or aid to get building owners to improve fire safety; the town's "stubbing" of downtown buildings for sprinkler installation highlights this need. A proactive fire chief who was supported by the town council and several experts was able to convince the town to "stub" every building in the downtown. Despite this, only 10-20% of the approximate fifty buildings in the downtown have sprinkler systems installed. The only tool Willmar has available to require building owners to install sprinkler systems is the 2007 Minnesota Building Code. This building code can only require the installation of a sprinkler system if the building in question is declared unsafe. This rarely happens in Willmar. Willmar has been reluctant to adopt Minnesota Building Code 1306, despite the fact that it is an effective means to require building owners to install sprinkler systems, due to the cost of installation. Thus Willmar successfully laid down the foundation for a successful fire protection plan, but was unable to take it any further.

#### **4.8 Stillwater, MN**

Stillwater, Minnesota, is located to the east of Minneapolis and had 15,143 residents at the time of the 2000 census. Most buildings in the downtown are two stories tall and have crawl spaces in place of basements. These buildings are in the classic streetscape design with their adjoining brick walls. Close to 80% of the buildings in the historically designated ten-block downtown of Stillwater have sprinkler systems installed. There have not been any major fires in the downtown main street area in approximately twenty years. Stillwater adopted Minnesota building code 1306, which has resulted in approximately 90% of the sprinkler installations (T. Ballis, personal communication, November 23, 2009).

This code states that if existing buildings either have an occupancy classification change or gain a significant increase in total floor area, such that the occupancy load increases, the building owner is required to install an automatic sprinkler system (Chapter 1306, Special Fire Protection Systems).

A Stillwater town ordinance requires any sprinkler system with more than twenty sprinkler heads to have a monitoring and alarm system. Thus, almost all of the buildings with sprinkler systems also have monitoring systems. There are a few buildings that are potentially grandfathered into the previous law which required a monitoring system only if the building had 100 or more sprinkler heads (T. Ballis, personal communication, November 23, 2009).

Typically a change of occupancy classification occurs along with a change in ownership. Thus, people looking to buy buildings in Stillwater and change the occupancy classification or add floor area are warned that they may be responsible for installing a sprinkler system before the purchase occurs. However, the new owners are given a period of time to install the sprinkler system to defray the cost of installation (T. Ballis, personal communication, November 23, 2009).

All of the downtown buildings have the municipal water running into their basements, so the sprinkler systems are already “stubbed” and just need to be installed inside the building. All concealed spaces over 18” in height are required to be sprinklered; however there are some acceptable alternatives to sprinklers in Stillwater, such as filling the smaller spaces with fire-rated insulation (T. Ballis, personal communication, November 23, 2009).

#### **4.9 Analysis of the Stillwater Case Study**

Stillwater is an example of a town in that had success in protecting buildings from fire in the downtown due in part to the adoption of Minnesota Building Code 1306.

Stillwater has “stubbed” the entire downtown and installed sprinkler systems in 80% of the downtown. It has also passed an ordinance requiring the installation of an alarm system with sprinkler systems that contain more than twenty heads. These actions all point to a community that understands and utilizes building codes to protect itself from fire.

Stillwater has not had a major fire in its downtown in the last twenty years.

#### **4.10 Analysis of Willmar and Stillwater Case Studies**

Stillwater, MN and Willmar, MN are comparable because they are similar in size, are subject to the same required and optional fire and building codes, and have taken some similar approaches to fire protection. However, the seemingly minor difference of choosing to adopt or not adopt Minnesota Building Code 1306 is responsible for the drastic difference in the amount of downtown buildings with sprinkler systems installed. The downtowns of each of these towns have their buildings “stubbed” for sprinkler systems. Contacts within each town have estimated that 80% of the downtown buildings in Stillwater have sprinkler systems, while only 10-20% of the downtown buildings in Willmar have sprinkler systems. Stillwater has adopted Minnesota Building Code 1306, while Willmar has not. Approximately 90% of the sprinkler systems installations have occurred in Stillwater because of 1306.

#### 4.11 Anoka, MN

Anoka, Minnesota, is a city that has had outstanding success in motivating its citizens to install sprinklers and protect their historic downtown. The most recent fire occurred in October 2006. It was an arson fire in a building that had a partially installed sprinkler system. This sprinkler system prevented the fire from spreading to the rest of the buildings on the block, most of which have common attics and walls. Fire Chief Charlie Thompson met face to face with the owners of every building on the block, most of which did not have sprinkler systems, and showed them pictures of the arson. He then explained to them that had the building not been sprinklered, there was a good chance the entire block would have been destroyed (C. Thompson, personal communication, November 4, 2009).

Anoka was already in the process of determining how best to install sprinkler and detection systems in their historic four block downtown streetscapes at the time of this fire. Interest in preserving historic buildings in Anoka began about 20 years ago. This interest was due to the fact that there are few buildings from the 1800's in states like Minnesota simply due to how the country was settled (J. Bergman, personal communication, December 02, 2009).

Approximately ten years ago Anoka became serious about protecting their downtown in this manner, and obtained a Community Block Development Grant (CDBG) from the county. This was possible because Anoka County, due to its population being greater than 50,000, qualifies as an Entitlement District and thus is awarded funds from the Federal Department of Housing and Urban Development every year. The city petitioned the county for a portion of these funds and received between \$50,000 and \$75,000 to assist



Anoka in determining where and how to set up a detection and suppression system in the downtown area (J. Bergman, personal communication, December 02, 2009).

Anoka was able to completely pay for the installation of detection and suppression systems for three city blocks, with the owners seeing no cost, because of Tax Increment Funding (TIF). This was done through the Housing and Redevelopment Authority (HRA) of Anoka. The HRA designated a section of the city in which improvements were to be made. The property values in this area were then frozen for a period of 25 years. This occurred in Anoka in 2006 (J. Bergman, personal communication, December 02, 2009).

Money is then invested into the property to increase its value. Property taxes are paid based on the frozen value, while the HRA, who has the power and authority to implement this as it is the redevelopment arm of the city, receives the tax money on the difference between the frozen value and what the taxes on the property would actually be due to the improvements. This money was used for the installation of detection and suppression systems in Anoka, and up to this point has raised \$900,000 out of the total projected cost of \$1.2 million (J. Bergman, personal communication, December 02, 2009).

Unfortunately, in terms of fire protection, the last block in Anoka's downtown will remain without a detection and suppression system. This is because one city council member, who feels as though it would be a conflict of interest, owns around 85% of the buildings. The personal cost is too great, around \$180,000, so for the present the buildings will remain without sprinklers (J. Bergman, personal communication, December 02, 2009).

While the CDBG took care of the cost of planning, and the TIF took care of the cost of installation, there remains one expense that the building owners will have to cover. It costs \$600 a year per block for fire detection devices and a dedicated phone line that will alert

the fire department in the event of fire. This cost is split among every building owner in the block, so the total cost per owner per year is roughly \$50 (J. Bergman, personal communication, December 02, 2009).

Many of the downtown buildings in Anoka have multiple owners on each block; the town was successful in bringing agreement to install these systems in their building. Anoka was very successful in eliminating the cost of sprinkler systems, which was the only thing preventing owners from installing sprinklers.

Buildings that have sprinkler systems installed are required to undergo yearly inspections. All other buildings undergo inspections every other year. This is because the local fire department covers two towns, Anoka and Champlin. These inspections are important for two reasons. First, inspections catch potential fire hazards, as they are designed to do. Second, when building owners become accustomed to inspections, they tend to keep consistent with building maintenance (C. Thompson, personal communication, November 4, 2009).

Anoka uses these inspections as a means of education. Every issue is explained to the building owner in order to spread information and concern about fire safety. Anoka also uses multiple town council meetings as a means of spreading fire information, especially when decisions regarding the program have to be made. There is a formal education system in place, but it is directed only at school age children due to budget constraints (C. Thompson, personal communication, November 4, 2009).

Anoka is an example of what a motivated community can accomplish. The town officials were able to secure funding and use the community's interest in preserving their valued historic downtown to install detection and suppression systems with little cost to

the building owners. The town council acted as one unit, giving every resident the same story, and willingly held multiple town council meetings until all questions and concerns were addressed and alleviated (C. Thompson, personal communication, November 4, 2009). The actions of this community make it clear that the protection of historic streetscapes from fire is a problem that can be addressed and resolved.

#### **4.12 Analysis of the Anoka Case Study**

The Anoka case study outlined the methods of a community that was successful in addressing the issue of fire prevention and protection. Anoka had a large community in the downtown that was interested in preserving its historic downtown. This interest developed because of a series of successful meetings held by a group of officials. The local Fire Chief in turn led this group. Anoka was able to secure funding through the work of its Housing and Redevelopment Authority for an analysis of sprinkler system location and the complete coverage of the cost of these sprinkler systems.

It was this financial assistance that secured Anoka residents' interest in installing these systems. Three previous incentives, only one of which included sprinkler systems, were offered to try to use building rehabilitation as a means of addressing the fire issue. The reason Anoka was successful in convincing its residents is that it continued to offer different incentives until one worked for the community.

Anoka continues its fire protection plan through yearly building inspections in buildings that have sprinkler systems installed and the inspection of other buildings every two years. It has also established an educational system for children in grade school.

These factors were all essential to Anoka successfully addressing the issue of protecting the streetscapes in its historic downtown from fire. A dedicated group of town

officials dealt with the problem by getting the community on board and then dealing with the specific needs of that community.

### 4.13 Rome, GA

Rome, Georgia has not experienced a major fire in its downtown region since 1986. However, Rome does have much experience with fire in its downtown prior to 1986. “Fire is no stranger to Broad Street and Downtown Rome” (G. Lanier, personal communication, December 4, 2009). Rome addressed this issue through revitalizing its downtown area, through various means of education, and by passing ordinances. These issues were able to be successfully addressed because of the combined efforts of “...all of the departments, agencies, organizations, and individuals involved in the Main Street” and “the fire department and building official” (G. Lanier, personal communication, December 4, 2009).

Fires in the downtown region of Rome have been a common occurrence throughout the city’s history. Notable fires include the Nevin Opera House in 1921, the Third Avenue Hotel in the early 1900’s, the Armstrong Hotel in 1921, the Forrest building in the late 1960’s and late 1970’s, and a fire in the Thom McAn Shoes store in 1962, which was responsible for severely injuring 2 fire fighters (G. Lanier, personal communication, December 4, 2009).

Fires in downtown Rome became less common in the 1980’s due to several actions by the town. A sprinkler ordinance was passed by Rome in 1982. This ordinance was applied primarily in instances of new construction and change of occupancy. One and two story buildings with an area greater than 5,000 square feet were required to have sprinkler systems installed, unless they broke their building up into sections smaller than 5,000 with fire barriers that had a two hour fire rating. Buildings over two stories were required to

have a sprinkler system installed, as did places of assembly with an occupancy load greater than 100 people and a license to serve alcohol (G. Lanier, personal communication, December 4, 2009).

This sprinkler ordinance was useful because it helped reduce the amount of firefighters needed to fight a fire. The Rome Fire Department had calculated that for buildings with an area greater than 5,000 square feet, based on ISO fire flow requirements and several NFPA publications, over half of the town's fire engines and a ladder truck would be required to successfully extinguish a fire in such a building. This represents a large drain on the fire departments resources that was much reduced by the addition of sprinkler systems in many of these buildings (G. Lanier, personal communication, December 4, 2009).

The sprinkler ordinance was also able to allow reductions in construction costs and insurance premiums, in one case enough so that one building owner was able to use his insurance savings to pay for the recently installed sprinkler system in 5 years' time. While this amount of savings is not universal, it does show that there are financial incentives for the installation of detection and suppression systems, beyond the obvious cases of the reduction of the risk of having a business, and a source of livelihood, being completely destroyed (G. Lanier, personal communication, December 4, 2009).

Rome passed an ordinance in 1983 concerning building rehabilitation and preservation. Rome had to go through a difficult process of drafting then instituting this ordinance, as has been seen in other case studies. The Building Official, the Rome Fire Chief, and George Lanier, who was the Fire Marshal for both Rome and Floyd counties, drafted this ordinance. They made sure to work with other city departments as closely as

possible in order to create a more successful ordinance. This ordinance went to the City Commission after being drafted. Residents who were either for or against its implementation were able to appear before the City Commission. Generally those opposed were developers. Its supporters were property owners concerned about the safety of their buildings, historic preservationists, fire officials, and building officials (G. Lanier, personal communication, December 4, 2009).

To ease tensions caused by the building rehabilitation and preservation ordinance, fire protection supporters provided a publication entitled A Guide to the Role of Buildings and Fire Related Codes in Building and Revitalization Projects. It outlines the issues of fire protection and code compliance in terms of building renovation. Supporters also created a presentation, which dealt with fire protection issues in the downtown area. It was shown to civic clubs and special interest organizations as a means of educating and providing information to the groups that would have the largest impact in revitalizing the downtown area. A local radio station owner, who was well known for his work in community development and historic preservation efforts and was well regarded within the town, narrated this presentation (G. Lanier, personal communication, December 4, 2009).

The sprinkler and building rehabilitation and preservation ordinances had another intended goal beyond life safety and property protection. In the 1980's, Rome's downtown was a collection of few shops and many vacant buildings. Rome joined the Main Street program in 1981 (Rome, Georgia). The program was well marketed and succeeded in gaining the attention of building owners who had lived with the knowledge of the risk of fire in Rome's Downtown but had done nothing to prevent these risks. The ordinances passed in 1982 and 1983 complemented the Main Street program and successfully

revitalized Rome's Downtown. It is now a thriving area with businesses, apartments, and enough forms of entertainment that there is talk of creating an entertainment districts near or within the Downtown area (G. Lanier, personal communication, December 4, 2009).

There were many vacant upper floors in downtown Rome prior to the Main Street Program revitalization. Upper floor vacancies represent a large fire hazard for two reasons. First, they are often uninspected for long periods of time, which allows them to fall into states of high disrepair. The second reason is that they are often used for storage, which provides extra fuel for a fire (G. Lanier, personal communication, December 4, 2009).

Rome tries to inspect its buildings on an annual basis, but things such as educational programs and specific inspection requests take personnel away. Rome has responded to this issue by using its engine companies to inspect buildings greater than 5,000 square feet twice a year. An official inspection of the building occurs if the engine crews find a fire hazard in the building. This solution has proven to be an effective way to deal with the inspection issue (G. Lanier, personal communication, December 4, 2009).

Rome's successful education of building owners has also had a large impact in the decrease in fires in the downtown coupled with a simultaneous revitalization of the downtown area. "Education, education, education" (G. Lanier, personal communication, December 4, 2009) was George Lanier's solution to working around the conflicting agendas of groups involved in the process of fire protection and restoration of historic buildings. It is unlikely that the average building owner is going to have very much knowledge of building codes, fire codes, methods of detection and suppression, or of alternative means of solving these issues (G. Lanier, personal communication, December 4, 2009).

Site visits with building owners was one of the most effective tools in educating them concerning the various risks and solutions available. It was much more effective to go through a building and have risks pointed out then to try and comprehend a building code. Educational programs in Rome stressed the need for maintenance and provide business owners and organizations with information regarding suppression systems (G. Lanier, personal communication, December 4, 2009).

Rome's education did not end with building owners and special interest organizations. Rome has a program of fire education that occurs every month in every 5<sup>th</sup> grade class in every school in Rome and Floyd counties. George Lanier stated that there is evidence of this program saving lives (G. Lanier, personal communication, December 4, 2009).

In 1975 Rome decided to evaluate fire problems in the community and then base public education efforts on findings. This plan changed one year later due to a fire that resulted in the death of a five-year-old boy and his two-year-old sister. The parents and the children were not aware of basic fire survival techniques, such as crawling to get beneath the smoke, which contributed to the fatalities. This tragedy was responsible for jump-starting public education programs in Rome (G. Lanier, personal communication, December 4, 2009).

Rome understood that there were multiple issues involved fire protection and prevention of historic streetscapes, and the city dealt with them in a well thought out manner. The city officials realized that each individual rehabilitation project would be different than any of the others, and thus addressed these issues on a case-by-case basis. They used codes and laws to overcome problems encountered, but stressed the need to



building owners and developers to be flexible in their solutions (G. Lanier, personal communication, December 4, 2009).

The officials concerned with Rome's rehabilitation process were all united and worked together. This allowed the town to have a Main Street Program, which must be started by a core group of dedicated residents in the town. This also allowed them to create and distribute informational pamphlets, have a successful educational program, and completely revitalize their downtown into an economic success. The fact that Rome has managed to both transform their downtown and decrease the number of fires in the downtown is testament to their success in addressing the fire prevention and protection issue.

#### **4.14 Analysis of the Rome Case Study**

Rome dealt with the issue of fire in its downtown streetscapes in a very effective manner. The city has not experienced a major fire in its downtown since 1986 due to several key actions.

In 1981 Rome became a member of the Main Street program. At this time the downtown area had many second floor vacancies and few businesses. In 1982 Rome passed a sprinkler ordinance that required the installation of sprinkler systems in floors larger than 5,000 square feet and situations where the building changed use. This reduced strain on the Rome Fire Department, which had needed to respond with half of its fire crew to fires in buildings that had floors greater than 5,000 square feet. In 1983 Rome passed an ordinance concerning Building Rehabilitations and Preservation. Rome successfully eased tensions created by this ordinance by creating a publication. These three actions resulted

in the successful rehabilitation of downtown Rome. Downtown Rome is now thriving. These actions also helped resolve the fire problem.

Rome maintains its protection plan through education and building inspections. Fire engine crews are used in conjunction with building inspections to help spot potential hazards before they are able to damage a streetscape. Rome has programs in place to educate both its children and adults. A unified group of town officials listened to recommendations from the Rome Fire Department, and were able to effectively address the issue of fire protection in Rome.

#### **4.15 Analysis of the Anoka and Rome Case Studies**

The similarities between Rome and Anoka, towns that successfully addressed the issue of fire protection, do not exist in the details, but rather in the larger picture. This is because these two towns have taken different paths while having the same intentions and focus. Both towns have set up forms of education for both adults and children. Both towns have used regular building inspections and property maintenance as tools to prevent fire. Most important, both towns had a group of experts and officials that were the driving force behind each town's protection plan. These groups dealt with the specific needs of their community. These reasons are why both towns are examples of success.

### **Summaries**

The following towns and cities are included in this report because, like the case study towns and cities, they have suffered fires or have had success improving fire safety or

both. However, these towns and cities are not pursued to the same depth as the case study towns.

#### **4.16 Hopkins, MN**

Hopkins, MN, has a main street composed of buildings constructed primarily in the early 1900's. The streetscapes in the historic eight-block downtown are of mixed use. Half of these downtown buildings have sprinkler systems installed in the basement. The Hopkins Fire Department was able to convince some of the building owners to install sprinkler systems in their basement by informing the owners that fire fighters would not be sent into basements in the event of a fire, because of the basement's construction. The city of Hopkins offered discounts to owners who would "stub" their buildings in the early 1990s. (D. Specken, personal communication, November 03, 2009).

Hopkins has experienced two major fires in the downtown. The first occurred in August of 2004 because of an electrical malfunction. The fire was successfully contained to the store and resulted in \$500,000 in damages. This building does not have a sprinkler system in place, because there was no ordinance requiring the installation of one when it was rebuilt. The second fire occurred in May of 2005 because of a discarded cigarette. This fire resulted in the complete loss of the building and damages totaling \$3 million. This building was rebuilt after Hopkins instituted a sprinkler system ordinance, and is equipped with a full sprinkler system (D. Specken, personal communication, November 03, 2009).

Hopkins adopted Minnesota Building Code 1306 in late 2004. The request for adoption of the code was brought to the town council by the fire chief. The public was informed and invited to a public hearing through a newspaper article and a letter

distributed to business owners. No one attended the hearing, thus there was no opposition and the code was adopted. Approximately 50% of the basements have sprinklers installed, but most of the installations occurred prior to the adoption of Building Code 1306 (D. Specken, personal communication, November 03, 2009). However, the adoption was very recent, so more sprinklers may be installed.

#### **4.17 Miles City, MT**

We acquired the following information through a phone call with Chief Derrick Rodgers of Miles City, MT, in a phone interview on 11/06/09, except where noted. Miles City, MT, is located in eastern Montana and has approximately 9,000 residents. In March of 2009 a fire occurred in the downtown area that started from sparks that fell into a wall from pipe cutting in the basement. The fire spread up the wall into the 2<sup>nd</sup> floor area and spread into hidden spaces. The fire then spread into the two adjoining buildings through the 2<sup>nd</sup> floor walls. Complicating the fire situation, the workers cutting the pipes attempted to fight the fire themselves before calling the fire department. This allowed the fire to grow and delayed the fire department's response. These buildings had no detection systems; Chief Rodgers said that few buildings in the downtown area have detection systems. Rodgers also said there has been limited discussion about improving fire safety and protection in the downtown area, the general belief is that sprinkler systems do not offer payback. Miles City has lost at least three other buildings to fire in the last 25 years, but the city has also had success saving buildings from fires. Chief Rodgers expressed a concern that money is a common factor and said that a downtown-wide sprinkler installation would require a grant or some other form of funding from beyond the city level.

#### **4.18 National Trust on Fire Protection and Prevention**

The National Trust for Historic Preservation's Main Street program offers resources for people seeking to revitalize their downtown historic areas. These resources include monthly publications and books. A community does not need to become a designated Main Street community to utilize the methods and information available in Main Street publications. Becoming a member of the National Trust Main Street Program does offer communities access to a wider range of documents and contacts. The Main Street Consulting Services offers consulting, technical assistance and training to a range of downtown areas (National Trust for Historic Preservation, 2009). However, despite the focus on the revitalization and rehabilitation of downtowns, there has been a limited focus on fire protection and prevention of these downtowns. According to Lauren Adkins, Assistant Director for Field Services of the National Trust for Historic Preservation Main Street, there are approximately 1250 active communities that have applied for and received the Main Street designation and there are approximately 750 more member communities that receive Main Street newsletters and publications (personal communication, 2009). This means a potential publication on fire prevention and protection could reach thousands of communities. Funding Used by Communities to Finance Fire Protection Improvements

#### **Funding**

The funding sources we have listed below are creative funding options that we found towns are utilizing to improve fire protection or in the case of the federal and state tax rehabilitation, a method that could potentially be used to help reduce the cost of a sprinkler installation in a Nationally Designated historic property. There are many more

funding options available at the local, state and federal level regarding historic preservation and rehabilitation. Due to the number of options, the variance from state to state (in some cases) and the certain property requirements, it is impossible for us to list all of them.

### **Community Development Block Grant**

The Community Development Block Grant (CDBG) is offered through the US Department of Housing and Urban Development (HUD). Funding is available directly from HUD for entitlement communities, which are cities larger than 50,000 residents or cities that lie in a county larger than 200,000 residents (Community Development Block Grant Entitlement Communities Grants). HUD also gives CDBGs to states to administer to communities that do not fit the “entitlement” description. There are restrictions on how the money must be allocated, but as seen in Anoka, MN, A CDBG could be utilized to plan a massive renovation project, such as sprinkler installation (Community Development Block Grant, 2009).

### **Economic Development Administration**

The Economic Development Administration (EDA) offers funds available through the Economic Development Assistance Program primarily for communities with distressed economies. While not all downtowns will meet these criteria, potentially, money could be available to downtowns responding to a major fire for rebuilding and improving fire protection.

## **Tax Increment Financing**

Tax Increment Financing (TIF) is used to fund the redevelopment of an area or district. The local government designates a “redevelopment district” and “agrees to dedicate the increased property tax revenue to the project itself” (NTHP, p. 48). Thus, the city essentially freezes the property values in that area at their current level, as the property value increases, the amount of property tax will increase as well. This new tax revenue is then invested back into the project, typically by paying off bonds issued to fund the project initially.

## **Federal and state rehabilitation tax credits**

Developers and property owners may be able to utilize federal and state income tax credits for historic income-producing buildings (NTHP, p. 50). There is an income tax credit equal to 20% of qualified rehabilitations on buildings listed in the National Register of Historic Places; this tax credit extends to contributing buildings of a Nationally Registered Historic District. There is also a 10% income tax credit for qualified rehabilitations on buildings built before 1936. Additionally, these tax credits can be sold or transferred to investors if the building owner/developer cannot utilize the tax credit, which provides a way for the owner/developer to take advantage of the incentive even if they cannot use the income tax credit.

## **Insurance Discounts**

According to Hayward Howard of the National Trust Insurance Services, several of the major U.S. insurance companies will not insure historic buildings. However, an insurance company that does cover historic buildings will give a sprinkler discount of up to 10% and

a discount of up to 5% for installing smoke alarms (personal communication, 2009). Thus the cost of the installation of a smoke alarm will be covered in one year by the insurance savings. Building owners should contact their insurance companies to learn about discounts granted for installing fire protection methods.



## **5 Conclusions and Recommendations**

We have determined problems facing the fire protection of historic streetscapes through archival research, touring of specific streetscapes, and interviews with professionals. These problems have been outlined in our Results and Analysis section, contained in chapter 4 of this report. This final chapter contains our conclusions along with our recommendations concerning the remediation of these problems.

### **5.1 Conclusions**

Our results have led us to draw several conclusions concerning this project and its focus. We have broken these results down into six separate areas in order to address them in a more efficient and organized manner.

#### **5.1.1 Irregular and Infrequent Building Inspections in Historic Districts Contribute to the Threat of Fire**

One of the key reasons buildings burn down is the lack of regular maintenance. This is facilitated by a lack of regular code compliance inspections. These inspections are useful because they both encourage regular maintenance from owners who wish to avoid citations and because a well performed inspection can find potential hazards before they can damage or destroy the building.

It is rare for a municipality to have enough building inspectors to perform these inspections in any adequate amount of time, as we have found through our research and through communications with members of the National Trust for Historic Preservation. Additional building inspectors tend to be hired after fires occur, not before, when preventing these fires through inspections was possible.

Alternative solutions are needed to help facilitate building inspections since this lack of inspections is a widespread issue and not limited to a few municipalities. This would help reduce the risk of fire due to a lack of maintenance, which is a common issue in many municipalities.

### **5.1.2 Convincing Building Owners of the Necessity of Maintenance is an Issue**

Maintenance is one of the cheapest and most effective ways to prevent fires. This is a preventative measure that helps reduce the risk of fire by eliminating hazards within the building. Preventative measures are inherently more important than methods of fire suppression because fire suppression is only necessary when fire prevention fails.

Unfortunately, building owners are often convinced that a fire will not occur in their building, and thus have little interest in prevention and protection methods. We have found examples through our research of building owners who allowed their property to fall into dangerous states of disrepair due to this prevailing mentality, such as in the case of the Bellefonte Academy fire in 2004.

Well-established and sustained educational programs can be very influential in convincing building owners to take action. Anoka addresses the issue of education through programs at the grade school level and by explaining the risk factors and hazards to building owners during inspections. Similar to Anoka, Rome has dealt with this issue through grade school education, but also has used educational programs directed at the adult population in the city. Rome attributes its lack of major fires in its historic downtown in the last twenty years in no small part to its educational programs.

Education of building owners, in the form of pamphlets and town meetings, tends to rise significantly after a fire occurs. These same educational programs are often discontinued before they can have a positive impact on the municipality due to dwindling interest and a lack of funding. An example of this can be seen in Bellefonte, which discontinued its educational efforts after the creation of the publication developed by Mr. Artim and Dr. Watts. Little can be gained from educational programs if they are not stressed as necessary, in terms of both expenditure and fire prevention.

### **5.1.3 Factors Involved with the Installation of Detection and Suppression Systems Can Be a Deterrent to Building Owners**

There are several concerns building owners have with the installation of detection and suppression systems. These problems are common to all building owners and thus are the biggest impediments towards the installation of these systems.

The first of these issues is the fear that the installation process will damage the building. This is a legitimate concern as damage is a risk with all construction projects. However, this pales in comparison to the damage that can occur to a building as a result of fire.

There is another issue related to building owners knowledge of construction projects. These owners share concerns regarding the interference the installation process will have on their lives or businesses. Renovation can be a lengthy process, which is viewed as more of an annoyance than a solution to the issue of fire.

Our research has shown that the cost of the installation of a sprinkler system is a prevalent concern. The installation of these sprinkler systems is costly, even in cities such as Willmar where public water is already “stubbed” into the building.

Additionally, a common problem is deciding how to pay for the installation of a sprinkler system in spaces that are shared by multiple building owners in a streetscape. This becomes increasingly complicated if one or more of these building owners is not interested in or unable to afford the installation of a sprinkler system.

Sprinkler systems can be very unsightly because of their pipes and sprinkler heads. These systems can be hidden, but even the simplest methods of disguising these systems can add to the cost of installation. A visually unappealing system, that costs even more to hide or disguise, does not offer much incentive to a building owner who is reluctant to install such a system in the first place.

Funding for sprinkler systems can be an issue as well. Information about funding, such as tax credits, grants, and loans with favorable terms, is not always widely distributed. Funding can be difficult to obtain, especially in regards to historic buildings. While there are numerous grants and programs available, these often have strict requirements. Tax Increment Financing (TIF) and Community Development Block Grants (CDBG) are examples of creative ways to fund programs.

These concerns about cost have a large impact on a building owner's decision to install a sprinkler system or not. Towns that do not address these concerns are in most cases unsuccessful in protecting their historic streetscapes from fire. Towns, such as Anoka, have successfully addressed this issue by acquiring and distributing funding to building owners, and by informing building owners that the risks of not having these systems severely outweighs the issues involved with installation.

#### **5.1.4 Alternative Methods of Fire Prevention Are Not Always Explained**

Many building owners, when confronted with the cost of sprinkler installation, decide that fire protection is unaffordable. This is a problem because sprinkler systems, though they are one of the most effective solutions, are not the only option for fire protection.

Alternative options are available to enable a building owner to comply with the intent of fire and building codes. These alternatives include fire resistant material such as intumescent paint, compartmentation, and renovation methods to protect a building from an excess of damage in the case of a fire.

Intumescent paint can be applied to a surface to help insulate it in the event of a fire. When this paint is heated, it rapidly expands into fireproof foam that provides a one-hour fire rating. This delays fire from igniting the surface the paint is protecting, and helps provide time for the fire to be extinguished. This method is fairly effective, but cannot be used alone to protect a building from fire. This is in part because it is impractical to cover every surface of the building with paint, and protection only lasts for a certain amount of time.

Compartmentation is an effective means of breaking up large open spaces in which fire can easily spread through. This is especially effective in reducing the risk of fire spreading through shared spaces in streetscapes. Compartmentation must be done with fire-rated material otherwise this will be ineffective.

Fire and building codes themselves can be useful in requiring a building owner to install suppression and detection systems. The appropriate local authorities determine the interpretation and application of these codes. Sometimes these officials are allowed leeway in applying building and fire regulations, which can be a more effective means of

preventing and protecting against fire. This leeway is determined on a case-by-case basis according to the building and fire codes the municipality has adopted.

### **5.1.5 Vacant Upper Floors Increase the Threat of Fire**

Vacant upper floors of historic buildings represent a large fire hazard. These floors can be unused for decades, and tend to fall into states of disrepair. This significantly increases the risk of fire. These floors are generally vacant due to building code requirements calling for extensive renovation before use, which is a deterrent to building owners because of the cost of renovation.

The lack of building inspectors in municipalities can lead these floors to go uninspected for decades. This only compounds the problem of increasing fire hazards as a floor falls into disrepair. These floors are often used for storage, which adds to the risk of fire by providing accelerants and combustibles.

Towns with successful fire prevention programs have been successful in addressing the upper-story vacancy issue. The Main Street program, through the National Trust for Historic Preservation, has been shown to be helpful in this regard, as it provides experts in renovation and rehabilitation to municipalities that are accepted into this program. Resolving this issue reduces the fire risk and brings in revenue, since a paying renter or company will take up space there. This process helps revitalize downtown areas, which is a further source of revenue for building owners. Rome is an example of this, as several key ordinances and its adoption into the Main Street program eliminated upper floor vacancies and completely revitalized the downtown.

### **5.1.6 United and Well-Organized Town Councils and Officials are Effective in Reducing Fire Loss**

We have found a pattern in our research regarding successful fire programs. Every city that had a successful fire program also had town officials that worked together to give the community the same perspective on every issue. These town officials were led by a “sparkplug,” a dedicated and knowledgeable leader with sufficient position within the town, to address the problem. This unity allowed these officials to anticipate and address the specific needs of their community and create a fire prevention and protection program that was well suited to the resident’s needs. Rome and Anoka, in particular, have used this method to address the issue of fire in their historic downtown streetscapes.

## **5.2 Recommendations**

We have developed several recommendations in order to address the issues presented in the Conclusions section. Implementing these recommendations can help reduce the likelihood that fire will destroy historic streetscapes in the downtown.

### **5.2.1 Assemble an Educational Packet**

We recommend that a packet of information be compiled to provide education to towns or cities that are interested in protecting their downtowns from fire. This packet should include several pieces of information. The packet should include information similar to the publication developed for the Borough of Bellefonte, *Fire Detection and Suppression in for Buildings in Historic Districts*. This should include information regarding cost and installation of sprinkler systems, as well as alternative methods of fire protection, such as intumescent paint. There should be a section on correct property maintenance as a

means of preventing fire. This would be an ideal place to include a list of resources and publications regarding the topic of protecting historic streetscapes. Finally, we recommend this packet contain a list of possible grants or methods of funding, such Tax Increment Financing (TIF) and Community Development Block Grants (CDBG), in order for interested parties to further pursue how to best fund their program.

This packet could act as a starting point for building owners, town officials, fire officials, historic preservationists and any other interested parties. It will contain enough information to get a dedicated group of officials on the right path to protecting their downtowns from fire. It will inform them of conventional means of fire prevention and protection, such as sprinklers, while opening their minds to the fact that there are alternative methods to protect their buildings from fire. The grant options and publications will provide ideas for how to create and implement a protection plan. This packet will help inspire confidence in the town officials and set them along the right path to create a successful fire prevention plan.

### **5.2.2 Inspect Buildings in Historic Streetscapes on a Yearly Basis**

The correction of hazards discovered by yearly inspections of historic buildings could help to minimize the amount of fires that occur in these structures. We have found instances where floors have been vacant and uninspected for decades. Over such periods of time these floors fall into states of disrepair. When coupled with the fact that many of these vacant floors are used for storage, the risk of fire increases dramatically.

Alternative methods of building inspections must be addressed because the lack of building inspectors is not an issue faced by a few municipalities, but a widespread problem



throughout the United States. We recommend using pre-planning tours to spot hazards in buildings, followed by an official inspection if hazards are found.

Pre-planning tours are a feasible and cost effective solution because they are already conducted by many fire departments across the nation. The Rome Fire Department successfully uses this method. These tours are used as a means of acquiring information on buildings that could present a fire department with many problems should it catch on fire. Since these tours are already conducted, there would be no increase in cost to the municipality, no need to hire additional fire fighters, and would provide casual inspections by trained professionals.

### **5.2.3 Encourage Compliance with the Intent of Building and Fire Codes**

We have found instances of towns that have been able to use fire and building codes to protect their historic streetscapes. Stillwater is an example of this because it installed sprinkler systems in approximately 70% of its downtown through the adoption of Minnesota Building Code 1306. Codes vary from city to city, but often can be used in instances of zoning changes or renovations to require a building owner to bring their property as close to compliance as possible. These codes are valuable tools in fire prevention.

It is important to mention that there are often alternate means of bringing buildings up to code that can be used to preserve the historic fabric of these buildings. Something as simple as removing a tin ceiling, installing material that gives the ceiling a four-hour fire rating, then placing the original ceiling over that can be an option.

Town officials need to be in agreement on what constitutes code equivalency, and they need to agree that code officials have the final say on whether or not a certain

alternative is acceptable. Towns need to understand that creative ideas are a good thing and that the historic fabric of buildings can often be preserved with such methods.

Finally, with the cost of suppression and detection systems being such a concern, it is important to realize that some residents may need an extended period of time to install these systems. This is an important option for small businesses or residents that do not have the money to pay for these systems upfront. A system that is installed over a period of five years is a much greater achievement than a system not being installed at all. Such a program could be instrumental in winning over residents of a town.

#### **5.2.4 Hold Town Meetings to Educate and Inform Owners of the Necessity of Prevention**

A series of town meetings should be held to educate building owners and help alleviate any concerns they may have with doing what is necessary to protect their buildings. Building owners, historic preservationists, architects and code officials should be invited to attend these meetings. Examples of previous fires destroyed large amounts of property in streetscapes that did not have adequate protection and examples of streetscapes that were saved from fire damage due to containment from protection systems would be invaluable in convincing building owners of the need for protection.

Building owners are often hesitant to install suppression and detection systems in their buildings due to costs. The actual cost of installation should be presented to them, along with information concerning tax credits and other means of alleviating the cost. The financial incentive of having a renovated and protected upper floor must be presented as well.

The leader and the town officials supporting him or her must stress that maintenance with annual building inspections is one of the least expensive and most effective ways of preventing fire. Regular maintenance reduces the risk of fire caused by a lack of upkeep, and when coupled with building inspections, ensures that the building owner addressed the major the issues within the property.

With the two biggest issues addressed – the perceptions that a fire will not happen in the owner’s building and that the cost of prevention and protection is too great – the town officials should then proceed to address other concerns that arise. This should continue until the majority, if not all, interested citizens of the town are convinced of the need to protect their historic buildings from possible fire destruction.

### **5.2.5 A “Spark Plug” and Unified Town Officials Are Key to Success**

We have found that towns with effective fire prevention programs all have the benefit of a group of town officials that work together as one unit. Prevention programs have been a success when they are spearheaded by one passionate leader, known as a “spark plug”, who is supported by a unified group of city officials. The leader and the city officials must be able to sustain the interest of the community in fire protection find available grant money, convey the need to protect streetscapes from fire to building owners, and bring in experts to help detail sections of the fire protection plan when necessary.

The leader of this process is the most important individual to the success of the fire prevention program. He or she needs to be a public figure that is well supported by other officials and residents in the town. This leader must also have an influential position in the town that gives him or her the ability to organize, call, and carry out town meetings.

Anoka is an example of a city that had both a “spark plug” and a unified group of town officials, and was successful in reducing the risk of fire. Chief Thompson acted as the “spark plug” and other city officials supported his efforts to address the issue of fire in Anoka. Fire Marshal Lanier acted as the “spark plug” for Rome. City officials in Rome listened to his advice, and once again the issue of fire was successfully addressed.

#### **5.2.6 Develop a Relationship between the National Association of State Fire Marshals and the National Trust for Historic Preservation**

The National Trust for Historic Preservation (NTHP) can be very helpful in the revitalization of downtown streetscapes through its Main Street Program. A town interested in its programs must approach this organization in order to ensure the seriousness of that town in making positive changes. The NTHP always sends experts in historic building rehabilitation to towns that gain the Main Street designation in order to provide knowledge and support. These experts do not include fire protection engineers, which we believe is an oversight.

We recommend that a fire protection engineer, with a focus on historic buildings, be included in the process. This would help reduce the risk of fire during renovation and encourage these dedicated main streets to consider fire protection and prevention as a higher priority. We recommend that the National Association of State Fire Marshals (NASFM) encourage more fire protection engineers to develop a focus on fire protection of historic buildings. This could be accomplished through a scholarship fund offered to college students who develop such a focus.

We also recommend that NASFM form a partnership with the NTHP for the distribution of the educational packet detailed in section 5.2.1. The packet will reach a large

number of dedicated communities because of the size of the Main Street program. The act of working together on development and dissemination of the educational packet potentially will lead to additional joint activities between the two organizations.

### **5.2.7 Next Step Recommendations for NASFM**

In the immediate future we recommend that NASFM work with proactive and responsive fire marshals and chiefs to gather more information about fire protection of historic streetscapes. In our time in Washington, DC, we have collected extensive information about towns and cities in Minnesota, many of which have found different and creative ways of addressing the fire protection issue for their historic districts. Based on the volume of results from Minnesota, we believe that there must be other states that have multiple cases of towns addressing the fire protection issue differently.

NASFM is in a unique position to address the issue of fire protection in historic streetscapes due to its extensive networks of fire marshals and officials. We recommend NASFM utilize this network as a means determining communities and fire marshals that are willing to address the issue of fire protection in historic streetscapes.

NASFM can use these responsive communities and officials to test various ways of addressing the issue of fire protection. Recommendations from this report, such as the distribution of an educational packet, could be tested as well. This process will allow NASFM to figure out what makes a town responsive to the issue of fire protection, as well as figure out how to help these towns proceed towards successfully addressing the issue.

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## Appendices

### Appendix A: Interviews

This appendix contains summaries of interviews conducted with various experts. Many of these interviews served as a primary source for our case studies. With each interview we sought to gain an understanding of the issues regarding fire protection of historic streetscapes and learn how various towns and organizations addressed these problems.

#### Interview questions bank

- Can you tell us about some historic district fires that have occurred in your area?
- What fire protection systems were in place before the fire(s) occurred?
- Were there previous fires in your town's historic district that caused the town to push for better fire protection systems?
- After the buildings were restored, were any ordinances or programs put in place to install better fire protection systems?
- Are these measures required of owners or incentive-based?
- What groups are involved in the process of creating a fire protection plan (i.e. fire department, town council, building owners, etc)? What discussions go on in the town meetings regarding such programs?

- What kind of opposition is faced, if any, when trying to pass programs and ordinances regarding fire protection plans or as part of the process of bringing buildings up to fire code?
- Have any fires reoccurred in the same sites after restoration?
- In your professional opinion, what is the most important method of fire protection that could be used in a historic district to protect against loss of life and property?
- What was the overall process in creating and passing the programs? Was it costly? How much time did the process take? What were the greatest challenges? Why?
- Since implementing the programs, has there been a change in the amount of expansive fires (more than one building)?
- Could you tell us about any fire protection projects in your experience similar to our project? Could you put us in contact with the people who were involved in these similar projects?
- Could we get a copy of the fire incident report for our research?

- Are you aware of any fires that happened in historic districts outside of your jurisdiction?
- Could we quote you in our report? If you would like we can send you the draft chapter or section to review your quotations. Also, if you would like we can send you the final report when it is completed in Mid-December.
- Are there any questions we should have asked you?
- Could we contact you again if we have further questions?
- Do you have our contact information?

#### **Interview with Lt. John Bowes of the Annapolis Fire Department, MD 11/10/09**

Buildings in Annapolis used to be inspected every three years. Then fires in the downtown occurred in 1997 and 2005, and Annapolis was able to get one more inspector. Through many efforts, Annapolis' Blue Ribbon Committee was able to achieve the extra inspector. This committee was formed after the 1997 fire, but recommendations made at that time were not put into effect until after the fire in 2005. Now there are annual inspections of historic commercial buildings in order to check maintenance and to look for unsafe conditions. If a problem exists, such as too little separation between buildings, this inspection picks up on it.

There were few, if any, buildings that had anything in place in terms of fire protection, including smoke detectors, before the fire in 1997 occurred. Only places of assembly, buildings with a capacity of 50 or more people, such as bars, were inspected before this fire.

The city started low interest loan of revolving funds to help owners install sprinklers. This works by giving out loans and redistributing the money as building owners pay back their loans to the fund. There used to be legislation concerning renovation in residential buildings in Annapolis's downtown. If an addition or major renovation affected greater than 50% of the market value of the building, the owner was required to install a sprinkler system. This legislation was not well received by many residents in Annapolis and was changed to read that if an addition or major renovation affects greater than 50% of the buildings structure, the owner has to install a sprinkler system. Information on this and other legislation can be found in the city code section of [www.annapolis.gov](http://www.annapolis.gov).

Historic buildings will never meet building and fire codes due to their nature, so fire protection engineers are valuable to help assess the building and suggest reasonable alternatives or equivalents that the city could ask the owners to implement.

Annapolis used the life safety code to require building owners to install sprinklers and detectors in buildings that were already in compliance with building and fire codes, but did not have these systems in place. Another initiative for fire protection was moving wires underground so that fire equipment could go down Fleet and Cornhill Streets.

Building owners believe strongly that fire "won't happen to me" until a fire actually occurs. Then they want to know what can be done and are interested in installing sprinkler

systems in their building. An example of this occurred in Annapolis during the 2005 fire, where one of the neighbors to a building caught in the fire called the fire department for information regarding sprinkler installation the week after the fire occurred.

Fire fighters conduct Fire Hazard Surveys in order to provide information on a building, which can be accessed in the event of a fire at this location. This survey lists such things as gas and electric shutoffs, special hazards, fire hydrant locations, and contact information for the owner of the building.

There is no means to judge if Annapolis is doing a good job of fire prevention. This is due to the lack of recent fires. Annapolis has had no reoccurring fires in the same buildings.

Fire alarm systems are not, in themselves, valuable in terms of fire protection or prevention. This is for a couple reasons. They do not suppress or control the fire. They also do not work as effectively in the daytime. This is because if fire occurs during the day, it is going to be spotted or smelt by people who will call in the fire. People are more effective forms of fire detection in the day than actual detection devices. These devices are only useful at night, when businesses are unoccupied and thus less of a risk to life safety than if a fire were to occur in the same buildings during the day.

Sprinklers systems, when tied into fire alarm systems, are the best method to help preserve lives. They are the cheapest and most effective detection and suppression system that business owners would even likely get. Others methods and systems do exist that are more effective, but if owners do not want to spend money on sprinkler systems they are not going to spend money on a more expensive suppression system. Sprinkler systems can be installed without hindering a business's operation. Installation can occur in the evening

when the business would be closed down anyway. There were instances of this in Annapolis. Intumescent paint is an example of a cheap solution to some fire issues. It can provide a 1 hour fire protection rating, but the drawback with this is that you cannot cover an entire building with this paint, so routes that fire likes to travel, such as through windows, remain.

Building owners often have issues with the installation of suppression systems due to their costs. They also have issues in the cases of shared spaces between building owners. It is difficult to determine who should pay for the installation of suppression systems in these instances. Every owner of a building sharing a space must be in full agreement concerning the installation of a detection and suppression system. The other issue lies with the opinion that their historic building has survived for a long times without suppression systems, so there is little reason why one needs to be installed now.

The weakest link in buildings is shared third floors, attics, and basements. The second weakest is shared walls, due to the fact that these cannot be controlled retroactively. Sprinkler systems are a good form of protection in these instances.

The materials that buildings are made from are not as much an issue in the case of fire as is the fuel content inside. This is why buildings made of steel, which isn't flammable, can still burn down if it has a lot of combustible materials within.

It is almost impossible to force owners to install detection and suppression systems unless the fire department or town feels strongly that someone could lose a life if such a system remains uninstalled. This is hard to prove; there has to be solid evidence of this claim. A change of use, such as an office being converted to mercantile or residential, offers opportunity to enforce code compliance. This also gives opportunity to chip away at



problems in the buildings, by allowing the city to require the new owner to, for example, extend fire walls up into the shared attic to break up this shared space.

There are common structural issues in historic buildings. Electricians and contractors drilling holes in firewalls when installing utilities render firewalls useless over time. There are often false walls and ceilings in historic buildings due to past renovations. The spaces between these false walls and ceilings can create a chimney effect that intensifies fire. These spaces also allow fires to burn between walls and ceilings without anyone noticing for extended periods of time. Multiple false ceilings can complicate matters further.

**Interview with Patricia Blick, Chief of Historic Preservation of the Annapolis, MD  
Department of Planning and Zoning 11/10/09**

Many buildings in downtown Annapolis only have the first floor available for use because there is not enough space outside these buildings to install means of egress. This is due to the close proximity of buildings in streetscapes. Annapolis does not allow the use of upper level floors in instances where a second means of egress for these upper levels does not exist.

Annapolis looks for creative ways to set up fire protection systems with historic buildings that can allow them to be brought up to code while preserving appearance. One example of this is glass walls that close at the sign of smoke to contain fire. Another example is cement backer board over a roof, with wooden shingles laid over it to protect the house from fire. This method also helps preserve the historic appearance of a building. Historic preservationists want to use the original building materials in renovation projects,

but will occasionally use alternatives. Regardless, “safety trumps preservation,” in the eyes of fire officials.

The town also offers “incentives” for building owners to rebuild after a fire. If a bar or liquor store is damaged or destroyed by fire, the town can revoke the owner’s liquor license until they repair or rebuild.

**Interview with Mary Giannini, Director of the Annapolis Main Street Program,  
12/07/09**

Annapolis requires the installation of sprinkler systems before the upper floors of streetscapes in the downtown can be used. Many upper floors in Annapolis are vacant despite this ordinance. The HOPE VI Revitalization Grants Program could be used as an incentive for building owners to renovate these vacant floors. Community Legacy funding can be used by towns in Maryland for local economic development.

**Interview with Dennis Gentzel, Chief Fire Protection Engineer, Pikesville, MD  
11/09/09**

In the borough of Bellefonte, PA, 4 historic buildings have burned down. 3 of these buildings have burned down in the last 5 years. One of these 4 fires occurred in the Bush House. The Bush House was originally a hotel built around 1850. It was a 4-story building with a wooden frame and brick walls. This building covered an entire city block and had no suppression systems installed inside. Another of these fires occurred at the Bellefonte Academy. At the time of the fire, the Academy existed as an apartment complex made up of 30 or more apartments. The downtown of Bellefonte has “tremendous architecture.”

Cumberland, MD has taken some steps in terms of fire suppression. They have required sprinkler systems. When sprinklers were installed in residences, people moved into the upper floors. One of the borough council members opposed the proposal of installing sprinklers in buildings. This is because of the massive cost that installing sprinkler systems in every building would bring. Other opposition from the council to Chief Fire Protection Engineer Gentzel's Fire Committee came about because the council did not know where the funds to pay for the sprinklers would come from. They now have a system where if you retrofit with sprinkler systems, you get a 50% city tax cut for 5 years so long as this doesn't exceed the cost of the system.

The Fire Marshal from Kalamazoo, MI was successful at acquiring funding federal funding to retrofit buildings with sprinkler systems. This generated income because the buildings became taxable when the systems were installed.

Howard, County, MD offers a tax incentive for retrofitting sprinklers.

### **Interview with Erin Hammerstedt, Historic Preservation Consultant, Bellefonte, PA 12/02/09**

The entire downtown of Bellefonte, PA is on the national register of historic streetscapes. Children playing with fire started the fire in the Bellefonte Academy, an apartment complex. These apartments were in a deteriorated condition with lots of fire hazards. The Bush House was home to several businesses when it burned down. As a major landmark and home to these businesses, it had a large impact on Bellefonte's economy. It had partially been outfitted with sprinkler systems in the lobby and hallways at the time of the fire. The Bush House has not been rebuilt; it is still an undeveloped, vacant lot. The Borough has conducted a study concerning flood plains and the impact

rebuilding the Bush House would have on the waterfront, but no reconstruction has occurred at this point.

Bellefonte has had an interest in educating its residents. Nick Artim held a workshop in 2006 that was concerned with fires and the installation of sprinkler systems. He also worked with Dr. John M. Watts, Jr. to create a publication, Fire Detection & Suppression for Buildings in Historic Districts, for Bellefonte. This was used as a source to provide education and information for the residents of Bellefonte.

Residents of Bellefonte are hesitant to install sprinkler systems because they believe these are too expensive and are afraid that their installation will damage the building. Despite Dr. John M. Watts Jr. and Nick Artim's work, Bellefonte is still struggling to convince owners that steps need to be taken to protect their buildings.

Bellefonte used a Pennsylvania Project Grant after the Bush House and Bellefonte Academy fires. This grant came from the Pennsylvania State Historic Preservation Office and provided up to \$15,000 for specific preservation projects. Bellefonte also received some funds from the Pennsylvania Downtown Center and the Borough itself. Erin Hammerstedt is not aware of any grants or tax credits available for fire protection, though Bellefonte is currently looking into this.

Bellefonte has new codes that have resulted in lots of proposals going to the historic review board concerning egress. Buildings over two stories, or with two residential units, are now required to have a second means of egress, a sprinkler system, or in some cases both of these. Bellefonte revoked requirements for bed and breakfasts to have sprinkler systems installed because of public complaint. The residents of Bellefonte believed this to

be too costly a requirement. Erin Hammerstedt thinks more people will realize that sprinkler systems are important over time because of the actions Bellefonte is taking.

All buildings with rental units are inspected annually. There are no commercial safety inspections. Building inspections only occur if there is a change of use of the building. Residential buildings are not inspected at all. Currently there is a bi-annual commercial building inspection plan on the table.

There has been no opposition by members of the council towards fire protection plans, just concerns of demanding things of people that they cannot afford.

### **Interview with Tim Knisely, former Fire Chief of Bellefonte, PA 12/11/09**

The Bellefonte Academy apartment complex had several fires in its history before the final one in 2004. The building fell into the category of low income, subsidized housing, thus the tenants paid very little to live there. There were many issues with the Academy. Fire doors had been removed, exits to fire escapes were wired shut to prevent outsiders from getting into the building, the emergency lights did not work, and there were storage issues in the basement. There was a large gap between the ceilings of apartments and the original ceiling of the academy. The third floor was being renovated, but it cannot be said with accuracy how far along this process was when the fire destroyed the building.

The fires that occurred at the Bush House and at the Bellefonte Academy got the Borough's attention because these buildings had a lot of history. As the Fire Chief at the time, Tim Knisely went to the town council to suggest the creation of a task force to analyze the fire protection and prevention issues in Bellefonte, and to make recommendations toward solving them. This task force consisted of Tim Knisely, a structural engineer, a fire

engineer, an expert on building and fire codes, a fire alarm and sprinkler system contractor, and a historic preservationist.

With grant money, this group brought in Nick Artim and Dr. John M. Watts Jr. to present an educational program to both the county and the community. This was aired on a local government television channel, and was rebroadcast several times. Bellefonte received a second grant through the Pennsylvania Museum and Historic Commission. This grant paid for the publication created by Artim and Dr. Watts.

In 2007 the task force presented recommendations that they thought would reduce the fire issue in Bellefonte to the town council. These recommendations included the inspection of all residential buildings both within the first year and periodically after that, depended on the perceived risk of fire for each building. They also recommended the installation of wireless smoke alarms in the upper floors of Bellefonte's streetscapes so that a detection system could be put in place without rewiring historic buildings. The task force recommended a time frame of three to five years to install fire detection systems and seven to ten years for the installation of sprinkler systems.

Bellefonte applied few of the recommendations that the task force made. They did, however, require the installation of fire alarms and smoke detectors in apartments. This is an issue because many of the buildings in downtown Bellefonte are mixed use, with commercial on the bottom floor and residential on the upper floors. Inspectors only visit the apartments. Therefore only apartments are known to be safe, while the rest of the building the apartment is in could be a large fire hazard. In Bellefonte the bottom floor of a building, not the upper floors, is more likely to be vacant. This is because many students from Penn St. come and rent out these apartments.

Tim Knisely believes preplanning by the fire department and education are key ways of solving the fire protection issue. He also believes that there are bad myths concerning sprinkler systems that the public believes in. An example of this is the belief that when one sprinkler head goes off, every head in the system will too.

Pennsylvania had no building code until 2004. In Pennsylvania owners of historic buildings would often not have to install sprinkler systems, because if for some reason they were required to install them, they would claim that it was too expensive and that they could not be expected to afford it.

Tim Knisely provided an example that illustrates some of the issues facing Bellefonte. A business in Bellefonte was using space heaters to thaw pipes. These pipes were dripping onto the space heaters and causing a hazard. The inspector issued an order to fix this issue, but was overruled by the council, who claimed he did not have the authority due to the fact that only apartments in buildings can be inspected.

### **Interview with Fire Chief Marvin Calvin of Willmar, MN 11/18/09 and 11/19/09**

**11/18/09**

Willmar, MN has a historically designated downtown. Streetscapes in the downtown are very standard, in that businesses are generally set up on the first floor with residences in the upper floors. These streetscapes have shared walls, attics, and narrow alleys. Buildings in the downtown are at most three stories tall. In the downtown only four out of the fifty or sixty buildings have sprinkler systems. All buildings in the downtown have water stubs running into the basement. With the municipal water already running into these buildings, the largest part of sprinkler system installation is already taken care of. Therefore it is just a matter of installing the sprinkler systems in downtown buildings.

Willmar's infrastructure was rebuilt in the last 20 years. This project installed water stubs into the basements of every building in the downtown. A proactive fire marshal was able to get these stubs installed. Funding for this project came from the taxpayers and town's budget. The town council supported the fire chief, which helped to facilitate this project. Various groups such as engineers, building officials, and the fire department were also involved in this process.

One fire that occurred in Willmar's downtown was accidental. Willmar was able to require that this building be brought up to code after the fire. This included the installation of a sprinkler system. Willmar has had some success using the NFPA 13 to bring historic buildings up to code.

There was an example of Willmar requiring a building that was damaged in an arson fire in 1990 to install a sprinkler system upon rebuilding. They were able to do this due to the amount of structural damage from the fire.

One group of buildings, which shared an attic space, was essentially converted into one larger building by bringing down the separation walls between them. This newly formed building then had a sprinkler system installed in the attic.

Buildings in the downtown have to be brought up to code to be utilized. However, some leniency has been granted. Building owners can adhere to either the current fire code or the historic preservation fire code. Chief Calvin feels it is important to give building owners options. Minnesota's fire code is based off the ICC and allows for a phase in program to defray cost of sprinklers by installing sprinklers in sections. Code officials would prefer to get sprinklers installed in buildings over time rather than not at all.

The cost of sprinkler system installation has been a concern with the owners.



**11/19/09**

Willmar uses sections 463.15-463.29 of the 2007 Minnesota State Building Code to determine if the town can require a building to be renovated.

Small businesses in the downtown are hurting due to the economy and competition from chain stores. This gives these small town stores little to no incentive to spend more money on sprinkler systems when they are already in financial trouble.

The reason Willmar has been able to develop its fire protection program is because the Building Chief and the Fire Marshal worked hand in hand to create a fire prevention program. Thus building owners receive the same information regardless of whom they talk to. This consistency translates into efficiency and makes the owners believe in these officials.

Adopting provision of 1306 of the IBC would require sprinklers. Willmar is hesitant to do this because it would create a financial issue for building owners. If there were a grant opportunity Willmar would utilize it to push building owners to install sprinklers.

Buildings classified as 'B' occupancy are not required to have smoke detectors. Few buildings in Willmar that are not specifically required to have smoke detectors install them.

**Interview with Deputy Fire Chief Tom Ballis of Stillwater, MN 11/23/09**

Stillwater, MN has not had a large fire in at least twenty years in its downtown. The downtown area of Stillwater has sprinkler systems installed in close to 80% of its buildings. The downtown consists of roughly nine to ten blocks. Buildings in the

downtown are mostly two stories with a crawl space for basement. The downtown area is located on Main Street, which runs along the riverfront.

New buildings in Minnesota are required to have sprinklers installed. Minnesota building code 1306, which is voluntary to adopt, requires existing buildings to have sprinkler systems installed if the building increases in total floor area, which is not common in the downtown, or if the building changes occupancy. Sprinkler systems are required in basements, attics, and any concealed space larger than 18 inches. There are some alternatives for the small spaces. One example is filling the space with fire rated insulation.

Minnesota based their 2007 Minnesota State Fire Code off of the 2006 International Fire Code. The Minnesota State Fire Code requires monitoring, which includes an alarm system, in all sprinkler systems that consist of more than twenty heads. This requirement changed from one hundred heads to twenty heads, and consequently some buildings do not have alarm systems installed with their sprinkler systems.

Typically, an occupancy change occurs when the ownership changes. New owners are warned that if they change occupancy they will be required to install sprinklers. To help the owners, generally have a timeline, few months to a year, is offered to install sprinklers. This means the owner is not obligated to install a sprinkler system immediately. This timeline gives owners the ability to defray the cost of sprinklers somewhat.

**Interview with Fire Chief Charlie Thompson of Anoka, MN via Email and Phone Call on 11/24/09**

Initial information provided in email:

We had fires in these buildings in the past but the most recent was in a building that was partially sprinkled. The fire occurred in about 2005. It was an arson fire that was set in the basement of a bar restaurant. The facility was broken into in the early morning hours. The arsonist piled couches on top of each other then poured accelerant on them. They also poured accelerant in several other places and set them on fire. Fortunately, this portion of the building was sprinkled. The majority of this block was not sprinkled. Shortly after this event I met with all the owners in this block. I showed them pictures of the arson and then told them if this building was not sprinkled most likely the entire block would have been lost. By the time we would have been notified most of the damage would have been done. These old buildings share common walls and have no fire stops. The construction is balloon (sic) thus no stop to the attic spaces. I also reminded them the identity of Anoka is in the downtown building infrastructure.

Sprinkling these buildings had been discussed in the past but I believe it took an event such as this to motivate local government and local business to find a permanent solution. Protect the identity of down town Anoka.

This process was completely handled by our HRA director. Many meetings with landowner occurred. This was after the funding was secured for the project thru a grant.

We have sprinkled 3 city blocks and are in the process of the fourth block. Since this project took place 3 years ago we have not had a single fire in this downtown area.

We try to get all the buildings in Anoka inspected every other year. This has not always been the case in the past but we are now on a pretty consistent schedule. The Anoka Champlin fire department is a fire district that covers two cities, Anoka and Champlin. This is why we try to inspect every other year. I definitely do think the inspections help in

reducing potential fires. It allows us to get into buildings and see potential fire code issues. We then educate the owner on these issues and explain why we require what we require. When the building owners know we are going to do the inspections they tend to keep consistent on maintain the buildings per fire code. We do have fire education programs in place that target the younger populations, typically school age children. Although we would like to be more aggressive in this area budgets tend to limit what we can do

#### **Interview on 11/24/09:**

The buildings in Anoka are streetscapes, and are all considered historic. They have common doors, common attics, and common basements. They are of typical 1800's style construction. Buildings are a combination of business and residential, usually residential on the second floor and mercantile or business on the first.

The Community Development Block Grant allowed Anoka to determine sprinkler system placement for three city blocks in the downtown. This grant was available to Anoka residents before the Arson fire in 2006 fire. Prior to this grant the city had been working towards the installation of suppression systems in the downtown, but building owners were resistant due to the perception that the cost of installation would be much higher than it actually was. After the fire Chief Thompson, HRA Executive Director Jennifer Bergman, and a few other city staff members talked with building owners during a scheduled meeting. They showed them pictures of the arson and explained to the owners that the situation could have turned out much worse. They then suggested that it would perhaps be a good time to install suppression systems.

The real turning point in convincing building owners that a suppression system was necessary was this fire. Chief Thompson thinks this is because the arson was so blatant and the pictures showing suppression systems flooding the area were pretty sobering. The motivator may have been grant compensation, but he thinks the real motivator was the possibility of losing downtown historic identity.

One or two owners were resistant to installation, and at the meetings concerning this there were many questions, but multiple meetings resolved this issue.

The fact that buildings in the streetscapes had different owners was an obstacle in terms of sprinkler installation. Hiring contractors was difficult because of shared spaces; you cannot really hire a contractor to install a system for 1/3 of an attic. This issue was solved, again, through multiple meetings. Building owners were presented with formal agreements to sign at the end of the meeting process.

### **Interview with Jennifer Bergman, Executive Director of the Housing and Redevelopment Authority of Anoka, 12/01/09**

Anoka, MN began to discuss what it would take to preserve their buildings about twenty years ago, with the real push to do this occurring ten years ago. Interest in protecting Anoka's historic downtown originated because of fires that happened in the late 1800's. Anoka, like many towns out west, are concerned with protecting historic buildings because they have so few that were built in, for example, the 1800's.

During the process of evaluating Anoka for placement of sprinkler systems the arson Chief Thompson spoke of occurred. This arson fire was extinguished by a sprinkler system that partially covered a building, thus saving the entire streetscape. Things were already in motion at this point, so the fire was not a cause of Anoka protecting their

buildings, though may have had some influence on building owners acceptance of the town councils decisions.

A Community Development Block Grant (CDBG) was obtained 10 years ago and was used to plan out where and how Anoka was going to install sprinkler systems. This fund provided did not offer that much money, providing about \$50,000 to \$70,000.

The process of obtaining this grant is as follows. Funds are made available from the United States Department of Housing and Urban Development (HUD) to each state and entitlement district. In order for a county to be considered an entitlement district, it must have a population greater than 200,000. In order for a city to be considered an entitlement district, it must have a population greater than 50,000. Anoka (the city) did not qualify, but Anoka County did. Thus \$1.8 million was allocated to the county. The City applied for a portion of this money in order to analyze sprinkler placement. They were successful.

Anoka used Tax Increment Funding (TIF) to pay for the entire cost of the installation of the sprinkler systems in downtown Anoka. The owners paid no money towards this. This works by having the city designate an area where they want to make improvements. The property values in this area are frozen for a certain number of years. These properties were frozen in Anoka in 2006. Money is invested into the property to increase its value. Taxes are paid to the City, State, and Federal Government based on the frozen value. Anoka's Housing and Redevelopment Authority (HRA), which has the power and authority to do this as it is the redevelopment arm of the city, receives the tax money on the difference between the frozen value and what the taxes on the property would actually be due to the improvements. Any money generated in this manner goes directly to the HRA, which they used for sprinkler and detection system installation.

The total estimate of sprinkling 4 blocks in downtown Anoka was 1.2 million. So far it has cost \$900,000 for 3 blocks. The last block will remain without a sprinkler and detection system due to the fact that a member of the council owns approximately 85% of it, and feels as though it would be a conflict of interest to accept the money. The total estimated cost of installing sprinklers and detection systems for this final block is \$180,000. All sprinkler systems in the streetscapes in each individual block are tied together. This helped save money on the installation.

The building owners paid nothing for this. They do, however, have to pay \$600 a year for both fire detection devices and a dedicated phone line to alert the local fire department in the event of a fire. This cost is spread out amongst the owners of individual buildings in the streetscape, so the cost is generally around \$50 a year per building owner. Buildings in Anoka that have sprinkler systems installed are required to have yearly inspections.

There was absolutely no opposition by residents or town council members to the idea of installing sprinkler systems in Anoka.

### **Interview with Robert Kirchner of Anoka, 12/07/09**

Former Anoka Fire Chief Dick Phinney put the issue of fire suppression on the town council's agenda in the late 1990's. His concern was the ease in which fire is able to spread through downtown streetscapes. He pointed out that many of the firewalls in the streetscapes downtown had been breached from utilities, and that fire could easily travel through them. He also stated that if he would not send fire fighters into a fire in a streetscape because of the risk to their lives. Therefore it would be very likely that then entire block would be lost.

Chief Phinney and Fire Marshal Doug Frebee met with the Anoka Business and Landowners Association and showed them a video of the difference between how fire starts and travels in buildings with sprinkler systems and without. This meeting occurred on September 11<sup>th</sup>, 2001, the events of which contributed to the start of the fire suppression program in Anoka.

A walk around survey of Anoka was conducted. This survey found that, when all the floors in downtown Anoka were added up, there was a 30-35% floor vacancy due to the vacancies in the 2<sup>nd</sup> floors. This vacancy contributed to fire issues since there was no maintenance and upkeep.

After the walk around survey was conducted, an architectural survey began. At this time there was a Community Development Block Grant (CDBG) available to Anoka. It provided about \$150,000 for a survey of how best to install detection and suppression systems in one building. Anoka re-applied to the county, and this grant was amended to provide \$150,000 for the surveying of multiple buildings. Thus the architectural survey was paid for.

There have been two Tax Increment Finance (TIF) programs set up in Anoka. The Housing and Redevelopment Authority (HRA) was able to use these programs to provide funding for several fire protection plans.

This money helped solve the issue of fire protection in Anoka. Originally Anoka offered a \$25,000 loan at 2% interest for exterior building work. Wanting to expand this to include interior rehabilitation, the HRA increased this to \$25,000 towards exterior work and \$75,000 towards interior, all at 2% interest, for up to 50% of the rehabilitation cost. The residents of Anoka did not take advantage of this. Anoka then increased this offer to



include money for the installation of a sprinkler system. The residents of Anoka still were not interested. Finally the city decided to completely pay for sprinkler installation. Funding for this came from the TIF programs. It was estimated that it would cost \$3.50 per square foot for installation. The residents took advantage of this offer.

Robert Kirchner believes that for a town to imitate Anoka's success it must have a group of residents in the downtown that want to solve this issue. In the 1980's Anoka tried to start a Main Street program, but small business owners would not spend the money to renovate their buildings. During the next 10 years, investors looking to renovate and solve the upper floor vacancy issues bought these buildings.

#### **Interview with George Lanier, Fire Safety Compliance Officer of Rome, GA 12/05/09**

Rome, GA is an example of a city that successfully addressed their fire protection issues with a proactive group of city officials who listened to the advice of fire officials. Brochures were brought to all the businesses in order to let them know that city officials wanted to open the lines of communication and obtain their support.

Fire officials, building officials, and George Lanier kept in touch with all organizations, such as the Downtown Development Authority and the Main Street Program. This helped get everyone on the same page in terms of protecting and revitalizing the downtown.

Education, coupled with the fact that building owners were spending money to fix up their buildings, helped contribute to the lack of bad fires Rome's downtown since the 1980's.

Unoccupied upper levels are the biggest fire hazard, especially when they are used for storage. Rome tries for annual fire inspections, but things such as educational programs

and specific inspection requests take personnel away. The way Rome has responded to this is by using their engine companies to inspect buildings that are greater than 5,000 square feet twice a year. An inspection will perform an inspection on a building if the companies find something wrong. This solution provides more eyes and more inspections by professionals who know what hazards to look for.

Rome has received funding for its efforts from the Department of Community Affairs. Rome received grants, low interest loans for façade upgrades, and infrastructure improvements through the local government.

Codes are problematic in that there are a lot of odd things that go into them. Perhaps a code decision was made quickly because those making it wanted to go home early. A lot of different people have their hands in the code making process so fire officials need to be able to translate these codes and present them to the public, as well as apply them logically and find alternatives when needed.

### **Interview with Fire Chief Derrick Rodgers of Miles City, MT 11/06/09**

Miles City is located in eastern Montana and is a small town with about 9,000 residents. It is common for buildings in Miles city to have basements with sprinkler systems installed. It is also common for firewalls in buildings to have holes in them that are covered up, but not filled in. Additionally, the downtown is not the busiest part of town. This means Miles City does not have downtown business revenue to rely on when completing the installation of sprinkler systems in streetscapes. It is expensive to retrofit buildings, so the city would need funding from beyond the city level.

There has been very limited discussion in Miles City about installing sprinklers in the upper floors. There is a belief that there is very little benefit to installing sprinkler

systems. Chief Rodgers thinks that most towns will have an issue with supplying the funding to install sprinkler systems in buildings.

One fire that occurred in the downtown of Miles City involved a building that was just purchased. The building was in the process of being remodeled, and steam pipes were being removed from the basement. Sparks from this removal dropped into an enclosed wall in the basement and the fire that broke out came up the wall into the second floor. The fire proceeded to spread into hidden spaces in the building. Fire was able spread to the surrounding buildings through the second floor. Many of the buildings in downtown Miles City have no detection systems, and these buildings were no exception.

Miles City has lost at least 3 other buildings in the last 25 years, all of which did not have fire protection.

### **Interview with Lauren Adkins from the National Trust for Historic Preservation, 11/30/09**

Fire is always an issue during building rehabilitation. This is because materials, such as flammable paint, are used during this process. Often these buildings have no construction insurance, so when the building burns down during reconstruction the owners receives no insurance money.

Restaurants, because of hazards like grease fires and electrical issues, are the most typical business to experience fire. Arson is another issue because often older, run-down buildings are viewed as fun places to burn down.

The National Trust for Historic Preservation (NTHP) helps building owners find alternative ways to comply with fire and building codes without destroying the historic aspects of the building. An example given to us was of a small town fire marshal that told

the owner of a building with a historic tin ceiling that the ceiling had to be completely removed because of the fire hazard it caused. The NTHP informed both parties that it was possible to carefully remove the ceiling, install fireproof material above it, and then replace the ceiling. This ensured fire protection without ruining the historic fabric of the building.

Buildings with a business on both the bottom floor and on the top may need a lower fire rating between floors than buildings with a business on the bottom and a residence on top. This is because of life safety codes.

When dealing with egress issues building owners will install old looking stairs or other means of escape in the rear of buildings, which is not usually considered historically significant. Another easy egress solution is to remove windows and turn them into doors.

The number one question that the NTHP gets is “Where can I get a grant to pay for the rehabilitation of my building?” There are several tax credits that can be used to for funding. The Federal Historic Preservation Tax Credit Program is a 20% tax credit for substantial renovation of a building that is designated as historic. Other tax credits include Americans with Disabilities Act tax credits and Federal Tax Credits for Energy Efficiency. The NTHP focuses more on securing tax credits because of economic stimulus, though they do offer the Bricks and Mortar grant. The NTHP works with an insurance company to provide insurance to historic building owners. Often insurance companies will not risk dealing with historic buildings.

There usually are not enough building inspectors to perform inspections in any reasonable time frame. This is a huge problem since a building inspection will catch hazards before they result in fire. Most fires in historic buildings occur because of the lack of inspections. More funding for building inspectors would solve these issues.

Lauren Adkins explained to us an example that illustrates why frequent inspections are important. A Main Street program was holding a workshop in a town. The local building inspector, the local fire chief, a realtor, and an economic specialist all toured vacant second floors in downtown streetscapes in order to figure out how to renovate these upper floors for the best return on their investment. On one of the tours the building inspector announced that he was 'off the clock' because he had not been in the buildings in the last ten years. These were very run down and had many hazards that were not addressed.

### **Interview with Hayward Howard, National Trust Insurance, 12/10/09**

Many larger insurance companies will not insure historically designated property because the perceived risk of these buildings suffering damage is so much larger than modern buildings. If a historic building does manage to obtain insurance, they will be offered different rates based on the materials the building was constructed from. A wooden building is more likely to burn down than a brick building, making it a higher risk for insurance companies.

The owner of an old building could get as much as a 10% discount of the total insurance premium, depending on the size of the building, if a sprinkler system is installed. Historic buildings are generally able to receive a 4% discount. These discounts are static, and will only change if the insurance company changes its rates.

There are tax credits available for buildings with smoke detectors installed. The cost of installing smoke detectors would be paid for within a year because the cost of insurance for historic buildings with smoke detectors is lower than the cost of insurance in buildings without detectors.

Updates to utilities, such as heating, plumbing, and electric, are the most important step to take towards insuring a building. Knob and tube wiring, if in use, could double the cost of insurance by itself. Proper maintenance of a building is the largest indicator of whether a building is a good risk for insurance companies. Insurance rates lower when buildings are improved.

There are many routes a historic building owner can take to secure funding for rehabilitation. These include Historical Restoration Grants and tax credits. Insurance companies will not cover mixed-use buildings that do not have a second means of egress for all floors.

### **Interview with Mike Jackson, Chief Architect of the Preservation Services Division of the Illinois Historic Preservation Agency, 12/03/09**

Mike Jackson found that residents of towns did not have the knowledge needed to tackle fire protection issues. They had little knowledge of building and fire codes. Code officials generally lack knowledge of historic building codes since they normally deal with newer buildings. Thus the Upstairs Downtown program included a one-hour presentation as part of the one-day program they offered to towns. This program taught communities that it was essential to have many experts to address the issue of fire protection.

The Upstairs Downtown program was aware of the high cost of sprinkler systems, so it looked into alternative methods of fire protection. This program discovered that most small towns did not have the expertise to explore alternative methods. This program focuses on providing experts to assist small towns because of this lack of knowledge of fire issues.

## Appendix B: Questionnaire

The following set of questions was developed for a questionnaire to try to determine why building owners had not installed sprinklers in their buildings. However, due to time constraints the questionnaire was not distributed, it is our hope that NASFM will be able to adopt it for future use.

How many floors are in your building?

Have you renovated your building recently?

What type of occupancy is each floor of your building?

Is your building completely occupied?

How long are the current occupancies?

Is your building owner occupied?

Is your building designated as historic?

If not, when was your building built?

**If you have outfitted your building with sprinklers we would appreciate your answers to this first set of questions:**

- What factors and considerations went into your decision to install sprinklers in your building?
- Was the look of the sprinkler system a factor in your decision?
- Were there any tradeoffs? If so, what were they?
- Were there any incentives offered that influenced your decision?
- Were there any particular people who influenced your decision? If so, how were they able to influence you?

- If your building was not stubbed already, would you have proceeded with the sprinkler installation? Why or Why not?
- What were your major concerns involved with installing sprinklers?
- Do you receive any discounts, such as on your insurance policy, for having sprinklers installed?
- Did you consider any other fire protection methods?

**If you have not outfitted your building with sprinklers we would appreciate your answers to the following set of questions, please give as many details as you can.**

- What are the issues you've had to consider regarding sprinkler installation?
- Are installing sprinklers part of your plan?
- If funding were available to you, would you want to have your building protected with sprinklers or some other protective system?
- Have any incentives been offered to you if you install sprinklers?
- What incentives would need to be offered to make it possible for you to install sprinklers in your building?
- Do you know if your insurance company would give you a discount for installing sprinklers?
- Have you considered any other fire protection methods? Have you implemented them?
- Is the look of a sprinkler system a factor in your decision?



## Appendix C: Glossary

This glossary contains some of the key terms encountered in our report, particularly regarding fire protection concepts.

### **Building**

**Preservation** - Sustaining the existing building through maintenance.

**Rehabilitation** - Repairing or adding to a building while not affecting its historic status

**Restoration** - Modifying or repairing, including missing elements to restore a building to its construction from a particular time period.

**Reconstruction** - Rebuilding to replicate a building from a certain time period.

**Compartmentation** - Designing and outfitting the building with fire resistive material such that the fire does not spread from room to room or floor to floor.

**Fire Protection Plan** - The methods used by a municipality to address the issue of fire, consists of both active and passive forms of fire protection.

**Active Fire Protection** - Systems that actively work to detect, alarm and suppress fires. Examples include smoke alarms and sprinkler systems.

**Passive Fire Protection** - The use of the buildings structural components to resist the spread of fire. Passive fire protection utilizes components such as fire walls, stops and fire doors.

**Fire Prevention** - A proactive solution to fire protection because of its focus on keeping fire from starting before it starts. Typically accomplished through enforcement of codes and education.

**Fire Resistance/rating** - A rating in hours of how long a structural material can resist fire.

**Fire separations/stopping/walls** - Characteristics of passive fire protection, typically walls built with fire resistant material that will slow the spread of fire from one section of the building to another.

**Historic Streetscape**- A set of 2 or more buildings that are located next to each other, often adjoined with common walls,basements and/or attics. Sometimes the buildings may be divided by small alleys. The streetscape may have multiple owners, either by building or by floor. The buildings may be historic by themselves or considered historic together.

**Intumescent Paint**- Paint designed specifically for resisting fire, when the paint heats up it foams to form essentially a shield over what it is covering and offers fire, heat and smoke resistivity for up to one hour.

**Loss prevention** - limiting the damage from a fire if it does occur

**Main Street Program-** A National Trust for Historic Preservation-run program that helps small towns revitalize and restore their historic downtowns with funding, design, and architect aids.

**Pre-planning Tour** - A method used by fire fighters to provide information on a building that can be accessed in the event of a fire at that location. This information contains such things as utility shutoffs, special hazards, fire hydrant location, contact information for the owner of the building, and other pertinent details.